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SITE REASSESSMENT REPORT

AIRTRON A DIVISION OF LITTON INDUSTRIES INC.

EPA ID# NJD030239412

HANOVER TOWNSHIP
MORRIS COUNTY

VOLUME 1 OF 3

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF ENVIRONMENTAL MEASUREMENTS AND SITE ASSESSMENT

USEPA COPY

AIRTRON DIVISON
230 HANOVER AVENUE
HANOVER TOWNSHIP, MORRIS COUNTY
NEW JERSEY

TABLE OF CONTENTS

NARRATIVE

MAPS

1. NJDEP GIS TOPOGRAPHIC MAP (2008)
2. HANOVER TOWNSHIP TAX MAP (2006)
3. AIRTRON SITE MAP (2008)
4. MORRIS COUNTY ROAD MAP (2008)
5. COMPUTER GENERATED WATER WITHDRAWAL POINTS MAP (2008)
6. NJDEP GIS WETLANDS MAP (2008)
7. FIRM FLOOD INSURANCE MAP (2008)
8. NJDEP GIS POPULATION MAP (2008)

ATTACHMENTS

VOLUME I

A. USEPA SUPERFUND INFORMATION SYSTEM SITE INFORMATION; MARCH 2008

B. FINAL REPORT OF GROUNDWATER MONITORING PROGRAM BY CONVERSE WARD DAVIS DIXON INC; AUGUST 10,1981

C. SOIL & GROUNDWATER REMEDIAL INVESTIGATION REPORT, BY CONVERSE ENVIRONMENTAL EAST; NOVEMBER 24, 1987

D. SITE-WIDE SOIL REMEDIAL ACTION REPORT, BY PANTHER TECHNOLOGIES, INC; NOVEMBER 15, 2005

E. REMEDIAL INVESTIGATION REPORT, BY SCS ENGINEERS; AUGUST 15, 1994

F. SITE INVESTIGATION REMEDIAL INVESTIGATION WORKPLAN, BY SCS ENGINEERS; MARCH 31, 1997

VOLUME II

F. Cont' SITE INVESTIGATION REMEDIAL INVESTIGATION WORKPLAN, BY SCS ENGINEERS; MARCH 31, 1997

G. SITE INVESTIGATION/REMEDIAL INVESTIGATION AND REMEDIAL ACTION SELECTION REPORT, BY ARCADIS; JULY 1, 1998

H. AOC-6 STREAM SEDIMENT SAMPLING SUMMARY, BY ARCADIS; OCTOBER 2002

I. AOC-11 INTERIM DATA SUMMARY, ON-SITE SOURCE AREA ACTIVITIES, PHASE 1 SUPPLEMENTAL REMEDIAL INVESTIGATION, BY ARCADIS; MAY 2003

J. REVISED REMEDIAL ACTION WORK PLAN ADDENDUM, BY PANTHER TECHNOLOGIES INC.; FEBRUARY 10, 2003

VOLUME III

K. REMEDIAL INVESTIGATION WORK PLAN ADDENDUM, BY PANTHER TECHNOLOGIES INC.; JANUARY 12, 2007

L. REVISED AOC-13 REMEDIAL INVESTIGATION WORK PLAN, BY ARCADIS; MAY 7 2007

M. SPRING 2007 SEMIANNUAL MONITORING REPORT, BY ARCADIS; NOVEMBER 9, 2007

N. NDEP SITE INVESTIGATION REPORT, BY NJDEP; OCTOBER 1981

O. SOURCE WATER ASSESSMENT REPORTS, BY TOWNSHIPS OF PARSIPPANY AND HANOVER; MAY 2008

P. MISSOURI CENSUS DATA CENTER, BY MABLE; APRIL 2008

NARRATIVE

SITE REASSESSMENT REPORT

Airtron Division of Litton Industries Incorporated
230 Hanover Avenue
Hanover Township, Morris County, New Jersey 07950
Latitude: 40.816269 Longitude: 74.472616
EPA ID No. NJD030239412

INTRODUCTION

The United States Environmental Protection Agency (EPA) has tasked the New Jersey Department of Environmental Protection (NJDEP) with a Site Reassessment to gather and evaluate new information on the Airtron Division site located in Morris Plains, Morris County, to determine whether further action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is needed. (Attachment A)

The NJDEP issued a No Further Action (NFA) determination for the following areas of concern (AOCs): hazard materials storage building area (AOC-1), former parking island drum storage area #1 (AOC-2), former drum storage area #2 (AOC-3), former sludge lagoons 1 through 5 (AOC-4) and storm sewer drainage area (AOC-12). The following AOCs, bridgeport area, plating room and tool cribsite, located within the facility were also NFAed. AOC areas 5, 6, 7, 8, 9 and 10 are being remediated under NJDEP oversite.

SITE LOCATION

Airtron a Division of Litton Industries was located at 230 Hanover Avenue in Hanover Township, Morris County, New Jersey, Block 601, Lot 1. The site is situated on 18.8 acres and is located in a mixed industrial area. South of the site is the Mennen warehouse, west of the site is the Mennen manufacturing facility and the Mennen Sports Arena. Northwest of the facility is the Champion facility and to the north is an undeveloped wooded area. East of the site is a tributary to the Whippany River. The nearest residence is approximately 1,100 feet south of the site. (Attachment N)

SITE HISTORY

The Monroe Calculating Machine Company originally owned the site in 1952 and constructed the building and parking lot that same year. Monroe Calculating Machine Company manufactured adding machines. The production consisted of sheet metal stamping and alloys casting fabrication and assembly. In 1958, Litton Business Systems purchased the property and moved their Airtron Division onsite that same year. Airtron manufactured high technology waveguide, microwave components, gallium arsenide ingots and wafers for semiconductor substrate. All products are used in the commercial, semiconductor and defense industries. Production activities included

manufacturing, engineering, research and development of these products. The building houses the offices and manufacturing facility. There were also five lagoons, no longer present, used for the dewatering of wastewater treatment system of sludge. Airtron ceased operations and production in 2001. In 2002 Northrop Grumman Corporation purchased the property. Currently the facility is unoccupied and just remedial work is being conducted. (Attachment D and J)

During the course of remediation a number of Area of Concern (AOCs) have been identified:

AOC #	Description of Area of Concern
1	Hazard Materials Storage Building Area
2	Former Parking Island Drum Storage Area #1
3	Former Drum Storage Area #2
4	Former Sludge Lagoon #5
5	Former Sludge Lagoons 1-4
6	Stream Sediments
7	Paint Stripping Area /Former 10,000-gallon UST
8	Gallium Arsenide Wing Trench
9	Former 15,000-gallon UST
10	Former 20,000-gallon UST
11	Groundwater
12	Storm Drainage Area
13	Vapor Intrusion Evaluation

In 1981, Airtron completed the installation and sampling of five onsite monitoring wells, plus the sampling of three (3) existing onsite wells in conjunction with the closure of five (5) lagoons as directed in an NJDEP Administrative Order from 1979. Although no heavy metals were detected, the groundwater samples and soil samples around the lagoons exhibited TCE contamination. (Attachment B)

In 1987, a soil and groundwater remedial investigation was conducted by Converse Environmental East to assess the impact from two former drum storage areas (AOC's 2 and 3) and the five lagoons. Twenty-five (25) soil borings were collected and six additional monitoring wells were installed. Only one soil boring exceeded NJDEP action levels for volatile organics and the monitoring wells indicated contamination of DCE, TCE and PCE. (Attachment C)

In 1990, a soil and groundwater investigation was conducted by Converse Environmental East. Seven additional monitoring wells were installed to delineate the upper unconfined aquifer in the southeastern portion of the property. The results indicated contamination of TCE and PCE in the upper aquifer. In 1991, a soil vapor extraction test program was conducted in the vicinity of the former lagoons and drum storage area. (Attachment D)

In 1994, as part of a Remedial Investigation (RI) SCS Engineers conducted soil sampling in AOC-2, sediment sampling in the intermittent drainage feature (AOC-6) and an electromagnetic (EM) terrain conductivity survey in AOC-3 and AOC-4.

In 1996, a Remedial Investigation was conducted by SCS Engineers and consisted of a soil gas survey in the area of AOC-2 to further assess the lateral extent of VOC's identified during the RI investigation. (Attachment D and E)

In 1997, a Site Investigation/Remedial Investigation (SI/RI) Work Plan was prepared by SCS Engineers to evaluate past work that had been conducted at the site and to give a description of future work to be conducted. (Attachment D and F)

In 1998, an SI/RI and Remedial Action Selection Report was completed by Geraghty & Miller (ARCADIS) that focused on the characterization and delineation of the soil and groundwater contamination at AOC-1 through 7, AOC-9 and AOC-11. (Attachment G)

In 2002, stream sediment sampling was completed within AOC-6 (intermittent drainage feature) by ARCADIS. Based on the findings ARCADIS recommended that no further sampling at AOC-6. Also in 2002, a Pre-Design Investigation by Panther Technologies, Inc. was conducted to evaluate a soil remedy for AOC-1 through 4, and it was determined that an in-situ remediation process would be the most cost effective. (Attachment D and H)

In 2003, a SI report was completed by Panther Technologies, Inc. for the bridgeport area, tool crib area and plating room, all located inside the facility building. This work was conducted to satisfy Airtron's ISRA obligations and is related to facility closure following cessation of operations. Also in 2003, AOC-11 (groundwater) was further delineated in the source areas of AOCs 1 through 4 and was reported in the Interim Data Summary, On-site Source Area Activities, Phase 1 Supplement Remedial Investigation Report. The report provided a summary of groundwater data collected by ARCADIS. (Attachment D and I)

In 2004, ARCADIS and Panther completed a Storm Drain Investigation (AOC-12) report. The goal of the investigation was to delineate the impact to soils both horizontally and vertically in the vicinity of the storm drainage receptacle. All soils that were sampled were below NJDEP Soil Cleanup Criteria. (Attachment D)

A Site-Wide Soil Remedial Action Report was completed in 2005 by Panther Technologies for Northrop Grumman Component Technologies. The report outlined past remedial actions completed at the site and future remedial actions. The remedial actions completed included the treatment of soils at AOC-1 through 4, AOC-12 and Compactor Area inside the building. Continued groundwater monitoring (AOC-11) and the remediation of contaminated groundwater with a pump and treat system was also detailed. (Attachment D)

In 2007 Panther Technologies, Inc. prepared a Remedial Investigation Work Plan Addendum to further investigate groundwater impacted with TCE and PCE. The pump and treat system installed in 1994 is still operational and sampling of wells is done semiannually. Also in 2007 ARCADIS

completed a report detailing a vapor intrusion study (AOC-13) that was conducted inside the facility in 2006. AOCs still under remedation at the Airtron site included AOC-11 (Groundwater) and AOC-13 (Vapor Intrusion). (Attachment L, K and M)

Approximately thirty (30) wells have been installed on the property to assess the groundwater contamination since 1981. In 1994 a pump and treat system was installed to remediate contaminated groundwater. Presently the groundwater is still under remediation as AOC-11. Remediation of soils in AOC 1 trough 4, the hydraulic compactor area and a portion of AOC-12 storm sewer line were conducted in 2004 and 2005 as part of the source removal program. The purpose was to evaluate the beneficial impact that soil source removal activities are expected to have on the on-site groundwater over time in the vicinity of the identified AOC's. (Attachment M)

The groundwater results that were collected in 2007 from the source removal program indicate that groundwater in the vicinity of AOC-1 through 4 are still contaminated with PCE as high as 5,170 ppb, TCE as high as 783 ppb and DCE as high as 297 ppb, although the soils have been remediated. Groundwater remediation is still under investigation by the property owner. (Attachment M)

CURRENT HAZARD ASSESSMENT

The Airtron facility has been under remedial investigation since 1994. The contaminated soils associated with several AOCs have been treated and or removed off-site. The surface water (AOC-6) was evaluated and delineated with no further assessment activities proposed in 2002 with NJDEP approval. The current environmental issues that still exist at the site are groundwater contamination and a further investigation of indoor air quality. The groundwater is being remediated with an on-site pump and treatment system and the indoor air is presently being further evaluated.

SOURCES

During the course of remediation a number of AOCs were identified. Soil contamination was detected at AOC-3 with PCE (as high as 24,000 mg/kg), TCE (as high as 320 mg/kg) and cis-1, 2-DCE (as high as 380 mg/kg).

Ground Water Migration Pathway

The Brunswick Formation aquifer system underlies the site and groundwater at the site ranges from 40 feet below grade at the front of the facility to 60 feet below grade at the rear of the property. Groundwater flow direction is to the southwest and influenced by several production wells located adjacent to the site at the Mennen Corporation. (Attachment C and I)

The Airtron site is located in the Piedmont Physiographic Province of New Jersey. In the vicinity of Hanover Township the rocks which overlie the Piedmont Province consist entirely of

consolidated sedimentary deposits of the Boonton member of the Brunswick Formation. This formation is composed of Triassic sandstone with interbedded shales.

Approximately 2,000 feet west of the site, the Brunswick Formation is truncated by the Great Border Fault, which forms the actual geologic boundary between the Piedmont and Highland Physiographic Provinces. A section of the Whippany River, located 0.50 miles west of the site, locally outlines the trend of this fault zone. Along this north-south fault, sedimentary rocks of the Brunswick Formation lie against Precambrian crystalline rocks. These crystalline rocks consist of hard gneisses, granites and schists. Overlying the Brunswick Formation are surficial deposits from a glacial delta of the Wisconsin Age, which are predominantly composed of interbedded sands, gravels, silts and clays. Bedrock is encountered at approximately 138 feet below grade. (Attachment N)

A release to groundwater has been documented at the Airtron site. Five (5) monitoring wells were installed on site in 1987. Sampling of the monitoring wells revealed TCE at 7,200 ppb and PCE at 3,000 ppb in MW-2 and TCE at 2,000 ppb and PCE at 1,500 ppb in MW-3. In 1994 a Pump and Treatment System was installed to remediate the groundwater contamination. Temporary wells located on the site were sampled in 2002 and exhibited contamination of PCE as high as 171,000 ppb and TCE as high as 49,200 ppb and cis-1, 2 DCE as high as 197,000 ppb.
(Attachment D, E and I)

Targets Associated with the Ground Water Migration Pathway

The majority of the developed land within a half-mile of the site is commercial. Two (2) local water utilities, the Southeast Morris County MUA and Parsippany Troy Hills Twp. Water Department provide water in the area. The number of people that are on public water within a four-mile radius of the site is 48,965. There are no private wells within one mile of the site.
(Attachment N and O)

Surface Water Pathway

The property is topographically level and surrounding land topography generally slopes downward towards the Whippany River, located approximately 1 mile to the southeast of the property. The Whippany River generally flows from northwest to the southeast through the region. Site drainage occurs by overland flow across paved areas and /or via storm sewer network to an outfall located in the northeast edge of the site. This outfall then discharges to a drainage ditch located within the wooded area along the eastern property boundary. The drainage ditch, which is generally dry except during heavy precipitation, leaves the site along the southern property line and becomes an unnamed tributary of the Whippany River.

The site drains via an unnamed tributary and discharges to the Whippany River that is located in the Passaic River Drainage Basin. (Attachment D and N)

In 1987 twenty-five (25) soil borings and samples were collected from the AOC-2, 3 and the closure of five (5) lagoons. Contamination of the soils was found in the area of AOC-3, PCE as high as 202 ppm and TCE as high as 23.9 ppm, which were above the NJDEP RDCSCC. In 1991 a Soil Vapor Extraction System (SVE) was installed in AOC-3, AOC-4, AOC-5 and AOC-7. The system consisted of nine (9) extraction wells and 19-air injection wells. The SVE system operated for 11 months, operating sporadically during that time due to flooding problems caused by perched groundwater. (Attachment J)

In 2003 Airtron completed soil investigations and delineation in all nine previously soil areas of concern (AOCs 1, 2, 3, 4, 5, 7, 8, 9 and 10). Airtron implemented closure activities, which included underground storage tank removal and lagoon closure, for select AOC's. Based on the results the NJDEP approved "No Further Actions" in connection with soil conditions in five of the nine AOC's (AOCs 5, 7, 8, 9 and 10). (Attachment J)

Targets Associated with the Surface Water Migration Pathway

The targets associated with the surface water migration pathway are the unnamed tributary and the Whippany River located approximately 1 mile from the site. Stream and sediment (AOC-6) sampling conducted along the unnamed tributary in 2002 by ARCADIS, Inc. revealed site-related metals impact to the unnamed tributary, however the results indicate metals below the severe effects level SEL. (Attachment H)

Soil Exposure Pathway

The designated soil types on site are Parsippanny silt loam and sandy loam, Haledon silt loam and Urban land -Rockway complex. (Attachment D)

In 2003 Airtron began remediating soil at AOCs-1 through 4 and AOC-12. The remedial action consisted of in-situ/ex-situ chemical oxidation with a mixture of hydrogen peroxide and sodium persulfate. The mixture aids in oxidation to the soil and increases a release of VOC's. As the soil was removed it was transported to the treatment cells and stockpiled to an approximate height of three (3) feet. The equipment that was used to blend the oxidant and homogenize the soil was designed to mix a three-foot soil matrix. The cells were constructed long and narrow (40' x 200') with travel paths between each for application of the oxidant. All areas were contained, lined and protected by soil erosion and runoff control measures. Each cell had a sump to collect any rainwater or excess runoff from within the cell and then treated on-site. (Attachment D)

When remedial goals were achieved soils were designated as acceptable for on-site reuse and no additional sampling was performed. However, when individual lot samples collected indicated that remedial goals had not been achieved, these lots were retreated until remedial goals were met. All soils re-used on-site met or were below the remediation goal of 5 mg/kg for targeted VOC's. Approximately 40,000 tons of soil were remediated and reused on-site as fill. Approximately 9,100 tons of soil/debris were removed from the site. (Attachment D)

Targets Associated with the Soil Exposure Pathway

The Airtron facility is located in a commercial/residential area of Hanover Township. The closest residence is approximately 1/4 mile south of the site. A chain-link fence to prevent access to the property surrounds the facility. Presently the facility is non-operational with no employees at the site. The facility had nine (9) AOC's for soils, but all of these have been remediated and are in the process of receiving "No Further Action " determination from the NJDEP. The population within one (1) mile and four (4) miles of the site is 8,330 and 29,493 respectively, based on the 2000 population census. (Attachment D, J and P)

Air Migration Pathway

The Airtron air migration pathway is through the soil and interior of the building. In 1987 a soil gas survey was conducted to assess locations of possible soil contamination. A soil vapor extraction system was implemented to remediate soil conditions. The system was in use when remediation of the soils were in progress, but when the soils remedation was complete the system was turned off. Presently the air conditions within the facility are under remedial investigation as AOC-13. (Attachment D and L)

Targets Associated with the Air Migration Pathway

Personnel are present on-site only during sampling events and monitoring and maintenance of the site. The approximate number of people within a four (4) mile radius of the site is 29,493 based on the 2000 population census. (Attachment P)

CONCLUSIONS

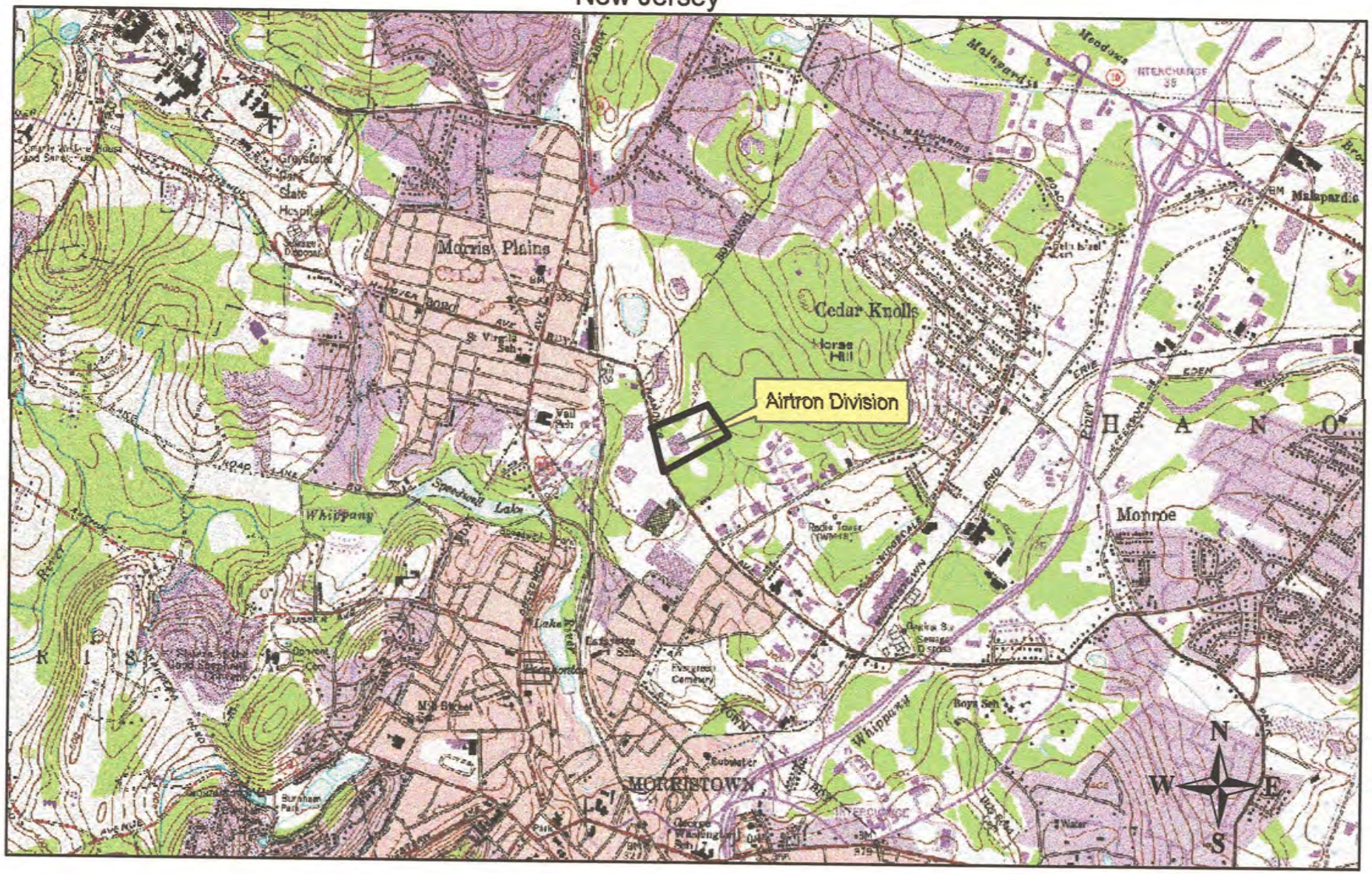
Airtron operated at the Hanover Township, Morris County site beginning in 1952 and continued until 2001 when all operations ceased. Thirteen AOCs had been identified at the site, with most of the AOC's concerning soil contamination. Airtron has been under agreement with the Department to remediate the site and perform monitoring and maintenance since 1987. On-site soils have been remediated and the groundwater and air issues are still under remedial investigation with NJDEP oversite. The Quickscore is above 28.5, however, based on the results of the remedial work that has been conducted at the site and the planned remedial work with NJDEP oversight, a No Further Remedial Action Planned under CERCLA designation is recommended.

Submitted by: Robert Fowler
Title: PES
NJDEP Publicly Funded Remediation Element,
Bureau of Environmental Measurements and Site Assessment
Date: June 11, 2008

MAPS

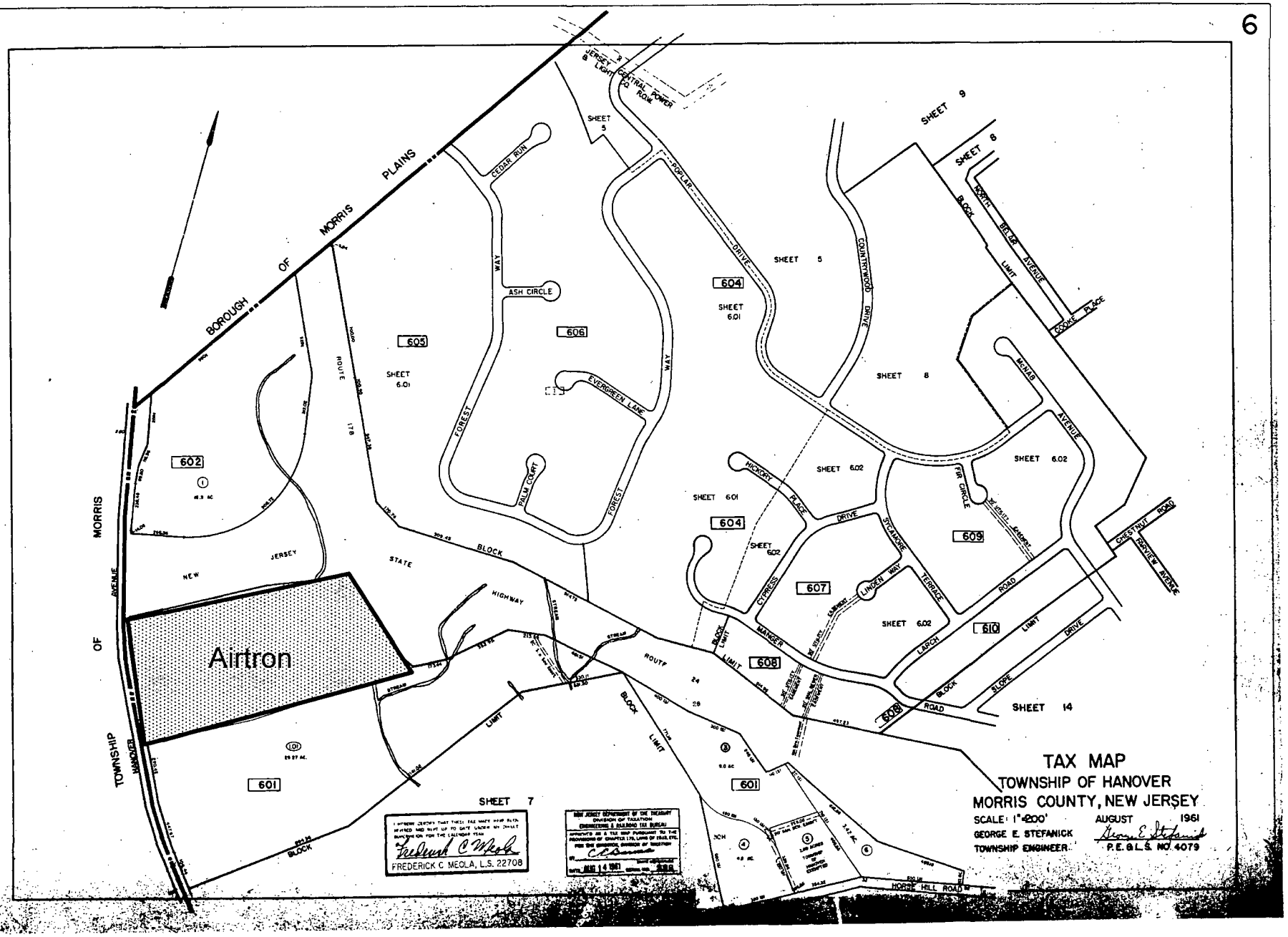
TOPOGRAPHIC MAP
Airtron Division
Hanover Twp., Morris Co.
New Jersey

MAP 1



TAX MAP
Airtron Division
Hanover Twp., Morris Co.
New Jersey

MAP 2

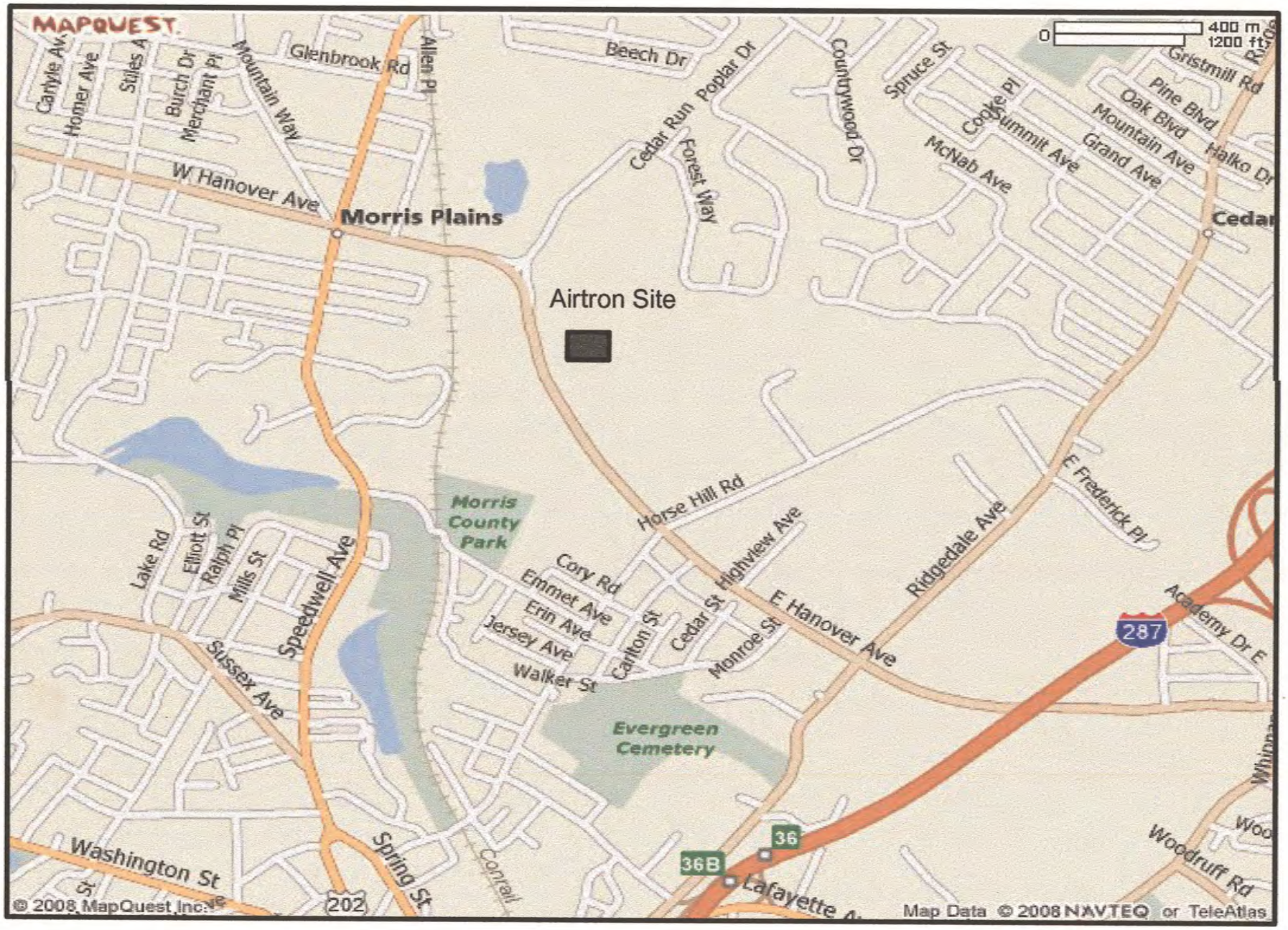


SITE MAP
Airtron Division
Hanover Twp., Morris Co.
New Jersey

Map 3

ROAD MAP
Airtron Division
Hanover Twp., Morris Co.
New Jersey

MAP 4



100,000 GPD WATER WITHDRAWAL POINTS WITHIN 5 Miles OF :
X : 500197
Y : 722813

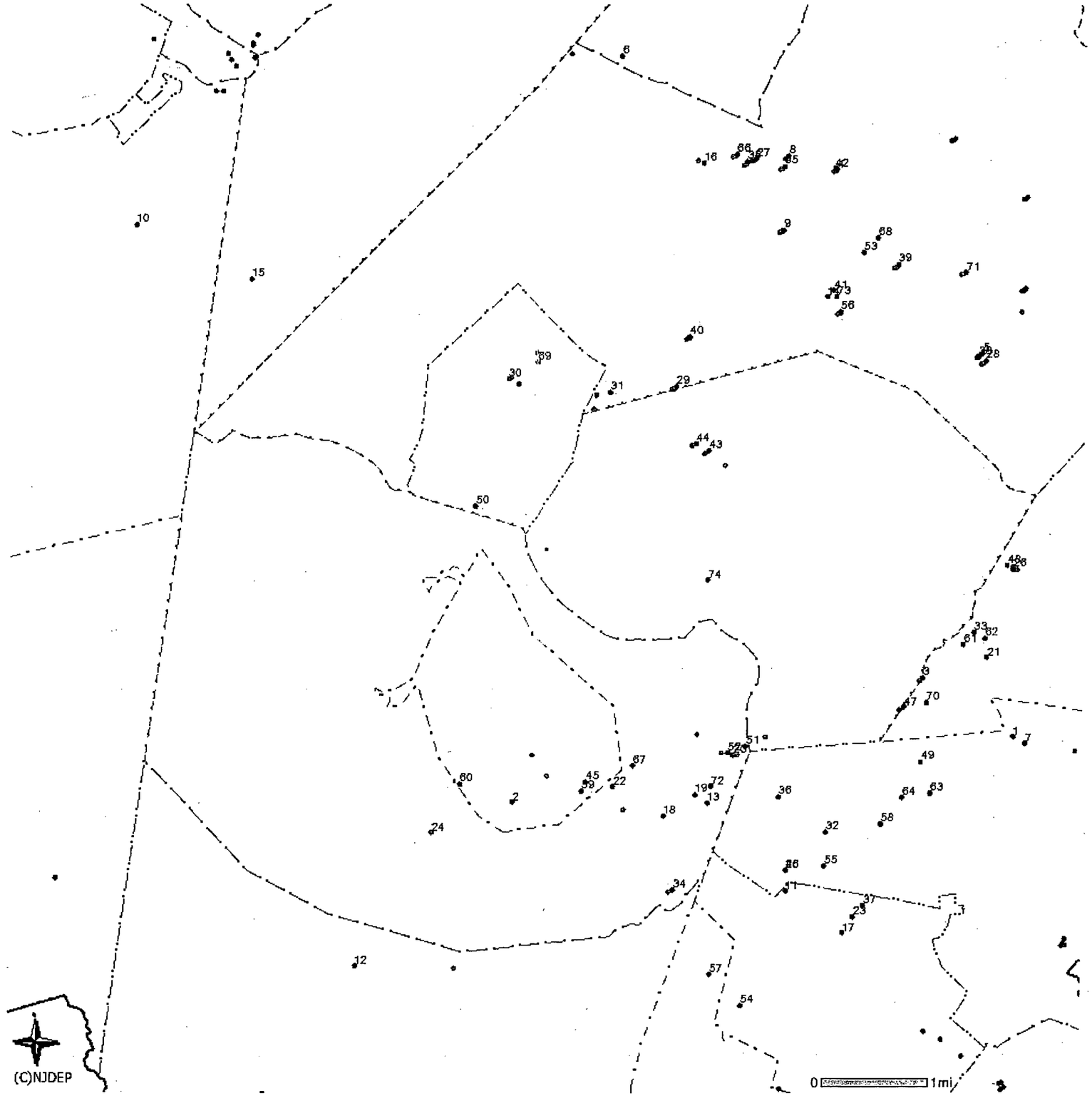
40.49.04
74.28.15

SCALE : 1 : 63,360

PLOT PRODUCED BY :
NJDEP
WATER SUPPLY
BUREAU OF WATER ALLOCATION
P.O. Box 426
TRENTON, NJ 08625
DATE : 4/15/2008

SUBJECT TO REVISION

MAP 5



Legend

- Water Allocation, Diversion and Monitoring Locations
- Municipalities
- Counties

Withdrawal Points Tabular Data

Sequence Number (BWA)	PI ID Number (Preferred NJEMS ID)	PI Name	Activity Number	SI Category Code	SI Designation	SI Description	Distance From XY Origin - ft. (BWA)	County Code	Municipality Code	SPC83X	SPC83Y	XY Accuracy + Units Code	Dep to Top of Open Interval + Units	Dep To Btm of Open Interval + Units	Z (Elevation)	Z Accuracy + Units Code	Geologic Unit Code	Hydrogeologic Unit Code	Rated Pump Capacity + Units Code	BRDGBWASUBJITEMID (BWA)
1	2342P	MORRIS COUNTY PARKS COMMISSION	WAP020001	WSWL	4500000355	WELL 1	24719.49	14	11	523193.52	713745.04	200ft			200	10Feet	2440	3050	350gm	259
2	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010001	WSWL	2500014520	LIDGERWOOD WELL	12356.97	14	24	498535.57	710568.22	100ft	68ft	265ft	294	5Feet	2440	3050	410gm	696
3	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010002	WSWL	2500014181	BLACK BROOK 1	19551.04	14	12	518727.55	716578.14	10ft	82ft	118ft	174	5Feet	1020	129	1400gm	1067
4	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500065015	WELL 4A	23244.58	14	29	514334.03	741264.60	40ft	121ft	151ft	299.537	5Feet	1020	129	900gm	606
5	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	4500000034	WELL 8-1	23345.37	14	29	521513.32	732333.13	40ft	66ft	90ft	186	5Feet	1020	129	300gm	666
6	5238	MOUNTAIN LAKES BOROUGH WATER DEPT	WAP990001	WSWL	2500014698	WELL 5	24183.01	14	25	503756.38	746732.63						1020	129	1000gm	1407
7	2342P	MORRIS COUNTY PARKS COMMISSION	WAP020001	WSIN	PWHI-1	STORAGE POND 17 (CORRECTED)	25399.41	14	11	523792.59	713411.23	200ft			200	10Feet			1100gm	1555
8	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500018849	WELL 17	22403.02	14	29	511950.25	741885.54	40ft	106ft	139ft	299	5Feet	1020	129	700gm	2173
9	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500065020	WELL 12	19309.84	14	29	511732.89	738298.44	40ft	73ft	103ft	297	5Feet	1020	129	300gm	2174
10	10575W	BETA REALTY GROUP	WUR880001	WSWL	2500026977	WELL 3	25702.05	14	32	479865.64	738536.15	500ft	50ft	75ft	700	10Feet	1020	129	545gm	2520
11	10778W	FAIRLEIGH DICKINSON UNIV	WUR940001	WSWL	4500044957	1 SOUTH	20378.86	14	11	512084.84	706260.48				210	10Feet	2440	3050	400gm	1925
12	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010001	WSWL	4500000350	SAND SPRING WELL	22268.60	14	13	490799.20	702624.69	500ft	36ft	94ft	290	5Feet	2440	3050	600gm	1971
13	2025P	MORRIS COUNTY GOLF CLUB	WAP990001	WSWL	2500010487	WELL 1	14697.89	14	24	508235.30	710507.72	500ft	241ft	271ft	390	5Feet	1020	129	175gm	2032
14	2206P	PFIZER, INC	WAP980001	WSWL	2500011876	WELL 3	18410.19	14	29	513905.27	735102.25	500ft	60ft	80ft			1020	129	450gm	2081
15	2206P	PFIZER, INC	WAP980001	WSWL	2500028829	WELL 6	19643.72	14	29	485550.48	735902.89	1000ft	60ft	80ft	283		1020	129	450gm	3069
16	10322W	TI PARSIPPANY INC	WUR070001	WSWL	2500069513	IRRIGATION WELL	20208.60	14	29	507820.25	741528.67	100ft	158ft	178ft	360	20Feet	2460	3050	800gm	3122
17	5069	MADISON BOROUGH WATER DEPT	WAP980001	WSWL	2500004918	WELL D	23661.74	14	17	514856.37	704239.06									2762
18	10180W	JCP&L CO MORRISTOWN GENERAL OFFICE	WUR930001	WSWL	2500011968	WELL 1	14191.28	14	22	506081.87	709899.23	500ft	205ft	600ft	380	5Feet	2440	3050	150gm	3906
19	2025P	MORRIS COUNTY GOLF CLUB	WAP990001	WSWL	2500034663	WELL 3	14025.76	14	23	507619.67	710912.09									3456
20	2117P	HONEYWELL INTERNATIONAL	WAP070001	WSWL	2500047591	WELL 10	13637.65	14	24	509481.26	712823.27	100ft	178ft	200ft	346	20Feet	1440	79	200gm	3515

		INC																		
21	2118P	NOVARTIS PHARMACEUTICALS CORP	WAP990001	WSWL	2500013934	WELL P-4	22262.23	14	10	521841.58	717604.12		68ft	84ft	210		1020	129	500gm	4237
22	10396W	CHASE BANK	WUR940001	WSWL	2500002685	WELL 1	11975.14	14	24	503542.75	711314.60		120ft	300ft	360	10Feet	2440	3050	300gm	4972
23	5069	MADISON BOROUGH WATER DEPT	WAP980001	WSWL	2500004660	WELL C	23382.66	14	17	515359.52	705012.50	100ft	120ft	160ft	160	10Feet	1020	129	1200gm	4979
24	2021P	SPRING BROOK COUNTRY CLUB	WAP000001	WSIN	INTAKE 1	POND 1	14845.88	14	24	494543.55	709085.78				310	20Feet			600gm	5266
25	10778W	FAIRLEIGH DICKINSON UNIV	WUR940001	WSWL	4500044956	2 MAIN	19565.33	14	11	512084.01	707272.41				210	10Feet	2440	3050	400gm	4869
26	5072	EAST HANOVER TWP WATER DEPT	WAP020001	WSWL	2500013672	WELL 1	22966.06	14	10	523143.41	721855.88	500ft	110ft	120ft	180	5Feet	1020	129	500gm	6164
27	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500065019	WELL 9	21537.20	14	29	510378.86	741791.54	40ft	60ft	80ft	310	5Feet	1020	129	540gm	6898
28	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	4500000036	WELL 8-3	23377.15	14	29	521702.12	731979.95	40ft	60ft	80ft	200	5Feet	1020	129	600gm	6654
29	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500021431	WELL 19	10150.26	14	29	506547.30	730731.63	40ft	106ft	134ft	280	5Feet	1020	129	700gm	6655
30	2195P	WARNER LAMBERT CO LLC	WAP070001	WSWL	2500000731	WELL 3	8500.46	14	23	498239.62	731084.91	100ft	46ft	135ft	429.8	10Feet	1020	129	150gm	7609
31	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP050001	WSWL	4500000316	LITTLETON 1	8231.84	14	29	503277.00	730447.00	40ft			320	20Feet	1020	129	350gm	7630
32	2339P	ROCK GW LLC	WAP990001	WSWL	2500006994	PW-1	19463.75	14	11	514005.64	709095.54	500ft	64ft	94ft	184.5	5Feet	1410	116	1030gm	8389
33	2118P	NOVARTIS PHARMACEUTICALS CORP	WAP990001	WSWL	2500046969	WELL P-6	21403.82	14	10	521224.94	718817.69		120ft	140ft	195		1020	129	1000gm	8410
34	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP060001	WSWL	2500033503	MCCABE WELL	17685.04	14	22	506570.00	706316.00	40ft	184ft	209ft	345	5Feet	1020	129	600gm	8467
35	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500018850	WELL 18	21173.57	14	29	509949.41	741607.01	40ft	109ft	127ft	312	5Feet	1020	129	750gm	8475
36	10021W	SISTERS CHARITY OF ST ELIZABETH	WUR910001	WSWL	2500022434	WELL 1	16619.56	14	11	511696.49	710813.85		178ft	300ft			2440	3050	525gm	9357
37	10876W	WYETH PHARMACEUTICALS	WUR950001	WSWL	2500056513	WELL 2	23302.19	14	17	515855.31	705555.52	1000ft		400ft	330	20Feet	2490	3050	90gm	9554
38	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500043870	WELL 8-2	23098.62	14	29	521327.14	732144.42	40ft	43ft	61ft	185	5Feet	1020	129	400gm	9600
39	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500027259	WELL 20	22060.06	14	29	517380.33	736647.33	40ft	65ft	95ft	273	5Feet	1020	129	700gm	9761
40	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500065017	WELL 14	12465.98	14	29	507178.89	733140.50	40ft	68ft	88ft	275	5Feet	1020	129	700gm	9762
41	2206P	PFIZER, INC	WAP980001	WSWL	4500000256	WELL 4	18841.70	14	29	514212.37	735406.11	500ft			283		1020	129	450gm	9783
42	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	4500000033	WELL 4	23234.61	14	29	514248.37	741317.40	40ft	52ft	82ft	300	5Feet	1020	129	250gm	9379
43	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010002	WSWL	2500003527	TODD	9288.88	14	12	508156.41	727602.10	10ft	94ft	144ft	274	5Feet	1020	129	1200gm	10450

44	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010002	WSWL	2500000048	WING	8966.38	14	12	507536.86	727963.37	10ft	106ft	136ft	272	5Feet	1020	129	3200gm	10451
45	2196P	AHS - MORRISTOWN MEMORIAL HOSP	WAP980001	WSWL	2500008577	WELL 2	11478.86	14	24	502235.06	711516.41		147ft	507ft	230		2460	3050	300gm	10111
46	10778W	FAIRLEIGH DICKINSON UNIV	WUR940001	WSWL	4500044955	3 NORTH	19565.33	14	11	512084.01	707272.41				210	10Feet	300	30	133gm	10560
47	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010002	WSWL	2500014182	BLACK BROOK 2	19182.56	14	12	517793.15	715173.78	10ft	75ft	122ft	174	5Feet	1020	129	1400gm	10601
48	5072	EAST HANOVER TWP WATER DEPT	WAP020001	WSWL	2500014205	WELL 2	22650.90	14	10	522835.61	722057.88	500ft	85ft	115ft	180	5Feet	1020	129	1000gm	10665
49	5214	FLORHAM PARK BORO PUBLIC WORKS	WAP980001	WSWL	4500000299	WELL 2	21145.31	14	11	518659.56	712504.26	100ft			182	5Feet	1020	129	1000gm	14758
50	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP050001	WSWL	4500000039	MORRIS PLAINS	4152.70	14	23	496606.00	724898.00	10ft			400	20Feet	1020	129	500gm	14797
51	2117P	HONEYWELL INTERNATIONAL INC	WAP070001	WSWL	2500047592	WELL 2	13757.65	14	22	510079.37	713241.24	100ft	142ft	172ft	308	20Feet	1440	79	200gm	16371
52	2117P	HONEYWELL INTERNATIONAL INC	WAP070001	WSWL	2500004286	WELL 1	13386.08	14	22	509233.55	712937.05	100ft	337ft	767ft	360	20Feet	2490	3050	100gm	16372
53	11012W	BOONTON ELECTRONICS	WUR980001	WSWL	2500025494	WELL 5	21148.15	14	29	515670.59	737228.98	500ft			293		1020	129	200gm	16406
54	10876W	WYETH PHARMACEUTICALS	WUR950001	WSWL	2500043034	WELL 1	24168.20	14	17	509934.78	700693.20	1000ft		500ft	330	20Feet	2490	3050	150gm	13563
55	2339P	ROCK GW LLC	WAP990001	WSWL	2500014658	EM-2	20586.45	14	11	513930.17	707476.38	500ft	78ft	88ft	198.5	5Feet	1410	116	24gm	12232
56	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500007620	WELL 7	18431.07	14	29	514571.80	734348.90	40ft	56ft	66ft	259	5Feet	1020	129	500gm	12250
57	10737W	3 GIRALDA FARMS	WUR930001	WSWL	2500034323	WELL 1	22173.84	14	17	508394.72	702210.00	1000ft	130ft	150ft	350	10Feet	1020	129	100gm	12280
58	10464W	HAMILTON PARK ASSOC	WUR850001	WSWL	2500026568	WELL 1	21199.48	14	11	516697.61	709502.89	1000ft	158ft	330ft	190	10Feet			400gm	13743
59	5264X	SOUTHEAST MORRIS COUNTY MUA	WAP010001	WSWL	2500013439	TURNBULL WELL	11866.27	14	24	502036.27	711090.04	100ft	124ft	496ft	300	5Feet	2440	3050	450gm	15229
60	10882W	MORRIS SCHOOL DISTRICT	WUR950001	WSWL	2500034109	WELL 1	12172.84	14	22	495927.83	711413.40	1000ft	57ft	400ft	325		2440	3050	70gm	13801
61	2118P	NOVARTIS PHARMACEUTICALS CORP	WAP990001	WSWL	2500013935	WELL P-5	21000.76	14	10	520687.39	718209.89		117ft	132ft	190		1020	129	500gm	16996
62	2118P	NOVARTIS PHARMACEUTICALS CORP	WAP990001	WSWL	2500000635	WELL P-3	21990.41	14	10	521763.57	718514.76				200		1020	129	500gm	12548
63	5214	FLORHAM PARK BORO PUBLIC WORKS	WAP980001	WSWL	2500012424	WELL 3	22316.54	14	11	519122.72	710986.85	100ft	67ft	103ft	182	5Feet	1020	129	900gm	15520
64	5214	FLORHAM PARK BORO PUBLIC WORKS	WAP980001	WSWL	2500021204	WELL 4	21269.98	14	11	517738.44	710782.96	100ft	89ft	139ft	206	5Feet	1020	129	1300gm	15521
65	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500065014	WELL 1A	21880.34	14	29	511770.06	741382.29	40ft	101ft	136ft	301.196	5Feet	1020	129	420gm	12600
66	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500065018	WELL 10	21255.45	14	29	509453.32	741947.23	40ft	106ft	136ft	317	5Feet	1020	129	500gm	12601

67	2196P	AHS - MORRISTOWN MEMORIAL HOSP	WAP980001	WSWL	2500005647	WELL 1	11350.44	14	24	504542.17	712327.03		187ft	504ft	230		2460	3050	300gm	14136
68	11135W	STATE FARM MUTUAL AUTO INSURANCE	WUR010001	WSWL	2500056630	WELL 1	22136.98	14	29	516361.40	737938.02	500ft			331	10Feet	1440	79	100gm	15919
69	2579P	JOHNSON & JOHNSON CONSUMER HEALTH CO	WAP070001	WSWL	2500004274	WELL 6	9113.42	14	23	499710.46	731913.36	100ft	58ft	102ft	434	10Feet	1020	129	500gm	13018
70	10088W	THYSSEN KRUPP VDM USA INC	WUR930001	WSWL	2500010880	WELL 1	20148.01	14	10	518921.91	715374.46	1000ft	72ft	102ft			1020	129	500gm	11656
71	5236	PARSIPPANY TROY HILLS TWP WATER DEPT	WAP070001	WSWL	2500040965	WELL 21	24527.31	14	29	520698.38	736277.54	40ft	70ft	95ft	220	5Feet	1020	129	1400gm	13164
72	2025P	MORRIS COUNTY GOLF CLUB	WAP990001	WSIN	INTAKE 1	POND (CORRECTED)	14115.44	14	24	508388.60	711317.37	500ft			390	5Feet			1100gm	17855
73	2206P	PFIZER, INC	WAP980001	WSWL	2500006488	WELL 1	18756.29	14	29	514366.33	735102.66	500ft	75ft	95ft	283		1020	129	275gm	17173
74	10919W	BEAR STEARNS & CO INC	WUR960001	WSWL	2500046286	WELL 1	8089.97	14	12	508151.19	721335.37	1000ft	115ft	335ft	250	20Feet	2460	3050	350gm	17219

SECTION IV – DESCRIPTION OF WATER SYSTEM

Southeast Morris County MUA
PWID # 1424001

19 Saddle Road
Cedar Knolls, NJ 07927
(973)326-6880

Southeast Morris County MUA is a public community water system consisting of

11 Entry Points to the Distribution System (EPTDS)
- 12 wells
- 0 wells under the influence of surface water
- 1 surface water intake(s)
- 2 purchased ground water
- 2 purchased surface water

Table 6 below contains the municipalities and the population within each of these municipalities served by Southeast Morris County MUA.

Table 6: Municipalities and Population Served

Municipality	County	Population Served - 2003
Chatham Boro	Morris	57
Hanover Twp.	Morris	12717
Harding Twp.	Morris	1131
Mendham Twp.	Morris	297
Morris Plains Boro	Morris	5589
Morris Twp.	Morris	20952
Morristown Town	Morris	11205

SECTION V - INVENTORY OF TREATMENT PLANTS AND DRINKING WATER SOURCES

SECTION V - SYSTEM INVENTORY FOR: Southeast Morris County MUA

Table 7 provides the Southeast Morris County MUA's treatment plant(s); source(s); the sources' location(s); whether the source(s) are ground water, surface water, or a purchased supply; and the sources' capacity(s). The first column contains the EPTDS ID and sources contributing to the same EPTDS are identified by the same number. An EPTDS is the entry point to the distribution system, and for most community water systems this location is after the water is treated at a treatment plant.

In the case of a ground water source, the well's confinement status and well permit number are provided.

Table 7: Drinking Water Source and EPTDS Inventory

EPTDS ID	Source ID	Source Name	Water System Component *	Source Status *	Source *	Source Capacity (MGD)	Well Permit #	Confinement Status *
01	001	BLACK BROOK PLANT	T	P				
01	003	BLACK BROOK WELL 1	G	P	glacial sand and gravel	1.3162	25-14181	U
01	004	BLACK BROOK WELL 2	G	P	glacial sand and gravel	1.1506	25-14182	U
02	006	CLYDE POTTS RESERVOIR PLANT	T	P				
02	007	CLYDE POTTS RESERVOIR	S	P	Clyde Potts Reservoir	4	smclyde	
03	008	LIDGERWOOD WELL PLANT	T	P				
03	009	LIDGERWOOD WELL	G	P	Brunswick aquifer	0.409	25-14520	U
04	010	LITTLETON WELLS PLANT	T	P				
04	011	LITTLETON WELL 1	G	P	glacial sand and gravel	0.504	45-00316	U
04	012	LITTLETON WELL 2	G	P	glacial sand and gravel	0.4694	45-00317	U
05	013	NORMANDY WELL PLANT	T	W				
05	014	NORMANDY WELL	G	W	glacial sand and gravel	0.2304	45-00351	U
06	015	SAND SPRING WELL PLANT	T	P				
06	016	SAND SPRING WELL	G	P	Brunswick aquifer	0.8078	45-00350	U
08	020	TODD WELL PLANT	T	P				
08	021	TODD WELL	G	P	glacial sand and gravel	1.2125	25-03527	U
09	022	TURNBULL LANE WELL PLANT	T	P				
09	023	TURNBULL LANE WELL	G	P	Brunswick aquifer	0.4795	25-13439	U
10	024	WING WELL PLANT	T	P				
10	025	WING WELL	G	P	glacial sand and gravel	3.3809	25-00048	U
14	062	MCCABE WELL LOT 7 BLOCK 387 KI	G	P	glacial sand and gravel	0.7733	25-33503	U

EPTDS ID	Source ID	Source Name	Water System Component *	Source Status *	Source *	Source Capacity (MGD)	Well Permit #	Confinement Status *
14	063	MCCABE WELL TREATMENT PLANT (M	T	P				
17	057	MORRIS COUNTY	W	P				
18	068	MORRIS PLAINS WELL TP MORRIS P	T	E				
18	069	MORRIS PLAINS WELL MORRIS PLAI	G	E	Brunswick aquifer	0.288	45-00039	U
30	054	NJAWC-SHORT HILLS SYSTEM	P	E				
31	059	MORRIS COUNTY MUA	W	E				
33	067	PARK AVENUE BOOSTER STATION	P	P				

*KEY

Water System Component

G = Ground Water, P = Purchased Surface Water, S = Surface Water, T = Treatment Plant (EPTDS), U = Ground Water Under The Direct Influence of Surface Water, W = Purchased Ground Water. For a complete definition of each source of drinking water, please refer to the Glossary at the end of this report.

Confinement Status

C = Confined, U = Unconfined. For a definition of a confined and an unconfined aquifer please refer to the Glossary at the end of this report. K = Unknown, S = Semi-confined. For the purposes of SWAP both K and S were treated as unconfined wells.

Source Status

C = Recharge, E = Emergency, I= Interim, O = Other, P= Permanent, R= Reserve, S= Seasonal, U = Not in Use/Capped, V = Abandoned/Not Capped, W = Not in Use/Unspecified, X = Not in Use/Mechanical, Y = Not in Use/Contaminated. For a complete definition of each well status category, please refer to the Glossary at the end of this report.

Source

For ground water sources, the name of the aquifer is provided. For surface water sources, the name of the surface water body on which the intake is located is given.

The Southeast Morris County MUA contains 11 EPTDS as illustrated in Table 7 (identified by a "T" in the water system component column). Often public water systems treat source water at the EPTDS to ensure the drinking water provided to the public meets Federal and State Drinking Water Standards. Please refer to Appendix A- Attachment 5 for information on the public water system's treatment process.

SECTION VI - SUSCEPTIBILITY RATINGS FOR YOUR DRINKING WATER SOURCE(S)

SECTION VI – SUSCEPTIBILITY RATINGS FOR DRINKING WATER SOURCE(S)

Table 8 provides a summary of the susceptibility ratings for the system's source(s). The source column of the table provides the number of ground water and surface water sources and the number of ground water under the direct influence of surface water (GUDI) wells in the system. The other columns provide the total number of source(s) that rated high (H), medium (M), and low (L) for each of the contaminant categories.

Table 8: Summary of Susceptibility Ratings for Drinking Water Source(s)

	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
Sources	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Wells- 12		10	1	10	1			2	9	11			5	6		2	9		11			6	5	
GUDI - 0																								
Surface water intakes - 1	1				1				1		1		1					1			1	1		

To review a summary of how the other public water systems in the State of New Jersey rated, please refer to Table 5, "Summary of Statewide Susceptibility Ratings for Community Water System Sources (Percent %)" in Section III of the Source Water Assessment Report.

If a drinking water source's susceptibility is high, it does not necessarily mean the water is contaminated. High susceptibility is a vulnerability rating, not a factor determining whether or not the water is or is not meeting State and Federal Safe Drinking Water Standards. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels. Please refer to the Consumer Confidence Report (CCR) to determine if the drinking water is meeting all of the Safe Drinking Water Act regulatory requirements.

Table 9 illustrates the susceptibility rating for each individual source for each of the contaminant categories.

Table 9: Susceptibility Rating for Drinking Water Source(s)

EPTDS ID	Source ID	Source Name	Contaminant Category							
			Pathogens	Nutrients	Pesticides	VOCs	Inorganics	Radionuclides	Radon	DBPs
			Rating	Rating	Rating	Rating	Rating	Rating		Rating
01	003	BLACK BROOK WELL 1	M	H	L	H	M	M	H	H
01	004	BLACK BROOK WELL 2	M	H	L	H	H	M	H	H
02	007	CLYDE POTTS RESERVOIR	H	M	L	M	H	L	L	H
03	009	LIDGERWOOD WELL	M	H	L	H	H	M	H	M
04	011	LITTLETON WELL 1	M	H	L	H	M	M	H	M
04	012	LITTLETON WELL 2	M	H	L	H	H	M	H	M
05	014	NORMANDY WELL								
06	016	SAND SPRING WELL	M	H	M	H	M	M	H	H
08	021	TODD WELL	M	H	L	H	M	M	H	H
09	023	TURNBULL LANE WELL	M	M	L	H	H	H	H	M
10	025	WING WELL	M	H	L	H	H	M	H	H
14	062	MCCABE WELL LOT 7 BLOCK 387 KI	L	H	L	H	M	M	H	M
18	069	MORRIS PLAINS WELL MORRIS PLAI	M	H	M	H	M	H	H	H

The potential contaminant source inventory and sensitivity variables were used to determine the susceptibility ratings for the sources. For specific information on the water system's potential contaminant source inventory and sensitivity variables, please refer to the Individual Explanatory Variable Inventory and the Specific Potential Contaminant Sources Inventory, Appendix A- Attachment 1 and 2.

SECTION IV – DESCRIPTION OF WATER SYSTEM

Township of Parsippany-Troy Hills Water Department
PWID # 1429001

1001 Parsippany Boulevard
Parsippany, NJ 07054
(973)263-7099

Township of Parsippany-Troy Hills Water Department is a public community water system consisting of

17 Entry Points to the Distribution System (EPTDS)
- 20 wells
- 0 wells under the influence of surface water
- 0 surface water intake(s)
- 3 purchased ground water
- 0 purchased surface water

Table 6 below contains the municipalities and the population within each of these municipalities served by Township of Parsippany-Troy Hills Water Department.

Table 6: Municipalities and Population Served

Municipality	County	Population Served - 2003
Mountain Lakes Boro	Morris	36
Parsippany Troy-hills	Morris	50000

SECTION V - INVENTORY OF TREATMENT PLANTS AND DRINKING WATER SOURCES

SECTION V - SYSTEM INVENTORY FOR: Township of Parsippany-Troy Hills Water Department

Table 7 provides the Township of Parsippany-Troy Hills Water Department's treatment plant(s); source(s); the sources' location(s); whether the source(s) are ground water, surface water, or a purchased supply; and the sources' capacity(s). The first column contains the EPTDS ID and sources contributing to the same EPTDS are identified by the same number. An EPTDS is the entry point to the distribution system, and for most community water systems this location is after the water is treated at a treatment plant.

In the case of a ground water source, the well's confinement status and well permit number are provided.

Table 7: Drinking Water Source and EPTDS Inventory

EPTDS ID	Source ID	Source Name	Water System Component *	Source Status *	Source *	Source Capacity (MGD)	Well Permit #	Confinement Status *
01	001	TREATMENT HOUSE WELL 1A	T	P				
01	002	WELL 1A/PUMP HOUSE ROAD	G	P	glacial sand and gravel	0.5846	25-07381	U
02	004	TREATMENT HOUSE WELL 3	T	P				
02	005	WELL 3/VAIL ROAD	G	P	glacial sand and gravel	0.2016	45-00032	U
03	007	TREATMENT PLANT/PARSIPPANY BLV	T	P				
03	008	WELL 4/PARSIPANY BLVD	G	P	glacial sand and gravel	0.324	25-00599	U
03	009	WELL 4A PARSIPPANY BLVD	G	P	glacial sand and gravel	1.2959	25-07545	U
04	010	TREATMENT HOUSE WELL 7	T	Y				
04	011	WELL 7/HALSEY RD	G	Y	glacial sand and gravel	0.288	25-07620	U
05	015	TREATMENT PLANT S. BEVERWYCK R	T	P				
05	016	WELL 8-1/SO. BEVERWYCK RD	G	P	glacial sand and gravel	0.432	45-00034	U
05	017	WELL 8-2 SO. BEVERWYCK RD	G	P	glacial sand and gravel	0.36	25-43870	U
05	018	WELL 8-3/SO. BEVERWYCK RD	G	P	glacial sand and gravel	0.8639	45-00036	U
06	019	TREATMENT HOUSE WELL 9	T	S				
06	020	WELL 9/HOMER ST	G	P	glacial sand and gravel	0.5904	25-11627	U
07	021	TREATMENT HOUSE WELL 10	T	P				
07	022	WELL 10 CHERRY HILL RD	G	P	glacial sand and gravel	0.288	25-11628	U

EPTDS ID	Source ID	Source Name	Water System Component *	Source Status *	Source *	Source Capacity (MGD)	Well Permit #	Confinement Status *
08	023	TREATMENT HOUSE WELL 11	T	W				
08	024	WELL 11 TROY MEADOW RD	G	P	glacial sand and gravel	0.085	25-12635	U
09	026	TREATMENT HOUSE WELL 12	T	P				
09	027	WELL 12 FAIRFIELD RD	G	P	glacial sand and gravel	0.432	25-12718	U
10	029	TREATMENT HOUSE WELL 13	T	P				
10	030	WELL 13 MARSHA TERRACE	G	P	glacial sand and gravel	0.6076	25-11106	U
11	032	TREATMENT HOUSE WELL 14	T	P				
11	033	WELL 14 SYLVAN WAY	G	P	glacial sand and gravel	1.0079	25-13259	U
12	035	WELL #15	T	P				
12	036	WELL 15/BALL AVE	G	P	glacial sand and gravel	0.216	25-15809	U
13	037	TREATMENT HOUSE WELL 17	T	P				
13	038	WELL 17 PUMP HOUSE RD	G	P	glacial sand and gravel	0.9518	25-18849	U
14	039	TREATMENT HOUSE WELL 18 (ULYSS	T	P				
14	040	WELL 18 ULYSSES ST	G	P	glacial sand and gravel	1.0799	25-18850	U
28	060	MOUNTAIN LAKES W C\	W	E				
29	062	DENVILLE TWP W D	W	E				
31	066	RANDOLPH TWP MUA	W	E				
32	068	TREATMENT HOUSE WELL 19	T	P				
32	069	WELL 19/PRUDENTIAL BUS DIST/OF	G	P	glacial sand and gravel	0.9259	25-21431	U
33	076	SMITH & MAZDABROOK RD.	T	P				
33	077	WELL 20/SMITH & MAZADABROOK RD	G	P	glacial sand and gravel	0.8856	25-27259	U
34	081	WELL NO. 21 TREATMENT PLANT TR	T	P				
34	082	WELL #21 TROY RD. LOT #2.02, 2	G	P	glacial sand and gravel	1.5062	25-40965	U

*KEY

Water System Component

G = Ground Water, P = Purchased Surface Water, S = Surface Water, T = Treatment Plant (EPTDS), U = Ground Water Under The Direct Influence of Surface Water, W = Purchased Ground Water. For a complete definition of each source of drinking water, please refer to the Glossary at the end of this report.

Confinement Status

C = Confined, U = Unconfined. For a definition of a confined and an unconfined aquifer please refer to the Glossary at the end of this report. K = Unknown, S = Semi-confined. For the purposes of SWAP both K and S were treated as unconfined wells.

Source Status

C = Recharge, E = Emergency, I= Interim, O = Other, P= Permanent, R= Reserve, S= Seasonal, U = Not in Use/Capped, V = Abandoned/Not Capped, W = Not in Use/Unspecified, X = Not in Use/Mechanical, Y = Not in Use/Contaminated. For a complete definition of each well status category, please refer to the Glossary at the end of this report.

Source

For ground water sources, the name of the aquifer is provided. For surface water sources, the name of the surface water body on which the intake is located is given.

The Township of Parsippany-Troy Hills Water Department contains 17 EPTDS as illustrated in Table 7 (identified by a "T" in the water system component column). Often public water systems treat source water at the EPTDS to ensure the drinking water provided to the public meets Federal and State Drinking Water Standards. Please refer to Appendix A- Attachment 5 for information on the public water system's treatment process.

SECTION VI - SUSCEPTIBILITY RATINGS FOR YOUR DRINKING WATER SOURCE(S)

SECTION VI – SUSCEPTIBILITY RATINGS FOR DRINKING WATER SOURCE(S)

Table 8 provides a summary of the susceptibility ratings for the system's source(s). The source column of the table provides the number of ground water and surface water sources and the number of ground water under the direct influence of surface water (GUDI) wells in the system. The other columns provide the total number of source(s) that rated high (H), medium (M), and low (L) for each of the contaminant categories.

Table 8: Summary of Susceptibility Ratings for Drinking Water Source(s)

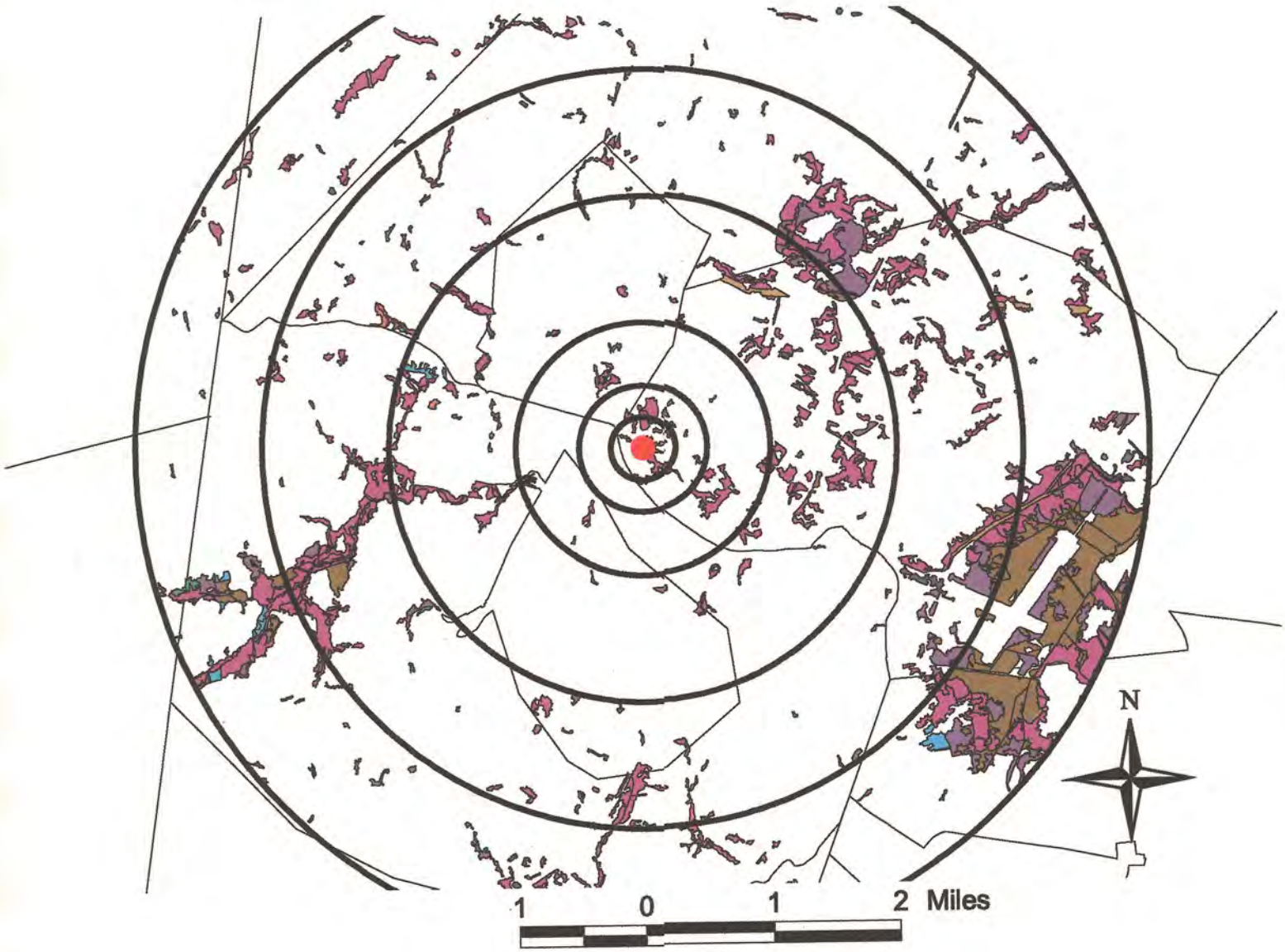
	Pathogens			Nutrients			Pesticides			VOCs			Inorganics			Radionuclides			Radon			DBPs		
Sources	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
Wells - 20		17	3	20				5	15	20			14	6		4	16		20			6	14	
GUDI - 0																								
Surface water intakes - 0																								

To review a summary of how the other public water systems in the State of New Jersey rated, please refer to Table 5, "Summary of Statewide Susceptibility Ratings for Community Water System Sources (Percent %)" in Section III of the Source Water Assessment Report.

If a drinking water source's susceptibility is high, it does not necessarily mean the water is contaminated. High susceptibility is a vulnerability rating, not a factor determining whether or not the water is or is not meeting State and Federal Safe Drinking Water Standards. The rating reflects the potential for contamination of source water, not the existence of contamination. Public water systems are required to monitor for regulated contaminants and to install treatment if any contaminants are detected at frequencies and concentrations above allowable levels. Please refer to the Consumer Confidence Report (CCR) to determine if the drinking water is meeting all of the Safe Drinking Water Act regulatory requirements.

Map of Wetlands
AIRTRON DIVISION
Hanover Twp., Morris County, New Jersey
Lat: 40° 49' 04.00" , Long: -74° 28' 15.00"

MAP 6

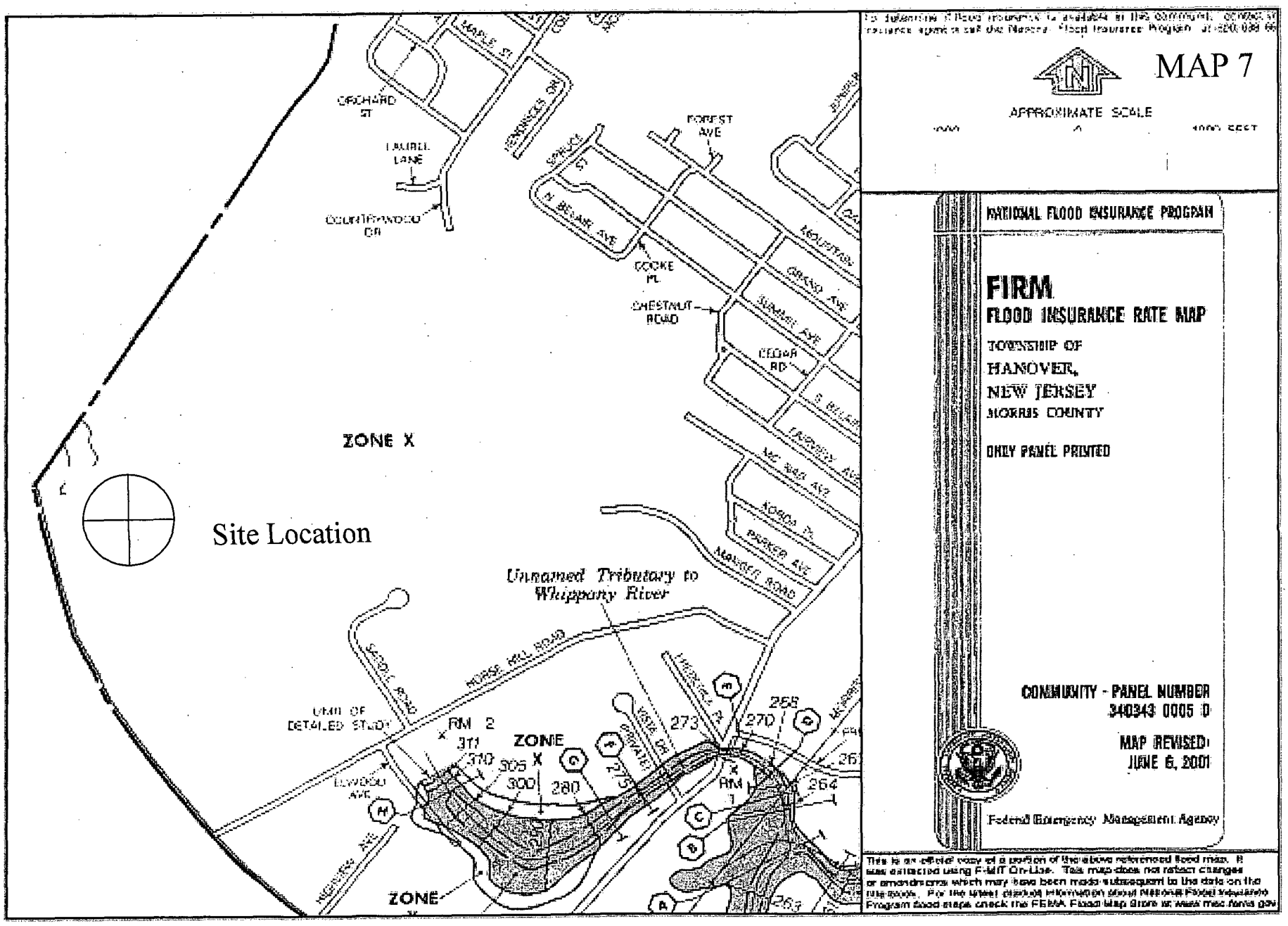


Ring	1	(0.00- 0.25)	has Wetlands Acres:	25
Ring	2	(0.25- 0.50)	has Wetlands Acres:	21
Ring	3	(0.50- 1.00)	has Wetlands Acres:	57
Ring	4	(1.00- 2.00)	has Wetlands Acres:	476
Ring	5	(2.00- 3.00)	has Wetlands Acres:	996
Ring	6	(3.00- 4.00)	has Wetlands Acres:	1913

*Based on 1986 Land Use/Land Cover Data

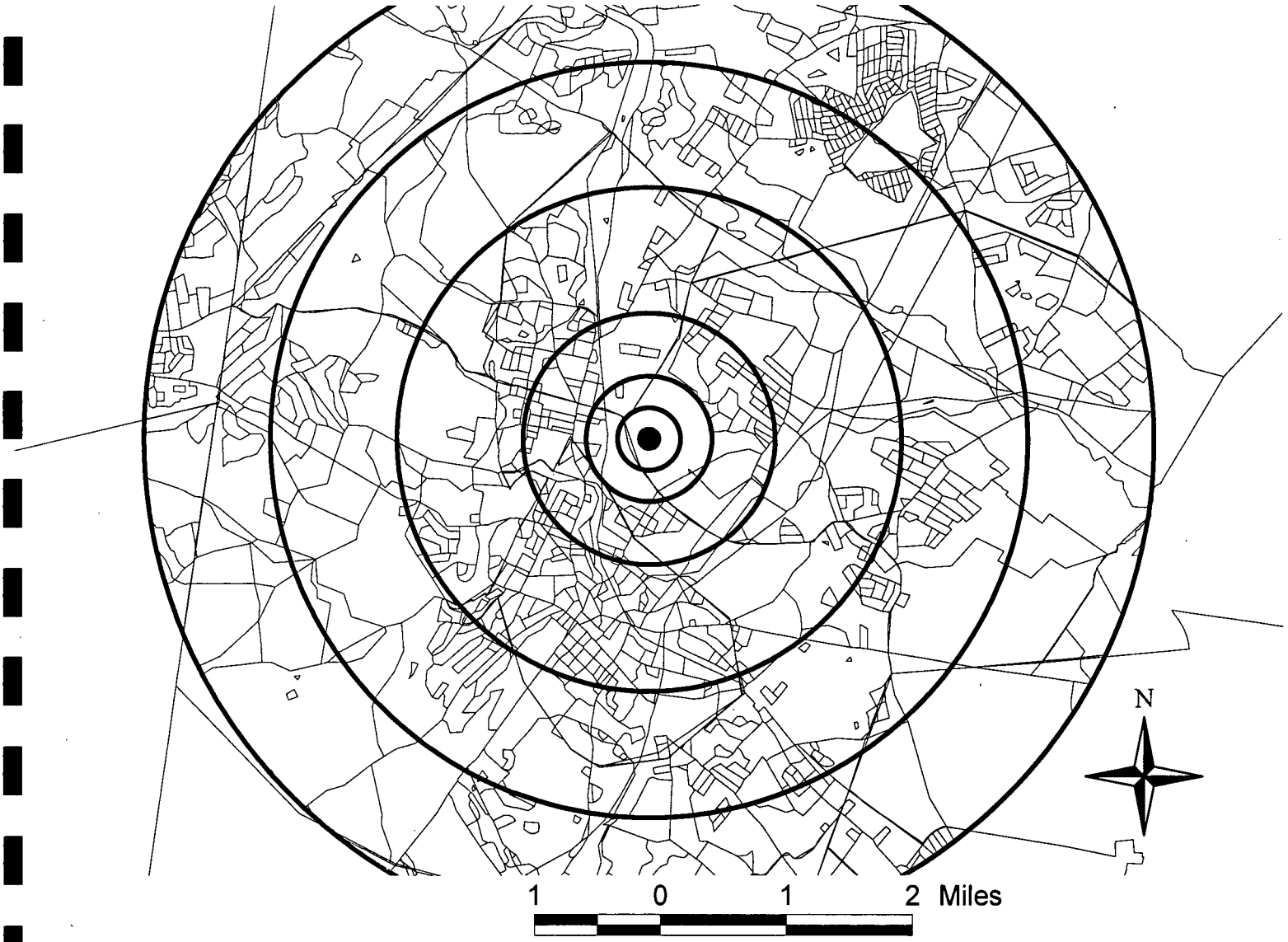
FLOOD INSURANCE MAP

Airtron Division
Hanover Twp., Morris Co.
NewJersey



Map of Population
AIRTRON DIVISION
Hanover Twp.,Morris County, New Jersey
Lat: 40° 49' 04.00" , Long: 74° 28' 15.00"

MAP 8



Ring	1	(0.00- 0.25)	has Population:	291
Ring	2	(0.25- 0.50)	has Population:	1418
Ring	3	(0.50- 1.00)	has Population:	8330
Ring	4	(1.00- 2.00)	has Population:	25755
Ring	5	(2.00- 3.00)	has Population:	23560
Ring	6	(3.00- 4.00)	has Population:	29493

*Based on 2000 Census Data.

ATTACHMENT A

U.S. ENVIRONMENTAL PROTECTION AGENCY

Superfund Information Systems

Superfund Site Information

Site Documents

Data Element Dictionary (DED)

Order Superfund Products

Superfund Site Information

Search Results

Search Criteria:

Active vs. Archived: ***Active*** *What are active and archived sites?*

EPA ID: *NJD030239412*

Found **1** site(s) that match your search criteria listed above.
To conduct another search, return to the **Search Superfund Site Information** page or request a **Customized SIS Report**.

Save results in Excel format

Displaying sites 1 through 1

EPA ID	Site Name	City	County	State	NPL Status
NJD030239412	AIRTRON DIV LITTON INDUSTRIES INC	MORRIS PLAINS	MORRIS	NJ	Not NPL

Displaying sites 1 through 1

DISCLAIMER: Be advised that the data contained in these profiles are intended solely for informational purposes use by employees of the U.S. Environmental Protection Agency for management of the Superfund program. They are not intended for use in calculating Cost Recovery Statutes of Limitations and cannot be relied upon to create any rights, substantive or procedural, enforceable by any party in litigation with the United States. EPA reserves the right to change these data at any time without public notice.

URL: http://cfpub.epa.gov/supercpad/cursites/srchrslt.cfm
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U.S. ENVIRONMENTAL PROTECTION AGENCY

Superfund Information Systems

Superfund Site Information

Site Documents

Data Element Dictionary (DED)

Order Superfund Products

Superfund Site Information

AIRTRON DIV LITTON INDUSTRIES INC

Site Information

Site Info | Aliases | Operable Units | Contacts
Actions | Contaminants | Site-Specific Documents

Site Name: AIRTRON DIV LITTON INDUSTRIES INC
Street: 200 E HANOVER AVE
City / State / ZIP: MORRIS PLAINS, NJ 07950

NPL Status: Not on the NPL
Non-NPL Status: Other Cleanup Activity: State-Lead Cleanup

ERS Exclusion: An Eligible Response Site (ERS) Exclusion decision has been made at this site.

EPA ID: NJD030239412
EPA Region: 02
County: MORRIS

Federal Facility Flag: Not a Federal Facility

Return to Search Results

Return to Search Superfund Site Information

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U.S. ENVIRONMENTAL PROTECTION AGENCY

Superfund Information Systems

Superfund Site Information

Site Documents

Data Element Dictionary (DED)

Order Superfund Products

Superfund Site Information

AIRTRON DIV LITTON INDUSTRIES INC

Operable Units

Site Info | Aliases | Operable Units | Contacts
Actions | Contaminants | Site-Specific Documents

OU ID	OU Name
00	SITEWIDE

Return to Search Results

Return to Search Superfund Site Information

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U.S. ENVIRONMENTAL PROTECTION AGENCY

Superfund Information Systems

Superfund Site Information

AIRTRON DIV LITTON INDUSTRIES INC

Actions

Site Info | Aliases | Operable Units | Contacts
Actions | Contaminants | Site-Specific Documents

OU	Action Name	Qualifier	Lead	Actual Start	Actual Completion
00	DISCOVERY		F		06/01/1981
00	PRELIMINARY ASSESSMENT	L	S	10/01/1985	11/01/1985
00	SITE INSPECTION	D	S	11/01/1989	12/31/1989

Return to Search Results

Return to Search Superfund Site Information

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URL: http://cfpub.epa.gov/supercpad/cursites/cactinfo.cfm
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ATTACHMENT B

FINAL REPORT OF
GROUNDWATER MONITORING PROGRAM
AirTron - DIVISION OF LITTON INDUSTRIES
MORRIS PLAINS, NEW JERSEY

K = C

For

AirTron

By

CONVERSE WARD DAVIS DIXON, INC.

10 August 1981

Project No. 81-07125-01

ConverseWardDavisDixon
Geotechnical Consultants

10 August 1981

AirTron
200 East Hanover
Morris Plains, New Jersey 07950

Attention: Mr. John Nicola

Final Report : Groundwater Monitoring Program
AirTron - Division of Litton Industries
Morris Plains, New Jersey
(81-07125-01)

Gentlemen:

In accordance with our proposal dated 26 March 1981, and your subsequent authorization via Purchase Order No. 33603 dated 5 June 1981, we have performed a groundwater monitoring program at your plant site in Morris Plains, New Jersey.

We are pleased to submit our Final Report presenting our scope of services, technical approach, and conclusions and recommendations regarding groundwater flow dynamics and quality.

Thank you for the opportunity of assisting you on this most interesting project. We look forward to providing continued assistance to you. If you have any questions or require clarification, please call.

Respectfully submitted,

CONVERSE WARD DAVIS DIXON, INC.

R. Brian Ellwood, Ph.D.
Vice President

RBE/RGE/CLT-G:eg

i Converse Ward Davis Dixon, Inc.
91 Roseland Avenue
Post Office Box 91
Caldwell, New Jersey 07006
201 226-9191 212 964-0405

CONTENTS

PROJECT DESCRIPTION AND LOCATION 1

PURPOSE 1

TECHNICAL APPROACH AND SCOPE OF STUDY 1

SITE CONDITIONS 4
- Site Description 4
- Hydrogeologic Conditions 4

RESULTS AND ANALYSES 5
- Hydrogeologic Conditions 5
- Groundwater Flow 5
- Groundwater Quality 7

CONCLUSIONS 8

RECOMMENDATIONS 9

LIMITATIONS 10

DRAWINGS
1) Boring Location Plan, Hydrogeologic Cross Section, and Groundwater Elevations
2) Concentration of Trichloroethylene and Total Organic Carbon in Soil Samples
3) Concentration of Trichloroethylene in Groundwater Samples

APPENDIX A - EXPLORATION PROGRAM
- Program Description A-1
- Visual Identification of Samples A-2 to A-3
- Logs of Borings A-4 to A-22

APPENDIX B - LABORATORY TESTING PROGRAM
- Program Description B-1
- Summary of Laboratory Tests B-2
- Test Data Curves B-3 to B-4

APPENDIX C - CHEMICAL ANALYSES
- Program Description C-1
- Summary of Laboratory Tests C-2 to C-3

Converse Ward Davis Dixon, Inc.

PROJECT DESCRIPTION AND LOCATION

AirTron, Division of Litton Industries, formerly disposed of sludges from heavy metal treatment processes in on-site sludge beds. The sludges have been removed and groundwater monitoring programs established to address concerns of N.J.D.E.P. about effects on groundwater from heavy metals. + Volatile Organics Analyses performed by N.J.D.E.P. on groundwater samples did not indicate contamination by heavy metals, however, the samples showed contamination by TCE under the two oldest former lagoon sites (Appendix C, Table 3). N.J.D.E.P.'s study was initiated when trichloroethylene (TCE) was discovered in the production well of the neighboring Mennen Corporation.

AirTron was put under a 30-day compliance schedule from 11 March 1981 to hire a hydrogeologist to investigate the degree and extent of groundwater contamination, assess hydrogeologic characteristics of the glacial deposits, and provide preliminary recommendations for a working plan for decontamination of groundwaters underlying the AirTron site, if needed.

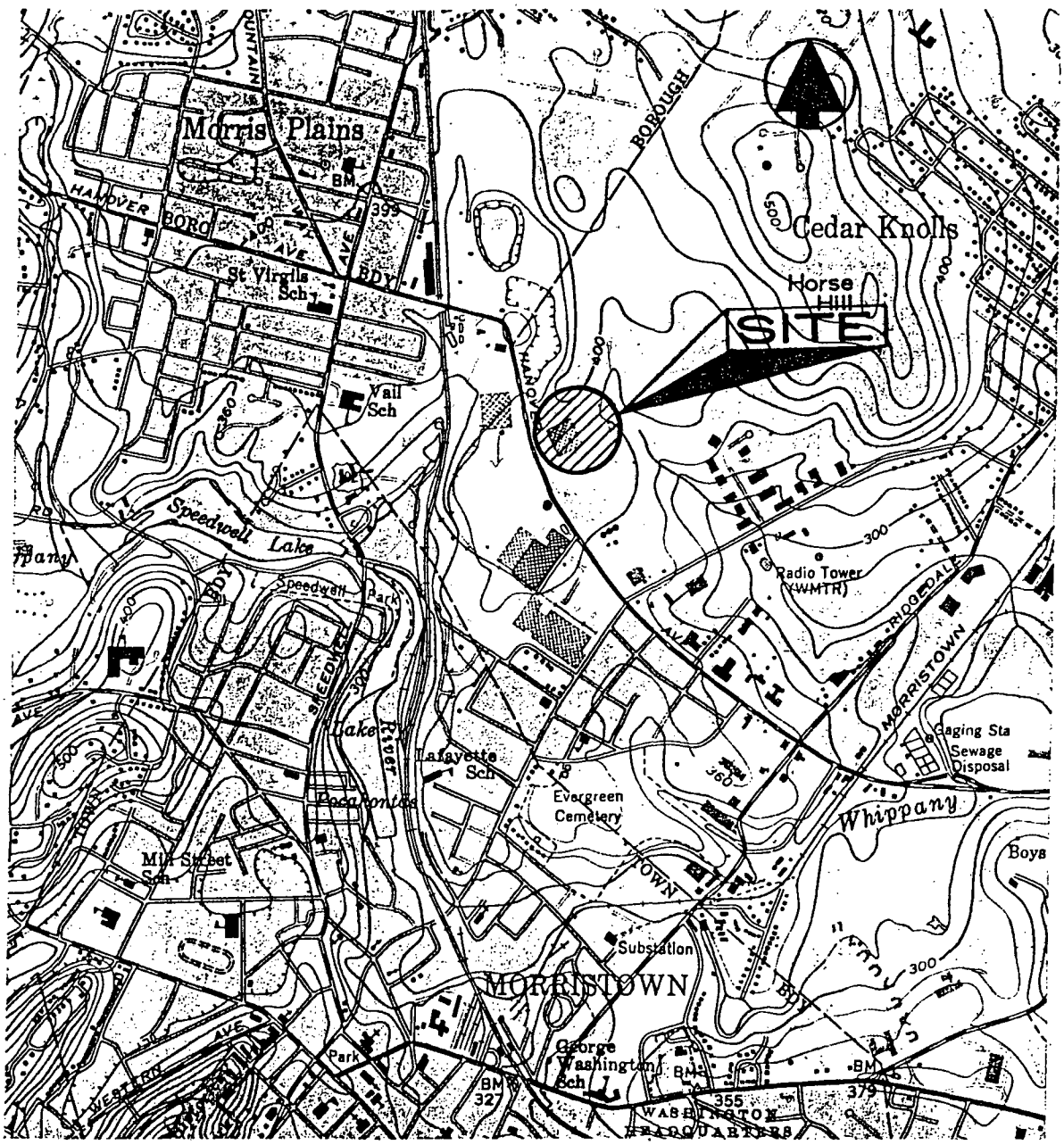
The study area consists of the AirTron property and nearby adjacent properties in Morris Plains, New Jersey. The site is generally bounded by Hanover Avenue on the west and private property lines to the north, east, and south. The location of the study area is shown on Figure 1, following.

PURPOSE

The purpose of this project was to investigate the subsurface stratigraphic conditions as they control groundwater movement, monitor the quality of groundwaters entering and leaving the plant site to assess possible on-site contaminant sources, and in addition, to evaluate groundwater flow characteristics, and provide preliminary recommendations for a plan to decontaminate groundwaters beneath the site, if needed.

TECHNICAL APPROACH AND SCOPE OF STUDY

Although geologic conditions in the general vicinity of the AirTron site had been fairly well established by review and evaluation of published groundwater and soils reports, and



SCALE 1"=2,000'

MAP SOURCE: BASE MAP WAS ADAPTED FROM A U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLE- MORRISTOWN QUADRANGLE, NEW JERSEY, 1954, PHOTOREVISED 1970, (BASE MAP 81-07125-01 MAY NOT REFLECT CARTOGRAPHIC CHANGES)

SITE LOCATION MAP

AIRTRON
MORRIS PLAINS, N.J.
FOR AIRTRON

Project No.
81-07125-01

Figure No.
1

ConverseWardDavisDixon Geotechnical Consultants

Approved for publication by
FORM NO. D56/78

Converse Ward Davis Dixon subsurface investigations performed adjacent to AirTron to the northwest (1972+1973), site specific stratigraphic information was required to assess groundwater flow dynamics in the former disposal site area. Converse Ward Davis Dixon therefore performed three shallow test borings to a maximum depth of 42 feet to assess the lateral continuity of a clay layer encountered in monitoring wells 1M and 2M installed by Diamond Drilling Company in October of 1980. One of these shallow borings (B-1) was converted to a shallow monitoring well, screened from 33' - 38' below land surface. B-2 was drilled at the location of a former lagoon as directed by N.J.D.E.P.

In addition, three deep borings were advanced to a maximum depth of 112'. Upon completion, these borings were converted to 3" PVC monitoring wells screened in the aquifer zone in which the Mennen well is completed.

During the course of the study AirTron requested that MW-1 be converted to a 6" production well if the aquifer was capable of supporting a production well yielding 50 gpm or more. To thoroughly evaluate the subsurface conditions, samples were obtained at 5-foot intervals throughout the entire depth of this boring. After drilling operations were completed this boring was electric logged using single-point resistance, SP, natural gamma and caliper probes Because of limited saturated thickness and anticipated low yield, the boring was completed as a monitoring well screened from 65-75 feet below surface.

Soil samples were collected to be used in visual identifications to classify and delineate hydrogeologic units. Representative soil samples were subjected to sieve analyses, to quantify grain size characteristics.

Soil samples were obtained at selected depths to analyze concentrations of TCE and total organic carbon (TOC) in the soil. These analyses were used to assess the vertical changes in contaminant concentration beneath and adjacent to the former lagoon area. Vertical concentration gradient data provided a basis for evaluating the location of the groundwater samples with respect to their vertical position within the contaminant plume. This resulted in a more accurate analysis of contaminant concentration in the groundwater, and direction of contaminant migration.

Groundwater quality and flow dynamics were evaluated, and preliminary recommendations for site decontamination were developed.

SITE CONDITIONS

Site Description

The study area is located in Morris Plains, Morris County, New Jersey and consists of portions of AirTron and adjacent properties pertinent to the investigation.

Topographically, the site is on a low ridge sloping gently to the southwest from approximate elevations of 400' to 390' across the site. Adjacent valleys trend to the southwest and southeast.

The AirTron manufacturing facility is located approximately 100 feet west of the former on-site sludge lagoons and is surrounded by paved surfaces. Wooded areas fringe the AirTron property to the south and east.

Hydrogeologic Conditions

Morris Plains is located in the Piedmont Physiographic Province and is underlain by Triassic shale and sandstone. Overlying the bedrock are unconsolidated glacial deposits, composed mainly of unstratified tills, gravels and sands of the Wisconsinan terminal moraine. Depth to bedrock is greater than 100 feet and, therefore, is of little importance in this study.

The unconsolidated sand and gravel deposits are the primary sources of groundwater within the study area. Reported specific capacities of production wells within the area range from approximately 10 to 120 gallons per minute per foot of drawdown (gpm/ft) with yields ranging from 150 to 450 gallons per minute (gpm). ??

The Triassic shales are utilized to a lesser degree for production purposes. Yields range from 60 to 100 gpm; specific capacities range from .5 to 2 gpm/ft.

RESULTS AND ANALYSES

Hydrogeologic Conditions

The subsurface conditions at the AirTron site consist of interbedded sands, silty/clayey sands, and silts and clays. The upper 35 - 45 feet consist of a brown silty coarse to medium sand, with traces of gravel and clay balls. This unit is classified as SM under the Unified Classification system. There are several lenses of sandy gravelly silt (ML); brown sandy clay (CL); clayey coarse to fine sand and silty fine sand (SC); and gravelly sand (SW) of varying thickness and lateral extent within this unit. Underlying this assemblege is the aquifer unit which is tapped by the Mennen production well. The aquifer unit varies from between 20 feet thick in MW-3 to about 44 feet thick in the Mennen production well. This unit is underlain by a brown silty sand to sandy gravelly silt of unknown thickness.

The aquifer is not completely saturated as illustrated in the cross section included in this report (Drawing 1). The average depth to the groundwater table is between 50 and 60 feet. Saturated thickness varies betweeen about 6 feet in MW-3 to about 22 feet in Well No. 1, and is probably greater in the Mennen production well (when the well is not pumping). The upper silty sand (unit 4) although it contains lenses of silt and clay, is not functioning as an impermeable unit which would protect the underlying aquifer from contaminants introduced at the surface. The lenses of silt and clay are not laterally continuous; pathways exist for transport of contaminants through these moderately permeable sediments.

Groundwater Flow

Based on topographic site conditions, the natural groundwater flow would be expected to be to the east-southeast. It is believed that pumpage from the Mennen well has altered the natural flow direction.

The direction of groundwater flow established from CWDD's observation is generally to the west with local slight west-northwest, or west-southwest components.

Based on water level measurements obtained during the groundwater sampling episode, and review of water level measurements obtained at various times over the course of the study (Table 1), we have prepared a map of groundwater elevations (Drawing No. 1). The groundwater gradient is calculated to be about .0156 feet/foot to the west. The permeability of the aquifer materials, based on empirical

K

calculations using grain size data is approximately 10 ft/day. The rate of groundwater flow is estimated to be about .15 ft/day to the west.

$\vec{V}$

discharge velocity - not true velocity

$V = \frac{Ki}{n}$

TABLE 1

GROUNDWATER ELEVATIONS (RELATIVE TO SITE DATUM)

Casing Elevation No.	Screen (Ft, Site Datum)	Depth (Ft, BLSD)	GROUNDWATER ELEVATION (Ft, Site Datum) 5/9/81	5/20/81	5/21/81	6/31/81
1M	402.51	11-21	394.34	394.18	393.93	395.34
2M	404.23	49-69	338.90	338.73	338.73	338.81
No.1	401.20	78-86	--	--	--	337.90
MW-1	399.73	65-75	--	--	--	342.40
MW-2	404.79	70-75	339.29	338.04	337.54	337.54
MW-3	400.05	55-65	--	--	--	348.38

Water levels in the vicinity of the AirTron site appear to have declined by as much as 20 feet over the last 30 years as a result of increased pumpage and reduced infiltration of rainfall associated with greater urbanization (as observed in changes in water levels observed in Well No. 1 from its installation in 1952 to present).

Utilizing currently available data it cannot be determined to what extent pumpage of the Mennen well is affecting groundwater levels, and, therefore, flow direction of groundwaters underlying the AirTron site. Continuous recording of water levels in the monitor wells would show if the Mennen production well is actually drawing water from beneath the area of the former sludge lagoons. The test should indicate the radius of influence of the Mennen production well.

porosity = n = 0.35 for sands

$$V = \frac{Ki}{n} = \frac{(0.0156 \text{ feet/foot})(10 \text{ ft/day})}{0.35} = 0.45 \text{ ft/day}$$

seepage velocity - close - to true gw velocity

Groundwater Quality

The concentrations of TCE and TOC in soil samples obtained during test drilling for this project are presented in Drawing No. 2. Concentrations of TCE in the groundwater are presented in Drawing No. 3. Chemical parameters are tabulated in Tables 2 and 3 in Appendix C of this report.

Concentrations of TOC are fairly uniform for most of the soil samples analyzed and appear to be fairly independent of TCE in those samples which also have low TCE concentrations. However, high concentrations of TCE are generally reflected in elevated TOC measurements. As such, TOC measurements are useful in evaluating the groundwater samples containing TCE with respect to their vertical position within the plume of contaminated groundwater.

TCE concentrations in soil samples from MW-2 (downgradient of the former waste lagoons) show the highest concentrations of TCE. The concentration of TCE in soil samples increases with increaing depth below the ground surface. TCE was present in all soil samples which were analyzed for this parameter including samples taken from wells both downgradient and upgradient of the AirTron waste lagoons.

Soil contam to at least 60'

Analyses of groundwater samples taken by CWDD in June 1981 agree in the relative distribution of concentration with the samples taken and analyzed by Princeton Testing Laboratory in January 1981. However, the concentrations of TCE in groundwater samples taken in June 1981 are consistently lower than those obtained in January 1981.

The highest concentrations of TCE are observed in wells downgradient of the former AirTron waste lagoons, i.e. Well No. 1 (14.6 ppm) and MW-2 (9.66 ppm).

The lowest concentrations of TCE are observed in MW-1, upgradient of the former sludge lagoons (.007 ppm).

The maximum allowable concentration for TCE in groundwater according to the proposed federal criteria for priority pollutants in drinking water is 2.1 ppb.

CONCLUSIONS

The data are indicative of a single event source, i.e. a spill. Patterns of concentration, and the decrease in concentration in all wells where there are two sampling episodes suggest a slug of contaminated groundwater moving towards and being intercepted by the Mennen production well. The source of the spill appears to have been in the general vicinity of the AirTron waste lagoons. This assessment is based on: 1) higher concentration of TCE in soil samples downgradient of the former waste lagoons; 2) Higher concentration of TCE in groundwater samples downgradient of the AirTron waste lagoons; 3) direction of groundwater flow towards Mennen production well from the area of the former waste lagoons.

Analyses of groundwater samples obtained from Well Nos. 2 and 3 in January 1981 indicate concentrations of .140 ppm and .007 ppm respectively. These wells are significantly upgradient of the AirTron waste lagoons. There are three possible explanations for contamination of these upgradient wells.:

1. The natural groundwater flow in the area of the AirTron site is probably to the east-southeast. It appears that pumpage of the Mennen well may be responsible for the presently observed westerly groundwater flow. During periods of prolonged non-pumpage of the Mennen well, (weekends) the water levels may recover sufficiently for groundwater to flow under static conditions to the east-southeast. Therefore, if contaminants (TCE) originated at the waste lagoons, it is possible for them to have migrated to the east- southeast under static (non-pumpage of Mennen well) groundwater flow conditions. When pumpage of the Mennen well is resumed, its radius of influence may not be great enough to reverse the flow of all the groundwater which contains TCE.

2. If the radius of influence of the Mennen well is large, extending well beyond the AirTron property, thereby reversing groundwater flow directions over a large area, it is possible that the radius of influence has "captured" contaminated groundwater from an area other than the AirTron site.

3. Migration of contaminants downward through the unsaturated zone follows stratigraphic control and is therefore in all directions. Contaminants may be carried

above the groundwater table and introduced to the groundwater in upgradient locations.

RECOMMENDATIONS

Based on presently available data it can not be established that the only source of contamination is from AirTron property or that an active decontamination program is necessary. The decrease in TCE values between January and June 1981, suggests that water quality in the aquifer is improving with time as a result of pumping by Mennen.

If the TCE in the groundwater being pumped from the Mennen well is not interfering with Mennen production activities AirTron may coordinate with Mennen and have the Mennen well serve as the intercept well. The contaminated groundwater pumped out in the cleanup of the aquifer could continue to be treated as it is presently being treated, until the aquifer is reclaimed.

To track aquifer rehabilitation we recommend that a monitoring program be implemented. This would include periodic pumping and sampling of selected existing monitoring wells over a period of one year and analyses of groundwater quality. If, on a quarterly basis, steady improvement in water quality is confirmed, then no further action would be required. Conversely, if satisfactgory improvement is not observed, an active decontamination program would have to be implemented. At this time a couple of alternate possibilities can be identified.

Method #1

AirTron could arrange access to existing Well No. 1. A pump could be installed in this well and the well used as an intercept well. Procedures for decontamination of the groundwater may include construction of an aeration lagoon (can be portable, tank-like structure) and transfer volatiles to the air (might need to obtain EPA approval for this procedure). Decontaminated groundwater could then be used for process cooling water.

Method #2

Installation of an intercept well in the area north of existing Well No. 1 and treatment as above. Well must be

pumped until aquifer is reclaimed. A well permit would be required from N.J.D.E.P.

These recommendations are based on the premise that contamination of the Mennen well is the result of a single-event source. As such, treatment consists simply of removing the contaminated groundwater and treating it until all the contaminants have been removed from the aquifer. At this point the aquifer will have been reclaimed and treatment of pumped groundwater will no longer be necessary.

We have presented what we feel to be appropriate and most cost-effective decontamination techniques. There are other more costly techniques which could be employed, but do not appear to be warranted based on the extent of the contamination encountered in this study.

During the course of the test drilling contamination was discovered in soils beneath the site of a former waste lagoon. A strong chemical/petroleum odor was observed in samples S-5, S-6 and S-7 from 25' to 37' [end of boring]) in boring B-2. There was visible contamination of the soils and interstitial fluids of these samples which may represent a future groundwater degradation problem.

LIMITATIONS

The conclusions contained in this report are our best professional judgment at this time regarding the current quality of groundwater underlying the AirTron site, groundwater flow direction and possible contaminant source. There may be subsurface or groundwater quality conditions not disclosed by our investigation.

This report has been prepared in accordance with generally accepted geologic, hydrogeologic and geotechnical engineering practices for the exclusive use of AirTron for specific application to the monitoring of groundwater at the AirTron site in Morris Plains, New Jersey. No other warranty, express or implied, is made.

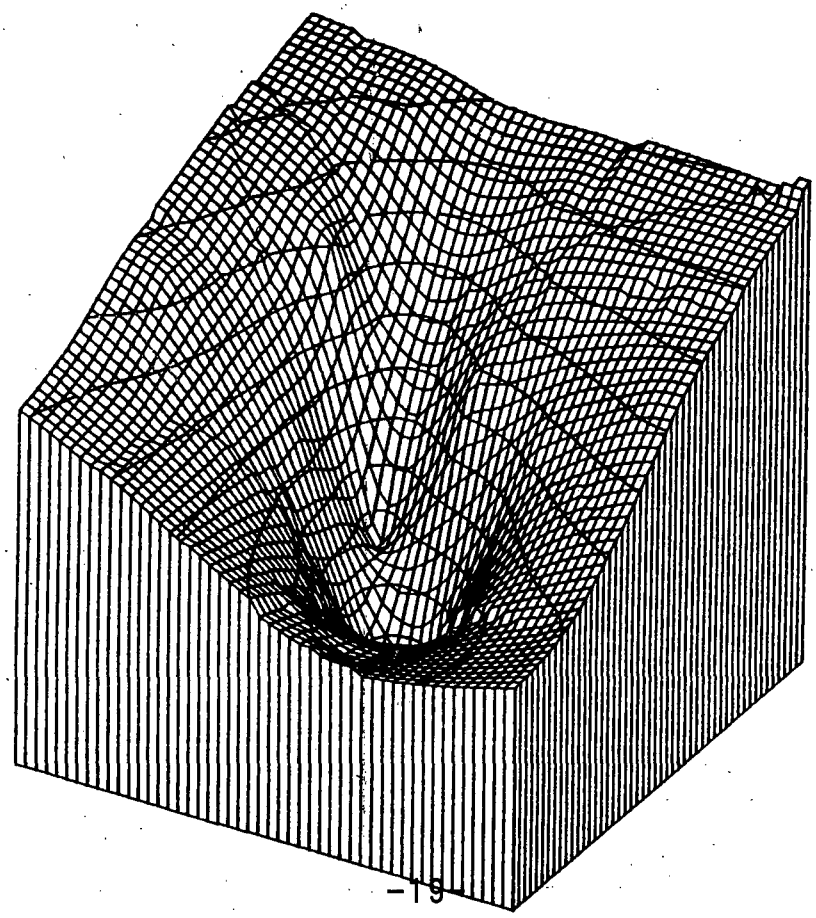
DRAWINGS

ATTACHMENT C

Converse
Environmental
East

SOIL & GROUNDWATER REMEDIAL INVESTIGATION
Phase 1
For
Litton Industries Inc.-Airtron Division
Hanover Twp., New Jersey

Nov. 24 1987



Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
NORTHERN BUREAU OF REGIONAL ENFORCEMENT
1259 ROUTE 46, BUILDING 2
PARSIPPANY, NEW JERSEY 07054

GEORGE G. McCANN, P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

DEC 1 1 1986

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. John Nicola
Litton Industries, Inc. - Airtron Division
200 East Hanover Avenue
Morris Plains, New Jersey 07950

Dear Mr. Nicola:

Re: Remedial Investigation of Groundwater Contamination
Litton Industries, Inc. - Airtron Division
Hanover Township, Morris County

As you are aware, the groundwater monitoring program of your facility has been under review by the Department for several years. In a letter dated October 12, 1983, from Jeffrey Hoffman, the Department informed Airtron that its requirement for additional monitoring wells was being held in abeyance pending the review of further sampling results from existing wells.

The New Jersey Geological Survey Element has recently completed a review of ground-water sampling data obtained from area monitoring and production wells located at both Airtron and Mennen. The conclusions reached utilizing the ground-water data from both sites are listed below:

1. Discharges to the unlined sludge lagoons at the Airtron site have led to ground-water contamination. A contaminant plume consisting of volatile organic compounds is emanating from the Airtron site and migrating toward the Mennen production wells.

2. The horizontal and vertical extent of ground-water contamination has not yet been determined.

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3. Contamination involving pollutants such as trichloroethene (TCE) and tetrachloroethene (PCE), which have a specific gravity greater than water will tend to sink through the water column. In order to determine the full vertical extent of contamination, deep monitor wells are necessary.

4. In order to assess the effectiveness of the Mennen wells in containing and remediating the contaminant plume, additional monitor wells are also necessary.

5. The sampling data has not shown any noticeable improvement in ground-water quality beneath the Airtron site, indicating that a source of pollution still exists on site. This source must be identified, delineated and remediated. Therefore, additional remedial investigation will be necessary.

6. Based upon the available data, the March 7, 1984 proposed Contingency Plan is unacceptable as submitted and should be modified after completion of the remedial investigation.

Therefore, the Airtron Division of Litton Industries, Inc., is DIRECTED to immediately conduct a remedial investigation of the groundwater contamination in the area of the facility. The remedial investigation shall be carried out in compliance with the following standards:

1. The remedial investigation shall be overseen by a qualified hydrogeologic consultant with substantial experience in groundwater pollution investigations.

2. The requirements of the remedial investigation are:

   a. Fully characterize all waste and other materials which are, or may be the source(s) of pollution at the site;

   b. Fully determine the nature, type and physical states of soil and ground-water pollution at and/or emanating from the site;

   c. Fully determine the horizontal and vertical extent of soil and ground-water pollution at and/or emanating from the site;

   d. Fully determine migration paths of pollutants through soil, surface water, ground water and sediment;

   e. Fully determine the impact of the pollution on human health and the environment;

   f. Collect, present and discuss all data necessary to adequately support the development of a feasibility study and the selection of a remedial action alternative that will remediate the adverse impacts of the pollution on human health and the environment in a timely fashion.

3. To properly assess the horizontal extent of ground-water contamination and whether the pumping of the Mennen wells is controlling the contaminant plume, at least four (4) additional shallow monitor wells shall be constructed on site in accordance with the attached monitor well specifications within sixty (60) calendar days of the date of this directive. The wells shall be constructed at locations as shown on Figure 1. The final location shall be approved by a Division of Water Resources ("DWR" or "Division") geologist before installation.

4. To initiate a proper assessment of the extent of vertical ground-water contamination, at least five (5) deep monitor wells shall be constructed on site in accordance with the attached monitor well specifications within sixty (60) calendar days of the date of this directive. The wells shall be constructed at locations as shown on Figure 1.

5. The monitor wells shall be installed in accordance with the following:

   a. All shallow monitor wells shall extend fifteen (15) feet below the water table. The screen shall extend from the bottom of the borehole to five (5) feet above the water table (i.e., 20 feet of screen). To insure the integrity of the well, centralizers shall be placed at ten (10)-foot intervals. In addition to the requirements listed on the well specifications, split spoon samples shall be taken at five (5)-foot intervals, at changes in soil strata and at any zones that show obvious signs of contamination. Split spoon samples shall be obtained according to ASTM Standard Penetration Methods (ASTM D1586-67).

   b. The deep monitor wells shall extend to a depth of 120 feet below the ground surface. The screen shall be placed at the interval of 100-120 feet below the ground surface.

   c. All well casings shall be surveyed to the nearest hundredth (0.01) foot above mean sea level by a NJ licensed surveyor.

   d. All wells shall have the appropriate permits from the Division's Water Allocation Unit at (609) 984-6831. The well permit number and the well designation number (i.e., MW-1) shall be permanently inscribed on all well covers.

6. In addition to the monitor wells, a proposed soil boring plan to delineate the extent of soil contamination shall be submitted to NJDEP for review. These soil borings shall extend 25 feet below the ground surface and be sampled continuously. The following procedures shall be implemented:

   a. All soil samples shall be screened using a photoionization detector (HNU) or a flame ionization detector (OVA). The three (3) soil samples from each boring with the highest readings shall be analyzed for volatile organic chemicals at

a laboratory certified by NJDEP using EPA Method 624. All other soil samples shall be retained for possible future reference and/or analysis.

b. All soil borings shall be permanently sealed with a cement/bentonite slurry upon completion by a NJ licensed well sealer. A tremie pipe shall be used to install the slurry.

c. As-built construction drawings will be needed for the Airtron site. If subsurface disposal systems such as septic tanks, seepage pits or dry wells are found on these diagrams, additional soil borings may be needed to determine whether these discharges could have impacted ground water.

7. Two (2) week prior notification is required before drilling so that a DWR geologist can be present during the installation of all wells and soil borings.

8. Decontamination procedures for all drilling equipment (paying particular attention to down hole tools, back of rig and drilling rod tracks), all sampling equipment (spoons, trowels, spatulas, bailers, pumps, etc.) and personnel clothing shall be approved by NJDEP before work is begun.

9. All wells shall be sampled approximately, but no sooner than two (2) weeks after installation and development. Sampling shall also include all existing wells. The samples shall be obtained according to the Ground-Water Sampling section of DWR's Field Procedure Manual for Water Data Acquisition. Field and trip blanks shall be used. The initial ground-water samples shall be analyzed for Priority Pollutants plus forty (40) (EPA Method 129), by a laboratory certified by the Department.

10. Subsequent sampling of all new wells and all existing wells shall be done quarterly. All such samples shall be analyzed for Volatile Organic Compounds (VOC's) (EPA Method 624) by a laboratory certified by the Department. Further, the samples shall be analyzed for other parameters as may be required by the Division pending review of the results of analysis of the initial sampling.

11. Two (2) week notification is required before the sampling of any monitor wells so that DWR personnel can split samples.

12. Monthly synoptic static water level readings shall be taken in all monitor wells (existing and proposed) to the nearest hundredth (0.01) foot above mean sea level.

13. To ensure the health and safety of field investigators, air measurements for volatile organics shall be made with one or more appropriate, properly calibrated survey instruments. When the presence of organic vapor/gases are unknown, instruments such as a photoionization detector (HNU) and/or a flame ionization detector (OVA), operated in total readout mode, should be used to

detect organic vapors. Total unidentified vapor/gas concentrations of 5 ppm above background require Level B protection (self contained breathing). Only a qualified individual such as a toxicologist should select Level C (air purifying respirators) protection for continual use in an unidentified vapor/gas concentration of 5 ppm above background.

14. After completion of the remedial investigation, a report shall be prepared by a qualified hydrogeologic consultant and contain, at a minimum, the following information:

    a. An evaluation of the site history and disposal practices;

    b. Results of all analyses including laboratory data sheets and the required quality assurance documentation;

    c. Summary table(s) of analyses;

    d. Stratigraphic logs and as-built construction diagrams for each monitor well and soil borings including grain size and field instrument readings during drilling;

    e. Well casing elevations to the nearest hundredth (0.01) foot above mean seal level for each monitor well and the existing wells;

    f. At a minimum, monthly synoptic static water level elevations to the nearest hundredth (0.01) foot above mean sea level in each monitor well and the existing wells;

    g. At least two (2) accurate ground-water contour maps for two (2) different sets of data. Contours for shallow and deep aquifers may be necessary;

    h. Ground-water quality contour maps for each set of sampling data;

    i. A site map including:

        1. Property boundaries;
        2. Structures and improvements;
        3. Topography indicating two (2) foot contours;
        4. All underground piping and utilities including septic tanks, seepage pits, dry wells and waste lagoons;
        5. Scale and orientation;

    j. A sample location map(s) including:

        1. Monitor well locations with screened interval depth and well casing elevations;
        2. Soil boring locations;

    k. Conclusions concerning the soil boring study and the types and locations of on-site sources of contamination;

l. Conclusions concerning the horizontal and vertical extent of the contaminant plume and the effectiveness of the Mennen production wells in containing and remediating the contaminant plume;

m. Recommendations for additional monitor well installations and/or soil borings, if necessary;

n. Recommendations for remedial measures to eliminate the sources of contamination and restore the site to background conditions in a timely fashion.

15. The report from this remedial investigation shall be submitted to the Department within one hundred eighty (180) calendar days of the date of this directive. The review of the report by the Department shall determine further requirements for remediation, which may include a feasibility study of remedial alternatives.

Failure to comply with this directive will result in substantial civil administrative penalties assessed against the Airtron Division of Litton Industries, Inc. Therefore, kindly devote your full attention to this matter.

All data and correspondence required by this directive is to be addressed to:

Joseph M. Mikulka, Chief
Northern Bureau of Regional Enforcement
Division of Water Resources, NJDEP
1259 Route 46, Building 2
Parsippany, New Jersey 07054

If you should have any questions on this matter, please contact Chris Mallery, who is responsible for this case, at (201) 299-7592, or by letter at the address above.

Very truly yours,

Jeffrey Hoffman

for Robert Plumb, Assistant Chief
Northern Bureau of Regional Enforcement

E112:bmf(9)

2 Attachments

SOIL AND GROUNDWATER REMEDIAL INVESTIGATION
PHASE 1 RESULTS

LITTON INDUSTRIES, INC. - AIRTRON DIVISION
Hanover Township, New Jersey

By

CONVERSE ENVIRONMENTAL EAST

24 November 1987

Project No. 87-47400-01

Cover - 3-dimensional fish net diagram of the water table surface in the upper flow system showing the drawdown configuration due to pumping of Mennen Production Well #1. View is from the southwest looking towards the Mennen Well and Airtron beyond.

Converse Environmental East

91 Roseland Avenue
Post Office Box 291
Caldwell, New Jersey 07006
201 226-1522

24 November 1987

New Jersey Department of Environmental Protection
Division of Water Resources
Northern Bureau of Regional Enforcement
1259 Route 46, Building 2
Parsippany, New Jersey 07054

Attention: Mr. Christopher Mallery

Re: Soil and Groundwater Remedial Investigation Report
Phase 1 Results
Litton Industries, Inc. - Airtron Division
200 East Hanover Avenue
Hanover Township, New Jersey 07950
(87-47400-01)

Dear Mr. Mallery:

Enclosed please find three copies of the Phase 1 Soil and Groundwater Remedial Investigation Report for the referenced site along with three copies of Addendum 1, Volumes 1 through 4, which contain the laboratory reports, QA/QC data, and chain-of-custody records, and Addendum 2 which contains copies of well records obtained from the NJDEP. The investigation was undertaken in response to the NJDEP Directive dated December 11, 1986 as amended by a letter dated April 24, 1987, copies of which are attached.

If you have any questions or comments, please call.

Very truly yours,

CONVERSE ENVIRONMENTAL EAST

R. Brian Ellwood, Ph.D.
Vice President

Donald A. Smith
Project Hydrogeologist

Robert L. Zelley
Staff Geologist

RBE/DAS/RLZ/mhm

Encl.

cc: Chief Mikulka, Northern Bureau of Regional Enforcement
Assistant Chief Plumb, Northern Bureau of Regional Enforcement
Chris Mallery, Northern Bureau of Regional Enforcement
George Van Orden, Hanover Health Department
Leon Pieta, Airtron Division, Litton Industries, Inc.
Joseph Lo Schiavo, Exec. V.P., Airtron Division, Litton Industries, Inc.

Let's protect our earth

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
NORTHERN BUREAU OF REGIONAL ENFORCEMENT
1259 ROUTE 46, BUILDING 2
PARSIPPANY, NEW JERSEY 07054

GEORGE G. McCANN, P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

APR 2 4 1987

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Robert Lagno, Vice President
Litton Industries, Inc., Airtron Division
200 East Hanover Avenue
Morris Plains, New Jersey 07950

Dear Mr. Lagno:

Re: Remedial Investigation of Ground-water Contamination
Litton Industries, Inc., Airtron Division
Hanover Township, Morris County

On March 17, 1987, representatives of the Department of Environmental Protection (the "Department") met with representatives of Litton Industries, Inc., Airtron Division ("Airtron") and Converse Environmental East ("Converse") to discuss modifications of the requirements of a Directive issued December 11, 1986, which detailed a Remedial Investigation that Airtron is to carry out at the Hanover facility. As a result of these discussions, it was determined that some specific modifications would be acceptable to the Department. The modifications of the Directive are:

1. In paragraph three (3) of the specifications of the Remedial Investigation, there is a requirement of at least four (4) additional shallow monitor wells. This is modified to a requirement of three (3) additional shallow monitor wells. The locations for these wells are indicated on the enclosed figure; however, these locations must be finalized by a geologist from the New Jersey Geological Survey Element before monitor well installation. All other specifications and sampling requirements for the shallow monitor wells remain in effect as stated in the Directive. In addition, U.S. Geological Survey Well No. 3 is to be included in all sampling programs for shallow monitor wells.

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2. In paragraph four (4) of the specifications of the Remedial Investigation, there is a requirement of at least five (5) deep monitor wells. This is modified to a requirement of three (3) deep monitor wells. The locations for these wells are indicated on the enclosed figure; however, these locations must be finalized by a geologist from the New Jersey Geological Survey Element before monitor well installation. All other specifications and sampling requirements for the deep monitor wells remain in effect as stated in the Directive.

3. In paragraph six, section a (6.a), of the specifications of the Remedial Investigation, there is a requirement that three (3) soil samples from each soil boring be analyzed (using EPA method 624). This is modified to a requirement that:

   a. If the soil from a particular boring shows uniformly low levels of volatile organic chemicals, only one soil sample (that is, the soil showing the highest relative level) from this boring shall be analyzed (using EPA method 624); and

   b. If the soil from a particular boring shows some elevated levels of volatile organic chemicals, three (3) samples from this boring (that is, the three showing the highest relative levels) shall be analyzed (using EPA method 624).

   All other specifications and sampling requirements of the soil boring plan shall remain in effect as stated in the Directive.

4. All compliance schedules contained in the Directive will be considered to start on the date of receipt of this letter. Among other requirements, this includes the installation of all monitor wells within sixty (60) days and the submittal of the report of the Remedial Investigation within one hundred eighty (180) days. Failure to comply with these schedules may result in further enforcement actions and the imposition of penalties.

The requirement that a geologist of the New Jersey Geological Survey be notified at least two (2) weeks prior to monitor well installation and sampling of monitor wells remains in effect and is of particular importance in the coordination of an effective Remedial Investigation at this site.

The interest and effort that Airtron has expressed in remediating this long term problem is very much appreciated by the Department. If any questions arise, please contact Christopher S. Mallery, of my staff, at (201) 299-7592.

Very truly yours,

Robert Plumb, Assistant Chief
Northern Bureau of Regional
Enforcement

E112:LW(12)

cc: Dr. Brian Ellwood, Vice President, Converse Environmental
Donald Smith, Hydrogeologist, Converse Environmental
Theodore Craver, Esq., Vice President, Litton Industries
John Nicola, Plant Engineer, Litton Industries-Airtron Division
Leon Pieta, Engineer, Litton Industries-Airtron Division
George Van Orden, Hanover Health Department
Joseph Lo Schiavo, President, Litton Industries-Airtron Division
Chief Joseph M. Mikulka, Northern Bureau of Regional Enforcement
Christopher Mallery, Northern Bureau of Regional Enforcement

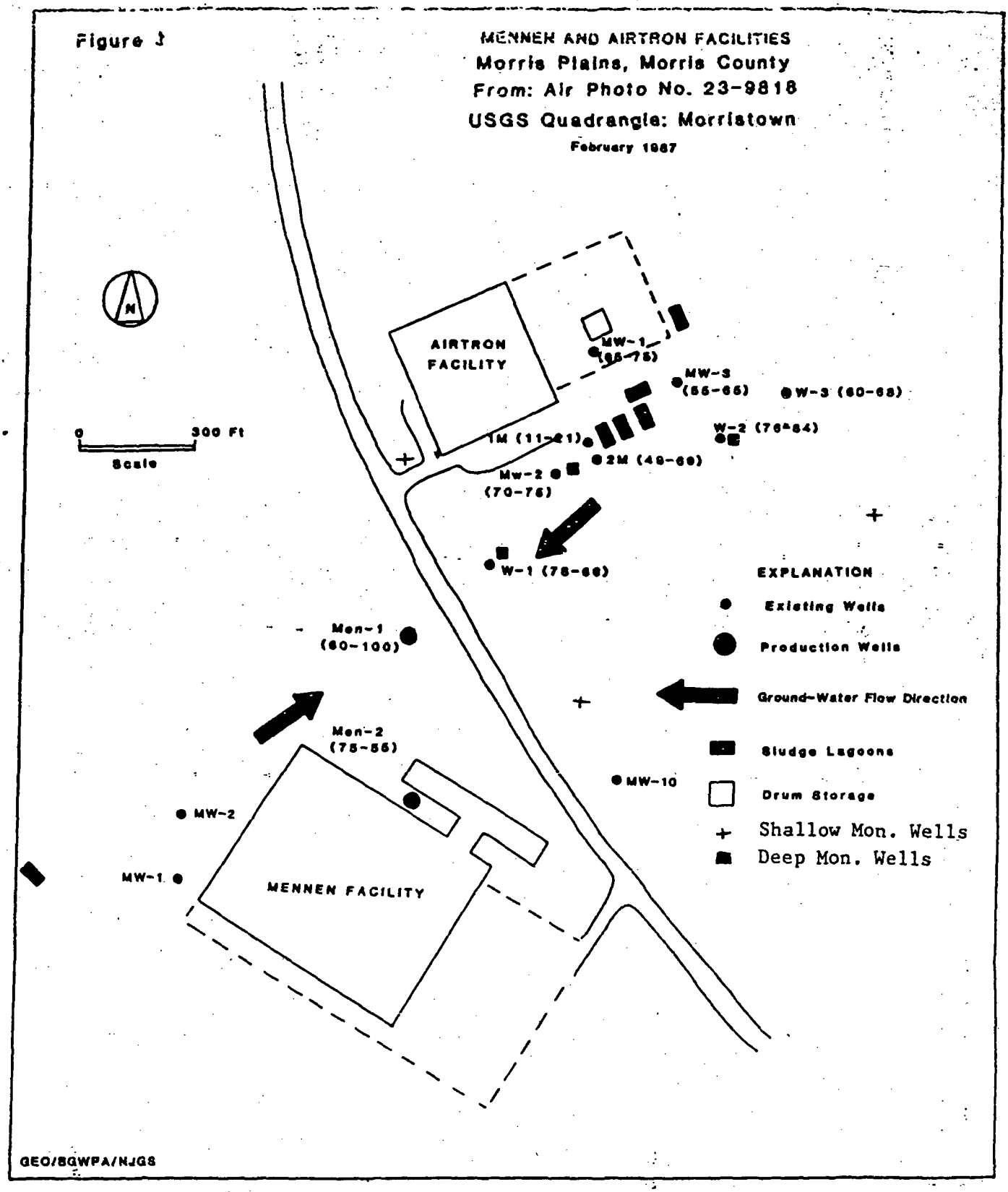


Figure 3
MENNEN AND AIRTRON FACILITIES
Morris Plains, Morris County
From: Air Photo No. 23-9818
USGS Quadrangle: Morristown
February 1987
N
0
300 Ft
Scale
AIRTRON FACILITY
MW-1 (65-75)
MW-3 (55-65)
W-3 (60-68)
W-2 (76-84)
1M (11-21)
2M (49-69)
Mw-2 (70-76)
W-1 (75-88)
Men-1 (60-100)
Men-2 (75-55)
MW-10
MW-2
MW-1
MENNEN FACILITY
EXPLANATION
Existing Wells
Production Wells
Ground-Water Flow Direction
Sludge Lagoons
Drum Storage
Shallow Mon. Wells
Deep Mon. Wells
GEO/BGWPA/NJGS

TABLE OF CONTENTS

	Page
INTRODUCTION	1
SUBSURFACE INVESTIGATION	
General	1
Shallow Soil Borings	5
Monitoring Well Installation	5
HYDROGEOLOGY	
General	9
Bedrock	10
Pleistocene Glacial Deposits	11
Upper Unsaturated Zone	11
Upper Unconfined Aquifer	13
Upper Aquitard	16
Lower Confined Aquifer	17
Lower Aquitard	17
FLOW DIRECTIONS AND GRADIENTS	
Upper Flow System	18
Lower Confined Aquifer	19
Vertical Gradients	20
SOIL SAMPLING PROGRAM	
General	22
Results of Laboratory Analysis	23
GROUNDWATER SAMPLING PROGRAM	
General	27
Results of Laboratory Analyses	29
CONCLUSIONS	37
RECOMMENDATIONS	40

APPENDIX A - Well and Boring Logs

APPENDIX B - Hydrograph Data

APPENDIX C - Well Wizard Certification

LIST OF TABLES, DRAWINGS AND FIGURES

TABLES

TABLE 1 - Project Chronology

TABLE 2 - Completion Summary of Newly Installed Wells

TABLE 3 - Completion Summary of Pre-Existing Wells

TABLE 4 - Well Elevation and Location Survey

TABLE 5 - Summary of Water Levels and Elevations

TABLE 6 - Chemical Test Results for Volatile Organic Compounds - Soil

TABLE 7 - Chemical Test Results for Base Neutral Compounds - Soil

TABLE 8 - Chemical Test Results for Volatile Organic Compounds - Water - Round 1

TABLE 9 - Chemical Test Results for Base Neutral Compounds - Water - Round 1

TABLE 10 - Chemical Test Results for Acid Extractable Compounds - Water - Round 1

TABLE 11 - Chemical Test Results for Pesticides/PCB's - Water - Round 1

TABLE 12 - Chemical Test Results for Metals, Cyanides and Phenols - Water - Round 1

TABLE 13 - Chemical Test Results for Volatile Organic Compounds - Water - Round 2

TABLE 14 - Chemical Test Results for Base Neutral Compounds - Water - Round 2

TABLE 15 - Well Location Survey

DRAWINGS

DRAWING 1 - Site Map and Results of Soil Analyses

DRAWING 2 - Subsurface Section A-A, B-B

DRAWING 3 - Subsurface Section A-A, B-B

DRAWING 4 - Water Table Contours - Upper Flow System

DRAWING 5 - Potentiometric Surface - Lower Aquifer

DRAWING 6 - Results of August and October, 1987 Groundwater Analyses

DRAWING 7 - Inferred Plume Boundaries

DRAWING 8 - Well Inventory Location Plan

FIGURES

FIGURE 1 - Site Location Map

FIGURE 2 - Well Location Map

FIGURE A-1 - Unified Soil Classification System

INTRODUCTION

The purpose of this report is to provide a summary of the field activities and laboratory analyses performed to-date for the Airtron facility, located in Hanover Township, New Jersey. The site location with respect to Hanover Township is shown on Figure 1. The purpose of this investigation is to obtain additional subsurface data needed to develop a cost-effective remediation program which will result in satisfactory control and clean-up of soil and groundwater contamination. This work was performed in response to the NJDEP Directive to Airtron dated December 11, 1986 and the modified Directive dated April 24, 1987. A chronology of major events during this phase of the project is summarized in Table 1.

SUBSURFACE INVESTIGATION

General

The soil sampling and monitoring well installation program was performed between May 18, 1987 and July 31, 1987 at the Airtron facility. The entire program was conducted and/or supervised by experienced Converse Environmental East (CEE) geologists and hydrogeologists. A total of 22 shallow soil borings, averaging approximately 50 feet in depth, were drilled by licensed drillers from CC Construction of Caldwell, New Jersey. In addition, the investigation included a total of 6 monitoring wells which were drilled and installed by Empire Soils Investigations, Inc. of Highland Park, New Jersey.

The monitoring wells consist of 3 deep double-cased wells which average approximately 135 feet in depth and 3 shallow wells which average approximately 80 feet in depth. The field program was inspected on a periodic basis by NJDEP representatives from the New Jersey Geologic Survey and the Northern Bureau of Regional Enforcement.

Drawing 1 and Figure 2 are March 1987 aerial photographs of the project area which show in detail the existing features of the Airtron site and surrounding properties. Drawing 1 shows the location of all borings and monitoring wells used in this study. Figure 2 shows the same areas as Drawing 1 but on a smaller scale. In addition, this figure shows the location of most of the shallow monitoring wells. Table 2 is a completion summary of monitoring wells installed for this investigation, whereas, Table 3 presents the completion details of the previously existing Airtron monitoring wells. Detailed well completion data and geologic logs of soils encountered are shown on the Logs of Wells and Borings, located in Appendix A. Drawings 2 and Drawing 3 present cross-sections based on our hydrogeologic interpretations of the subsurface conditions in the vicinity of the study area.

Table 4 is a well elevation summary taken from a survey performed by licensed land surveyors from Recon, Inc. of Whippany, New Jersey. As of this report, the New Jersey Grid Coordinates for the well locations are pending. Due to the excellent ground control provided by the high resolution aerial photographs, the locations of the wells as shown on the site maps are considered to be very accurate.

Water levels have been measured periodically in all the monitoring wells used in this study. A tabulation of these water level measurements and elevations with respect to mean sea level is shown on Table 5. Groundwater elevations from the upper flow system for the most recent round of measurements have been contoured and are presented on Drawing 4. Drawing 5 is a contour map representing the potentiometric surface of the lower confined aquifer. As part of this investigation, two Stevens Water Level Recorders were installed on monitoring wells MW-1 and MW-3 to observe and record continuous fluctuations of the water table in the upper aquifer. The recorder on MW-1 was later moved to monitoring well MW-2. The resulting hydrographs, along with precipitation measurements, barometric pressure data, and the Mennen Production Well discharge records for the same time interval, are presented in Appendix B.

Drawing 1 also contains a tabulation of total concentrations of volatile organics and base neutral extractables from the laboratory analyses of soil samples collected in the vicinity of the former Airtron lagoons. A summary of the complete laboratory analyses of the soil samples is shown on Tables 6 and 7. The laboratory reports, QA/QC documentation, and chain-of-custody forms are located in Addendum 1, Volumes 1 and 2 to this report.

Following the completion of the monitoring wells, groundwater samples were collected on August 17-18, 1987 from 15 existing and newly completed wells for analyses of priority pollutants plus 40. A summary of the results from the first round of groundwater sampling is shown on Tables 8 through 12. The

results are also shown on Drawing 6. Following technical review of the first round water quality data, the NJDEP approved a second round of sampling and analysis. This program consisted of laboratory analysis for only volatile organics at all the wells except for monitoring well MW-1. The MW-1 sample included analysis for base neutral extractables. The second groundwater sampling round was performed on September 30 and October 1, 1987. A summary of the second round groundwater analysis is presented on Tables 13 and 14. The results from the second round are also shown on Drawing 6, along with the first round results for comparison of the data. The complete laboratory reports, QA/QC documentation, and chain-of-custody forms are located in Addendum 1, Volumes 3 and 4 to this report.

An inventory of wells registered with the NJDEP was conducted as part of this study. This was done to gather additional hydrogeologic data for the area, to identify the locations of groundwater pumping wells in the vicinity, and to obtain data on other monitoring wells which have been installed in the surrounding area. A tabulation of known existing wells within a 1 1/2 mile radius of the Airtron site, including well owner, well depth and yield is presented on Table 15. The approximate well locations are shown on Drawing 8. Locations of wells within a 1/2 mile of the Airtron site were field verified. Copies of the well records obtained from the NJDEP are located in Addendum 2 to this report.

Shallow Soil Borings

The first stage of this soil and water investigation was the drilling and sampling of 22 shallow soil borings to the top of the water table. The drilling was performed by licensed drillers from CC Construction of Caldwell, New Jersey, utilizing a CME 55 drilling rig. The borings were drilled using rotary methods with a 3 7/8 inch diameter tri-cone bit and bentonite wash. Baroid, non-additive bentonite, was used as the drilling mud in all borings. Soil samples were collected for geologic and environmental purposes at 5 foot intervals using a 2 or 3 inch diameter split spoon sampler. Soil samples were described in accordance with the Unified Soil Classification System (USCS). Test boring logs, along with a description of the USCS soil identification system, (Figure A-1), are included in Appendix A.

Prior to advancing to the next boring, the licensed well driller pressure sealed the borehole with a thick bentonite slurry. The drilling rig, and all drilling and sampling equipment were decontaminated between borings with a Karcher, Model 580, high pressure/temperature steam cleaner capable of 250 degree F, 900 psi steam. All drilling mud and cuttings were stored in uniquely labeled 55 gallon drums, pending the results from the lab analyses.

Monitoring Well Installation

A total of 6 overburden monitoring wells were installed in accordance with NJDEP overburden monitor well specifications (NJAC-7:14A-6:13) by New Jersey licensed drillers.

Monitoring wells MW-201, MW-202, and MW-203 were completed as deep, double-cased wells, and monitoring wells MW-204, MW-205 and MW-206 were completed as shallow wells.

Exploration borings at each of the three deep well sites were drilled and sampled by CC Construction immediately following the shallow soil boring program. This was to save time and costs by using a smaller rig specifically designed to gather subsurface soil data rapidly. At each of the deep well sites, a small diameter pilot hole was drilled and sampled through the upper aquifer to within the underlying fine-grained till unit. The borings were advanced using the same methods as in the shallow soil boring program. Soil samples were obtained for geologic purposes at 5 foot intervals using a standard split spoon sampler. Soil samples were described in accordance with the Unified Soil Classification System (USCS). At boring site B-201, (the exploration hole for monitoring well MW-201), 4 inch diameter, flush-threaded, temporary steel casing was driven through the upper aquifer into the underlying fine-grained unit. This was done prior to drilling into the underlying material to protect the lower zones against hydraulic interconnection with the upper contaminated zone. This boring was then drilled and sampled through the lower aquifer and into the underlying fine-grained materials. Each boring was immediately sealed with a thick bentonite slurry after drilling. At boring site B-201, the borehole was filled with the bentonite slurry prior to removal of the temporary 4 inch diameter casing.

Empire Soils Investigations, Inc. mobilized to within about 10 feet from the exploration borings at each of the 3 deep monitoring well sites. At these locations, Empire drilled through the upper aquifer and to about 5 to 10 feet into the underlying fine-grained unit. The borings were advanced using rotary drilling methods with a 14 inch diameter drag bit and bentonite wash. The drilling of this upper portion proceeded slowly due to the large number of cobbles and boulders. To protect the lower aquifer from possible downward migration of volatile organics during the drilling operation, an 8 inch diameter steel casing was installed within each of 3 borings. The steel casing was grouted in-place with a cement/bentonite grout, and the grout allowed to set before drilling the remainder of the boring using rotary wash methods. The lower portion of boring MW-201 was completed based on the log developed during the sampling of the adjacent exploration boring. Soil samples were collected by Empire in the lower portions of borings MW-202 and MW-203. Based on the geologic logs, the entire thickness of the lower aquifer was screened at each of the 3 deep monitoring well sites.

The borings at each of the shallow monitoring well sites were drilled by Empire Soil Investigations, Inc. using rotary drilling methods with an 8 inch diameter tri-cone roller bit and bentonite wash. Soil samples were collected at 5 foot intervals using standard split spoon samplers and were logged as described previously. The borings at sites MW-204 and MW-206 were drilled to approximately 20 feet below the water table in the upper aquifer. Monitoring wells MW-204 and MW-206 were constructed using 20 feet of screen set between about 5 feet above and 15 feet below the water table. At

monitoring well site MW-205, the upper aquifer, as defined in this report, does not exist. The well was, therefore, screened in the first relatively permeable soils which were encountered between depths of 50.5 to 58.0 feet below ground surface. Consequently, the screened interval in this well does not span the water table as in the other shallow monitoring wells.

All drilling and sampling equipment was steam-cleaned between each well site. All drilling mud and cuttings were placed into 55 gallon drums, sealed, labeled and stored on-site as directed by Airtron.

All the deep and shallow monitoring wells were constructed of 4 inch diameter flush-threaded PVC casing and slotted screen with 0.010 inch factory saw cuts. A 1 foot long sump was attached to the bottom of each well to act as a sediment trap. Stainless steel, spread type centralizers were secured with stainless steel screws on the screened portion of each well. This was done to center the screen in the borehole and achieve the optimum annular space for the sand pack. The screened intervals were sand packed with #00 graded Jessie Morie Sand to approximately 2 to 3 feet above the top of the screen. Tremie methods were used to install the sand pack. The annular space above the sand pack was grouted with a thick bentonite slurry to approximately 3 feet below ground surface.

At most of the well sites, the annular space at the top of each hole was filled with concrete, and a protective steel casing with locking cap was installed above the ground. A concrete pad was placed at the base of each protective casing

to divert surface runoff. The NJDEP state permit number was permanently placed on the protective casing of each well. Monitoring wells MW-201 and MW-206 were constructed as flush mount completions using America, Inc. locking meter boxes.

Upon completion, each deep monitoring well was developed by air methods, and by hand bailing in each of the shallow wells. All the wells contained water which was initially very turbid. Development of each well continued until the discharge became clear and until conductivity measurements stabilized.

A dedicated Well Wizard P-1201 bladder pump, with PT-5100 teflon-lined polyethylene tubing, was installed in each new and existing monitoring well. Due to the large volume of water that is necessary to purge from the 3 USGS wells, a Grundfos SP-4-6, 115 volt, 1/2 horsepower submersible pump was also installed in each of these wells.

Following construction, the elevations and locations of the monitoring wells were surveyed by a New Jersey licensed surveyor from Recon, Inc. of Whippany, New Jersey. As of this report, the horizontal coordinates of each well location is pending.

HYDROGEOLOGY

General

The Airtron site and surrounding area is underlain by two general hydrogeologic units. These consist of bedrock aquifers, and the overlying Pleistocene glacial deposits.

Bedrock

The Airtron facility is located within the far western portion of the Piedmont Physiographic Province in northern New Jersey. In the vicinity of Hanover Township, New Jersey, the rocks which underlie the Piedmont Province consist entirely of consolidated sedimentary deposits of the Boonton member of the Brunswick Formation. This formation is composed of Triassic sandstone with interbedded shales.

Approximately 2000 feet west of the site, the Brunswick Formation is truncated by the Great Border Fault which forms the actual geologic boundary between the Piedmont and the Highland Physiographic Provinces. The Whippany River, located west of the Airtron site, locally outlines the trend of this fault zone. Along this north-south trending fault, sedimentary rocks of the Brunswick Formation lie against Precambrian crystalline rocks. These crystalline rocks consist of a variety of hard gneisses, granites and schists.

The bedrock surface forms a broad trough which locally trends in a general north-south direction. The Airtron site is located along the approximate axis of this trough, with outcrops of Precambrian crystalline rocks and sediments of the Brunswick Formation exposed at the surface about 2500 feet to the west and east of the site, respectively. This depression in the bedrock surface is filled with varying thicknesses of sediments deposited during the Wisconsin glaciation.

None of the borings drilled for this investigation penetrated the underlying Brunswick Formation. The boring logs from this study indicate a depth to bedrock of greater than 138

feet. Available well logs from the surrounding area indicate that the thickness of glacial soils overlying bedrock is about 190 feet at a well located approximately 1300 feet east of the site, and about 153 feet at a well located approximately 500 feet west of the site.

Because none of the bedrock strata were penetrated by any of the borings drilled for this investigation, and because it is believed they are not hydrologically relevant to the results of this study, the hydrologic properties of the bedrock units are not detailed in this report.

Pleistocene Glacial Deposits

The glacial sediments underlying the Airtron site can be divided into at least 5 general hydrogeologic units. These consist of an upper unsaturated zone, an upper unconfined aquifer, an upper fine-grained aquitard, a lower confined aquifer, and a lower fine-grained aquitard.

Upper Unsaturated Zone

The unsaturated zone under the study area can be subdivided into at least two separate geologic units: a relatively low permeability surface till and unsaturated outwash sands above the upper aquifer.

The uppermost unit consists mainly of non-residual, unstratified glacial till composed of various proportions of clay, silt, sand and gravel with occasional cobbles and boulders. The thickness of this surface till ranges from less than 25 feet to over 45 feet. Several discontinuous lenses of clays, silts, sands and gravelly sands were encountered within this unit. In general, the upper portion of the surface till contains a higher proportion of fine-grained materials than the lower portion of the till.

Permeabilities of the surface till were not measured for this study. Because of the extreme heterogeneity of these till deposits along with the existence of discontinuous lenses with variable compositions, the vertical and horizontal permeabilities may span a relatively large range of values. Bulk permeability of this generally fine-grained unit, however, is expected to be relatively low and values in the range of 1×10^{-5} to 1×10^{-7} cm/sec (0.2 to 0.002 gpd/ft.^{2}) are considered reasonable estimates.

A shallow, possibly discontinuous perched saturated zone is present within the upper portion of the surface till and was encountered in a shallow piezometer at boring B-117 and at existing monitoring well 1M. The depth to the perched zone is approximately 10 feet below grade. Although the base of the perched zone was not established, existing monitoring well B-1, which is located adjacent to MW-2 and screened within the lower portion of the surface till, is dry. This suggests the presence of a possibly discontinuous, very low permeability layer in the upper portion of the surface till. Water from within this perched zone was not sampled in this investigation. Previous analyses from a sample from monitoring well 1M in 1981, however, indicated the presence

of aliphatic volatile compounds at concentrations above NJDEP guidelines. The significance of this perched zone is that it could permit localized lateral movement of volatile contaminants away from the location of the former lagoons. However, significant contamination has not been found in soil samples from borings drilled outside the perimeter of the former lagoons.

The second unsaturated unit underlies the surface till at all the boring and well sites, except at monitoring well MW-205 where it does not exist. This material generally consists of well-sorted to poorly sorted, stratified fine to coarse sand with a trace to some silt and gravel. This is the same geologic material which composes the underlying upper aquifer. This unit is less than 10 feet in thickness at monitoring well USGS-3 and increases in thickness to the west towards the Mennen pumping well #1. In the western portion of the Airtron site, the thickness of this zone may be greater than 25 feet. Because this unit is generally coarse-grained and/or well sorted, relatively higher permeabilities in the range of 1×10^{-1} to 1×10^{-3} cm/sec (2000 to 20 gpd/ft.^{2}) can be expected in this interval.

Upper Unconfined Aquifer

The upper aquifer consists generally of poorly sorted to well-sorted stratified glacial outwash sands with a trace to some silt and gravel. This unit was encountered at all the sites investigated in this study, except at monitoring well MW-205. The log from this monitoring well indicates that either the subsurface outwash channel doesn't exist at this

location or that it has dramatically different hydraulic properties. The thickness of the upper aquifer in the remainder of the wells ranges from less than 25 feet to over 45 feet. Under the Airtron property, the saturated thickness is maximum under the eastern portion of the site and decreases to the west towards the Mennen pumping well #1. Permeabilities of the upper aquifer were not measured for this study. Based on experience with similar materials, the horizontal permeabilities of this unit would be expected to be within the range of about 1×10^{-3} to over 1×10^{-1} cm/sec (20 to >2000 gpd/ft.^{2}). Vertical permeabilities would probably be within the same order of magnitude as the horizontal permeabilities based on observations of soil samples and grain size characteristics. Assuming an average permeability of 5×10^{-2} cm/sec (1000 gpd/ft.^{2}) and an average saturated thickness of about 35 feet, the estimated transmissivity is about 35,000 gpd/ft. This is a reasonable value for outwash deposits in northern New Jersey.

Static water levels are below the base of the surface till, and unconfined conditions are expected to prevail in the upper aquifer. Although storage coefficients for the upper aquifer were not measured in this study, an estimated value of between 0.05 and 0.15 for the specific yield is probably reasonable.

On April 3, 1987, 2-Type F, Model 68, Stevens Water Level Recorders were installed on monitoring wells MW-1 and MW-3 to observe and investigate fluctuations of the water table in the upper aquifer. These float/time driven instruments recorded water table fluctuations at a 1:1 scale with respect to time. The data were recorded on scaled charts and are shown in Appendix B.

The possible influences on the water table include atmospheric-pressure effects and drawdown/recovery effects due to cyclic pumping of the Mennen production well. As the water levels in the monitored aquifer were over 50 feet below ground surface, fluctuations due to evapotranspiration were not expected to be present. On June 9, 1987, the Stevens recorder on MW-1 was relocated to MW-2; while the recorder on MW-3 remained. The Stevens Recorder Program continued until 18 July, 1987.

The water level data have been plotted versus three parameters: precipitation, pumping of Mennens' production well #1, and barometric pressure. Mennen Corporation supplied the pumping data, and Ion Weather, Inc., located at the nearby Morristown Airport, supplied the precipitation records and microbarograph charts.

These data show that little, if any, correlation exists between the pumping of the Mennen production well #1 and water level fluctuations in the monitored wells. An explanation is that the cone of depression around the Mennen well #1 is probably in a steady state condition, due to the nearly constant operation of at least one of the Mennen production wells for over 30 years. Accordingly, significant fluctuations due to Mennens' pumping would not be detected unless pumping rates were increased or terminated for long periods of time (i.e., possibly weeks).

No consistent correlation exists between the precipitation record and water level fluctuations. This is not surprising due to the presence of the overlying surface till which would greatly impede rapid infiltration of precipitation. There does appear to be a consistent inverse relationship between

the microbarograph record and water table fluctuations. The data show that when barometric pressure rises, the water levels fall, and vice versa.

Changes in atmospheric pressure have no direct effect on unconfined aquifer systems. It has been observed, however, that changes in atmospheric pressure can have an indirect inverse effect on water table fluctuations. These fluctuations are generally attributed to air bubbles entrapped in the partially saturated soil-moisture zone. Generally, the more fine grained the subsurface material and the larger the capillary fringe, the larger the corresponding fluctuation in head.

Based on the hydrographs obtained from the three monitoring wells, there appears to be two main mechanisms which create fluctuations in the water table of the upper aquifer. One is the small scale fluctuations due to barometric changes as were measured for this study. The other mechanism, which can only be inferred from the limited data, is due to seasonal variations in recharge and discharge in the upper aquifer.

Upper Aquitard

The upper aquifer at all of the sites monitored for this study is underlain by a fine-grained till and stratified silt which combine to form the upper aquitard. Monitoring well MW-205 is believed to be screened within a sand lense located within the till unit. The till material is similar to the surface till in composition, but has a greater density. The till is a heterogeneous mixture of clay, silt, sand, gravel with occasional cobbles and boulders. The other material

consists of stratified inorganic silts with varying proportions of fine sand and clay. These dense silts were found in the upper portion of monitoring well MW-205 and in several monitoring wells in the northern portion of the Airtron property. The thickness of the upper aquitard is about 30 feet. Due to the fine-grained nature of these over-consolidated deposits, very low vertical permeabilities in the range of 1×10^{-6} and 1×10^{-7} cm/sec (.02 and .002 gpd/ft.^{2}) are probably reasonable.

Lower Confined Aquifer

The upper aquitard is underlain by between 10 to 15 feet of stratified sands, with various amounts of silt, which make up the lower aquifer. The lower aquifer was penetrated and screened in the 3 deep monitoring wells (MW-201, MW-202 and MW-203). In addition, the boring log for monitoring well MW-1 indicates that this unit was penetrated at depth during the exploration drilling phase at this location. The unit is composed of relatively finer-grained material and is not as well sorted compared with the upper aquifer. Based on this, permeabilities of this aquifer are lower than the upper aquifer and probably range from 1×10^{-4} to 1×10^{-2} cm/sec (2 to 200 gpd/ ft.^{2}). Because of the presence of the low overlying permeability aquitard, confined conditions are present in this lower aquifer.

Lower Aquitard

This unit underlies the lower confined aquifer and was penetrated by exploration borings during the drilling of the

three deep wells for this study and MW-1 for a previous investigation by Converse in 1981. At all the borings, this unit is a dense, glacial till which is composed of a heterogeneous mixture of clays, silt, sand, gravel and occasional cobbles and boulders. The till is at least 5 feet thick. The total thickness of the lower aquitard is unknown. Based on field observations of this dense, fine-grained material, low permeabilities in the range of 1×10^{-6} to 1×10^{-7} cm/sec (0.02 to 0.002 gpd/ft.^{2}) are to be expected.

FLOW DIRECTIONS AND GRADIENTS

Upper Flow System

A continuous upper flow system has been inferred to underlie the entire study area. This system includes the upper unconfined aquifer, which occupies a buried outwash channel, and the saturated interval screened in monitoring well MW-205, believed to be outside the buried channel. Water levels measured in wells screened in these two units form a continuous shallow water table surface.

Static water level measurements taken from all existing well sites measured in this investigation are presented on Table 5. Drawing 4 is a contour map which shows the elevation of the water table surface under the Airtron site and surrounding area. As shown by Drawing 4, pumping of the Mennen production well #1 controls water levels in the surrounding area. In general, irregularities in slope and direction of flow are caused by differences in the thickness

and permeability of the materials which make up the upper flow system and their proximity to the discharging Mennen well. Drawing 4 basically illustrates the drawdown configuration in the upper flow system which has resulted from over 30 years of pumping activities at the Mennen site. Natural southerly flow directions have been altered so that all groundwater movement in the surrounding area is radially toward Mennen production well #1. This means that any contaminant source located within the capture zone of the Mennen well is, in effect, located upgradient. Any groundwater contaminated by such sources will be controlled and ultimately captured by the discharging Mennen well.

Under the Airtron site, all groundwater flow within the upper flow system is generally to the southwest towards the Mennen pumping well. The contour map indicates convergence of groundwater flow in the western portion of the Airtron property. This is probably related to the presence of sinuous, high permeability channel deposits within the upper aquifer. Although somewhat variable under the site, the average hydraulic gradient of the water table surface is approximately 0.02 ft./ft. (110 ft./mile).

Lower Confined Aquifer

In the vicinity of the Airtron site and surrounding area, the 3 deep wells installed for this study (i.e., MW-201, MW-202 and MW-203) actually penetrate and are screened within the lower confined aquifer. As a result, these 3 wells have water levels representative of the lower aquifer system. Water level measurements taken at the cluster monitoring well sites are presented on Table 5.

Drawing 5 is a contour map representing the potentiometric surface of the lower confined aquifer based on the most recent set of water level measurements. As shown by these contours, the general movement of groundwater in the lower system is in a southerly direction. Although not apparent from the limited data, flow directions in the lower aquifer probably increasingly refract towards the Mennen pumping well in the western portion of the study area. This is due to an increasing component of upward leakage through the overlying aquitard with ultimate discharge to the shallow aquifer. This is discussed in more detail in the following section. Based on the available data from the 3 deep wells, the average hydraulic gradient of the potentiometric surface is approximately 0.01 ft./ft. (55 ft./mile).

Vertical Gradients

Comparison of the groundwater elevations obtained from the shallow wells with those from the deep well at each of the 3 cluster well sites permits evaluation of the vertical component of groundwater flow. For the monitoring period between August and November 1987, a higher head with depth (upward component of flow) is clearly evident at all of the cluster sites for all of the dates on which measurements were made.

The water level data from each of the cluster sites indicate a continually increasing difference in heads between the upper and lower aquifer systems (i.e., increasing component of upward flow) in the direction of the discharging Mennen production well. For example, cluster site USGS-2/MW-201, located over 950 feet away from the Mennen production well,

has a head difference of about 3 feet. Cluster site 2M/MW-202, located less than 700 feet away from the discharaging Mennen well, has a head difference of over 7 feet. Cluster site USGS-1/MW-203, located less than 250 feet from production well Men-1, has a head difference of greater than 10.5 feet. The difference in vertical head between the shallow and lower aquifer would be expected to be at a maximum at the location of the Mennen production well.

The water level differentials indicates upward groundwater flow from the lower confined aquifer through the overlying aquitard to the upper aquifer. Because vertical gradients increase towards the Mennen production well, vertical flow rates would also be expected to increase in that direction (assuming all else is equal). Because of the very low estimated permeabilities of the lower aquitard (i.e., $<10^{-6}$ cm/sec (<0.02 gpd/ft.^{2})), the rate of vertical movement through this unit is relatively slow.

Based on ideal non-steady state aquifer theory, the area of influence due to pumping the upper unconfined aquifer is time dependent. In other words, the longer the shallow aquifer is continually pumped, the larger the area of influence until recharge equals discharge. The area of influence continues to expand unless boundary conditions within the aquifer are encountered. As discussed previously, the water levels in the shallow aquifer do not appear to be continually declining, and the area of influence does not appear to be continually expanding. This indicated that the shallow aquifer has reached dynamic equilibrium. This is due, in part, to the recharging effects caused by upward leakage of deeper groundwater through the intervening aquitard.

Although, upward velocities through the lower aquitard are relatively slow, the cumulative volume of groundwater leakage within a radius of about 1000 feet from the Mennen production well accounts for a great deal of recharge to the upper aquifer.

SOIL SAMPLING PROGRAM

General

The purpose of the soil boring program was to investigate the vertical and horizontal distribution of soil contamination around the former Airtron sludge lagoons. The soil sampling investigation followed the requirements set-forth in the NJDEP directive to Airtron dated December 11, 1986, the modified directive dated April 24, 1987 and the sampling procedures outlined in a letter sent from CEE to the NJDEP dated 27 May 1982.

The borings were drilled and sampled at 5 foot intervals to the top of the water table, which was found at depths ranging from 35 to 58 feet below the ground surface. The depth to groundwater generally increased in the direction of the Mennen pumping well located over 800 feet to the west of this area. All soil samples selected for analysis were submitted to York Laboratories of Whippany, New Jersey following strict chain-of-custody procedures. Samples submitted for laboratory analyses were limited to a vertical depth interval of 0.5 feet. The split spoon samplers were decontaminated using steam only between borings. Because of the presence of drilling fluids, strict decontamination was considered unnecessary between sample intervals. The split spoon

samplers were cleaned thoroughly between sample intervals using tap water and rinsed using distilled water. Samples selected for laboratory analysis were taken from the split spoon sampler and placed into laboratory bottles using disposable, sterile wooden spatulas. These procedures were approved by the NJDEP field representative.

A summary of the laboratory analyses for the soil samples is presented on Tables 6 and 7. The results of the soil analyses were totaled and are shown on Drawing 1. The complete laboratory reports, QA/QC documentation and chain-of-custody forms, for soil samples are located in Addendum 1, Volumes 1 and 2.

Results of Laboratory Analyses

Of the 51 soil samples from the 22 shallow borings drilled, only one soil sample (B-117.1A) contained levels of volatile organic compounds that exceeded NJDEP guidelines. This sample was from boring B-117 located north of and adjacent to the former NJPDES lagoon. The sample was collected from 4.5-5.0 feet below grade and showed a total sum of volatile organics of about 20,000 ug/kg (ppb). Sample B-117.4 was collected from 20.0-20.5 feet below grade in this same boring and contained concentrations of volatiles below NJDEP action levels. These data suggest that the soil contamination in this area is relatively shallow.

The fact that only very low levels of volatile organic compounds were found in borings as close as 10 to 20 feet from the location of the former lagoons suggests that, if in fact the lagoons are a source of contamination, the majority

of any contaminant movement must have been essentially straight down through the surface till to the upper aquifer. A 1969 aerial photograph of the Airtron site reveals that the back area in the vicinity of boring B-117 was formerly used for drum storage. This may explain the observed shallow distribution of soil contamination in this portion of the property.

For rapid screening of soils in the vadose zone for the presence of volatile organic compounds, the NJDEP approved the use of a portable organic vapor analyzer during this portion of the project. For each sampled interval, a soil sample was placed in a clean 8 oz. glass jar. The top of the jar was then covered with aluminum foil and the lid screwed on tightly. An environmental sample was collected for volatile organic analysis from a split of the same soil sample. Both the engineering and environmental samples were placed in a chilled cooler. At the end of each day, the engineering samples were scanned with a portable flame ionization detector (OVA -128), which measures the total amount of ionized volatile organics present. The method of operation for the OVA scan was the following: The engineering soil sample was removed from the cooler and left in room conditions for approximately 1/2 hour to warm-up. Next, the sample was shaken to loosen the soil particles. After a moment, the lid was removed and the aluminum foil was pierced by the OVA air intake line. The volatile organic concentration in the jar's head space was then measured.

As set-forth in the modified directive, if the OVA measurements were relatively low for all soil samples from a given boring, the soil sample with the highest relative reading was submitted to the laboratory for total volatile

organic analysis by GC/MS methods. In the event that relatively high readings occurred from a given boring, the 3 samples with the highest readings were submitted for analysis of total volatile organics. All other environmental soil samples were stored in a refrigerator within the Airtron facility for possible future reference and/or analyses. All OVA measurements, along with lab results, are included on the test boring logs. The engineering samples were retained by Converse Environmental East (CEE) for future reference.

In general, there was good correlation between the field OVA data and the corresponding laboratory analysis. Exceptions occurred in samples from six of the borings. At these sites, some of the soil samples registered high values on the OVA, whereas, the laboratory analyses indicated only trace levels of volatile organics far below NJDEP action levels. Once this trend became apparent, the laboratory was instructed to analyze two of the samples (B-103.1 and B-104.1) for base neutral extractables. This was to check for the presence of semi-volatile compounds which would not show up in the volatile analysis but could have been detected by the OVA. Although holding times for these samples were exceeded and the results should be used with caution, the base neutral scan indicated only the presence of low levels of di-n-butyl phthalate below NJDEP guidelines. Subsequent conversations with the technical staff from Foxboro, the manufacturers of the OVA, indicated that this compound, due to its extremely low vapor pressure and high boiling point, would not be detected by this field instrument.

During the shallow soil boring program, boring B-117 was selected for the installation of a 2 inch diameter PVC vapor test well. For this purpose, the well was screened above the

water table in the upper aquifer from 5 to 30 feet below ground surface. Because of the presence of a shallow perched water table at 11 feet below ground surface, only the upper 6 feet of screen was exposed. On August 26, 1987, CEE conducted a small scale vapor pumping test using this well. The test was conducted using a small vacuum pump which discharged vapor from the well at a rate of about 0.6 $feet^3$/minute. The discharge was periodically sampled using an OVA-128 and a MSA-260 portable gas and oxygen meter, both of which were calibrated to methane. In addition, the discharge was sampled using a TIP-II photoionization detector (PID) which does not detect methane. All three of the gas analyzers initially showed very high levels of detectable gases. The reading from the MSA instrument was initially above the lower explosion limit (LEL) for flammable gases. These measurements indicated the presence of both methane and volatile organic compounds in the vadose zone of this well. Based on these data, and the fact that several of the soil samples were reported to have a swampy odor, it is very possible the high OVA readings at the other six boring sites were false positive measurements due to the presence of methane. The significance of this finding is that future screening of samples from this site will be conducted using a PID instrument that will not detect methane. The presence of natural occurring gases in the subsurface may also explain the presence of some of the volatile compounds detected in the library search portion of the volatile organic GC/MS scan.

GROUNDWATER SAMPLING PROGRAM

General

An initial (first) round of groundwater sampling, as required by the NJDEP Directive, was performed approximately two weeks after the construction and groundwater development of the new monitoring wells between August 18-20, 1987. Following the receipt and review of the first round analytical data by NJDEP, CEE performed a second round of groundwater sampling on September 30 and October 1, 1987.

A total of 15 wells (13 Airtron, 2 Mennen) were included in the groundwater sampling and analyses programs. Well Wizard dedicated sampling systems were installed in all 13 of the Airtron monitoring wells. This system will purge and sample the groundwater from each well utilizing bladder pump methods, thus eliminating the need for decontamination procedures and reducing many of the variables associated with other purging and sampling methods. Due to the large volume of water needed to be purged from USGS Wells #1, #2 and #3, dedicated submersible pumps were also installed. The two wells without the Well Wizard samping systems are Mennen's production well #1 and the Mennen monitoring well MW-10.

During the 2 rounds of sampling for this study, the Mennen production well (MEN-1) was in use so no purging was necessary. The groundwater sample was collected from an on-line spigot located approximately 3 feet from the pump's motor assembly. Mennen's monitoring well MW-10 was purged utilizing a PVC bailer. Water samples were collected using a

point source teflon bailer with dual check values. The sample was obtained from the approximate mid-point of the screened interval in this well. Both bailers were decontaminated prior to purging/sampling using the following procedure:

1. Soap and tap water wash.
2. Tap water rinse.
3. Distilled/deionized water rinse.
4. 10% acid solution rinse (only during the initial sampling round).
5. Distilled/deionized water rinse.
6. Pesticide grade acetone rinse.
7. Total air dry.
8. Distilled/deionized water rinse.

All of the wells were purged of at least 3 casing volumes of water prior to sampling. The groundwater samples were collected within several hours of purging. The purging of each well was continued until conductivity, pH, and temperature measurements stabilized to within a change of less than 10% for 3 consecutive measurements.

For the first round of sampling, all of the wells were analyzed for priority pollutants plus 40 (PP +40) as per the NJDEP Directive.

The NJDEP reviewed the first round of analytical results, and approved a second sampling and analyses program. This program, as specified in a letter from the NJDEP dated October 20, 1987, consisted of laboratory analysis for volatile organic compounds plus 15, (VO +15) at all 15 of the

monitored wells. Analysis for base neutral and acid extractable compounds for at least 2 additional rounds of sampling was required for monitoring well MW-1.

For quality assurance, a hidden duplicate sample from a selected well was collected for each day of sampling during both sampling rounds. The duplicate sample was analyzed for the identical parameters to confirm laboratory accuracy. In addition, a trip blank of double deionized distilled water from the laboratory was carried in the field for each day of sampling and returned to the laboratory for analysis of volatile organics to detect possible glassware or reagent contamination.

All testing for both rounds of groundwater sampling was performed by York Laboratories of Whippany, New Jersey. The laboratory results for both rounds of sampling are summarized on Tables 8 through 14. Drawing 6 shows a comparison of analytical results between Round 1 and Round 2. Detailed laboratory reports, QA/QC documentation and chain-of-custody forms, are presented in Addendum 1, Volumes 3 and 4, to this report.

Results of Groundwater Analyses

The results of the first round of groundwater analysis from the 14 monitoring wells and the Mennen production well (MEN-1) showed that none of the samples contained detectable levels of acid extractable compounds, PCB/pesticide compounds or levels of any of the 13 priority pollutant metals above NJDEP drinking water standards. In addition, at all 15 of the sampled wells, the analyses indicated non-detectable or

trace levels of base neutral extractable compounds in the priority pollutant scan. Seven monitoring wells showed the presence of very low levels of either diethyl phthalate, di-n-butyl phthalate or both. The presence of trace amounts of these base neutral compounds could be related to the PVC well construction material, or that phthalates are a very common laboratory contaminant. The fact that in many cases these compounds were detected in the method blanks suggests the latter hypothesis may be valid.

The laboratory results indicated that only one monitoring well (MW-1) contained relatively high levels of a base neutral/ acid extractable compound in the library search portion of the analysis. The significance of the high library search value in the base neutral/acid extractable scan is not clear. Because the proximity of this well to the existing Airtron hazardous waste management facility (HWMF), the NJDEP required, in a letter dated October 20, 1987, that samples from monitoring well MW-1 be analyzed for base neutral and acid extractable compounds for at least the next two rounds of sampling. The second round of sampling was, however, completed prior to receipt of the NJDEP letter. Because of this, monitoring well MW-1 was only analyzed for base neutral extractables plus 15 during the second round. This was because the laboratory had identified the detected parameter from the first round as a base neutral compound. The results of the second round indicate much lower values in the library search portion of the analysis compared with the first round.

The results of the first round of analysis indicated that none of the 3 deep monitoring wells contained detectable levels of any volatile organic compounds. These values were confirmed during the second sampling and analysis program.

The significance of these results is that the vertical extent of groundwater contamination has been established. These data suggest that the low vertical permeability of the upper aquitard, coupled with upward vertical flow components, have effectively prevented the downward migration of contaminated groundwater to the lower confined aquifer.

The results of the first round of analyses also indicate that of the 12 wells which are screened within the upper flow system, only 2 monitoring wells (MW-1 and USGS-3) contained trace levels of volatile organics below established NJDEP guidelines. The presence of very low levels of methylene chloride in these wells is most probably due to laboratory contamination. These data were confirmed based on the results of the second water quality testing round. The presence of methylene chloride at relatively high levels during the first round in monitoring well MW-204 is believed to be suspect due to the presence of methylene chloride in the method blank.

In order to check this premise, a hidden duplicate sample from monitoring well MW-204 (called MW-408) was obtained during the second round of sampling and analyzed by the laboratory. The results for MW-204 and the hidden duplicate MW-408 both indicate the presence of methylene chloride in the method blank and trip blank from the laboratory. In addition, comparison of the levels of this volatile compound in samples from this well indicate a relatively high degree of variability in the reported concentrations. Based on these data, the presence of methylene chloride in monitoring well MW-204 is still considered suspect and will be closely checked in subsequent sampling rounds.

In the remaining 8 monitoring wells and the Mennen production well (MEN-1), relatively high levels of aliphatic volatile compounds were consistently detected above established NJDEP action levels in both water quality rounds. In general, the volatile compounds consist of trans-1, 2-dichloroethylene, trichloroethylene and tetrachloroethylene. Trace levels of related aliphatic compounds were also detected in most of these wells. Many of the volatiles detected are probably the result of degradation and complexing of the original chlorinated solvent contaminant which is believed to have been trichloroethylene. The presence of variable levels of methylene chloride, trichlorofluoromethane, chloroform and toluene in many of the groundwater analyses should be considered highly suspect. This is because these commonly used laboratory extraction agents are also present in most of the method blank analyses. In addition, the distribution of these volatile compounds is random, without any apparent pattern across the study area.

Based on the results of the 2 rounds of groundwater analyses for this investigation, and the flow directions inferred from the upper flow system groundwater contour maps, it does appear that past activities in the vicinity of the former lagoons and parking area at the Airtron site are responsible for the observed volatile organic contamination in the upper aquifer under the Airtron site. The plume emanating from the Airtron property is currently following hydraulic gradients created by the pumping of the Mennen production well #1. The plume is moving in a southwest direction towards the Mennen well, which currently is capturing the entire plume.

Prior to this investigation, several rounds of groundwater sampling were conducted at the Mennen monitoring well MW-10. This well is located in the far southwest corner of the Mennen Warehouse property. The laboratory results indicated the presence of relatively high levels of aliphatic volatile organic compounds in the upper aquifer at this location. Because of the similarity to the Airtron contamination, the NJDEP hypothesized that these contaminants were due to past activities in the vicinity of the former Airtron lagoons. This is highly unlikely, however, as the current contour maps show flow directions in the shallow aquifer at this location to be to the northwest towards the Mennen production well. The fact that the Mennen pumping wells have been discharging since their installation in the mid-1950's would suggest these gradients were in existence possibly 10 years before Airtron constructed the lagoons in the mid-1960's. These data, therefore, indicate the presence of another source of volatile compounds located farther to the southeast from the Mennen monitoring well MW-10.

A very probable source is the back portion of Fabricated Plastics, Inc. which is located on the northeast corner of Hanover Avenue and Horsehill Road. This site is also the former location of Air Products and Chemicals, Inc.. Recent site inspections by the NJDEP have noted the presence of dark stained soils and a high possibility that hazardous materials have been discharged to the environment in this area. Based on these inspections, NJDEP directed Fabricated Plastics, in a letter dated June 9, 1987, to submit a report detailing measures to be taken to remediate the site. In a letter dated August 29, 1987 from Storch Engineers, it was noted that "solvent odors were observed by Kramer Environmental

field personnel during excavation; four post-excavation soil samples were collected from "Area C" and were to be analyzed for volatile organic compounds".

These analysis have not been made available to Airtron at the time of this report. The documented observations of the NDJEP and Fabricated Plastics' environmental consultants, however, strongly suggests that the unpaved parking lot located adjacent to and northeast of the Fabricated Plastics building is a possible source of the volatile organic groundwater contamination observed in the Mennen monitoring well MW-10.

Prior to implementation of this project, a source of volatile organic contamination was suspected at a location upgradient from Mennen monitoring well MW-10 based on preliminary groundwater maps constructed by CEE. In order to investigate this possibility, monitoring well MW-206 was located in the front of the Mennen Warehouse building. It was believed that a well at this location would be between the known Airtron plume and the suspected plume from Fabricated Plastics and would thus conclusively show the presence of 2 plumes. The water quality data from the 2 rounds of sampling from this study, however, revealed the presence of high levels of aliphatic volatile organic compounds in the samples from this well. Based on the same arguments concerning groundwater flow directions presented for the Mennen monitoring well MW-10, a viable explanation for the observed chemistries in monitoring well MW-206 is the presence of another source located upgradient from this well which is to the east.

We conducted a field reconnaisance, upgradient of MW-206, searching for an additional source. Inspection of the wooded area adjacent to MW-205 revealed the presence of an old, abandoned landfill, as shown on Drawing 7. This landfill is located several hundred feet to the southeast of monitoring well MW-205 and occupies an area of about 2 acres. Most of the material appears to have been burned as there was abundant ash and cinders present. In the far western portion of the landfill was at least 1/2 dozen 55 gallon drums sticking out of the landfill; one of which was oozing a thick, black oily substance.

Because the landfill was subsequently determined to be entirely within AT&T and Fabricated Plastics properties, no further investigation was undertaken. Although the contribution of volatile organics to the groundwater from this area has not been investigated, the location of the landfill almost exactly upgradient from monitoring well MW-206 makes it highly suspect. The presence of low levels of aliphatic volatile compounds in monitoring well MW-205 could be due to this well being located along the northern edge of a volatile plume which is migrating towards monitoring wells MW-206 and USGS-1, on its way towards the Mennen pumping well.

Based on the information discussed in this section of the report, 3 groundwater plumes with very similar chemistries have been identified. The suspected source areas and generalized plume boundaries are presented on Drawing 7. The movement of these plumes are all being controlled by gradients created by the pumping of the Mennen production well. This is also to say that contaminated groundwater within these plumes will ultimately be captured and discharged by the Mennen well.

A conceptual model of the initial migration of volatile contaminants within the Airtron plume can be reconstructed. Using estimated properties for the shallow aquifer, an estimate of the flow velocity of contaminated groundwater can be calculated. Assuming an average permeability of 1 x 10^{-2} cm/sec (210 gpd/ft.^{2}) for the shallow aquifer, an average hydraulic gradient of 0.02 ft./ft. (110 ft./mile), an average saturated thickness of 35 feet, and an average porosity of 0.35 (35%); groundwater flow rates within the upper aquifer are about 600 feet/year (1.6 feet/day). The measured distance from the western-most former lagoon and Mennen production well (MEN-1) is about 800 feet. Based on these data, it took only about 1.3 years for contamination within the shallow aquifer to move from the closest lagoon to the Mennen pumping well. Assuming it was about 16 years between the time the first lagoons were installed (approximately 1965) and contamination was discovered in the Mennen well (approximately 1979) would indicate that about 14.7 years are unaccounted for. This presumbably is the time it took the contamination front to move downward approximately 40 feet from the lagoons to the shallow aquifer. Back calculating using this estimated velocity (i.e., 2.75 feet/year), and assuming a porosity of 0.35 (35%) and a vertical gradient of 1.0 ft./ft., yields a vertical permeability of about 1 x 10^{-6} cm/sec (0.02 gpd/ft.^{2}) for the surface till unit. This is believed to be a reasonable value for fine-grained glacial till deposits in northern New Jersey.

1979 was 1st time analyzed for VOCs

Based on these assumptions, therefore, a possible conceptual model is one in which it took about 15 years for contaminants to migrate through the low permeability surface till unit to

the water table. Once reaching the upper aquifer, it then only took slightly over 1 year for contaminated groundwater to reach the Mennen pumping well.

CONCLUSIONS

1. Based on the boring logs from previous investigations and this study, a fine-grained relatively low permeability surface till unit appears to be continuous under the site and extends from the surface to depths of less than 25 to over 45 feet. A shallow, possibly discontinuous, perched saturated zone is present within the upper portion of the surface till and was encountered in the new vapor piezometer B-117 and existing monitoring well 1M. The depth to the perched zone is approximately 10 feet below ground surface.

2. Only one of the 22 borings drilled for this project contained soils which exceed NJDEP allowable levels for volatile organics in soils. This boring is located adjacent to the southeast corner of the Airtron parking lot near the northern edge of the former NJPDES lagoon. Based on the distribution of volatile organics with depth, the contamination of the soil in this area is shallow. Aerial photographs from 1969 indicate that this area was used as a barrel storage area and may have been the source of soil contamination in this area. The fact that only very low levels of volatile organic compounds were found in all but one of the borings, some as close as 10 to 20 feet from the former Airtron lagoons, suggests that the majority of contaminant movement must have been essentially straight down through the surface till to the upper aquifer.

3. The surface till is underlain by 50 to 60 feet of sands and gravel which are believed to be part of a large buried glacial outwash channel deposit. The lower 25 to 45 feet of this deposit are saturated and make-up the upper aquifer which is characterized by relatively high permeabilities. All but one well monitored for this study penetrated the upper aquifer. The log from monitoring well MW-205 indicates that this permeable zone either doesn't exist at this location or has dramatically different hydraulic properties.

4. Based on the groundwater contour map of the upper flow system, flow directions under the Airtron site and surrounding area are fully controlled by the drawdrown associated with pumping of the Mennen production well (MEN-1). All flow is essentially radial towards the Mennen pumping well, which for the Airtron site is to the southwest. The contour map indicates convergence of groundwater flow in the western portion of the Airtron property. This is probably related to the presence of sinuous, high permeability channel deposits within the upper aquifer. Based on the contour map, all groundwater flow under the Airtron site is captured by the Mennen well.

5. The upper aquifer is underlain by about 30 feet of dense, low permeability till and silt deposits which in this report are called the upper aquitard. Below the upper aquitard is another sand deposit with relatively high permeabilities. This sand unit is between 10 and 15 feet in thickness and is called the lower confined aquifer in this report. Based on limited data from the deep wells which are screened in this interval, groundwater movement is in a southerly direction. Comparison of water levels

from the lower aquifer with water levels from adjacent wells in the upper aquifer indicates positive upward flow. The vertical gradients are greatest at the Mennen pumping well and decrease radially outward from this point. Due to these upward gradients, leakage through the overlying upper aquitard accounts for a significant amount of recharge to the upper aquifer.

6. Based on the water quality results from the initial round of groundwater sampling, none of the well samples exceeded NJDEP guidelines for base neutrals, acid extractables, PCB/pesticides, or priority pollutant metals. Relatively high levels of base neutral/acid extractables in the library search portion of the analysis were detected in monitoring well MW-1 during the first round. Based on this, the NJDEP is requiring that this well be sampled and analyzed for BN/AE compounds for at least 2 additional rounds of sampling.

7. The results of both rounds of sampling indicated that the 3 deep monitoring wells contained non-detectable levels of volatile organic compounds. This means that the vertical extent of groundwater contamination has been established. These data suggest that the low permeability of the upper aquitard, coupled with the upward vertical flow components, have effectively prevented the downward migration of contaminated groundwater to the lower confined aquifer.

8. The results of both rounds of the groundwater sampling program indicate that of the 12 wells screened in the upper flow system, 9 wells (including the Mennen

production well #1) contained relatively high levels of aliphatic volatile compounds above NJDEP action levels. In general, the volatile compounds consistd of trans-1, 2-dichloroethylene, trichlorethylene and tetrachlorethylene.

9. Three groundwater plumes with very similar chemistries have been identified. The suspected source areas include the former Airtron lagoons and parking area, an abandoned landfill located along the northern boundary of the AT&T and Fabricated Plastics properties, and the unpaved parking lot located adjacent to and northeast of the Fabricated Plastics Building. The movement of all these plumes is controlled by gradients created by the pumping of Mennen production well #1. Contaminated water within these plumes will ultimately be captured and discharged by the Mennen well.

RECOMMENDATIONS

Based on the results of the remedial investigation, we recommend:

1. The lower aquifer has been shown to be uncontaminated. The 3 deep monitoring wells installed for this purpose are no longer needed. They should be abandoned and sealed in accordance with NJSA 58:4A-4.1.

2. Quarterly sampling and analysis, for target compounds only, should be continued for those monitoring wells located on Airtron property. Information from this program will be used to evaluate the effectiveness of

Table 1

PROJECT CHRONOLOGY

AIRTRON

(87-47400-01)

December 11, 1986	- NJDEP Directive sent to Airtron.
December 18, 1986	- NJDEP Directive received by Airtron Real Estate Department.
December 23, 1986	- RFP's sent out by Airtron to prospective consultants.
December 27, 1986	- Initial Vapor Measurements from Well MW-2M.
January 7, 1987	- Meeting between Airtron and CEE to review the RFP and NJDEP directive.
January 27, 1987	- Two proposals sent by CEE and received by Airtron.
February 28, 1987	- Vapor probe experiment at Airtron by CEE.
March 16, 1987	- First meeting between Airtron and CEE to plan strategy for NJDEP meeting.
March 17, 1987	- Meeting with NJDEP, CEE and Airtron to discuss requirements of the remedial investigation and modifications to the original directive.
April 24, 1987	- NJDEP sent modified directive to Airtron.
April 28, 1987	- Receipt of modified directive by CEE.
May 11, 1987	- Meeting at Mennen Shipping between CEE, Airtron and Mennen reps to locate sites for off-site wells.
May 13, 1987	- Meeting at Airtron between CEE, Airtron, and NJDEP to approve monitoring well locations.
May 18, 1987	- CC Construction mobilized to site and began exploration drilling program.

Mennen pumping as the primary remediation and control mechanism, and to assess the rate of groundwater quality improvement as a result of this pumping.

3. Five exploration borings should be drilled in the vicinity of the former barrel storage area near boring B-117. Borings at this location would establish the levels and extent of soil contamination due to drum storage activities in this area. The borings would be drilled to the top of the upper aquifer. Soil samples would be collected and analyzed as per the Phase I soil program. The borings would be sealed using a thick bentonite slurry. Depending on the levels of soil contamination, at least one shallow piezometer should be installed adjacent to one of these deep boring sites. The shallow piezometer would be screened across the shallow perched zone to measure water level and water quality.

4. Because shallow piezometer B-117 was installed before the existence of the perched zone was identified in that area, the screened interval extends across the entire thickness of the surface till. To avoid the possibility of allowing downward migration of perched water to lower intervals, this piezometer should be abandoned and sealed.

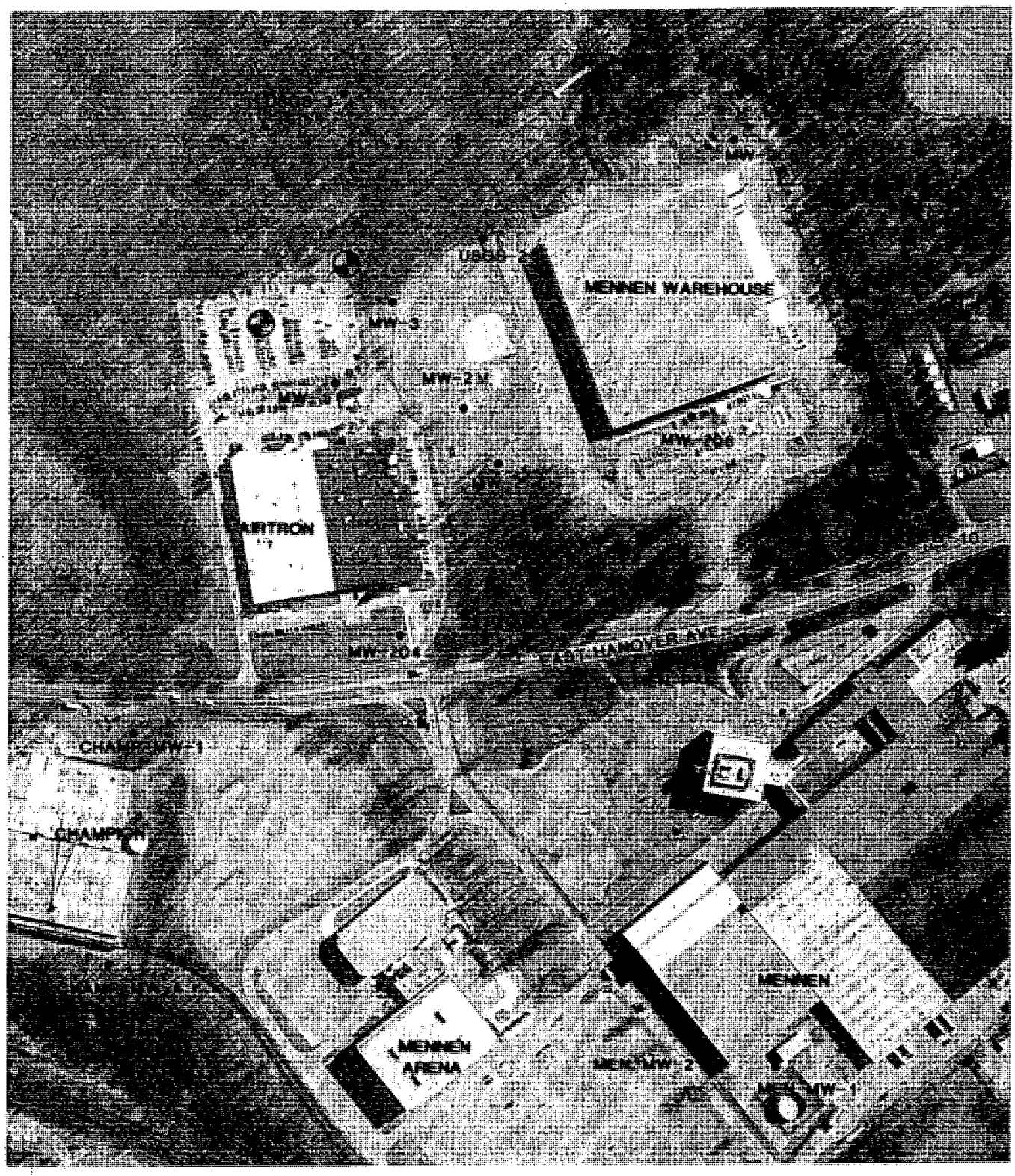
5. An appropriate remediation program will be established after the limits of contamination have been defined. In our judgment, a treatment system which capitalizes on the highly volatile properties of the aliphatic volatile compounds found at this site offers a potential means of recovery.

Following completion of the supplementary testing, a report summarizing the results along with recommendations on remediation will be submitted to the NJDEP.

Figure

AIRTRON

WELL LOCATION MAP



SCALE: 1" = 300'

May 27, 1987	- CEE letter sent to NJDEP proposing Soil Boring Program.
June 11, 1987	- Meeting between CEE and Airtron to discuss preliminary results of the Soil Exploration Program and drilling of additional borings.
June 19, 1987	- CC Construction finalized program and demobilized from the site.
June 24, 1987	- Empire Drilling Co. mobilized to site and began installation of monitoring wells.
July 8, 1987	- Letter request by CEE to NJDEP for a four week extension for completion of monitoring wells and water quality analyses.
July 31, 1987	- Empire Drilling Co. finalized monitoring well completions and demobilized from the site.
August 4, 1987	- Letter sent by CEE to Recon, Inc. with specifications for survey services.
August 10-11, 1987	- Installation of dedicted monitoring system.
August 17-18, 1987	- First round of water quality sampling (after allowing 2 weeks for the wells to "settle").
September 18, 1987	- Receipt of Round 1 groundwater quality data.
September 22, 1987	- Meeting with CEE and Airtron to discuss preliminary results of entire program.
September 28, 1987	- Meeting between CEE and NJDEP for review of Round 1 water quality results and to establish sampling parameters for Round 2 water quality analysis.
September 30, 1987 October 1, 1987	- Second round of water quality sampling.

October 23, 1987	- October 20, 1987 letter from NJDEP received by CEE which granted a 30 day extension for the remedial investigation report, established parameters to be analyzed during Round 2 groundwater sampling, and presented the NJDEP position on additional work items.
October 26, 1987	- Initial date Final Report was to be completed prior to the 4 week extension by NJDEP.
October 30, 1987	- Receipt of Round 2 of groundwater quality data.
November 24, 1987	- Revised date of Final Report submission due to the 4 week extension by NJDEP.

TABLE 2

COMPLETION SUMMARY OF NEWLY INSTALLED WELLS
AIRTRON, INC.
(87-47400-01)

Well No.	Total Depth Drilled	Depth of 8" Steel Casing	Depth of Screened Interval Top	Depth of Screened Interval Bottom	Bottom of Well	Depth Top of Sand Pack	Diameter of Well (inches)	Depth to Water**	Bottom of Well Wizard Pump
MW-201***	135.0	98.5	116.0	126.0	127.0	114.0	4	43.09	121
MW-202	128.0	98.0	118.0	125.0	126.0	116.0	4	46.19	122
MW-203	134.0	101.0	122.0	130.0	131.0	120.0	4	49.40	126
MW-204	72.0	NA	47.0	67.0	68.0	45.0	4	50.67	59
MW-205	90.0*	NA	53.0	58.0	59.0	50.0	4	29.08	56.5
MW-206***	67.0	NA	43.0	63.0	64.0	40.0	4	44.30	54

Note: All measurements are in feet measured from ground surface, unless noted.
All wells have a sump extending 1' beyond bottom of screen.
All wells were constructed with stainless steel centralizers.

* Hole was plugged with bentonite pellets to a depth of 62.0.
** As measured on 31 July 1987.
*** Flush mount completion.

TABLE 3

COMPLETION SUMMARY OF PRE-EXISTING WELLS
AIRTRON, INC.
(87-47400-01)

Well No.	Total Depth Drilled	Depth of Screened Interval Top	Depth of Screened Interval Bottom	Present Bottom of Well	Depth Top of Sand Pack	Diameter of Well (inches)	Depth to Water**	Bottom of Well Wizard Pump	Bottom of Submersible Pump
MW-1	112.0	65.0	75.0	75.5	64.0	3.0	40.60	70	NA
MW-2	82.0	70.0	75.0	77.3	69.0	3.0	60.90	73	NA
MW-3	87.0	55.0	65.0	61.75	54.0	3.0	44.00	58	NA
MW-2M	70.0	49.0	65.5	65.5	48.0	2.0	50.85	63.5	NA
USGS-1	86.0	78.0	86.0	78.2	NA	17.5	60.48	75	70
USGS-2	84.0	76.0	84.0	59.8	NA	17.5	47.50	55	50
USGS-3	68.0	60.0	68.0	67.4	NA	17.5	36.07	57	52

Note: All measurements are in feet measured from ground surface, unless noted.

** As measured on 31 July 1987.

TABLE 4
WELL ELEVATION AND LOCATION SURVEY
AIRTRON, INC.
(87-47400-01)

NJDEP WELL PERMIT No.	WELL	NJPCS LOCATIONS		GEODETIC LOCATION		ELEVATIONS			
		NORTHING	EASTING	LATITUDE	LONGITUDE	GROUND	TOP-PVC	TOP-CASING	TOP-LID
NA	NO. USGS-3	722,747.878	2,054,559.054	40° 49' 02.357"	74° 28' 10.404"	396.33	396.57	397.48	397.51
2529529-2	NO. 201	722,404.569	2,054,334.398	40° 48' 58.970"	74° 28' 13.336"	398.49	397.62	397.99	398.54
NA	NO. 3	722,529.700	2,054,161.274	40° 49' 00.210"	74° 28' 15.583"	396.64	398.19	398.51	398.57
25-21690	NO. 2-M	722,318.887	2,054,011.858	40° 48' 58.130"	74° 28' 17.533"	402.81	404.00	404.71	404.73
NA	NO. 1-M	722,321.338	2,054,007.635	40° 48' 58.155"	74° 28' 17.588"	402.71	405.14	NO CASING	405.19
2529530-6	NO. 202	722,329.674	2,054,005.766	40° 48' 58.237"	74° 28' 17.612"	402.60	403.83	404.07	404.11
NA	NO. 1	722,594.383	2,053,980.821	40° 49' 00.831"	74° 28' 04.923"	396.39	397.93	398.20	398.26
NA	NO. B-1	722,220.162	2,053,927.735	40° 48' 57.157"	74° 28' 18.630"	403.32	405.43	405.46	405.52
NA	NO. 2	722,227.408	2,053,924.958	40° 48' 57.228"	74° 28' 18.666"	403.16	404.81	405.17	405.24
2529533-1	NO. 204	722,313.884	2,053,522.011	40° 48' 58.092"	74° 28' 23.904"	400.63	402.17	403.55	403.57
2529532-2	NO. 205	721,973.027	2,054,706.363	40° 48' 54.698"	74° 28' 08.510"	387.63	389.06	389.23	389.31
NA	NO. USGS-2	722,391.644	2,054,358.520	40° 48' 58.842"	74° 28' 13.022"	401.16	401.37	402.45	402.48
2529534-9	NO. 206	721,875.756	2,054,137.604	40° 48' 53.749"	74° 28' 15.910"	396.88	396.35	396.68	396.97
NA	NO. 10	721,400.657	2,054,049.600	40° 48' 49.056"	74° 28' 17.069"	398.28	391.14	391.32	391.34
2529531-4	NO. 203	721,858.386	2,053,838.857	40° 48' 53.584"	74° 28' 19.796"	401.39	402.64	403.16	403.20
NA	NO. USGS-1	721,889.610	2,053,816.628	40° 48' 53.893"	74° 28' 20.084"	402.06	400.89	402.12	402.15
25-1891	PROD. 1	721,769.702	2,053,615.251	40° 48' 52.713"	74° 28' 22.707"	399.57	B.M. ON PUMP	395.55*	399.61
25-1890	PROD. 2	721,369.650	2,053,599.746	40° 48' 48.738"	74° 28' 09.915"	394.48	B.M. ON PUMP	386.99*	394.88
25-26055	MEN. NO. 2	721,484.058	2,052,913.035	40° 48' 49.905"	74° 28' 31.848"	394.46	397.45	397.65	397.67
25-26056	MEN. NO. 1	721,321.116	2,052,916.956	40° 48' 48.295"	74° 28' 31.801"	392.89	394.63	395.63	395.67
NA	NO. 1	722,798.091	2,053,145.218	40° 49' 02.885"	74° 28' 28.790"	395.68	396.14	396.73	396.74
NA	NO. 4	722,683.683	2,052,704.431	40° 49' 01.764	74° 28' 34.527"	389.34	391.23	389.56	NO LID

NOTE:

- ELEVATIONS ARE IN FEET AND REFER TO MEAN SEA LEVEL.
- THIS DATA IS TAKEN FROM A SURVEY COMPLETED BY [illegible] DATED NOV. 16, 1987.

* "CROSS" CUT IN BOLT ON PUMP HOUSING

TABLE 5

AIRTRON

SUMMARY OF WATER LEVELS AND ELEVATIONS

87-47400-01

WELL NUMBER AND ELEVATION	DATE OF MEASUREMENT	DEPTH TO WATER	WATER LEVEL ELEVATION
MW-201	07-Aug-87	42.79	354.83
397.62	14-Sep-87	41.77	355.85
	15-Oct-87	41.96	355.66
	23-Oct-87	42.03	355.59
	03-Nov-87	41.75	355.87
	12-Nov-87	41.81	355.81
MW-202			
403.83	14-Sep-87	47.13	356.70
	15-Oct-87	47.26	356.57
	23-Oct-87	47.41	356.42
	03-Nov-87	47.10	356.73
	12-Nov-87	47.16	356.67
MW-203			
402.64	14-Sep-87	50.09	352.55
	15-Oct-87	50.19	352.45
	23-Oct-87	50.29	352.35
	03-Nov-87	50.06	352.58
	12-Nov-87	50.12	352.52
MW-204			
402.17	14-Sep-87	52.44	349.73
	15-Oct-87	52.55	349.62
	23-Oct-87	52.65	349.52
	03-Nov-87	52.45	349.72
	12-Nov-87	52.54	349.63
MW-205			
389.06	14-Sep-87	30.58	358.48
	15-Oct-87	30.60	358.46
	23-Oct-87	30.65	358.41
	03-Nov-87	30.57	358.49
	12-Nov-87	30.71	358.35
MW-206			
396.35	14-Sep-87	44.97	351.38
	15-Oct-87	44.95	351.40
	23-Oct-87	45.00	351.35
	03-Nov-87	44.95	351.40
	12-Nov-87	45.06	351.29
MW-1			
397.93	14-Sep-87	41.61	356.32
	15-Oct-87	41.75	356.18
	23-Oct-87	41.90	356.03
	03-Nov-87	41.53	356.40
	12-Nov-87	41.64	356.29
MW-2			
404.81	14-Sep-87	62.65	342.16
	15-Oct-87	62.75	342.06

TABLE CONTINUED ON NEXT PAGE...

TABLE 5

AIRTRON

SUMMARY OF WATER LEVELS AND ELEVATIONS

87-47400-01

WELL NUMBER AND ELEVATION	DATE OF MEASUREMENT	DEPTH TO WATER	WATER LEVEL ELEVATION
	23-Oct-87	62.74	342.07
	03-Nov-87	62.58	342.23
	12-Nov-87	62.68	342.13
MW-3			
398.19	14-Sep-87	45.73	352.46
	15-Oct-87	45.75	352.44
	23-Oct-87	45.78	352.41
	03-Nov-87	45.75	352.44
	12-Nov-87	45.84	352.35
MW-2M			
404.00	14-Sep-87	59.65	344.35
	15-Oct-87	57.20	346.80
	23-Oct-87	54.64	349.36
	03-Nov-87	54.15	349.85
	12-Nov-87	56.90	347.10
USGS-1			
400.89	14-Sep-87	59.24	341.65
	15-Oct-87	59.21	341.68
	23-Oct-87	59.16	341.73
	03-Nov-87	59.12	341.77
	12-Nov-87	59.16	341.73
USGS-2			
401.37	14-Sep-87	48.49	352.88
	15-Oct-87	48.65	352.72
	23-Oct-87	48.76	352.61
	03-Nov-87	48.55	352.82
	12-Nov-87	48.77	352.60
USGS-3			
396.57	14-Sep-87	36.54	360.03
	15-Oct-87	36.55	360.02
	23-Oct-87	36.64	359.93
	03-Nov-87	36.53	359.61
	12-Nov-87	36.68	359.46
CHAMPION MW-1			
396.14	14-Sep-87	38.98	357.16
	15-Oct-87	39.00	357.14
	23-Oct-87	39.13	357.01
	03-Nov-87	38.86	357.28
	12-Nov-87	39.00	357.14
CHAMPION MW-4			
391.23	14-Sep-87	36.88	354.35
	15-Oct-87	36.85	354.38
	23-Oct-87	36.91	354.32
	03-Nov-87	36.79	354.44
	12-Nov-87	36.85	354.38

TABLE CONTINUED ON NEXT PAGE...

TABLE 5

AIRTRON

SUMMARY OF WATER LEVELS AND ELEVATIONS

87-47400-01

WELL NUMBER AND ELEVATION	DATE OF MEASUREMENT	DEPTH TO WATER	WATER LEVEL ELEVATION
MENNEN MW-1			
394.63	14-Sep-87	49.56	345.07
	15-Oct-87	49.51	345.12
	23-Oct-87	49.62	345.01
	03-Nov-87	49.43	345.20
	12-Nov-87	49.58	345.05
MENNEN MW-2			
397.45	14-Sep-87	51.50	345.95
	15-Oct-87	51.43	346.02
	23-Oct-87	51.55	345.90
	03-Nov-87	51.42	346.03
	12-Nov-87	51.55	345.90
MENNEN MW-10			
391.14	14-Sep-87	39.93	351.21
	15-Oct-87	39.90	351.24
	23-Oct-87	39.99	351.15
	03-Nov-87	39.97	351.17
	12-Nov-87	40.01	351.13

Elevations are with respect to mean sea level
All measurements are in feet

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN SOIL SAMPLES

TABLE 6

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-101.8	B-102.1	B-102.3	B-102.4	B-103.1	B-103.3	B-103.6	B-104.1	B-104.2
SAMPLE DEPTH (FT)	40.0-40.5	4.0-6.0	14.0-16.0	19.0-21.0	4.0-6.0	14.0-16.0	29.5-30.0	5.0-5.5	10.0-10.5
SAMPLE DATE	5/26/87	5/27/87	5/27/87	5/27/87	5/28/87	5/28/87	5/28/87	5/28/87	5/28/87
COMPOUND									
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	3 JB	4 JB	5 JB	4 JB	5 JB	7 JB	5 JB	23 B	2 JB
TRICHLOROFLUOROMETHANE	3 JB	3 JB	3 JB	3 JB	13 JB	4 JB	3 JB	5 JB	5 JB
1,1-DICHLOROETHENE	ND	0 JB	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	1 J	ND	ND	ND	ND	ND	ND	1 J
1,1,1-TRICHLOROETHANE	ND	2 JB	2 JB	2 JB	3 J	2 JB	1 JB	3 JB	2 J
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	ND	1 J	1 J	ND	ND	ND	ND	ND	ND
BENZENE	ND	1 JB	1 JB	0 JB	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	1 JB	1 JB	1 JB	0 JB	ND	1 JB	ND	ND	ND
TOLUENE	2 JB	2 JB	2 JB	ND	4 JB	2 JB	2 JB	2 JB	2 JB
ETHYL BENZENE	ND	1 JB	ND	ND	ND	ND	ND	ND	ND
TOTAL XYLENES	ND	ND	ND	ND	ND	1 J	ND	ND	ND
TOTAL VOLATILES	9	16	15	9	25	17	11	33	12
LIBRARY SEARCH (VO)	ND	25	ND	ND	240	60	100	ND	20

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN SOIL SAMPLES

TABLE 6 cont.

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-104.7	B-105.10	B-106.8	B-107.7	B-107.8	B-107.10	B-108.2	B-108.9	B-109.7
SAMPLE DEPTH (FT)	35.0-35.5	50.0-50.5	40.0-40.5	34.5-35.0	39.5-40.0	50.0-50.5	9.5-10.0	45.0-45.5	35.0-35.5
SAMPLE DATE	5/28/87	5/29/87	6/4/87	6/1/87	6/1/87	6/1/87	6/3/87	6/3/87	6/4/87
COMPOUND									
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	3 JB	1 JB	2 JB	5 JB	3 JB	1 JB	1 JB	2 JB	4 JB
TRICHLOROFLUOROMETHANE	7 JB	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	3 J	ND	ND	ND	ND	1 J	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	2 J	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	ND	1 J	39	1 J	4 J	5 J	ND	18	28
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	ND	2 J	21	1 J	3 J	8 J	ND	19	6 J
TOLUENE	ND	ND	2 JB	1 JB	ND	2 JB	ND	ND	ND
ETHYL BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOLATILES	12	4	67	8	10	16	1	40	38
LIBRARY SEARCH (VO)	40	20	ND	ND	20	15	20	ND	ND

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN SOIL SAMPLES

TABLE 6 cont.

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-109.10	B-109.11	B-110.6A	B-110.6B	B-110.11	B-111.9	B-111.10	B-111.11	B-112.1
SAMPLE DEPTH (FT)	50.0-50.5	55.0-55.5	30.0-30.5	30.0-30.5	55.0-55.5	45.0-45.5	50.0-50.5	55.0-55.5	4.5-5.0
SAMPLE DATE	6/4/87	6/4/87	6/5/87	6/5/87	6/8/87	6/8/87	6/8/87	6/8/87	6/9/87
COMPOUND									
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	1 JB	2 JB	1 JB	6 JB	ND	ND	ND	13 B
TRICHLOROFLUOROMETHANE	ND	3 JB	3 JB	3 JB	8 JB	3 JB	10 JB	7 JB	8 JB
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	1 J	ND	ND
1,1,1-TRICHLOROETHANE	ND	1 JB	8 J	8 J	ND	ND	ND	ND	2 J
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	ND	30	3 J	2 J	ND	4 J	5 J	4 J	ND
BENZENE	ND	ND	ND	ND	ND	ND	1 J	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	1 J	ND	ND
TETRACHLOROETHYLENE	ND	11	ND	ND	3 J	3 J	3 J	3 J	ND
TOLUENE	2 JB	2 JB	ND	ND	2 JB	2 JB	2 JB	ND	1 JB
ETHYL BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOLATILES	2	48	16	14	19	12	23	14	24
LIBRARY SEARCH (VO)	ND	ND	ND	ND	51	ND	ND	ND	ND

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN SOIL SAMPLES

TABLE 6 cont.

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-112.9	B-112.11	B-113.10	B-114.3	B-114.4	B-114.7	B-115.2	B-115.5	B-115.7
SAMPLE DEPTH (FT)	45.0-45.5	55.0-55.5	50.5-51.0	14.0-14.5	20.0-20.5	29.5-30.0	10.5-11.0	25.5-26.0	35.0-35.5
SAMPLE DATE	6/9/87	6/9/87	6/10/87	6/10/87	6/10/87	6/10/87	6/11/87	6/11/87	6/11/87
COMPOUND									
VINYL CHLORIDE	ND	ND ND	ND	10 J	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	19 J	22 B	38 B	8 JB	9 JB	19 B	11 JB	17 JB	21 B
TRICHLOROFLUOROMETHANE	ND	8 JB	9 JB	13 B	13 JB	11 JB	4 JB	5 JB	8 JB
1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	ND	81	3 J	95	41	4 J	13
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	3 J	3 J	3 J	3 J	ND	1 JB	1 JB	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	6 J	ND	6 J	43	5 J	9 J	ND	2 J	ND
BENZENE	ND	ND	0 J	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	2 J	1 J	2 J	60	67	150 B	2 JB	2 JB	4 J
TOLUENE	1 JB	1 JB	2 JB	2 J	2 J	3 JB	4 JB	4 JB	7 J
ETHYL BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOLATILES	31	35	60	220	99	288	63	34	53
LIBRARY SEARCH (VO)	34	20	190	ND	224	310	ND	ND	ND

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN SOIL SAMPLES

TABLE 6 cont.

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-116.8	B-117.1A	B-117.4	B-117.7	B-118.4	B-118.8	B-118.9	B-119.1	B-119.4
SAMPLE DEPTH (FT)	40.0-40.5	4.5-5.0	20.0-20.5	35.0-35.5	20.0-20.5	39.5-40.0	44.5-45.0	5.0-5.5	19.5-20.0
SAMPLE DATE	6/11/87	6/11/87	6/11/87	6/11/87	6/15/87	6/15/87	6/15/87	6/15/87	6/15/87
COMPOUND									
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	2 JB	220 J	2 JB	2 JB	3 J	3 J	16 JB	22 B	19 B
TRICHLOROFLUOROMETHANE	8 JB	520 JB	11 JB	8 JB	12 B	12 B	ND	10 JB	10 JB
1,2-DICHLOROETHENE	ND	ND	ND	ND	7 J	6 J	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	3 J	1,900	8 J	5 J	8 J	2 J	53	ND	ND
CHLOROFORM	ND	91 J	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	1 J	ND	10 J	6 J	ND	1 J	1 J
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	11 J	740 J	3 J	4 J	13	9 J	74	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	5,800	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	35	ND	16	29	7 J	15	55	ND	5 J
TOLUENE	11	8,700	25	11	2 JB	2 JB	ND	2 J	2 J
ETHYL BENZENE	ND	340 J	ND	ND	ND	ND	ND	ND	1 JB
TOTAL XYLENES		1,400			ND	ND	ND	ND	ND
TOTAL VOLATILES	70	19,711	66	59	62	55	198	35	38
LIBRARY SEARCH (VO)	ND	2,000	20	ND	140 B	150 B	490 B	220 B	220 B

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN SOIL SAMPLES

TABLE 6 cont.

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-119.7	B-120.4	B-121.5A	B-122.4	B-122.6	B-122.7
SAMPLE DEPTH (FT)	34.0-36.0	19.5-20.0	24.5-25.0	19.0-19.5	29.0-29.5	34.5-35.0
SAMPLE DATE	6/15/87	6/17/87	6/17/87	6/17/87	6/17/87	6/17/87
COMPOUND						
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	22 B	9 JB	9 JB	8 JB	12 JB	10 JB
TRICHLOROFLUOROMETHANE	10 JB	4 JB	2 JB	3 JB	4 JB	5 JB
1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	ND	2 J	ND	16
CHLOROFORM	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	1 J	ND	ND
1,2-DICHLOROPROPANE	ND	ND	5 J	ND	ND	ND
TRICHLOROETHYLENE	5 J	ND	ND	4 J	2 J	78
BENZENE	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	29	ND	ND	52	4 J	150
TOLUENE	2 J	2 J	2 J	2 J	2 J	1 J
ETHYL BENZENE	ND	1 JB	ND	ND	1 JB	ND
TOTAL XYLENES	ND	ND	ND	ND	ND	ND
TOTAL VOLATILES	68	16	18	72	25	260
LIBRARY SEARCH (VO)	250 B	ND	ND	ND	ND	ND

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN WATER BLANKS

TABLE 6 cont.

RESULTS FOR WATER BLANKS IN ug/l

SAMPLE NUMBER	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK
SAMPLE DATE	5/26/87	5/27/87	5/28/87	5/29/87	6/1/87	6/3/87	6/4/87	6/5/87	6/8/87	6/9/87
COMPOUND										
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	2 JB	6 JB	7 J	5 J	5 JB	4 JB	2 J	4 J	8 JB	ND
TRICHLOROFLUOROMETHANE	ND	3 JB	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	4 J	2 J	2 J	3 J	ND	3 J	3 J	ND	ND	ND
TRICHLOROETHYLENE	ND	ND	ND	ND	2 J	ND	ND	ND	ND	ND
BENZENE	ND	0 J	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	2 JB	2 JB	2 JB	1 JB	5 J	ND	ND	1 J	2 J	ND
ETHYL BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL VOLATILES	8	13	11	9	12	7	5	5	10	0
LIBRARY SEARCH (VO)	ND	ND	ND	ND	140	20	ND	ND	ND	11

ND - Not detected

Table continued on next page...

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN WATER BLANKS

TABLE 6 cont.

RESULTS FOR WATER BLANKS IN ug/l

SAMPLE NUMBER	TRIP BLANK	TRIP BLANK	TRIP BLANK	TRIP BLANK
SAMPLE DATE	6/10/87	6/11/87	6/15/87	6/17/87
COMPOUND				
VINYL CHLORIDE	ND	ND	ND	ND
METHYLENE CHLORIDE	1,100 B	4,300 B	5,500 B	4 B
TRICHLOROFLUOROMETHANE	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND
TRANS-1,2,-DICHLOROETHENE	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	5 J
TRICHLOROETHYLENE	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND
TETRACHLOROETHYLENE	ND	ND	ND	ND
TOLUENE	ND	56 JB	68 JB	2 J
ETHYL BENZENE	ND	ND	ND	ND
TOTAL XYLENES	ND	ND	ND	ND
TOTAL VOLATILES	1,100	4,356	5,568	11
LIBRARY SEARCH (VO)	ND	ND	ND	ND

ND - Not detected

Table continued on next page...

TABLE 7

AIRTRON 87-47400-01

CHEMICAL TEST RESULTS FOR
BASE NEUTRAL AND
ACID EXTRACTABLE
COMPOUNDS IN SOIL SAMPLES

ALL RESULTS IN ug/kg

SAMPLE NUMBER	B-103.1	B-104.1
SAMPLE DEPTH (FT)	4.0-6.0	5.0-5.5
SAMPLE DATE	5/28/87	5/28/87
BASE NEUTRALS:		
DI-N-BUTYL PHTHALATE	2,150 B	3,140 B
ACID EXTRACTABLES:		
NO COMPOUNDS DETECTED	ND	ND

ND - Not detected

Table continued on next page...

ROUND 1 - GROUNDWATER ANALYSES

TABLE 8

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	MW-1	MW-2	MW-2M	MW-3	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-412	USGS-1
SAMPLE DATE:	8/18/87	8/18/87	8/19/87	8/18/87	8/17/87	8/17/87	8/18/87	8/18/87	8/18/87	8/17/87	8/17/87	8/17/87
PARAMETER:												
METHYLENE CHLORIDE	9 B	580 J	ND	1,200 B	8 B	ND	ND	190 B	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 J	2 J	5 J
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	3 J	3 J	3 J
TRICHLOROETHYLENE	ND	7,200	2,000	2,000	ND	ND	ND	ND	32	3,300 D	3,200 D	9,000 D
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	19
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	14	15	28
TETRACHLOROETHYLENE	ND	3,000	530	1,500	ND	ND	ND	ND	ND	2,000 D	2,000 D	2,900 D
TRICHLOROLFLUOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 J	ND	1 J
TRANS-1,2-DICHLOROETHENE	ND	180 J	180 J	230 J	ND	ND	ND	ND	ND	510 D	480 D	520 D
TOLUENE	1 JB	94 JB	ND	96 JB	ND	ND	ND	1 J	1 JB	ND	1 JB	ND
TOTAL VOLATILES	10	11,054	2,710	5,026	8	0	0	191	33	5,830	5,701	12,476
LIBRARY SEARCH	13	ND	ND	ND	ND	ND	ND	ND	ND	28	6	53

ND - Not detected
D - Dilution factor of 50.

Table continued next page...

ROUND 1 - GROUNDWATER ANALYSES

TABLE 8 cont.

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	USGS-2	USGS-3	USGS-6	MENN-10	MENN PROD-1	TRIP	TRIP
SAMPLE DATE:	8/17/87	8/18/87	8/18/87	8/17/87	8/18/87	8/18/87	8/17/87
PARAMETER:							
METHYLENE CHLORIDE	12	11 B	14 B	ND	650 B	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	46	ND	4 J	1,300 D	1,100	5 JB	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	6	ND	ND	ND
TETRACHLOROETHYLENE	26	ND	4 J	450 D	180 J	5 JB	ND
TRICHLOROLFLUOROMETHANE	4 J	ND	ND	2 J	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	36	ND	ND	230 J	53 J	ND	ND
TOLUENE	ND	ND	1 JB	ND	90 JB	ND	ND
TOTAL VOLATILES	124	11	23	1,988	2,073	10	0
LIBRARY SEARCH	37	ND	ND	90	ND	9	9

ND - Not detected
D - Dilution factor of 50.

Table continued next page...

AIRTRON 87-47400-01

TABLE 9

ROUND 1 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
BASE NEUTRAL COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	MW-1	MW-2	MW-2M	MW-3	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-412	USGS-1
SAMPLE DATE:	8/18/87	8/18/87	8/19/87	8/18/87	8/17/87	8/17/87	8/18/87	8/18/87	8/18/87	8/17/87	8/17/87	8/17/87
PARAMETER:												
BIS(2-ETHYLYHEXYL) PHTHALATE	11 JB	ND	ND	8 JB	ND	ND	ND	ND	ND	ND	ND	ND
DI-N-OCTYL PHTHALATE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DI-N-BUTYL PHTHALATE	ND	ND	ND	ND	2 J	ND	ND	ND	ND	ND	ND	ND
DIETHYL PHTHALATE	ND	ND	2 J	ND	ND	ND	ND	ND	20 J	5 J	ND	ND
TOTAL BASE NEUTRALS	11	0	2	8	2	0	0	0	20	5	0	0
LIBRARY SEARCH (B/A/N)	1,300	ND	ND	29	ND	ND	ND	ND	ND	ND	ND	ND

ND- Not detected

Table continued next page...

AIRTRON 87-47400-01

TABLE 9 cont.

ROUND 1 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
BASE NEUTRAL COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	USGS-2	USGS-3	USGS-6	MENN-10	MENN PROD-1	TRIP	TRIP
SAMPLE DATE:	8/17/87	8/18/87	8/18/87	8/17/87	8/18/87	8/18/87	8/17/87
PARAMETER:							
BIS(2-ETHYLYHEXYL) PHTHALATE	ND	16 JB	ND	6 JB	ND	ND	ND
DI-N-OCTYL PHTHALATE	ND	ND	ND	ND	ND	ND	ND
DI-N-BUTYL PHTHALATE	ND	ND	ND	ND	ND	ND	ND
DIETHYL PHTHALATE	ND	ND	ND	ND	ND	ND	ND
TOTAL BASE NEUTRALS	0	16	0	6	0	0	0
LIBRARY SEARCH (B/A/N)	13	ND	ND	ND	ND	ND	ND

ND- Not detected

Table continued next page...

AIRTRON 87-47400-01

TABLE 10

ROUND 1 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
ACID EXTRACTABLE COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	MW-1	MW-2	MW-2M	MW-3	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-412	USGS-1
SAMPLE DATE:	8/18/87	8/18/87	8/19/87	8/18/87	8/17/87	8/17/87	8/18/87	8/18/87	8/18/87	8/17/87	8/17/87	8/17/87
PARAMETER:												
No Compounds Detected	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND - Not detected

Table continued next page...

AIRTRON 87-47400-01

TABLE 10 cont.

ROUND 1 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
ACID EXTRACTABLE COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	USGS-2	USGS-3	USGS-6	MENN-10	MENN PROD-1	TRIP	TRIP
SAMPLE DATE:	8/17/87	8/18/87	8/18/87	8/17/87	8/18/87	8/18/87	8/17/87
PARAMETER:							
No Compounds Detected	ND	ND	ND	ND	ND	ND	ND

ND - Not detected

Table continued next page...

AIRTRON 87-47400-01

TABLE 11

ROUND 1 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
PESTICIDES/PCB's
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	MW-1	MW-2	MW-2M	MW-3	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-412	USGS-1
SAMPLE DATE:	8/18/87	8/18/87	8/19/87	8/18/87	8/17/87	8/17/87	8/18/87	8/18/87	8/18/87	8/17/87	8/17/87	8/17/87
PARAMETER:												
No compounds detected	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND - Not detected

Table continued next page...

AIRTRON 87-47400-01

TABLE 11 cont.

ROUND 1 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
PESTICIDES/PCB's
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER:	USGS-2	USGS-3	USGS-6	MENN-10	MENN PROD-1	TRIP	TRIP
SAMPLE DATE:	8/17/87	8/18/87	8/18/87	8/17/87	8/18/87	8/18/87	8/17/87
PARAMETER:							
No compounds detected	ND	ND	ND	ND	ND	ND	ND

ND - Not detected

Table continued next page...

ROUND 1 - GROUNDWATER ANALYSES

TABLE 12

CHEMICAL TEST RESULTS FOR
METALS, CYANIDE & PHENOLS
IN WATER SAMPLES

ALL RESULTS IN UG/L

SAMPLE NUMBER:		MW-1	MW-2	MW-2M	MW-3	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206	MW-412	USGS-1
SAMPLE DATE:		8/18/87	8/18/87	8/19/87	8/18/87	8/17/87	8/17/87	8/18/87	8/18/87	8/18/87	8/17/87	8/17/87	8/17/87
ANALYTE	NJDEP GUIDELINES*												
ANTIMONY	---	<60	<60	<60	<60	<60	<60	<60	<60	<60	<60	<60	<60
ARSENIC	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
BERYLLIUM	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CADMIUM	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
CHROMIUM	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
COPPER	1,000	<30	<30	<30	<30	<25	<25	<30	<30	<30	<25	<25	<25
LEAD	50	<5.0	<5.0	<5.0	<5.0	8.2	<5.0	6	<5.0	<5.0	<5.0	<5.0	<5.0
MERCURY	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NICKEL	---	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40
SELENIUM	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SILVER	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
THALLIUM	---	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
ZINC	5,000	<20	<20	<20	<30	34	27	<20	<20	<20	99	106	32
CYANIDE	200	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
PHENOLS	---	<5	11	<5	<5	<5	<5	<5	9	<5	<5	<5	97

* - Used informally in evaluating possible cleanup requirements.

Table continued next page...

AIRTRON 87-47400-01

ROUND 1 - GROUNDWATER ANALYSES

TABLE 12 cont.

CHEMICAL TEST RESULTS FOR
METALS, CYANIDE & PHENOLS
IN WATER SAMPLES

ALL RESULTS IN UG/L

SAMPLE NUMBER:		USGS-2	USGS-3	USGS-6	MENN-10	MENN PROD-1	Q-001	TRIP	TRIP
SAMPLE DATE:		8/17/87	8/18/87	8/18/87	8/17/87	8/18/87	8/18/87	8/18/87	8/17/87
ANALYTE	NJDEP GUIDELINES*								
ANTIMONY	---	<60	<60	<60	<60	<60	<60	<60	<60
ARSENIC	50	<10	<10	<10	<10	<10	<10	<10	<10
BERYLLIUM	---	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CADMIUM	10	<10	<10	<10	<10	<10	<10	<10	<10
CHROMIUM	50	<10	<10	<10	<10	<10	<10	<10	<10
COPPER	1,000	<25	<30	<30	<25	110	<30	<30	<30
LEAD	50	<5.0	<5.0	<5.0	<5.0	23	<5.0	<5.0	<5.0
MERCURY	2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
NICKEL	---	<40	<40	<40	<40	40	<40	<40	<40
SELENIUM	10	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
SILVER	50	<10	<10	<10	<10	<10	<10	<10	<10
THALLIUM	---	<10	<10	<10	<10	<10	<10	<10	<10
ZINC	5,000	111	<30	<20	90	130	<20	<20	<20
CYANIDE	200	<5	<5	<5	<5	<5	<5	<5	<5
PHENOLS	---	6	36	<5	<5	<5	<5	<5	<5

* - Used informally in evaluating possible cleanup requirements.

Table continued next page...

ROUND 2 - GROUNDWATER ANALYSES

TABLE 13

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER	MW-1	MW-2	MW-2M	MW-3	MW-6	MW-201	MW-202	MW-203	MW-204	MW-205	MW-206
SAMPLE DATE:	10/1/87	10/1/87	10/1/87	9/30/87	10/1/87	10/1/87	9/30/87	9/30/87	9/30/87	10/1/87	10/1/87
PARAMETER:											
METHYLENE CHLORIDE	ND	1,900	410	136 JB	3 JB	ND	6 B	5 B	100 B	ND	2,600
1,1-DICHLOROETHENE	ND	ND	ND	ND	1 J	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	1 J	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	1 JB	6,700 B	1,800	2,564	2,500 DB	ND	ND	ND	ND	43 B	3,200 B
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	10	1 JB	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	1 JB	2,900 B	520 B	2,153	2,000 DB	1 JB	ND	ND	ND	1 JB	2,500 B
TRICHLOROLFLUOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	180 J	ND	287	300 D	ND	ND	ND	ND	ND	510
TOLUENE	1 JB	ND	50 JB	152 JB	2 JB	ND	3 J	2 J	4 J	ND	ND
TOTAL P.P. VOLATILES	3	11,680	2,780	5,292	4,817	2	9	7	104	44	8,810
LIBRARY SEARCH	ND	950	ND	770	5	ND	6	6	15	ND	2,000

ND - Not detected

D - Dilution factor of 50.

Table continued next page...

ROUND 2 - GROUNDWATER ANALYSES

TABLE 13 cont.

CHEMICAL TEST RESULTS FOR
VOLATILE ORGANIC COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER	MW-408	USGS-1	USGS-2	USGS-3	MENN-10	MENN PROD-1	TRIP	TRIP
SAMPLE DATE:	10/1/87	9/30/87	9/30/87	9/30/87	10/1/87	10/1/87	9/30/87	10/1/87
PARAMETER:								
METHYLENE CHLORIDE	50 B	110 J	ND	2 JB	740	110	3 JB	11
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHYLENE	ND	8,850	25	1 JB	1,800 B	1,200 JB	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHYLENE	ND	3,240	11	1 JB	620 B	200 JB	1 JB	ND
TRICHLOROLFLUOROMETHANE	ND	ND	2 J	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	635	37	ND	310	60 J	ND	ND
TOLUENE	1 JB	86 J	1 J	1 JB	55 JB	140 JB	1 JB	1 JB
TOTAL P.P. VOLATILES	51	12,921	76	5	3,525	1,710	5	12
LIBRARY SEARCH	5	940	9	ND	300	ND	6	ND

ND - Not detected

D - Dilution factor of 50.

Table continued next page...

TABLE 14

AIRTRON 87-47400-01

ROUND 2 - GROUNDWATER ANALYSES

CHEMICAL TEST RESULTS FOR
BASE NEUTRAL COMPOUNDS
IN WATER SAMPLES

ALL RESULTS IN ug/l

SAMPLE NUMBER	MW-1
SAMPLE DATE:	10/1/87
PARAMETER:	
BIS(2-ETHYLYHEXYL) PHTHALATE	6 JB
DI-N-OCTYL PHTHALATE	35 B
TOTAL BASE NEUTRALS	41
LIBRARY SEARCH	170

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

The redacted information consists of names and/or addresses of private individuals. Disclosure of this information would be invasive of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. 552(b)(6).

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
1	State of NJ	Greystone Park Morris Plains	7,400	270	Hospital	sand/granite	173	** *
2	State of NJ	Greystone Park Morris Plains	8,000	298	Hospital	sand/granite	105	**
3	State of NJ	Greystone Park Morris Plains	8,000	224	Test	granite	75	**
4	Pineview Homes Inc.	Greystone Morris Plains	6,000	200	NA	granite	112	
5	Pineview Homes Inc.	Greystone Morris Plains	4,300	250	D	granite	85	
6	Morristown	Malapardis Rd. Morris Plains	6,100	80	Test	sand/gravel	25	
7	Ex. 6	Old Wood Road Morris Plains	4,900	125	D	Shale	8	
8	Ex. 6	Morris Plains	5,600	69	D	NA	5	
9	[redacted]	Ex. 6 Morris Plains	4,500	157	D	Sand	15	
10	Ex. 6	Baily Hollow Rd. Morris Plains	4,000	87	D	Granite	4	
11	Litton Co./Airtron	Morris Plains	2,200	293	Construction	Shale	15	

* Water Chemistry Data Available ** Pump Test Data Available

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TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
12	Mennen Co.	Hanover Ave. Morris Plains	500	85	NA	NA	400	
13	Mennen Co.	Hanover Ave. Morris Plains	500	207	NA	Rock	NA	
14	Mennen Co.	Hanover Ave. Morris Plains	500	123	NA	Shale	NA	
15	Mennen Co.	Hanover Ave. Morris Plains	500	60	M	Sand	1	
16	Mennen Co.	Hanover Rd. Morris Plains	500	60	M	Sands/Silt	5	
17	American T&T Co.	Cedar Knolls	1,300	164	I	NA	20	
18	Swisscomatic Incorporated	NA	1,300	400	I	Sandstone	250	
19	Ex. 6	Lake Valley Rd. Morris Twshp.	6,200	80	D	Traprock	10	
20	E [redacted]	Egbert Ave. Morristown	8,100	298	D	Granite	8	
21	Ex. 6	Ex. 6	7,700	275	D	Granite	2	
22	Ex. 6	Ex. 6 Morris Plains	5,700	112	Agricultural	Sand/gravel	7	

* Water Chemistry Data Available ** Pump Test Data Available

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

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Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
44	Ex. 6	Ex. 6 Whippany	7,200	128	D	Sand/gravel	30	
45	Whippany Paper Co.	Eden Mill, Whippany	9,000	97	I	Sand/gravel	560	**
46	Whippany Paper Co.	Eden Mill, Whippany	9,000	63	I	Sand/Gravel	026	**
47	Torcan Inc.	E. Hanover Ave. Morristown	3,800	500	I	Shale	104	
48	USGS	20' W of Whippany River 200' N of Hanover Ave.	5,000	148	M	Sand	105	**
49	NA	111 Ridgedale Rd. Morris Twship.	5,200	163	I	Gravel	70	
50	B.W.B. Corp.	160 Ridgedale Ave. Morris Twship.	5,000	350	I	Sandstone	45	
51	T. Landi & Son	Ridgedale Ave. Morristown	5,300	48	I	Sand/Gravel	90	
52	USGS 100' NW of Whippany River;	1400' N Hanover Ave. & River	5,500	100	M	NA	NA	
53	Norman Weinberger	21 Oak Park Dr. Morristown	9,500	291	Agricultural	Sand	22	
54	Ex. 6	Ex. 6 Whippany	7,600	125	D	Gravel	15	

* Water Chemistry Data Available ** Pump Test Data Available

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

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Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
55	Ex. 6	Ex. 6 Whippany	7,600	130	D	Sand/gravel	15	
56	Exxon Co.	Whippany Rd. Morristown	8,500	20	M	Sand/Gravel	NA	
57	Exxon Co.	Whippany Rd. Morristown	8,500	14	M	Sand/Silt	NA	
58	Exxon Co.	Whippany Rd. Morristown	8,500	14	M	Sand	NA	
59	Exxon Co.	Whippany Rd. Morristown	8,500	14	M	Sand/Silt/Clay	NA	
60	Exxon Co.	Whippany Rd. Morristown	8,500	14	M	Silt/Clay	NA	
61	Exxon Co.	Whippany Rd. Morristown	8,500	15.5	M	Sand/Silt	NA	
62	Exxon Co.	Whippany Rd. Morristown	8,500	23.5	M	Silt/Clay	NA	
63	Ex. 6	Ex. Convent Station	8,600	65	NA	Sand/gravel	20	
64	Mepco Inc.	Whippany Rd. Morristown	8,000	166	NA	Sand	0	

* Water Chemistry Data Available ** Pump Test Data Available

The redacted information consists of names and/or addresses of private individuals. Disclosure of this information would be invasive of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. 552(b)(6).

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
75	Ex. 6	Ex. 6 Morristown	10,500	175	D	Sand/Clay	NA	
76	Ex. 6	Normandy Blvd. Morristown	10,300	197	D	Sand/Gravel	NA	
77	Ex. 6	Degan Lane, Morristown	12,000	146	D	NA	23	
78	Ex. 6	Ex. 6 Morristown	10,300	262	Agg	Shale	38	
79	Twin Oaks Indoor Tennis Courts		8,500	580	NA	Shale	100	
80	Morristown Memorial Hospital	Morristown	10,000	504	D	Sandstone	290	**
81	Allied Chemical	Columbia Rd. Morristown	12,000	273	NA	Sand/Gravel	20	
82	P.I.C. Realty Corp.	Lot 5, Bk 142 Chatham	12,200	50	M	Sand/Gravel	NA	
83	P.I.C. Realty Corp.	Lot 5, Bk 142 Chatham	12,200	50	M	Sand/Gravel	NA	
84	P.I.C. Realty Corp.	Lot 5, Bk 142 Chatham	12,200	50	M	Sand/Gravel	NA	
85	Allied Chemical	Columbia Rd. Morris Twshp.	12,000	231	NA	Sand/Gravel	20	

* Water Chemistry Data Available ** Pump Test Data Available

The redacted information consists of names and/or addresses of private individuals. Disclosure of this information would be invasive of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. 552(b)(6).

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
23	Parsippany Construction Co.	Garden St. & New St. Morristown	5,300	32	Dewatering	Silty Sand	NA	
24	Parsippany Construction Co.	Garden St. & New St. Morristown	5,300	36	Dewatering	Silty Sand	NA	
25	Texaco	48 Spring St. Morristown	6,000	12	M	Silty Clay	NA	
26	Texaco	48 Spring St. Morristown	6,000	12.5	M	Silty Clay	NA	
27	Texaco	48 Spring St. Morristown	6,000	13.7	M	Silt	NA	
28	Texaco	48 Spring St. Morristown	6,000	15.5	M	Silt	NA	
29	Texaco	48 Spring St. Morristown	6,000	13.2	M	Silt	NA	
30	Texaco	48 Spring St. Morristown	6,000	12.8	M	Silt	NA	
31	Ex. 6	Ex. 6 Morristown	10,000	210	D	Rock	NA	
32	All Soul Hospital	Morristown	10,200	506	D	Granite	205	

* Water Chemistry Data Available ** Pump Test Data Available

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
33	Mac-Cullough Hall Museum	45 Mac-Cullough St. Morristown	9,300	155	D	Gravel	24	
34	Jersey Central Power & Light Co.	Morristown	6,100	140	D	Sand/gravel	15	
35	Texaco	Morris St. & Olyphant Place, Morristown	7,000	14.5	M	Sand/Silt	NA	
36	Texaco	Morris St. & Olyphant Place, Morristown	7,000	14.5	M	Sand	NA	
37	Texaco	Morris St. & Olyphant Place, Morristown	7,000	14.5	M	Sand	NA	
38	Texaco	Morris St. & Olyphant Place, Morristown	7,000	14.5	M	Sand	NA	
39	Morristown	Overlook Rd. Morristown	10,700	442	NA	NA	NA	
40	Mennen Co.	Hanover Ave. Morristown	500	110	NA	Sand	100	
41	Airtron	Hanover Ave.	—	21	M	Silty Clay	NA	
42	Airtron	Hanover Ave.	—	72	M	Sand/gravel	NA	
43	Mennen Co.	Hanover Ave.	500	100	NA	Sand	300	

* Water Chemistry Data Available ** Pump Test Data Available

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
65	Mepco Inc.	Whippany Rd. Morristown	8,000	140	NA	Gravel	168	
66	Mepco Inc.	Whippany Rd. Morristown	8,000	507	D	NA	22	
67	Mepco Inc.	Whippany Rd. Morristown	8,000	40	M	Silts/Sands	NA	
68	Mepco Inc.	Whippany Rd. Morristown	8,000	50	M	Silts/Sands	NA	
69	Mepco Inc.	Whippany Rd. Morristown	8,000	50	M	Silts/Sands	NA	
70	Mepco Inc.	Whippany Rd. Morristown	8,000	25	M	Silts/Sands	NA	
71	Mepco Inc.	Whippany Rd. Morristown	8,000	25	M	Silts/Sands	NA	
72	Mepco Inc.	Whippany Rd. Morristown	8,000	80	M	Silts/Sands	NA	
73	Mepco Inc.	Whippany Rd. Morristown	8,000	40	M	Silts/Sands	NA	
74	Mepco Inc.	Whippany Rd. Morristown	8,000	80	M	Silts/Sands	NA	

* Water Chemistry Data Available ** Pump Test Data Available

The redacted information consists of names and/or addresses of private individuals. Disclosure of this information would be invasive of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. 552(b)(6).

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
86	Allied Chemical	Columbia Rd. Morris Twshp.	12,000	147	NA	Sand/Gravel	0	
87	Allied Chemical	Columbia Rd. Morris Twshp.	12,000	231	NA	Sand/Gravel	50	
88	Allied Chemical	Columbia Rd. Morris Twshp.	12,000	178	NA	Sand/Gravel	NA	
89	Morristown Memorial Hospital	100 Madison Ave.	10,000	507	D	Rock	325	
90	Mt. Carmel Monastary	Madison Ave. Morris Twshp.	10,600	370	D	Shale	28	
91	Schering Realty Corp.	Lot 3, Bk 33 Madison Boro	12,300	150	Agg/I	Gravel/Sand	125	
92	Ex. 6	Old Glen Rd. Morristown	12,100	175	D	Clay	NA	
93	Allied Chemical	Columbia Rd. Whippany	12,000	253	M	Sand	329	
94	U.S. Insurance Group	305 Madison Ave.	12,500	370	I	Shale	298	
95	Jersey Central Pwr & Lt Co.	Morris Twshp.	12,900	600	I	Shale	170	
96	NJ Power & Light	Morristown	13,400	225	D	Sandstone	50	
97	Morris County Golf Club		13,500	271	I	Sand/Gravel	236	**

* Water Chemistry Data Available ** Pump Test Data Available

The redacted information consists of names and/or addresses of private individuals. Disclosure of this information would be invasive of personal privacy and thus is exempt from mandatory disclosure by virtue of Exemption 6 of the FOIA, 5 U.S.C. 552(b)(6).

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
98	Morris County Golf Club		13,500	238	D	Clay/Boulders	15	
99	Allied Chemical	Lot 86, Bk 431 Morris Twshp.	12,000	198	I	Sand/Gravel	198	
100	Ex. 6 [redacted]	Normandy Parkway Morristown	10,000	425	D	Rock	NA	
101	Blanchard Securities, Inc.	Columbia Rd. Hanover	13,400	132.5	D	Sand	350	**
102	Airtron	Hanover Rd.	—		M	Sand		
103	Airtron	Hanover Rd.	—		M	Sand		
104	Airtron	Hanover Rd.	—		M	Sand		
105	USGS	North of Hanover Rd.	—	100	M	Sand	NA	
106	USGS	North of Hanover Rd.	—	10	M	Sand	NA	
107	USGS	North of Hanover Rd.	—	300	M	Sand	NA	
108	NJ Bell Co.		6,800	384	I	NA	85	
109	1st National Bank		6,600	80	D	NA	15	
110	Whippany Paper		10,800	193	NA	NA	26	
111	Whippany Paper		9,000	72	I	NA	560	

* Water Chemistry Data Available ** Pump Test Data Available

TABLE 15

WELL INVENTORY SURVEY

AIRTRON, INC.
(87-47400-01)

Well No.	Owner	Address	Distance From Site (ft.)	Depth (ft.)	Use	Water Bearing Formation	Yield (gpm)	Note
112	Whippany Paper		9,000	66	I	NA	NA	
113	ITT Rayonier		7,800	128	I	NA	320	
114	ITT Rayonier		7,800	127	I	NA	15	
115	Airtron	200 Hanover Ave. Morris Plains	0	135	M	Sand/Silt	3	
116	Airtron	200 Hanover Ave. Morris Plains	0	128	M	Sand/Silt	6	
117	Airtron	200 Hanover Ave. Morris Plains	0	134	M	Sand/Silt	5	
118	Airtron	200 Hanover Ave. Morris Plains	0	72	M	Sand	3	
119	Airtron	200 Hanover Ave. Morris Plains	0	90	M	Sand	3	
120	Airtron	200 Hanover Ave. Morris Plains	0	67	M	Sand	5	

* Water Chemistry Data Available ** Pump Test Data Available

ATTACHMENT D

MK-200

SITE-WIDE SOIL REMEDIAL ACTION REPORT

VOLUME I OF VII

AIRTRON DIVISION OF LITTON SYSTEMS, INC.
MORRIS PLAINS, NEW JERSEY

November 15, 2005

Prepared for:

NORTHROP GRUMMAN COMPONENT TECHNOLOGIES
MORRIS PLAINS, NEW JERSEY

Prepared by:

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CONTENTS

CERTIFICATIONS vii
EXECUTIVE SUMMARY viii
1.0 INTRODUCTION 1
2.0 ENVIRONMENTAL SETTING 10
2.1 Site Operations and Surrounding Land Use 10
2.2 Local Topography and Drainage 11
2.3 Soils and Wetlands 11
2.4 Regional Geology 12
2.5 Regional Water Supply 13
2.6 Site Geology 13
2.7 Site Hydrogeology 14
3.0 SUMMARY OF REMEDIAL INVESTIGATIVE ACTIVITIES 16
3.1 Previous Investigations 16
3.2 Ongoing Investigations 18
4.0 SUMMARY OF REMEDIAL ACTION WORKPLAN 20
4.1 Regulatory History 20
4.2 Applicable Remediation Goals 20
4.3 Remedial Action Scope of Work 21
5.0 SUMMARY OF REMEDIAL ACTION 22
5.1 Pre-Remedial Action Activities 22
5.1.1 Acquisition of Required Permits 22
5.1.1.1 Stream Encroachment/Waterfront Development 22
5.1.1.2 Wetlands/GP-4 Permitting 23
5.1.1.3 Air Permitting 23
5.1.1.4 NJPDES Permitting (DSW) 24
5.1.1.5 Soil Erosion and Sediment Control Plan 24
5.1.1.6 Local Construction Permits 25
5.1.1.7 DOT Access and Water Line Permit 25
5.1.1.8 AOC Waiver 26
5.1.2 Health and Safety 26
5.1.3 Monitoring Well Abandonment 27
5.2 Remedial Action Activities 27
5.2.1 Installation of Construction Support Facilities and Temporary Controls 27
5.2.2 Geophysical Survey 28
5.2.3 Perimeter Air Monitoring 28
5.2.4 Soil Vapor Extraction System Monitoring – AOCs 1-4 30
5.2.5 Soil Treatment Performance Monitoring 31
5.2.6 AOCs 1-4 In-situ Treatment Work 33
5.2.7 Remediation of AOC-1A 34
5.2.7.1 Excavation Activities 34

5.2.7.2 Post-Excavation Soil Sampling and Analysis 34
5.2.8 Remediation of AOC-1B 34
5.2.8.1 Groundwater Treatment Discharge Re-routing 34
5.2.8.2 Excavation Activities 35
5.2.8.3 Post-Excavation Soil Sampling and Analysis 35
5.2.9 Remediation of AOC-1C 35
5.2.10 Remediation of AOC-2A 35
5.2.10.1 Excavation Activities 35
5.2.10.2 Post-Excavation Soil Sampling and Analysis 35
5.2.11 Remediation of AOC-2B 36
5.2.11.1 Excavation Activities 36
5.2.11.2 Post-Excavation Soil Sampling and Analysis 36
5.2.12 Remediation of AOC 2C 36
5.2.13 Remediation of AOC-3A 36
5.2.13.1 Excavation Activities 36
5.2.13.2 Post-Excavation Soil Sampling and Analysis 37
5.2.14 Remediation of AOC-3B 37
5.2.14.1 Installation of Sheet-Piling 37
5.2.14.2 Excavation Activities 37
5.2.14.2.1 Off-Site Debris/Organic-Rich Soil Disposal 38
5.2.14.3 Post-Excavation Soil Sampling and Analysis 38
5.2.15 Remediation of AOC-3C 39
5.2.15.1 Water Line and Storm Drain Relocation 39
5.2.15.2 Excavation Activities 39
5.2.15.3 Presumed Clean Soil 39
5.2.15.4 Post-Excavation Soil Sampling and Analysis 40
5.2.16 Remediation of AOC-3D 40
5.2.16.1 Excavation Activities 40
5.2.16.1.1 Off-Site Debris Disposal 41
5.2.16.2 Post-Excavation Soil Sampling and Analysis 41
5.2.17 Remediation of AOC-4 41
5.2.17.1 Presumed Clean Soil 41
5.2.17.2 Excavation Activities 42
5.2.17.3 Post-Excavation Soil Sampling and Analysis 42
5.2.18 Remediation of Compactor Area 42
5.2.18.1 Excavation Activities 42
5.2.18.2 Post-Excavation Soil Sampling 43
5.2.19 Remediation of AOC-12 43
5.2.19.1 Water Line and Storm Drain Relocation 43
5.2.19.2 In situ Treatment and Mixing of Impacted Soils 44
5.2.19.3 Excavation Activities 45
5.2.19.4 Post-Excavation Soil Sampling and Analysis 46
5.2.19.5 Off-Site Disposal 47
5.2.20 Remediation of Interior AOCs 48
5.2.20.1 Excavation Activities 48

5.2.20.2 Post-Excavation Soil Sampling and Analysis 48
5.2.20.3 Waste Characterization Sampling and Analysis 49
5.2.21 Backfilling Activities 50
5.2.22 Water Management Activities 51
5.3 Post-Remedial Action Activities 52
5.3.1 Site Restoration 52
5.3.1.1 Grading and Seeding 52
5.3.1.2 Wetlands Restoration 52
5.4 Post-Remedial Monitoring and Reporting 53
5.4.1 Post-Source Removal Groundwater Monitoring 53
5.4.2 Wetlands Restoration Performance Monitoring 53
5.4.3 Deed Notice 53
6.0 QUALITY ASSURANCE 55
7.0 REMEDIAL ACTION AND O&M COSTS 56
8.0 CONCLUSIONS 57
9.0 REFERENCES 59

TABLES

(Includes Supplemental Tables for AOC 12 and Interior AOCs)

1. List of Previously Submitted Reports
2. Sample Summary and Description
3. Summary of Post-Treatment Soil Analytical Results
4. Summary of Excavation Volumes
5. Summary of Post-Excavation Soil Analytical Results
6. Summary of Waste Characterization Analytical Results
7. Summary of Presumed Clean Soil Analytical Results
8. Summary of Compactor Area Soil Analytical Results
9. Summary of Historical Post-Excavation Equivalency and PDI Data

FIGURES

1. Site Location Map
2a Pre-Excavation Site/Work Plan – AOCs 1-4 and Compactor Area
2b Pre-Excavation Site/Work Plan – AOC-12 and Interior AOCs
3 Pre-Excavation Site/Work Plan and Cross Section X-X'
4 Generalized Geological Cross-Section X-X'
5a AOCs 1-4 Soil Treatment Performance Diagram
5b AOC 12 Soil Treatment Performance Diagram
6 Actual Limits of Excavation
7-1 AOC-1 Soil Sample Locations and Analytical Results
7-2 AOC-2 Soil Sample Locations and Analytical Results

7-3A/C AOC 3A and 3C Soil Sample Locations and Analytical Results
7-3B/D AOC 3B and 3D Soil Sample Locations and Analytical Results
7-4 AOC-4 Soil Sample Locations and Analytical Results
7-12 AOC-12 Soil Sample Locations and Analytical Results
7-CA Compactor Area Soil Sample Locations and Analytical Results
7-IA Interior AOC Soil Sample Locations and Analytical Results
8a Excavation Cross Sections AOC 1-2
8b Excavation Cross Sections AOC 3-4

APPENDICES
(Note: Original Appendices Previously Submitted with Oct. 26, 2004 RAR)

A. Permits (Volume I of X)
B. Health and Safety Plan (Volume I of X)
C. Monitoring Well Abandonment Logs (Volume I of X)
D. Geophysical Survey (Volume I of X)
E. Quality Control Field Logs (Volume I of X)
F. Perimeter Air Monitoring (Volume I of X)
G. SVE System Air Analytical Results (Volume I of X)
H. Post-Treatment Soil Analytical Data Results (Volume II through VIII of X)
I. Post-Excavation and Presumed Clean Soil Analytical Results (Volume VIII and IX of X)
J. Waste Characterization, Anomaly, and Test Pit Analytical Results (Volume X of X)
K. Copies of Hazardous Waste Manifests and Certificates of Disposal (Volume I of X)
L. Compactor Area Soil Analytical Data Results (Volume I of X)
M. Copies of Clean Fill Certificates (Volume I of X)
N. Wetland Restoration (Volume I of X)
O. Quality Assurance Report (Volume I of X)
P. Project Photos (Volume I of X)

SUPPLEMENTAL APPENDICES

A. Permits (amended)
B. Health and Safety Plan (amended)
C. Monitoring Well Abandonment Logs (amended)
D. Geophysical Survey (amended)
E. Quality Control Field Logs (amended)
F. Perimeter Air Monitoring (amended)
H. Post-Treatment Soil Analytical Data Results (amended)
I. Post-Excavation and Presumed Clean Soil Analytical Results (amended)
J. Waste Characterization, Anomaly, and Test Pit Analytical Results (amended)
K. Copies of Waste Manifests and Certificates of Disposal (amended)
M. Copies of Clean Fill Certificates (amended)
P. Project Photos (amended)
Q. AOC 3 and 4 Environmental Deed Restriction (new)

ACRONYMS

ACO	Administrative Consent Order
AOCs	Areas of Concern
bgs	Below Ground Surface
VOCs	Chlorinated Volatile Organic Compounds
cy	Cubic Yard
DCE	Dichloroethene
EM	Electromagnetic
EPA	United States Environmental Protection Agency
EW	Extraction Well
FEMA	Federal Emergency Management Agency
g/kg	Grams of Oxidant per Kilogram of Soil
GP4	General Permit # 4
gpm	Gallons per Minute
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operation and Emergency Response
IGWSCC	Impact to Groundwater Soil Cleanup Criteria
ISCO	In-Situ Chemical Oxidation
ISRA	Industrial Site Recovery Act
LOI	Letter of Interpretation
LURP	Land Use Regulation Program
mg/kg	Milligrams per Kilogram
MS	Monitoring Station
MSL	Mean Sea Level
MW	Monitoring Well
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJPDES	New Jersey Pollutant Discharge Elimination System
NOD	Natural Oxidant Demand
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethene
PDI	Pre-Design Investigation
PID	Photoionization Detector
ppm	Parts per Million
PVC	Polyvinyl Chloride
QA	Quality Assurance
RA	Remedial Action
RAR	Remedial Action Report
RASR	Remedial Action Selection Report
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RF	Radio Frequency
RI	Remedial Investigation

ACRONYMS

RU	Restricted Use
SCC	Soil Cleanup Criteria
scfm	Standard Cubic Feet Per Minute
SCS	Soil Conservation Service
SESCP	Soil Erosion and Sediment Control Plan
SI	Site Investigation
SRIW	Supplemental Remedial Investigation Work Plan
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Procedures
URU	Unrestricted Use
USGS	United States Geological Survey
VC	Vinyl Chloride
VOCs	Volatile Organic Compounds

CERTIFICATIONS

"Based on my inquiry of those individuals responsible for obtaining the submitted information, I certify under penalty of law that I believe the information to be true, accurate, and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate, or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement, which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties."

Name: Joseph P. Kwan Signature: _____

Title: Director, Environmental Remediation

Company: Northrop Grumman Corporation

STATE OF CALIFORNIA

COUNTY OF

Sworn to and subscribed before me this 28th day of October, 2005.
Witness my hand and official seal.

_____
Notary Public

JENNIFER MATNEY
Commission # 1364825
Notary Public - California
Los Angeles County
My Comm. Expires Jul 14, 2006

EXECUTIVE SUMMARY

On behalf of the Airtron Division of Litton Systems, Inc. (Airtron), **Panther Technologies, Inc.**, (Panther) has prepared this Site-Wide Soil Remedial Action Report (RAR) to describe the soil remediation activities completed at the former Airtron facility located in Hanover Township, Morris County, New Jersey (Site). This RAR is provided to document the remedial approach (soil excavation, in-situ/ex-situ treatment and re-use of soils on-site) that was presented in the February 2003 (AOCs 1-4) and the September 2004 (AOC-12) revised Remedial Action Workplan (RAWP) Addenda and approved by the New Jersey Department of Environmental Protection (NJDEP) in letters dated June 27, 2003 and October 29, 2004, respectively. Additionally, this RAR also incorporates information submitted in the NJPDES Discharge to Groundwater (DGW) Permit by Rule (PBR) applied for and approved by the NJDEP on December 10, 2004 for in-situ treatment of soils in AOC-12.

This RAR addresses nine (9) primary soil areas of concern (AOCs), AOCs 1 through 4, AOC-12, the area known as the Hydraulic Compactor Pad (Compactor Area) and the interior AOCs (Tool Crib, Bridgeport Area and Plating Room). AOCs 1-4, AOC-12, the Compactor Area and the Tool Crib Area were impacted with chlorinated volatile organic compounds (VOCs) including tetrachloroethene (PCE), trichloroethene (TCE), and various intermediate degradation products of these VOCs (daughter products). The Plating Room was impacted with metals including copper and cadmium and the Bridgeport Area was impacted with polycyclic aromatic hydrocarbons (PAHs). These compounds exceeded the NJDEP's most stringent Impact to Groundwater Soil Cleanup Criteria (IGWSCC) or Restricted Use Soil Cleanup Criteria (RUSCC). All other AOCs at the Site have either been closed, or are currently the subject of ongoing remedial investigation, including AOC-11 (Groundwater) and AOC-13 (Indoor Air Quality).

AOCs 1-4 and Compactor Area Summary

Subsequent to the NJDEP's approval of soil delineation in AOCs 1-4, Airtron developed and submitted a RAWP for soils dated September 14, 1999 and issued a RAWP Addendum dated February 5, 2001. The original remedial approach was proposed under the assumption that the manufacturing facility was

still operating. At that time, the selected alternative was a less intrusive, in-situ approach based on enhanced reductive dechlorination of contaminants in soils using molasses. Since that time, the facility ceased operations, opening up the possibility of more aggressive and intrusive remedial approaches. In recognition of this fact, the NJDEP noted in its March 28, 2002, comment letter that it would be receptive to alternative approaches, which may be more feasible at an inactive facility. Airtron initiated a reevaluation of remedial action alternatives in response to the NJDEP's suggestion. Specifically, by letter dated June 17, 2002, Airtron identified several remedial alternatives that would be further evaluated. The selected remedy, ex-situ chemical oxidation of impacted soils, was discussed with the NJDEP during a subsequent meeting on July 18, 2002. During this meeting, it was agreed that implementation of this remedy would require the collection of additional data to fill data gaps and confirm the appropriateness of the technology. As a result, Airtron developed and implemented a Pre-Design Investigation (PDI) in the fall of 2002 with the following objectives:

- Fill RI data gaps in the delineation identified by the Department in its March 19, 2002 correspondence on the SI/RI/Remedial Action Selection Report (RASR);
- Define affected soil volumes;
- Provide supplemental sidewall/floor analytical data to be used as post-excavation-equivalent data; and,
- Provide treatability information for design of an optimum on-site treatment option.

After completion of the PDI and bench-scale testing, ex-situ chemical oxidation was verified as a viable technology to treat soil on-site. This revised approach was outlined in a Revised RAWP Addendum dated February 10, 2003. The February 2003 RAWP presented the PDI findings and outlined the revised strategy to remedy affected soils that presented an ongoing source of groundwater impacts. Specifically, the remedial approach presented in the RAWP was designed to remove over 95% of the defined VOC soil contaminant mass. The revised remedial approach in the RAWP, later approved by the NJDEP, incorporated the following key elements:

- Excavation of roughly 20,000 cubic yards (cy) of source area soils;
- Post-excavation soil sampling, where needed to fill data gaps;

- On-site, ex-situ chemical oxidation of soils;
- A post-treatment soil sampling program for soil re-use; and
- Site restoration activities including wetlands reinstallation.

In order to conduct the on-site treatment of impacted soils, an "Area of Contamination Waiver", pursuant to the National Contingency Plan (NCP), was requested and granted by the NJDEP for the entire Site. Although the original plan included roughly 20,000 cy (30,000 tons) of impacted soil to be treated as part of the RAWP implementation, approximately 40,577 tons were actually treated and re-used on-site. The additional soils were due to the presence of additional impacts that were discovered during the soil excavation and post-excavation sampling process. As a conservative measure, clean soils that were excavated for benching/sloping of sidewalls for compliance with OSHA excavation requirements were also treated and re-used. In addition, due to the presence of previously unidentified buried waste and metal debris, an additional 9,100 tons of commingled materials were excavated and disposed of off-site, as these materials were deemed to be untreatable on-site.

The specific goals of the remedial action were mass removal of contaminants in soil in the previously identified AOCs to achieve RUSCC and the protection of groundwater. In order to effectively achieve these goals, a Site-specific soil remediation goal was proposed in the RAWP for Site constituents of concern. The remediation goal, as presented in the RAWP, was 5 mg/kg for individual VOCs in soils. This remediation goal for soils was conditionally approved by the NJDEP in the referenced letter dated June 27, 2003, which also required additional groundwater investigation and possible remediation be performed and handled as a separate media-specific action.

The soil remedial action proposed in the RAWP was implemented starting on July 22, 2003. Excavation, treatment and backfill activities in AOCs 1A, 1B, 2A, 2B, 3A, 3B, 3C, 3D and 4 were largely completed by January 2004 prior to temporary demobilization for the winter. Wetlands restoration work was completed in the spring and summer of 2004. Overall, approximately 40,577

tons of soil were excavated, successfully treated on-site and re-used as fill. All soil re-used on-site met or was below the remediation goal of 5 mg/kg for targeted VOCs (7 mg/kg for vinyl chloride).

To put the effectiveness of the treatment in perspective, the pre-treatment concentration of VOCs in soil within the affected AOCs at the Site was as high as 25,000 mg/kg in known source soils, with an estimated Site-wide average of 250 mg/kg. After treatment, the average concentration of PCE, the most prevalent VOC, was just above 1 mg/kg in soils re-used on-site. The average concentration of the other VOCs being targeted was below 1 mg/kg after treatment.

As a result of the on-site treatment, Panther successfully treated over 40,000 tons of impacted soil in AOCs 1-4 to VOC concentrations below the remediation goals set in the RAWP. Based on the results of post-treatment soil sampling and analysis, the most stringent NJDEP soil cleanup criteria, the IGWSCC, was met in all soils backfilled in AOCs 1B and 2B. In addition, the treated and backfilled soils also met the Unrestricted Use Soil Cleanup Criteria (URUSCC) in AOCs 1B and 2B. As a result, there is no need for a deed notice for these AOCs. The URUSCC and RUSCC were also met in all soil treated and backfilled in AOCs 1A and 2A, although there were minor exceedances of the IGWSCC in these area. As a result, a deed notice is not required for these areas. AOCs 1C and 2C were investigated historically, and based on the additional sampling and modified excavations described below, soils in these area do not contain any contaminants over NJDEP SCC and therefore do not require any further action.

In AOC 3 and 4, the RUSCC were met, although there were minor exceedances of the URUSCC and IGWSCC. As such, AOCs 3 and 4 will be addressed, as required, under a deed notice that has been prepared and is included as an appendix to this RAR. It is noteworthy that the isolated exceedances in AOCs 3 and 4 are also all less than 5 mg/kg. These are considered de minimis concentrations and are expected to attenuate with time. The need for a deed notice due to VOC concentrations in AOCs 3 and 4 is not believed to be a significant issue in light of the fact that this area of the Site already has to be protected from future disturbance via a deed notice due to its wetland status.

During soil remediation, approximately 9,100 tons of soil/debris were removed from the Site. During Site restoration activities, this amount plus additional clean fill was imported to achieve final grade. As a result, each AOC at the Site received varying amounts of a clean fill cover for the soil cap. AOCs 1A and B were finished with approximately 18 inches of clean stone to support traffic before final restoration. AOCs 2A and B were capped with 18 to 24 inches of imported, clean fill as part of Site restoration activities. AOCs 3 and 4 both were capped with approximately 5 feet of clean fill during Site restoration activities to serve as a clean buffer for wetlands reinstallation. This additional measure of capping has been further addressed in the deed notice, as required, although engineering controls are not formally required based on post-treatment results. No exceedances of the RUSCC were present that would require mandatory engineering controls.

At this time, the areas of excavation, including the disturbed wetlands, have been restored with annual wetlands monitoring commencing in the Fall 2005.

AOC-12 and Interior AOCs Summary

During the remediation of AOCs 1-4, VOC impacts were discovered around the storm sewer line on-site. This supplemental information is provided within this modified Site-Wide Soil RAR to document the remedial approach (in situ/ex situ treatment, soil excavation, and re-use of soils on-site) implemented in AOC-12 that was outlined in the September 2004 RAWP Addendum, the November 2004 (amended December 2004) NJPDES DGW PBR request, with conditional approval by the NJDEP granted in a letter dated December 10, 2004.

This modified RAR addresses the storm sewer line area (AOC-12), and three (3) AOCs in the interior of the building previously identified by ARCADIS G&M, Inc (ARCADIS) during Industrial Site Recovery Act (ISRA) activities. The interior areas are identified as the Tool Crib Area, the Bridgeport Area and the Plating Room area. AOC-12 had been impacted with VOCs including PCE, TCE, and various daughter products of these VOCs. These compounds exceeded the NJDEP's most stringent IGWSCC of 1-mg/kg. The interior AOCs had been impacted with VOCs (PCE), polycyclic aromatic hydrocarbons (PAHs) and low levels of metals (copper and cadmium), in the Tool Crib, Bridgeport and Plating Room areas, respectively.

During relocation of a section of fencing while completing remediation activities associated with AOCs 1-4, field photo-ionization detector (PID) readings indicated the presence of VOCs in subsurface soils along a section of the existing sewer line. These readings were later confirmed through soil sampling and analysis. In an attempt to remediate the impacted area along the storm sewer line, a portion of the line was excavated, the storm sewer line replaced, and the excavated soils staged for on-site treatment. This newly identified area was designated AOC-12.

Since the AOC was identified during the course of active remediation of AOCs 1-4, approximately 1,200 tons of soil were excavated and treated on-site per the approved AOC 1-4 RAWP Addendum following verbal notification to the NJDEP, however some residual soil impacts could not be removed because of their depth, magnitude or proximity to an existing subsurface 12-inch-diameter water main. In addition, further investigation of this AOC was required. Based primarily on the proximity of the excavation to the 12-inch diameter ductile iron water main and the requirement to re-establish flow of storm water from the roof leader system, Panther backfilled the replaced storm sewer excavation to allow ongoing roof discharges to continue through a previously permitted outfall while investigations and remedial alternatives were reviewed and discussed with the NJDEP. At that time, a goal of providing some initial treatment by way of an in-situ chemical oxidation (ISCO) event using direct push technology was discussed for the area. As such, an initial NJPDES DGW-PBR permit submission was presented to the NJDEP in February 2004 for review. Based on that submission, the NJDEP requested a full delineation to the most stringent IGWSCC standard prior to issuing a DGW-PBR approval and implementation of the AOC-12 remedy.

Subsequent to the initial excavation, sewer line and clean fill replacement, additional soil samples were collected in an attempt to delineate the VOCs in AOC-12 at the request of the NJDEP (email correspondence on February 24, 2004). A direct-push Geoprobe rig was used to obtain soil samples over the length of AOC-12. Initially, a 30-foot grid was used to collect soil samples in accordance with the *Technical Requirements for Site Remediation,* N.J.A.C. 7:26E – 6.4 (TRSR). The intent of these initial samples was to delineate the VOC impacts in soils in AOC-12 by identifying a 1-mg/kg line around the impacted soil, not to identify or quantify elevated VOC concentrations within this

area. This line reflected the maximum extent of expected excavation given a 5-mg/kg remediation goal prior to backfilling. The sampling program was later expanded to delineate VOCs horizontally and vertically in accordance with email correspondence from the NJDEP on February 24, 2004.

Following completion of these AOC-12 delineation activities, Airtron evaluated potential remedies through a comprehensive options analysis. Airtron evaluated a number of soil remediation technologies and selected a hybrid consisting of ISCO with excavation and off-site disposal of untreatable soils as the best alternative considering a number of factors, including effectiveness, implementability, and future property use. This hybrid approach design was based on those same principles of chemical oxidation that were successfully implemented for AOCs 1-4, with an altered approach that utilized in-situ mixing to treat not only the soil lift targeted for mixing, but also the next soil lift below, pre-treating the soils prior to their mixing. The revised approach and the results of the expedited delineation sampling in AOC-12 were included in a RAWP Addendum submitted to the NJDEP on September 30, 2004. Another NJDPES DGW-PBR request was submitted in November 2004 (amended in December 2004) and the remedy was approved for implementation on December 10, 2004 by the NJDEP. The remedial approach for AOC 12 in the approved RAWP Addendum incorporated the following key elements:

- Relocation of the 12-inch water main and storm sewer lines crossing AOC-12;
- In situ chemical oxidation of impacted soils utilizing shallow soil mixing;
- Treatment and excavation of approximately 12,000 tons of AOC-12 soils;
- Post-excavation soil sampling, where needed to fill data gaps;
- A post-treatment soil sampling program; and
- Site restoration activities.

Although the original plan for AOC-12 included approximately 12,000 tons of impacted soil to be treated as part of the RAWP Addendum implementation, approximately 13,750 tons were actually treated and excavated. This included the treatment of approximately 10,400 tons of soil resulting in concentrations less that the URUSCC for all contaminants of concern, plus an additional 750 tons of impacted soil that was discovered during the storm drain re-location prior to excavation activities. Of the roughly 13,750 tons of soil treated, approximately 2,600 tons required non-hazardous disposal

off-site as these soils were not able to be treated to less than the 5-mg/kg remediation goal for use as backfill on-site due to their high organic content.

The specific goals of the remedial action were mass removal of contaminants in soil, treating VOCs to levels below the RUSCC and the protection of groundwater. In order to effectively achieve this goal, a Site-specific soil remediation goal was proposed in the RAWP Addendum for Site constituents of concern. The remediation goal, as presented in the RAWP Addendum, was 5 mg/kg for individual VOCs in soils (7mg/kg for vinyl chloride), below the RUSCC for these compounds. The approved soil remedy outlined in the RAWP Addendum was implemented starting on December 16, 2004. Treatment, excavation and backfill activities in AOC-12 along with the interior AOCs were completed by April 2005. Although some soil required re-treatment, all soil re-used on-site was below the remedial goal of 5 mg/kg for VOCs (and 7 mg/kg for vinyl chloride). In fact, based on the results of extensive post-treatment soil sampling and analysis, the URUSCC for all compounds of concern was met in all soils treated and backfilled in AOC-12. As a result, an environmental deed restriction will not be required for AOC-12.

Following treatment and backfilling activities (during Site restoration activities in AOC-12), additional clean fill was imported to achieve final grade. All disturbed areas were graded with imported, certified clean topsoil, hydro-seeded and covered with straw mulch in accordance with the Soil Erosion Sediment Control Plan (SESCP) approved by the Morris County Soil Conservation District.

Following completion of restoration activities in AOC-12, Airtron also requested Panther to complete excavation, backfill and restoration of the three (3) interior AOCs (Tool Crib, Bridgeport and Plating Room areas) to eliminate the requirement for an environmental deed restriction inside the building. An environmental deed restriction was originally proposed as the remedial action in the Facility SI Report (ARCADIS, May 2003) and conditionally approved by the NJDEP (August 10, 2004). Utilizing the delineation from the October 17, 2003 Site Investigation Report submitted by ARCADIS, as approved in the August 10, 2004 letter from the NJDEP, ARCADIS and Panther collected soil data from additional borings to better define the extent of excavation required in each

of the three (3) areas and to satisfy NJDEP TRSR for post-excavation soil-sampling requirements prior to initiating excavation activities. Following soil sample analysis, the overlying concrete was saw cut, broken and removed from the three areas. Approximately 20-tons of soil was excavated and staged from both the Tool Crib and Bridgeport Areas and approximately 280-tons of soil was excavated and staged for off-site disposal from the Plating Room. Following excavation, all three (3) AOCs were backfilled with certified clean structural fill and the concrete was restored to pre-excavation elevations. All soil was characterized and disposed of off-site as non-hazardous. As a result of excavation activities in these three (3) AOCs the soils meet the NJDEP URUSCC and no further action is required in these areas.

Based on all data resulting from soil treatment activities from AOCs 1-4, AOC-12, the Compactor Area and the three (3) interior AOCs, the only AOCs that will require an environmental deed restriction are AOCs 3 and 4 in the rear of the property, portions of which are also located within the confines of the reconstructed wetlands area. In all other areas, all soil was either removed or treated to less than the URUSCC. The environmental deed restriction for AOC-3 and 4 is included as an appendix to this modified RAR.

As a result of the successful soil remediation in the referenced AOCs, a request is hereby made for NJDEP approval of a *No Further Action* determination for soils in all areas at the Site including AOCs 1, 2, 3, 4, 12, the Compactor Area, the Tool Crib, the Bridgeport Area and the Plating Room.

The final status of each AOC addressed herein and associated recommendations are summarized below:

Area Of Concern	NJDEP SCC Met	Proposed Action
AOC 1A	URUSCC	NFA
AOC 1B	IGWSCC	NFA
AOC 1C	URUSCC	NFA
AOC 2A	URUSCC	NFA
AOC 2B	IGWSCC	NFA

AOC 2C	URUSCC	NFA
AOC 3A	RUSCC	Deed Notice/Conditional NFA
AOC 3B	RUSCC	Deed Notice/Conditional NFA
AOC 3C	RUSCC	Deed Notice/Conditional NFA
AOC 3D	RUSCC	Deed Notice/Conditional NFA
AOC 4	RUSCC	Deed Notice/Conditional NFA
AOC 12	URUSCC	NFA
Compactor Area	IGWSCC	NFA
Plating Room	URUSCC	NFA
Tool Crib	URUSCC	NFA
Bridgeport Area	IGWSCC	NFA

All identified areas of soil contamination at the Site have been fully delineated and successfully remediated in accordance with the all NJDEP requirements. As such, a *Site-wide media specific soil NFA* (*conditional,* where noted above) is requested herein based on the completion of this work. Groundwater investigation and remediation will continue under a separate program being managed by others.

1.0 INTRODUCTION

On behalf of Airtron Division of Litton Systems, Inc. (Airtron), Panther has prepared this RAR to describe the completed remedial activities for Site soils at the former manufacturing facility located in Hanover Township, Morris County, New Jersey (Site, see Figure 1).

This RAR addresses nine (9) primary soil areas of concern (AOCs), AOCs 1 through 4, AOC-12, the area known as the trash Compactor Area and the interior AOCs (Tool Crib, Bridgeport Area and Plating Room) (see Figures 2-A and 2-B). AOCs 1-4, AOC-12, the Compactor Area and the Tool Crib Area were impacted with chlorinated volatile organic compounds (VOCs) including tetrachloroethene (PCE), trichloroethene (TCE), and various intermediate degradation products of these VOCs (daughter products). The Plating Room was impacted with metals including copper and cadmium and the Bridgeport Area was impacted with polycyclic aromatic hydrocarbons (PAHs). These compounds exceeded the NJDEP's most stringent Impact to Groundwater Soil Cleanup Criteria (IGWSCC) or Unrestricted Use Soil Cleanup Criteria (URUSCC). The chlorinated VOCs were targeted as they may have acted as an ongoing source to groundwater, a concern at the Site. This RAR presents the remedial action findings and activities. The RA activities completed were organized into three basic tasks: excavation of source soils, post-excavation soil sampling and Site restoration activities.

1. Excavation of Source Area Soils

AOCs 1-4 and Compactor Area

Approximately 40,577 tons of affected source area soils were excavated and treated within constructed treatment cells on-site via ex-situ chemical oxidation. A total of 9,100 tons of soil mixed with metal and other debris, as well as soils with high natural oxidant demand (NOD) from AOC-3D and AOC-3B were disposed of at The Environmental Quality Company treatment and disposal facility in Belleville, Michigan. These materials could not be treated on-site due to the presence of metal and other debris, or an uncharacteristically high soil oxidant demand believed to be associated with a former sludge lagoon.

Limits of all excavations were pre-determined based on historical and more recent soil sampling as proposed in the February 2003 RAWP. Based on this sampling, AOCs 1C and 2C did not

contain any VOCs in excess of the most stringent NJDEP SCC and did not require remediation, with the exception of a small portion of AOC 2C, which was captured by expanding the excavations of AOC 2B and 2A.

Physical limits of the excavations as well as the extent of VOC impacts indicated by historical sampling dictated a planned excavation depths of 10 to 25 feet below ground surface (bgs), depending upon which AOC was being addressed. However, field screening results and further delineation dictated over-excavation of the following AOCs:

- *AOC-1A:* The east sidewall was over-excavated by an additional volume of approximately 10' x 32' x 20' to remove discolored soil with high VOC readings resulting in an additional 400 tons of soil being excavated and treated.

- *AOC-3B:* Based on test pitting information conducted in December 2003, an additional 1,000 tons of soil with high oxidant demand were excavated along the western and southern boundaries, as well as from the base of the excavation (a three-foot depth interval) for off-site treatment and disposal. The final depth of excavation was 23' bgs.

- *AOC-3C:* Field screening of the presumed clean soil from the 0 – 10' interval indicated that approximately 2,800 tons of this soil was impacted, and it therefore was treated on-site. Approximately 1,500 tons of soil from the 0 – 10' interval was excavated, sampled and backfilled as clean, reusable soils.

- *AOC-3D:* Field screening at the base of the planned excavation (20 bgs) yielded PID readings that indicated residual impacts still remained. As a result, Panther continued to excavate approximately 50% (28' x 50') of AOC-3D to 23' bgs where clean soil was confirmed through soil sampling.

- *AOC-4:* Field screening of the north wall of the excavation yielded PID readings that indicated residual impacts still remained. As a result, the north wall was over-excavated

approximately 5' wide by 20' deep. Also, while excavating to depth, PID readings indicated impacts at 7' bgs. Therefore, 7'–20' bgs was treated as opposed to the planned 10'–20' bgs.

- *Compactor Area:* This area was identified during the ISRA closure process by ARCADIS. As discussed with the NJDEP, approximately 300 tons of soil were excavated and treated from this area during the soil remediation activities. Post-excavation soil sampling was subsequently completed in accordance with the NJDEP TRSR. The soil sample collected from the south wall exceeded the Site-specific 5-mg/kg-remediation goal. Therefore, an additional 2' in width was excavated and re-sampled resulting in less than the URUSCC for all constituents of concern.

For all areas that were over excavated, confirmation post-excavation soil samples were taken in accordance with the TRSR.

AOC-12

Approximately 13,750 tons of VOC-impacted source soil were treated and excavated on-site via a combination of in situ chemical oxidation and off-site disposal. Panther applied chemically activated sodium persulfate in-place. Soil was mixed in successive 2-foot lifts prior to excavation and staging of treated soils to gain access to the next depth interval. The oxidants were pumped through a 1" hose attached to the mix tanks and secured to the boom of the excavator. The hose continued from the boom of the excavator through the mix head terminating with a spray nozzle at the base of the mixing head directly injecting oxidants into the soil-mixing zone.

Following mixing, the soil was excavated, placed in a lined 100' x 200' holding cell and covered to allow time for the oxidant reaction to proceed to completion. Following a 72-hour reaction cycle, the 100 cubic yard (cy) "lots" were uncovered and sampled for treatment effectiveness at a rate of 1 sample per 100 cy, and analyzed for VOCs by a certified laboratory. If analytical results from the lot samples indicated that remedial goals had not yet been achieved, these lots were re-treated ex situ, covered and allowed to react for an additional 72 hours. Following the 72-hour reaction cycle, the lots were uncovered and re-sampled. If desired results were obtained, the soils were consolidated into a reuse pile for subsequent backfilling at a later date.

A total of 11,150 tons was treated successfully below the 5-mg/kg remediation goal and the URUSCC. Approximately 2,600 tons of soil could not be treated below the remediation goal of 5-mg/kg due to an uncharacteristically high soil oxidant demand. As a result, this soil was disposed of as non-hazardous soil at two (2) facilities depending upon their availability to accept materials, the Mid Atlantic Recycling Technologies, Inc. (MART) facility in Vineland, New Jersey or at Clean Earth of New Castle, Inc. (Clean Earth) in New Castle, Delaware. Both are permitted thermal treatment recycling facilities.

Interior AOCs

Approximately 320 tons of impacted source soil was also excavated from the three (3) interior AOCs (the Bridgeport Area, Tool Crib Area and Plating Room) prior to demobilization from the

Site. During excavation activities, each area was saw cut and the concrete was broken apart and recycled off-site. The soil was excavated and stockpiled, the excavation was backfilled and compacted with certified clean structural fill, and the concrete was restored to the original elevation. The Bridgeport area had an area of excavation of 10′ x 15′ x 3′ with approximately 20-tons of soil excavated. The Tool Crib Area also had an area of excavation of 10′ x 15′ x 3′ with approximately 20-tons of soil excavated. Finally, approximately 280 tons of soil was excavated from a 900 square foot area in the Plating Room. Soil from the three (3) interior AOCs was characterized as non-hazardous and transported to Clean Earth for disposal.

2. Post-Excavation Soil Sampling

AOCs 1-4 and Compactor Area

As presented in the approved RAWP, a number of pre-existing soil samples were used as post-excavation samples in the implementation of the RAWP. Additional post-excavation soil samples were necessary and collected to assure compliance with the NJDEP TRSR. Following excavation of targeted soils, select post-excavation soil samples were collected where needed to augment existing post-excavation data. A summary of post-excavation soil samples collected during the remedial action and results follow:

- *AOC-1A:* Two (2) post-excavation samples were collected from the over-excavated sidewalls. Sample results indicated concentrations of VOCs below the NJDEP URUSCC for all constituents of concern.

- *AOC-2B:* Two (2) post-excavation samples were collected from AOC-2B in accordance with the RAWP. Results indicated concentrations of VOCs less than the most stringent NJDEP IGWSCC.

- *AOC-3B:* Four (4) post-excavation samples were collected in accordance with the approved RAWP, while the remaining samples were collected in accordance with the NJDEP TRSR. Two sample locations along the south wall were over-excavated twice because of sample concentrations exceeding 5 mg/kg at 1' bgs. Sample results indicated concentrations of VOCs below the NJDEP URUSCC for all constituents of concern.

- *AOC-3C:* Two (2) post-excavation samples were collected along the west sidewall from biased-high locations at 1-foot bgs, and two samples were collected from biased-high locations along the base at 25' bgs. All post-excavation samples collected in AOC-3C resulted in concentrations of VOCs less than the most stringent NJDEP IGWSCC.

- *AOC-3D:* Two (2) samples were collected from the over-excavation of the base of AOC-3D at 23' bgs. All post-excavation base samples collected in AOC-3D resulted in concentrations of VOCs less than the most stringent NJDEP IGWSCC.

- *AOC-4:* In accordance with the approved RAWP, four (4) post-excavation soil samples were collected in AOC-4 to confirm the excavation of contaminants or concern to below the soil remediation goals. All three post-excavation samples collected in AOC-4 resulted in concentrations of VOCs less than the most stringent NJDEP IGWSCC.

- *Former Compactor Area:* Six (6) post-excavation soil samples were collected from this area, with one sidewall sample initially exceeding the 5 mg/kg goal. The south wall, where the soil sample that exceeded the Site-specific 5 mg/kg goal was collected, was over-excavated and re-sampled, resulting in less than the 5 mg/kg Site-specific standard as well as the 1 mg/kg NJDEP IGWSCC for VOCs.

AOC-12

As presented in the approved AOC-12 RAWP Addendum, a number of soil samples collected during delineation activities were used as post-excavation samples in the implementation of the RAWP Addendum. Additional post-excavation soil samples were proposed in the RAWP Addendum and collected to assure compliance with the NJDEP TRSR. Following treatment and excavation of source soils, select post-excavation soil samples were collected, where needed, to augment existing delineation and post-excavation data. A summary of post-excavation soil samples and results for AOC-12 follows:

Five (5) post-excavation samples were collected from the excavation floor at 20 feet (ft) bgs in accordance with the RAWP Addendum. In addition, at the request of the NJDEP, two post-excavation sidewall samples were collected from the northern boundary of the excavation at 0.5 to 1.0 ft bgs near delineation borings GP-9 and GP-18. The post-excavation samples were collected from the biased high PID reading found while field screening the excavation sidewall. All sample results indicated VOC concentrations less than the URUSCC.

Eight (8) post-excavation soil samples were collected from the over-excavation area in accordance with the NJDEP TRSR. Two (2) samples were collected from the excavation floor at 10 ft bgs, and six (6) samples were collected from the north and east sidewalls at 0.5-1.0 ft bgs and 9.5-10.0 ft bgs. All sample results indicated VOC concentrations less than the URUSCC.

Interior AOC Excavations

ARCADIS completed the horizontal and vertical delineation of the three (3) interior AOCs to satisfy post-excavation-sampling requirements. Four (4) post-excavation samples were collected by ARCADIS from the Bridgeport area prior to excavation activities. These samples were analyzed for PAHs and were used as post-excavation samples in accordance with the NJDEP TRSR. Four (4) post-excavation samples were also collected from the Tool Crib area prior to excavation activities. These samples were analyzed for VOCs and were used as post-excavation samples in accordance with the NJDEP TRSR. Eleven (11) post-excavation samples were collected from the Plating Room area prior to excavation activities. These samples were analyzed for copper and cadmium and were used as post-excavation samples in accordance with the NJDEP TRSR. All samples collected for post-excavation were below the applicable NJDEP IGWSCC (PAHs and VOCs) or URUSCC (metals).

3. Site Restoration

Site restoration included analytical testing, backfilling and compaction of treated soils in accordance with the approved RAWP Addenda. Affected wetlands were restored in accordance with an approved Wetlands Restoration Plan. Additionally, all areas not classified as wetlands or transition zone areas were restored in accordance with the approved Morris County Soil Conservation District soil erosion and sedimentation control plan. Photographs and documents associated with the Site restoration are discussed in Section 5.3 below.

In summary, the remedial activities specifically focused on the remediation of source area soils only. It is anticipated that the removal of over 95% of the VOC mass in soils at the Site will result in the improvement in groundwater quality. The ongoing groundwater RI and other supplemental remediation activities that were not part of this modified RAR will be addressed under separate cover at a later date, as planned and approved by the NJDEP. Additionally, during the remedy evaluation for groundwater, Airtron plans to continue operation of the interim hydraulic control groundwater extraction and treatment system; as well as continuing with the RI of groundwater (AOC-11).

This RAR is divided into nine sections with supporting tables, figures, and appendices. Section 2.0 discusses the environmental setting of the Site. Previous remedial investigations at the Site are described in Section 3.0. Section 4.0 summarizes the remedial action work plan and section 5.0 addresses the activities conducted during the remedial action. Section 6.0 discusses quality assurance and health and safety. Section 7.0 discusses the remedial action costs and section 8.0 discusses the findings and conclusions. Section 9.0 includes associated references.

2.0 ENVIRONMENTAL SETTING

The environmental setting presented herein includes a brief description of the former Site operations and surrounding land use; local topography and drainage; soils and wetlands; regional geology; regional water supply; Site geology; and Site hydrogeology based on the results of all RI activities performed to date.

2.1 Site Operations and Surrounding Land Use

The Airtron facility is located at 200 East Hanover Avenue, Hanover Township, Morris County, New Jersey. A Site location map and Site plans are presented as Figures 1, 2a and 2b, respectively. The Site is designated as Block 0601, Lot 1, and is located in a mixed commercial, industrial and residential area. Land use within a 1,000-foot radius of the Site is predominantly commercial and industrial. A warehouse, former dump, and bulk petroleum storage facilities are located to the southeast of the facility. A sports arena and two manufacturing facilities are located to the west of the facility across East Hanover Avenue. A former sand and gravel quarry is located to the north and undeveloped woodland to the east. Some residential development exists greater than 1,000 feet to the west.

The Site was developed as a manufacturing facility in 1952 by Monroe Calculating Machine Company. Litton Business Systems purchased the property in 1958 and moved the Airtron Division into the facility that year. Airtron manufactured wave guide/microwave components and ingots/wafers used in the semiconductor industry until the cessation of operations in 2001. A full description of the historic manufacturing operations and product use was provided in the Site Investigation/Remedial Investigation/Remedial Action Selection Report (SI/RI/RASR) previously submitted to the NJDEP in July 1998. The Site is also currently undergoing post-closure Industrial Site Recovery Act (ISRA) investigations with regard to indoor air quality as a separate activity under the direction of the NJDEP.

The Site is approximately 19 acres in size. There is a single-story building approximately 105,000 ft^2 in size. A small storage shed is located in the rear parking lot. A majority of the property immediately adjacent to the main building (approximately 160,000 ft^2) is asphalt paved. Some

grassed areas exist along the edges of the property including a ball field on the southeast property line. The property to the east is wooded.

2.2 Local Topography and Drainage

The property is topographically level, at an average elevation of approximately 400 feet above mean sea level (MSL). Surrounding land topography generally slopes downward towards the Whippany River, approximately 2,500 feet to the southwest and southeast of the property. The Whippany River flows generally from northwest to southeast through this region.

Site drainage occurs by overland flow across paved areas and/or via storm sewer network to an outfall located in the northeast edge of the parking lot. This outfall discharges to a drainage ditch located within the wooded area along the eastern property boundary. The normally dry drainage ditch leaves the Site along the southern property line, and becomes an unnamed tributary of the Whippany River.

Ponded surface water is also present in the northern end of the former sand and gravel quarry north of the Site. Based on field observations, this water body appears to be perennial and represents either a reflection of the water table or accumulated precipitation.

The Site drains via an unnamed tributary and discharges to the Whippany River that is located in the Passaic River Drainage Basin. The Water Quality Classification of this section of the Whippany River is freshwater non-trout FW2-NT.

2.3 Soils and Wetlands

Published information was studied to determine the approximate extent of wetlands on the Site and adjacent properties. Amy S. Greene Environmental Consultants, Inc. (ASGECI) delineated the wetlands at the Site in April 2002. Vegetation, soils, and hydrology were examined for evidence of wetland characteristics according to methodology outlined in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (Federal Interagency Committee on Wetland Delineation, 1989). In order to be identified as wetlands, an area must have hydrophytic vegetation, hydric soils, and be

saturated by groundwater or inundated by surface water for two weeks or more during the growing season.

Forested wetlands associated with an unnamed tributary of the Whippany River were identified in the eastern portion of the Site during the field investigation. Two wetland lines (A1 to A59 and B1 to B17) were used to identify the wetland/upland. Points A23 to A34 also delineate a forested wetland swale. Wetlands delineation was completed and the NJDEP review of a Letter of Interpretation is included in Appendix A.

Hydric soils characterized by low chroma matrix and mottling were identified in the wetland areas delineated within the Site. These characteristics were not observed in upland areas of the Site. Hydric soil mapped at the Site included Ridgebury extremely stony loam 3-8% slopes. The soil within the uplands exhibited a high (bright) chroma matrix indicative of a non-hydric soil. Upland soils present on the Site include Pits, sand and gravel, Boonton gravelly loam, 3-8% slopes; Hibernia stony loam, 3-11% slopes; and Urban land (NJDEP GIS Soil Map, 1996; Figure 4).

2.4 Regional Geology

The Site is situated within the western boundary of the Piedmont Physiographic Province (Triassic Lowland Subsection). The Piedmont is an elongated down-faulted basin also referred to as the Newark basin. The Triassic strata dip west-northwest at about 8 to 10 degrees (Nichols 1968). Immediately west of the facility is a major fault that forms the boundary between the Triassic Lowland and the New Jersey Highlands. The New Jersey Highlands are located on an upthrown portion of the fault and consist of Paleozoic and Precambrian gneisses, granites and schists.

The geology of the Morris Plains area consists of a series of glacial units overlying interbedded sedimentary and igneous rock of the Jurassic age (Lyttle and Epstein, 1987). These rocks form part of the Newark Super group and are (from top to bottom) the Boonton Formation, Hook Mountain Basalt, Towaco Formation, Preakness Basalt, Feltville Formation, and Orange Mountain basalt. Combined, these rocks were formerly referred to as the Brunswick Formation. Periods of glaciation occurred during the Pleistocene Epoch, sometime referred to as the Great Ice Age or Glacial Epoch, which began about 2.5 million years ago.

During the Pleistocene period, glaciers advanced and retreated several times. As the sheets of ice retreated, the glaciers dropped debris, creating deposits of sediments consisting of clay and crushed rock of all sizes. This material is typically called till. The thickness of till deposits varies depending upon the degree of ice movement, the amount of materials caught up in the bottom of the ice, and the bedrock topography (Gill and Vecchioli 1965). Till deposits blanket a large portion of Morris County.

2.5 Regional Water Supply

Public water supply in the area is predominantly from groundwater wells that penetrate the glacial valley-fill sediments. Reported specific capacities of production wells in the area range from approximately 10 to 120 gallons per minute (gpm) per foot of drawdown with yields ranging from 150 to 450 gpm (Converse 1981).

2.6 Site Geology

Bedrock at the Airtron Site occurs at depth greater than approximately 140 feet and consists of interbedded sandstones and shales associated with the Boonton Formation. The Site-specific lithology is interpreted to include four unconsolidated lithological units as described below. The discussion below represents a generalized overview of the lithology. More detailed discussions of the lithology and associated hydrogeology are provided in the SI/RI/RASR (ARCADIS, 1998). Site plans depicting a geologic transect and a generalized geologic cross-section showing subsurface relationships is provided as Figures 3 and 4. Generally, the lithological units observed at the Site include the following:

Glacial Till (Unit 1)

The uppermost unit is classified as till and the thickness of deposits varies. Several discontinuous lenses of clays, silts, sands and gravelly sands are encountered within this unit. Perched groundwater conditions within this unit have been identified sporadically across the Site. Where present, the perched groundwater is observed at depths ranging from 5 feet to 20 feet bgs. Overall, the unit is very heterogeneous due to these discontinuous lenses. This heterogeneity is one of the primary reasons that an ex-situ remedial approach for treatment of impacted soils was conducted.

Outwash Sands and Gravels (Unit 2)

This unit is located below the till and is comprised of outwash sands and gravels. The upper unconfined aquifer is present within this unit with depth to water ranging from approximately 30 feet to 40 feet bgs. This unit is located below the till and is comprised of outwash sands and gravels and outwash transition sands and silts, which also include localized silty clay aquitards (particularly underlying portions of the identified source areas).

Aquitard (Unit 3)

This unit consists of fine-grained till and dense-stratified silts and is approximately 30 feet thick and is located beneath the outwash sands and gravels as depicted on Figure 4.

Lower Outwash Sands and Gravels (Unit 4)

This unit is located approximately 70 feet to 90 feet bgs and is directly beneath the aquitard unit. The lower aquifer is present in this unit and occurs under confined conditions.

2.7 Site Hydrogeology

As briefly noted above, the three hydrogeologic units (water-bearing units) identified at the Airtron facility are:

- perched groundwater within the glacial till;
- upper unconfined aquifer within the shallow outwash deposits;
- lower confined aquifer located below the aquitard.

Perched groundwater generally occurs as a result of isolated clay lenses or highly compacted till zones that impede the vertical infiltration of water. The perched groundwater is found in isolated areas around the Site, with the primary area along the southeastern edge of the former parking lot (i.e., in the vicinity of AOC-4). This area is also affected by significant recharge due to surface water runoff. Run-off also provides the bulk of the water, which appears to sustain local wetlands in conjunction with the subsurface low permeability lithologic units.

The upper unconfined aquifer has a saturated thickness of approximately 40 to 50 feet and is encountered at approximately 30 to 40 feet bgs across the Site. This upper aquifer has a gradient of approximately 0.0057 feet per foot with a general flow direction to the southwest toward the Whippany River that serves as a regional hydrologic discharge boundary.

The lower confined aquifer is located at approximately 70 to 90 feet bgs and has a horizontal gradient of approximately 0.0125 ft/ft. Relative groundwater elevation data between monitoring wells in the upper unconfined aquifer and those in the lower confined aquifer indicate a vertically upward head gradient. Regional flow direction in the lower confined aquifer is toward the southeast.

3.0 SUMMARY OF REMEDIAL INVESTIGATIVE ACTIVITIES

This section provides a brief overview of previously conducted remedial investigations at the Site. A list of previously submitted reports including the SI/RI activities is provided in Table 1.

3.1 Previous Investigations

The findings and conclusions for this Site have been based on a series of investigations, which have been presented in detail in the RI Report, the RAWP, and the revised RAWP Addenda submitted February 2003 and September 2004. A brief description of the chronology of Site investigation activities is presented below.

- *1981 Preliminary Investigation.* Five monitoring wells (MW-1, MW-1M, MW-2, MW-2M, and MW-3) were installed by Converse Ward Davis Dixon to investigate groundwater quality in conjunction with the closure of the five lagoons at the Airtron facility as directed in an Administrative Order from the NJDEP dated December 14, 1979.

- *1987 Phase I Soil and Groundwater Remedial Investigation.* Twenty five soil borings (B-101 to B-122, B-201, B-202, and B-203) and six monitoring wells (MW-201 through MW-206) were drilled at the Airtron facility by Converse Environmental East to assess the impact from two former drum storage areas (AOCs 2 and 3) and the five lagoons.

- *1990 Phase II Soil and Groundwater Investigation.* Seven monitoring wells (MW-301 through MW-307) were installed by Converse Environmental East to further assess and delineate volatile organic compound (VOC) impacts in groundwater. The investigation primarily focused on the southeastern boundary of the plume in the upper unconfined aquifer.

- *1991 Soil Vapor Extraction Test Program.* A soil vapor extraction (SVE) pilot study was performed by SCS Engineers on one extraction well, EW-1, located in AOC-3. Based on this pilot test, a SVE system was installed in AOC-3, AOC-4, AOC-5, and AOC-7 in July 1992 by Empire Soils.

- *1994 Phase I Remedial Investigation.* In 1994, SCS Engineers conducted a soil gas survey and soil sampling program in AOC-2, sediment sampling in the intermittent drainage feature (AOC-6), and an electromagnetic (EM) terrain conductivity survey in AOC-3 and AOC-4.

- *1996 Phase II Remedial Investigation.* A supplementary soil gas survey was conducted by SCS Engineers in AOC-2 to assess the lateral extent of VOCs identified during the Phase I RI in 1994.

- *1998 Site Investigation/Remedial Investigation and Remedial Action Selection Report.* In September 1997 ARCADIS Geraghty & Miller (ARCADIS) conducted phase I of an SI/RI and in January and February of 1998 ARCADIS completed phase II of the SI/RI activities, which were focused on the characterization and delineation of constituents in soil and groundwater at AOCs 1 through 7, 9 and 11 at the former Airtron facility.

- *2002 AOC-6 Stream Sediment Sampling Summary.* On June 27, 2002, an additional surface water and sediment sampling event was conducted in AOC-6. Based on the findings of the investigation, this AOC had been delineated and no additional assessment activities were proposed.

- *2002 Pre-Design Investigation.* In fall 2002, Airtron retained Panther to develop and implement the Pre-Design Investigation (PDI) and associated soil remedy for AOCs 1 through 4. ARCADIS supported Panther with field assistance during the PDI. The objectives of the PDI were as follows: to fill RI data gaps related to the delineation of VOCs in soils, identified by the NJDEP in its March 19, 2002 correspondence; define affected soil volumes which represented source areas; provide supplemental sidewall and floor soil analytical data which could be used as post-remediation equivalent data; and, provide treatability study information for selection of the optimum on-site soil treatment option.

- *2003 Site Investigation Report.* In October 2003, Airtron completed the SI in accordance with the Tech Regs related to potential AOCs identified inside the facility building. This work was being conducted to satisfy Airtron's ISRA obligations and is related to facility closure following cessation of operations. The investigative activities were completed and presented in a 10/17/03 Report; the NJDEP, via letters dated 8/10/04, deemed the report complete and concurred with recommendations (including excavating the compactor area, limited restricted use for 3 other AOCs), and issued an NFA determination for the remaining AOCs investigated within the facility building.

- *2004 Storm Drain Investigation.* In March 2004, ARCADIS and Panther initiated the planned soil delineation of the storm drain area (AOC-12). The ARCADIS and Panther team delineated the impacts of contamination in both the horizontal and vertical direction to the 1-mg/kg boundary utilizing a truck-mounted Geoprobe rig. Soil samples were collected for analytical testing at a fixed base certified laboratory when PID readings indicated a "clean" zone. The goal of the investigation was not to determine the magnitude of soil impacts, but rather to define a "clean" zone, or the extent of soil contamination to the most stringent soil

quality criteria (IGWSCC). Following collection and review, all data were submitted within the AOC-12 RAWP Addendum in September 2004 for the NJDEP's review.

3.2 Ongoing Investigations

Ongoing or recently completed investigations are addressed below. In general, ARCADIS is leading the ongoing Supplemental Groundwater Remedial Investigation program while both ARCADIS and Panther are collaborating on the process of completing the Storm Drain Investigation and Remediation. Ultimately, ARCADIS remains as the lead consultant for overall project responsibilities with Panther serving as a remediation specialty contractor supporting soil remediation activity at the Site. The ongoing efforts include:

- *ISRA Facility Closure Site Investigation.* Airtron has initiated an SI in accordance with N.J.A.C. 7:26E related to potential AOCs identified inside the facility building. This work was conducted to satisfy Airtron's ISRA obligations and is related to facility closure following cessation of operations. The investigative activities were completed and presented in a 10/17/03 Report; the NJDEP, via letters dated 8/10/04, deemed the report complete and concurred with recommendations (including excavating the compactor area, limited restricted use for 3 other AOCs), and issued an NFA determination for the remaining AOCs investigated within the facility building.

- *Supplemental Groundwater Remedial Investigation Program.* Airtron is continuing the investigation of groundwater in a phased approach in accordance with the approved Supplemental Remedial Investigation Work Plan (SRIW) Addendum dated February 5, 2001. Airtron provided on-site sampling results to the NJDEP in June 2002. Airtron provided on-site and off-site groundwater quality sampling results to the NJDEP in two Interim Data Summary Reports in May 2003 and December 2004. In addition, Airtron presented recommendations for the post-source-removal monitoring program under separate cover on October 16, 2004 that have been subsequently implemented with NJDEP approval. During 2005, Airtron has recently completed additional supplemental remedial investigation activities for groundwater (AOC-11). Airtron anticipates providing the NJDEP with an additional Interim Data Summary to facilitate continued discussions with the NJDEP regarding AOC-11 requirements.

- *Supplemental Stream Sediment Remedial Investigation Program.* Airtron completed additional stream sediment sampling activities in April 2004 in accordance with the NJDEP-approved Phase 2 SRI Work Plan, as requested by the NJDEP in correspondence dated May 8, 2003. The investigative activities were completed and presented in a 10/6/04 Report; the NJDEP, via letter dated 4/12/05, deemed the report complete and concurred with the "weight of evidence" ecological evaluation and has issued an NFA determination for AOC-6.

- *Indoor Air Quality Investigation.* In accordance with the August 10, 2004 NJDEP correspondence, Airtron and ARCADIS have initiated a sub slab and indoor air quality investigation for the Airtron building. The results of the investigation of AOC-13 will be reported under separate cover.

4.0 SUMMARY OF REMEDIAL ACTION WORKPLAN

This section includes a discussion on the regulatory history of the Site leading up to the submission of this Site-Wide Soil RAR, applicable remediation standards, and a summary of the approved Remedial Action (RA) scope of work.

4.1 Regulatory History

A series of RIs have been performed at the Site since the late 1980's in accordance with the *Technical Requirements for Site Remediation* New Jersey Administrative Code 7:26E (TRSR), the original Site Administrative Consent Order (ACO) dated December 14, 1979 and the current ACO dated December 16, 1992 and amended March 21, 2001 and October 26, 2001. A comprehensive summary of previous soil and groundwater investigations conducted at each AOC was presented in ARCADIS' "*Site Investigation/Remedial Investigation and Remedial Action Selection Report (SI/RI/RASR)*", dated July 1, 1998. A list of major reports previously submitted to the NJDEP is provided in Table 1.

4.2 Applicable Remediation Goals

The goals of the approved soil remedy were to remove VOC mass from the soil, achievement of Restricted Use Soil Cleanup Criteria (RUSCC) and to prevent further degradation of groundwater by removing the soil source. In order to achieve a cost-efficient mass removal that met the objectives of being protective of human health and the environment, a remedial goal of 5 mg/kg for PCE, TCE, cis-1, 2-DCE and 7 mg/kg for VC were approved by the NJDEP for soils in AOCs 1-4 and AOC-12. Meeting this objective would achieve the goal of remediation to the RUSCC. Meeting this remedial goal would also have a positive impact on on-site groundwater quality by eliminating the source of VOCs impacting groundwater quality. By removing all VOCs in soils to approximately 25 ft bgs to a target level of 5 mg/kg, more than 95% of all VOCs in soils at the Site would be removed.

The applicable NJDEP Soil Cleanup criteria (SCC) for the compounds of concern are summarized below:

Compound	URUSCC (mg/kg)	RUSCC (mg/kg)	IGWSCC (mg/kg)
PCE	4	6	1
TCE	23	54	1
Cis-1, 2 DCE	79	1000	1
Vinyl chloride	2	7	10

The NJDEP considers the SCC as guidance for cleanup; however, other Site-specific factors such as: the potential for sensitive receptors; acceptance of restricted use scenarios; cost-benefit analysis and planned implementation of engineering/institutional controls were also considered in the selection of Site-specific cleanup goals. With all of these factors considered, and based on results obtained during bench testing of the proposed remedy, a soil remediation goal of 5 mg/kg for PCE, TCE and cis-1, 2-DCE were proposed with 7 mg/kg proposed for VC. Treating soils to these levels would achieve the RUSCC as well as prevent further degradation of groundwater by eliminating the source of VOCs in soil. Further explanation of the rationale for these cleanup goals is included in the RAWP Addenda.

4.3 Remedial Action Scope of Work

The goal of the soil remedial action was to achieve substantial VOC mass removal from soils with known elevated VOC concentrations. The distribution of VOCs in soils had been well characterized during recent and historical investigations. Based on the distribution of VOCs in soils, over 95% of the contaminant mass in soils could be removed by focusing on the source areas within the AOCs identified. By focusing on these soils and conducting in-situ/ex-situ chemical oxidation, over 95% of the known contaminant mass at the Site was destroyed. This action will have a significant, positive impact on soils as well as on-site groundwater quality and is designed to be protective of both human health and the environment. The VOC mass remaining in soils at depths greater than 25 feet bgs and in outlying areas represent less than 5% of the total VOCs known to be present in soil and will be addressed through institutional controls where necessary, as described in Section 5.4.3.

5.0 SUMMARY OF REMEDIAL ACTION

5.1 Pre-Remedial Action Activities

The following subsections discuss activities that took place prior to mobilization and commencement of remedial activities for both AOCs 1-4 and AOC-12. These pre-remedial action activities included acquisition of required air pollution control and wetland permits, Department of Transportation (DOT) access and water line permits, obtaining an AOC Waiver and implementation of an extensive Site-specific health and safety program.

5.1.1 Acquisition of Required Permits

The requirements of federal, state and local authorities were reviewed during preparation of the RAWP Addenda to determine which specific permits or approvals would be required prior to initiating RA activities. Those permits found to be necessary were completed and submitted prior to mobilization. A brief description of the applicability, purpose and scope of each required permit is presented below with appropriate copies of each included in Appendix A.

5.1.1.1 Stream Encroachment/Waterfront Development

Given the proximity of the woodland area drainage features to the limits of excavation in AOCs 1-4, Panther contacted the Land Use Regulation Program (LURP) regarding a Jurisdictional Determination of the potential permit applicability under the Flood Hazard Area Control Act (Stream Encroachment). After reviewing United States Geological Survey (USGS) Topographic Quadrangle Maps, Federal Emergency Management Agency (FEMA) Flood Maps and the Soil Conservation Service (SCS) Soil Survey Maps for the local area, Panther submitted supporting documentation showing that the contributory drainage area was below the threshold used by LURP to determine applicability. As such, the NJDEP agreed that neither a Stream Encroachment nor a Waterfront Development Permit was required for AOCs 1-4 and hence were also not needed for AOC-12 RA activities. A copy of the LURP written jurisdictional determination is provided in Appendix A.

5.1.1.2 Wetlands/GP-4 Permitting

Airtron submitted a Letter of Interpretation (LOI) to the NJDEP's Land Use Regulation Program for the determination of the wetlands delineation and quality assessment, as well as applicable transition area encroachment to determine mitigation requirements. The remedial activities temporarily disrupted a small portion of wetlands and transition area. In order to address the wetlands disruption and restoration, a NJDEP General Permit #4 (GP4) permit was obtained. ASGECI performed this work under contract to Panther. All necessary activities related to wetlands disruption and restoration was implemented according to the permit. A copy of the GP-4 permit is included in Appendix A.

Based on the approved wetlands and wetlands transition zone identified during AOCs 1-4, activities conducted in AOC-12 did not impact either wetlands or wetlands transition zone areas. As such, no modification to the GP4 permit was required for this phase of RA Activities.

5.1.1.3 Air Permitting

Although the remedial approach was based on chemical oxidation or destruction of the VOCs and not mass transfer, there was a potential to emit VOCs during soil handling; consequently, an air pollution control permit was obtained. The work involved hooded equipment, sprung structures and possible open emissions for RA activities in AOCs 1-4. Collected emissions were pulled under vacuum and discharged to vapor phase carbon. Additionally, vapor control was implemented in the individual treatment cells and underneath the sprung structure that contained the highest impacted soils. Vapors were collected from the sprung structure via a 750 standard cubic feet per minute (scfm) vapor extraction system and passed through vapor phase carbon. Under the permit, monitoring included perimeter ambient air monitoring as well as monitoring of the vapor recovery system after the first carbon unit and after the second carbon unit prior to discharge. Additional vapor control was managed by way of dispensed hydrogen peroxide atop open soil piles to destroy organics on contact prior to being emitted to the air. A copy of the Air Pollution Control Permit is included in Appendix A.

As with AOCs 1-4, an air permit was necessary since there was the potential to emit VOCs during the soil mixing process for AOC-12. Although the remedial approach was based on chemical oxidation or destruction of the VOCs and not mass transfer, there was a potential to emit VOCs during soil handling. Upon evaluation of the existing approved air permit, the requirements set forth in the air permit obtained for AOCs 1-4 accurately described AOC-12 activities, therefore, no permit modification was required. This was discussed with the NJDEP air permitting group in detail prior to initiation of the work. In accordance with the existing permit, perimeter ambient air monitoring was conducted. Additional vapor control was managed by applying hydrogen peroxide to the open excavation to destroy organics on contact prior to being emitted to the air. Additionally, hydrogen peroxide was added right at the mixing head to eliminate potential emissions during mixing activities.

5.1.1.4 NJPDES Permitting (DSW)

The existing New Jersey Pollutant Discharge Elimination System (NJPDES) Permit was renewed and was used to discharge all treated water generated from the Site, including both groundwater pumped from the existing extraction well as well as perched water collected during excavation which represented the same constituents of concern. A copy of the NJPDES Permit is included in Appendix A. All water was stored in two (2) to three (3) 21,000 gallon storage tanks, allowed to settle, pumped through a bag filter then directed into the existing groundwater treatment system for treatment and discharge. A total of 415,000 gallons were stored and treated as a result of rainwater collection and dewatering activities for AOCs 1-4 and a total of 152,012 gallons were stored and treated during AOC-12 RA activities.

5.1.1.5 Soil Erosion and Sediment Control Plan

Since both phases of the remediation project involved intrusive land disturbance, excavation and soil handling activities, a Soil Erosion and Sediment Control Plan (SESCP) was submitted for approval to the Morris County Soil Conservation District as provided as Appendix A. The objective of the SESCP was to develop a Site-specific management plan that minimized the potential for soils to be mobilized and transported off-site. Controls included grading for run-on diversion and erosion mitigation, and installation of sediment barriers such as silt fence and rock check dams. In addition,

construction activities were sequenced to minimize erosion potential. The SESCP also includes Site restoration plans including grading and seeding. All measures were implemented in accordance with the State of New Jersey Standards throughout RA activities for both AOCs 1-4 and AOC-12.

As shown in Figure 2a and Figure 2b, silt fence was installed along the downgradient perimeter of the excavated areas to protect the drainage features to the south and east. Additionally, berms were installed around the soil staging and treatment stockpiles. During the excavation of AOC-3C and AOC-12, Panther was required to remove and replace approximately 600 linear feet of storm sewer and the stormwater outfall; a temporary diversion was installed as shown. Following backfill, the temporary diversion was re-routed to its approximate original location. The outfall was re-constructed per the approved SESCP.

The SESCP controls were maintained and upgraded as necessary throughout the construction project. Site restoration including grading and seeding was conducted in accordance with the approved SESCP for all areas disturbed during RA activities.

5.1.1.6 Local Construction Permits

A building/plumbing permit was required for construction activities in Hanover Township. Panther obtained a building permit for installation of the Site trailer, an electrical sub code for electrical service, and a plumbing permit for installation of required health and safety equipment. All construction permits are included in Appendix A.

5.1.1.7 DOT Access and Water Line Permit

A water main (12-inch diameter, ductile iron pipe owned by the Southeastern Morris County Municipal Utility Authority) burdened the planned excavation of AOC-3C and AOC-12. Therefore, Panther received approval from the Township of East Hanover to complete the water line bypass and obtained a permit from the New Jersey Department of Transportation (NJDOT). The affected portion of the water main was relocated prior to excavation activities in these areas. The pipe was relocated approximately 60′ to the north on NJDOT property to facilitate benching of soil sidewalls for the excavation of AOC-3C and AOC-12. For AOC-12, this work was completed under the

existing New Jersey Department of Transportation (NJDOT) Highway Occupancy Permit that was received prior to the excavation activities of AOCs 1-4. The NJDOT Water Line Permit and the Hanover Township Notification/Approval Letters are provided in Appendix A.

5.1.1.8 AOC Waiver

In order to facilitate and eliminate any concerns with soil management issues on-site, Panther requested an AOC waiver for the entire property from the NJDEP on September 5, 2002. The AOC waiver was approved in a letter from the NJDEP dated September 13, 2002 (see Appendix A). The AOC waiver addressed the investigation–derived wastes as well as the planned remedial approach outlined above and detailed in the referenced RAWP. With the AOC Waiver in place, certain waste generation, storage and treatment issues that would otherwise be applicable did not apply to the planned remedial activities. Specifically, the AOC Waiver allowed Airtron to excavate and manage impacted soils on-site (within the AOC Waiver) without the soils being technically considered as being "generated, stored or disposed". Without a hazardous waste being generated, RCRA placement issues were not triggered.

5.1.2 Health and Safety

All intrusive excavation and on-site treatment activities at the Airtron Site were performed by personnel who received 40-hours of initial training and 8-hours of annual refresher training in accordance with the Occupational Safety and Health Administration's (OSHA's) Hazardous Waste Operation and Emergency Response (HAZWOPER) Standard, 29 CFR 1910.120 (e). Technical personnel also participated in a medical monitoring program for all hazardous waste workers as specified by 29 CFR 1910.120(f). Technical personnel were proven medically fit for duty, as shown by a physician's written release stating the worker had undergone annual medical monitoring and had passed the medical surveillance examination prior to any Site work. Additional, Site-specific and chemical-specific training was conducted for personnel handling the oxidants by the manufacturers of the chemicals used.

Panther prepared a Site-specific Health and Safety Plan (HASP) that governed field activities for the hazardous waste investigation and remedial action. The HASP was prepared in accordance with the

HAZWOPER Standard, OSHA's *Guidance Manual for Hazardous Waste Site Activities*, and other appropriate health and safety standards and procedures. Panther's Site-Specific HASP is included in Appendix B.

5.1.3 Monitoring Well Abandonment

Monitoring wells MW-403S in AOC-1B, MW-406 in AOC-3A, MW-301S near AOC-4 and MW-409 located adjacent to AOC-12 were properly abandoned during remedial activities. All monitoring wells were properly abandoned in accordance with N.J.A.C. 7:26E, N.J.A.C. 7:9D. Copies of the Monitoring Well Abandonment Forms are provided in Appendix C. Replacement/installation of monitoring wells satisfying NJDEP groundwater monitoring requirements associated with AOC 1-4, AOC-12 have either been conducted by others or will be proposed under separate cover and are not included within the scope of this soil RAR.

5.2 Remedial Action Activities

The following subsections discuss all activities performed in the field during the course of the RA. Implementation of the remedial action included the following components: installation of construction support facilities and temporary controls; geophysical survey; perimeter air monitoring; soil vapor extraction system monitoring; soil treatment performance monitoring; in-situ treatment work; remediation of AOCs 1-4 and AOC-12; backfilling activities; water management activities; and restoration activities (wetlands and vegetative soil cap).

5.2.1 Installation of Construction Support Facilities and Temporary Controls

Construction support facilities were installed as part of the remedy including the soil handling and treatment areas, a rail-mounted sprung structure (AOCs 1-4 RA only), Site trailers (office, decontamination, and break), first aid station, sanitary facilities, temporary Site fencing to restrict access, utility connections for power and water, construction access roads, temporary dewatering and storage system, and the decontamination area. These facilities were installed during mobilization and subsequently removed during demobilization.

5.2.2 Geophysical Survey

While conducting oxidant injection activities on August 18, 2003, portions of steel drums and other metal debris were encountered in AOC-3B. With the observation of this debris, a geophysical investigation was conducted to quantify the extent of other potential buried debris in AOC-3. The results of the geophysical investigation indicated a large amount of metal debris in two localized areas within AOC-3, specifically in AOC-3B and AOC-3D with some other metal anomalies located in AOC-3C. As a precaution, Panther assumed that drums were present in AOC-3B and AOC-3D and excavation activities in these areas were performed in full Level B protection. The results of the Geophysical Survey are included as Appendix D. The soils adjacent to debris encountered during excavation activities were segregated and disposed at the EQ disposal facility in Bellville, Michigan.

Prior to mobilization for RA activities associated with AOC-12, a geophysical investigation was conducted by Enviroscan, Inc. on August 30, 2004 to quantify the extent of potential buried debris in AOC-12. The results of the geophysical investigation indicated some small areas of metal anomalies. However, these anomalies were not indicative of buried drums or debris as encountered in AOC-3; therefore, Panther did not anticipate Level B excavation activities and such an upgrade was not found to be required. Geophysical results are included in Appendix D.

5.2.3 Perimeter Air Monitoring

Perimeter air monitoring was implemented to provide early warning in the event that VOC emissions were migrating to the Site boundary. A weather station was set up on the roof of the building to provide accurate wind speed and direction, temperature, barometric pressure and rainfall amounts during the course of the remediation. The weather station transmitted data to a remote panel located in the project trailer. The meteorological data of interest was wind direction.

During RA activities in AOCs 1-4 and AOC-12, real-time ambient VOC data were collected using the RAELink communication kit or by manual monitoring utilizing Mini-Rae 2000 PIDs by field personnel. A wireless, RF (radio frequency) modem allowed four (4) Mini-Rae 2000 PIDs to communicate and transmit readings on a real-time basis with a remotely located ProRAE Remote host controller located in the project trailer. The data were checked periodically throughout the day

and were recorded twice a day in a logbook (see Appendix E). Real time data were downloaded every fifteen minutes and then exported to Microsoft Word (see Appendix F – AOCs 1-4 only). The Mini-Raes were calibrated daily using 100 parts per million (ppm) isobutylene gas and zero air. All calibrations were recorded in the field logbook. All monitoring was conducted in accordance with the approved Periodic Monitoring Protocol, associated with the Air Pollution Control Permit.

As shown on Figure 2a and 2b, eight (8) monitoring stations (MS-1 through MS-8) were established along the inside perimeter of the Site. One Mini-Rae was setup in the upwind position and three were located downwind of the Site activity. The positions of the upwind and downwind Mini-Raes were based on wind direction and the day's activities. When wind direction changed greater than 60° from base wind direction, the Mini-Raes were moved accordingly. The Mini-Raes were setup on days of handling impacted soil such as, excavating, loading trucks, and mixing cells. The Mini-Raes were not setup on days of heavy precipitation because of inaccurate readings due to moisture and the potential of damage to the equipment. On the days when real-time data was not being collected, monitoring or Health & Safety personnel continuously checked the air quality around the perimeter of the Site manually with a PID and recorded these values in the logbook.

Real-time air monitoring was conducted from the start of excavation on July 21, 2003 to the end of excavation on January 28, 2004 for AOCs 1-4, and commenced on December 16, 2004 to the end of AOC-12 RA activities on March 31, 2005. During this time period very few detections occurred along the perimeter of the Site from emitted VOCs due to the use of hydrogen peroxide atop open piles to prevent emissions. A few detections were due to the Min-Rae readings drifting because of moisture. The highest VOC reading was 6.5 ppm on December 23, 2003. This detection occurred at the southeast corner of the Site while excavating debris-impacted soil from AOC-3B. The highest VOC reading during AOC-12 RA activities was 0.5 ppm on January 3, 2005. This detection occurred at the northern perimeter of the Site while treating and mixing the 0-2 ft lift from the area near GP-10 and GP-12 of AOC-12. Additional hydrogen peroxide was used in response to these reading as an odor/vapor control measure. From January 28, 2004 to April 2, 2004, impacted soil still remained in the cells for treatment. Therefore, air quality along the perimeter of the Site was checked twice a day with a PID. These values were recorded in a daily logbook (see Appendix E).

During RA activities in AOCs 1-4 and AOC-12, local concentrations within the breathing zone of the operator of the excavators and/or mixing equipment required an upgrade to Level C due to a potential to be exposed to concentrations in excess of the Site-specific standard of 5 mg/m^3 VOC established.

The dust monitor was calibrated daily and recorded in the logbook. The data was downloaded at the end of the day and saved into spreadsheets (see Appendix F). The dust monitor was positioned either at one of the downwind locations or was with health and safety personnel monitoring excavation activities. The dust monitor was not used on days with precipitation. The use of the dust monitor was discontinued after heavy snowfall in early December for both RA activities in AOCs 1-4 and AOC-12. The action level for dust was never exceeded at the Site.

All data were collected in accordance with the approved *Air Pollution Control Pre Construction Permit* (June 2003) (see Appendices E and F).

5.2.4 Soil Vapor Extraction System Monitoring – AOCs 1-4

Monitoring of the SVE system consisted of the collection of PID readings twice a day from three locations in the system. Sample ports were located before the first vapor phase carbon unit, between the lead and lag units and after the lag unit prior to discharge, in accordance with the Air Pollution Control Permit. Actual air samples were also collected in tedlar bags once a week for the first 2 months and then once every other week until the SVE system was demobilized. The air samples sent off-site for analysis were taken from the same locations as the PID readings. A total of 11 air samples were collected (SVE-01 through SVE-11). Air samples were analyzed for TO-15. Sample results and analytical data are presented in Appendix G.

The highest reading detected from the flow into the primary carbon unit was 2.2 ppm. This reading occurred on October 17, 2003, and was associated with soil from AOC-3C. No readings were detected from the flow into the secondary carbon unit or from the outflow into the atmosphere. The low VOC detections in the SVE system were attributable primarily to the addition of the oxidants

(hydrogen peroxide and sodium persulfate), which quickly destroyed the VOCs and minimized any release of VOCs into the air.

Due to the change in methodology for mixing in AOC-12 including the application of oxidants right into the zone of soil mixing without first excavating the soils and staging in a treatment cell, the soil vapor extraction system was not utilized during mixing operations in AOC-12.

5.2.5 Soil Treatment Performance Monitoring

AOCs 1-4

As soil was excavated, it was transported to the treatment cells and stockpiled to an approximate height of 3 feet. A 6-inch buffer of clean soils was placed at the base of each treatment cell. This buffer was designed to minimize contact of the equipment with the underlying HDPE liner and asphalt. The equipment that was used to blend the oxidant and homogenize the soil was designed to mix a three-foot deep soil matrix. The cells were constructed long and narrow (40′ x 200′) with travel paths between each for application of the oxidant. All areas were contained, lined and protected by soil erosion and runoff control measures. Each cell had a sump to collect any rainwater or excess runoff from within the cell. All collected water was then treated on-site.

Beginning in November 2003, a minor deviation to the chemical oxidant recipe was implemented at the Site. A mixture consisting of 10%-35% hydrogen peroxide and 10%-50% sodium persulfate was utilized to chemically catalyze the oxidation reaction as opposed to the originally planned heat activated reaction. Originally, only persulfate had been planned with use of peroxide as an odor control. Low ambient temperatures and additional soil moisture due to excessive rains that occurred since project inception made it difficult to keep soil at an optimum temperature. The hydrogen peroxide/sodium persulfate mixture created a chemically activated sodium persulfate, which readily oxidized the COCs, as evidenced by the post-treatment soil analysis. Hydrogen peroxide had always been a component of fugitive emissions control at the Site but it now served two roles.

Following a 3-day reaction time, the cells were uncovered, sampled for compliance before being removed and staged in a clean backfill stockpile for use as Site backfill. Post-treatment sampling was conducted in accordance with the approved RAWP. Soils within the process area were

subdivided into 100 cubic yard (cy) lots. The treated soils were sampled by hand auguring through the depth of the pile at a frequency of 1 per 20 cy lot. Samples were field screened using a PID and samples exhibiting the highest readings were collected for lab analysis. Post-treatment samples were analyzed at a frequency of 1 sample per 100 cy (8 samples per cell) for VOCs by Environmental Protection Agency (EPA) Method 8260 (see Figure 5a). Samples were sent to Integrated Analytical Laboratories, LLC in Randolph, New Jersey. Field duplicate samples were collected at a frequency of 1 per 20 soil samples.

When remedial goals were achieved (< 5 mg/kg for targeted VOCs), soils were designated as acceptable for on-site reuse and no additional sampling was performed. However, when individual lot samples indicated that remedial goals had not been achieved, these lots were re-treated and re-sampled until the remedial goal was met (see Table 2 for explanation of Sample IDs). Re-treated samples were given a designation of R1, R2, etc. after the original sample ID. For example, if the original sample designation were TB1a, then the first re-treated sample ID would be TB1a-R1. A total of 437 post-treatment samples were collected during the remedial action from AOC-1 through AOC-4 soils, and from the former compactor area (see Table 3 and Appendix H). A total of approximately 40,577 tons of soil were excavated, treated, and backfilled from AOCs 1A, 1B, 2A, 2B, 3 and 4. As soils from each AOC were treated successfully, they were replaced into their original excavations.

AOC-12

After the soil was treated and mixed in situ, it was excavated and transported to the 100' x 200' treatment cell and stockpiled to an approximate height of 3 - 5 feet. A 6-inch buffer of clean soil was placed at the base of each treatment cell to protect the integrity of the 40-mil HDPE liner system. This 6-inch soil buffer remained in the cells until all treatment activities were completed on-site. All soil that had not been sampled post-treatment was contained in the lined cell and protected by multiple levels of soil erosion and runoff control measures. All precipitation that collected in the treatment cell was transferred to the on-site water storage system then treated on-site through the on-site groundwater treatment system.

Following a 2 to 3-day reaction time, the soils were uncovered, sampled for compliance before being removed and backfilled or staged in a clean soil stockpile. Post-treatment sampling was conducted in accordance with the approved RAWP Addendum. Soils within the treatment cells were subdivided into 100 cubic yard (cy) lots. The treated soils were sampled by hand auguring through the depth of the pile at a frequency of 1 per 20 cy lot or a total of 5 samples per lot. These samples were field screened using a PID and the sample exhibiting the highest readings were collected for lab analysis. Post-treatment samples were analyzed by a fixed base laboratory at a frequency of 1 sample per 100 cy for VOCs by Environmental Protection Agency (EPA) Method 8260 (see Figure 5b). Samples were sent to Integrated Analytical Laboratories, LLC in Randolph, New Jersey. Field Duplicate samples were collected at a frequency of 1 duplicate per 20 soil samples.

When remedial goals were achieved (<5 mg/kg for targeted VOCs), soils were designated as acceptable for on-site reuse and no additional sampling was performed, consistent with the approved approach outlined in the RAWP Addendum. However, when individual lot samples indicated that remedial goals had not been achieved, these lots were re-treated ex-situ and re-sampled until the remedial goal was met or the soils were deemed untreatable and disposed of off-site (see Table 2 for explanation of Sample IDs). Re-treated samples were given a designation of R1, R2, etc. after the original ID. For example, if the original sample designation were TB1A, then the first re-treated sample ID would be TB1A-R1. A total of 92 post-treatment and 41 re-treatment samples were collected during the remedial action from AOC-12 soils (see Supplemental Table 3 and Supplemental Appendix H). A total of approximately 13,750 tons of soil were treated and excavated from AOC-12, with approximately 11,150 tons of soil reused on-site as backfill.

5.2.6 AOCs 1-4 In-situ Treatment Work

In an attempt to reduce the high NOD found in some localized soils as well as high concentrations of VOCs found in the perched water zone in AOCs 3B and 3C, an 8% hydrogen peroxide solution, followed by a 20% sodium permanganate solution was injected in the subsurface using direct push Geoprobe techniques and excavated infiltration galleries. Approximately 650 gallons of hydrogen peroxide (8%) and approximately 3,300 gallons of sodium permanganate (20%) were successfully injected into AOC-3B and AOC-3C under a permit by rule granted by the NJDEP. Prior to injecting

the permanganate, the residual peroxide levels were measured. Injection of permanganate proceeded only after the peroxide had been exhausted. The results of these efforts showed an immediate reaction occurring with subsurface concentrations of VOCs. This work was performed in accordance with an NJDEP approved Permit-By-Rule (see Supplemental Appendix A).

5.2.7 Remediation of AOC-1A

5.2.7.1 Excavation Activities

Approximately 1,745 tons of soil were excavated and treated from AOC-1A. The final area of disturbance was 1,571 square feet with a final depth of 20 feet bgs (see Figure 6, Figure 8a and Table 4). Upon completion of the planned excavation, a gray discolored lens of silty sand was observed on the east sidewall. Field screen readings with the PID indicated VOC concentrations of around 400 ppm. Therefore, the east sidewall was over-excavated approximately 10 x 32 x 20 feet to remove the discolored soil. An additional 400 tons of soil were excavated and treated. Photographs showing the additional excavation and discolored materials are included as Appendix P.

5.2.7.2 Post-Excavation Soil Sampling and Analysis

No post-excavation samples were required for AOC-1A according to the approved RAWP. However, because of the over-excavation, one sample was collected from the east wall (1A09) at 17 feet bgs, and one sample was collected from the southeast corner sidewall (1A10) at 17 feet bgs (see Figure 7-1 for sample locations). Sample results indicated concentrations below the cleanup objective of 5 mg/kg (Figure 7-1, Table 5 and Appendix I). As a result of the remedial activities completed, and based on the soil sample results from this area, AOC1A meets the URUSCC.

5.2.8 Remediation of AOC-1B

5.2.8.1 Groundwater Treatment Discharge Re-routing

During the excavation of this area, a portion of the existing groundwater treatment system discharge pipe (8-inch diameter polyvinyl chloride [PVC]) leading toward Outfall 003 was cut and rerouted around the disturbed area. The rerouting was permanently left in place to prevent pipe undermining as a result of soil settling following backfill activities.

5.2.8.2 Excavation Activities

Approximately 867 tons of soil were excavated and treated from AOC-1B. The final area of disturbance was 1,560 square feet with a final depth of 10 feet bgs (see Figure 6, Figure 8a and Table 4). Field screen readings collected from the base and sidewalls of the planned excavation indicated no detectable VOC concentrations, therefore completing the excavation.

5.2.8.3 Post-Excavation Soil Sampling and Analysis

Prior to excavation, sufficient soil samples had been taken and were used as post-excavation sample points. No additional post-excavation samples were required for AOC-1B according to the approved RAWP Addendum and as shown on Figure 7-1. As a result of the remedial activities completed, and based on the soil sample results from this area, AOC1B meets the IGWSCC.

5.2.9 Remediation of AOC-1C

As outlined in the February 2003 RAWP Addendum, all samples collected during PDI activities were below the URUSCC for all constituents of concern and 1 of 4 samples exceeded the IGWSCC for PCE. As a result, no action was taken in this area.

5.2.10 Remediation of AOC-2A

5.2.10.1 Excavation Activities

Approximately 2,056 tons of soil were excavated and treated from AOC-2A. The final area of disturbance was 1,851 square feet with a final depth of 20 feet bgs (see Figure 6, Figure 8a and Table 4). Field screen readings collected from the base and sidewalls of the planned excavation indicated no detectable VOC concentrations, therefore completing the excavation.

5.2.10.2 Post-Excavation Soil Sampling and Analysis

Prior to excavation, sufficient soil samples had been taken and were used as post-excavation sample points. No additional post-excavation samples were required for AOC-2A according to the approved RAWP Addendum and as shown on Figure 7-2. As a result of the remedial activities completed, and based on the soil sample results from this area, AOC 2A meets the URUSCC.

5.2.11 Remediation of AOC-2B

5.2.11.1 Excavation Activities

Approximately 1,522 tons of soil were excavated and treated from AOC-2B. The final area of disturbance was 1,826 square feet with a final depth of 15 feet bgs (see Figure 6, Figure 8a and Table 4). Field screen readings collected from the base and sidewalls of the planned excavation indicated no detectable VOC concentrations, therefore completing the excavation.

5.2.11.2 Post-Excavation Soil Sampling and Analysis

In accordance with the approved RAWP, confirmatory post-excavation soil sampling was conducted in AOC-2B to confirm the excavation of VOC impacts to below approved soil cleanup criteria. Both of the additional post-excavation samples (2B07 and 2B08) collected in AOC-2B at 15 feet bgs resulted in concentrations of VOCs less than the most stringent NJDEP IGWSCC (see Figure 7-2 for sample locations). The analytical data is provided in Table 5 and Appendix I. As a result of the remedial activities completed, and based on the soil sample results from this area, AOC 2B meets the IGWSCC.

5.2.12 Remediation of AOC 2C

As discussed in the February 2003 RAWP Addendum, there was one (1) exceedance of the URUSCC for PCE. This sample location, 2C03, was merged into AOC-2B and the remaining samples collected in AOC-2C were less than the URUSCC for all constituents of concern. As a result, only a small portion of AOC-2C required remediation, and that area was addressed during AOC-2B activities. No further action is required for this AOC.

5.2.13 Remediation of AOC-3A

5.2.13.1 Excavation Activities

Approximately 5,556 tons of soil were excavated and treated from AOC-3A. The final area of disturbance was 5,000 square feet with a final depth of 20 feet bgs (see Figure 6, Figure 8b and Table 4). Field screen readings collected from the base and sidewalls of the planned excavation indicated no detectable VOC concentrations, therefore completing the excavation.

5.2.13.2 Post-Excavation Soil Sampling and Analysis

Prior to excavation, sufficient soil samples had been taken and were used as post-excavation sample points. No additional post-excavation samples were required for AOC-3A according to the approved RAWP Addendum and as shown on Figure 7-3A/C. As a result of the remedial activities completed, and based on the soil sample results from this area, the remedial goal of 5mg/kg was met. However post-treatment data on re-used soils indicates some exceedances of the URUSCC. All soils in this AOC meet the RUSCC. As a result, these soils will be included in the deed restriction per Section 5.4.3.

5.2.14 Remediation of AOC-3B

5.2.14.1 Installation of Sheet-Piling

During September 2003, Panther initiated installation of sheet piling to a depth of 27 feet bgs along the eastern boundary of AOC-3B. As a result of subsurface anomalies located during geophysical activities in August and September 2003, sheet piling along the eastern boundary was relocated approximately 15-feet further east to encompass debris located outside of Area 3B. The sheet piling was designed to retard horizontal flow from the wetland areas and allow for excavation of Area 3B.

5.2.14.2 Excavation Activities

During injection activities in August 2003, debris/drums and high NOD soil was located in AOC-3B. Therefore, test pitting was conducted in December 2003 in AOC-3B to determine the extent and depth of high NOD materials that could not be treated on-site cost-effectively and that would have to be disposed of off-site. Eight (8) test pits were excavated along the western and southern boundaries of AOC-3B to define the lateral extent of impacted materials. The northern and eastern extents had already been defined by the original AOC-3B excavation limits. High NOD materials were encountered to the existing western boundary of AOC-3B and extending approximately 15' south of the previously defined AOC-3B border. Additionally, high NOD materials were encountered in the center of AOC-3B to a depth of 23' bgs. The high NOD materials were encountered in a "bowl" configuration with the lowest point in the center of AOC-3B sloping toward the surface as the excavation progressed to the western and southern boundaries. Based on this test pitting information, an additional 1,000 tons of high NOD impacted soils were excavated along the western

and southern boundaries, and over the additional 3' zone on the base of the excavation for off-site treatment and disposal. The NOD report for AOC-3B is included in Appendix K. Post-excavation soil samples were collected in accordance with the TRSR and the approved RAWP Addendum.

Approximately 13,379 tons of soil was excavated from AOC-3B. Approximately 4,779 tons were treated, and 8,600 tons were sent to an off-site disposal facility. The final area of disturbance was 12,041 square feet with a final depth of 23 feet bgs (see Figure 6, Figure 8b and Table 4). Details of these activities are discussed below.

5.2.14.2.1 Off-Site Debris/Organic-Rich Soil Disposal

A large amount of soil from AOC-3B contained drum debris and high-NOD soil. The high-NOD soil could not be treated on-site. The high-NOD areas required nearly 285 grams of oxidant per kilogram (g/kg) soil as opposed to 3 g/kg for all other areas of the Site as observed during bench testing and other soils treated to date. Panther conducted Toxic Characteristic Leaching Procedure (TCLP) analysis on one sample of high NOD soil from AOC-3B and found it to exceed applicable PCE and TCE Resource Conservation and Recovery Act (RCRA) criteria (see Table 6 and Appendix J). Approximately 8,600 tons of soils from AOC-3B were transported off-site for disposal. All soils were disposed of at The Environmental Quality Company treatment and disposal facility located in Belleville, Michigan. Copies of the Hazardous Waste Manifests and Certificates of Disposal are provided in Appendix K.

5.2.14.3 Post-Excavation Soil Sampling and Analysis

In accordance with the approved AOC1-4 RAWP Addendum for the Site and in accordance with the TRSR, nineteen (19) post-excavation soil samples were collected from the sidewalls and base of the excavation prior to backfilling. Four (4) samples (3B17, 3B18, 3B19 and 3B20) were collected in accordance with the approved AOC 1-4 RAWP Addendum, while the remaining samples (15) were collected in accordance with the TRSR. Two (2) sample locations along the south wall were over-excavated twice because of sample concentrations exceeding 5 mg/kg at 1-foot bgs (see Figure 7-3B/D, Table 5 and Appendix I). All post-excavation samples met the NJDEP URUSCC with minor exceedances of the IGWSCC for all constituents of concern. As a result of the remedial activities completed, and based on the soil sample results from this area, the remedial goal of 5mg/kg was met.

However post-treatment data on re-used soils indicates some exceedances of the URUSCC, and the area will be included in the deed restriction. All soils in this AOC meet the RUSCC.

5.2.15 Remediation of AOC-3C

5.2.15.1 Water Line and Storm Drain Relocation

A water main (12-inch diameter, ductile iron pipe owned by the Southeastern Morris County Municipal Utility Authority) burdened the planned excavation of AOC-3C. The affected portion of the water main was relocated prior to excavation activities in this area. The pipe was relocated approximately 60′ to the north on New Jersey Department of Transportation property to facilitate benching of soil sidewalls for the excavation of AOC-3C.

Approximately 100 feet of storm sewer pipe associated with Outfall 002 (24-inch diameter RCP) crossed the planned excavation of AOC-3C. This section of the pipe was temporarily removed for excavation and restored during backfilling. This section of pipe was replaced with corrugated 24″ HDPE smooth curve pipe. Appropriate engineering controls were implemented to ensure that diverted storm water did not contact impacted soils prior to discharge. The outfall was restored in accordance with the SESCP during wetland restoration activities. Details regarding these controls are included in the Soil Erosion and Sediment Control Plan (Appendix A).

5.2.15.2 Excavation Activities

Approximately 15,484 tons of soil were excavated and treated from AOC-3C. The final area of disturbance was 11,148 square feet with a final depth of 25 feet bgs (see Figure 6, Figure 8b and Table 4). Field screen readings collected from the base and sidewalls of the planned excavation indicated no detectable VOC concentrations, therefore completing the excavation.

5.2.15.3 Presumed Clean Soil

Portions of AOC-3C contained clean, un-impacted soils, according to previous investigation efforts. To confirm this, soil samples were collected from presumed clean soils in AOC-3C at a frequency of 1 per 100 cubic yards. When field-screening results indicated the presence of VOCs, soils were treated onsite. However, when VOCs were not indicated from field screening, soils were sampled

and analyzed for confirmation at IAL for re-use. A total of ten samples (CSC3C designation) were collected from AOC-3C between 0 and 10 feet bgs (see Table 7 and Appendix I). Approximately 1,500 tons of soil from AOC-3C were excavated, sampled and backfilled as reusable soils. All soils sampled for reuse resulted in less than the 5 mg/kg soil reuse criteria and were utilized as backfill in AOC-3A.

5.2.15.4 Post-Excavation Soil Sampling and Analysis

In accordance with the approved AOC 1-4 RAWP Addendum, confirmatory post-excavation soil sampling was conducted, as required, in AOC-3C to confirm the excavation of Site contaminants to below the site-specific soil cleanup criteria. Samples 3C12 and 3C13 were collected along the west sidewall from biased-high locations at 1 foot bgs. Samples 3C14 and 3C15 were collected from biased-high locations along the base at 25 foot bgs. All post-excavation samples collected in AOC-3C resulted in concentrations of VOCs less than the most stringent NJDEP IGWSCC (see Figure 7-3A/C and Table 5).

5.2.16 Remediation of AOC-3D

5.2.16.1 Excavation Activities

During the excavation of AOC-3D, field screening at the base of the planned excavation (20 feet bgs) yielded PID readings that indicated residual impacts still remained. As a result, Panther continued to excavate approximately 50% (28 ft. x 50 ft) of AOC-3D to 23 feet bgs where clean soil was encountered and additional post-excavation samples were collected per the TRSR.

Also, during the excavation of AOC-3D, gray discolored soil along with a partial drum of sludge was discovered approximately in the center of the excavation. As a result of these anomalous materials, three additional samples were collected. One sample (AN-AOC3D) was collected from the drum waste and analyzed for PP + 40. Two samples (AOC3D-AN2 and AOC3D-AN3) were collected from the gray discolored soil and were analyzed for TCLP RCRA Waste Classification and TCL VO (see Table 6 and Appendix J). These samples were collected to confirm that soils being shipped off-site were in accordance with previously profiled soils. No changes to the existing profiles or additional constituents of concern were reported.

Approximately 7,719 tons of soils were excavated from AOC-3D. Approximately 7,219 tons of soils were treated, and approximately 500 tons were sent to an off-site disposal facility. The final area of disturbance was 6,462 square feet with a final depth of 20 feet bgs on the east half and a final depth of 23 feet bgs on the west half of the AOC (see Figure 6, Figure 8b and Table 4).

5.2.16.1.1 Off-Site Debris Disposal

Approximately 500 tons of debris-impacted materials from AOC-3D were sent to an off-site disposal facility. Copies of the Hazardous Waste Manifests and Certificates of Disposal are provided in Appendix K.

5.2.16.2 Post-Excavation Soil Sampling and Analysis

Prior to excavation activities, sufficient soil samples had been taken to adequately delineate soil impacts and serve as post-excavation samples. No additional post-excavation samples were required from AOC-3D in accordance with the approved RAWP Addendum. However, because of the over-excavation of the base, two post-excavation samples were collected at 23 bgs. Sample results indicated concentrations below the cleanup objective of 5 mg/kg (see Figure 7-3B/D, Table 5 and Appendix I). As indicated on the summary tables and figures, all post-excavation samples resulted in concentrations of contaminants of concern below the IGWSCC. As a result of the remedial activities completed, and based on the soil sample results from this area, the remedial goal of 5mg/kg was met. However post-treatment data from re-used soils indicates some exceedances of the URUSCC which will be included in a deed restriction. All soils in this AOC meet the RUSCC.

5.2.17 Remediation of AOC-4

5.2.17.1 Presumed Clean Soil

During previously implemented soil remediation activities (1980), the area know designated as AOC-4 was excavated and backfilled with clean soil per a NJDEP 1979 Administrative Order. As a result, the AOC 1-4 RAWP Addendum called for re-use of the clean fill, which sat above the soils requiring remediation. For confirmation, and prior to excavation activities, soil samples were taken from the presumed clean soils in AOC-4 at a frequency of 1 per 100 cubic yards. A total of five samples were collected from AOC-4 (see Figure 7-4, Table 5). Based on the analytical results, the

top 7 feet of soil from AOC 4 was found to be clean, and therefore reused as backfill. However, soils below this were excavated and treated on-site.

5.2.17.2 Excavation Activities

Approximately 1,049 tons of soil were excavated and treated from AOC-4. The final area of disturbance was 1,573 square feet with a final depth of 20 feet bgs (see Figure 6, Figure 8b and Table 4). Field screening of the north wall of the excavation yielded PID readings that indicated residual impacts still remained. As a result Panther over-excavated the north wall approximately 5 feet wide by 20 feet deep. Also, while excavating to depth, PID readings indicated impacts at 7 feet bgs. Therefore, 7 – 20 feet bgs was excavated and treated as opposed to the planned 10 – 20 feet bgs.

5.2.17.3 Post-Excavation Soil Sampling and Analysis

In accordance with the approved AOC 1-4 RAWP Addendum, confirmatory post-excavation soil sampling was conducted, as required, in AOC-4 to confirm the excavation of Site contaminants to below the applicable SCC. All three post-excavation samples (4X06, 4X07 and 4X08) collected in AOC-4 resulted in concentrations of VOCs less than the most stringent NJDEP IGWSCC (see Figure 7-4 for post-excavation sample locations). Post-excavation analytical data results are provided in Table 5 and Appendix I. As a result of the remedial activities completed, and based on the soil sample results from this area, the remedial goal of 5mg/kg was met. However post-treatment data from re-used soils indicates some exceedances of the URUSCC. These soils will therefore be included in the deed restriction. All soils in this AOC meet the RUSCC.

5.2.18 Remediation of Compactor Area

5.2.18.1 Excavation Activities

During December 2003, Panther completed excavation, treatment and backfill of the Compactor Area along the northeast corner of the building. Approximately 300 tons of soil were excavated and treated from this area that was identified by ARCADIS during the ISRA closure process. Following excavation, post-excavation soil sampling was completed in accordance with the TRSR. Imported

clean fill was then used to restore this area. The final area of disturbance was approximately 400 square feet with a final depth of 10 feet bgs (see Figure 6 and Table 4).

5.2.18.2 Post-Excavation Soil Sampling

Six (6) total samples were taken from the area, with one sidewall sample initially exceeding the 5 mg/kg remediation goal (see Figure 7-CA and Table 8). The south wall, where the soil sample that exceeded the site-specific 5 mg/kg remediation goal (CAS-6) was collected, was over-excavated and re-sampled (CAS-2-6) resulting in less than the 1-mg/kg NJDEP IGWSCC. Following receipt of the analytical results, the Compactor Area was backfilled with certified clean fill. The Compactor Area analytical data are provided in Table 8 and Appendix L.

5.2.19 Remediation of AOC-12

5.2.19.1 Water Line and Storm Drain Relocation

Prior to commencing on-site soil treatment and excavation activities, Panther relocated two primary utilities crossing through AOC-12. Panther requested and received approval from Southeast Morris County Municipal Utilities Authority (SMCMUA) to relocate the existing water main from the Airtron property boundary to the north onto the adjacent NJDOT property. The affected portion of the water main (12-inch diameter, cast iron, lead-soldered pipe) was relocated prior to excavation activities in AOC-12 as had been done in AOC-3C. The water main was relocated approximately 60 feet to the north on NJDOT property to facilitate benching of soil sidewalls for the excavation of AOC-12.

Approximately 250 feet of storm sewer pipe associated with the stormwater outfall (24-inch diameter RCP) also crossed the planned excavation AOC-12. This section of the pipe was relocated approximately 60 feet north onto the NJDOT property prior to excavation activities. This section of pipe was replaced with corrugated 24-inch HDPE smooth core pipe. During construction and relocation activities, appropriate engineering controls were implemented to ensure that diverted storm water did not contact impacted soils prior to discharge.

5.2.19.2 In situ Treatment and Mixing of Impacted Soils

The soil remediation in AOC-12 was completed in accordance with the September 2004 RAWP Addendum and other previously submitted documents including the permit by rule. In accordance with the approved RAWP Addendum, chemical oxidation was used to destroy contaminants in the soil matrix. For the soil in AOC-12, **Panther** applied chemically activated sodium persulfate and mixed the soil in-place. This in situ method of treating and mixing enabled excess oxidants to percolate through the soil matrix, pre-treating soils below the mixing zone (i.e., in the next lift) before those soils were uncovered during excavation. Soil was mixed in successive 2-foot lifts prior to excavation utilizing an excavator mounted rotating head mixing unit. The treatment process began with an excavator bucket fluffing and turning over soils of the 2-foot lift to remove any large boulders and to break up any hard ground to allow for adequate mixing. While the excavator was fluffing the soils, oxidant was being applied to the soil to initiate the reaction process and to provide an odor and vapor suppressant. Primary treatment and mixing was then achieved using the excavator-mounted mixing unit. The oxidant was injected into the soil directly from the mixing unit via a 1-inch hose and spray system fed from one of two-5500 gallon polypropylene mixing tanks. The oxidant was pumped through a flow meter to control the rate of oxidant application as well as accurately record the amount of oxidant injected per lift. Following passage through the flow meter, the oxidants were pumped through a 1-inch hose that acted as an umbilical from the mix tanks and was secured to the boom of the excavator. The hose continued from the boom of the excavator through the mix head terminating with a spray nozzle at the base of the mixing head directly injecting oxidants into the soil-mixing zone.

Following mixing, the soil was excavated, placed in a lined 100' x 200' holding cell and covered to allow time for the oxidant reaction to proceed to completion. Following a 72-hour reaction cycle, the 100 cy lots were uncovered and performance sampled at a rate of 1 sample per 100 cy for analysis by a certified laboratory. If analytical results from the lot samples indicated that remedial goals had not yet been achieved, these lots were re-treated ex situ, covered and allowed to react for an additional 72 hours. As previously, following the 72-hour reaction cycle, the lots were uncovered and re-sampled.

5.2.19.3 Excavation Activities

Excavation activities were completed identical to excavation activities in AOCs 1-4 using sidewall benching methods (1:1 slope) to preclude the use of sheeting and shoring around the excavation. Following mixing, the soil was excavated and placed in a lined 100' x 200' holding cell to allow time for the oxidation reaction to proceed to completion. The treatment cell was constructed using a 40-mil HDPE liner and surrounded by concrete jersey barriers. The cell was sloped and had an integrated collection sump for collection of precipitation from the covered piles. The soil in the holding cell was covered to prevent saturation as a result of rain and to eliminate the possibility for odor from the staged soils during the reaction. Since the highest VOC concentrations in AOC-12 were lower than previously excavated soils (AOC-3B and 3C) and the treatment was completed in-situ, no sprung structure and/or negative pressure enclosures were needed for these soils.

During the storm drain relocation, solvent odors were encountered approximately 20 feet northeast of the proposed limits of excavation for AOC-12. Three (3) test pits were excavated along the northern and eastern boundaries of AOC-12 to define the lateral extent of impacted materials. Based on test pitting information, an additional 750 tons of soil needed to be treated and excavated. Field screening readings were collected via the use of a PID in both the horizontal and vertical directions to assure that non-impacted soils were not being treated or over-excavated.

Approximately 750 tons of soil were over-excavated from AOC-12. Following excavation, post-excavation soil sampling was completed in accordance with the TRSR. The final area of disturbance for AOC-12 was approximately 12,000 square feet with a final depth ranging from 10 to 20 feet bgs.

Approximately 13,750 tons of soil were excavated and treated from AOC-12. The final area of disturbance was approximately 12,000 square feet with a final depth of 20 feet bgs in the original excavation area and 10 feet bgs in the over-excavation area (see Figure 6, Figure 8b and Table 4). Of the 13,750 tons treated, approximately 6,250 tons of soil was retreated with approximately 3,650 tons of this soil being retreated successfully and approximately 2,600 tons being sent off-site as non-hazardous waste.

5.2.19.4 Post-Excavation Soil Sampling and Analysis

Following excavation to 20 feet, the focused post-excavation base soil-sampling program was implemented as described in the approved RAWP Addendum to augment existing post-excavation data. Based upon the post-excavation equivalent samples collected during delineation activities, only limited additional confirmatory sampling was performed beyond the original delineation samples. Additional floor and sidewall sampling was performed in AOC-12 to meet the NJDEP requirements (one per 900 square feet (sf) of excavation and one per 30 lf of perimeter sidewall). Five (5) post-excavation base samples (AOC12-PE1 through PE5) were collected in AOC-12 to meet NJDEP requirements (see Figure 7-12 for sample locations). These samples were collected from the biased-high PID readings found while field screening the excavation base at 20 feet bgs. Additionally, at the request of the NJDEP, Panther collected two (2) additional surface post-excavation soil samples along the northern boundary of the excavation. These samples (AOC12-SW-1 and AOC12-SW-2) were collected from the north sidewall at 0.5 to 1.0 ft bgs. All post-excavation soil samples were analyzed for VOCs by EPA Method 8260. All post-excavation soil samples had concentrations less than the URUSCC for all constituents of concern (Figure 7-12, Amended Table 5 and Supplemental Appendix I).

In accordance with the approved RAWP Addendum for the Site and in accordance with the TRSR, two (2) base samples and six (6) sidewall samples (3 locations) were collected from the area of over-excavation along the northeastern excavation boundary (see Figure 7-12 for sample locations). The

over-excavation created an additional 83 feet of linear wall and an additional base of approximately 1,000 square feet. After excavation activities, field screening was conducted using a portable PID from the base at 10 feet bgs and from the new north and east sidewalls. Samples were collected biased to the soil exhibiting the highest PID readings. The two (2) base samples were collected at 10 feet bgs. Four (4) samples were collected from the north sidewall (two at 0.5 – 1.0 ft bgs and two at 9.5 – 10 ft bgs. Two (2) samples were collected from the east sidewall (one at 0.5 – 1.0 ft bgs and one at 9.5 – 10 ft bgs (3 locations total) in accordance with the Tech Regs. With the exception of sample AOC12-SW-6 collected along the north wall at 9.5 to 10 ft bgs with a PCE concentration of 1.7 ppm, all post-excavation samples from the over-excavation resulted in concentrations less than the most stringent NJDEP IGWSCC (see Table 5 for sample results). As a result of the remedial activities completed, and based on the soil sample results from this area, the remedial goal of 5mg/kg was met; however post-treatment data from re-used soils indicates some exceedances of the IGWSCC. All soils in this AOC meet the URUSCC. As a result, this area does not have to be deed restricted.

5.2.19.5 Off-Site Disposal

Approximately 2,600 tons of soil from AOC-12 could not be treated below the remedial goal of 5 mg/kg. The majority of this soil originated from the 0 to 10 foot intervals of the soil exhibiting the highest NOD/COD concentrations during delineation activities. Panther conducted TCLP analysis on two samples of untreatable soil from AOC-12 and found that concentrations did not exceed applicable PCE and TCE RCRA criteria (see Supplemental Table 6 and Supplemental Appendix J). All non-hazardous soils were disposed of at MART located in Vineland, New Jersey or at Clean Earth located in New Castle, Delaware. One load of hazardous debris (concrete storm drain) was disposed of at The Environmental Quality Company treatment and disposal facility located in Belleville, Michigan as a precautionary measure in accordance with previous sections of the storm drain that were sent there from AOC-3. Copies of the Non Hazardous and Hazardous Waste Manifests and Certificates of Disposal are provided in Supplemental Appendix K.

5.2.20 Remediation of Interior AOCs

5.2.20.1 Excavation Activities

During April 2005, Panther completed excavation and backfill of three (3) AOCs inside the former Airtron building identified during ISRA closure activities by ARCADIS. Approximately 320 tons were excavated from the three (3) areas. To better define the extent of excavation required, ARCADIS mobilized a truck-mounted Geoprobe rig to collect additional samples to limit the extent of soil excavation in the three areas. The sample locations and the results are summarized on Table 7 and Figure 7-IA. Prior to excavation, Panther saw cut and removed the concrete floor from these areas. The concrete floor in the Bridgeport and Tool Crib areas were approximately 6 inches thick. However, parts of the Plating Room floor had three (3) separate layers of concrete. All three (3) areas were backfilled with clean certified fill and compacted using the bucket of the excavator. Details regarding the remediation of soils from each interior AOC are provided below:

Bridgeport Area. Approximately 20 tons of PAH-impacted soil was excavated from the Bridgeport Area. The final area of disturbance was 100 sq ft with a final depth of 3 feet below the concrete floor.

Tool Crib Area. Approximately 20 tons of chlorinated VOC-impacted soil was excavated from the Tool Crib Area. The final area of disturbance was 150 sq ft with a final depth of 3 feet below the concrete floor.

Plating Room. Approximately 280 tons of copper- and cadmium-impacted soil was excavated from the Plating Room. The final area of disturbance was 900 sq ft with a final depth of 7 feet in the copper impacted area and a deeper 11-foot deep excavation below the concrete floor in the cadmium impacted area.

5.2.20.2 Post-Excavation Soil Sampling and Analysis

During March 2005, ARCADIS completed additional horizontal and vertical delineation of the three (3) AOCs to better define the areas of excavation and to satisfy NJDEP Tech Reg. post-excavation-

sampling requirements. Samples were sent to IAL in Randolph, New Jersey under a 24-hour turnaround time (TAT). The details of each area are as follows:

- *Bridgeport Area.* Four (4) post-excavation delineation samples were collected by ARCADIS from the Bridgeport Area prior to excavation activities. These samples were analyzed for PAHs by USEPA Method 8270 and were used as post-excavation samples in accordance with NJDEP TRSR. As a result of the remedial activities completed, and based on the soil sample results from this area, this AOC meets the IGWSCC.

- *Tool Crib Area.* Four (4) post-excavation delineation samples were also collected by ARCADIS from the Tool Crib Area prior to excavation activities. These samples were analyzed for VOCs by USEPA Method 8260 and were used as post-excavation samples in accordance with NJDEP TRSR. As a result of the remedial activities completed, and based on the soil sample results from this area, this AOC meets the URUSCC.

- *Plating Room.* Eleven (11) post-excavation delineation samples were collected by ARCADIS from the Plating Room prior to excavation activities. These samples were analyzed for copper and cadmium by USEPA Method 6010 and were used as post-excavation samples, along with subsequent post-excavation samples taken after excavation. As a result of the remedial activities completed, and based on the soil sample results from this area, this AOC meets the URUSCC.

5.2.20.3 Waste Characterization Sampling and Analysis

A summary of the waste characterization strategy used for interior areas is provided below:

- *Bridgeport Area.* No waste characterization samples were required from the Bridgeport Area as previous data was sufficient for characterization. The concrete had not been impacted, and therefore was disposed of as clean concrete at a recycler. The soil was disposed of as non-hazardous along with the soil from the other two (2) interior AOCs.

- *Tool Crib Area.* No waste characterization samples were required from the Tool Crib Area. The concrete had not been impacted, and therefore was disposed of as clean concrete at a recycler. The soil was disposed of as non-hazardous along with the soil from the other two (2) interior AOCs.

- *Plating Room.* Two samples were collected from the concrete associated with the Plating Room excavation and were analyzed for TCLP metals, RCRA metals and reactivity cyanide to assure previous operations had not affected the concrete since some of the concrete was discolored. One composite sample (PR-Concrete) was collected from the concrete that was removed from the Plating Room floor. One composite sample (PR-Pit) was collected from a concrete pit that was located beneath the floor and above the high cadmium-impacted soil. Analytical results from both samples indicated that the concrete from the Plating Room could be disposed of as non-hazardous.

Two samples were also collected from the soil excavated from the Plating Room area and were analyzed for TCLP metals, RCRA metals and reactivity cyanide. One composite sample [PR-Soil (0-7)] was collected from the soil excavated from the 0-7 foot interval of the excavation. The second composite sample [PR-Soil (7-11)] was collected from the 7-11 foot interval, which was the suspected high cadmium-impacted soil. Sample results indicated that the soil from the Plating Room could also be disposed of as non-hazardous.

5.2.21 Backfilling Activities

During backfill activities, approximately 10,730 tons of certified clean backfill were imported to the Site through April 2004 to fill in void space created by soils sent off-site for disposal. The two main areas where backfill was needed were the former lagoon area of AOC-3B and the debris area located in the middle of AOC-3D. Certificates of the clean backfill are provided in Supplemental Appendix M. The clean fill brought on Site was used primarily as cover material in AOC-3. As a result, all treated soils that were re-used as backfill are now located approximately five feet below existing grade. The top five feet of AOC-3 is comprised of certified clean fill imported to the Site.

The treated soils from a given AOC were used as backfill in that same AOC. Specifically, the treated soils from AOC 1 were backfilled in AOC 1; the treated soils from AOC 2 were backfilled in AOC 2; the treated soils from AOC 3 were backfilled in AOC 3 and the treated soils from AOC 4 were backfilled into AOC 4. The soils excavated from the Compactor Area were treated and re-used in AOC 3. The Compactor Area was restored with clean imported fill to grade.

One objective of the on-site remediation was to treat defined AOC soils to acceptable levels and utilize treated soils as backfill. Approximately 80 percent of AOC-12 soil was treated to below URUSCC concentrations for all constituents of concern and was backfilled, the remaining 20% disposed of off-site. No odorous or visible objectionable materials (e.g. debris, etc.) were used for backfilling purposes. Due to saturation of the soil from surface runoff, perched groundwater, and the application of oxidants, various sources of certified clean materials were used to amend the soil prior to backfilling to remove excess moisture and allow compaction.

The different sources included crushed stone fines, additional certified clean fill or certified clean cement kiln dust. Removal of the excess moisture assured the proper compaction of the backfilled area, and eliminated the risk for future settlement of the backfilled area. Approximately 585 tons of certified clean backfill were imported to the Site for AOC-12 to fill in void space created by soils sent off-site for disposal. Certificates of the clean backfill are provided in Supplemental Appendix M for each material used.

Approximately 320 tons of certified clean structural fill were imported to the Site to fill in the three (3) interior excavations. Certificates of the certified clean backfill are provided in Supplemental Appendix M.

5.2.22 Water Management Activities

Perched or trapped groundwater encountered during excavation activities and ponded surface water runoff were removed from the excavations via temporary sumps and transferred to temporary storage tanks (21,000 gallon storage tanks) to facilitate the removal of impacted soils to the design depth. Minor amounts of water were also generated from equipment and personnel decontamination

activities. All collected water from dewatering or decontamination was treated on-site through the existing groundwater treatment system and discharged through an existing, currently permitted outfall in accordance with effluent criteria provided in the facility's NJPDES-DSW permit. A total of 415,000 gallons of water were stored and treated as a result of rainwater collection and dewatering activities for AOCs 1-4 and a total of 152,012 gallons were stored and treated during AOC-12 RA activities.

5.3 Post-Remedial Action Activities

5.3.1 Site Restoration

All upland (non-LURP-regulated) areas disturbed by remediation activities were graded, reseeded and mulched as specified in the SESCP. Areas that were designated as wetland or transitional areas were restored in accordance with the Wetland Restoration Plan and the GP-4 Permit replanting specifications. Photographs documenting restoration activities are included as Supplemental Appendix P.

5.3.1.1 Grading and Seeding

Subsequent to Site soil treatment and backfilling activities, the Site was backfilled and graded to match pre-remediation conditions to the extent practical. All non-wetlands designated areas have been seeded in accordance with the SESCP and Morris County Soil Conservation District requirements.

5.3.1.2 Wetlands Restoration

After completion of soil remediation activities, wetlands restoration activities began, in accordance with the GP-4 Permit and approved Wetlands Restoration Plan. The plan is designed to restore the wetlands, wetland transition areas, and adjacent upland habitats that were disrupted as a necessary component of Site remediation.

Following restoration of the specified topsoil, trees, shrubs, herbaceous species and various seed mixes were planted throughout the appropriate areas. Some plants originally specified were not available during the time of restoration. As a result, Panther confirmed substitute species with the

LURP prior to installation and received approval for alternate non-invasive species. Implementation of the wetlands restoration was otherwise conducted as specified in the approved GP-4 Permit. Seed mixes, designed to meet the requirements of the Wetlands Restoration Plan, and to comply with the SESCP Plan, were used as needed throughout the restoration area.

5.4 Post-Remedial Monitoring and Reporting

Post-remedial monitoring and reporting activities, including groundwater monitoring and wetlands restoration performance monitoring is described below.

5.4.1 Post-Source Removal Groundwater Monitoring

The groundwater-monitoring program is focused on evaluating the beneficial impact that soil remediation/source removal activities are expected to have on groundwater over time in the immediate vicinity of AOCs 1 through 4 and AOC-12. The groundwater-monitoring program has been proposed under separate cover (ARCADIS, 10/6/04). As stated in ARCADIS' proposal, existing monitoring well MW-407 is used to monitor AOC-12 on an interim basis until AOC-12 soil remediation was completed. The NJDEP approved ARCADIS' proposal via email correspondence dated November 4, 2004. Additional communication with the NJDEP on the post-source removal groundwater-monitoring program, as warranted, will be conducted under the current semi-annual groundwater effectiveness monitoring and reporting program managed by ARCADIS on behalf of Airtron.

5.4.2 Wetlands Restoration Performance Monitoring

The restored wetlands areas will be monitored annually as described in the Wetland Restoration Plan. Generally, the monitoring will include fall Site inspections of the planted species survivability and overall coverage. At end of the fifth year, a comprehensive review will be conducted in accordance with the GP-4 Permit.

5.4.3 Deed Notice

Select exceedances of the URUSCC require a deed notice to be placed on portions of the property (AOCs 3 and 4) as well as wetlands and transition areas. Following completion and analysis of all

post treatment and post-excavation soil sampling results from all AOCs undergoing remediation, the results indicate that only AOCs 3 and 4 require an Environmental Deed Restriction due to minor exceedances of the URUSCC for contaminants of concern. The VOC mass remaining in soils at depths greater than 25 feet bgs and in outlying areas represent less than 5% of the total VOCs known to be present in soil and will be addressed through institutional controls where necessary.

As previously mentioned in Section 5.2.15, the excavation activities performed on New Jersey Department of Transportation (NJDOT) property were required to facilitate benching and sloping of soil sidewalls for excavation of a portion of AOC-3C (per OSHA requirements). Based on historical and pre-design investigation soil sampling results, no soil impacts were identified above the URUSCC on NJDOT property. Based on soil handling records, soil on NJDOT property excavated for this purpose was staged separately and re-used as backfill for this portion of the AOC-3C excavation (i.e., treated soils were not used as backfill). Therefore, this disturbed area representing a small are of AOC-3C on NJDOT property does not require an institutional control.

While there are some exceedances of the IGWSCC, it is noteworthy that VOC concentrations in AOCs 3 and 4 are also all less than 5 mg/kg and below the RUSCC for all contaminants of concern. These exceedances are considered de minimis concentrations and are expected to attenuate with time. The need for a deed notice due to VOC concentrations in AOCs 3 and 4 is not believed to be a significant issue in light of the fact that much of this area of the Site already has to be deed noticed from development due to its wetland status. The draft Environmental Deed Restriction has been prepared and is included in Appendix Q.

6.0 QUALITY ASSURANCE

Extensive analytical data were collected to assess the performance of the on-site treatment through the planned post-treatment soil-sampling program. All data received were independently reviewed for quality assurance (QA) purposes. Any inconsistencies found with the laboratory data packages and the Department's "Reduced Data Deliverable" package requirements were addressed with the laboratory and corrected. Sampling and analytical procedure were conducted in accordance with the TRSR and Field Sampling Procedures Manual. The Quality Assurance Report is included as Appendix O.

7.0 REMEDIAL ACTION AND O&M COSTS

The costs for remediation of the targeted soils were approximately $3,500,000 for AOCs 1-4 and $2,080,000 for AOC-12. Additional costs were incurred for off-site disposal of non-treatable soils and hazardous debris and the inclusion of out-of-scope activities including excavation and disposal activities of the Interior AOCs. The overall remedial action costs for all AOCs addressed through both phases of soil remediation activities on-site were approximately $9,080,000. In addition to overall implementation costs associated with the remedial action, approximately $25,000 per year is anticipated for maintenance of the wetlands and monitoring over the next five years. This budget does not assume costs associated with other on-site activities that may be performed that are not associated with AOCs 1-4, AOC-12, the Compactor Area or interior AOCs, such as ongoing groundwater monitoring and remediation.

8.0 CONCLUSIONS

Panther successfully treated and backfilled approximately 40,577 tons of soil impacted with chlorinated VOCs from AOC 1-4 and approximately 11,150 tons of soil from AOC-12 within a thirteen-month time frame (nine month and four month timeframes, respectively). As a result of the extensive soil remediation activities, it is estimated that over 26,000 pounds of VOCs were destroyed utilizing the chemical oxidation process. In addition, approximately 9,100 tons of hazardous soil and debris from AOCs 1-4, and 2,600 tons of non-hazardous soils from AOC-12 were removed and disposed of off-site. As expected, the soil remediation activities completed on-site have had a significant positive effect on soil quality. It is anticipated that groundwater quality will improve over time as a direct result of onsite soil remediation activities. .

In addition to soil remediation activities in AOCs 1-4, the Compactor Area and AOC-12, Airtron also elected to voluntarily address soil VOC, PAH, and metal impacts inside the building as opposed to instituting institutional or engineering controls.

All permits were maintained in compliance and any changes to the RAWP Addenda during implementation were communicated to the NJDEP in Remedial Action Progress Reports (RAPRs) during the course of remedial activities.

Ongoing activities at the Site include the re-establishment of restored wetlands in areas disturbed by the remedial action pursuant to the GP4 Permit; ongoing operation of the groundwater extraction and treatment system, which acts as an interim remedial measure (IRM) for groundwater; ongoing semi-annual effectiveness groundwater monitoring; investigation of the groundwater and ultimate development of a groundwater remedy (AOC-11); and investigation of indoor air (AOC-13).

As a result of the successful soil remediation in the referenced AOCs, a request is hereby made for NJDEP approval of a *No Further Action* determination for soils in all areas at the Site including AOCs 1, 2, 3, 4, 12, the Compactor Area, the Tool Crib, the Bridgeport Area and the Plating Room.

The final status of each AOC addressed herein and associated recommendations are summarized below:

Area Of Concern	NJDEP SCC Met	Proposed Action
AOC 1A	URUSCC	NFA
AOC 1B	IGWSCC	NFA
AOC 1C	URUSCC	NFA
AOC 2A	URUSCC	NFA
AOC 2B	IGWSCC	NFA
AOC 2C	URUSCC	NFA
AOC 3A	RUSCC	Deed Notice/Conditional NFA
AOC 3B	RUSCC	Deed Notice/Conditional NFA
AOC 3C	RUSCC	Deed Notice/Conditional NFA
AOC 3D	RUSCC	Deed Notice/Conditional NFA
AOC 4	RUSCC	Deed Notice/Conditional NFA
AOC 12	URUSCC	NFA
Compactor Area	IGWSCC	NFA
Plating Room	URUSCC	NFA
Tool Crib	URUSCC	NFA
Bridgeport Area	IGWSCC	NFA

9.0 REFERENCES

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ARCADIS Geraghty & Miller, Inc. 1999a. Site Investigation/Remedial Investigation Report Addendum, Airtron Division of Litton Systems, Inc., February 3, 1999.

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SCS Engineers. 1994. Remedial Investigation Report (Draft) for the Airtron Division of Litton Systems, Inc. Prepared for Airtron Division of Litton Systems, Inc., August 15, 1994.

SCS Engineers. 1997. Site Investigation/Remedial Investigation Work Plan for Litton - Airtron, March 31, 1997 (revised July 30, 1997).

Table 1. List of Previously Submitted Reports. Airtron, Division of Litton Systems, Inc., Morris Plains, New Jersey.

DATE	DOCUMENT TITLE	AUTHOR
August 1981	Final Report of Groundwater Monitoring Program	Converse, Ward, Davis, Dixon
1987	Soil and Groundwater Remedial Investigation, Phase I Results, Litton Industries, Inc.	Converse Environmental East
April 1990	Report on Phase II Soil and Groundwater Investigation. Prepared for Litton Industries	Converse Environmental East
March 5, 1991	Soil Vapor Extraction Test Program at Litton	SCS Engineers
December 9, 1993	Interim Remedial Measures Work Plan	SCS Engineers
August 15, 1994	Remedial Investigation Report (Draft)	SCS Engineers
March 31, 1997 (revised July 30, 1997)	Site Investigation/Remedial Investigation Work Plan	SCS Engineers
July 1, 1998	Site Investigation/Remedial Investigation and Remedial Action Selection Report	ARCADIS Geraghty & Miller
February 3, 1999	Site Investigation/Remedial Investigation Report Addendum	ARCADIS Geraghty & Miller
September 14, 1999	Supplemental Site Investigation/Remedial Investigation Report Addendum	ARCADIS Geraghty & Miller
September 14, 1999	Remedial Action Workplan	ARCADIS Geraghty & Miller
February 5, 2001	Remedial Action Workplan Addendum	ARCADIS Geraghty & Miller
October 11, 2002	AOC-6 Stream Sediment Sampling Summary	ARCADIS Geraghty & Miller
February 10, 2003	Revised RAWP Addendum (AOCs 1-4)	Panther Technologies, Inc.
May 15, 2003	AOC-11 Interim Data Summary, On-Site Source Area Activities, Phase 1 Supplemental Remedial Investigation	ARCADIS Geraghty & Miller
August 8, 2003	Phase 2 Supplemental Remedial Investigation Work Plan for AOC-6 (Stream Sediment)	ARCADIS Geraghty & Miller
October 17, 2003	Site Investigation Report	ARCADIS Geraghty & Miller
February 4, 2004	ISCO Permit by Rule AOC-12	Panther Technologies, Inc.
February 16, 2004	Proposed Delineation Activities AOC-12	Panther Technologies, Inc.
September 30, 2004	RAWP Addendum AOC-12	Panther Technologies, Inc.
October 6, 2004	Interim Summary of 2004 Source-Area Vicinity Groundwater Conditions, AOC-11 (Groundwater) Phase 1 Supplemental Remedial Investigation	ARCADIS Geraghty & Miller
October 11, 2004	Remedial Action Report AOCs 1-4	Panther Technologies, Inc.
December 10, 2004	ISCO Permit by Rule AOC-12 (Revised)	Panther Technologies, Inc.

Table 2. Sample Summary and Descriptions - AOCs 1-4 Remedial Activities. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

Samples	Sample ID	Sample Description	Lab Analysis	Number of Samples
Post-Treatment	TB1a, TB1b, etc.	samples collected from highest PID reading from each Lot	TCL VO	437
Post Excavation (pre-determined)	2B, 3B, 3C, 4X, etc.	sample location pre-determined and biased	TCL VO	13
Post Excavation (additional) (out-of-scope)	1A-09	sample collected because of over-excavation of the sidewalls of AOC-1A, sample collected from the southeast sidewall at 17' bgs	TCL VO	25
	1A-10	sample collected because of over-excavation of the sidewalls of AOC-1A, sample collected from the east sidewall at 17' bgs		
	AOC3D-NW	sample collected because of over-excavation of the base of AOC-3D, sample collected at 23' bgs		
	AOC3D-SE	sample collected because of over-excavation of the base of AOC-3D, sample collected at 23' bgs		
	CAN-5	former compactor area - north wall, dark gray discolored soil collected at 5' bgs (25 ppm)		
	CAS-6	former compactor area - south wall, dark gray discolored soil collected at 6' bgs (300 ppm)		
	CAE-5	former compactor area - east wall, dark gray discolored soil collected at 5'bgs (5 ppm)		
	CAW-6	former compactor area - west wall, dark gray discolored soil collected at 6' bgs (5 ppm)		
	CAF-10	former compactor area - floor, brown silty sand collected at 10' bgs (80 ppm)		
	CAS2-6	former compactor area - over-excavation of south wall, brown and discolored soil collected at 6' bgs (20 ppm)		
	3B21	AOC-3B base sample @ 23' bgs, green gray sand, 10 ppm		
	3B22a	AOC-3B southeast wall sample @ 1' bgs, brown silty clay, 2.7 ppm		
	3B22b	AOC-3B southeast wall sample @ 22' bgs, brown medium grained sand, 1.5 ppm		
	3B23a	AOC-3B south wall sample @ 1' bgs, brown silty clay, 7.0 ppm		
	3B23b	AOC-3B south wall sample @ 22' bgs, brown medium grained sand, 1.0 ppm		
	3B24a	AOC-3B south wall sample @ 1' bgs, gray brown silty clay, 6.5 ppm		
	3B24b	AOC-3B south wall sample @ 22' bgs, gray silty clay, 1.1 ppm		
	3B25a	AOC-3B south wall sample @ 1' bgs, brown silty sand, 0.0 ppm		
	3B25b	AOC-3B southwest wall sample @ 22' bgs, gray silty clay, 0.6 ppm		
	3B26a	AOC-3B south wall sample @ 1' bgs, brown silty sand, 0.0 ppm		
	3B26b	AOC-3B southwest wall sample @ 22' bgs, gray silty clay, 0.6 ppm		
	3B27a	AOC-3B over-excavation south wall sample @ 1' bgs, brown silty sand, 0.0 ppm		
	3B28a	AOC-3B over-excavation south wall sample @ 1' bgs, brown silty sand, 0.0 ppm		
	3B29a	AOC-3B south wall over-excavation @ 1' bgs, brown silty sand, 0.0 ppm		
	3B30a	AOC-3B south wall over-excavation @ 1' bgs, brown silty sand, 0.0 ppm		

Table 2. Sample Summary and Descriptions - AOCs 1-4 Remedial Activities. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

Samples	Sample ID	Sample Description	Lab Analysis	Number of Samples
Confirmatory Soil Collection (presumed clean)	CSC4-01, etc	samples collected from presumed clean soil from AOC-4 at 0-6 feet bgs (one sample per 100 cubic yards)	TCL VO	5
	CSC3C-01, etc.	samples collected from presumed clean soil from AOC-3C at 0-10 feet bgs (one sample per 100 cubic yards)		10
Test Pit	TP-001	AOC-3B, sampled black, high organic, and high VOC concentrated soil	TCL VO	5
	TP-001A	AOC-3B, sampled black, high organic, and high VOC concentrated soil	TCLP	
	AOC3B-SL*	sampled gray sludge at 23' bgs, PID readings around 15 ppm	TCL VO	
	AOC3B-SA	sampled green gray sand at 30' bgs, PID readings around 15 ppm	TCL VO	
	AOC3B-WT	sample green alkaline soil from waste treatment system? At 3' bgs, PID reading = 0 ppm	TCL VO & TCLP	
Anomoly	AN-AOC3D	sample collected in AOC-3D from drum waste (tar?, grease?)	PP+40	3
	AOC3D-AN2	sample collected in AOC-3D from a gray material with a hydrocarbon odor	TCLP	
	AOC3D-AN3	sample collected in AOC-3D from a gray material with a hydrocarbon odor	TCL VO	
Air	SVE-01, 02, etc.	air samples collected from the SVE system (outflow)	TO-15	11
Field Duplicate	TA, TB, TC-01, 02, etc.	duplicate samples collected from soil samples (1 per 20 samples)	TCL VO	26

Total # of samples

535

Total # of soil samples (not including field duplicate samples)

498

Field Duplicate Frequency

520

NOTES:

The table above does not include the following samples: Samples pre-dating RAWP implementation that were used as delineation and/or post-excavation samples, bench test, miscellaneous water, carbon, storm drain post-excavation, and storm drain delineation) - the storm drain investigation is not included in this RAR.

PID = Photoionization Detector
TCL VO = Target Contaminant List Volatiles
AOC = Area of Concern
bgs = below ground surface
CA = Compactor Area
CSC = Confirmatory Soil Collection
TP = Test Pit
TCLP = Toxic Characteristic Leaching Procedure
TO-15 = EPA air analysis method
* = used as a post-excavation sample

VOC = Volatile Organic Compound
SL = Sludge
SA = Sand
WT = Waste Treatment
ppm = part per million
AN = Anomoly
PP+40 = EPA Test Method
SVE = Soil Vapor Extraction

Supplemental Table 2. Sample Summary and Descriptions - AOC-12 Remedial Activities. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

Samples	Sample ID	Sample Description	Lab Analysis	Number of Samples
Post-Treatment	TB1a, TB1b, etc.	samples collected from highest PID reading from each Lot	TCL VO	133
Post Excavation (pre-determined)	AOC12- (PE1 - PE5)	sample location pre-determined and biased	TCL VO	5
Post Excavation (additional)	AOC-12 PE6	AOC-12 post excavation base sample @ 10' bgs, brown silty sand, 0.0 ppm	TCL VO	10
	AOC-12 PE7	AOC-12 post excavation base sample @ 10' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-1	AOC-12 post excavation sidewall sample @ 0-0.5" bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-2	AOC-12 post excavation sidewall sample @ 0-0.5' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-3	AOC-12 post excavation sidewall sample @ 0.5-1.0' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-4	AOC-12 post excavation sidewall sample @ 9.5-10' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-5	AOC-12 post excavation sidewall sample @ 0.5-1.0' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-6	AOC-12 post excavation sidewall sample @ 9.5-10' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-7	AOC-12 post excavation sidewall sample @ 0.5-1.0' bgs, brown silty sand, 0.0 ppm		
	AOC-12-SW-8	AOC-12 post excavation sidewall sample @ 9.5-10' bgs, brown silty sand, 0.0 ppm		
Storm Drain Test Pit Samples	TP-34	Sample collected 0-6" below original storm drain (10-10.5' bgs), same location as GP-34	TCL VO	3
	TP-36	Sample collected 0-6" below original storm drain (9.5-10.0' bgs), same location as GP-36		
	TP-37	Sample collected 0-6" below original storm drain (9-9.5' bgs), same location as GP-37		
Waste Characterization	AOC12-WC1	Waste characterization for offsite disposal of soil.	TCLP (Full Suite) & Total Metals	14
	AOC12-WC2	Waste characterization for offsite disposal of soil.	TCLP (Full Suite) & Total Metals	
	AOC12-WC3	Waste characterization for offsite disposal of soil.	TOX	
	AOC12-WC4	Waste characterization for offsite disposal of soil.	TCLP VOA, TCLP Ni, Total VOA, PCB, pH, Reactivity Cyanide, Sulfide, ignitability	
	AOC12-WC4A - 4F	Waste characterization for offsite disposal of soil.	TPH	
	PH-1 through PH-4	Additional pH sampling for soils to be disposed off offsite from AOC 12.	pH	
Waste Characterization (Plating Room)	PR-Soil (0-7)	soil from the 0-7 foot interval	TCLP Metals, RCRA Metals, & Reactivity	3
	PR-Soil (7-11)	soil from the 7-11 foot interval	TCLP Metals, RCRA Metals, & Reactivity	
	PR-PIT	concrete from the pit wrapped in fiberglass found above the high cadmium-impacted soil	TCLP Metals, RCRA Metals, & Reactivity	

Samples	Sample ID	Sample Description	Lab Analysis	Number of Samples
Waste Characterization (Plating Room)	PR-CONCRETE	concrete from the Plating Room floor	TCLP Metals, RCRA Metals, & Reactivity Cyanide	1
Field Duplicate	FD-01, 02, etc.	duplicate samples collected from soil samples (1 per 20 samples)	TCL VO	8

Total # of samples

177

Total # of soil samples (not including field duplicate samples)

169

NOTES:

The table above does not include the following samples: Samples pre-dating RAWP implementation that were used as delineation and/or post-excavation samples, bench test, miscellaneous water, carbon and storm drain delineation.

PID = Photoionization Detector
TCL VO = Target Contaminant List Volatiles
AOC = Area of Concern
bgs = below ground surface
PR = Plating Room
TP = Test Pit
TCLP = Toxic Characteristic Leaching Procedure
* = used as a post-excavation sample
VOC = Volatile Organic Compound
ppm = part per million

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
06727-001	TB1A	8/4/2003	2B	2B	0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	
06727-002	TB1B	8/4/2003	2B	2B	0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	
06727-003	TB2A	8/4/2003	2B	2B	0.507	U	0.507	U	0.507	U	0.507	U	0.507	U	0.507	U	
06727-004	TB2B	8/4/2003	2B	2B	0.546	U	0.546	U	0.546	U	0.546	U	0.546	U	0.546	U	
06727-005	TB3A	8/4/2003	2B	2B	0.521	U	0.521	U	0.521	U	0.521	U	0.521	U	0.521	U	
06727-006	TB3B	8/4/2003	2B	2B	0.599	U	0.599	U	0.599	U	0.599	U	0.599	U	0.599	U	
06727-007	TB4A	8/4/2003	2B	2B	0.424	U	0.424	U	0.424	U	0.424	U	0.424	U	0.424	U	
06727-008	TB4B	8/4/2003	2B	2B	0.550	U	0.550	U	0.550	U	0.550	U	0.550	U	0.550	U	
06968-001	TC 1A	8/11/2003	1A	1A	0.609		0.541	U	0.541	U	0.541	U	0.541	U	0.541	U	
06968-002	TC 1B	8/11/2003	1A	1A	1.24		0.431	U	0.431	U	0.431	U	0.431	U	0.431	U	
06968-003	TC 2A	8/11/2003	1A	1A	*16.4*		0.448	U	0.448	U	0.448	U	0.448	U	0.448	U	
07198-001	TC2A-R1	8/18/2003	1A	1A	*19.5*		0.955	U	0.955	U	0.955	U	0.955	U	0.955	U	
07417-003	TC2A-R2	8/25/2003	1A	1A	*10.2*		0.563	U	0.563	U	0.563	U	0.563	U	0.563	U	
07656-003	TC2A-R3	9/2/2003	1A	1A	0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	
06968-004	TC 2B	8/11/2003	1A	1A	*76.1*		0.978	U	0.978	U	0.978	U	0.978	U	0.978	U	Sample Dilution
07198-002	TC2B-R1	8/18/2003	1A	1A	3.50		0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	
06968-005	TC 3A	8/11/2003	1A	1A	*15.9*		0.453	U	0.453	U	0.453	U	0.453	U	0.453	U	
07198-003	TC3A-R1	8/18/2003	1A	1A	3.23		0.537	U	0.537	U	0.537	U	0.537	U	0.537	U	
06968-006	TC 3B	8/11/2003	1A	1A	3.85		0.502	U	0.502	U	0.502	U	0.502	U	0.502	U	
06968-007	TC 4A	8/11/2003	1A	1A	0.412	J	0.425	U	0.425	U	0.425	U	0.425	U	0.425	U	
06968-008	TC 4B	8/11/2003	1A	1A	0.961		0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	
06974-001	TA 1A	8/11/2003	1A	1A	0.541	U	0.541	U	0.541	U	0.541	U	0.541	U	0.541	U	
06974-002	TA 1B	8/11/2003	1B	1B	0.416	U	0.416	U	0.416	U	0.416	U	0.416	U	0.416	U	
06974-003	TA 2A	8/11/2003	1B	1B	0.516	U	0.516	U	0.516	U	0.516	U	0.516	U	0.516	U	
06974-004	TA 2B	8/11/2003	1B	1B	0.447	U	0.447	U	0.447	U	0.447	U	0.447	U	0.447	U	
06974-005	TA 3A	8/11/2003	1A	1B	0.470	U	0.470	U	0.470	U	0.470	U	0.470	U	0.470	U	
06974-006	TA 3B	8/11/2003	1A	1B	0.526	U	0.526	U	0.526	U	0.526	U	0.526	U	0.526	U	
06974-007	TA 4A	8/11/2003	1A	1B	0.522	U	0.522	U	0.522	U	0.522	U	0.522	U	0.522	U	
06974-008	TA 4B	8/11/2003	1A	1B	0.205	J	0.597	U	0.597	U	0.597	U	0.597	U	0.597	U	
07198-004	TC7A	8/18/2003	2A	2A	*6.97*		0.429	U	0.429	U	0.429	U	0.429	U	0.429	U	
07417-005	TC7A-R1	8/25/2003	2A	2A	0.505	U	0.505	U	0.505	U	0.505	U	0.505	U	0.505	U	
07198-005	TC7B	8/18/2003	2A	2A	0.627	U	0.627	U	0.627	U	0.627	U	0.627	U	0.627	U	
07198-006	TC8A	8/18/2003	2A	2A	0.553	U	0.553	U	0.553	U	0.553	U	0.553	U	0.553	U	
07198-007	TC8B	8/18/2003	2A	2A	0.410	U	0.410	U	0.410	U	0.410	U	0.410	U	0.410	U	
07198-008	TC6B	8/18/2003	2A	2A	*35.8*		0.444	U	0.444	U	0.444	U	0.444	U	0.444	U	Sample Dilution
07417-004	TC6B-R1	8/25/2003	2A	2A	*5.21*		0.712	U	0.712	U	0.712	U	0.712	U	0.712	U	
07656-004	TC6B-R2	9/2/2003	2A	2A	0.498	U	0.498	U	0.498	U	0.498	U	0.498	U	0.498	U	
07280-001	TB5A	8/20/2003	2A	2A	0.569	U	0.569	U	0.569	U	0.569	U	0.569	U	0.569	U	
07280-002	TB5B	8/20/2003	2A	2A	0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	
07280-003	TB6A	8/20/2003	2A	2A	0.130	J	0.446	U	0.446	U	0.446	U	0.446	U	0.446	U	
07280-004	TB6B	8/20/2003	2A	2A	*7.94*		0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	
07562-004	TB6B-R1	8/28/2003	2A	2A	1.15		0.423	U	0.423	U	0.423	U	0.423	U	0.423	U	
07280-005	TB7A	8/20/2003	2A	2A	*8.91*		0.498	U	0.498	U	0.498	U	0.498	U	0.498	U	
07562-005	TB7A-R1	8/28/2003	2A	2A	0.932		0.551	U	0.551	U	0.551	U	0.551	U	0.551	U	
07280-006	TB7B	8/20/2003	2A	2A	*6.84*		0.458	U	0.458	U	0.458	U	0.458	U	0.458	U	

-204-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
07562-006	TB7B-R1	8/28/2003	2A	2A	0.593		0.460	U	0.460	U	0.460	U	0.460	U	0.460	U	
07280-007	TB8A	8/20/2003	2A	2A	1.24		0.417	U	0.417	U	0.417	U	0.417	U	0.417	U	
07280-008	TB8B	8/20/2003	2A	2A	1.03		0.445	U	0.445	U	0.445	U	0.445	U	0.445	U	
07417-001	TC 9A	8/25/2003	4	4	0.685	J	0.311	J	0.788	U	0.788	U	0.788	U	0.788	U	
07417-002	TC 9B	8/25/2003	4	4	4.86		0.180	J	0.688	U	0.688	U	0.688	U	0.688	U	
07417-006	TC 11B	8/25/2003	4	4	0.472	U	0.472	U	0.472	U	0.472	U	0.472	U	0.472	U	
07417-007	TC 12A	8/25/2003	4	4	0.583	U	0.583	U	0.583	U	0.583	U	0.583	U	0.583	U	
07417-008	TC 12B	8/25/2003	4	4	0.462	U	0.136	J	0.462	U	0.462	U	0.462	U	0.462	U	
07562-001	TB9A	8/28/2003	2A	2A	0.380	U	0.168	J	0.380	U	0.380	U	0.380	U	0.380	U	
07562-002	TB9B	8/28/2003	4	4	0.100	J	0.242	J	0.430	U	0.430	U	0.430	U	0.430	U	
07562-003	TB10A	8/28/2003	4	4	2.73		0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	
07562-007	TB12A	8/28/2003	4	4	0.127	J	0.409	J	0.469	U	0.469	U	0.469	U	0.469	U	
07656-001	TC13A	9/2/2003	3A	2A	0.453	U	0.453	U	0.453	U	0.453	U	0.453	U	0.453	U	
07656-002	TC13B	9/2/2003	3A	2A	0.634	U	0.634	U	0.634	U	0.634	U	0.634	U	0.634	U	
07656-005	TC15A	9/2/2003	3A	2A	0.426	U	0.426	U	0.426	U	0.426	U	0.426	U	0.426	U	
07656-006	TC15B	9/2/2003	3A	2A	0.556	U	0.556	U	0.556	U	0.556	U	0.556	U	0.556	U	
07656-007	TC16A	9/2/2003	3A	2A	0.895	U	0.895	U	0.895	U	0.895	U	0.895	U	0.895	U	
07659-001	TA7A	9/2/2003	2A/4	2A	0.641	U	0.238	J	0.641	U	0.641	U	0.641	U	0.641	U	
07659-002	TA7B	9/2/2003	4	2A	0.522	U	0.204	J	0.522	U	0.522	U	0.522	U	0.522	U	
07659-003	TA8A	9/2/2003	4	2A	0.557	U	0.130	J	0.557	U	0.557	U	0.557	U	0.557	U	
07860-001	TA 5A	9/8/2003	3A	3	0.535	U	0.535	U	0.535	U	0.535	U	0.535	U	0.535	U	
07860-002	TA 5B	9/8/2003	3A	3	0.579	U	0.579	U	0.579	U	0.579	U	0.579	U	0.579	U	
07860-003	TA 6A	9/8/2003	3A	3	0.345	U	0.345	U	0.345	U	0.345	U	0.345	U	0.345	U	
07860-004	TA 6B	9/8/2003	3A	3	0.495	U	0.495	U	0.495	U	0.495	U	0.495	U	0.495	U	
07875-001	TB 13A	9/8/2003	3A	3	1.02		0.499	U	0.499	U	0.499	U	0.499	U	0.499	U	
07875-002	TB 13B	9/8/2003	3A	3	2.29		0.452	U	0.452	U	0.452	U	0.452	U	0.452	U	
07875-003	TB 14A	9/8/2003	3A	3	1.30		0.673	U	0.673	U	0.673	U	0.673	U	0.673	U	
07875-004	TB 14B	9/8/2003	3A	3	0.606		0.461	U	0.461	U	0.461	U	0.461	U	0.461	U	
07875-005	TB 15A	9/8/2003	3A	3	*6.68*		0.446	U	0.446	U	0.446	U	0.446	U	0.446	U	
08174-009	TB15A-R1	9/15/2003	3A	3	3.89		0.524	U	0.524	U	0.524	U	0.524	U	0.524	U	
07875-006	TB 15B	9/8/2003	3A	3	*8.22*		0.383	U	0.383	U	0.383	U	0.383	U	0.383	U	
08174-010	TB15B-R1	9/15/2003	3A	3	2.18		0.505	U	0.505	U	0.505	U	0.505	U	0.505	U	
07875-007	TB 16A	9/8/2003	3A	3	2.60		0.538	U	0.538	U	0.538	U	0.538	U	0.538	U	
07875-008	TB 16B	9/8/2003	3A	3	1.31		0.391	U	0.391	U	0.391	U	0.391	U	0.391	U	
08160-001	TA 11B	9/15/2003	3A	3	0.517		0.407	U	0.407	U	0.407	U	0.407	U	0.407	U	
08160-002	TA 12A	9/15/2003	3A	3	0.325	J	0.416	U	0.416	U	0.416	U	0.416	U	0.416	U	
08160-003	TA 12B	9/15/2003	3A	3	0.542		0.420	U	0.420	U	0.420	U	0.420	U	0.420	U	
08174-001	TC17A	9/15/2003	3A	3	*6.48*		0.432	U	0.432	U	0.432	U	0.432	U	0.432	U	
08382-001	TC17A-R1	9/22/2003	3A	3	*29.9*		0.628	U	0.628	U	0.628	U	0.628	U	0.628	U	Sample Dilution
08637-001	TC17A-R2	9/29/2003	3A	3	*5.89*		0.450	U	0.450	U	0.450	U	0.450	U	0.450	U	
08695-001	TC17A-R3	10/1/2003	3A	3	2.24		0.567	U	0.567	U	0.567	U	0.567	U	0.567	U	
08872-001	TC17A-R4 [2]	10/6/2003	3A/3C	3	3.31		0.474	U	0.474	U	0.474	U	0.474	U	0.474	U	
08174-002	TC17B	9/15/2003	3A	3	2.27		0.377	U	0.377	U	0.377	U	0.377	U	0.377	U	
08695-002	TC17B-R3 [2]	10/1/2003	3A	3	2.63		0.535	U	0.535	U	0.535	U	0.535	U	0.535	U	
08872-002	TC17B-R4 [2]	10/6/2003	3A/3C	3	*18.6*		0.907	U	0.907	U	0.907	U	0.907	U	0.907	U	

-205-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

Lab ID#	Panther Sample Number *	Sample Date	AOC *Origination*	AOC Sample *Destination*	CONSTITUENT: (Units in mg/kg) Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
09147-002	TC17B-R5	10/13/2003	3A/3C	3	4.89		0.462	U	0.462	U	0.462	U	0.462	U	0.462	U	
08174-003	TC18A	9/15/2003	3A	3	3.48		0.461	U	0.461	U	0.461	U	0.461	U	0.461	U	
08637-003	TC22A	9/29/2003	3A	3	*6.71*		0.556	U	0.556	U	0.556	U	0.556	U	0.556	U	
08695-003	TC18A-R3 [3]	10/1/2003	3A	3	*8.09*		0.489	U	0.489	U	0.489	U	0.489	U	0.489	U	
08872-003	TC18A-R4	10/6/2003	3A/3C	3	3.86		0.582	U	0.582	U	0.582	U	0.582	U	0.582	U	
08174-004	TC18B	9/15/2003	3A	3	*59.1*		0.155	J	0.606	U	0.606	U	0.606	U	0.606	U	Sample Dilution
08382-002	TC18B-R1	9/22/2003	3A	3	2.89		0.431	U	0.431	U	0.431	U	0.431	U	0.431	U	
08637-004	TC22B	9/29/2003	3A	3	*5.29*		0.574	U	0.574	U	0.574	U	0.574	U	0.574	U	
08695-004	TC18B-R3 [3]	10/1/2003	3A	3	2.54		0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	
08872-004	TC18B-R4 [2]	10/6/2003	3A/3C	3	3.78		0.456	U	0.456	U	0.456	U	0.456	U	0.456	U	
08174-005	TC19A	9/15/2003	3A	3	*8.67*		0.546	U	0.546	U	0.546	U	0.546	U	0.546	U	
08382-003	TC19A-R1	9/22/2003	3A	3	*5.69*		0.655	U	0.655	U	0.655	U	0.655	U	0.655	U	
08637-005	TC19A-R2	9/29/2003	3A	3	2.99		0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	
08695-005	TC19A-R3 [2]	10/1/2003	3A	3	*5.47*		0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	
08872-005	TC19A-R4	10/6/2003	3A/3C	3	*6.54*		0.568	U	0.568	U	0.568	U	0.568	U	0.568	U	
09450-003	TB19A-R5	10/22/2003	3A/3C	3	3.43		0.417	U	0.417	U	0.417	U	0.417	U	0.417	U	
08174-006	TC19B	9/15/2003	3A	3	*8.44*		0.563	U	0.563	U	0.563	U	0.563	U	0.563	U	
08382-004	TC19B-R1	9/22/2003	3A	3	*19.5*		0.519	U	0.519	U	0.519	U	0.519	U	0.519	U	
08637-006	TC19B-R2	9/29/2003	3A	3	*8.14*		0.511	U	0.511	U	0.511	U	0.511	U	0.511	U	
08695-006	TC19B-R3	10/1/2003	3A	3	*6.12*		0.616	U	0.616	U	0.616	U	0.616	U	0.616	U	
08872-006	TC19B-R4	10/6/2003	3A/3C	3	*6.75*		0.519	U	0.519	U	0.519	U	0.519	U	0.519	U	
09450-004	TB19B-R5 [4]	10/22/2003	3A/3C	3	3.82		0.439	U	0.439	U	0.439	U	0.439	U	0.439	U	
08174-007	TC20A	9/15/2003	3A	3	14.4		0.422	U	0.422	U	0.422	U	0.422	U	0.422	U	
08382-005	TC20A-R1	9/22/2003	3A	3	35.7		0.903	U	0.903	U	0.903	U	0.903	U	0.903	U	
08637-007	TC20A-R2	9/29/2003	3A	3	8.67		0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	
08695-007	TC20A-R3	10/1/2003	3A	3	3.38		0.475	U	0.475	U	0.475	U	0.475	U	0.475	U	
08872-007	TC20A-R4 [2]	10/6/2003	3A/3C	3	3.45		0.478	U	0.478	U	0.478	U	0.478	U	0.478	U	
08174-011	TB18A	9/15/2003	3A	3	1.91		0.329	U	0.329	U	0.329	U	0.329	U	0.329	U	
08174-012	TB18B	9/15/2003	3A	3	1.19		0.440	U	0.440	U	0.440	U	0.440	U	0.440	U	
08174-013	TB19A	9/15/2003	3A	3	1.58		0.433	U	0.433	U	0.433	U	0.433	U	0.433	U	
08174-014	TB19B	9/15/2003	3A	3	1.05		0.484	U	0.484	U	0.484	U	0.484	U	0.484	U	
08174-015	TB20A	9/15/2003	3A	3	1.28		0.555	U	0.555	U	0.555	U	0.555	U	0.555	U	
08388-001	TA9A	9/22/2003	3A	3	0.364	J	0.958	U	0.958	U	0.958	U	0.958	U	0.958	U	
08388-002	TA9B	9/22/2003	3A	3	1.20		0.573	U	0.573	U	0.573	U	0.573	U	0.573	U	
08388-003	TA10A	9/22/2003	3A	3	1.73		0.701	U	0.701	U	0.701	U	0.701	U	0.701	U	
08388-004	TA10B	9/22/2003	3A	3	0.297	J	0.345	U	0.345	U	0.345	U	0.345	U	0.345	U	
08626-001	TA 13A	9/29/2003	3A	3	1.50		0.742	U	0.742	U	0.742	U	0.742	U	0.742	U	
08626-002	TA 13B	9/29/2003	3A	3	0.611		0.291	U	0.291	U	0.291	U	0.291	U	0.291	U	
08626-003	TA 14A	9/29/2003	3A	3	1.06		0.692	U	0.692	U	0.692	U	0.692	U	0.692	U	
08626-004	TA 14B	9/29/2003	3A	3	0.239	J	0.704	U	0.704	U	0.704	U	0.704	U	0.704	U	
08626-005	TA 15A	9/29/2003	3A	3	0.810		0.701	U	0.701	U	0.701	U	0.701	U	0.701	U	
08626-006	TA 15B	9/29/2003	3A	3	1.33		0.643	U	0.643	U	0.643	U	0.643	U	0.643	U	
08626-007	TA 16A	9/29/2003	3A	3	*12.5*		0.199	J	0.983	U	0.983	U	0.983	U	0.983	U	
08867-007	TA16A-R1 [1]	10/6/2003	3A	3	1.55		0.437	U	0.437	U	0.437	U	0.437	U	0.437	U	
08626-008	TA 16B	9/29/2003	3A	3	0.789		0.621	U	0.621	U	0.621	U	0.621	U	0.621	U	

-206-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	CONSTITUENT: (Units in mg/kg) Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
08637-002	TC21B	9/29/2003	3A	3	4.43		0.509	U	0.509	U	0.509	U	0.509	U	0.509	U	
08637-011	TB21A	9/29/2003	3A	3	*15.5*		0.579	U	0.579	U	0.579	U	0.579	U	0.579	U	
08861-001	TB21A-R1	10/3/2003	3A	3	2.53		0.661	U	0.661	U	0.661	U	0.661	U	0.661	U	
08637-012	TB21B	9/29/2003	3A	3	*43.0*		0.527	U	0.527	U	0.527	U	0.527	U	0.527	U	
08861-002	TB21B-R1	10/3/2003	3A	3	3.51		0.631	U	0.631	U	0.631	U	0.631	U	0.631	U	
08637-013	TB22A	9/29/2003	3A	3	*31.3*		0.497	U	0.497	U	0.497	U	0.497	U	0.497	U	
08861-003	TB22A-R1	10/3/2003	3A	3	*17.8*		0.122	J	0.568	U	0.568	U	0.568	U	0.568	U	
09094-003	TB22A-R2	10/10/2003	3A	3	3.95		0.378	U	0.378	U	0.378	U	0.378	U	0.378	U	
08637-014	TB22B	9/29/2003	3A	3	*17.6*		0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	
08861-004	TB22B-R1	10/3/2003	3A	3	*10.4*		0.487	U	0.487	U	0.487	U	0.487	U	0.487	U	
09094-004	TB22B-R2	10/10/2003	3A	3	3.64		0.410	U	0.410	U	0.410	U	0.410	U	0.410	U	
08637-015	TB23A	9/29/2003	3A	3	*6.07*		0.586	U	0.586	U	0.586	U	0.586	U	0.586	U	
08861-005	TB23A-R1	10/3/2003	3A	3	*56.2*		0.699	U	0.699	U	0.699	U	0.699	U	0.699	U	Sample Dilution
09094-005	TB23A-R2	10/10/2003	3A	3	*36.5*		0.414	U	0.414	U	0.414	U	0.414	U	0.414	U	Sample Dilution
09260-005	TB23A-R3	10/15/2003	3A	3	*6.83*		0.446	U	0.446	U	0.446	U	0.446	U	0.446	U	
09450-005	TB23A-R4	10/22/2003	3A	3	*8.32*		0.423	U	0.423	U	0.423	U	0.423	U	0.423	U	
09597-001	TB23A-R5	10/27/2003	3A	3	3.73		0.488	U	0.488	U	0.488	U	0.488	U	0.488	U	
08637-016	TB23B	9/29/2003	3A	3	*13.6*		0.396	U	0.396	U	0.396	U	0.396	U	0.396	U	
08861-006	TB23B-R1	10/3/2003	3A	3	*21.5*		0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	Sample Dilution
09094-006	TB23B-R2	10/10/2003	3A	3	*27.4*		0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	Sample Dilution
09260-006	TB23B-R3	10/15/2003	3A	3	*11.6*		0.418	U	0.418	U	0.418	U	0.418	U	0.418	U	
09450-006	TB23B-R4	10/22/2003	3A	3	*10.7*		0.489	U	0.489	U	0.489	U	0.489	U	0.489	U	
09597-002	TB23B-R5	10/27/2003	3A	3	*7.37*		0.464	U	0.464	U	0.464	U	0.464	U	0.464	U	
09852-006	TB23B-R6	11/3/2003	3A	3	*6.67*		0.333	U	0.333	U	0.333	U	0.333	U	0.333	U	
10138-006	TB23B-R7	11/10/2003	3A	3	*7.15*		0.583	U	0.583	U	0.583	U	0.583	U	0.583	U	
10367-006	TB23B-R8	11/17/2003	3A	3	2.73		0.401	U	0.401	U	0.401	U	0.401	U	0.401	U	
08637-017	TB24A	9/29/2003	3A	3	1.69		0.537	U	0.537	U	0.537	U	0.537	U	0.537	U	
08861-007	TB24A-R1 [2]	10/3/2003	3A	3	*20.8*		0.644	U	0.644	U	0.644	U	0.644	U	0.644	U	
09094-007	TB24A-R2	10/10/2003	3A	3	*9.57*		0.546	U	0.546	U	0.546	U	0.546	U	0.546	U	
09260-007	TB24A-R3	10/15/2003	3A	3	*14.7*		0.540	U	0.540	U	0.540	U	0.540	U	0.540	U	Sample Dilution
09450-007	TB24A-R4	10/22/2003	3A	3	*7.48*		0.295	U	0.295	U	0.295	U	0.295	U	0.295	U	
09597-003	TB24A-R5	10/27/2003	3A	3	*8.52*		0.494	U	0.494	U	0.494	U	0.494	U	0.494	U	
09852-007	TB24A-R6	11/3/2003	3A	3	*7.01*		0.448	U	0.448	U	0.448	U	0.448	U	0.448	U	
10138-007	TB24A-R7	11/10/2003	3A	3	3.60		0.548	U	0.548	U	0.548	U	0.548	U	0.548	U	
08637-018	TB24B	9/29/2003	3A	3	*9.02*		0.441	U	0.441	U	0.441	U	0.441	U	0.441	U	
08861-008	TB24B-R1	10/3/2003	3A	3	*28.9*		0.681	U	0.681	U	0.681	U	0.681	U	0.681	U	Sample Dilution
09094-008	TB24B-R2	10/10/2003	3A	3	*11.6*		0.517	U	0.517	U	0.517	U	0.517	U	0.517	U	
09260-008	TB24B-R3	10/15/2003	3A	3	*10.0*		0.284	U	0.284	U	0.284	U	0.284	U	0.284	U	
09450-008	TB24B-R4	10/22/2003	3A	3	*5.04*		0.322	U	0.322	U	0.322	U	0.322	U	0.322	U	
09597-004	TB24B-R5	10/27/2003	3A	3	4.74		0.416	U	0.416	U	0.416	U	0.416	U	0.416	U	
08867-001	TA17A [1]	10/6/2003	3C/3D	3	*58.0*		0.611	U	0.611	U	0.611	U	0.611	U	0.611	U	Sample Dilution
09143-001	TA17A-R1	10/13/2003	3C/3D	3	*31.2*		0.567	U	0.567	U	0.567	U	0.567	U	0.567	U	Sample Dilution
09369-001	TA17A-R2	10/20/2003	3C/3D	3	*21.5*		0.639	U	0.639	U	0.639	U	0.639	U	0.639	U	
09520-001	TA17A-R3	10/24/2003	3C/3D	3	*10.7*		0.513	U	0.513	U	0.513	U	0.513	U	0.513	U	
09721-001	TA17A-R4	10/30/2003	3C/3D	3	*12.4*		0.548	U	0.548	U	0.548	U	0.548	U	0.548	U	

-207-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	CONSTITUENT: (Units in mg/kg) Tetrachloroethylene	Q	Trichloroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
10131-005	TC17A-R5 [6]	11/10/2003	3C/3D	3	1.12		0.480	U	0.480	U	0.480	U	0.480	U	0.480	U	
08867-002	TA17B [1]	10/6/2003	3C/3D	3	*68.8*		0.495	U	0.495	U	0.495	U	0.495	U	0.495	U	Sample Dilution
09143-002	TA17B-R1	10/13/2003	3C/3D	3	*18.8*		0.521	U	0.521	U	0.521	U	0.521	U	0.521	U	
09369-002	TA17B-R2	10/20/2003	3C/3D	3	*12.6*		0.601	U	0.601	U	0.601	U	0.601	U	0.601	U	
09520-002	TA17B-R3	10/24/2003	3C/3D	3	*20.9*		0.440	U	0.440	U	0.440	U	0.440	U	0.440	U	Sample Dilution
09721-002	TA17B-R4	10/30/2003	3C/3D	3	*9.35*		0.498	U	0.498	U	0.498	U	0.498	U	0.498	U	
10367-001	TB17B-R5 [7]	11/17/2003	3C/3D	3	2.44		0.539	U	0.539	U	0.539	U	0.539	U	0.539	U	
08867-003	TA18A [1]	10/6/2003	3C/3D	3	*19.0*		0.480	U	0.480	U	0.480	U	0.480	U	0.480	U	
09143-003	TA18A-R1	10/13/2003	3C/3D	3	3.95		0.503	U	0.503	U	0.503	U	0.503	U	0.503	U	
08867-004	TA18B [1]	10/6/2003	3C/3D	3	*26.1*		0.546	U	0.546	U	0.546	U	0.546	U	0.546	U	Sample Dilution
09143-004	TA18B-R1	10/13/2003	3C/3D	3	3.32		0.488	U	0.488	U	0.488	U	0.488	U	0.488	U	
08867-005	TA19A [1]	10/6/2003	3C/3D	3	2.09		0.492	U	0.492	U	0.492	U	0.492	U	0.492	U	
08867-006	TA19B [1]	10/6/2003	3C/3D	3	1.10		0.377	U	0.377	U	0.377	U	0.377	U	0.377	U	
08867-008	TA20B [1]	10/6/2003	3C/3D	3	1.24		0.666	U	0.666	U	0.666	U	0.666	U	0.666	U	
09094-001	TB25A	10/10/2003	3D	3	*23.5*		0.952	U	0.952	U	0.952	U	0.952	U	0.952	U	Sample Dilution
09260-001	TB25A-R1	10/15/2003	3D	3	*63.4*		0.129	J	0.455	U	0.455	U	0.455	U	0.455	U	Sample Dilution
09450-001	TB25A-R2	10/22/2003	3D	3	*8.58*		0.390	U	0.390	U	0.390	U	0.390	U	0.390	U	
09597-005	TB25A-R3	10/27/2003	3D	3	4.17		0.485	U	0.485	U	0.485	U	0.485	U	0.485	U	
09094-002	TB25B	10/10/2003	3D	3	*6.15*		0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	
09260-002	TB25B-R1	10/15/2003	3D	3	*8.01*		0.435	U	0.435	U	0.435	U	0.435	U	0.435	U	
09450-002	TB25B-R2	10/22/2003	3D	3	*18.1*		0.529	U	0.529	U	0.529	U	0.529	U	0.529	U	
09597-006	TB25B-R3	10/27/2003	3D	3	3.41		0.432	U	0.432	U	0.432	U	0.432	U	0.432	U	
09143-005	TA23A	10/13/2003	3D	3	2.06		0.438	U	0.438	U	0.438	U	0.438	U	0.438	U	
09143-006	TA23B	10/13/2003	3D	3	2.10		0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	
09143-007	TA24A	10/13/2003	3D	3	0.620		0.459	U	0.459	U	0.459	U	0.459	U	0.459	U	
09143-008	TA24B	10/13/2003	3D	3	1.16		0.455	U	0.455	U	0.455	U	0.455	U	0.455	U	
09147-001	TC25A	10/13/2003	3D	3	2.61		0.463	U	0.463	U	0.463	U	0.463	U	0.463	U	
09147-003	TC26A	10/13/2003	3D	3	*8.25*		0.536	U	0.536	U	0.536	U	0.536	U	0.536	U	
09365-003	TC26A-R1	10/20/2003	3D	3	2.29		0.422	U	0.422	U	0.422	U	0.422	U	0.422	U	
09147-004	TC26B	10/13/2003	3D	3	4.33		0.420	U	0.420	U	0.420	U	0.420	U	0.420	U	
09147-005	TC27A	10/13/2003	3D	3	2.66		0.451	U	0.451	U	0.451	U	0.451	U	0.451	U	
09147-006	TC27B	10/13/2003	3D	3	2.67		0.424	U	0.424	U	0.424	U	0.424	U	0.424	U	
09147-007	TC28A	10/13/2003	3D	3	2.47		0.431	U	0.431	U	0.431	U	0.431	U	0.431	U	
09147-008	TC28B	10/13/2003	3D	3	0.703		0.450	U	0.450	U	0.450	U	0.450	U	0.450	U	
09260-003	TB26A	10/15/2003	3D	3	3.01		0.420	U	0.420	U	0.420	U	0.420	U	0.420	U	
09260-004	TB26B	10/15/2003	3D	3	1.67		0.505	U	0.505	U	0.505	U	0.505	U	0.505	U	
09365-001	TC29A	10/20/2003	3C	3	1.98		0.520	U	0.520	U	0.520	U	0.520	U	0.520	U	
09365-002	TC29B	10/20/2003	3C	3	2.04		0.457	U	0.457	U	0.457	U	0.457	U	0.457	U	
09365-004	TC30B	10/20/2003	3D	3	4.52		0.502	U	0.502	U	0.502	U	0.502	U	0.502	U	
09365-005	TC31A	10/20/2003	3D	3	1.16		0.528	U	0.528	U	0.528	U	0.528	U	0.528	U	
09365-006	TC31B	10/20/2003	3D	3	2.95		0.535	U	0.535	U	0.535	U	0.535	U	0.535	U	
09365-007	TC32A	10/20/2003	3D	3	4.53		0.406	J	0.633	U	0.633	U	0.633	U	0.633	U	
09365-008	TC32B	10/20/2003	3D/3C	3	1.50		0.460	U	0.460	U	0.460	U	0.460	U	0.460	U	
09369-003	TA26A	10/20/2003	3C	3	*10.9*		0.497	U	0.497	U	0.497	U	0.497	U	0.497	U	
09520-003	TA26A-R1	10/24/2003	3C	3	4.49		0.455	U	0.455	U	0.455	U	0.455	U	0.455	U	

-208-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
09369-004	TA26B	10/20/2003	3C	3	4.85		0.638	U	0.638	U	0.638	U	0.638	U	0.638	U	
09369-005	TA27A	10/20/2003	3C	3	*12.9*		0.580	J	0.672	U	0.672	U	0.672	U	0.672	U	
09520-004	TA27A-R1	10/24/2003	3C	3	2.43		0.226	J	0.413	U	0.413	U	0.413	U	0.413	U	
09369-006	TA27B	10/20/2003	3C	3	*6.59*		0.135	J	0.415	U	0.415	U	0.415	U	0.415	U	
09520-005	TA27B-R1	10/24/2003	3C	3	0.554		0.449	U	0.449	U	0.449	U	0.449	U	0.449	U	
09369-007	TA28A	10/20/2003	3C	3	1.49		0.163	J	0.612	U	0.612	U	0.612	U	0.612	U	
09369-008	TA28B	10/20/2003	3C	3	0.748		0.309	J	0.465	U	0.465	U	0.465	U	0.465	U	
09520-006	TA32A	10/24/2003	3C	3	1.35		0.498	U	0.498	U	0.498	U	0.498	U	0.498	U	
09520-007	TA32B	10/24/2003	3C	3	1.67		0.423	U	0.423	U	0.423	U	0.423	U	0.423	U	
09593-001	TC33A	10/27/2003	3D	3	*19.2*		0.512	U	0.512	U	0.512	U	0.512	U	0.512	U	
09839-001	TC33A-R1	11/3/2003	3D	3	1.67		0.603		0.484	U	0.484	U	0.484	U	0.484	U	
09593-002	TC33B	10/27/2003	3D	3	2.21		0.171	J	0.396	U	0.396	U	0.396	U	0.396	U	
09593-003	TC34A	10/27/2003	3C	3	0.550		0.582		0.439	U	0.439	U	0.439	U	0.439	U	
09593-004	TC34B	10/27/2003	3C	3	0.279	J	0.682		0.522	U	0.522	U	0.522	U	0.522	U	
09593-005	TC35A	10/27/2003	3C	3	4.13		0.389	U	0.389	U	0.389	U	0.389	U	0.389	U	
09593-006	TC35B	10/27/2003	3C	3	0.720		0.454	U	0.454	U	0.454	U	0.454	U	0.454	U	
09593-007	TC36A	10/27/2003	3C	3	1.33		0.476	U	0.476	U	0.476	U	0.476	U	0.476	U	
09593-008	TC36B	10/27/2003	3C	3	1.96		0.501	U	0.501	U	0.501	U	0.501	U	0.501	U	
09721-003	TA34A	10/30/2003	3C	3	2.81		0.383	U	0.383	U	0.383	U	0.383	U	0.383	U	
09721-004	TA34B	10/30/2003	3C	3	2.09		0.271	J	0.417	U	0.417	U	0.417	U	0.417	U	
09834-001	TA35A	11/3/2003	3D	3	1.19		2.03		0.454	U	0.454	U	0.454	U	0.454	U	
09834-002	TA35B	11/3/2003	3D	3	0.738		0.483	U	0.483	U	0.483	U	0.483	U	0.483	U	
09834-003	TA36A	11/3/2003	3D	3	*11.2*		0.332	J	0.555	U	0.555	U	0.555	U	0.555	U	
10075-003	TA36A-R1	11/7/2003	3D	3	0.781		0.537	U	0.537	U	0.537	U	0.537	U	0.537	U	
09834-004	TA36B	11/3/2003	3D	3	1.40		0.458	U	0.458	U	0.458	U	0.458	U	0.458	U	
09839-002	TC37B	11/3/2003	3C	3	0.189	J	0.530	U	0.530	U	0.530	U	0.530	U	0.530	U	
09839-003	TC38A	11/3/2003	3D	3	0.661	U	0.661	U	0.661	U	0.661	U	0.661	U	0.661	U	
09839-004	TC38B	11/3/2003	3D	3	0.174	J	0.512	U	0.512	U	0.512	U	0.512	U	0.512	U	
09839-005	TC39A	11/3/2003	3D	3	0.286	J	0.537	U	0.537	U	0.537	U	0.537	U	0.537	U	
09839-006	TC39B	11/3/2003	3D	3	0.491	J	0.514	U	0.514	U	0.514	U	0.514	U	0.514	U	
09839-007	TC40A	11/3/2003	3D	3	0.833		0.503	U	0.503	U	0.503	U	0.503	U	0.503	U	
09839-008	TC40B	11/3/2003	3D	3	0.846		0.517	U	0.517	U	0.517	U	0.517	U	0.517	U	
09852-001	TB29A	11/3/2003	3D	3	4.23		0.619	U	0.619	U	0.619	U	0.619	U	0.619	U	FielSample Dilution Sample Dilutionuplicate sample
10138-001	TB29A-R1	11/10/2003	3D	3	4.91		0.545	U	0.545	U	0.545	U	0.545	U	0.545	U	faileSample Dilution
09852-002	TB29B	11/3/2003	3D	3	*5.15*		0.417	U	0.417	U	0.417	U	0.417	U	0.417	U	
10138-002	TB29B-R1	11/10/2003	3D	3	*12.8*		0.445	U	0.445	U	0.445	U	0.445	U	0.445	U	
10367-002	TB29B-R2	11/17/2003	3D	3	*5.31*		0.502	U	0.502	U	0.502	U	0.502	U	0.502	U	
10547-002	TB29B-R3	11/21/2003	3D	3	*6.81*		0.480	U	0.480	U	0.480	U	0.480	U	0.480	U	
10727-002	TB29B-R4	12/1/2003	3D	3	1.84		0.448	U	0.448	U	0.448	U	0.448	U	0.448	U	
09852-003	TB30A	11/3/2003	3D	3	*6.38*		0.420	U	0.420	U	0.420	U	0.420	U	0.420	U	
10138-003	TB30A-R1	11/10/2003	3D	3	*7.51*		0.452	U	0.452	U	0.452	U	0.452	U	0.452	U	
10367-003	TB30A-R2	11/17/2003	3D	3	*8.92*		0.554	U	0.554	U	0.554	U	0.554	U	0.554	U	
10547-003	TB30A-R3	11/21/2003	3D	3	1.64		0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	
09852-004	TB30B	11/3/2003	3D	3	*6.88*		0.502	U	0.502	U	0.502	U	0.502	U	0.502	U	
10138-004	TB30B-R1	11/10/2003	3D	3	*6.20*		0.503	U	0.503	U	0.503	U	0.503	U	0.503	U	

-209-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
10367-004	TB30B-R2	11/17/2003	3D	3	*6.59*		0.551	U	0.551	U	0.551	U	0.551	U	0.551	U	
10547-004	TB30B-R3	11/21/2003	3D	3	4.12		0.653	U	0.653	U	0.653	U	0.653	U	0.653	U	
09852-005	TB31A	11/3/2003	3D	3	*13.3*		0.447	U	0.447	U	0.447	U	0.447	U	0.447	U	
10138-005	TB31A-R1	11/10/2003	3D	3	*15.6*		0.566	U	0.566	U	0.566	U	0.566	U	0.566	U	
10367-005	TB31A-R2	11/17/2003	3D	3	4.57		0.505	U	0.505	U	0.505	U	0.505	U	0.505	U	
09852-008	TB32B	11/3/2003	3D	3	2.71		0.414	U	0.414	U	0.414	U	0.414	U	0.414	U	
09949-001	TA37A	11/5/2003	3D	3	0.601		0.544	U	0.544	U	0.544	U	0.544	U	0.544	U	
09949-002	TA37B	11/5/2003	3D	3	2.06		0.517	U	0.517	U	0.517	U	0.517	U	0.517	U	
09949-003	TA38A	11/5/2003	3D	3	*5.43*		0.511	U	0.511	U	0.511	U	0.511	U	0.511	U	
10147-003	TA38A-R1	11/10/2003	3D	3	3.35		0.451	U	0.451	U	0.451	U	0.451	U	0.451	U	
09949-004	TA38B	11/5/2003	3D	3	4.59		0.487	U	0.487	U	0.487	U	0.487	U	0.487	U	
10075-001	TA39A	11/7/2003	3D	3	0.217	J	0.493	U	0.493	U	0.493	U	0.493	U	0.493	U	
10075-002	TA39B	11/7/2003	3D	3	0.826		0.543	U	0.543	U	0.543	U	0.543	U	0.543	U	
10075-004	TA40B	11/7/2003	3D	3	0.921		0.514	U	0.514	U	0.514	U	0.514	U	0.514	U	
10131-001	TC41A	11/10/2003	3B	3	0.279	J	0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	
10131-002	TC41B	11/10/2003	3B	3	0.641		0.453	U	0.453	U	0.453	U	0.453	U	0.453	U	
10131-003	TC42A	11/10/2003	3B	3	0.261	J	0.395	U	0.395	U	0.395	U	0.395	U	0.395	U	
10131-004	TC42B	11/10/2003	3B	3	0.766		0.508	U	0.508	U	0.508	U	0.508	U	0.508	U	
10131-006	TC43B	11/10/2003	3B	3	3.40		0.568	U	0.568	U	0.568	U	0.568	U	0.568	U	
10131-007	TC44A	11/10/2003	3B	3	1.11		0.523	U	0.523	U	0.523	U	0.523	U	0.523	U	
10131-008	TC44B	11/10/2003	3B	3	0.322	J	0.569	U	0.569	U	0.569	U	0.569	U	0.569	U	
10138-008	TB36B	11/10/2003	3B	3	0.705		0.494	U	0.494	U	0.494	U	0.494	U	0.494	U	
10147-001	TA41A	11/10/2003	3D/3B	3	1.07		0.497	U	0.497	U	0.497	U	0.497	U	0.497	U	
10147-002	TA41B	11/10/2003	3D/3B	3	1.33		0.538	U	0.538	U	0.538	U	0.538	U	0.538	U	
10147-004	TA42B	11/10/2003	3D/3B	3	2.00		0.440	U	0.440	U	0.440	U	0.440	U	0.440	U	
10308-001	TA43A	11/14/2003	3D	3	0.462	J	0.484	U	0.484	U	0.484	U	0.484	U	0.484	U	
10308-002	TA43B	11/14/2003	3D	3	0.192	J	0.467	U	0.467	U	0.467	U	0.467	U	0.467	U	
10308-003	TA44A	11/14/2003	3D	3	0.611		0.510	U	0.510	U	0.510	U	0.510	U	0.510	U	
10308-004	TA44B	11/14/2003	3D	3	0.588		0.490	U	0.490	U	0.490	U	0.490	U	0.490	U	
10367-007	TB40A	11/17/2003	3D	3	1.83		0.151	J	0.348	J	0.556	U	0.556	U	0.556	U	
10367-008	TB40B	11/17/2003	3D	3	2.28		0.185	J	0.994		0.555	U	0.555	U	0.555	U	
10376-001	TC45A	11/17/2003	3D	3	0.457	J	0.871	U	0.871	U	0.871	U	0.871	U	0.871	U	
10376-002	TC45B	11/17/2003	3D	3	0.412	J	0.471	U	0.471	U	0.471	U	0.471	U	0.471	U	
10376-003	TC46A	11/17/2003	3D	3	0.237	J	0.628	U	0.628	U	0.628	U	0.628	U	0.628	U	
10376-004	TC46B	11/17/2003	3D	3	0.330	J	0.608	U	0.608	U	0.608	U	0.608	U	0.608	U	
10376-005	TC47A	11/17/2003	3D	3	0.435	J	0.583	U	0.583	U	0.583	U	0.583	U	0.583	U	
10376-006	TC47B	11/17/2003	3D	3	0.367	J	0.681	U	0.681	U	0.681	U	0.681	U	0.681	U	
10376-007	TC48A	11/17/2003	3D	3	0.708	J	0.754	U	0.754	U	0.754	U	0.754	U	0.754	U	
10376-008	TC48B	11/17/2003	3D	3	1.87		0.628	U	0.628	U	0.628	U	0.628	U	0.628	U	
10377-001	TA45A	11/17/2003	3D/3C	3	1.56		0.134	J	0.588	U	0.588	U	0.588	U	0.588	U	
10377-002	TA45B	11/17/2003	3D/3C	3	1.60		0.115	J	0.433	U	0.433	U	0.433	U	0.433	U	
10377-003	TA46A	11/17/2003	3D/3C	3	0.724		0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	
10377-004	TA46B	11/17/2003	3D/3C	3	0.391	J	0.573	U	0.573	U	0.573	U	0.573	U	0.573	U	
10547-001	TB41A	11/21/2003	3C	3	1.77		0.148	J	0.564	U	0.564	U	0.564	U	0.564	U	
10547-005	TB43A	11/21/2003	3C	3	1.02		1.95		0.516	U	0.516	U	0.516	U	0.516	U	

-210-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
10547-006	TB43B	11/21/2003	3C	3	1.11		3.90		0.600	U	0.600	U	0.600	U	0.600	U	
10547-007	TB44A	11/21/2003	3C	3	0.798		*12.0*		0.464	U	0.464	U	0.464	U	0.464	U	
10727-007	TB44A-R1	12/1/2003	3C	3	1.20		*55.7*	le Di	0.607	U	0.607	U	0.607	U	0.607	U	Sample Dilution
10977-007	TA44A-R2 [5]	12/8/2003	3C	3	0.601		2.81		0.502	U	0.502	U	0.502	U	0.502	U	
10547-008	TB44B	11/21/2003	3C	3	2.83		*61.0*		0.822	U	0.822	U	0.822	U	0.822	U	Sample Dilution
10727-008	TB44B-R1	12/1/2003	3C	3	1.22		*14.8*		0.783	U	0.783	U	0.783	U	0.783	U	
10977-008	TA44B-R2 [5]	12/8/2003	3C	3	1.12		*6.99*		0.524	U	0.524	U	0.524	U	0.524	U	
11545-008	TA44B-R3	12/29/2003	3C	3	0.777		*5.12*		0.461	U	0.461	U	0.461	U	0.461	U	
00036-004	TC44B-R4 [8]	1/5/2004	3C	3	0.761		2.39		0.641	U	0.641	U	0.641	U	0.641	U	
10590-001	TA49A	11/24/2003	3C	3	4.41		*6.79*		*26.1*		0.719	U	0.719	U	0.259	J	
10733-001	TA49A-R1	12/1/2003	3C	3	0.970		0.395	J	0.459	U	0.459	U	0.459	U	0.459	U	
10590-002	TA49B	11/24/2003	3C	3	*5.43*		*5.46*		0.516	J	0.617	U	0.617	U	0.617	U	
10733-002	TA49B-R1	12/1/2003	3C	3	0.971		1.97		0.135	J	0.497	U	0.497	U	0.497	U	
10590-003	TA50A	11/24/2003	3C	3	1.71		*5.56*		0.270	J	0.524	U	0.524	U	0.524	U	
10733-003	TA50A-R1	12/1/2003	3C	3	0.797		1.94		0.490	U	0.490	U	0.490	U	0.490	U	
10590-004	TA50B	11/24/2003	3C	3	1.96		*24.3*		0.136	J	0.622	U	0.622	U	0.622	U	Sample Dilution
10733-004	TA50B-R1	12/1/2003	3C	3	0.882		*7.59*		0.395	U	0.395	U	0.395	U	0.395	U	
10977-004	TA50B-R2	12/8/2003	3C	3	0.630		1.55		0.429	U	0.429	U	0.429	U	0.429	U	
10591-001	TA47A	11/24/2003	3C	3	0.671	J	0.821		0.164	J	0.764	U	0.764	U	0.764	U	
10591-002	TA47B	11/24/2003	3C	3	0.744		0.224	J	0.609	U	0.609	U	0.609	U	0.609	U	
10591-003	TA48A	11/24/2003	3C	3	0.608		0.735		0.607	U	0.607	U	0.607	U	0.607	U	
10591-004	TA48B	11/24/2003	3C	3	0.553	J	0.285	J	0.569	U	0.569	U	0.569	U	0.569	U	
10598-001	TC49A	11/24/2003	3B	3	*7.56*		0.164	J	0.312	J	0.645	U	0.645	U	0.645	U	
10881-001	TC49A-R1	12/4/2003	3B	3	1.24		0.589	U	0.589	U	0.589	U	0.589	U	0.589	U	
10598-002	TC49B	11/24/2003	3B	3	0.998		0.721	U	0.721	U	0.721	U	0.721	U	0.721	U	
10598-003	TC50A	11/24/2003	3B	3	0.862		0.618	U	0.618	U	0.618	U	0.618	U	0.618	U	
10598-004	TC50B	11/24/2003	3B	3	2.57		0.496	U	0.496	U	0.496	U	0.496	U	0.496	U	
10598-005	TC51A	11/24/2003	3B	3	0.382	J	0.593	U	0.593	U	0.593	U	0.593	U	0.593	U	
10598-006	TC51B	11/24/2003	3B	3	1.07		0.645	U	0.645	U	0.645	U	0.645	U	0.645	U	
10598-007	TC52A	11/24/2003	3B	3	0.834		0.565	U	0.565	U	0.565	U	0.565	U	0.565	U	
10727-001	TB45A	12/1/2003	3B	3	0.771		0.608	U	0.608	U	0.608	U	0.608	U	0.608	U	
10727-003	TB46A	12/1/2003	3B	3	1.32		0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	
10727-004	TB46B	12/1/2003	3B	3	1.48		0.518	U	0.518	U	0.518	U	0.518	U	0.518	U	
10727-005	TB47A	12/1/2003	3B	3	0.724		0.572	U	0.572	U	0.572	U	0.572	U	0.572	U	
10727-006	TB47B	12/1/2003	3B	3	0.992		3.36		0.485	U	0.485	U	0.485	U	0.485	U	
10733-005	TA51A	12/1/2003	3B	3	3.96		0.191	J	0.227	J	0.529	U	0.529	U	0.529	U	
10733-006	TA51B	12/1/2003	3B	3	2.11		0.615	U	0.615	U	0.615	U	0.615	U	0.615	U	
10733-007	TA52A	12/1/2003	3B	3	*12.0*		0.358	J	0.494	U	0.494	U	0.494	U	0.494	U	
10977-006	TA52A-R1	12/8/2003	3B	3	0.772		3.17		0.727	U	0.727	U	0.727	U	0.727	U	
10733-008	TA52B	12/1/2003	3B	3	1.27		0.460	U	0.460	U	0.460	U	0.460	U	0.460	U	
10881-002	TC53B	12/4/2003	3B	3	2.19		0.633	U	0.633	U	0.633	U	0.633	U	0.633	U	
10881-003	TC54A	12/4/2003	3B	3	2.70		0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	
10881-004	TC54B	12/4/2003	3B	3	*7.39*		*0.515*	*U*	*0.515*	*U*	*0.515*	*U*	*0.515*	*U*	*0.515*	*U*	
11548-004	TC54B-R1	12/29/2003	3B	3	0.380		0.275		0.499	U	0.499	U	0.499	U	0.499	U	
10881-005	TC55A	12/4/2003	3B	3	1.14		0.424	U	0.424	U	0.424	U	0.424	U	0.424	U	

-211-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
10881-006	TC55B	12/4/2003	3B	3	1.53		0.578	U	0.128		0.578	U	0.578	U	0.578	U	
10881-007	TC56A	12/4/2003	3B	3	2.84		0.651	U	0.651	U	0.651	U	0.651	U	0.651	U	
10881-008	TC56B	12/4/2003	3B	3	1.41		0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	
10977-001	TA53A	12/8/2003	3B	3	0.266		0.516	U	0.516	U	0.516	U	0.516	U	0.516	U	
10977-002	TA53B	12/8/2003	3B	3	1.00		0.098		0.416	U	0.416	U	0.416	U	0.416	U	
10977-003	TA54A	12/8/2003	3B	3	1.67		0.557		0.540	U	0.540	U	0.540	U	0.540	U	
10977-005	TA55A	12/8/2003	3B	3	2.02		0.152		0.508	U	0.508	U	0.508	U	0.508	U	
11545-001	TA57A	12/29/2003	3C	3	0.649		3.50		0.568	U	0.568	U	0.568	U	0.568	U	
11545-002	TA57B	12/29/2003	3C	3	0.859		1.20		0.570	U	0.570	U	0.570	U	0.570	U	
11545-003	TA58A	12/29/2003	3C	3	0.963		1.85		0.506	U	0.506	U	0.506	U	0.506	U	
11545-004	TA58B	12/29/2003	3C	3	0.899		2.51		0.540	U	0.540	U	0.540	U	0.540	U	
11545-006	TA59B	12/29/2003	3C	3	2.29		0.478	U	0.478	U	0.478	U	0.478	U	0.478	U	
11547-001	TB49A	12/29/2003	3C	3	0.503	U	4.77		0.503	U	0.503	U	0.503	U	0.503	U	
11547-002	TB49B	12/29/2003	3C	3	0.484		2.36		0.444	U	0.444	U	0.444	U	0.444	U	
11547-003	TB50A	12/29/2003	3C	3	0.376		4.91		0.441	U	0.441	U	0.441	U	0.441	U	
11547-004	TB50B	12/29/2003	3C	3	0.366		2.76		0.526	U	0.526	U	0.526	U	0.526	U	
11548-001	TC57A	12/29/2003	3C	3	1.01		1.43		2.31		0.580	U	0.580	U	0.580	U	
11548-002	TC57B	12/29/2003	3C	3	0.507		0.601		0.402	U	0.402	U	0.402	U	0.402	U	
11548-003	TC58A	12/29/2003	3C	3	0.376		0.419	U	0.419	U	0.419	U	0.419	U	0.419	U	
11548-005	TC59A	12/29/2003	3C	3	0.431		*17.4*		0.455	U	0.455	U	0.455	U	0.455	U	
00036-001	TC59A-R1	1/5/2004	3C	3	0.508		*25.2*		0.498	U	0.498	U	0.498	U	0.498	U	Sample Dilution
00506-004	TC59A-R3	1/19/2004	3C	3	0.601		*13.2*		0.726	U	0.726	U	0.726	U	0.726	U	TC59A-R2 - not sent to lab (high PISample Dilution reaSample Dilutionings)
00690-006	TC59A-R4	1/23/2004	3C	3	0.299		1.87		0.537	U	0.537	U	0.537	U	0.537	U	
11548-006	TC59B	12/29/2003	3C	3	0.382		*10.2*		0.573	U	0.573	U	0.573	U	0.573	U	
00036-002	TC59B-R1	1/5/2004	3C	3	0.564		*32.0*		0.679	U	0.679	U	0.679	U	0.679	U	Sample Dilution
00506-005	TC59B-R3	1/19/2004	3C	3	0.405		*7.60*		0.746	U	0.746	U	0.746	U	0.746	U	TC59B-R2 - not sent to lab (high PISample Dilution reaSample Dilutionings)
00690-007	TC59B-R4	1/23/2004	3C	3	0.553		3.44		0.842	U	0.842	U	0.842	U	0.842	U	
11548-007	TC60A	12/29/2003	3C	3	0.684		*6.37*		0.683	U	0.683	U	0.683	U	0.683	U	
00036-003	TC60A-R1	1/5/2004	3C	3	0.589		*8.23*		0.541	U	0.541	U	0.541	U	0.541	U	
00394-001	TC60A-R2	1/14/2004	3C	3	0.713		*11.3*		0.679	U	0.679	U	0.679	U	0.679	U	
00506-006	TC60A-R3	1/19/2004	3C	3	0.544		*6.96*		0.844	U	0.844	U	0.844	U	0.844	U	
00690-008	TC60A-R4	1/23/2004	3C	3	0.302		1.72		0.581	U	0.581	U	0.581	U	0.581	U	
11548-008	TC60B [9]	12/29/2003	3C	3	0.372		0.370	U	0.370	U	0.370	U	0.370	U	0.370	U	
00171-001	TB51A	1/8/2004	3C	3	0.543	U	0.116		0.543	U	0.543	U	0.543	U	0.543	U	
00171-002	TB51B	1/8/2004	3C	3	0.140		0.359		0.574	U	0.574	U	0.574	U	0.574	U	
00171-003	TB52A	1/8/2004	3C	3	0.135		0.553		0.484	U	0.484	U	0.484	U	0.484	U	
00171-004	TB52B	1/8/2004	3C	3	2.61		4.15		0.170		0.503	U	0.503	U	0.503	U	
00172-001	TA61A	1/8/2004	3C	3	0.296		1.81		0.705	U	0.705	U	0.705	U	0.705	U	
00172-002	TA61B	1/8/2004	3C	3	0.103		0.293		0.457	U	0.457	U	0.457	U	0.457	U	
00172-003	TA62A	1/8/2004	3C	3	0.725	U	0.725	U	0.725	U	0.725	U	0.725	U	0.725	U	
00313-001	TA63A	1/13/2004	3C	3	0.136		0.889		0.555	U	0.555	U	0.555	U	0.555	U	
00313-002	TA63B	1/13/2004	3C	3	0.155		1.02		0.595	U	0.595	U	0.595	U	0.595	U	
00313-003	TA64A	1/13/2004	3C	3	0.355		0.803		0.711	U	0.711	U	0.711	U	0.711	U	

-212-

Table 3. AOCs 1-4 Post-Treatment Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Sample Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
00394-002	TC60B [9]	1/14/2004	3C	3	0.519		2.70		0.506	U	0.506	U	0.506	U	0.506	U	
00394-003	TC61A	1/14/2004	3C	3	4.63		1.11		0.517	U	0.517	U	0.517	U	0.517	U	
00506-001	TC61B-R1	1/19/2004	3C	3	2.96		3.00		0.492	U	0.492	U	0.492	U	0.492	U	TC61B - not sent to lab (high PISample Dilution reaSample Dilutionings)
00506-002	TC62A-R1	1/19/2004	3C	3	0.375		*7.88*		0.777	U	0.777	U	0.777	U	0.777	U	TC62A - not sent to lab (high PISample Dilution reaSample Dilutionings)
00690-005	TC62A-R2	1/23/2004	3C	3	0.152		2.11		0.489	U	0.489	U	0.489	U	0.489	U	
00506-003	TC62B-R1	1/19/2004	3C	3	0.166		1.77		0.537	U	0.537	U	0.537	U	0.537	U	TC62B - not sent to lab (high PISample Dilution reaSample Dilutionings)
00506-007	TC63A	1/19/2004	3C	3	0.160		2.86		0.536	U	0.536	U	0.536	U	0.536	U	
00502-002	TA65B	1/19/2004	3C	3	0.753		*25.9*		0.831	U	0.831	U	0.831	U	0.831	U	Sample Dilution
00690-002	TA65B-R1	1/23/2004	3C	3	1.94		1.98		0.630	U	0.630	U	0.630	U	0.630	U	
00502-003	TA66A	1/19/2004	3C	3	0.844		0.653	U	0.653	U	0.653	U	0.653	U	0.653	U	
00502-004	TB53A	1/19/2004	3C	3	3.39		0.569	U	0.569	U	0.569	U	0.569	U	0.569	U	
00502-005	TB53B	1/19/2004	3C	3	0.281		0.477	U	0.477	U	0.477	U	0.477	U	0.477	U	
00502-006	TB54A	1/19/2004	3C	3	2.26		0.750		0.543	U	0.543	U	0.543	U	0.543	U	
00535-001	TA67A	1/20/2004	3C	3	0.398		*8.80*		0.747	U	0.747	U	0.747	U	0.747	U	
00690-003	TA67A-R1	1/23/2004	3C	3	1.39		*9.52*		0.556	U	0.556	U	0.556	U	0.556	U	
00896-002	TA67A-R2	2/3/2004	3C	3	0.559		1.10		0.590	U	0.590	U	0.590	U	0.590	U	
00535-002	TA67B	1/20/2004	3C	3	0.167		1.10		0.579	U	0.579	U	0.579	U	0.579	U	
00535-003	TA68A	1/20/2004	3C	3	0.654	U	3.13		0.654	U	0.654	U	0.654	U	0.654	U	
00535-004	TA68B	1/20/2004	3C	3	0.157		4.70		0.670	U	0.670	U	0.670	U	0.670	U	
00535-005	TB55A	1/20/2004	3C	3	0.216		2.91		0.740	U	0.740	U	0.740	U	0.740	U	
00535-006	TB55B	1/20/2004	3C	3	0.156		0.397		0.530	U	0.530	U	0.530	U	0.530	U	

-213-

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
12424-001	TB1A	12/27/2004	12	12	0.589	U	0.589	U	0.589	U	0.589	U	0.589	U	0.589	U	Sample ID is TB1a in Final Lab Report.
12424-002	TB1B	12/27/2004	12	12	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	Sample ID is TB1b in Final Lab Report.
12424-003	TB8A	12/27/2004	12	12	0.579	U	0.579	U	0.579	U	0.579	U	0.579	U	0.579	U	Sample ID is TB8a in Final Lab Report.
12504-001	TB4A	12/30/2004	12	12	0.587	U	0.587	U	0.587	U	0.587	U	0.587	U	0.587	U	
12504-002	TB5A	12/30/2004	12	12	0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	
12504-003	TB6A	12/30/2004	12	12	0.582	U	0.582	U	0.582	U	0.582	U	0.582	U	0.582	U	
00005-001	TA7B	1/4/2005	12	12	0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	0.588	U	
00005-002	TB7A	1/4/2005	12	12	0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	
00005-003	TB8B	1/4/2005	12	12	0.531	U	0.531	U	0.531	U	0.531	U	0.531	U	0.531	U	
00005-004	TA8A	1/4/2005	12	12	0.758		0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	
00005-005	TA7A	1/4/2005	12	12	0.526	U	0.526	U	0.526	U	0.526	U	0.526	U	0.526	U	
00005-006	TA6A	1/4/2005	12	12	0.958		0.597	U	0.597	U	0.597	U	0.597	U	0.597	U	
00125-001	TA1A	1/6/2005	12	12	**113**		0.620	U	0.620	U	0.620	U	0.620	U	0.620	U	
00474-001	TA1A-R1	1/17/2005	12	12	**1070**	D	1.54		0.615	U	0.615	U	0.615	U	0.615	U	Disposed of off-site.
00474-007	FD-01	1/17/2005	12	12	**704**	D	1.21		0.554	U	0.554	U	0.554	U	0.554	U	Field Duplicate of TA1A-R1.
00125-002	TA2A	1/6/2005	12	12	**4650**	D	3.31		0.495	U	0.495	U	0.495	U	0.495	U	
00474-002	TA2A-R1	1/17/2005	12	12	**163**	D	0.562	U	0.562	U	0.562	U	0.562	U	0.562	U	Disposed of off-site.
00125-003	TA3A	1/6/2005	12	12	**21.4**		0.797		0.552	U	0.552	U	0.552	U	0.552	U	
00474-003	TA3A-R1	1/17/2005	12	12	**96**		0.546	U	0.546	U	0.546	U	0.546	U	0.546	U	Disposed of off-site.
00125-004	TA4A	1/6/2005	12	12	**55.5**		1.14		0.536	U	0.536	U	0.536	U	0.536	U	
00474-004	TA4A-R1	1/17/2005	12	12	**164**	D	0.663	U	0.663	U	0.663	U	0.663	U	0.663	U	Disposed of off-site.
00204-004	TA4B	1/10/2005	12	12	0.805		0.541	U	0.541	U	0.541	U	0.541	U	0.541	U	
00204-003	TA5B	1/10/2005	12	12	**94.7**		0.500	U	0.500	U	0.500	U	0.500	U	0.500	U	
00474-005	TA5B-R1	1/17/2005	12	12	**288**	D	0.770		0.601	U	0.601	U	0.601	U	0.601	U	Disposed of off-site.
00204-002	TA6B	1/10/2005	12	12	**20.3**		0.823		0.540	U	0.540	U	0.540	U	0.540	U	
00474-006	TA6B-R1	1/17/2005	12	12	**20.5**		0.617	U	0.617	U	0.617	U	0.617	U	0.617	U	Disposed of off-site.
00204-001	TA8B	1/10/2005	12	12	3.53		0.488	U	0.488	U	0.488	U	0.488	U	0.488	U	
00476-001	TB15A	1/17/2005	12	12	**9.69**		0.581	U	0.581	U	0.581	U	0.581	U	0.581	U	
00649-001	TB15A-R1	1/21/2005	12	12	0.527	U	0.527	U	0.527	U	0.527	U	0.527	U	0.527	U	
00476-002	TB16A	1/17/2005	12	12	**11.2**		0.587	U	0.587	U	0.587	U	0.587	U	0.587	U	
00649-002	TB16A-R1	1/21/2005	12	12	0.530	U	0.530	U	0.530	U	0.530	U	0.530	U	0.530	U	
00649-006	FD-02	1/21/2005	12	12	0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	Field Duplicate of TB16A-R1.
00582-001	TB12A	1/20/2005	12	12	0.459	U	0.459	U	0.459	U	0.459	U	0.459	U	0.459	U	
00582-002	TB13A	1/20/2005	12	12	0.527	U	0.527	U	0.527	U	0.527	U	0.527	U	0.527	U	
00582-003	TB14A	1/20/2005	12	12	0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	
00649-003	TB14B	1/21/2005	12	12	0.495	U	0.495	U	0.495	U	0.495	U	0.495	U	0.495	U	
00649-004	TB15B	1/21/2005	12	12	0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	
00649-005	TB16B	1/21/2005	12	12	0.590	U	0.590	U	0.590	U	0.590	U	0.590	U	0.590	U	
00732-001	TB22B	1/25/2005	12	12	0.535		0.483	U	0.483	U	0.483	U	0.483	U	0.483	U	the section of zone 2 that was under the asphalt.
00732-002	TB23B	1/25/2005	12	12	0.579		0.478	U	0.478	U	0.478	U	0.478	U	0.478	U	the section of zone 2 that was under the asphalt.
00732-003	TB24B	1/25/2005	12	12	1.86		0.488	U	0.488	U	0.488	U	0.488	U	0.488	U	the section of zone 2 that was under the asphalt.
00841-001	TB22A	1/28/2005	12	12	0.734		0.501	U	0.501	U	0.501	U	0.501	U	0.501	U	the section of zone 2 that was under the asphalt.

-214-

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
00841-002	TB23A	1/28/2005	12	12	0.491	U	0.491	U	0.491	U	0.491	U	0.491	U	0.491	U	the section of zone 3 that was under the asphalt.
00841-003	TB24A	1/28/2005	12	12	0.669	U	0.669	U	0.669	U	0.669	U	0.669	U	0.669	U	the section of zone 4 that was under the asphalt.
00898-001	TB21A	1/31/2005	12	12	0.539	U	0.539	U	0.539	U	0.539	U	0.539	U	0.539	U	
00898-002	TB31B	1/31/2005	12	12	**267**	D	0.549	U	0.549	U	0.549	U	0.549	U	0.549	U	near GP-9
01156-001	TB31B-R1	2/8/2005	12	12	**35.4**		0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	
01363-001	TB31B-R2	2/14/2005	12	12	**37.9**		0.545	U	0.545	U	0.545	U	0.545	U	0.545	U	Disposed of off-site.
00898-003	TB32B	1/31/2005	12	12	**2.44**		0.487	U	0.487	U	0.487	U	0.487	U	0.487	U	
01084-001	TB29A	2/4/2005	12	12	**6.4**		0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	
01435-001	TB29A-R1	2/16/2005	12	12	**1.20**		0.491	U	0.491	U	0.491	U	0.491	U	0.491	U	
01084-002	TB30A	2/4/2005	12	12	**1.35**		0.480	U	0.480	U	0.480	U	0.480	U	0.480	U	
01084-006	FD-03	2/4/2005	12	12	**0.732**		0.482	U	0.482	U	0.482	U	0.482	U	0.482	U	Field Duplicate of TB30A.
01084-003	TB30B	2/4/2005	12	12	**112**	D	0.536	U	0.536	U	0.536	U	0.536	U	0.536	U	
01435-002	TB30B-R1	2/16/2005	12	12	**1.18**		0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	
01084-004	TB31A	2/4/2005	12	12	**14.9**		0.523	U	0.523	U	0.523	U	0.523	U	0.523	U	
01435-003	TB31A-R1	2/16/2005	12	12	**2.52**		0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	
01084-005	TB32A	2/4/2005	12	12	**0.482**	U	0.482	U	0.482	U	0.482	U	0.482	U	0.482	U	
01156-002	TB38A	2/8/2005	12	12	**168**	D	0.523	U	0.523	U	0.523	U	0.523	U	0.523	U	
01363-002	TB38A-R1	2/14/2005	12	12	**171**	D	0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	Disposed of off-site.
01156-003	TB38B	2/8/2005	12	12	**104**		0.660	U	0.660	U	0.660	U	0.660	U	0.660	U	
01363-003	TB38B-R1	2/14/2005	12	12	**34.1**		0.504	U	0.504	U	0.504	U	0.504	U	0.504	U	
01619-004	TB38B-R2	2/22/2005	12	12	**2.07**		0.215	U	0.215	U	0.215	U	0.215	U	0.215	U	
01156-004	TB39A	2/8/2005	12	12	**29**		0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	
01363-004	TB39A-R1	2/14/2005	12	12	**5.62**		0.537	U	0.537	U	0.537	U	0.537	U	0.537	U	
01619-003	TB39A-R2	2/22/2005	12	12	**6.30**		0.242	U	0.242	U	0.242	U	0.242	U	0.242	U	Disposed of off-site.
01156-005	TB39B	2/8/2005	12	12	**138**	D	0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	
01363-005	TB39B-R1	2/14/2005	12	12	**23.7**		0.583	U	0.583	U	0.583	U	0.583	U	0.583	U	
01619-002	TB39B-R2	2/22/2005	12	12	**8.29**		0.275	U	0.275	U	0.275	U	0.275	U	0.275	U	
01993-001	TB39B-R3	3/4/2005	12	12	**28.2**		0.531	U	0.531	U	0.531	U	0.531	U	0.531	U	Disposed of off-site.
01993-002	FD-05	3/4/2005	12	12	**15.9**		0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	Field Duplicate of TB39B-R3.
01156-006	TB40A	2/8/2005	12	12	**114**	D	0.534	U	0.534	U	0.534	U	0.534	U	0.534	U	
01363-006	TB40A-R1	2/14/2005	12	12	**15.9**		0.474	U	0.474	U	0.474	U	0.474	U	0.474	U	
01619-001	TB40A-R2	2/22/2005	12	12	**48.8**		0.322	U	0.322	U	0.322	U	0.322	U	0.322	U	Disposed of off-site.
01363-009	TB47A	2/14/2005	12	12	**105**		0.816		0.572	U	0.572	U	0.572	U	0.572	U	
01619-005	TB47A-R1	2/22/2005	12	12	**2.99**		0.213	U	0.213	U	0.213	U	0.213	U	0.213	U	
01363-008	TB48A	2/14/2005	12	12	**120**		0.829	U	0.829	U	0.829	U	0.829	U	0.829	U	
01619-006	TB48A-R1	2/22/2005	12	12	**3.93**		0.216	U	0.216	U	0.216	U	0.216	U	0.216	U	
01363-007	TB48B	2/14/2005	12	12	**141**	D	0.493	U	0.493	U	0.493	U	0.493	U	0.493	U	
01619-007	TB48B-R1	2/22/2005	12	12	**67.9**	D	0.207	U	0.207	U	0.207	U	0.207	U	0.207	U	
02053-003	TB48B-R2	3/7/2005	12	12	**11.6**		0.556	U	0.556	U	0.556	U	0.556	U	0.556	U	Disposed of off-site.
01539-003	TA15A	2/18/2005	12	12	**2.98**		0.537	U	0.537	U	0.537	U	0.537	U	0.537	U	
01539-002	TA16A	2/18/2005	12	12	**8.60**		0.534	U	0.534	U	0.534	U	0.534	U	0.534	U	
02053-002	TA16A-R1	3/7/2005	12	12	**46**		0.558	U	0.558	U	0.558	U	0.558	U	0.558	U	Disposed of off-site.

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
01539-001	TA16B	2/18/2005	12	12	**110**		2.31		0.754		0.558	U	0.558	U	0.558	U	
02053-001	TA16B-R1	3/7/2005	12	12	**47.5**		0.522	U	0.522	U	0.522	U	0.522	U	0.522	U	Disposed of off-site.
01842-005	TA12B	2/28/2005	12	12	**63.4**		0.533	U	0.533	U	0.533	U	0.533	U	0.533	U	
02264-005	TA12B-R1	3/11/2005	12	12	**9.76**		0.484	U	0.484	U	0.484	U	0.484	U	0.484	U	
02612-005	TA12B-R2	3/21/2005	12	12	3.54		0.534	U	0.534	U	0.534	U	0.534	U	0.534	U	
01842-004	TA13A	2/28/2005	12	12	**18**		0.493	U	0.493	U	0.493	U	0.493	U	0.493	U	
02264-004	TA13A-R1	3/11/2005	12	12	2.50		0.541	U	0.541	U	0.541	U	0.541	U	0.541	U	
01842-003	TA13B	2/28/2005	12	12	**93.7**		0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	
02264-003	TA13B-R1	3/11/2005	12	12	1.40		0.542	U	0.542	U	0.542	U	0.542	U	0.542	U	
01842-002	TA14A	2/28/2005	12	12	**21.9**		0.524	U	0.524	U	0.524	U	0.524	U	0.524	U	
02264-002	TA14A-R1	3/11/2005	12	12	**75.5**		0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	Disposed of off-site.
01842-001	TA14B	2/28/2005	12	12	**57.7**		0.547	U	0.547	U	0.547	U	0.547	U	0.547	U	
02264-001	TA14B-R1	3/11/2005	12	12	**10.3**		0.534	U	0.534	U	0.534	U	0.534	U	0.534	U	
02612-006	TA14B-R2	3/21/2005	12	12	**23.9**		0.511	U	0.511	U	0.511	U	0.511	U	0.511	U	Disposed of off-site.
02060-001	TB56B	3/7/2005	12	12	0.730		0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	
02060-002	TB56A	3/7/2005	12	12	**12**		0.495	U	0.495	U	0.495	U	0.495	U	0.495	U	
02327-001	TB56A-R1	3/14/2005	12	12	1.25		0.531	U	0.531	U	0.531	U	0.531	U	0.531	U	
02060-003	TB55B	3/7/2005	12	12	**5.06**		0.523	U	0.523	U	0.523	U	0.523	U	0.523	U	
02327-002	TB55B-R1	3/14/2005	12	12	2.35		0.476	U	0.476	U	0.476	U	0.476	U	0.476	U	
02196-001	TB55A	3/10/2005	12	12	1.86		0.482	U	0.482	U	0.482	U	0.482	U	0.482	U	
02196-003	TB54A	3/10/2005	12	12	1.36		0.571	U	0.571	U	0.571	U	0.571	U	0.571	U	
02196-002	TB54B	3/10/2005	12	12	1.66		0.482	U	0.482	U	0.482	U	0.482	U	0.482	U	
02327-004	TA11A	3/14/2005	12	12	3.82		0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	
02327-003	TA11B	3/14/2005	12	12	3.80		0.524	U	0.524	U	0.524	U	0.524	U	0.524	U	
02336-003	TB52B	3/14/2005	12	12	**23.7**		0.482	U	0.482	U	0.482	U	0.482	U	0.482	U	
02612-003	TB52B-R1	3/21/2005	12	12	1.22		0.649	U	0.649	U	0.649	U	0.649	U	0.649	U	
02336-002	TB53A	3/14/2005	12	12	2.13		0.479	U	0.479	U	0.479	U	0.479	U	0.479	U	
02336-001	TB53B	3/14/2005	12	12	3.67		0.525	U	0.525	U	0.525	U	0.525	U	0.525	U	
02484-001	TA24A	3/17/2005	12	12	0.573	U	0.573	U	0.573	U	0.573	U	0.573	U	0.573	U	
02484-003	FD-06	3/17/2005	12	12	0.567	U	0.567	U	0.567	U	0.567	U	0.567	U	0.567	U	Field Duplicate of TA24A.
02484-002	TA24B	3/17/2005	12	12	**12.6**		0.648	U	0.648	U	0.648	U	0.648	U	0.648	U	
02612-004	TA24B-R1	3/21/2005	12	12	4.95		0.607	U	0.607	U	0.607	U	0.607	U	0.607	U	Disposed of off-site.
02550-002	TA23A	3/18/2005	12	12	1.85		0.571	U	0.571	U	0.571	U	0.571	U	0.571	U	
02550-001	TA23B	3/18/2005	12	12	**6.53**		0.471	U	0.471	U	0.471	U	0.471	U	0.471	U	
02788-001	TA23B-R1	3/25/2005	12	12	0.707		0.478	U	0.478	U	0.478	U	0.478	U	0.478	U	
02550-003	FD-07	3/18/2005	12	12	3.31		0.471	U	0.471	U	0.471	U	0.471	U	0.471	U	Field Duplicate of TA23B.
02612-007	TA22A	3/21/2005	12	12	1.85		0.446	U	0.446	U	0.446	U	0.446	U	0.446	U	
02612-008	TA22B	3/21/2005	12	12	2.68		0.586	U	0.586	U	0.586	U	0.586	U	0.586	U	
02612-001	TB51A	3/21/2005	12	12	1.50		0.477	U	0.477	U	0.477	U	0.477	U	0.477	U	
02612-002	TB51B	3/21/2005	12	12	0.948		0.512	U	0.512	U	0.512	U	0.512	U	0.512	U	
02707-002	TA21A	3/23/2005	12	12	1.17		0.532	U	0.532	U	0.532	U	0.532	U	0.532	U	
02707-001	TA21B	3/23/2005	12	12	3.85		0.527	U	0.527	U	0.527	U	0.527	U	0.527	U	

					CONSTITUENT: (Units in mg/kg)												
Lab ID#	Panther Sample Number *	Sample Date	AOC Origination	AOC Destination	Tetrachloroethylene	Q	Trichloroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP RDCSCC					4		23		79		2		8		1000		
NJDEP NRDCSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
POST-TREATMENT																	
02707-003	TB49B	3/23/2005	12	12	0.547	U	0.547	U	0.547	U	0.547	U	0.547	U	0.547	U	Over-excavation.
02754-002	TB50A	3/24/2005	12	12	0.539	U	0.539	U	0.539	U	0.539	U	0.539	U	0.539	U	Over-excavation.
02754-001	TB50B	3/24/2005	12	12	0.536	U	0.536	U	0.536	U	0.536	U	0.536	U	0.536	U	
02788-004	TA19B	3/25/2005	12	12	0.556	U	0.556	U	0.556	U	0.556	U	0.556	U	0.556	U	Over-excavation.
02788-003	TA20A	3/25/2005	12	12	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	
02788-002	TA20B	3/25/2005	12	12	0.483	U	0.483	U	0.483	U	0.483	U	0.483	U	0.483	U	
02825-001	TA18B	3/28/2005	12	12	2.27		0.647	U	0.647	U	0.647	U	0.647	U	0.647	U	Over-excavation.
02825-003	FD-08	3/28/2005	12	12	2.45		0.477	U	0.477	U	0.477	U	0.477	U	0.477	U	Field Duplicate of TA18B.
02825-002	TA19A	3/28/2005	12	12	1.51		0.570	U	0.570	U	0.570	U	0.570	U	0.570	U	
02915-010	TB57A	3/30/2005	12	12	1.48		0.455	U	0.455	U	0.455	U	0.455	U	0.455	U	Over-excavation.
02915-011	TB57B	3/30/2005	12	12	0.555		0.493	U	0.493	U	0.493	U	0.493	U	0.493	U	
02962-001	TB58A	3/31/2005	12	12	1.17		0.641	U	0.641	U	0.641	U	0.641	U	0.641	U	
02962-002	TB58B	3/31/2005	12	12	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	
02962-003	TB59A	3/31/2005	12	12	1.54		0.712	U	0.712	U	0.712	U	0.712	U	0.712	U	

The sample IDs listed below were not used for the following reasons: the batch or lot location did not contain soil because the area was needed for equipment access to other soil in the cell, or the location was being used to stage clean soil or soil that needed to be retreated.

	TB2A	TB9A	TB17A	TB21B	TB28B	TB36A	TB59B	TA10B			
	TB2B	TB9B	TB17B	TB25A	TB29B	TB36B	TA1B	TA12A			
	TB3A	TB10A	TB18A	TB25B	TB33A	TB37A	TA2B				
	TB3B	TB10B	TB18B	TB26A	TB33B	TB37B	TA3B				
	TB4B	TB11A	TB19A	TB26B	TB34A	TB40B	TA5A				
	TB5B	TB11B	TB19B	TB27A	TB34B	TB47B	TA9A				
	TB6B	TB12B	TB20A	TB27B	TB35A	TB52A	TA9B				
	TB7B	TB13B	TB20B	TB28A	TB35B	TB49A	TA10A				

NOTES:	
AOC	= Area of Concern
AOC Origination Explanation	= Example: 12-1 (0-4) = AOC-12, zone 1, soil from the 0 to 4 ft depth. Due to the excavation and in-situ treatment method, as well as hauling the soil to the cells to "cook", the soil has been mixed to the point that the sample is representative of the 0 to 4 foot interval.
NJDEP	= New Jersey Department of Environmental Protection
RDCSCC	= Residential Direct Contact Soil Cleanup Criteria
NRDCSCC	= Non-Residential Direct Contact Soil Cleanup Criteria
IGWSCC	= Impact to Groundwater Soil Cleanup Criteria
Results in bold	= Indicates results exceeding reuse criteria of 5 mg/kg
Sample IDs ending in R1	= Indicates first re-treatment
*	= TB1A is treatment cell B, Batch 1, lot A; all batch numbers are sequential throughout the project, not repeated.
Q	= Qualifier
D	= Dilution
U	= Compound was not detected at the method detection limit (MDL). Value given is the MDL.

-217-

Amended Table 4. Summary of Site-Wide Soil Excavation Volumes. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

AOC	Surface Area (square feet)	Final Depth of Excavation (ft)	Planned Excavation Volume (Tons)	Actual Excavation Volume (Tons)	Total Over-excavation (Tons)	Presumed Clean Soil (Tons) verified clean with samples	Soils disposed of offsite (Tons)	Excavated Soils Treated on Site (Tons)
Calculated Volumes								
1A	1,570.83	20.00	1,348.38	1,745.37	396.99	0.00	0.00	1,745.37
1B	1,559.88	10.00	689.44	866.60	177.16	0.00	0.00	866.60
2A	1,850.72	20.00	1,481.74	2,056.36	574.62	0.00	0.00	2,056.36
2B	1,826.03	15.00	966.73	1,521.69	554.96	0.00	0.00	1,521.69
3A	5,000.29	20.00	4,948.89	5,555.88	606.99	0.00	0.00	5,555.88
3B	12,040.87	23.00	8,765.61	13,378.74	4,613.13	0.00	8,600.00	4,778.74
3C	11,148.17	25.00	8,083.36	15,483.57	7,400.21	1,500.00	0.00	15,483.57
3D	6,462.14	20 & 23	4,810.98	7,718.67	2,907.69	0.00	500.00	7,218.67
4	1,572.88	20.00	339.44	1,048.59	709.15	750.00	0.00	1,048.59
CA	400.00	10.00	222.22	302.22	80.00	0.00	0.00	302.22
12	12,678.92	20.00	12,000.00	13,750.00	1,750.00	0.00	2,600.00	11,150.00
TC	150.00	3.00	20.00	20.00	0.00	0.00	20.00	0.00
BA	150.00	3.00	20.00	20.00	0.00	0.00	20.00	0.00
PR	900.00	7 & 12	280.00	280.00	0.00	0.00	280.00	0.00
Totals			**43,976.79**	**63,747.69**	**19,770.90**	**2,250.00**	**12,020.00**	**51,727.69**

NOTES:

AOC	**Area of Concern**
NOD	**Natural Oxidant Demand**
CA	**Compactor Area**
TC	**Tool Crib Area**
BA	**Bridgeport Area**
PR	**Plating Room Area**

Amended Table 5. Post Excavation Data Summary. Airtron Division of Litton Systems, Inc. Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)											
Lab ID#	Panther Sample Number *	Sample Date	AOC	Depth (feet BGS)	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q
NJDEP URUSCC					4		23		79		2		8		1000	
NJDEP RUSCC					6		54		1000		7		150		1000	
NJDEP IGWSCC					1		1		1		10		10		50	
Reuse Criteria (mg/kg)					5		5		7		5		5		5	
AOC-1A																
06859-001	1A09	8/7/2003	1A	17.0-17.5	1.17		0.244	J	0.238	J	0.561	U	0.561	U	0.561	U
06859-002	1A10	8/7/2003	1A	17.0-17.5	0.522	U	0.522	U	0.522	U	0.522	U	0.522	U	0.522	U
AOC-2B																
06546-001	2B07	7/29/2003	2B	15.0-15.5	0.628		0.587	U	0.587	U	0.587	U	0.587	U	0.587	U
06546-002	2B08	7/29/2003	2B	15.0-15.5	0.592		0.528	U	0.528	U	0.528	U	0.528	U	0.528	U
AOC-3B																
10996-001	AOC3B-SL	12/9/2003	3B	23.0-23.5	0.528	U	0.528	U	0.528	U	0.528	U	0.528	U	0.528	U
00381-001	3B17	1/14/2004	3B	1.0-1.5	0.522	U	0.522	U	0.522	U	0.522	U	0.522	U	0.522	U
00381-002	3B18	1/14/2004	3B	1.0-1.5	0.798	U	0.798	U	0.798	U	0.798	U	0.798	U	0.798	U
00381-003	3B19	1/14/2004	3B	23.0-23.5	0.692	U	0.692	U	0.404	J	0.692	U	0.692	U	0.692	U
00381-004	3B20	1/14/2004	3B	23.0-23.5	0.667	U	0.667	U	1.77		0.922		0.667	U	0.667	U
00381-005	3B21	1/14/2004	3B	23.0-23.5	0.715	U	0.715	U	0.260	J	0.715	U	0.715	U	0.715	U
00381-006	3B22A	1/14/2004	3B	1.0-1.5	*8.95*		0.352	J	0.276	J	ND	U	0.708	U	0.708	U
00630-005	3B27A	1/22/2004	3B	1.0-1.5	*7.90*		0.585	U	0.585	U	0.585	U	0.585	U	0.585	U
00691-001	3B29A	1/23/2004	3B	1.0-1.5	0.669	U	0.669	U	0.669	U	0.669	U	0.669	U	0.669	U
00381-007	3B22B	1/14/2004	3B	22.0-22.5	0.757	U	0.757	U	0.757	U	0.757	U	0.757	U	0.757	U
00381-008	3B23A	1/14/2004	3B	1.0-1.5	*19.3*		1.04		1.00		0.642	U	0.642	U	0.642	U
00630-006	3B28A	1/22/2004	3B	1.0-1.5	*14.1*		0.530	U	0.530	U	0.530	U	0.530	U	0.530	U
00691-002	3B30A	1/23/2004	3B	1.0-1.5	0.564	U	0.564	U	0.564	U	0.564	U	0.564	U	0.564	U
00381-009	3B23B	1/14/2004	3B	22.0-22.5	0.144	J	0.601	U	0.601	U	0.601	U	0.601	U	0.601	U
00381-010	3B24A	1/14/2004	3B	1.0-1.5	2.14		0.738		0.219	J	0.723	U	0.723	U	0.723	U
00381-011	3B24B	1/14/2004	3B	22.0-22.5	0.534		0.148	J	0.092	J	0.453	U	0.453	U	0.453	U
00630-001	3B25A	1/22/2004	3B	1.0-1.5	1.39		0.469	U	0.469	U	0.469	U	0.469	U	0.469	U
00630-002	3B25B	1/22/2004	3B	22.0-22.5	0.442	U	0.442	U	0.442	U	0.442	U	0.442	U	0.442	U
00630-003	3B26A	1/22/2004	3B	1.0-1.5	3.54		0.672	U	0.672	U	0.672	U	0.672	U	0.672	U
00630-004	3B26B	1/22/2004	3B	22.0-22.5	0.446	U	0.446	U	0.524		0.446	U	0.446	U	0.446	U

Amended Table 5. Post Excavation Data Summary. Airtron Division of Litton Systems, Inc. Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)											
Lab ID#	Panther Sample Number *	Sample Date	AOC	Depth (feet BGS)	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q
NJDEP URUSCC					4		23		79		2		8		1000	
NJDEP RUSCC					6		54		1000		7		150		1000	
NJDEP IGWSCC					1		1		1		10		10		50	
Reuse Criteria (mg/kg)					5		5		7		5		5		5	
AOC-3C																
09888-001	3C14	11/4/2003	3C	25.0-25.5	1.09		0.575		0.502	U	0.502	U	0.502	U	0.502	U
11561-001	3C12	12/29/2003	3C	1.0-1.5	0.634		0.638		0.123	J	0.457	U	0.457	U	0.457	U
11561-002	3C13	12/29/2003	3C	1.0-1.5	0.156		0.070	J	0.154	U	0.154	U	0.154	U	0.154	U
00394-005	3C15	1/14/2004	3C	25.0-25.5	0.875		0.176	J	0.576	U	0.576	U	0.576	U	0.576	U
AOC-3D																
09871-001	AOC3D-NW	11/4/2003	3D	23.0-23.5	0.513		0.400	U	0.400	U	0.400	U	0.400	U	0.400	U
09871-002	AOC3D-SE	11/4/2003	3D	23.0-23.5	0.772		0.454	U	0.454	U	0.454	U	0.454	U	0.454	U
AOC-4																
07417-010	4X06	8/25/2003	4	16.0-16.5	0.405	U	0.126	J	0.405	U	0.405	U	0.405	U	0.405	U
07417-011	4X07	8/25/2003	4	16.5-16.5	0.434	U	0.327	J	0.434	U	0.434	U	0.434	U	0.434	U
07417-012	4X08	8/25/2003	4	20.2-20.5	0.889	U	0.751	J	0.197	J	0.889	U	0.889	U	0.889	U
AOC-12																
00812-001	AOC12-SW-1	1/27/2005	12	0.5-1.0	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U	0.585	U
00912-001	AOC12-PE1	2/1/2005	12	20.0-20.5	0.561	U	0.561	U	0.561	U	0.561	U	0.561	U	0.561	U
00912-002	AOC12-PE2	2/1/2005	12	20.0-20.5	0.560	U	0.560	U	0.560	U	0.560	U	0.560	U	0.560	U
01842-006	AOC12-PE3	2/28/2005	12	20-20.5	2.75		0.612	U	0.612	U	0.612	U	0.612	U	0.612	U
01872-001	AOC12-PE3A**	3/1/2005	12	20-20.5	1.21		0.532	U	0.532	U	0.532	U	0.532	U	0.532	U
00812-002	AOC12-SW-2	1/27/2005	12	0.5-1.0	1.12		0.613	U	0.613	U	0.613	U	0.613	U	0.613	U
02484-004	AOC12-PE4	3/17/2005	12	20-20.5	1.1		0.433	U	0.433	U	0.433	U	0.433	U	0.433	U
02915-009	AOC12-PE5	3/30/2005	12	20-20.5	0.557	U	0.557	U	0.557	U	0.557	U	0.557	U	0.557	U
02915-001	AOC12-PE6	3/30/2005	12	10-10.5	0.637	U	0.637	U	0.637	U	0.637	U	0.637	U	0.637	U
02915-002	AOC12-PE7	3/30/2005	12	10-10.5	0.818	U	0.818	U	0.818	U	0.818	U	0.818	U	0.818	U
02915-003	AOC12-SW-3	3/30/2005	12	0.5-1.0	0.751	U	0.751	U	0.751	U	0.751	U	0.751	U	0.751	U
02915-004	AOC12-SW-4	3/30/2005	12	9.5-10.0	0.575	U	0.575	U	0.575	U	0.575	U	0.575	U	0.575	U
02915-005	AOC12-SW-5	3/30/2005	12	0.5-1.0	0.599	U	0.599	U	0.599	U	0.599	U	0.599	U	0.599	U
02915-006	AOC12-SW-6	3/30/2005	12	9.5-10.0	1.7		0.546	U	0.546	U	0.546	U	0.546	U	0.546	U
02915-007	AOC12-SW-7	3/30/2005	12	0.5-1.0	0.592	U	0.592	U	0.592	U	0.592	U	0.592	U	0.592	U
02915-008	AOC12-SW-8	3/30/2005	12	9.5-10.0	0.659	U	0.659	U	0.659	U	0.659	U	0.659	U	0.659	U

Amended Table 5. Post Excavation Data Summary. Airtron Division of Litton Systems, Inc. Morris Plains, New Jersey.

					CONSTITUENT: (Units in mg/kg)											
Lab ID#	Panther Sample Number *	Sample Date	AOC	Depth (feet BGS)	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q
NJDEP URUSCC					4		23		79		2		8		1000	
NJDEP RUSCC					6		54		1000		7		150		1000	
NJDEP IGWSCC					1		1		1		10		10		50	
Reuse Criteria (mg/kg)					5		5		7		5		5		5	
Tool Crib																
02511-005	TC-1	3/17/2005	Tool Crib	1.0-1.5	1.09		0.639	U	0.639	U	0.639	U	0.639	U	0.639	U
02511-006	TC-2	3/17/2005	Tool Crib	1.0-1.5	*4.24*		0.571	U	0.571	U	0.571	U	0.571	U	0.571	U
02511-007	TC-3	3/17/2005	Tool Crib	1.0-1.5	0.558	U	0.558	U	0.558	U	0.558	U	0.558	U	0.558	U
02511-008	TC-4	3/17/2005	Tool Crib	1.5-2.0	0.474	U	0.474	U	0.474	U	0.474	U	0.474	U	0.474	U
02511-010	TC-6	3/17/2005	Tool Crib	1.0-1.5	0.568	U	0.568	U	0.568	U	0.568	U	0.568	U	0.568	U

NOTES:

AOC	= Area of Concern
–	= Not applicable
*	= See Table 2 for sample description
Q	= Qualifier
U	= Compound was not detected at the method detection limit (MDL). Value given is the MDL
J	= Indicates an estimated value. The compound was detected at a value below the method detection limit but greater than zero.
Results in Italics	= Indicates results from locations that were subsequently excavated and treated.

Supplemental Table 5. Bridgeport Area Post Excavation Data Summary. Airtron, Divison of Litton Systems, Morris Plains, New Jersey

Arcadis Sample Number				BP-1		BP-2		BP-3		BP-4		BP-5	
Lab ID#				02511-013		02511-014		02511-015		02511-016		02511-017	
Sample Date				3/17/2005		3/17/2005		3/17/2005		3/17/2005		3/17/2005	
Sample Depth (ft bgs)	NJDEP URUSCC	NJDEP RUSCC	NJDEP IGWSCC	1.5-2.0	Q	0-0.5	Q	1.0-1.5	Q	1.5-2.0	Q	0-0.5	Q
Contaminant (mg/kg)													
Napthalene	230	4,200	100	0.108	U	0.109	U	0.105	U	0.108	U	--	
Acenapthylene	-	-	-	0.108	U	0.109	U	0.105	U	0.108	U	--	
Acenaphthene	3,400	10,000	100	0.108	U	0.082	J	0.105	U	0.108	U	--	
Flourene	2,300	10,000	100	0.108	U	0.109	U	0.105	U	0.108	U	--	
Phenanthrene	-	-	-	0.108	U	0.109	U	0.108		0.171		--	
Anthracene	10,000	10,000	100	0.108	U	0.109	U	0.105	U	0.108	U	--	
Flouanthrene	2,300	10,000	100	0.108	U	0.109	U	0.084	J	0.089	J	--	
Pyrene	1,700	10,000	100	0.108	U	0.109	U	0.110		0.109		--	
Benzo[b]fluoranthene	0.90	4	50	0.108	U	0.109	U	0.105	U	0.108	U	--	
Benzo[k]fluoranthene	0.90	4	500	0.108	U	0.109	U	0.105	U	0.108	U	--	
Benzo[a]pyrene	0.66	0.66	100	0.108	U	0.109	U	0.105	U	0.108	U	--	
Indeno[1,2,3-cd]pyrene	0.90	4	500	0.108	U	0.109	U	0.105	U	0.108	U	--	
Dibenz[a,h]anthracene	0.66	0.66	100	0.108	U	0.109	U	0.105	U	0.108	U	--	
Benzo[g,h,i,]perylene	-	-	-	0.108	U	0.109	U	0.105	U	0.108	U	--	

NOTES:

-	= No criterion derived for this contaminant
--	= Not Analyzed
Q	= Qualifier
U	= Compound was not detected at the method detection limit limit (MDL). Value given is the MDL.
J	= Indicates an estimated value.
ft bgs	= feet below ground surface

-222-

Supplemental Table 5. Bridgeport Area Post Excavation Data Summary. Airtron, Divison of Litton Systems, Morris Plains, New Jersey

Arcadis Sample Number				BP-6		BP-7		BP-8	
Lab ID#				02511-018		02511-019		02511-020	
Sample Date				3/17/2005		3/17/2005		3/17/2005	
Sample Depth (ft bgs)	NJDEP URUSCC	NJDEP RUSCC	NJDEP IGWSCC	1.0-1.5	Q	1.5-2.0	Q	1.5-2.0	Q
Contaminant (mg/kg)									
Napthalene	230	4,200	100	--		--		--	
Acenapthylene	-	-	-	--		--		--	
Acenaphthene	3,400	10,000	100	--		--		--	
Flourene	2,300	10,000	100	--		--		--	
Phenanthrene	-	-	-	--		--		--	
Anthracene	10,000	10,000	100	--		--		--	
Flouanthrene	2,300	10,000	100	--		--		--	
Pyrene	1,700	10,000	100	--		--		--	
Benzo[b]fluoranthene	0.90	4	50	--		--		--	
Benzo[k]fluoranthene	0.90	4	500	--		--		--	
Benzo[a]pyrene	0.66	0.66	100	--		--		--	
Indeno[1,2,3-cd]pyrene	0.90	4	500	--		--		--	
Dibenz[a,h]anthracene	0.66	0.66	100	--		--		--	
Benzo[g,h,i,]perylene	-	-	-	--		--		--	

NOTES:

-	= No criterion derived for this contaminant
--	= Not Analyzed
Q	= Qualifier
U	= Compound was not detected at the method detection lim limit (MDL). Value given is the MDL.
J	= Indicates an estimated value.
ft bgs	= feet below ground surface

-223-

Supplemental Table 5. Plating Room Post Excavation Data Summary. Airtron, Divison of Litton Systems, Morris Plains, New Jersey

Lab ID#	Arcadis Sample Number *	Sample Date	Sample Depth (ft bgs)	Cadmium mg/kg	Q	Copper mg/kg	Q
NJDEP URUSCC				39		600	
NJDEP RUSCC				100		600	
Plating Room							
02511-001	B-21B-1	3/17/2005	7.5-8.0	0.280	U	34.1	
02511-002	B-21B-2	3/17/2005	9.5-10.0	--		--	
02511-003	B-22B-1	3/17/2005	7.5-8.0	0.277	U	*1270*	
02511-004	B-22B-2	3/17/2005	9.5-10.0	*234*		*1930*	
02920-001	B-22C	3/30/2005	11.5-12.0	0.321		23.8	
02920-002	B-22C	3/30/2005	13.5-14.0	0.278	U	25.8	
02920-003	B-22C	3/30/2005	15.5-16.0	--		--	
02920-004	B-22C	3/30/2005	17.5-18.0	--		--	
02920-005	B-22C	3/30/2005	19.5-20.0	--		--	
02920-006	B-48B	3/30/2005	9.5-10.0	0.274	U	20	
02920-007	B-48B	3/30/2005	11.5-12.0	--		--	
02920-008	B-48B	3/30/2005	13.5-14.0	0.274	U	17.6	
02920-009	B-48B	3/30/2005	15.5-16.0	--		--	
02920-010	B-48B	3/30/2005	17.5-18.0	--		--	
02920-011	B-48B	3/30/2005	19.5-20.0	--		--	
02920-012	B-45B	3/30/2005	9.5-10.0	0.284	U	149	
02920-013	B-26C	3/30/2005	9.5-10.0	0.274	U	18.5	
02920-014	B-46B	3/30/2005	9.5-10.0	0.292		30.5	
02920-015	B-46B	3/30/2005	11.5-12.0	--		--	
02920-016	B-46B	3/30/2005	13.5-14.0	0.301	U	30	
02920-017	B-46B	3/30/2005	15.5-16.0	--		--	
02920-018	B-46B	3/30/2005	17.5-18.0	--		--	
02920-019	B-46B	3/30/2005	19.5-20.0	--		--	

NOTES:

-- = Not Analyzed
Q = Qualifier
U = Compound was not detected at the method detection limit (MDL). Value given is the MDL.
ft bgs = feet below ground surface

Table 6. Waste Characterization Data Summery AOCs 1-4. Airtron Division of Litton Systems, Inc. Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	Panther Sample Number *	Sample Date	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
TEST PIT															
06628-001	TP-001	7/31/2003	*423*		*107*		*184*		2.85		0.438		1.16		Sample dilution
06768-001	TP-001A	8/5/2003	4.72(TCLP)		1.89(TCLP)		0.036	U	0.05(TCLP)		0.026	U	0.036	U	TCLP
10996-002	AOC3B-SA	12/9/2003	1.67		0.196	J	0.461	J	0.528	U	0.528	U	0.528	U	
11035-001	AOC3B-WT	12/10/2003	0.014	U	0.0095	U	~	U	0.015	U	0.011	U	0.0095	U	TCL VO & TCLP
ANOMALY															
08867-010	AN-AOC3D 1	10/6/2003	3.33	J	5.10	U	~		5.10	U	5.10	U	5.10	U	PP+40, sample dilution
09003-001	AOC3D-AN2	10/8/2003	0.023	U	0.014	U	0.0095	U	0.025	U	0.022	U	0.0095	U	TCLP
09722-003	AOC3D-AN3	10/30/2003	1.91		2.86		*6.74*		0.466	U	0.466	U	0.466	U	

-227-

NOTES:

AOC	= Area of Concern
Results in Italics	= Indicates results from soil batches that were subsequently re-treated
--	= Not applicable
~	= Not analyzed
*	= See Table 2 for sample description
1	= Surrogate DCB Recovery criteria was not met due to matrix interference
Q	= Qualifier
U	= Compound was not detected at the method detection limit (MDL). Value given is the MDL
J	= Indicates an estimated value. The compound was detected at a value below the method detection limit but greater than zero.

Table 7. AOC-3C and AOC-4 Presumed Clean Soil Data Summery. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	Panther Sample Number *	Sample Date	AOC Origination	AOC Destination	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP URUSCC					4		23		79		2		8		1000		
NJDEP RUSCC					6		54		1000		7		150		1000		
NJDEP IGWSCC					1		1		1		10		10		50		
Remediation Goal (mg/kg)					5		5		5		7		5		5		
PRESUMED CLEAN																	
06283-001	CSC4-1	7/21/2003	4	4	0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	0.481	U	
06283-002	CSC4-2	7/21/2003	4	4	0.485	U	0.485	U	0.485	U	0.485	U	0.485	U	0.485	U	
06283-003	CSC4-3	7/21/2003	4	4	0.509	U	0.509	U	0.509	U	0.509	U	0.509	U	0.509	U	
06283-004	CSC4-4	7/21/2003	4	4	0.439	U	0.439	U	0.439	U	0.439	U	0.439	U	0.439	U	
06283-005	CSC4-5	7/21/2003	4	4	0.591	U	0.591	U	0.591	U	0.591	U	0.591	U	0.591	U	
08626-009	AOC3C-2	9/29/2003	3C	3C	1.39		0.930	U	0.930	U	0.930	U	0.930	U	0.930	U	
08637-008	AOC3CO-2 200	9/29/2003	3C	3C	0.619	U	0.167	J	0.619	U	0.619	U	0.619	U	0.619	U	
08637-009	AOC3CO-2 300	9/29/2003	3C	3C	0.659	U	0.659	U	0.659	U	0.659	U	0.659	U	0.659	U	
08637-010	AOC3CO-2 400	9/29/2003	3C	3C	0.699		0.670	U	0.670	U	0.670	U	0.670	U	0.670	U	
08637-019	AOC3CO-2 500	9/29/2003	3C	3C	0.554	U	0.554	U	0.554	U	0.554	U	0.554	U	0.554	U	
08710-001	AOC3C2-4 600	10/1/2003	3C	3C	4.66		0.595	U	0.595	U	0.595	U	0.595	U	0.595	U	
08710-002	AOC3C2-4 700	10/1/2003	3C	3C	0.182	J	0.614	J	0.550	J	0.626	U	0.626	U	0.626	U	
09721-005	CSC3C-07	10/30/2003	3C	3C	0.394	J	0.177	J	0.523	U	0.523	U	0.523	U	0.523	U	
09804-001	CSC3C-08	10/31/2003	3C	3C	0.490	U	0.490	U	0.490	U	0.490	U	0.490	U	0.490	U	
09852-010	CSC3C09	11/3/2003	3C	3C	0.492	U	0.492	U	0.492	U	0.492	U	0.492	U	0.492	U	

NOTES:

AOC	= Area of Concern
*	= See Table 2 for sample description
Q	= Qualifier
U	= Compound was not detected at the method detection limit (MDL). Value given is the MDL
J	= Indicates an estimated value. The compound was detected at a value below the method detection limit but greater than zero.

Table 8. Compactor Area Post Excavation Data Summary. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	Panther Sample Number *	Sample Date	Depth (ft BGS)	Tetrachloroethylene	Q	Tricholoroethylene	Q	cis-1,2-Dichloroethylene	Q	Vinyl Chloride	Q	1,1-Dichloroethylene	Q	trans, 1,2-Dichloroethylene	Q	Comments
NJDEP URUSCC				4		23		79		2		8		1000		
NJDEP RUSCC				6		54		1000		7		150		1000		
NJDEP IGWSCC				1		1		1		10		10		50		
Remediation Goal (mg/kg)				5		5		7		5		5		5		
COMPACTOR AREA																
Post-Excavation Lab ID																
11194-001	CAN-5	12/15/2003	5.0-5.5	1.37		1.04		1.41		0.975	U	0.975	U	0.975	U	
11194-002	CAS-6	12/15/2003	6.0-6.5	*43.0*		*22.5*		1.48		0.701	U	0.701	U	0.701	U	Sample dilution
11418-001	CAS2-6	12/22/2003	6.0-6.5	0.718		0.41	U	0.41	U	0.41	U	0.41	U	0.41	U	Over-excavation
11194-003	CAE-5	12/15/2003	5.0-5.5	1.70		0.178	J	0.584	U	0.584	U	0.584	U	0.584	U	
11194-004	CAW-6	12/15/2003	6.0-6.5	0.825		0.260	J	0.370	J	0.625	U	0.625	U	0.625	U	
11194-005	CAF-10	12/15/2003	10.0-10.5	0.603		0.553	U	0.231	J	0.553	U	0.553	U	0.553	U	
Post-Treatment Lab ID																
11545-005	TA59A	12/29/2003		0.577	U	0.577	U	0.577	U	0.577	U	0.577	U	0.577	U	
11545-007	TA60A	12/29/2003		3.02		0.559	U	0.559	U	0.559	U	0.559	U	0.559	U	

NOTES:

AOC	= Area of Concern
CA	= Compactor Area sample designation
Italics Type	= Results exceeded cleanup objective of 5 mg/kg for targeted VOC. These were subsequently over-excavated. All final post-excavatio
--	= Not applicable
*	= See Table 2 for sample description
Q	= Qualifier
U	= Compound was not detected at the method detection limit (MDL). Value given is the MDL.
J	= Indicates an estimated value. The compound was detected at a value below the method detection limit but greater than zero.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
Site ID:				B-201	B-201	B-202	B-202	B-203	B-203	B-204	B-204	B-205
Sample ID:				B201 2-4	B201 12-14	B202 0-2	B202 8-10	B203 0-2	B203 8-10	B204 0-2	B204 8-10	B205 0-2
Date:				09/15/97	09/15/97	09/15/97	09/15/97	09/15/97	09/15/97	09/16/97	09/16/97	09/16/97
Starting Depth ft bls				2.00	12.00	0.00	8.00	0.00	8.00	0.00	8.00	0.00
Ending Depth ft bls				4.00	14.00	2.00	10.00	2.00	10.00	2.00	10.00	2.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.66	<0.64	<0.62	<0.56	<0.75	<0.53	<0.62	<0.65	<0.63
Tetrachloroethene*	4 (b)	6 (b)	1	<0.66	<0.64	3.9	<0.56	**0.49 J**	<0.53	<0.62	<0.65	<0.63
Toluene	1000 (a)	1000 (a)	500	<0.66	<0.64	<0.62	<0.56	<0.75	<0.53	<0.62	<0.65	<0.63
Trichloroethylene*	23	54 (b)	1	<0.66	<0.64	<0.62	<0.56	<0.75	<0.53	<0.62	<0.65	<0.63
Vinyl chloride*	2	7	10	<1.3	<1.2	<1.2	<1.1	<1.4	<1	<1.2	<1.2	<1.2
Xylene (total)	410	1000 (a)	67	<0.66	<0.64	<0.62	<0.56	<0.75	<0.53	<0.62	<0.65	<0.63
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.66	<0.64	<0.62	<0.56	<0.75	<0.53	<0.62	<0.65	<0.63
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
Area of Concern:				AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
Site ID:				B-205	B-205	B-206	B-206	B-207	B-207	B-207	B-234	B-234
Sample ID:				B205 6-8	B205 22-24	B206 0-2	B206 8-10	B207 0-2	B207 4-6	B207 10-12	B234 0.5-2	B234 4-6
Date:				09/16/97	09/16/97	09/17/97	09/17/97	09/16/97	09/16/97	09/16/97	09/25/97	09/25/97
Starting Depth ft bls				6.00	22.00	0.00	8.00	0.00	4.00	10.00	0.50	4.00
Ending Depth ft bls				8.00	24.00	2.00	10.00	2.00	6.00	12.00	2.00	6.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.64	<0.6	<0.62	<0.63	<0.66	<0.65	<0.63	**0.8**	<0.61
Tetrachloroethene*	4 (b)	6 (b)	1	**2.6**	**1.4**	<0.62	**0.33 J**	<0.66	<0.65	<0.63	**470 D**	**78 D**
Toluene	1000 (a)	1000 (a)	500	<0.64	<0.6	<0.62	<0.63	<0.66	<0.65	<0.63	**2.9**	<0.61
Trichloroethylene*	23	54 (b)	1	**39 DJ**	**0.57 J**	<0.62	<0.63	<0.66	<0.65	<0.63	**1.7**	<0.61
Vinyl chloride*	2	7	10	<1.2	<1.2	<1.2	<1.2	<1.3	<1.2	<1.2	<1.3	<1.2
Xylene (total)	410	1000 (a)	67	<0.64	<0.6	<0.62	<0.63	<0.66	<0.65	<0.63	**10**	<0.61
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	**8.2**	**0.64**	<0.62	<0.63	<0.66	<0.65	<0.63	**2.4**	<0.61
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health-based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
Site ID:				B-234	B-235	B-235	B-253	B-253	1A01	1A02	1A03	1A03
Sample ID:				B234 16-18	B235 2-4	B235 12-14	B253 6-8	B253 10-12	1A01(20)	1A02 20	1A03(1)	REP-3
Date:				09/25/97	09/25/97	09/25/97	01/26/98	01/26/98	09/18/02	09/16/02	09/18/02	09/18/02
Starting Depth ft bls				16.00	2.00	12.00	6.00	10.00	20.00	20.00	1.00	1.10
Ending Depth ft bls				18.00	4.00	14.00	8.00	12.00	20.50	20.50	1.50	1.60
Ethylbenzene	1000 (a)	1000 (a)	100	<0.58	<0.57	<0.64	<0.66 J	<0.66 J	<0.659	<0.668	<0.687	<0.731
Tetrachloroethene*	4 (b)	6 (b)	1	<0.58	<0.57	**0.56 J**	<0.66 J	<0.66 J	**0.72**	**1.46**	<0.687	<0.731
Toluene	1000 (a)	1000 (a)	500	<0.58	<0.57	<0.64	<0.66 J	<0.66 J	<0.659	<0.668	<0.687	<0.731
Trichloroethylene*	23	54 (b)	1	<0.58	<0.57	<0.64	<0.66 J	<0.66 J	<0.659	<0.668	<0.687	<0.731
Vinyl chloride*	2	7	10	<1.1	<1.1	<1.2	<1.3 J	<1.3 J	<0.659	<0.668	<0.687	<0.731
Xylene (total)	410	1000 (a)	67	<0.58	<0.57	<0.64	<0.66 J	<0.66 J	<0.659	<0.668	<0.687	<0.731
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.58	<0.57	**0.61 J**	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	<0.66 J	<0.66 J	<0.659	**0.252 J**	<0.687	<0.731

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
Site ID:				1A03	1A04	1A04	1A05A	1A05A	1A05B	1A06	1A06	1A07
Sample ID:				1A03(20)	1A04(1.2)	1A04(20)	1A05A(1.3)	1A05A(20)	1A05B (1.3)	1A06(1.3)	1A06(20)	1A07 (1.0)
Date:				09/18/02	09/19/02	09/19/02	09/18/02	09/18/02	09/27/02	09/18/02	09/18/02	09/27/02
Starting Depth ft bls				20.00	1.20	20.00	1.30	20.00	1.30	1.30	20.00	1.00
Ending Depth ft bls				20.50	1.70	20.50	1.80	20.50	1.80	1.80	20.50	1.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.616	<0.771	<0.633	<0.935	<0.614	<0.624	<0.737	<0.631	<0.671
Tetrachloroethene*	4 (b)	6 (b)	1	**0.26 J**	**0.681 J**	<0.633	**3.27**	**1.84**	**1.45**	**0.953**	**0.779**	**0.321 J**
Toluene	1000 (a)	1000 (a)	500	<0.616	<0.771	<0.633	<0.935	<0.614	<0.624	<0.737	<0.631	<0.671
Trichloroethylene*	23	54 (b)	1	**0.128 J**	<0.771	<0.633	<0.935	<0.614	<0.624	<0.737	<0.631	<0.671
Vinyl chloride*	2	7	10	<0.616	<0.771	<0.633	<0.935	<0.614	<0.624	<0.737	<0.631	<0.671
Xylene (total)	410	1000 (a)	67	<0.616	<0.771	<0.633	<0.935	<0.614	<0.624	<0.737	<0.631	<0.671
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**0.643**	<0.771	<0.633	<0.935	<0.614	<0.624	<0.737	<0.631	<0.671

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
			Area of Concern:	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
			Site ID:	1A08	1A08	1B01	1B02	1B03	1B03	1B04	1B04	1B05
			Sample ID:	1A08 (1.0)	DUP 10	1B01 10	1B02 10	1B03(1)	1B03(10)	1B04(1)	1B04(10)	1B05(1)
			Date:	09/27/02	09/27/02	09/16/02	09/16/02	09/18/02	09/18/02	09/18/02	09/18/02	09/18/02
			Starting Depth ft bls	1.00	1.10	10.00	10.00	1.00	10.00	1.00	10.00	1.00
			Ending Depth ft bls	1.50	1.60	10.50	10.50	1.50	10.50	1.50	10.50	1.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661
Tetrachloroethene*	4 (b)	6 (b)	1	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661
Toluene	1000 (a)	1000 (a)	500	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661
Trichloroethylene*	23	54 (b)	1	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661
Vinyl chloride*	2	7	10	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661
Xylene (total)	410	1000 (a)	67	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.795	<0.667	<0.627	<0.619	<0.676	<0.638	<0.616	<0.613	<0.661

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-1
Site ID:				1B05	1B06	1B06	1C01	1C01	1C01	1C02	1C02	1C03
Sample ID:				1B05(10)	1B06(2)	1B06(10)	1C01(1.75)	1C01(7.5)	1C01(9)	1C02(1.75)	1C02(9)	1C03(1.75)
Date:				09/18/02	09/18/02	09/18/02	09/17/02	09/17/02	09/17/02	09/16/02	09/16/02	09/17/02
Starting Depth ft bls				10.00	2.00	10.00	1.75	7.50	9.00	1.75	9.00	1.75
Ending Depth ft bls				10.50	2.50	10.50	2.25	8.00	9.50	2.25	9.50	2.25
Ethylbenzene	1000 (a)	1000 (a)	100	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	<0.643
Tetrachloroethene*	4 (b)	6 (b)	1	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	**1.62**
Toluene	1000 (a)	1000 (a)	500	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	<0.643
Trichloroethylene*	23	54 (b)	1	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	<0.643
Vinyl chloride*	2	7	10	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	<0.643
Xylene (total)	410	1000 (a)	67	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	<0.643
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.65	<0.664	<0.703	<0.651	<0.709	<0.767	<0.811	<0.733	<0.643

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-1	AOC-1	AOC-1	AOC-1	AOC-1	AOC-9	AOC-9	AOC-9	AOC-9
Site ID:				1C03	1C03	1C04	1C04	1C04	B-231	B-231	B-233	B-233
Sample ID:				1C03(5.1)	1CO3(9)	1C04(1.75)	1C04(5.9)	1C04(9)	B231 5-7	B231 17-19	B233 2-4	B233 10-12
Date:				09/17/02	09/17/02	09/17/02	09/17/02	09/17/02	09/25/97	09/25/97	09/25/97	09/25/97
Starting Depth ft bls				5.10	9.00	1.75	5.90	9.00	5.00	17.00	2.00	10.00
Ending Depth ft bls				5.60	9.50	2.25	6.40	9.50	7.00	19.00	4.00	12.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.619	<0.78	<0.769	<0.587	<0.767	<0.58	<0.65	<0.64	<0.58
Tetrachloroethene*	4 (b)	6 (b)	1	<0.619	<0.78	<0.769	<0.587	<0.767	<0.58	<0.65	<0.64	**1.3**
Toluene	1000 (a)	1000 (a)	500	<0.619	<0.78	<0.769	<0.587	<0.767	<0.58	<0.65	<0.64	<0.58
Trichloroethylene*	23	54 (b)	1	<0.619	<0.78	<0.769	<0.587	<0.767	<0.58	<0.65	<0.64	<0.58
Vinyl chloride*	2	7	10	<0.619	<0.78	<0.769	<0.587	<0.767	<1.1	<1.2	<1.2	<1.1
Xylene (total)	410	1000 (a)	67	<0.619	<0.78	<0.769	<0.587	<0.767	<0.58	<0.65	<0.64	<0.58
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	<0.58	<0.65	<0.64	<0.58
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.619	<0.78	<0.769	<0.587	<0.767	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-1. Summary of Historical Soil Analytical Results for AOC-1. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC				
Area of Concern:				AOC-9	AOC-9	AOC-9	AOC-9
Site ID:				B-236	B-236	B-237	B-237
Sample ID:				B236 0-2	B236 9-11	B237 2-4	B237 8-10
Date:				09/25/97	09/25/97	09/25/97	09/25/97
Starting Depth ft bls				0.00	9.00	2.00	8.00
Ending Depth ft bls				2.00	11.00	4.00	10.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.57	<0.66	<0.6	<0.6
Tetrachloroethene*	4 (b)	6 (b)	1	<0.57	<0.66	<0.6	<0.6
Toluene	1000 (a)	1000 (a)	500	<0.57	<0.66	<0.6	<0.6
Trichloroethylene*	23	54 (b)	1	<0.57	<0.66	<0.6	<0.6
Vinyl chloride*	2	7	10	<1.1	<1.3	<1.2	<1.2
Xylene (total)	410	1000 (a)	67	<0.57	<0.66	<0.6	<0.6
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.57	<0.66	<0.6	<0.6
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-1 Hazardous Materials Storage Building Area
AOC-9 Former 15,000-Gallon Underground Storage Tank (NOTE: 1997/1998 results for borings in this area used to evaluate AOC-1 soil quality distribution)
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
Site ID:				B-208	B-208	B-209	B-209	B-210	B-210	B-210	B-211	B-211
Sample ID:				B208 2-4	B208 22-24	B209 2-4	B209 22-24	B210 2-4	B210 10-12	B210 29-31	B211 0-2	B211 10-12
Date:				09/17/97	09/17/97	09/17/97	09/18/97	09/18/97	09/19/97	09/19/97	09/19/97	09/19/97
Starting Depth ft bls				2.00	22.00	2.00	22.00	2.00	10.00	29.00	0.00	10.00
Ending Depth ft bls				4.00	24.00	4.00	24.00	4.00	12.00	31.00	2.00	12.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.64	<0.64	<0.64	<0.62	<0.65	<0.62 J	<0.64	<0.72	<0.74
Tetrachloroethene*	4 (b)	6 (b)	1	**13**	**1.8**	<0.64	**1.6**	**16**	**9100 DJ**	<0.64	<0.72	<0.74
Toluene	1000 (a)	1000 (a)	500	<0.64	<0.64	<0.64	<0.62	<0.65	<0.62 J	<0.64	<0.72	<0.74
Trichloroethylene*	23	54 (b)	1	<0.64	<0.64	<0.64	<0.62	<0.65	<0.62 J	<0.64	<0.72	<0.74
Vinyl chloride*	2	7	10	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2 J	<1.2	<1.4	<1.4
Xylene (total)	410	1000 (a)	67	<0.64	<0.64	<0.64	<0.62	<0.65	<0.62 J	<0.64	<0.72	<0.74
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.64	<0.64	<0.64	<0.62	<0.65	<0.62 J	<0.64	<0.72	<0.74
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
Site ID:				B-212	B-213	B-238	B-238	B-239	B-239	B-254	B-254	B-255
Sample ID:				B212 14-16	B213 15-17	B238 0.5-2	B238 8-10	B239 0.5-2	B239 8-10	B254 16-18	B254 22-24	B255 2-4
Date:				09/19/97	09/22/97	09/25/97	09/25/97	09/25/97	09/25/97	01/20/98	01/20/98	01/19/98
Starting Depth ft bls				14.00	15.00	0.50	8.00	0.50	8.00	16.00	22.00	2.00
Ending Depth ft bls				16.00	17.00	2.00	10.00	2.00	10.00	18.00	24.00	4.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.75	<0.68	<0.61	<0.64	<0.62	<0.58	<0.62 J	<0.65 J	<0.73
Tetrachloroethene*	4 (b)	6 (b)	1	**1.5**	**2.5**	**0.71**	<0.64	<0.62	<0.58	**0.41 J**	**3.2 J**	<0.73
Toluene	1000 (a)	1000 (a)	500	<0.75	<0.68	**4.2**	<0.64	<0.62	<0.58	<0.62 J	<0.65 J	<0.73
Trichloroethylene*	23	54 (b)	1	<0.75	<0.68	<0.61	<0.64	<0.62	<0.58	<0.62 J	<0.65 J	<0.73
Vinyl chloride*	2	7	10	<1.4	<1.3	<1.2	<1.2	<1.2	<1.1	<1.2 J	<1.2 J	<1.4
Xylene (total)	410	1000 (a)	67	<0.75	<0.68	<0.61	<0.64	<0.62	<0.58	<0.62 J	<0.65 J	<0.73
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.75	<0.68	<0.61	<0.64	<0.62	<0.58	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	<0.62 J	<0.65 J	<0.73

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
Site ID:				B-255	B-256	B-256	B-257	B-257	2A01	2A02	2A03	2A03
Sample ID:				B255 10-12	B256 2-4	B256 10-12	B257 2-4	B257 10-12	2A01 20	2A02 20	2A03(1)	2A03(20)
Date:				01/19/98	01/19/98	01/19/98	01/19/98	01/19/98	09/16/02	09/16/02	09/24/02	09/24/02
Starting Depth ft bls				10.00	2.00	10.00	2.00	10.00	20.00	20.00	1.00	20.00
Ending Depth ft bls				12.00	4.00	12.00	4.00	12.00	20.50	20.50	1.50	20.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.69	<0.66	<0.65 J	<0.61	<0.61 J	<0.703	<0.666	<0.754	<0.7
Tetrachloroethene*	4 (b)	6 (b)	1	<0.69	<0.66	<0.65 J	<0.61	<0.61 J	**2.65**	**1.49**	**0.197 J**	**0.702**
Toluene	1000 (a)	1000 (a)	500	<0.69	<0.66	<0.65 J	<0.61	<0.61 J	<0.703	<0.666	<0.754	<0.7
Trichloroethylene*	23	54 (b)	1	<0.69	<0.66	<0.65 J	<0.61	<0.61 J	<0.703	<0.666	<0.754	<0.7
Vinyl chloride*	2	7	10	<1.3	<1.3	<1.2 J	<1.2	<1.2 J	<0.703	<0.666	<0.754	<0.7
Xylene (total)	410	1000 (a)	67	<0.69	<0.66	<0.65 J	<0.61	<0.61 J	<0.703	<0.666	<0.754	<0.7
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.69	<0.66	<0.65 J	<0.61	<0.61 J	<0.703	<0.666	<0.754	<0.7

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
			Area of Concern:	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
			Site ID:	2A04	2A04	2A05	2A05	2A06	2A06	2A06A	2B01	2B01
			Sample ID:	2A04(1)	2A04(20)	2A05(1)	2A05(20)	2A06(1)	2A06(20)	2A06A (20)	2B01 10	REP-1
			Date:	09/24/02	09/24/02	09/24/02	09/24/02	09/24/02	09/24/02	09/27/02	09/16/02	09/16/02
			Starting Depth ft bls	1.00	20.00	1.00	20.00	1.00	20.00	20.00	10.00	10.10
			Ending Depth ft bls	1.50	20.50	1.50	20.50	1.50	20.50	20.50	10.50	10.60
Ethylbenzene	1000 (a)	1000 (a)	100	<0.69	<0.686	<0.607	<0.691	<0.811	<0.634	<0.656	<0.592	<0.694
Tetrachloroethene*	4 (b)	6 (b)	1	<0.69	**0.16 J**	<0.607	**0.579 J**	**0.209 J**	**2.87**	**1.07**	**0.775**	**0.604 J**
Toluene	1000 (a)	1000 (a)	500	<0.69	<0.686	<0.607	<0.691	<0.811	<0.634	<0.656	<0.592	<0.694
Trichloroethylene*	23	54 (b)	1	<0.69	<0.686	<0.607	<0.691	<0.811	<0.634	<0.656	<0.592	<0.694
Vinyl chloride*	2	7	10	<0.69	<0.686	<0.607	<0.691	<0.811	<0.634	<0.656	<0.592	<0.694
Xylene (total)	410	1000 (a)	67	<0.69	<0.686	<0.607	<0.691	<0.811	<0.634	<0.656	<0.592	<0.694
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.69	<0.686	<0.607	<0.691	<0.811	<0.634	<0.656	<0.592	<0.694

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
Site ID:				2B02	2B02	2B02	2B03	2B03	2B03A	2B04	2B04	2B05
Sample ID:				SB02(1)	SB02(10)	DUP05	2B03(1)	2B03(10)	2B03A (10)	2B04(1)	2B04(10)	2B05(1)
Date:				09/23/02	09/23/02	09/23/02	09/24/02	09/24/02	09/27/02	09/24/02	09/24/02	09/24/02
Starting Depth ft bls				1.00	10.00	10.10	1.00	10.00	10.00	1.00	10.00	1.00
Ending Depth ft bls				1.50	10.50	10.60	1.50	10.50	10.50	1.50	10.50	1.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.713	<0.62	<0.695	<0.662	<0.645	<0.717	<0.75	<0.753	<0.702
Tetrachloroethene*	4 (b)	6 (b)	1	<0.713	**0.199 J**	<0.695	<0.662	**0.475 J**	<0.717	<0.75	**2.74**	<0.702
Toluene	1000 (a)	1000 (a)	500	<0.713	<0.62	<0.695	<0.662	<0.645	<0.717	<0.75	<0.753	<0.702
Trichloroethylene*	23	54 (b)	1	<0.713	<0.62	<0.695	<0.662	<0.645	<0.717	<0.75	<0.753	<0.702
Vinyl chloride*	2	7	10	<0.713	<0.62	<0.695	**0.269 J**	<0.645	<0.717	<0.75	<0.753	<0.702
Xylene (total)	410	1000 (a)	67	<0.713	<0.62	<0.695	<0.662	<0.645	<0.717	<0.75	<0.753	<0.702
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.713	<0.62	<0.695	**3.82**	<0.645	<0.717	<0.75	**0.208 J**	<0.702

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
Site ID:				2B05	2C01	2C01	2C02	2C02	2C02	2C03	2C03	2C04
Sample ID:				2B05(10)	2C01(1.75)	2C01(10)	2C02(1.75)	2C02(10)	2C02(12)	2C03(1.75)	2C03(10.5)	2C04(1.75)
Date:				09/24/02	09/18/02	09/18/02	09/18/02	09/18/02	09/18/02	09/18/02	09/18/02	09/18/02
Starting Depth ft bls				10.00	1.75	10.00	1.75	10.00	12.00	1.75	10.50	1.75
Ending Depth ft bls				10.50	2.25	10.50	2.25	10.50	12.50	2.25	11.00	2.25
Ethylbenzene	1000 (a)	1000 (a)	100	<0.738	<0.665	<0.716	<0.774	<0.696	<0.701	<0.7	<0.701	<0.749
Tetrachloroethene*	4 (b)	6 (b)	1	**0.345 J**	**0.256 J**	**0.414 J**	**4.95**	**3.44**	**6.92**	<0.7	<0.701	<0.749
Toluene	1000 (a)	1000 (a)	500	<0.738	<0.665	<0.716	<0.774	<0.696	<0.701	<0.7	<0.701	<0.749
Trichloroethylene*	23	54 (b)	1	<0.738	<0.665	<0.716	<0.774	<0.696	<0.701	<0.7	<0.701	<0.749
Vinyl chloride*	2	7	10	<0.738	<0.665	<0.716	<0.774	<0.696	<0.701	<0.7	<0.701	<0.749
Xylene (total)	410	1000 (a)	67	<0.738	<0.665	<0.716	<0.774	<0.696	<0.701	<0.7	<0.701	<0.749
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.738	<0.665	<0.716	<0.774	<0.696	<0.701	<0.7	<0.701	<0.749

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-2. Summary of Historical Soil Analytical Results for AOC-2. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC					
Area of Concern:				AOC-2	AOC-2	AOC-2	AOC-2	AOC-2
Site ID:				2C04	2C05	2C05	2C05	2C05
Sample ID:				2C04(10)	2C05 (1.75)	2C05 (12)	2C05 (16)	2C05 (20)
Date:				09/18/02	09/27/02	09/27/02	09/27/02	09/27/02
Starting Depth ft bls				10.00	1.75	12.00	16.00	20.00
Ending Depth ft bls				10.50	2.25	12.50	16.50	20.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.606	<0.875	<0.666	<0.701	<0.59
Tetrachloroethene*	4 (b)	6 (b)	1	**1.23**	<0.875	**2.41**	**1.99**	**0.815**
Toluene	1000 (a)	1000 (a)	500	<0.606	<0.875	<0.666	<0.701	<0.59
Trichloroethylene*	23	54 (b)	1	<0.606	<0.875	<0.666	<0.701	<0.59
Vinyl chloride*	2	7	10	<0.606	<0.875	<0.666	<0.701	<0.59
Xylene (total)	410	1000 (a)	67	<0.606	<0.875	<0.666	<0.701	<0.59
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.606	<0.875	<0.666	<0.701	<0.59

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-2 Former Parking Island Drum Storage Area # 1
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-221	B-221	B-222	B-222	B-223	B-223	B-224	B-224	B-225
Sample ID:				B221 2-4	B221 10-12	B222 2-4	B222 8-10	B223 2-4	B223 8-10	B224 2-4	B224 14-16	B225 3-5
Date:				09/24/97	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97
Starting Depth ft bls				2.00	10.00	2.00	8.00	2.00	8.00	2.00	14.00	3.00
Ending Depth ft bls				4.00	12.00	4.00	10.00	4.00	10.00	4.00	16.00	5.00
Ethylbenzene	1000 (a)	1000 (a)	100	**0.12 J**	<0.64	**0.51 J**	**0.098 J**	**410 D**	**0.25 J**	<0.69	<0.65	**3.8**
Tetrachloroethene*	4 (b)	6 (b)	1	<0.95 J	<0.64	**0.4 J**	<0.64	**1700 D**	<0.71	**160 D**	<0.65	<0.91
Toluene	1000 (a)	1000 (a)	500	**1.4 J**	**0.68**	<0.9	<0.64	**520 D**	<0.71	<0.69	<0.65	**1.3**
Trichloroethylene*	23	54 (b)	1	<0.95 J	<0.64	<0.9	<0.64	**390 D**	<0.71	<0.69	<0.65	<0.91
Vinyl chloride*	2	7	10	<1.8 J	<1.2	<1.8	<1.2	**1 J**	<1.4	<1.3	<1.2	<1.8
Xylene (total)	410	1000 (a)	67	<0.95 J	<0.64	**1.2**	**0.22 J**	**1300 D**	**0.58 J**	<0.69	<0.65	**19**
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.95 J	<0.64	<0.9	<0.64	**130 D**	<0.71	<0.69	<0.65	<0.91
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-225	B-240	B-240	B-241	B-241	B-242	B-242	B-242	B-243
Sample ID:				B225 9-11	B240 0.5-2	B240 8-10	B241 2-4	B241 10-12	B242 2-4	B242 10-12	B242 22-24	B243 7-9
Date:				09/24/97	09/25/97	09/25/97	09/25/97	09/25/97	09/25/97	09/25/97	09/25/97	09/25/97
Starting Depth ft bls				9.00	0.50	8.00	2.00	10.00	2.00	10.00	22.00	7.00
Ending Depth ft bls				11.00	2.00	10.00	4.00	12.00	4.00	12.00	24.00	9.00
Ethylbenzene	1000 (a)	1000 (a)	100	**0.2 J**	<0.54	<0.63	<0.71	<0.61	**0.16 J**	**0.23 J**	<0.54	<0.69
Tetrachloroethene*	4 (b)	6 (b)	1	<0.69	<0.54	<0.63	**1.7**	**59 D**	<0.61	<0.73	**0.85**	<0.69
Toluene	1000 (a)	1000 (a)	500	**2.9**	<0.54	**0.3 J**	<0.71	<0.61	<0.61	<0.73	**0.32 J**	<0.69
Trichloroethylene*	23	54 (b)	1	<0.69	<0.54	<0.63	<0.71	**0.76**	<0.61	<0.73	<0.54	<0.69
Vinyl chloride*	2	7	10	<1.3	<1	<1.2	<1.4	<1.2	<1.2	<1.4	<1	<1.3
Xylene (total)	410	1000 (a)	67	**0.78**	<0.54	<0.63	<0.71	**0.54 J**	<0.61	<0.73	<0.54	<0.69
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.69	<0.54	<0.63	**9.2**	**2**	<0.61	<0.73	<0.54	<0.69
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-244	B-244	B-245	B-245	B-245	B-246	B-246	B-247	B-247
Sample ID:				244 2-4	B214 12-14	B245 2-4	B245 10-12	B245 14-16	246 0-2	246 16-18	B247 2-4	B247 10-12
Date:				09/26/97	09/26/97	09/26/97	09/26/97	09/26/97	09/26/97	09/26/97	09/26/97	09/25/97
Starting Depth ft bls				2.00	12.00	2.00	10.00	14.00	0.00	16.00	2.00	10.00
Ending Depth ft bls				4.00	14.00	4.00	12.00	16.00	2.00	18.00	4.00	12.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.83	<0.65	<0.68	<0.7	<0.64	<0.7	<0.65	<0.63	<0.62
Tetrachloroethene*	4 (b)	6 (b)	1	<0.83	**4.1**	<0.68	<0.7	<0.64	**28**	**26**	<0.63	<0.62
Toluene	1000 (a)	1000 (a)	500	<0.83	<0.65	<0.68	<0.7	<0.64	<0.7	<0.65	<0.63	<0.62
Trichloroethylene*	23	54 (b)	1	<0.83	<0.65	<0.68	<0.7	<0.64	**0.39 J**	**0.4 J**	<0.63	<0.62
Vinyl chloride*	2	7	10	<1.6	<1.3	<1.3	<1.4	<1.2	<1.4	<1.3	<1.2	<1.2
Xylene (total)	410	1000 (a)	67	<0.83	<0.65	<0.68	<0.7	<0.64	<0.7	<0.65	<0.63	<0.62
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.83	<0.65	<0.68	<0.7	<0.64	**1.3**	**1.3**	<0.63	<0.62
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-248	B-248	B-249	B-249	B-250	B-250	B-251	B-251	B-251
Sample ID:				B248 0-2	B248 8-10	249 0-2	249 8-10	250 2-4	B-250 8-10	B251 0-2	B251 12-14	B251 22-24
Date:				09/26/97	09/26/97	09/26/97	09/25/97	09/26/97	09/25/97	09/26/97	09/26/97	09/26/97
Starting Depth ft bls				0.00	8.00	2.00	8.00	2.00	8.00	0.00	12.00	22.00
Ending Depth ft bls				2.00	10.00	4.00	10.00	4.00	10.00	2.00	14.00	24.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.78	<0.66	<0.67	<0.65	<0.69	<0.64	<0.67	<0.59	<0.61
Tetrachloroethene*	4 (b)	6 (b)	1	<0.78	**2**	**0.6 J**	<0.65	**0.86**	**7.4**	<0.67	**0.67**	**1.4**
Toluene	1000 (a)	1000 (a)	500	<0.78	**1**	<0.67	<0.65	<0.69	<0.64	<0.67	<0.59	<0.61
Trichloroethylene*	23	54 (b)	1	<0.78	**0.37 J**	<0.67	<0.65	<0.69	<0.64	<0.67	**10**	**1.5**
Vinyl chloride*	2	7	10	<1.5	<1.3	<1.3	<1.3	<1.3	<1.2	<1.3	<1.1	<1.2
Xylene (total)	410	1000 (a)	67	<0.78	<0.66	<0.67	<0.65	<0.69	<0.64	<0.67	<0.59	<0.61
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.78	**1.5**	<0.67	<0.65	<0.69	<0.64	<0.67	<0.59	<0.61
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	---	---	---	---	---	---	---

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-252	B-252	B-258	B-258	B-259	B-259	B-260	B-260	B-261
Sample ID:				B252 2-4	B252 10-12	B258 6-8	B258 20-22	B259 16-18	B259 22-24	B260 12-14	B260 32-34	B261 12-14
Date:				09/26/97	09/26/97	01/20/98	01/20/98	01/21/98	01/21/98	01/22/98	01/22/98	01/29/98
Starting Depth ft bls				2.00	10.00	6.00	20.00	16.00	22.00	12.00	32.00	12.00
Ending Depth ft bls				4.00	12.00	8.00	22.00	18.00	24.00	14.00	34.00	14.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.72	<0.66	<0.62 J	<0.65 J	<0.7 J	<0.56 J	<0.63 J	<0.63 J	<0.69
Tetrachloroethene*	4 (b)	6 (b)	1	**3.3**	**2.8**	<0.62 J	**0.77 J**	**4.5 J**	**2.1 J**	**0.64 J**	<0.63 J	<0.69
Toluene	1000 (a)	1000 (a)	500	<0.72	<0.66	<0.62 J	<0.65 J	<0.7 J	<0.56 J	<0.63 J	<0.63 J	<0.69
Trichloroethylene*	23	54 (b)	1	**0.45 J**	<0.66	<0.62 J	<0.65 J	<0.7 J	**0.54 J**	**0.74 J**	<0.63 J	<0.69
Vinyl chloride*	2	7	10	<1.4	<1.3	<1.2 J	<1.2 J	<1.3 J	<1.1 J	<1.2 J	<1.2 J	<1.3
Xylene (total)	410	1000 (a)	67	<0.72	<0.66	<0.62 J	<0.65 J	<0.7 J	<0.56 J	<0.63 J	<0.63 J	<0.69
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	**3.1**	**0.42 J**	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	<0.62 J	<0.65 J	<0.7 J	<0.56 J	<0.63 J	<0.63 J	<0.69

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-261	B-262	B-262	B-263	B-263	B-264	B-264	B-264	B-265
Sample ID:				B261 16-18	B262 12-14	B262 16-18	B263 22-24	B263 34-36	B264 12-14	B264 18-20	B264 36-38	B265 2-4
Date:				01/29/98	01/30/98	01/30/98	01/21/98	01/21/98	01/22/98	01/22/98	01/22/98	01/30/98
Starting Depth ft bls				16.00	12.00	16.00	22.00	34.00	12.00	18.00	36.00	2.00
Ending Depth ft bls				18.00	14.00	18.00	24.00	36.00	14.00	20.00	38.00	4.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.81	<0.75	<0.72	<0.62 J	<0.62 J	<0.66 J	<0.59 J	<0.61 J	<0.75
Tetrachloroethene*	4 (b)	6 (b)	1	<0.81	<0.75	**0.89**	**3.3 J**	**1.8 J**	**14 J**	**4.1 J**	**1.9 J**	<0.75
Toluene	1000 (a)	1000 (a)	500	<0.81	<0.75	<0.72	<0.62 J	<0.62 J	<0.66 J	<0.59 J	<0.61 J	<0.75
Trichloroethylene*	23	54 (b)	1	<0.81	<0.75	<0.72	<0.62 J	<0.62 J	<0.66 J	**0.48 J**	<0.61 J	<0.75
Vinyl chloride*	2	7	10	<1.6	<1.4	<1.4	<1.2 J	<1.2 J	<1.3 J	<1.1 J	<1.2 J	<1.4
Xylene (total)	410	1000 (a)	67	<0.81	<0.75	<0.72	<0.62 J	<0.62 J	<0.66 J	<0.59 J	<0.61 J	<0.75
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.81	<0.75	<0.72	<0.62 J	<0.62 J	<0.66 J	<0.59 J	<0.61 J	<0.75

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-265	B-266	B-266	B-266	B-267	B-267	B-267	B-268	B-268
Sample ID:				B265 14-16	B266 2-4	B266 8-10	B266 16-18	B267 2-4	B267 16-18	B267 30-32	B268 8-10	B268 18-20
Date:				01/30/98	01/30/98	01/30/98	01/30/98	01/26/98	01/26/98	01/26/98	01/30/98	01/30/98
Starting Depth ft bls				14.00	2.00	8.00	16.00	2.00	16.00	30.00	8.00	18.00
Ending Depth ft bls				16.00	4.00	10.00	18.00	4.00	18.00	32.00	10.00	20.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.81	<0.72	<0.8	<0.7	<0.78	<0.65	<0.69 J	<0.69	<0.74
Tetrachloroethene*	4 (b)	6 (b)	1	**1**	<0.72	<0.8	**3**	**24000 DJ**	**5600 DJ**	**1.5 J**	<0.69	**1.6**
Toluene	1000 (a)	1000 (a)	500	<0.81	<0.72	<0.8	<0.7	<0.78	<0.65	<0.69 J	<0.69	<0.74
Trichloroethylene*	23	54 (b)	1	<0.81	<0.72	<0.8	**0.43 J**	**320 E**	**4.5**	<0.69 J	<0.69	<0.74
Vinyl chloride*	2	7	10	<1.6	<1.4	<1.5	<1.4	**3.1**	<1.2	<1.3 J	<1.3	<1.4
Xylene (total)	410	1000 (a)	67	<0.81	<0.72	<0.8	<0.7	<0.78	<0.65	<0.69 J	<0.69	<0.74
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.81	<0.72	<0.8	<0.7	**380 E**	**1.7**	<0.69 J	<0.69	<0.74

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-269	B-269	B-269	B-270	B-270	B-271	B-271	B-271	B-271
Sample ID:				B269 2-4	B269 10-12	B269 20-22	B210 2-4	B270 16-18	B271 2-4	B271 8-10	B271 16-18	B271 22-24
Date:				01/20/98	01/20/98	01/20/98	02/03/98	02/03/98	02/02/98	02/02/98	02/02/98	02/02/98
Starting Depth ft bls				2.00	10.00	20.00	2.00	16.00	2.00	8.00	16.00	22.00
Ending Depth ft bls				4.00	12.00	22.00	4.00	18.00	4.00	10.00	18.00	24.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.69 J	<0.72 J	<0.66 J	<0.84	<0.66	<0.8 J	<0.73 J	<0.73 J	<0.84 J
Tetrachloroethene*	4 (b)	6 (b)	1	<0.69 J	<0.72 J	<0.66 J	<0.84	<0.66	**1.7 J**	<0.73 J	<0.73 J	<0.84 J
Toluene	1000 (a)	1000 (a)	500	<0.69 J	<0.72 J	<0.66 J	<0.84	<0.66	<0.8 J	<0.73 J	<0.73 J	<0.84 J
Trichloroethylene*	23	54 (b)	1	<0.69 J	<0.72 J	<0.66 J	<0.84	<0.66	<0.8 J	<0.73 J	**1 J**	<0.84 J
Vinyl chloride*	2	7	10	<1.3 J	<1.4 J	<1.3 J	<1.6	<1.3	<1.5 J	**2.6 J**	**1.2 J**	**2.7 J**
Xylene (total)	410	1000 (a)	67	<0.69 J	<0.72 J	<0.66 J	<0.84	<0.66	<0.8 J	<0.73 J	<0.73 J	<0.84 J
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.69 J	<0.72 J	<0.66 J	<0.84	<0.66	<0.8 J	**2 J**	**1.2 J**	**5.4 J**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				B-271	B-272	B-272	B-273	B-273	3A01	3A02	3A03	3A03
Sample ID:				B271 32-34	B272 14-16	B272 18-20	B273 8-10	B273 12-14	3A01(20)	3A02(20)	3A03(20)	REP-5
Date:				02/02/98	02/02/98	02/02/98	02/02/98	02/02/98	09/20/02	09/20/02	09/20/02	09/20/02
Starting Depth ft bls				32.00	14.00	18.00	8.00	12.00	20.00	20.00	20.00	20.10
Ending Depth ft bls				34.00	16.00	20.00	10.00	14.00	20.50	20.50	20.50	20.60
Ethylbenzene	1000 (a)	1000 (a)	100	<0.82 J	<0.67 J	<0.59 J	<0.63 J	<0.72 J	<0.641	<0.602	<0.639	<0.634
Tetrachloroethene*	4 (b)	6 (b)	1	<0.82 J	<0.67 J	**1.1 J**	<0.63 J	<0.72 J	**1.62**	**1.34**	**1.33**	**1.62**
Toluene	1000 (a)	1000 (a)	500	<0.82 J	<0.67 J	<0.59 J	<0.63 J	<0.72 J	<0.641	<0.602	<0.639	<0.634
Trichloroethylene*	23	54 (b)	1	<0.82 J	<0.67 J	**1 J**	<0.63 J	<0.72 J	**0.184 J**	**0.699**	**0.289 J**	**0.369 J**
Vinyl chloride*	2	7	10	**0.7 J**	<1.3 J	<1.1 J	<1.2 J	<1.4 J	<0.641	<0.602	<0.639	<0.634
Xylene (total)	410	1000 (a)	67	<0.82 J	<0.67 J	<0.59 J	<0.63 J	<0.72 J	<0.641	<0.602	<0.639	<0.634
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**1.6 J**	<0.67 J	<0.59 J	<0.63 J	<0.72 J	<0.641	<0.602	<0.639	<0.634

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3A04	3A04	3A04	3A05	3A06	3A06	3A06	3A07	3A07
Sample ID:				3A04(6.5)	3A04(20.3)	3A04(24)	3A05(20)	3A06(1.0)	3A06(20.0)	3A06(23.3)	3A07(1.0)	DUP07
Date:				09/20/02	09/20/02	09/20/02	09/20/02	09/26/02	09/26/02	09/26/02	09/25/02	09/25/02
Starting Depth ft bls				6.50	20.30	24.00	20.00	1.00	20.00	23.30	1.00	1.10
Ending Depth ft bls				7.00	20.80	24.50	20.50	1.50	20.50	23.80	1.50	1.60
Ethylbenzene	1000 (a)	1000 (a)	100	<0.668	<0.656	<0.664	<0.59	<0.76	<0.567	<0.623	<0.658	<0.705
Tetrachloroethene*	4 (b)	6 (b)	1	**414 D**	**1.74**	**2.76**	**1.48**	<0.76	**0.824**	**0.81**	<0.658	<0.705
Toluene	1000 (a)	1000 (a)	500	<0.668	<0.656	<0.664	<0.59	<0.76	<0.567	<0.623	<0.658	<0.705
Trichloroethylene*	23	54 (b)	1	<0.668	**0.439 J**	**0.394 J**	**0.379 J**	<0.76	**0.115 J**	**0.198 J**	<0.658	<0.705
Vinyl chloride*	2	7	10	<0.668	<0.656	<0.664	<0.59	<0.76	<0.567	<0.623	<0.658	<0.705
Xylene (total)	410	1000 (a)	67	<0.668	<0.656	<0.664	<0.59	<0.76	<0.567	<0.623	<0.658	<0.705
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**0.378 J**	<0.656	<0.664	<0.59	<0.76	<0.567	<0.623	<0.658	<0.705

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3A07	3A07	3A08	3A08	3A08	3A09	3A09	3A09	3A10
Sample ID:				3A07(20)	3A07(23.5)	3A08(1)	3A08(20)	3A08(23.5)	3A09(1.0)	3A09(20.0)	3A09(23.5)	3A10(1.75)
Date:				09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/26/02
Starting Depth ft bls				20.00	23.50	1.00	20.00	23.50	1.00	20.00	23.50	1.75
Ending Depth ft bls				20.50	24.00	1.50	20.50	24.00	1.50	20.50	24.00	2.25
Ethylbenzene	1000 (a)	1000 (a)	100	<0.603	<0.651	<0.805	<0.564	<0.637	<0.643	<0.627	<0.614	<0.659
Tetrachloroethene*	4 (b)	6 (b)	1	**1.26**	**3.59**	<0.805	**0.651**	**0.748**	<0.643	**1.38**	**2.36**	**0.358 J**
Toluene	1000 (a)	1000 (a)	500	<0.603	<0.651	<0.805	<0.564	<0.637	<0.643	<0.627	<0.614	<0.659
Trichloroethylene*	23	54 (b)	1	**0.123 J**	**0.339 J**	<0.805	**0.206 J**	**0.182 J**	<0.643	**0.341 J**	**0.738**	<0.659
Vinyl chloride*	2	7	10	<0.603	<0.651	<0.805	<0.564	<0.637	**1.21**	<0.627	<0.614	<0.659
Xylene (total)	410	1000 (a)	67	<0.603	<0.651	<0.805	<0.564	<0.637	<0.643	<0.627	<0.614	<0.659
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.603	<0.651	**0.696 J**	<0.564	<0.637	**3.33**	<0.627	<0.614	<0.659

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3A10	3A10	3A10	3A11	3A11	3A12	3A13	3B01	3B01
Sample ID:				3A10(11.0)	3A10(20.0)	DUP 08	3A11(1.0)	DUP 09	3A12(1.0)	3A13(1.0)	3B01(20)	3B01(24)
Date:				09/26/02	09/26/02	09/26/02	09/26/02	09/26/02	09/26/02	09/26/02	09/17/02	09/17/02
Starting Depth ft bls				11.00	20.00	20.10	1.00	1.10	1.00	1.00	20.00	24.00
Ending Depth ft bls				11.50	20.50	20.60	1.50	1.60	1.50	1.50	20.50	24.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.719	<0.583	<0.694	<0.655	<0.691	<0.595	<0.655	<0.751	<0.761
Tetrachloroethene*	4 (b)	6 (b)	1	**0.254 J**	**0.846**	**1.17**	<0.655	<0.691	<0.595	<0.655	<0.751	<0.761
Toluene	1000 (a)	1000 (a)	500	<0.719	<0.583	<0.694	<0.655	<0.691	<0.595	<0.655	<0.751	<0.761
Trichloroethylene*	23	54 (b)	1	<0.719	<0.583	**0.14 J**	<0.655	<0.691	<0.595	<0.655	<0.751	<0.761
Vinyl chloride*	2	7	10	<0.719	<0.583	<0.694	<0.655	<0.691	<0.595	<0.655	**0.62 J**	**3.18**
Xylene (total)	410	1000 (a)	67	<0.719	<0.583	<0.694	<0.655	<0.691	<0.595	<0.655	<0.751	<0.761
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.719	<0.583	<0.694	<0.655	<0.691	<0.595	<0.655	**14.1**	**37.4**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3B01	3B02	3B02	3B03	3B03	3B03	3B03	3B04	3B04
Sample ID:				3B01(26.5)	3B02(20)	3B02(26.5)	3B03(20)	3B03(24)	3B03(26.5)	REP-4	3B04(20)	3B04(24)
Date:				09/17/02	09/19/02	09/19/02	09/19/02	09/19/02	09/19/02	09/19/02	09/19/02	09/19/02
Starting Depth ft bls				26.50	20.00	26.50	20.00	24.00	26.50	26.60	20.00	24.00
Ending Depth ft bls				27.00	20.50	27.00	20.50	24.50	27.00	27.10	20.50	24.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.645	<0.745	<0.68	<0.603	<0.675	<0.643	<0.638	<0.64	<0.751
Tetrachloroethene*	4 (b)	6 (b)	1	<0.645	<0.745	<0.68	<0.603	<0.675	<0.643	<0.638	**3.48**	**4.36**
Toluene	1000 (a)	1000 (a)	500	<0.645	<0.745	<0.68	**0.26 J**	**0.679**	<0.643	<0.638	<0.64	<0.751
Trichloroethylene*	23	54 (b)	1	**1.62**	<0.745	<0.68	<0.603	<0.675	<0.643	<0.638	**0.349 J**	**0.38 J**
Vinyl chloride*	2	7	10	**1.29**	**4.81**	<0.68	**1.14**	<0.675	<0.643	<0.638	<0.64	<0.751
Xylene (total)	410	1000 (a)	67	<0.645	<0.745	<0.68	<0.603	**0.147 J**	<0.643	<0.638	<0.64	<0.751
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**8.04**	**27**	<0.68	**3.37**	<0.675	<0.643	<0.638	**1.07**	**1.19**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3B04	3B05	3B05	3B06A	3B06A	3B06A	3B06A	3B07	3B07
Sample ID:				3B04(26.5)	3B05(20)	3B05(26.5)	3B06A(1.0)	3B06A(20)	3B06A(26.5)	3B06A(31)	3B07(1.0)	3B07(20)
Date:				09/19/02	09/20/02	09/20/02	09/20/02	09/20/02	09/20/02	09/20/02	09/19/02	09/19/02
Starting Depth ft bls				26.50	20.00	26.50	1.00	20.00	26.50	31.00	1.00	20.00
Ending Depth ft bls				27.00	20.50	27.00	1.50	20.50	27.00	31.50	1.50	20.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.629	<0.651	<0.619	<0.89	<0.838	<0.605	<0.781	<0.665	<0.675
Tetrachloroethene*	4 (b)	6 (b)	1	**1.32**	**0.884**	**0.506 J**	**18.3**	<0.838	<0.605	<0.781	<0.665	<0.675
Toluene	1000 (a)	1000 (a)	500	<0.629	<0.651	<0.619	<0.89	<0.838	<0.605	<0.781	<0.665	<0.675
Trichloroethylene*	23	54 (b)	1	<0.629	<0.651	<0.619	**1.35**	<0.838	<0.605	**1.56**	<0.665	<0.675
Vinyl chloride*	2	7	10	<0.629	<0.651	<0.619	<0.89	<0.838	**2.06**	**3.67**	<0.665	**0.514 J**
Xylene (total)	410	1000 (a)	67	<0.629	<0.651	<0.619	<0.89	<0.838	<0.605	<0.781	<0.665	<0.675
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.629	<0.651	<0.619	**1.24**	**5.9**	**5.51**	**9.16**	<0.665	**2.08**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3B08	3B08	3B09	3B09	3B09	3B10	3B11C	3B11C	3B12
Sample ID:				3B08(1.0)	3B08(20.0)	3B09(1.0)	3B09(20)	3B09(24)	3B10 1	3B11C(1.0)	3B11C(20)	3B12 2
Date:				09/19/02	09/19/02	09/20/02	09/20/02	09/20/02	09/16/02	09/19/02	09/19/02	09/16/02
Starting Depth ft bls				1.00	20.00	1.00	20.00	24.00	1.00	1.00	20.00	2.00
Ending Depth ft bls				1.50	20.50	1.50	20.50	24.50	1.50	1.50	20.50	2.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.716	<0.734	<0.624	<0.591	<0.58	<0.641	<0.896	<0.734	<0.711
Tetrachloroethene*	4 (b)	6 (b)	1	<0.716	<0.734	<0.624	**1.2**	**1.09**	<0.641	**6.41**	<0.734	**1.77**
Toluene	1000 (a)	1000 (a)	500	<0.716	<0.734	<0.624	<0.591	<0.58	<0.641	<0.896	<0.734	<0.711
Trichloroethylene*	23	54 (b)	1	<0.716	<0.734	<0.624	**0.213 J**	**0.121 J**	<0.641	**0.283 J**	**0.166 J**	**0.144 J**
Vinyl chloride*	2	7	10	<0.716	<0.734	<0.624	<0.591	<0.58	<0.641	<0.896	<0.734	**6.01**
Xylene (total)	410	1000 (a)	67	<0.716	<0.734	<0.624	<0.591	<0.58	<0.641	<0.896	<0.734	<0.711
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.716	<0.734	<0.624	**0.148 J**	<0.58	<0.641	**0.491 J**	**0.235 J**	**1.61**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3B12B	3B12B	3B13	3B13	3B14	3B14	3B15	3B15	3B16
Sample ID:				3B12B(1.0)	3B12B(20)	3B13(1.5)	3B13(20)	3B14(1.0)	3B14(20)	3B15(1.0)	3B15(20)	3B16(1.0)
Date:				09/19/02	09/19/02	09/19/02	09/19/02	09/19/02	09/19/02	09/20/02	09/19/02	09/19/02
Starting Depth ft bls				1.00	20.00	1.50	20.00	1.00	20.00	1.00	20.00	1.00
Ending Depth ft bls				1.50	20.50	2.00	20.50	1.50	20.50	1.50	20.50	1.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.596	<0.676	<0.945	<0.716	<0.645	<0.648	<0.593	<0.664	<0.833
Tetrachloroethene*	4 (b)	6 (b)	1	<0.596	<0.676	<0.945	<0.716	<0.645	**0.88**	**0.168 J**	**0.214 J**	<0.833
Toluene	1000 (a)	1000 (a)	500	<0.596	<0.676	<0.945	<0.716	<0.645	<0.648	<0.593	<0.664	<0.833
Trichloroethylene*	23	54 (b)	1	<0.596	**0.15 J**	<0.945	<0.716	<0.645	<0.648	**0.124 J**	**0.358 J**	<0.833
Vinyl chloride*	2	7	10	<0.596	<0.676	<0.945	<0.716	<0.645	<0.648	<0.593	<0.664	<0.833
Xylene (total)	410	1000 (a)	67	<0.596	<0.676	<0.945	<0.716	<0.645	<0.648	<0.593	<0.664	<0.833
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.596	**0.199 J**	<0.945	<0.716	<0.645	<0.648	**0.9**	**0.722**	<0.833

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3B16	3C01	3C01	3C01	3C01	3C02	3C02	3C02	3C03
Sample ID:				3B16(20)	3C01(1.75)	3C01(7.50)	3C01(20.0)	3C01(23.5)	3C02(1.75)	3C02(11)	3C02(23.5)	3C03(1.75)
Date:				09/19/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02	09/25/02
Starting Depth ft bls				20.00	1.75	7.50	20.00	23.50	1.75	11.00	23.50	1.75
Ending Depth ft bls				20.50	2.25	8.00	20.50	24.00	2.25	11.50	24.00	2.25
Ethylbenzene	1000 (a)	1000 (a)	100	<0.601	<0.625	<0.652	<0.593	<0.63	<0.666	<0.708	<0.54	<0.65
Tetrachloroethene*	4 (b)	6 (b)	1	<0.601	<0.625	**0.788**	**1.18**	**3.67**	<0.666	**2.91**	**0.567**	**0.451 J**
Toluene	1000 (a)	1000 (a)	500	<0.601	<0.625	<0.652	<0.593	<0.63	<0.666	<0.708	<0.54	<0.65
Trichloroethylene*	23	54 (b)	1	<0.601	<0.625	<0.652	**0.332 J**	**1.14**	<0.666	**0.17 J**	**0.647**	<0.65
Vinyl chloride*	2	7	10	**1.06**	<0.625	<0.652	<0.593	<0.63	<0.666	<0.708	<0.54	<0.65
Xylene (total)	410	1000 (a)	67	<0.601	<0.625	<0.652	<0.593	<0.63	<0.666	<0.708	<0.54	<0.65
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**1.24**	**0.326 J**	<0.652	<0.593	<0.63	<0.666	<0.708	<0.54	<0.65

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3C03	3C03	3C07	3C07	3C07	3C08	3C08	3C08	3C08
Sample ID:				3C03(11.0)	3C03(23.0)	3C07(1.75)	3C07(15)	3C07(20)	3C08(1.75)	3C08(14.0)	3C08(22.5)	3C08(27.5)
Date:				09/25/02	09/25/02	09/24/02	09/24/02	09/24/02	09/25/02	09/25/02	09/25/02	09/25/02
Starting Depth ft bls				11.00	23.00	1.75	15.00	20.00	1.75	14.00	22.50	27.50
Ending Depth ft bls				11.50	23.50	2.25	15.50	20.50	2.25	14.50	23.00	28.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.655	<0.658	<0.724	<0.565	<0.618	<0.679	<0.669	<0.673	<0.68
Tetrachloroethene*	4 (b)	6 (b)	1	**0.882**	**0.692**	**0.357 J**	**0.182 J**	**0.577 J**	<0.679	<0.669	<0.673	**1.48**
Toluene	1000 (a)	1000 (a)	500	<0.655	<0.658	<0.724	<0.565	<0.618	<0.679	<0.669	<0.673	<0.68
Trichloroethylene*	23	54 (b)	1	<0.655	**0.512 J**	**1.22**	**0.245 J**	**1.12**	<0.679	**0.946**	**11.7**	**1.73**
Vinyl chloride*	2	7	10	<0.655	<0.658	<0.724	<0.565	<0.618	<0.679	<0.669	<0.673	<0.68
Xylene (total)	410	1000 (a)	67	<0.655	<0.658	<0.724	<0.565	<0.618	<0.679	<0.669	<0.673	<0.68
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.655	<0.658	**0.563 J**	<0.565	**0.472 J**	<0.679	<0.669	<0.673	<0.68

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3C08A	3C09	3C09	3C09	3C09	3C09	3C09	3C09	3C10
Sample ID:				3C08A (27.5)	3C09(1.75)	3C09(11)	DUP06	3C09(15.5)	3C09(22)	3C09(25.5)	3C09(27.5)	3C10(1.75)
Date:				09/27/02	09/24/02	09/24/02	09/24/02	09/24/02	09/24/02	09/24/02	09/24/02	09/24/02
Starting Depth ft bls				27.50	1.75	11.00	11.10	15.50	22.00	25.50	27.50	1.75
Ending Depth ft bls				28.00	2.25	11.50	11.60	16.00	22.50	26.00	28.00	2.25
Ethylbenzene	1000 (a)	1000 (a)	100	<0.624	<0.727	<0.711	<0.726	<0.59	<2.57	<0.688	<0.592	<0.788
Tetrachloroethene*	4 (b)	6 (b)	1	**0.471 J**	<0.727	<0.711	<0.726	**0.735**	**23.9**	**1.51**	**0.594**	<0.788
Toluene	1000 (a)	1000 (a)	500	<0.624	<0.727	<0.711	<0.726	<0.59	<2.57	<0.688	<0.592	<0.788
Trichloroethylene*	23	54 (b)	1	**0.263 J**	<0.727	**0.508 J**	**0.88**	**7.13**	**202**	**24.3**	**1.88**	<0.788
Vinyl chloride*	2	7	10	<0.624	<0.727	<0.711	<0.726	<0.59	<2.57	<0.688	<0.592	<0.788
Xylene (total)	410	1000 (a)	67	<0.624	<0.727	<0.711	<0.726	<0.59	<2.57	<0.688	<0.592	<0.788
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.624	<0.727	<0.711	<0.726	<0.59	<2.57	**0.178 J**	<0.592	<0.788

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3C10	3C10	3C11	3C11	3C11	3C11	3D01	3D01	3D01
Sample ID:				3C10(11.0)	3C10(22.0)	3C11(11.5)	3C11(15.5)	3C11(20.0)	3C11(24)	3D01(1.75)	3D01(2.5)	3D01(10)
Date:				09/24/02	09/24/02	09/20/02	09/20/02	09/20/02	09/20/02	09/23/02	09/23/02	09/23/02
Starting Depth ft bls				11.00	22.00	11.50	15.50	20.00	24.00	1.75	2.50	10.00
Ending Depth ft bls				11.50	22.50	12.00	16.00	20.50	24.50	2.25	3.00	10.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.662	<0.642	<6.24	<27.7	<0.766	<0.568	<0.692	**1.65**	**4.18**
Tetrachloroethene*	4 (b)	6 (b)	1	**0.46 J**	**1.74**	<6.24	<27.7	<0.766	**0.522 J**	<0.692	<0.657	<0.79
Toluene	1000 (a)	1000 (a)	500	<0.662	<0.642	<6.24	<27.7	<0.766	<0.568	<0.692	**10.7**	**33**
Trichloroethylene*	23	54 (b)	1	**0.505 J**	**0.783**	**554**	**2480**	**29.4**	**2.61**	<0.692	<0.657	<0.79
Vinyl chloride*	2	7	10	<0.662	<0.642	<6.24	<27.7	<0.766	<0.568	<0.692	<0.657	<0.79
Xylene (total)	410	1000 (a)	67	<0.662	<0.642	<6.24	<27.7	<0.766	<0.568	**1.06**	**39.3**	**16**
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.662	<0.642	<6.24	<27.7	**0.36 J**	<0.568	<0.692	<0.657	**0.483 J**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3D01	3D01	3D02	3D02	3D02	3D02	3D03	3D03	3D03
Sample ID:				3D01(12)	3D01(20)	3D02(1.75)	3D02(5)	3D02(11)	3D02(20)	3D03(1.75)	3D03(9.5)	3D03(20)
Date:				09/23/02	09/23/02	09/23/02	09/23/02	09/23/02	09/23/02	09/23/02	09/23/02	09/23/02
Starting Depth ft bls				12.00	20.00	1.75	5.00	11.00	20.00	1.75	9.50	20.00
Ending Depth ft bls				12.50	20.50	2.25	5.50	11.50	20.50	2.25	10.00	20.50
Ethylbenzene	1000 (a)	1000 (a)	100	**0.125 J**	<0.621	<0.782	**3.64**	**6.39**	<0.768	<0.639	<0.688	<0.674
Tetrachloroethene*	4 (b)	6 (b)	1	<0.603	**0.715**	<0.782	<0.627	<0.698	**1.29**	**0.421 J**	**0.308 J**	**0.718**
Toluene	1000 (a)	1000 (a)	500	**0.231 J**	<0.621	<0.782	<0.627	<0.698	<0.768	<0.639	<0.688	<0.674
Trichloroethylene*	23	54 (b)	1	<0.603	<0.621	<0.782	<0.627	<0.698	**0.166 J**	<0.639	<0.688	<0.674
Vinyl chloride*	2	7	10	<0.603	<0.621	<0.782	<0.627	<0.698	<0.768	<0.639	<0.688	<0.674
Xylene (total)	410	1000 (a)	67	<0.603	<0.621	<0.782	**4.57**	**2.69**	<0.768	<0.639	<0.688	<0.674
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**0.792**	<0.621	<0.782	<0.627	<0.698	<0.768	<0.639	<0.688	<0.674

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3D04	3D04	3D04	3D05	3D05	3D05	3D05	3D06	3D06
Sample ID:				3D04(1.75)	3D04(10)	3D04(20.0)	3D05(1.75)	3D05(4)	3D05(9)	3D05(20.0)	3D06(1.75)	3D06(6.5)
Date:				09/23/02	09/23/02	09/26/02	09/23/02	09/23/02	09/23/02	09/23/02	09/23/02	09/23/02
Starting Depth ft bls				1.75	10.00	20.00	1.75	4.00	9.00	20.00	1.75	6.50
Ending Depth ft bls				2.25	10.50	20.50	2.25	4.50	9.50	20.50	2.25	7.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.841	<0.573	<0.661	<0.628	<0.635	<0.642	<0.636	<0.68	<0.648
Tetrachloroethene*	4 (b)	6 (b)	1	**0.284 J**	**0.159 J**	**0.527 J**	**47.4 D**	**32.9**	**23**	**0.69**	**237 D**	**495 D**
Toluene	1000 (a)	1000 (a)	500	<0.841	<0.573	<0.661	<0.628	<0.635	<0.642	<0.636	<0.68	**0.205 J**
Trichloroethylene*	23	54 (b)	1	<0.841	<0.573	<0.661	<0.628	<0.635	<0.642	<0.636	**1.13**	**4.47**
Vinyl chloride*	2	7	10	<0.841	<0.573	<0.661	<0.628	<0.635	<0.642	<0.636	<0.68	<0.648
Xylene (total)	410	1000 (a)	67	<0.841	<0.573	<0.661	<0.628	<0.635	<0.642	<0.636	<0.68	<0.648
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.841	<0.573	<0.661	<0.628	<0.635	<0.642	<0.636	**0.332 J**	**0.331 J**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-3. Summary of Historical Soil Analytical Results for AOC-3. Airtron Division of LItton Systems, Inc., Morris Plains, New Jersey.

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3	AOC-3
Site ID:				3D06	3D06	3D07	3D07	3D07	3D07	3D08	3D08	3D08
Sample ID:				3D06(11.5)	3D06(20)	3D07(1.75)	3D07(10.5)	3D07(17.0)	3D07(20.0)	3D08(1.75)	3D08(9.0)	3D08(20.0)
Date:				09/23/02	09/23/02	09/26/02	09/26/02	09/26/02	09/26/02	09/26/02	09/26/02	09/26/02
Starting Depth ft bls				11.50	20.00	1.75	10.50	17.00	20.00	1.75	9.00	20.00
Ending Depth ft bls				12.00	20.50	2.25	11.00	17.50	20.50	2.25	9.50	20.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.613	<0.594	<0.718	<0.633	<0.587	<0.572	<0.631	<0.67	<0.599
Tetrachloroethene*	4 (b)	6 (b)	1	**522 D**	**2.91**	**0.84**	**13.3**	**4.99**	**1.07**	**4.96**	**6.09**	**3.14**
Toluene	1000 (a)	1000 (a)	500	**0.232 J**	<0.594	<0.718	<0.633	<0.587	<0.572	<0.631	<0.67	<0.599
Trichloroethylene*	23	54 (b)	1	**4.24**	**0.216 J**	<0.718	**0.817**	**0.277 J**	**0.177 J**	<0.631	<0.67	**0.197 J**
Vinyl chloride*	2	7	10	<0.613	<0.594	<0.718	<0.633	<0.587	<0.572	<0.631	<0.67	<0.599
Xylene (total)	410	1000 (a)	67	<0.613	<0.594	<0.718	<0.633	<0.587	<0.572	<0.631	<0.67	<0.599
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	---	---	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	**0.578 J**	<0.594	<0.718	**0.429 J**	**0.19 J**	<0.572	<0.631	<0.67	**0.259 J**

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-3 Former Drum Storage Area # 2
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-4. Summary of Historical Soil Analytical Results for AOC-4. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				A0C-4	A0C-4	AOC-4	AOC-4	AOC-4	AOC-4	AOC-4	AOC-4	AOC-4
Site ID:				B-219	B-219	4X01	4X02	4X03	4X04	4X04	4X04A	4X05
Sample ID:				B219 6-8	B219 16-18	4X01 20	4X02(18)	4X03(18)	4X04(18)	REP-2	4X04A (18)	4X05(18)
Date:				09/23/97	09/23/97	09/16/02	09/17/02	09/17/02	09/17/02	09/17/02	09/27/02	09/17/02
Starting Depth ft bls				6.00	16.00	20.00	18.00	18.00	18.00	18.10	18.00	18.00
Ending Depth ft bls				8.00	18.00	20.50	18.50	18.50	18.50	18.60	18.50	18.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.73	<0.7	<0.601	<0.789	<0.626	<0.696	<0.821	<0.75	<0.64
Tetrachloroethene*	4 (b)	6 (b)	1	<0.73	<0.7	<0.601	<0.789	**0.62 J**	<0.696	<0.821	**0.245 J**	**0.381 J**
Toluene	1000 (a)	1000 (a)	500	<0.73	<0.7	<0.601	<0.789	<0.626	<0.696	<0.821	<0.75	<0.64
Trichloroethylene*	23	54 (b)	1	<0.73	**15**	**0.858**	<0.789	<0.626	**5.29 J**	**11.3 J**	**3.71**	<0.64
Vinyl chloride*	2	7	10	<1.4	<1.3	<0.601	<0.789	<0.626	<0.696	<0.821	<0.75	<0.64
Xylene (total)	410	1000 (a)	67	<0.73	<0.7	<0.601	<0.789	<0.626	<0.696	<0.821	<0.75	<0.64
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	<0.73	**2.5**	---	---	---	---	---	---	---
cis-1,2-Dichloroethene*	79	1000 (a)	1	---	---	<0.601	<0.789	<0.626	**0.293 J**	**0.767 J**	**0.342 J**	<0.64

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-4 Former Sludge Lagoon # 5
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-4. Summary of Historical Soil Analytical Results for AOC-4. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC
Area of Concern:			
Site ID:			
Sample ID:			
Date:			
Starting Depth ft bls			
Ending Depth ft bls			
Ethylbenzene	1000 (a)	1000 (a)	100
Tetrachloroethene*	4 (b)	6 (b)	1
Toluene	1000 (a)	1000 (a)	500
Trichloroethylene*	23	54 (b)	1
Vinyl chloride*	2	7	10
Xylene (total)	410	1000 (a)	67
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	I(d)
cis-1,2-Dichloroethene*	79	1000 (a)	1

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-4 Former Sludge Lagoon # 5
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
(c) Insufficient information available to calculate impact to ground water criteria.
(d) Most stringent of cis or trans criteria.
(e) Criteria for sum of cis and trans.
(f) Criteria are health based using an incidental ingestion exposure pathway except where noted below.
(g) Criteria are subject to change based on site specific factors(e.g., aquifer classification,soil type, natural background, environmental impacts, etc.).
J Estimated value.
D Detected at secondary dilution.
--- Not analyzed or no standard applicable.
Bolded results were detected.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
Results which exceed the proposed remediation goal of 5 mg/kg are highlighted (as applied to identified primary target compounds).
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-12. Summary of Historical Soil Analytical Results for AOC-12. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC										
Area of Concern:				AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12
Site ID:				GP-01	GP-02	GP-03	GP-04	GP-04A	GP-04B	GP-05	GP-06	GP-07
Sample ID:				01562-001	01562-002	01562-003	01562-004	02014-002	02014-003	01562-005	01562-006	01562-007
Date:				02/24/04	02/24/04	02/24/04	02/24/04	03/09/04	03/09/04	02/24/04	02/24/04	02/24/04
Starting Depth ft bls				12.00	17.00	16.00	9.50	16.00	12.00	12.00	17.00	9.50
Ending Depth ft bls				12.50	17.50	16.50	10.00	16.50	12.50	12.50	17.50	10.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.517	<0.435	<0.486	<0.530	<0.541	<0.529	<0.504	<0.592	<0.517
Tetrachloroethene*	4 (b)	6 (b)	1	0.267J	0.420J	0.877	3.17	0.511J	0.286J	0.256J	2.98	0.443J
Toluene	1000 (a)	1000 (a)	500	<0.517	<0.435	<0.486	<0.530	<0.541	<0.529	<0.504	<0.592	<0.517
Trichloroethylene*	23	54 (b)	1	<0.517	<0.435	0.139J	0.267J	<0.541	<0.529	<0.504	<0.592	<0.517
Vinyl chloride*	2	7	10	<0.517	<0.435	<0.486	<0.530	<0.541	<0.529	<0.504	<0.592	<0.517
Xylene (total)	410	1000 (a)	67	<0.517	<0.435	<0.486	<0.530	<0.541	<0.529	<0.504	<0.592	<0.517
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.517	<0.435	<0.486	<0.530	<0.541	<0.529	<0.504	<0.592	<0.517

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-12 Sewer Line Area
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
J Estimated value.
--- Not analyzed or no standard applicable.
Bolded results were detected above the URUSCC.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-12. Summary of Historical Soil Analytical Results for AOC-12. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC									
Area of Concern:				AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12	AOC-12
Site ID:				GP-08	GP-08A	GP-08B	GP-9A	GP-11	GP-11B	GP-12A	GP-13	GP-14
Sample ID:				01562-008	02014-004	02014-005	01950-003	01597-004	02014-001	01950-002	01597-005	01597-006
Date:				02/24/04	03/09/04	03/09/04	03/05/04	02/25/04	03/09/04	03/05/04	02/25/04	02/25/04
Starting Depth ft bls				9.50	11.50	8.00	14.50	16.00	16.00	12.50	18.00	16.50
Ending Depth ft bls				10.00	12.00	8.50	15.00	16.50	16.50	13.00	18.50	17.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.573	<0.482	<0.435	<0.452	<0.611	<0.848	<0.679	<0.526	<0.693
Tetrachloroethene*	4 (b)	6 (b)	1	1.68	0.642	<0.435	0.692	1.58	0.723J	0.856	**4.41**	3.76
Toluene	1000 (a)	1000 (a)	500	<0.573	<0.482	<0.435	<0.452	<0.611	<0.848	<0.679	<0.526	<0.693
Trichloroethylene*	23	54 (b)	1	<0.573	<0.482	<0.435	<0.452	<0.611	<0.848	<0.679	0.516J	0.573J
Vinyl chloride*	2	7	10	<0.573	<0.482	<0.435	<0.452	<0.611	<0.848	<0.679	<0.526	<0.693
Xylene (total)	410	1000 (a)	67	<0.573	<0.482	<0.435	<0.452	<0.611	<0.848	<0.679	<0.526	<0.693
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.573	<0.482	<0.435	<0.452	<0.611	<0.848	<0.679	0.266J	0.879

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-12 Sewer Line Area
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
J Estimated value.
--- Not analyzed or no standard applicable.
Bolded results were detected above the URUSCC.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-12. Summary of Historical Soil Analytical Results for AOC-12. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC	AOC-12 GP-15 01642-001 02/26/04 16.00–16.50	AOC-12 GP-16 01642-002 02/26/04 16.00–16.50	AOC-12 GP-17 01642-003 02/26/04 10.00–10.50	AOC-12 GP-19 01642-004 02/26/04 16.00–16.50	AOC-12 GP-20 01642-005 02/26/04 17.00–17.50	AOC-12 GP-21 01642-006 02/26/04 16.00–16.50	AOC-12 GP-22 01689-001 02/27/04 20.00–20.50	AOC-12 GP-23 01689-002 02/27/04 12.00–12.50	AOC-12 GP-24 01689-004 02/27/04 16.00–16.50
Ethylbenzene	1000 (a)	1000 (a)	100	<0.653	<0.875	<0.524	<0.550	<0.592	<0.472	<0.496	<0.488	<0.660
Tetrachloroethene*	4 (b)	6 (b)	1	0.486J	1.41	0.272J	<0.550	0.657	0.620	0.780	0.375J	0.555J
Toluene	1000 (a)	1000 (a)	500	<0.653	<0.875	<0.524	<0.550	<0.592	<0.472	<0.496	<0.488	<0.660
Trichloroethylene*	23	54 (b)	1	<0.653	<0.875	<0.524	<0.550	<0.592	<0.472	<0.496	<0.488	<0.660
Vinyl chloride*	2	7	10	<0.653	<0.875	<0.524	<0.550	<0.592	<0.472	<0.496	<0.488	<0.660
Xylene (total)	410	1000 (a)	67	<0.653	<0.875	<0.524	<0.550	<0.592	<0.472	<0.496	<0.488	<0.660
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.653	<0.875	<0.524	<0.550	<0.592	<0.472	<0.496	<0.488	<0.660

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-12 Sewer Line Area
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
J Estimated value.
--- Not analyzed or no standard applicable.
Bolded results were detected above the URUSCC.
[ ] Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-12. Summary of Historical Soil Analytical Results for AOC-12. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC					
Area of Concern:				AOC-12	AOC-12	AOC-12	AOC-12	AOC-12
Site ID:				GP-34	GP-35	GP-36	GP-37	GP-37A
Sample ID:				01804-007	01804-008	01804-009	01804-010	01950-001
Date:				03/02/04	03/02/04	03/02/04	03/02/04	03/05/04
Starting Depth ft bls				16.00	14.00	15.00	15.50	15.50
Ending Depth ft bls				16.50	14.50	15.50	16.00	16.00
Ethylbenzene	1000 (a)	1000 (a)	100	<0.571	<0.582	<0.469	<0.823	<0.617
Tetrachloroethene*	4 (b)	6 (b)	1	<0.571	<0.582	<0.469	1.26	<0.617
Toluene	1000 (a)	1000 (a)	500	<0.571	<0.582	<0.469	<0.823	<0.617
Trichloroethylene*	23	54 (b)	1	<0.571	<0.582	<0.469	<0.823	<0.617
Vinyl chloride*	2	7	10	<0.571	<0.582	<0.469	<0.823	<0.617
Xylene (total)	410	1000 (a)	67	<0.571	<0.582	<0.469	<0.823	<0.617
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	--	--	--	--	--
cis-1,2-Dichloroethene*	79	1000 (a)	1	<0.571	<0.582	<0.469	<0.823	<0.617

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
AOC-12 Sewer Line Area
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
(a) Health based criterion exceeds the 1000 mg/kg maximum for volatile organic contaminants.
(b) Criteria based on inhalation exposure pathway, which yielded a more stringent criterion than the incidental ingestion exposure pathway.
J Estimated value.
— Not analyzed or no standard applicable.
Bolded results were detected above the URUSCC.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
* Primary target compound compared to remediation goal of 5 mg/kg.

Table 9-CA. Summary of Historical Soil Analytical Results for Compactor Area. Airtron Division of Litton Systems, Inc., Morris Plains, New Jersey

CONSTITUENT: (Units in mg/kg)	URUSCC	RUSCC	IGWSCC	Compactor Area	Compactor Area	Compactor Area	Compactor Area	Compactor Area
Area of Concern:				Compactor Area	Compactor Area	Compactor Area	Compactor Area	Compactor Area
Site ID**:				B-29	B-56	B-57	B-58	B-60
Sample ID:								
Date:				01/08/03	05/27/03	05/27/03	05/27/03	05/27/03
Starting Depth ft bls				1.00	7.50	1.00	1.00	1.00
Ending Depth ft bls				1.50	8.00	1.50	1.50	1.50
Ethylbenzene	1000 (a)	1000 (a)	100	ND	ND	NE	ND	ND
Tetrachloroethene*	4 (b)	6 (b)	1	**258**	**14.7**	NE	ND	ND
Toluene	1000 (a)	1000 (a)	500	ND	ND	NE	ND	ND
Trichloroethylene*	23	54 (b)	1	ND	ND	NE	ND	ND
Vinyl chloride*	2	7	10	ND	ND	NE	ND	ND
Xylene (total)	410	1000 (a)	67	ND	ND	NE	ND	ND
1,2-Dichloroethene(total)*	79(d)	1000(a&d)	1(d)	ND	ND	NE	ND	ND
cis-1,2-Dichloroethene*	79	1000 (a)	1	--	--	--	--	--

mg/kg Milligrams per kilogram.
ft bls Feet below land surface.
URUSCC Unrestricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
RUSCC Restricted Use Soil Cleanup Criteria (f&g) (NJDEP, last revised 5/12/99)
IGWSCC Impact to Ground water Soil Cleanup Criteria (g)(NJDEP, last revised 5/12/99)
-- Not analyzed or no standard applicable.
Bolded results were detected above the URUSCC.
Results which exceed the most stringent of the NJDEP soil cleanup criteria are boxed.
* Primary target compound compared to remediation goal of 5 mg/kg.
** Data w/deliverables included with 10/2003 ARCADIS SI Report.

ATTACHMENT E

Draft

REMEDIAL INVESTIGATION REPORT
for
AIRTRON DIVISION
of
LITTON SYSTEMS, INC.

Prepared for:

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TABLE OF CONTENTS

Section		Page
EXECUTIVE SUMMARY		ES-1
1.0	INTRODUCTION	1-1
2.0	RESULTS OF REMEDIAL INVESTIGATION ACTIVITIES	2-1
2.1	SOIL CHARACTERIZATION	2-1
2.1.1	Soil Gas Survey	2-1
2.1.1.1	Advancement of Sampling Probe Apparatus	2-2
2.1.1.2	Soil Gas Sample Collection	2-3
2.1.1.3	Soil Sample Collection	2-4
2.1.1.4	Soil Sample Documentation	2-4
2.1.1.5	Filling and Repair of Borehole	2-5
2.1.1.6	Laboratory Analyses	2-5
2.1.2	Geophysical Investigation	2-5
2.1.2.1	Electromagnetic Terrain Conductivity Theory	2-6
2.1.2.2	Data Acquisition	2-7
2.1.2.3	Data Reduction	2-7
2.1.2.4	Interpretation	2-8
2.2	GROUNDWATER CHARACTERIZATION	2-10
2.2.1	Groundwater Sampling	2-10
2.2.2	Laboratory Analyses	2-12
2.3	SEDIMENT CHARACTERIZATION	2-13
2.3.1	Sediment Sample Collection	2-13
2.3.2	Sediment Sample Documentation	2-14
3.0	INTERPRETATION OF REMEDIAL INVESTIGATION FINDINGS	3-1
3.1	AIRTRON HYPOTHESIS	3-2
3.1.1	Likely Sources at Airtron Facility	3-3
3.1.2	Likely Sources at Mennen Facility	3-3
3.1.3	Likely Sources at Other Facilities	3-15
3.2	MENNEN HYPOTHESIS	3-16
3.2.1	The Influence of Mennen Pumping Well P-1	3-17
3.2.2	The Groundwater Divide	3-18
3.2.3	The "Buried Channel"	3-19
3.2.4	Pattern of VOC Concentrations in Groundwater	3-22

TABLE OF CONTENTS (continued)

Section Page

3.3 CONCLUSIONS 3-25
3.4 RECOMMENDATIONS 3-28

4.0 QUALITATIVE RISK ASSESSMENT 4-1

LIST OF FIGURES

Number Page

1-1. Facility Location Map 1-4

2-1. Soil Gas Sampling Grid 2-15
2-2. Geoprobe™ Subsurface Soil Gas Sampling Apparatus 2-16
2-3. Location of EM Terrain Conductivity Survey Data Points 2-17
2-4. Contour Map of Electromagnetic Terrain Conductivity 2-18
2-5. Monitoring Well Locations and Sampling Points 2-19

3-1. Location of Site Features of the Mennen-Airtron Site 3-30
3-2. Mennen AOC #1 Leach Field 3-31
3-3. Cross-Section of Mennen AOC#1 3-32
3-4. Mennen AOC #3 Leach Pit 3-33
3-5. Cross-Section of Mennen AOC #3 3-34
3-6. Mennen AOC #17 Wastewater Injection System 3-35
3-7. Cross-Section of Mennen AOC #17 3-36
3-8. Contour Map of Top of Clay Till Aquitard 3-37
3-9. Contour Map of Top of Low-Permeability Sand (with Silt and Clay) 3-38
3-10. Cross-Section through AOC #17 3-39
3-11. Cross-Section of Former Airtron Lagoon No. 1 3-40
3-12. Expected Flow Paths for Dissolved VOCs (February 1990 Groundwater Contours) . . . 3-41
3-13. Estimated Flow Path from AOC #17 3-42
3-14. Spatial Distribution of Freon 11 Detections 3-43
3-15. Theoretical Flow Path from AT&T Dump 3-44
3-16. ERM Interpretation of Groundwater Contours (July 1993 Conditions) 3-45
3-17. Groundwater Contours Plotted Using SURFER (July 1993 Conditions) 3-46
3-18. Groundwater Contours Plotted Using SURFER (May 1994 Conditions) 3-47
3-19. ERM Interpretation of Groundwater Contours (February 1990 Conditions) 3-48
3-20. Modified ERM Interpretation of Groundwater Contours (February 1990 Conditions) 3-49
3-21. Theoretical Flow Path from Airtron's Lagoons 3-50
3-22. Areas of Elevated TCE Concentrations (May 1994) 3-51

Table of Contents (continued)

LIST OF TABLES

Number		Page
2-1.	FID Readings	2-20
2-2.	HNu (PID) READINGS	2-22
2-3.	Summary of VOCs Detected in Soil Samples	2-23
2-4.	Monitoring Well Characteristics	2-24
2-5.	Summary of Groundwater Analytical Results May 1994 Sampling Event	2-25
2-6.	Summary of Sediment Sampling	2-27
3-1.	Summary of Historical Groundwater Analytical Results (1985–1994 Period)	3-52

APPENDICES

Appendix A: Laboratory Report

Appendix B: Environmental Consultants and Contractors, Inc. Letter Report, June 10, 1994

Appendix C: Well Sampling Logs

Appendix D: Photographs

EXECUTIVE SUMMARY

The Airtron Division of Litton Systems, Inc. has completed a Remedial Investigation (RI) of its manufacturing facility located on Hanover Avenue in Morris Plains, New Jersey. The RI included one round of groundwater sampling of monitoring wells located at the Airtron facility and at a facility formerly owned by the Mennen Corporation across Hanover Avenue from Airtron. In addition, the RI included an investigation using geophysical, soil gas, and soil sampling techniques for a former drum storage area at the rear of the Airtron facility. Last, the RI included sampling and analysis of sediments from an unnamed stream at the rear of the Airtron property.

Based upon the data collected during the RI, and based upon data previously collected by Airtron and Mennen, two alternative hypotheses were evaluated to explain the presence of volatile organic compounds (VOCs) in groundwater at the Mennen-Airtron facilities:

- **Airtron Hypothesis:** Several different facilities, including both Airtron and Mennen, are sources of significant concentrations of VOCs in groundwater in the immediate vicinity of the Mennen and Airtron facilities. Additional off-site sources other than Airtron and Mennen may also exist.

- **Mennen Hypothesis:** The Airtron facility is the sole source of VOC contamination of groundwater beneath the Mennen facility.

The Airtron hypothesis is strengthened by historical evidence that Mennen injected millions of gallons of wastewater containing perchloroethylene (PCE) and trichloroethylene (TCE) into the subsurface environment. The wastewater injection systems used by Mennen may have resulted in releases of dense, non-aqueous-phase liquid (DNAPL) PCE and TCE. Available geologic information indicates that a DNAPL, if released from Mennen, would migrate along a clay aquitard toward and beyond Hanover Avenue. In addition, trichlorofluoromethane (Freon 11), a chemical used by Mennen, has been detected in groundwater across most of the Mennen facility, but has not been detected near the Airtron waste management areas.

A dump located on land now owned by AT&T (apparently upgradient of the study area) also appears to be a source of VOCs in groundwater at the Mennen-Airtron facilities.

The Airtron hypothesis suffers from a lack of groundwater monitoring data along historical groundwater flow directions; e.g., between the various Mennen wastewater disposal systems and Mennen's water supply well (operated until 1991) near Hanover Avenue.

The Mennen hypothesis is based upon the presence of a "buried channel" preferential flow path which conveyed VOC-contaminated groundwater from Airtron's former waste management areas in a circular pattern outside the pumping influence of Mennen's water supply well. The "buried channel" is reported to be located parallel to a groundwater divide located east of Airtron's and Mennen's facilities.

Data presented by Mennen's consultants do not support the concept of a "buried channel" preferential flow path extending from Airtron's waste management areas to the Mennen facility. Instead, the data presented by Mennen's consultants strongly suggest that any releases to groundwater from Airtron's former waste management areas would flow toward Mennen's water supply well (at least until 1991). In addition, even assuming a "buried channel" preferential flow path, current average linear groundwater velocities over much of the study area are too low (on the order of 15 feet per year) to explain the current distribution of VOCs in groundwater at the Mennen-Airtron facilities. The RI revealed that groundwater concentrations of TCE, for example, are about the same near the Airtron waste management areas and at the downgradient boundary of Mennen's property (a distance of about 1,800 feet).

In summary, compared with the Mennen hypothesis, the Airtron hypothesis is more consistent with the laws of nature, and better explains the extensive environmental data available for the Mennen-Airtron facilities. Mennen's former wastewater injection disposal systems are the most likely sources for the VOCs detected in 1994 on the Mennen property.

Interim Remedial Measures now planned at the Airtron facility should be adequate to control any VOCs released from Airtron's former waste management areas. The planned measures should be extended to dewatering a perched groundwater zone in an area

formerly used for drum storage, followed by soil vapor extraction to reduce any VOCs present in soils in that area.

SECTION 1.0
INTRODUCTION

This Remedial Investigation (RI) report provides details concerning environmental investigation activities that have been performed at the Airtron Division of Litton Industries, Incorporated (Airtron) site, located at 200 East Hanover Avenue, Morris Plains, New Jersey. Figure 1-1 provides a facility location map.

At present, the Airtron facility produces high technology communications equipment which is used in the aviation, semi-conductor, and defense industries. The facility has been involved in the manufacturing of high technology equipment since its origination in 1952. As is typical of high technology companies, the specific operations performed at the site have changed considerably since operations began. Such change has been required to keep pace with the current state-of-the-art as the communications technology field has matured over the last few decades. Some 200 personnel currently are employed in various departments, including manufacturing, engineering, research and development, environmental safety and compliance, sales, and accounting. A more detailed description of the facility history and current operations is presented in Section 2 of the RI Workplan.

This RI report was prepared to fulfill the requirements of the RI Workplan, which was prepared under a December 16, 1992 Administrative Consent Order (ACO) between Airtron and the New Jersey Department of Environmental Protection and Energy (NJDEPE). More specifically, the RI requirements are addressed in the ACO at Section II (Remedial Investigation and Cleanup), Subsection D (Remedial Investigation), and Appendix B (Remedial Investigation Scope of Work). The RI Workplan, prepared in accordance with the ACO, was conditionally approved by NJDEPE on December 3, 1993. The following subsequent correspondence between Litton and the Department discussed conditions pertaining to the RI Workplan requirements:

- December 17, 1993 letter from Litton to NJDEPE
- January 18, 1994 letter from NJDEPE to Litton
- February 2, 1994 letter from Litton to NJDEPE
- March 2, 1994 letter from NJDEPE to Litton
- March 24, 1994 letter from Litton to NJDEPE

- April 8, 1994 letter from Litton to NJDEPE
- April 15, 1994 letter from NJDEPE to Litton

The RI was conducted in accordance with most recent submission of the RI Workplan (dated October 25, 1993), incorporating revisions corresponding to the above-listed correspondence.

Prior to the recent RI activities, considerable investigative activities (including 35 rounds of groundwater sampling and analysis) have been performed at the site since 1980. Investigative activities have also been performed to characterize hazardous substance releases at neighboring facilities. The results of the previous investigations at the Airtron facility are summarized in Section Two of the RI Workplan.

In conjunction with the RI activities, several interim remedial measures (IRMs) have been implemented at the site. These include:

- Operation of a soil vapor extraction system (VES). Start-up of the VES occurred on February 1, 1993. The purpose of the VES is to remove volatile organic compounds (VOCs) from soil in the vicinity of five former lagoons, a former drum storage area, a former underground storage tank (UST), and a former paint stripping area. Operation of the VES was suspended in January 1994 in conjunction with the removal of a 20,000-gallon UST.

- Design of a groundwater pump-and-treat system. The purpose of the pump-and-treat system will be to prevent the migration of VOCs from the site via groundwater. Extracted groundwater will be treated to the extent required for discharge to surface water under a New Jersey Pollution Discharge Elimination System (NJDPES) permit. Installation of this system is planned for completion by October 29, 1994 (six months after the modified NJDPES Permit was issued).

- Removal of a 20,000-gallon heating oil UST from the east side of the facility. In January 1994, this UST was excavated and removed from the ground. Post-excavation sample results indicated that all soils containing

petroleum hydrocarbons above NJDEPE cleanup levels were removed. Approximately 900 tons of soils were transported off-site for thermal treatment.

Additional details concerning the IRMs can be found in the IRM Work Plan [SCS Engineers, March 1993].

This RI Report is presented in the following two volumes:

- Volume I: RI Report (Text), and
- Volume II: Appendices (including laboratory deliverables).

Volume I, presented herein, presents the RI report text. In summary, Volume I includes:

- Executive Summary,
- Section 1: Introduction,
- Section 2: Results of Remedial Investigation Activities,
- Section 3: Interpretation of Remedial Investigation Findings, and
- Section 4: Qualitative Risk Assessment.

SECTION 2.0
RESULTS OF REMEDIAL INVESTIGATION ACTIVITIES

The field component of the remedial investigation activities began on May 2, 1994. These activities included sampling of soil, groundwater, and sediments. The soil investigation included a soil gas survey in the parking lot, the collection of four confirmatory soil samples, and an electromagnetic survey in the former drum storage area. The groundwater investigation included the collection of 26 groundwater samples from wells installed in the perched water zone, the unconfined aquifer, and the confined aquifer, including wells located at the Airtron site, as well as the Mennen Warehouse and main Mennen facility sites. The sediment sampling included collection of four sediment samples from the unnamed tributary to the Whippany River. Each of these activities is discussed in detail in the following sections.

2.1 SOIL CHARACTERIZATION

2.1.1 Soil Gas Survey

Drums were reportedly stored during the 1950s and/or 1960s on the former parking lot island. To evaluate the impact, if any, of the former drum storage on the subsurface soils, SCS conducted a soil gas survey, with field activities beginning on May 10 and concluding on May 12, 1994. As shown on Figure 2-1, the soil gas survey focused on the former parking lot island, shown on Figure 2-1. The soil gas survey was performed to assess whether VOCs are present in the shallow subsurface soils in this area. The soil gas survey was intended to serve as a semi-quantitative screening tool. Laboratory analysis of soil samples was used to ascertain the presence of specific VOCs, and provide an approximate delineation of the presence of VOCs in the soil.

SCS contracted with Envirosurv, Incorporated, to provide Geoprobe™ gas sampling equipment mounted on a 4-wheel-drive truck bed. In order to evenly distribute the sample locations for the soil gas survey, a 240-foot by 75-foot grid was oriented over the area of concern. Sample points were located on 15-foot centers throughout the grid (refer to Figure 2-1). The sample collection process for the survey consisted of the following steps:

- Advancement of the sampling probe apparatus;
- Soil gas sample collection;
- Soil sample collection;
- Screening with the flame ionization detector (FID) and/or the photoionization detector (PID);
- Soil sample documentation;
- Filling and repairing of the borehole; and
- Laboratory analyses. SCS first completed the screening of the soil gas points prior to initiating soil sampling. Soil gas samples that exhibited HNu™ (PID) readings above 10 HNu™ units were selected for soils sampling points. The following sample collection methods were utilized.

2.1.1.1 Advancement of Sampling Probe Apparatus

Subsurface gas samples for field screening and soil samples for laboratory analysis were collected utilizing a Geoprobe™ subsurface gas and soil sampling apparatus, operated by Envirosurv personnel. Soil gas and soil sampling probes are constructed of ½-inch, inside diameter (I.D.), hardened steel in 3 foot lengths. Each probe was driven a minimum of 5 feet into the subsurface by a hydraulic cylinder/percussion hammer unit mounted in the back of a 4-wheel-drive pickup truck. The probe was then raised approximately 6-inches to extend the gas sampling tip; this was followed by the insertion of an extension rod down the probe rod to verify that the gas sampling tip was extended from the rod. Probes were removed using the same hydraulic system. An illustration of the Geoprobe™ subsurface soil gas sampling apparatus is included in Figure 2-2.

The location of the former island currently is covered by asphalt. Asphalt penetration was required at most sample locations; the same hydraulic percussion hammer assembly was used to drive a 1-inch, outside diameter (O.D.) probe through the 4-to-6 inches of asphalt

and subbase. The ¾-inch, O.D. probe rod was then placed in the pilot hole and driven approximately 5 feet below ground surface.

2.1.1.2 Soil Gas Sample Collection

Once the soil gas probe was driven to the desired sampling depth and the gas sampling tip was extended, polypropylene tubing was attached to the lead rod via a threaded sample cap with an "O" ring (to prevent vacuum leakage). The dedicated sample line then was attached to a purge vacuum pump system located in the bed of the probe truck. The vacuum pump is designed for maintaining consistent flow rates over a reasonable sample collection time and is powered by an internal, rechargeable DC power supply.

Prior to screening, a minimum of 750 milliliters (ml) (approximately 3 empty borehole volumes) of gas was purged from the sampling apparatus. The purpose of the purging was to remove any ambient air that may have entered the sampling apparatus during the probe assembly and installation.

When purging was complete, the purge pump was disconnected from the dedicated polypropylene tubing, and the subsurface gas was scanned with a Sensidyne Model 7011962-1 FID and/or an HNu™ Model HW 101 PID equipped with a vacuum pump for sample collection. Many of the boreholes were located in tight soils, which did not allow gases to be drawn with a shallow vacuum. Consequently, the FID flame would be extinguished upon attaching the unit to the polypropylene tubing. The PID was capable of pulling gases from the subsurface soil with its internal vacuum pump. Additionally, the FID was detecting methane gas present in some of the soils towards the northeast end of the grid in the vicinity of the perched water zone. A granular activated carbon (GAC) filter was used with the FID to differentiate between methane detections and VOC detections. Results of the FID and PID screening were recorded in ink in the field notebook. Tables 2-1 and 2-2 summarize the FID and PID readings for each grid location.

As indicated in Table 2-1, the FID allows measurement of VOCs plus methane (i.e., without the use of a carbon filter on the FID probe), and methane only (using a carbon filter to adsorb VOCs). The VOC concentration is calculated as the difference between the two measurements.

Once the borehole was screened, the polypropylene tubing was removed and discarded. The rods and sampling tip were removed and decontaminated using the following procedures:

- Water rinse,
- Detergent wash (e.g., Alconox™) and rinse,
- Water rinse,
- Acetone rinse,
- Distilled water rinse, and
- Air dry.

2.1.1.3 Soil Sample Collection

Soil samples for laboratory analysis were subsequently collected at the grid points with PID readings above 10 HNu™ units. Four grid points exhibited HNU™ levels above 10 ppm — 1C, 2B, 5C, and 5~~B~~E as illustrated on Figure 2-1. The Geoprobe™ was equipped with a 1-inch-diameter, stainless steel Shelby tube to obtain the soil samples. Once the piston soil sampler was driven to the top of the desired sampling depth, the piston was released via an extension rod inserted down the probe rod. With the core barrel free to move, the probe rod was then driven an additional 12 inches to collect approximately 150 grams of soil. Soil samples were immediately transferred to 4-ounce glass jars and closed with polypropylene lids equipped with Teflon™-lined septums.

2.1.1.4 Soil Sample Documentation

After each soil sample was collected, a sample label was completed and placed on the glass jar. The sample label included the following:

- Date,
- Time,
- Media,
- Job number,
- Location description,

- EPA laboratory method number, and
- Name of sampler.

Similar information was recorded in ink in the field notebook. The sample information also was entered on the chain-of-custody (COC) form. Each soil sample was placed in a cooler with blue ice after the label was completed. The samples were delivered to IEA Laboratory in Whippany, New Jersey, by SCS personnel on the same day they were collected.

2.1.1.5 Filling and Repair of Borehole

After the samples were obtained for laboratory analysis, the sampling equipment was removed from each grid location. A borehole having a diameter of approximately 3/4-inch remained. Each borehole was backfilled with a sand and bentonite mixture that was hand-compacted using a tamping rod. The borehole was patched at the surface with cold patch asphalt mix.

2.1.1.6 Laboratory Analyses

The soil samples were delivered by SCS personnel to IEA Laboratory. Laboratory analysis of soil samples for VOCs plus tentatively identified compounds (TICs) was performed in accordance with EPA SW-846, Method 8240. VOCs detected in one or more samples are presented in Table 2-3. The laboratory report, which identifies those VOCs which were analyzed for but not detected, is presented in Appendix A. Note that 2-propanone (acetone) was detected as a tentatively identified compound in three of the four field (decontamination) blanks at concentrations of 67, 26,000 and 2,800 ppb, respectively. Acetone was also detected in each of the four soil samples. The presence of acetone in the soil samples is considered an artifact of field decontamination. Thus, acetone is not reported in Table 2-3.

2.1.2 Geophysical Investigation

An electromagnetic (EM) terrain conductivity survey was performed over approximately 1.4 acres at the former drum storage area of the northern portion of the parking lot. The survey area includes the eastern half of the rear parking area, and extends northward from

the drum storage and handling building to the stream bed of the unnamed tributary in the adjacent woodland. The EM terrain conductivity survey was conducted primarily to assess the areal extent of a discontinuous clay lens encountered at a depth of approximately 8 to 10 feet at the monitoring well (MW)-301 location; the discontinuous clay lens is suspected of causing perched water conditions in the area of this monitoring well. The electromagnetic terrain conductivity survey method was selected because it is non-destructive, cost-effective, and provides a time-efficient method for the detection of subsurface anomalies.

SCS subcontracted with Environmental Consultants and Contractors, Incorporated (ECC), to perform the EM terrain conductivity survey at the facility. The following Subsections present the theory, field techniques, and interpretations of the EM terrain conductivity survey, as presented by ECC in a letter report dated June 10, 1994 (Appendix B).

2.1.2.1 Electromagnetic Terrain Conductivity Theory

EM terrain conductivity surveys are used to measure the apparent conductivity of the subsurface earth. EM terrain conductivity measurements are useful in detecting and mapping shallow stratigraphic changes, delineating contaminant plumes (typified by anomalous conductance) in groundwater, detecting and delineating landfills, and investigating shallow earth features which exhibit anomalous electrical properties in comparison with the surrounding earth.

Electromagnetic terrain conductivity instruments operate on the principle of the measurement of induced magnetic field decay. A transmitter coil energized with an alternating current at an audio frequency produces a time-varying magnetic field which induces very small eddy currents in the earth. These eddy currents generate secondary magnetic fields which are detected, along with the primary magnetic field, by the receiver coil. The secondary magnetic field is a function of intercoil spacing, operating frequency, and ground conductivity. At low values of induction, in which these instruments are designed to operate, the ratio of the secondary to the primary magnetic fields is linearly proportional to the terrain conductivity.

The terrain conductivity measurement, reported in units of milliSiemens per meter (mS/m), is an apparent conductivity of a volume of earth between the ground surface and an effective depth of investigation. The depth of investigation is dependent upon intercoil separation and dipole configuration of the instrument. Terrain conductivity values are weighted measurements, with near-surface earth contributing more to the value than deeper earth.

2.1.2.2 Data Acquisition

Terrain conductivity measurement data were acquired at discrete locations on a grid system established by the field geophysical survey crew. A 20-foot-interval grid was laid over the survey area to provide sufficient visual control for subdivision of the grid.

Quadrature phase electromagnetic terrain conductivity data values were acquired at 5 feet intervals along parallel survey lines spaced 20 feet apart (total discrete data points = 969). Two sets of electromagnetic conductivity data were acquired to ascertain the effect of the azimuthal orientations of the terrain conductivity meter. Data set 1 was acquired along survey lines oriented north (N) to south (S) (coordinate system line designation). Data set 2 was acquired along survey lines oriented east (E) to west (W) (coordinate system station designation), perpendicular to Data set 1. The locations of the data points of the survey are shown on Figure 2-3.

A Geonics EM-31D terrain conductivity meter was used in the vertical dipole configuration to acquire quadrature phase electromagnetic conductivity data measurements. This instrument arrangement provided an effective depth of investigation of approximately 20 feet (surficially weighted). The quadrature phase terrain conductivity values, along with the corresponding grid coordinates, were digitally recorded and stored in a Polycorder Digital Data Recorder. At the completion of the survey, the electromagnetic survey data were transferred from the Polycorder to disk storage on a computer.

2.1.2.3 Data Reduction

Upon completion of the geophysical survey data acquisition, the survey data were reduced and processed to provide graphical representations (contour maps) of the data for use in interpretation. The electromagnetic data were reduced, using the following procedures:

1. Electromagnetic terrain conductivity data were input to a spreadsheet program for deletion of erroneous data points identified in the field log book.

2. Data sets 1 and 2 were combined and processed using matrix smoothing functions in conjunction with a Kriging algorithm. This processing method provided the effect of removing high horizontal gradients exhibited by terrain conductivity measurements for each data set where the influence of near-surface cultural features (electrical service, metallic debris, buried cables, etc.) was enhanced by the azimuthal orientation of the EM31D terrain conductivity instrument boom.

3. The resultant electromagnetic terrain conductivity data were input to Golden Software's Surfer™ program for computer contouring of the grid data. Computer grid densities which matched actual field grid data were selected to prevent "speculative" interpolation outside of field data boundaries, as is common when using computer contouring programs.

4. A contour map of terrain conductivity values, as shown on Figure 2-4, was prepared.

2.1.2.4 Interpretation

The interpretation of surface geophysical surveys is a qualitative assessment of the results of the geophysical surveys in comparison to historical, geologic, and cultural data of the survey area. Pertinent data may include: land use records and maps, aerial photographs, personnel interviews, well logs and records, utilities maps, and topographic maps.

The contour map of terrain conductivity values is presented on Figure 2-4. The hardcopy outputs of the electromagnetic data reduction process are included in Appendix B. The electromagnetic conductivity data values were contoured to show significant variances in the terrain conductivity. As the interpretation of electromagnetic conductivity data is qualitative, determination of a site "background" terrain conductivity is essential for comparative assessment of the terrain conductivity data. Conductivity data acquired in the woodland north of the parking area indicate the "background" terrain conductivity value of the survey area ranges from 6.5 to 10 mS/m.

A terrain conductivity anomaly of moderate magnitude and low horizontal gradient was measured in the area of MW-301 and well A-6. The anomaly exhibits terrain conductivity values ranging from 12 to 21 mS/m, with the highest conductivity values measured in the vicinity of well A-6. The anomaly is lobate in shape and covers approximately 15,000 square feet (0.3 acre) in areal extent. The low horizontal conductivity gradients exhibited by the anomaly suggest the source is an "earth feature" such as a clay layer or a conductive contaminant plume, and not a "cultural feature" such as buried piping or drums. This anomaly may represent the horizontal extent of the discontinuous clay lens observed in the boring for MW-301. Another possible source of the anomaly is residual metal waste from the former sludge pond located in the area. Historical data indicate wastewaters containing metals concentrations may have been present in the pond, and the conductivity anomaly may represent the horizontal extent of residual metals in the subsurface environment.

An area of high magnitude terrain conductivity anomalies exhibiting high horizontal gradients was measured at the eastern edge of the survey area. The anomaly exhibits terrain conductivity values up to 38 mS/m, with the highest conductivity values in a north-south linear trend. Negative conductivity measurements were measured in this area in both data sets. Negative conductivity measurements in quadrature phase data are indicative of shallow, highly-conductive sources (typically metallic objects). The negative conductivity measurement is a non-linear function of the instrument's quadrature phase response to highly conductive sources. The linear anomaly extends northward into the study area approximately 220 feet, until terminating approximately 30 feet north of the parking lot in the vicinity of the former surface impoundment. The most probable source of the anomaly is a cast-iron pipe, which was observed during earthwork activities performed during previous site investigation and remediation activities. It is suspected that this pipe was used to carry wastewater to the former surface impoundment.

A circular-shaped, low-conductivity anomaly exhibiting high gradients was measured in the parking area approximately mid-point between MW-1 and well A-6. This anomaly corresponds to a cast-iron storm grate visible at the surface.

The edge of an anomalous area was detected at the southwest corner of the survey area, approximately 60 feet west of MW-1. The areal extent and magnitude of the anomaly

was not defined; however, elevated volatile organic vapor measurements detected during the soil gas investigation in this area suggest the area may be a source of subsurface VOCs.

2.2 GROUNDWATER CHARACTERIZATION

As discussed in Section 1.0 of this RI report, the original RI Workplan was modified significantly. Through Interim Remedial Measures, Airtron planned on initiating a groundwater pump-and-treat system, and then performing two rounds of groundwater sampling during the RI to evaluate the effectiveness of the system. In contrast, NJDEPE requested that one round of groundwater sampling be performed.

After several months of correspondence and discussion between Litton and NJDEPE, Airtron initiated the modified RI Workplan; one round of groundwater sampling was completed on a subset of monitoring wells which extended from the Airtron property, off-site onto the Mennen Warehouse property, and across Hanover Avenue to the Mennen property. Presented below is a summary of the procedures for conducting the groundwater sampling, and the results of the laboratory analyses.

2.2.1 Groundwater Sampling

One round of groundwater sampling was conducted during the week of May 2, 1994. Twenty-six groundwater monitoring wells were sampled during the sampling event. Locations of the 26 monitoring wells are shown in Figure 2-5. The characteristics of each of the wells are presented in Table 2-4. All of the monitoring wells were installed prior to the implementation of this RI.

Three of these wells are screened in the lower aquifer and range in total depth (from the top of the casing) from 126.0 feet to 131.0 feet. MW-201 is located immediately east of the former lagoons; MW-202 is located immediately west. MW-203 is located approximately 500 feet downgradient of the former lagoon area. These three wells were sampled to assess whether the lower aquifer has been impacted. Historical analytical testing indicates the lower aquitard has not been impacted, and that flow direction between the two aquifers is upward from the lower to the upper aquifer.

Twenty-three of the monitoring wells are screened in the upper aquifer, and range in depth from 59.8 feet to 91.0 feet. MW-1 is screened within the upper aquifer and is located up gradient of the lagoon area (Note: This monitoring well was inadvertently not sampled during the sampling round). MW-3, MW-2, MW-2M, MW-302, MW-206, USGS-1, and USGS-2 are screened within the upper aquifer and are located immediately adjacent to the former lagoon area or are downgradient within the plume of VOCs that appear to have emanated from the lagoon area.

MW-301 is located adjacent to the former settling basin and drum storage area, and is screened within a perched water table confined to this area. This well was sampled to determine any changes in the concentrations of constituents present within the perched water table.

The sampling round was initiated by determining the total depth of each monitoring well and measuring the depth to water below the top of casing (TOC). The measured depths were recorded in ink to document any deviation from the well depth installation records.

The electronic water level indicator was decontaminated prior to use in each monitoring well in accordance with the following procedures:

- Water rinse,
- Detergent wash (e.g., Alconox™) and rinse,
- Water rinse,
- Acetone rinse,
- Air dry, and
- Distilled water rinse.

Both the depth to water and total well depth were recorded on the well sampling log. All Airtron monitoring wells are equipped with dedicated Well Wizard P-1201 positive displacement bladder pumps with PT-5100 Teflon™-lined polyethylene tubing. The USGS wells are equipped with dedicated Grundfos SP-4-6, 115-volt, ½-horsepower submersible purge pumps and QED bladder pumps. Once purging was completed with the electric pump, sampling of these three monitoring wells was performed with the dedicated bladder pump.

The Mennen wells were purged using either a Grundfos Redi-Flo2 environmental sampling pump or by hand bailing with disposable polypropylene bailers. The Grundfos Redi-Flo2 pump was thoroughly decontaminated in the manner discussed above prior to use in each monitoring well.

A minimum of three well volumes were purged from each monitoring well prior to sample collection. The pH, temperature, and specific conductivity of the purge water was monitored and recorded during purging to determine when a representative water sample could be collected. The total volume purged was recorded on the well sampling logs; copies of the well sampling logs are included in Appendix C.

Samples from each Airtron monitoring well were collected directly from the Teflon™-lined sample tubing and tip (dedicated to each monitoring well) into the sample containers. Prior to sample collection, each dedicated sampling tip was decontaminated in accordance with procedures outlined above. The flow rate from the bladder pump was reduced to a minimum for sample collection, and the aqueous sample was collected into the sample container in a manner that minimized agitation.

After collection, each sample container was capped, inverted, and tapped lightly to confirm that no air bubbles were present in the sample. Sample containers were pre-preserved with hydrochloric acid (HCl) supplied by the analytical laboratory. After a sample was collected and properly labeled, it was placed in a clean cooler with ice, and held under COC procedures until hand-delivered to the analytical laboratory by the field engineer.

2.2.2 Laboratory Analyses

Groundwater samples were delivered to IEA Laboratory (NJ Certification #14530) on a daily basis. All groundwater samples and QA/QC samples were analyzed in accordance with EPA Method 624 for Volatile Organics with a forward library search for TICs. Ten percent of the laboratory deliverables for the groundwater samples conform to the Tier I data format. The remaining 90 percent of the laboratory deliverables for the groundwater samples conform to the Tier II data format. Wells that historically exhibited the most elevated VOC concentrations were selected for Tier I format deliverables. A complete

copy of the laboratory deliverables is included in Volume II of this report. A summary of detected VOCs are listed in Table 2-5.

2.3 SEDIMENT CHARACTERIZATION

Airtron has operated the current wastewater treatment system since 1980. The treated water from this treatment system has been discharged to the unnamed tributary of the Whippany River which flows from the northwest towards the southeast along the north property line of the Airtron site. As discussed in Subsection 2.16.4 of the RI Workplan, the Hanover Department of Health collected discrete sediment samples from the unnamed tributary on May 12, 1986. The 1986 results are considered suspect because of limited documentation for the sampling event.

2.3.1 Sediment Sample Collection

On May 9, 1994, SCS conducted sampling of the sediments of the unnamed tributary to the Whippany River. In accordance with the RI Workplan, four sampling points were selected for characterization:

- At the west property line, as surface water flows onto the Airtron site (050994-WPL);
- Immediately upgradient of the NJPDES-permitted outfall from the on-site wastewater treatment plant (050994-UP-001);
- Immediately downgradient of the NJPDES-permitted outfall from the on-site wastewater treatment plant (050994-DN-001); and
- At the east property line, as surface water flows off the Airtron site (050994-EPL).

Locations of these sampling point are illustrated on Figure 2-5. Each sediment sample was collected by hand using a clean, disposable latex glove. The sample was limited to the top one inch of sediment present under the surface water. The sediment samples were placed

directly into 8-ounce glass sample jars, which were provided by IEA Laboratory. At each sampling point, a water grab sample was collected and screened in the field for pH, temperature, and conductivity; results are presented in Table 2-6.

2.3.2 Sediment Sample Documentation

After each sediment sample was collected, a sample label was completed and placed on the glass jar. The sample label included the following:

- Date,
- Time,
- Media,
- Job number,
- Location description,
- EPA laboratory method number, and
- Name of sampler.

Similar information was recorded in ink in the field notebook. The sample information also was entered on the COC form. Each sediment sample was placed in a cooler with blue ice after the label was completed. The samples were delivered to IEA Laboratory by SCS personnel on the same day they were collected.

The sediment samples were delivered by SCS personnel to IEA Laboratory in Whippany, New Jersey. Laboratory analysis of sediment samples was performed in accordance with EPA SW846 Method 7060; the results of the laboratory analyses are summarized in Table 2-6.

Airtron has an NJPDES permit which allows the release of arsenic within the permit-specified concentration limits. Until April 27, 1994, the permit limits for Arsenic were 0.003 kilograms per day (kg/day) monthly average and 0.008 kg/day daily maximum. Airtron was issued a revised NJPDES permit (Permit No. NJ0025739), effective April 27, 1994, which raised the limits for discharge from this wastewater treatment system outfall to 0.028 kg/day monthly average, and 0.071 kg/day daily maximum for arsenic. As such, arsenic detections are to be expected in the stream bed.

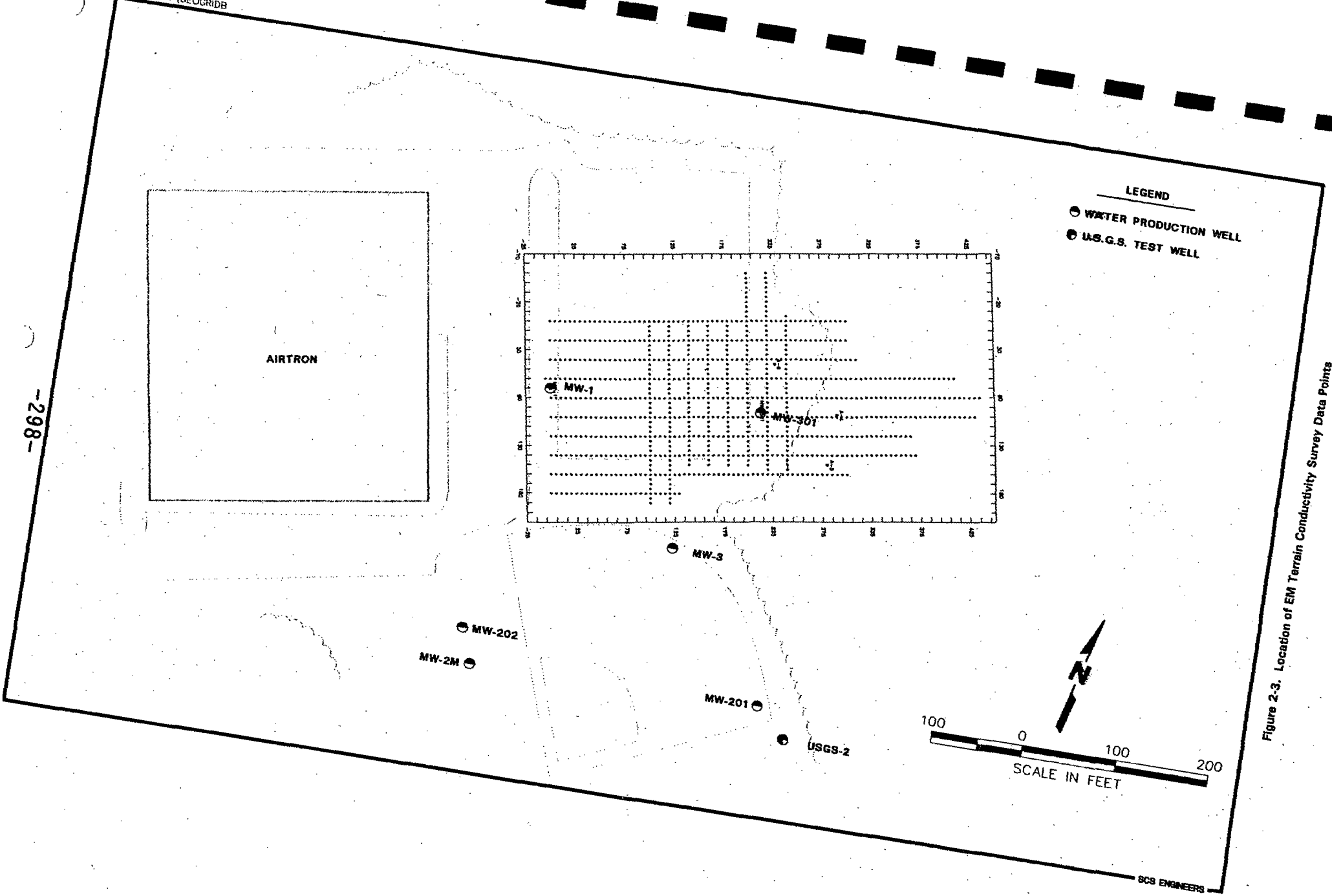

Figure 2-3. Location of EM Terrain Conductivity Survey Data Points

M:\291031\GEOSURVB

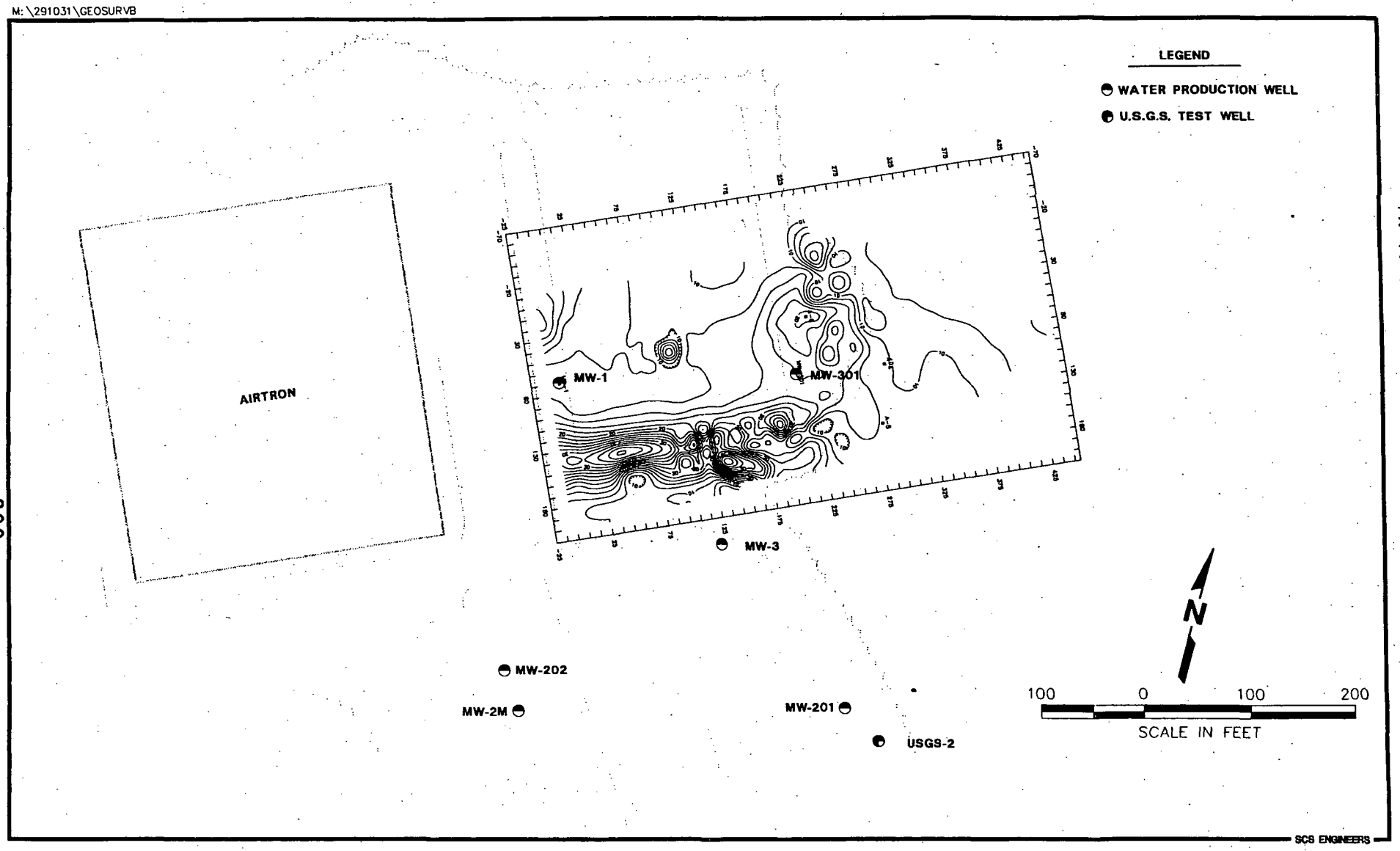

Figure 2-4. Contour Map of Electromagnetic Terrain Conductivity Values

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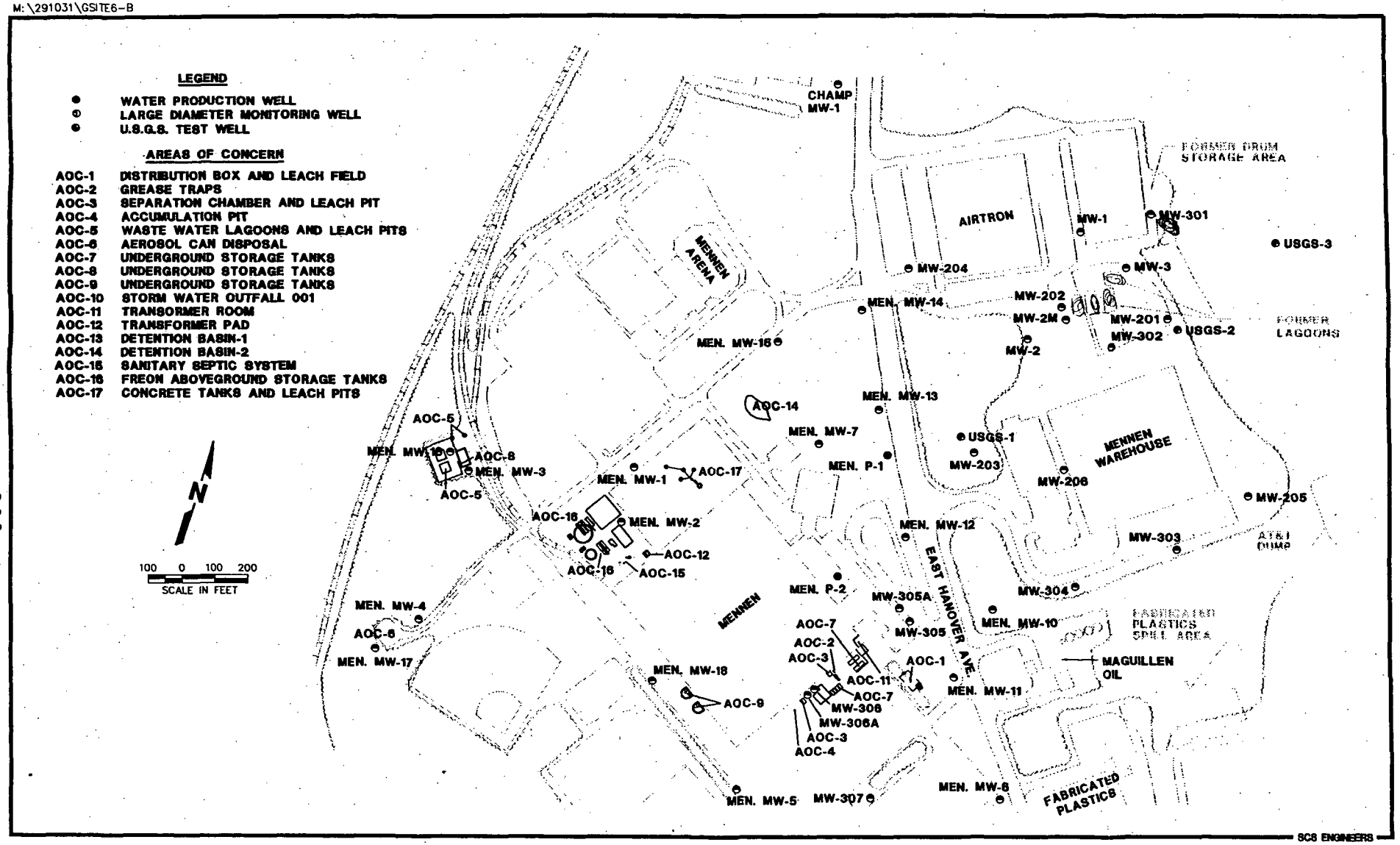

Figure 2-5. Monitoring Well Locations and Sampling Points

Table 2-1. FID Readings

Sampling Location		A	B	C	D	E
1	VOCs & Methane	NF	20	118	NF	0
	Methane Only		0	0		0
	VOCs Only		12	118		0
2	VOCs & Methane	NF	12	—	0	0
	Methane Only		0		0	0
	VOCs Only		12		0	0
3	VOCs & Methane	0	2	—	NF	0
	Methane Only	0	0			0
	VOCs Only	0	2			0
4	VOCs & Methane	0	2	0	NF	0
	Methane Only	0	0	0		0
	VOCs Only	0	2	0		0
5	VOCs & Methane	0	NF	10	0	50
	Methane Only	0		1.5		0
	VOCs Only	0		8.5		50
6	VOCs & Methane	NF	0	0	0	12
	Methane Only		0		0	1
	VOCs Only		0		0	11
7	VOCs & Methane	NF	NF	0	0	0
	Methane Only			0	0	0
	VOCs Only			0	0	0
8	VOCs & Methane	NF	NF	2	0	*
	Methane Only			2	0	
	VOCs Only			0	0	
9	VOCs & Methane	NF	NF	15	0	160
	Methane Only			6	0	65
	VOCs Only			9	9	95

Unshaded areas — Without Carbon Filter
Shaded areas — With Carbon Filter indicated methane concentrations
NF — No Flow
— — FID Reading Not Taken
* — Geoprobe Refusal.

Table 2-1. (continued)

		A	B	C	D	E
10	VOCs & Methane	NF	NF	27	0	330
	Methane Only			12	0	150
	VOCs Only			15	0	180
11	VOCs & Methane	0	15	0	0	600
	Methane Only	0	3	0	0	600
	VOCs Only	0	12	0	0	0
12	VOCs & Methane	0	0	21	0	10,000
	Methane Only	0	0	2	0	10,000
	VOCs Only	0	0	19	0	0
13	VOCs & Methane	0	NF	0	2	10,000
	Methane Only	0		0	0	10,000
	VOCs Only	0		0	2	0
14	VOCs & Methane	1	0	2	3	10,000
	Methane Only	0	0	1	0	10,000
	VOCs Only	1	0	1	3	0
15	VOCs & Methane	1	0	85	0	—
	Methane Only	0		50	0	—
	VOCs Only	1	0	35	6	
16	VOCs & Methane	0	0	0	0	—
	Methane Only	0	0	0	0	—
	VOCs Only	0	0	0	0	

Unshaded areas — Without Carbon Filter
Shaded areas — With Carbon Filter indicated methane concentrations
NF — No Flow
— — FID Reading Not Taken
* — Geoprobe Refusal

Table 2-2. HNu (PID) READINGS

Sampling Location	A	B	C	D	E
1	0.6	0	510	0	0
2	0	170	4.8	0	0
3	0	0	4.6	1.0	0
4	0	4	0	2.0	2.0
5	0	0	205	0	16
6	0	0	0	0	3.0
7	0	1	0	0	0
8	0	0	2.0	0	*
9	0	0	3.6	0.4	2.6
10	0	0	2.4	1.0	2.0
11	0	7.8	0.6	0.2	0
12	0	2.0	2.0	0	0
13	0	0	5.0	5.6	0
14	0	0	3.4	4.0	0
15	3.8	0	5.0	0	0
16	1.4	0	0	0	0

* — Geoprobe Refusal

Table 2-3. Summary of VOCs Detected in Soil Samples

Sample ID	Volatile Compounds Detected		
051294-5C	Tetrachloroethene	=	61,000 ppb
051294-2B	Propane, 2-methoxy-2-methyl	=	49 ppb
	Methylene chloride	=	9 ppb
051294-1C	Tetrachloroethene	=	14 ppb
	Propane, 2-methoxy-2-methyl	=	85 ppb
	Methylene chloride	=	12 ppb
051294-5E	Tetrachloroethene	=	4 ppb J
	Propane, 2-methoxy-2-methyl	=	100 ppb
	Methylene chloride	=	10 ppb

Note: J denotes below Practical Quantitation Limit (PQL); concentration is estimated.

Table 2-4. Monitoring Well Characteristics

Monitoring Well Number	Date of Installation	Approximate Depth (feet)	Depth of Screened Interval (feet)	Well Construction Material	Diameter (inches)	Remarks
MW-1	05/81	75.5	65-75	PVC	3	1,2
MW-2	05/81	77.3	70-75	PVC	3	1,2
MW-2M	10/80	65.5	49-69	PVC	2	1,2
MW-3	05/81	61.7	55-65	PVC	3	1,2
MW-204	07/87	68.0	47-67	PVC	4	1
MW-205	07/87	59.0	53-58	PVC	4	1
MW-206	07/87	64.0	43-63	PVC	4	1
MW-301	12/89	18.0	3-18	PVC	4	Installed adjacent to former lagoon to assess perched water table.
MW-302	12/89	71.0	38-68	PVC	4	4
MW-303	12/89	91.0	39-69	PVC	4	4
MW-304	12/89	81.0	29-79	PVC	4	4
MEN.MW-10	UNKNOWN	UNKNOWN	UNKNOWN	PVC	4	
USGS-1	1952	78.2	78-86	Steel	17.5	1,2
USGS-2	1952	59.8	76-84	Steel	17.5	1,2
USGS-3	1952	67.4	60-68	Steel	17.5	1,2
MW-201	07/87	127.0	116-126	PVC	4	1,3
MW-202	07/87	126.0	118-125	PVC	4	1,3
MW-203	07/87	131.0	122-130	PVC	4	1,3

1. Information summarized from Converse Environmental East, 14 November 1987, Soil and Groundwater Remedial Investigation, Phase 1 Results.

2. Additional information summarized from Converse Consultants, Inc., 16 August 1982. Report of Aquifer Test Using Mennen Production Well.

3. Screened within the lower confined aquifer.

4. Information summarized from Converse Environmental East, 19 April 1990, Phase II Soil and Groundwater Investigation.

Table 2-5. Summary of Groundwater Analytical Results May 1994 Sampling Event

General Well Information		Volatile Organic Compounds by GC/MS (ppb)															
WELL Number (Screen interval in ft. below ground)	Sampling Date	TCE	PCE	Cis-1,2-DCE	Trans-1,2-DCE	VC	Freon 11	Freon 12	Freon 113	2-Propenone	Methylene Chloride	Chloro-ethane	1,1-DCE	1,1-DCA	Toluene	1,1,1-TCA	Neph-thalene
MW-2 (70-75)	5/3/94	3300	2200	720	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7	ND
MW-2M (49-65.5)	5/9/94	240	99	54	ND	ND	ND	ND	ND	230B	5	ND	ND	ND	ND	ND	ND
MW-3 (55-65)	5/3/94	610	650	160	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-201 (116-126)	5/10/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	ND	ND	ND	ND
MW-202 (113-125)	5/9/94	ND	ND	ND	ND	ND	ND	ND	3J	ND	7	ND	ND	ND	ND	ND	ND
MW-203 (122-130)	5/6/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	7	ND	ND	ND	ND	ND	ND
MW-204 (47-67)	5/9/94	9	ND	ND	ND	ND	ND	ND	ND	34B	ND	ND	ND	ND	ND	ND	ND
MW-205 (53-58)	5/4/94	44	ND	ND	ND	ND	ND	ND	ND	63B	ND	ND	ND	ND	ND	ND	ND
MW-206 (43-63)	5/4/94	1200	1300	340	7	ND	ND	ND	ND	1100B	ND	ND	ND	ND	ND	ND	ND
MW-301 (3-18)	5/3/94	350	760	2800	16	2400	ND	ND	ND	ND	ND	21	6	9	11	ND	ND
MW-302 (38-68)	5/3/94	180	480	190	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW-303 (39-69)	5/4/94	4J	ND	ND	ND	ND	ND	ND	ND	49B	ND	ND	ND	ND	ND	ND	ND
MW-304 (29-79)	5/4/94	170	ND	110	ND	ND	ND	ND	ND	300B	ND	ND	ND	ND	ND	ND	ND
MW-305 (39-69)	5/5/94	1800	1100	310	ND	ND	ND	ND	ND	480B	ND	ND	ND	ND	ND	ND	ND
MW-306 (38-58)	5/5/94	440	99	43	ND	ND	ND	ND	ND	ND	7J	ND	ND	ND	ND	ND	ND
MW-307 (36.5-56.5)	5/5/94	ND	ND	ND	ND	ND	ND	ND	ND	128B	ND	ND	ND	ND	ND	ND	18

Table 2-6. Summary of Sediment Sampling

Sampling Point	Surface Water pH (s.u.)	Surface Water Temperature (°F)	Surface Water Conductivity (μMHOS)	Sediment Arsenic (mg/kg)
050994-WPL	5.94	59.8	129	7.26
050994-UP-001	6.65	60.5	126	47.5
060994-DN-001	7.38	62.7	314	9.55
050994-EPL	7.92	63.3	348	65.6

Table 2-5. (continued)

General Well Information		Volatile Organic Compounds by GC/MS (ppb)															
WELL Number (Screen interval in ft. below ground)	Sampling Date	TCE	PCE	Cis-1,2-DCE	Trans-1,2-DCE	VC	Freon 11	Freon 12	Freon 113	2-Propanone	Methylene Chloride	Chloro-ethane	1,1-DCE	1,1-DCA	Toluene	1,1,1-TCA	Naph-thalene
USGS-1 (78-86)	5/3/94	490	180	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
USGS-2 (76-84)	5/3/94	78	390	92	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
USGS-3 (60-68)	5/3/94	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEN-MW-5 (27-57)	5/5/94	3100	710	490	ND	ND	8	ND	ND	66B	ND	ND	ND	ND	ND	8	ND
MEN-MW-7 (43-63)	5/5/94	440	90	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEN-MW-10 (40-55)	5/5/94	1300	1000	210	ND	ND	ND	ND	ND	200B	ND	ND	ND	ND	ND	ND	ND
MEN-MW-11 (53-63)	5/6/94	960	650	310	ND	ND	ND	ND	ND	ND	4J	ND	ND	ND	ND	4J	ND
MEN-MW-14 (83.5-63.5)	5/6/94	110	14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEN-MW-15 (67-77)	5/6/94	180	100	6	ND	ND	ND	ND	ND	ND	6	ND	ND	ND	ND	ND	ND
MEN-MW-18 (37-47)	5/6/94	ND	ND	ND	ND	ND	620 E	19	ND	85B	5J	ND	ND	ND	ND	ND	ND

NOTES:

ND	=	Not Detected	J	=	Estimated Value
E	=	Estimated Concentration; Exceeded Calibration Curve	TCE	=	Trichloroethylene
PCE	=	Perchloroethylene	Cis-1,2-DCE	=	Cis-1,2-Dichloroethylene
Trans-1,2-DCE	=	Trans-1,2-Dichloroethylene	VC	=	Vinyl Chloride
Freon 11	=	Trichlorofluoromethane	Freon 12	=	Dichlorofluoromethane
Freon 113	=		1,1-DE	=	1,1-Dichloroethene
1,1-DCE	=	1,1-Dichloroethane	1,1,1-BCA	=	1,1,1-Trichloroethane

B = 2-Propanone detected as a TIC in 3 of 4 field (decon) blanks at concentrations of 67, 26,000, and 2,800 ppb, respectively.

All results reported in parts per billion (ppb).

SECTION 3.0
INTERPRETATION OF REMEDIAL INVESTIGATION FINDINGS

Thousands of environmental data points have been compiled for the Mennen-Airtron facilities over the last 13 years. Interpretation of the RI findings in the context of the large volume of other information available requires a conceptual facility model, or a working hypothesis. Once postulated, the hypothesis can be tested against the experimental data available, and its validity assessed.

For the Mennen-Airtron site, at least two hypotheses have been proposed by various previous investigators. For convenience, the two hypotheses can be called the Airtron Hypothesis and the Mennen Hypothesis and may be summarized as follows:

- **Airtron Hypothesis:** Several different facilities, including both Airtron and Mennen, are sources of significant concentrations of VOCs in groundwater at the Mennen and Airtron facilities.

- **Mennen Hypothesis:** The Airtron facility is the sole source of VOC-impacted groundwater at the Mennen facility.

Each hypothesis is more fully discussed below. For each, available experimental data are reviewed to assess its validity. A brief summary of assumptions common to both hypotheses is provided below:

- Until July 1991, Mennen operated a production well located between the Mennen and Airtron facilities. The production well changed natural groundwater flow paths at the two plants, and withdrew at least some (if not all) of the groundwater containing VOCs beneath the two facilities.

- Mennen ceased using its production well in July 1991. After that date, groundwater flow paths began to recover, and VOC migration directions and flow velocities in the groundwater changed.

- Both Mennen and Airtron conducted industrial and waste management operations involving VOCs, including chlorinated solvents such as PCE and TCE.

Figure 3-1 shows the locations of site features at the Mennen-Airtron facilities discussed below, including historical waste management systems, areas of concern (AOC), and monitoring wells installed during previous investigations.

3.1 AIRTRON HYPOTHESIS

Based upon existing information, the most likely sources of VOCs detected in groundwater at the Mennen-Airtron facilities are:

- At Airtron: Former wastewater lagoons located between MW-2 and MW-3, a former wastewater lagoon located near MW-301, and a former drum storage area also located near MW-301.

- At Mennen: A former wastewater leach field (AOC #1) located 150 feet south of MW-305, a former wastewater leach pit located 15 feet northeast of MW-306 (AOC #3), and a series of four former shallow wastewater injection structures located beneath Mennen's warehouse attached to the northwest side of its plant (AOC #17).

- Other: A dump located about 900 feet east of the former Airtron Lagoons on property now owned by AT&T (evidence is visible of 55-gallon drums having been disposed at this dump).

Existing information is not adequate to determine whether other nearby facilities (e.g., Champion Paper, Fabricated Plastics, and Maguillen Oil) caused or contributed to the VOCs present in groundwater at the facilities.

3.1.1 Likely Sources at Airtron Facility

The concept that Airtron's former wastewater lagoons and former drum storage area are likely sources of at least some of the VOCs in groundwater is not controversial. Elevated concentrations of TCE (trichloroethylene) and PCE (Perchloroethylene) have been measured in MW-2 and MW-2M, downgradient from the former lagoons.

The sample from an apparent perched groundwater zone beneath one of the former lagoons and the former drum storage area, monitored via MW-301, contains a blend of chlorinated solvents (350 micrograms per liter [μg/l] TCE; 760 μg/l PCE; 2,800 μg/l dichloroethene [DCE]; and 2,400 μg/l vinyl chloride) not observed elsewhere on the Mennen-Airtron facilities. The physical (perched conditions) and chemical evidence suggests that the VOCs present in the vicinity of MW-301 are localized; for example, no vinyl chloride has been detected in MW-3 or MW-1, each located within 200 feet downgradient from MW-301.

The lateral and vertical extent of the perched groundwater zone has been estimated using electromagnetic terrain conductivity measurements as is described in Subsection 2.1.2.

3.1.2 Likely Sources at Mennen Facility

While the concept that Airtron's former waste management units are likely sources of some of the VOCs in groundwater at the Mennen-Airtron facilities is not controversial (previous investigators have reached this conclusion), less agreement exists regarding the extent to which Mennen's former waste management units are significant sources of VOCs in groundwater.

Mennen's June 1992 Initial Notice Site Evaluation Submission (1992 SES) to NJDEPE did not list either PCE or TCE as raw materials currently used or formerly used at the Mennen facility. If complete, the 1992 SES suggests that Mennen did not use PCE or TCE, the two principal VOCs found in groundwater beneath the Mennen-Airtron facilities. However, other evidence is available that indicates Mennen used PCE and TCE in its operations.

For example, in its August 1980 RCRA Section 3010 Notification, Mennen listed the following among the hazardous wastes it generated:

- The spent halogenated solvents used in degreasing, tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and the chlorinated fluorocarbons; and sludges from the recovery of these solvents in degreasing operations (Waste Code F001);

- The spent halogenated solvents, tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, trichlorofluoromethane and the still bottoms from the recovery of these solvents (Waste Code F002);

- Discarded, off-specification, or spill residue from tetrachloroethylene commercial chemical product (Waste Code U210); and

- Discarded, off-specification, or spill residue from trichloroethylene commercial chemical product (Waste Code U228).

Mennen's Section 3010 Notification indicated that Mennen was a generator of hazardous waste, and that it managed hazardous wastes in a treatment, storage, or disposal facility, and that it managed hazardous wastes using an underground injection control structure (e.g., an injection well).

In its subsequent (late 1980 or early 1981) RCRA Part A Permit Application for hazardous waste container and waste pile storage, Mennen estimated its annual quantity of spilled or off-specification PCE (Waste Code U210) to be 1,000 pounds per year, and TCE (Waste Code U228) to be 100 pounds per year. If these estimates of the annual quantities of spilled and discarded PCE and TCE were accurate in 1980, it is reasonable to assume that substantially larger quantities of PCE and TCE were purchased and used by Mennen at that time.

Seventeen AOCs are described in Environmental Resources Management's (ERM's) 1993 ECRA/ISRA Site Investigation Report, prepared on behalf of the Mennen Corporation.

Although VOCs were identified as being present in or near several AOCs, for purposes of this discussion attention will be focussed on AOCs previously used by Mennen to introduce industrial wastewater to the subsurface environment.

Three different wastewater disposal systems reportedly were used by Mennen between 1953 and 1968. The first (AOC #1), used from 1953 to 1956, included a leach field located 150 feet south of MW-305, between MW-306 and MENMW-11. The second (AOC #3), used from 1957 to 1966, included a leach pit located about 15 feet northeast of MW-306. The third (AOC #17), used from 1966 to 1968, included four wastewater injection structures located 400 feet southwest of MENMW-7 and 800 feet northwest of MW-306, beneath what is now the warehouse attached to Mennen's main plant. Figures 3-2 through 3-7 show details and cross sections of Mennen's AOC #1, AOC #3, and AOC #17.

Some disagreement occurs in the literature regarding the period during which AOC #17 operated. A May 1985 draft report prepared by Dames & Moore (Dames & Moore. Draft Report, Subsurface Investigation, The Mennen Company, Morristown, New Jersey. May 30, 1985) for Mennen, states that the AOC #17 system was shut down in 1966 and thereafter "washwater was disposed of via an injection well located to the west of the former disposal system." An October 1985 report by Dames & Moore (Dames & Moore. Report, Disposal Tank Removal, The Mennen Company, Morristown, New Jersey. October 4, 1985), also prepared for the Mennen Company, states the AOC #17 system operated between 1964 and 1966.

The confusion regarding dates of operation may have resulted from a change in nomenclature for the AOC #17 system; at the time it was operated, it may have been called an injection well system (this might explain why Mennen's RCRA Section 3010 Notification referenced underground injection control); and when it was closed, Mennen or its consultants may have called it a disposal tank system. We will assume, for purposes of the following discussion, that the AOC #17 wastewater injection system operated between 1966 and 1968, as stated in the 1993 ERM report.

Little has been reported regarding flow rates and wastewater characteristics for the various wastewater disposal systems employed by Mennen. AOC #17 (including the four

wastewater injection structures) is reported to have disposed of an average of 18,000 gallons per day (gpd). As the AOC #17 system reportedly was designed to replace the AOC #1 and AOC #3 systems, those systems may have disposed of similar volumes of wastewater.

A March 1985 report by Elson T. Killam Associates (Subsurface Treatment System Disposal Site Evaluation) prepared for Mennen listed a number of volatile parameters present in Mennen's wastewater, including PCE, methylene chloride, toluene, and TCE. According to Table 3 of the Killam report, these parameters were "identified in wastewater samples collected in October and November, 1983 and reported on January 10, 1984 by Elson T. Killam Associates, Inc."

When AOC #17 was closed in 1985, samples of sludge were collected from each of the four injection structures, as well as from each of three 750-gallon settling tanks located immediately upstream of the injection structures. It is unclear from the various investigation and closure reports whether the 750 gallon settling tanks were sealed or were open-bottom; the October 1985 Dames and Moore report states that the settling tanks are "sealed"; however, Appendix A, Figure 1 of the same report notes that the settling tanks are "open bottom with gravel bed."

The seven sludge samples contained total VOC concentrations ranging from 6,450 micrograms per kilogram (μg/kg) to 103,800 μg/kg. Analytical results (in μg/kg) were as follows:

Sludge Sample Location	Total VOCs	PCE	TCE
MDT-1	6,450	2,360	
MDT-2	57,000	19,160	1,428
MDT-3	103,800	2,840	2,980
MDT-4	19,600	13,100	564
MDT-5	6,880	2,310	
MDT-6	6,600	2,850	
MDT-7	7,780	6,180	

Clearly, wastewater disposed by Mennen contained substantial amounts of both PCE and TCE. In 1980, Mennen estimated it needed to store 1,000 and 100 pounds per year of

off-specification or spilled PCE and TCE, respectively. Wastewater sampling in 1983 by Elson T. Killam Associates confirmed the presence of PCE and TCE in Mennen's wastewater. In 1985, sludge samples collected from the bottom of Mennen's wastewater injection system contained PCE and TCE at elevated levels.

If 18,000 gpd were disposed through the AOC #17 wastewater injection structures for 500 days over two years, then a total of 9,000,000 gallons of wastewater containing PCE and TCE were injected into the subsurface environment beneath the Mennen facility during that period. If the AOC #1 leach field and AOC #3 leach bed managed similar volumes of wastewater, then over 67 million gallons of wastewater containing PCE and TCE were injected into the subsurface between 1953 and 1968 by Mennen.

Estimates of the volume of sludge generated by AOC #17 over a two-year period can be calculated based upon the reported geometry for the four injection structures and the reported depths of sludge present at closure. The October 1985 report by Dames and Moore reported a 6-foot I.D. for the injection structures and total sludge depth of 14 feet, which is equivalent to 3,000 gallons, plus up to three times 750 gallons. Between 3,000 and 5,000 gallons of sludge were removed from the system at closure.

The estimates of sludge removed from AOC #17 can be compared with the reported volumes of sludge removed in 1993 from the various settling chambers associated with AOC #1 and AOC #3, the leach field and leach pit. According to the 1993 ERM ECRA/ISRA Site Investigation Report, three drums (150 gallons) of wastewater and sludge were removed from the distribution box associated with AOC #1, and 32 drums (1,600 gallons) of wastewater and sludge were removed from the separation chamber associated with AOC #3.

Either one or some combination of the following must have occurred with respect to sludge generation:

- The AOC #1 and AOC#3 systems produced much less sludge per year than did the AOC #17 system; or

- The sludge in the AOC #1 and AOC #3 systems consolidated in volume much more in the course of 38 and 27 years, respectively, than did the AOC #17 sludge in 7 years; or

- Sludge had previously been removed one or more times from the AOC #1 and AOC #3 systems prior to 1993.

If sludge previously had been removed from the AOC #1 and AOC #3 systems (e.g., when those systems were taken out of service), then the 1993 sludge sampling results may not be relevant to conditions when the systems were operated.

No analyses of total VOCs for sludge samples collected in 1993 were reported. Also, no analyses of total VOCs for sludge removed prior to 1993, if any, have been reported. The 1993 sludge samples were analyzed for toxicity characteristics leaching procedure (TCLP) (leachable) VOCs, and no detections were reported; however, it is not known whether the failure to detect TCLP VOCs was due to elevated detection limits, or VOCs being bound to organic matter in the sludge (and thus not leachable), or VOCs having already leached from the sludge, or VOCs not being present in the sludge.

No soil samples have been collected from directly beneath any of the four wastewater injection structures associated with AOC #17. In connection with the 1985 closure of the system, soil samples collected from three different soil borings installed outside the southwestern boundary of the system were found to contain PCE. According to the October 1985 Dames and Moore report, concentrations and depths were as follows (locations are shown on Figure 3-6):

Depth (bls)*	PCE
40 feet (B-1)	49 μg/kg
15 feet (B-3)	270 μg/kg
20 feet (B-3)	175 μg/kg
25 feet (B-5)	26 μg/kg
25 feet (B-5 duplicate)	42 μg/kg

* bls = below land surface

The average of the five soil samples listed above is 112 μg/kg. To put these PCE concentrations into perspective, two years after the above results were obtained on the Mennen property, Airtron collected samples from a number of soil borings just outside its various historical waste management units. Soil samples from nine different soil borings were found to contain PCE above quantitation limits. According to the 1987 Soil and Groundwater Remedial Investigation Report by Converse Environmental East, concentrations were as follows;

Depth (ft bls)	Boring Number	PCE (μg/kg)
40	B-106	21
45	B-108	19
55	B-109	11
14	B-114	60
20	B-114	67
30	B-114	150
40	B-116	35
20	B-117	16
35	B-117	29
40	B-118	15
45	B-118	55
35	B-119	29
19	B-122	52
35	B-122	150

The average of the 14 soil samples listed above is 51 μg/kg. In all, Airtron collected 63 soil samples from around the Airtron lagoons for VOC analysis. None contained PCE in concentrations as high as Mennen's two reported values (175 μg/kg and 270 μg/kg) in 1985 for Mennen's soil boring near one of its wastewater injection well structures.

In 1990, SCS Engineers installed soil borings through the center of each of the former Airtron lagoons, and soil samples were collected at various depths. The March 1991 report of this investigation (Soil Vapor Extraction Test Program) provided the resulting soil concentrations for TCE and PCE (detection limit was 6 μg/kg):

	Depth (ft bls)	TCE (µg/kg)	PCE (µg/kg)
Lagoon No. 1	15	BDL	BDL
	25	BDL	BDL
	30	BDL	BDL
	50	BDL	BDL
Lagoon No. 2	15	13	BDL
	50	BDL	7
Lagoon No. 3	15	7	BDL
	45	BDL	6
Lagoon No. 4	15	BDL	BDL
	45	BDL	6
Lagoon No. 5	5	BDL	BDL
(perched zone)	15	73	BDL

BDL = below detection limit

The trace PCE and TCE concentrations found in the 1990 soil sampling results from borings installed at the center of each former Airtron lagoon clearly indicate that the lagoons are not a continuing source of releases of VOCs to groundwater. There are no similar soil concentration data reported for Mennen's AOC #1 (leach field), AOC #3 (leach pit), or AOC #17 (wastewater injection structures). All of the soil sample data reported by Mennen for these systems was collected either outside the systems entirely (AOC #3 and AOC #17), or along the edge of the system (AOC #1). If the 1985 sludge sampling results for AOC #17 (the wastewater injection structures) can be compared to VOC concentrations found in soils directly underlying the center of the systems, then significant continuing sources of VOCs may exist beneath each Mennen system.

Based upon the sludge sample results and the wastewater volumes reported, significant amounts of VOCs (PCE and/or TCE) were introduced by Mennen to the subsurface environment through the wastewater injection structures associated with AOC #17. AOC #17 introduced wastewater containing VOCs directly to the higher permeability outwash sands beneath the upper till, above the water table aquifer (see Figure 3-7). The outwash sands apparently were capable of passing substantial quantities of wastewater directly to groundwater, based upon the 18,000 gpd flow rate reported by Mennen.

Assuming that the AOC #1 leach field and AOC #3 leach pit disposed of wastewaters having characteristics similar to those disposed via the AOC #17 injection structures, it is likely that significant amounts of VOCs (PCE and/or TCE) were introduced to the subsurface environment through AOC #1 and AOC #3.

The fate of any VOCs introduced by Mennen to the subsurface environment may be inferred based upon available groundwater monitoring data. Table 3-1 summarizes analytical results for selected VOCs in groundwater samples collected at the Mennen-Airtron facilities. The highest reported values to date for TCE concentrations in groundwater samples from the Mennen-Airtron facilities were found in October 1991 at MW-305 (14,000 μg/l) and in August 1989 at USGS-1 (13,000 μg/l). The highest reported value to date for PCE concentrations in groundwater samples was found in August 1989 at USGS-1.

USGS-1 is located about equidistant from Mennen's AOC #17 and AOC #1 and Airtron's former lagoons. MW-305 is located about 150 feet north of AOC #1 (Mennen's former leach field), 800 feet east of AOC #17 (Mennen's former wastewater injection system), and 1,200 feet south of Airtron's former lagoons. Based simply on geographic proximity (i.e., ignoring groundwater flow directions), VOCs found in groundwater in USGS-1 are as likely to have originated from Mennen as from Airtron; and those found at MW-305 are more likely to have originated from Mennen than from Airtron.

To the extent that they were free-phase products, releases of TCE and PCE from Mennen's AOC #17, AOC #1, and AOC #3 would be expected to sink to the bottom of the higher-permeability sands and to migrate along confining layers, following the laws of gravity.

A depression in the top of the clay till aquitard appears to be present at the Mennen-Airtron facilities, centered between Hanover Avenue and the Mennen Distribution Facility next door to Airtron. Figure 3-8 is a contour map showing the top of the aquitard at the Mennen-Airtron facilities. In the 1993 ECRA/ISRA Site Investigation Report, ERM discusses the presence of a low-permeability sand (with silt and clay) just above the clay till in several areas of the site. As shown in Figure 3-9, the top of the lower permeability sands with silt and clay (transition sands) also appears to form a depression in this area, bounded to the northwest by USGS-1.

Dense, non-aqueous phase liquids (DNAPL) introduced to the subsurface through AOC #17 (Mennen's wastewater injection system), if any, would be expected to move by gravity along one or both aquitards (e.g., the top of the clay till or the top of the transition sands) until they reached a depression (for example, in the vicinity of MENMW-10, between USGS-1 and MENMW-11). Figure 3-10 shows a cross section through AOC #17.

DNAPL introduced to the subsurface through AOC #1 (the former Mennen leach field) or AOC #3 (the former Mennen leach pit), if any, also would be expected to migrate along one or both aquitards until they reached a depression. However, both AOC #1 and AOC #3 appear to be located on a ridge in the aquitards (see Figures 3-8 and 3-9); thus, any migrating DNAPL might migrate either to a point beneath MENMW-10 or to a point in the vicinity of MENMW-11.

The former Airtron lagoons were constructed at land surface, with metal hydroxide sludges managed within berms constructed at the natural ground surface. It is unlikely, although possible, that DNAPL could have been introduced to the subsurface environment through the ground-surface bottoms of Airtron's shallow lagoons. Figure 3-11 shows former Airtron Lagoon No. 1 in cross section; a comparison with Figure 3-7 will illustrate the differences between Airtron's and Mennen's subsurface wastewater injection structures (AOC #17).

The low-permeability soils beneath Airtron's lagoons would be expected to prevent "slugs" of free product from entering the subsurface environment. However, if created, any such DNAPL would be expected to migrate along one of the aquitards to a point near USGS-1.

Dissolved PCE and TCE, if any, released from Mennen's AOC #17 (the wastewater injection structures) and AOC #1 (the leach field) probably migrated toward Mennen's production well (P-1) while it was operating. If the influence of P-1 extended as much as 600 feet to the southeast, then dissolved PCE and TCE, if any, released from Mennen's AOC #3 (the leach pit) also probably migrated toward P-1.

In general, groundwater flow can be determined using groundwater elevation contours (equipotential lines). Flow lines and equipotential lines intersect at right angles. Using these principles (discussed in fundamental hydrology texts such as Chapter 5 of Freeze

and Cherry's Groundwater [1979]), it is possible to draw theoretical groundwater flow lines from the various waste disposal structures used by Mennen. Figure 3-12 shows the theoretical flow paths for dissolved VOCs released from the three Mennen AOCs.

One problem in evaluating the possible migration of dissolved PCE and TCE from AOC #17, AOC #1, and AOC #3 is the lack of monitoring wells along probable flow paths between these subsurface wastewater disposal systems and P-1. In its May 1985 draft report, Dames and Moore stated that the (then) existing contamination present in MENMW-1 and MENMW-2 "is effectively being drawn into the Mennen production wells." Figure 3-13 is taken from Dames and Moore's draft report (the present location of MENMW-7 has been added to the figure); it shows the estimated path of groundwater migration from the AOC #17 area toward Mennen's production well, based upon water level measurements performed in April 1985.

Importantly, the path shown does not directly intersect MENMW-7, later installed north (cross-gradient) of the estimated groundwater flow path. More importantly, neither MENMW-1 nor MENMW-2 is downgradient of AOC #17 (the contamination present in those wells to which the report refers includes a trace of TCE and several forms of Freon).

Theoretical flow paths (perpendicular to equipotential lines) from AOC #17, AOC #1, and AOC #3 under pumping conditions are depicted on Figure 3-12, using groundwater contours provided in Figure 24 of ERM's 1993 report. Aside from pumping well P-1, the only wells located near any of the estimated flow paths are

- MENMW-7, located near the flow path for any dissolved VOCs released from AOC #17 (the wastewater injection structures). Four samples reportedly have been analyzed from this well; a November 1987 sample contained a trace of TCE, an August 1991 sample contained 200 μg/l TCE and 110 μg/l PCE, an August 1993 sample contained 417 μg/l TCE and 90 μg/l PCE, and a May 1994 sample contained 440 μg/l TCE and 90 μg/l PCE.

- Mennen's standby production well P-2, located near the flow path for any dissolved VOCs released from AOC #1 (the leach field). Few analytical data

have been reported for P-2; an April 1985 sample contained 466 μg/l of TCE; a November 1987 sample contained 180 μg/l TCE.

- MW-305, located near the flow path for any dissolved VOCs released from AOC #1. A sample from this well contained the highest TCE concentration (14,000 μg/l) reported at the two facilities; the 15 other samples analyzed from MW-305 contained TCE on the order of 2,000 μg/l and PCE on the order of 1,000 μg/l.

- MW-305A, a shallow well located near MW-305 and the flow path for any dissolved VOCs from AOC #1. Only one VOC sample has been reported for this well; it contained 2,030 μg/l TCE and 1,150 μg/l PCE.

The well pair MW-305 and MW-305A have been sampled contemporaneously only once, in July 1993. TCE and PCE concentrations were as follows:

Well Sampled	TCE	PCE
MW-305 (deeper well)	289 μg/l	120 μg/l
MW-305A (shallow well)	2,030 μg/l	1,150 μg/l

These results, if confirmed by subsequent investigation, may indicate that the source of PCE and TCE in groundwater at the MW-305 location is located near the surface of the ground (e.g., at AOC #1), rather than at depth.

The focus of the discussion to this point has been on the VOCs PCE and TCE. Another important pollutant which has been reported present in groundwater at the Mennen facility (but not at the Airtron facility) is trichlorofluoromethane, or Freon 11. Freon 11 has not been detected above quantitation limits in any of the several hundred samples collected on the Airtron side of Hanover Avenue. Freon 11 has been detected in both of Mennen's production wells (P-1 and P-2) and in the following Mennen monitoring wells, all on the south or southwest portion of Mennen's property: MENMW-1, MENMW-2, MENMW-3, MENMW-4, MENMW-5, MENMW-16, MENMW-17, and MENMW-18. Figure 3-14 shows the spatial distribution of Freon-11 detections in groundwater at the Mennen-Airtron facilities.

The presumed source of the Freon 11 at the Mennen facility is a former Freon 11 aboveground bulk storage tank farm (AOC #16) located about 300 feet southwest of AOC #17 (the former wastewater injection structures). Freon 11 also might have been released from the underground piping which connected AOC #16 with the Mennen Main Facility. In either case, Freon 11 may be more a "tracer" indicating groundwater movement rather than a "tracer" of Mennen wastewater disposed in various disposal systems.

As a groundwater tracer, Freon 11 analytical results suggest that Freon released near MENMW-2 (or perhaps from points further southwest) migrated northeast toward Mennen's pumping well P-1; after P-1 ceased pumping, groundwater containing Freon 11 migrated southeast toward MENMW-5 and MENMW-18. The migration pathway for Freon 11 suggested by the data is relevant to possible VOC releases elsewhere on the Mennen property (e.g., from the AOC #17 former wastewater injection structures located between AOC #16 and P-1). Where Freon 11 has been detected in a given Mennen well, it is likely that any other dissolved VOCs identified in the well originated, at least in part, from the AOC #17 wastewater injection system.

3.1.3 Likely Sources at Other Facilities

The former dump located on land now owned by AT&T was shown on the original 1952 construction drawing for what is now the Airtron facility, indicating that the dump predates the Airtron facility. Recent photographs of the surface of the dump appear in Appendix D.

Although no records of any investigation of the dump have been found, MW-205 is believed to have been located downgradient of the dump, at least until July 1991 when the Mennen production well ceased operation. Other monitoring wells which appear to have been located downgradient of the dump while the Mennen production well was pumping include MW-206, MW-304, USGS-1, and perhaps MW-303 (and others). Figure 3-15 shows the theoretical groundwater flow path for releases from the dump, based upon the principle that flow lines cross equipotential lines at right angles. Note that the theoretical flow path does not intersect MW-303; significant concentrations of VOCs have not been found in groundwater samples collected from MW-303.

Interestingly, MW-205 and MW-304 appear to be downgradient of the dump, but not downgradient (at least with respect to dissolved VOCs) of any of the Airtron or Mennen former waste management areas. Over the last seven years, samples collected from MW-205 have contained about 40 μg/l TCE, but no PCE or DCE. Samples collected from MW-304 have contained about 120 μg/l TCE, about 80 μg/l DCE, but (with the exception of a 2 μg/l result reported for July 1991) no PCE. These are the only wells in the study area in which significant concentrations of TCE have been detected without significant concentrations of PCE also being present.

Based upon the unique chemical composition of groundwater samples collected from MW-205 and MW-304, and the location of these wells downgradient from AT&T dump, the AT&T dump appears to be likely source of VOCs detected in these wells.

3.2 MENNEN HYPOTHESIS

The technical basis for the Mennen hypothesis is described in detail in ERM's October 1993 report. The report notes (at page 55) that "the sampling of additional wells on the Airtron and Mennen properties since 1986 has revealed that the VOC plume from the sludge lagoons [on Airtron's property] has migrated to the Main facility. . . . Recent data generated at the Mennen and Distribution Center properties show without question the continued migration of the VOC plume to and across the Main Facility." This is a remarkable statement for a scientist to make. As should be evident from the discussion of the Airtron hypothesis above, substantial question exists whether a single plume emanating from the Airtron lagoons explains all of the VOC detections on Mennen's Main Plant.

The Mennen hypothesis contains several critical assertions:

- Contrary to the 1982 findings of Converse Consultants (Report of Aquifer Test Using Mennen Production Well), the area of influence of Mennen's production well did not extend to USGS-3 (1,170 feet from Mennen P-1) and beyond.

- A groundwater divide exists trending northeast-southwest located generally between the Mennen employee parking lot and its distribution center on the northeast side of Hanover Avenue.

- Along the northern side of the groundwater divide, a "buried channel" of relatively high-permeability sands conveys groundwater in a preferential flow path connecting the following wells: MW-302, MW-206, MENMW-10, MW-305, MW-306, and MENMW-5.

Based upon these assertions, Mennen's consultants say that the "data demonstrate that during pumping conditions, a portion of the ground water (and ground water plume) flowed from the northeast (Airtron): (1) to the southwest along the ground water divide; and (2) between the ground water divide and the southern edge of the capture zone created by well P-1."

The various elements of the Mennen Hypothesis are evaluated in the discussion which follows.

3.2.1 The Influence of Mennen Pumping Well P-1

The 1982 Converse report presented a distance-drawdown plot and estimated that the area of influence of Mennen's P-1 extended over 8,000 feet north of P-1, well beyond USGS-3. The 1993 ERM report did not present a distance-drawdown plot to estimate the extent of P-1's influence. Instead, ERM evaluated hydrographs compiled after P-1 stopped pumping for various wells in the study area to determine whether they showed clear evidence of sustained recovery. Where the pattern clearly indicated a well steadily recovered, ERM concluded it was within the influence of P-1. Where the pattern was equivocal, ERM concluded it was not within the influence of P-1. The result of ERM's analysis was a comparatively small area of influence, extending less than 1,200 feet north of P-1 (compared with the over 8,000 feet estimated by Converse).

Mennen's P-1 has operated at different pumping rates over the years; in general, the pumping rates have declined over time. Thus, it is possible that the different pumping rates in effect at the time of Converse's 1982 estimates and just before ERM's 1993

estimates explain at least some of the difference in the areas estimated. The 1993 ERM report does not address the effect that different pumping rates would be expected to have, if any, on P-1's area of influence.

However, it is difficult, if not impossible, to use the limited empirical approach described by ERM to evaluate the full area of influence of Mennen P-1. No attempt was made to control or record other factors (e.g., unusual precipitation, drought, influence of other pumping wells, etc.) which could explain regional changes in water table elevations during the study period. While it is stated that wells such as USGS-3 were "stable" compared to one another, it is impossible to know from the data presented whether they were "stable" as compared with wells outside the possible area of influence of P-1. Extremely small variations in groundwater elevations can indicate a given well is within the influence of a pumping well. The fact that groundwater elevations rose in wells such as MW-2M (located about 700 feet from P-1) by about six feet during the two-year study period suggests that wells much further away likely were in the area of P-1's influence.

3.2.2 The Groundwater Divide

The groundwater divide discussed by ERM in its 1993 report probably exists, based upon data collected by ERM using Geoflow meters and other available information. However, the only existing monitoring well thought to be located east of the divide is Mennen's MENMW-6, and groundwater elevation data from this monitoring well may be anomalous.

Significant changes in groundwater elevations have been reported for MENMW-6 over the last seven years both in an absolute sense, and in a relative sense (as compared with reported elevations in MENMW-5). The following elevations have been reported for the dates shown:

Date	MENMW-6 Elevation	MENMW-5 Elevation
11/87	354.67	347.26
02/90	350.00	350.76
07/93	350.81	352.10
05/94	350.76	352.11

What may have been a 7.4-foot gradient from MENMW-6 toward MENMW-5 in 1987 today appears as a 1.4-foot gradient in the opposite direction. MENMW-6 is reported to be completed within a subsurface layer of till. If this well is poorly connected to the surrounding water-table aquifer, it is possible that its water level is not representative of groundwater elevations.

However, based on the limited groundwater elevation data available, and on the apparent eastern extent of VOCs detected in groundwater, it appears that the groundwater divide is present. This divide would prevent migration of VOCs in groundwater from the Mennen-Airtron facilities past the divide to the east of the Mennen facility.

Mennen's AOC #1 (the former leach field) is located near the groundwater divide. No groundwater elevation data are available to measure the effect of subsurface wastewater disposal by Mennen in AOC #1 while it was used. It is likely that when AOC #1 operated, a "mounding" effect was created, driving wastewater in a radial pattern in every direction. The groundwater divide likely affected the radial mounding effect; wastewater constrained by the divide would be expected to migrate to the north (toward MENMW-10) and south (toward MENMW-5), as well as toward P-1 while pumping.

3.2.3 The "Buried Channel"

The assertion that a "buried channel" forms a preferential flow path from the former Airtron lagoons, along the groundwater divide, and to a point near MENMW-5 merits close scrutiny. Two principal observations are offered by Mennen's consultants in support of the assertion:

- Significantly higher permeabilities (as measured by hydraulic conductivities determined during slug tests) are present within the "buried channel."

- Groundwater contours suggest channel flow between MENMW-5 and MENMW-10, even during the period of time during which P-1 was operating.

ERM presented hydraulic conductivities based on slug-test data for 12 monitoring wells; hydraulic conductivities were estimated for four additional wells. ERM divided the

conductivity values into two groups: (1) medium hydraulic conductivities from 1 to 10 ft/day (average 5 ft/day), and (2) lower hydraulic conductivities less than 1 ft/day. However, the use of 1 ft/day as the criterion to define the two groups is not helpful, given the distribution of the data. For example, ERM characterized MW-306 (1.1 ft/day) as a medium hydraulic conductivity well, and MENMW-2 (0.9 ft/day) as a lower hydraulic conductivity well, although the two conductivity values are essentially the same..

Using an alternative (and more helpful) approach, the hydraulic conductivities reported by ERM fall into the following nearest order-of-magnitude ranges (square root of 10, or 3.16, is used for break point between ranges):

Hydraulic Conductivity (rounded)	Associated Wells
10 ft/day	MENMW-12, MW-305, MENMW-11, MENMW-18
1 ft/day	MENMW-13, MW-306, MENMW-5, MENMW-14, MENMW-15, MENMW-2, MENMW-17
0.1 ft/day	MW-307, MENMW-6, MENMW-7, MENMW-3, MENMW-16

If the group of seven wells shown for the 1 ft/day hydraulic conductivity is regarded as typical for the site, then four wells have significantly higher conductivities. Three of these are located along Hanover Avenue between Mennen's Main Plant and its Distribution Facility, near AOC #1 (the former leach field). One is located behind the Main Plant over 600 feet southwest.

Five wells have significantly lower conductivities than 1 ft/day. Two are located to the east in what has been described as the edge of the "buried channel." One is north of the Main Plant, and two are southwest of the Main Plant near the railroad tracks.

Aside from perhaps demonstrating that the sands beneath the AOC #1 former leach field might have been able to permit substantial quantities of wastewater to migrate vertically and laterally, it is not clear what is demonstrated by the hydraulic conductivity data. Preferential flow paths in nature should be observed by changes in potential energy of the water (i.e., by groundwater elevations). If a channel of significantly more permeable sands

connects an area of higher hydraulic head with an area of lower hydraulic head, then a pattern of smooth "U-shaped" curves with the closed end extending toward the area of higher hydraulic head should be evident from the groundwater contours.

In its 1993 report, ERM interpreted such a pattern for groundwater conditions in July 1993 (after P-1 ceased operation) in its Figure 26, included as Figure 3-16. The smooth curves shown in the vicinity of MW-305 and MW-306 represent the kind of "U-shaped" groundwater contours (with open end to the south and closed end to the north) one would expect if a preferential flow path to the southwest of Mennen's Main Facility existed. If the ERM interpretation shown in Figure 3-16 is correct, then one would expect groundwater beneath the Mennen Main Facility (and any VOCs contained therein) to migrate southeast until they reached the center of the preferential flow path and turned southwest to MENMW-5.

However, ERM's interpretation shown on Figure 3-16 does not appear to even infer the continuation of a preferential flow path extending as far as the Mennen Distribution Center or the former Airtron lagoons. The "U-shaped" contours shown for groundwater elevations 352.5 and 353 between the Mennen main facility and the groundwater divide to the east have virtually disappeared at the 353.5 contour, and are not shown closer to the Mennen Warehouse or the former Airtron lagoons.

We analyzed the data presented by ERM for July 1993 (non-pumping) conditions using Surfer, a standard data analysis package used to interpolate geologic and hydrogeologic data and plot contours. We instructed the package to consider the 10 nearest points to any given point of data, to perform Kriging of the data to smooth the resulting curves, and to plot 1-foot contours over the study area. The resulting groundwater elevation contours are presented in Figure 3-17. No "U-shaped" contours (indicating a possible preferential flow path) are apparent between Hanover Avenue and MENMW-5.

Figure 3-18 shows groundwater contours based upon current (May 1994) groundwater elevations. It was developed using the same input parameters to the Surfer package described above. Again, no "U-shaped" contours indicating a preferential flow path are apparent between Hanover Avenue and MENMW-5.

Also in its 1993 report, ERM provides an interpretation of groundwater contours in February 1990 (while P-1 was pumping) in its Figure 24, included as Figure 3-19. The rationale for the two 351-foot groundwater contours in the vicinity of the southwest corner of the Mennen Distribution Center is not clear. An alternative, and more likely, interpretation of the 351-foot contour is shown in Figure 3-20. No "U-shaped" groundwater contours indicating a preferential flow path between Hanover Avenue and MENMW-5 are shown in either Figure 3-19 or Figure 3-20.

Figure 3-21 shows a theoretical groundwater flow path (drawn perpendicular to equipotential groundwater contour lines) from Airtron's waste management areas superimposed on Figure 3-20, reflecting ERM's interpretation of the limited extent of P-1's influence. Even if ERM's interpretation was a correct interpretation of groundwater flow conditions at the Mennen-Airtron facilities under pumping conditions, it is not possible to draw a flow path from the Airtron waste management areas to MENMW-5 without violating the law of gravity. Such an impossible flow path would have to either move downgradient to P-1 and then upgradient to MENMW-5, or move laterally in a direction parallel to groundwater contours. Groundwater flowlines are perpendicular to groundwater contours (not parallel); and theoretically, there can be no flow across a flowline (Freeze and Cherry, 1979).

There appears to be no scientific basis for ERM's statement at page 7 of its 1993 ECRA/ISRA Site Investigation Report that a VOC plume could have flowed from Airtron through a preferential flow path to MENMW-5 while the Mennen production well P-1 was operating.

3.2.4 Pattern of VOC Concentrations in Groundwater

As shown on Figure 3-22, at least three discrete "pockets" of elevated TCE concentrations are now present in the immediate vicinity of the Mennen-Airtron facility. Monitoring wells located between the three pockets contain significantly lower concentrations of VOCs. The three include:

- An area on Airtron's property near MW-2, with TCE and PCE concentrations of 3,300 and 2,200 μg/l, respectively;

- An area on Mennen's property near MW-305, with TCE and PCE concentrations of 1,800 and 1,100 μg/l, respectively; and

- An area on Mennen's property (and perhaps off-site to the southwest) near MENMW-5, with TCE and PCE concentrations of 3,100 and 710 μg/l, respectively.

These pockets are in addition to other discrete "pockets" of VOCs which may exist near the dump on AT&T's property, or beneath the Mennen Main Facility.

According to the Second Law of Thermodynamics, there is a progression in nature from order to randomness. As applied to chemical thermodynamics, chemicals in the environment move from areas of high concentrations to low concentrations. What possible explanations are there to explain a concentration of TCE at MENMW-5 that is essentially equal to the TCE concentration in MW-2, over 1,600 feet away, in light of seven observation points between the two with much lower concentrations?

In the absence of a plausible scientific explanation for a connection between the VOCs from Airtron and the VOCs observed at MENMW-5, are there other possible explanations for the VOCs found at MENMW-5? A few historical observations indicate that there are.

The appearance of significant concentrations of VOCs at MENMW-5 may be a relatively recent phenomenon, as shown by the following tabulation:

	MENMW-5	
Sampling Date	TCE (μg/l)	PCE (μg/l)
November, 1987	180	ND
August, 1991	1,900	81
July, 1993	2,930	299
May, 1994	3,100	710

VOC concentrations in MENMW-5 have steadily increased in the three years since the Mennen production well ceased operation; they are more than two orders of magnitude higher than the reported concentration prior to July 1991. With the possible exception of

MENMW-7 (which had TCE concentrations that increased more than two orders of magnitude from 2 μg/l in 1987 to 440 μg/l in 1994), concentrations at no other monitoring well at the Mennen-Airtron facilities have increased so much in the course of the various investigations over the years.

What do MENMW-5 and MENMW-7 have in common? One commonality is that both are located near either the source of a Mennen wastewater disposal system (MENMW-5 and AOC #3), the groundwater flow path from such a system under pumping conditions (MENMW-7 and AOC #17). As groundwater levels have recovered since the production well ceased operation, both are now downgradient (or more cross-gradient, in the case of MENMW-7) from the production well and/or the flow path. If dissolved VOCs had been released to groundwater from AOC #3 (the former Mennen leach pit located near MW-306) while the production well was in operation, they would have migrated beneath the Mennen plant toward the production well. When the groundwater flow path reversed, the VOCs from the leach pit would migrate back toward MENMW-5.

Similarly, if VOCs had been released to groundwater from AOC #17 (the former Mennen shallow wastewater injection structures) while the production well was in operation, they would have migrated either toward the production well or in a more southeasterly direction (depending upon which interpretation of groundwater elevations under pumping conditions one selects). When the pump ceased operation, and depending upon where the VOCs had migrated, they would move either toward MENMW-7 or MENMW-5 as groundwater elevations recovered.

The velocity of groundwater at the Mennen-Airtron facilities is relevant to the question of the sources of the discrete "pockets" of VOCs now present in groundwater. It is possible to estimate the groundwater velocity under current conditions, and to calculate the distance over which VOCs would move by advection in the three years after P-1 ceased operation. Velocity is given by the equation

$$v = \frac{(K)(I)}{n}$$

where

v	=	average groundwater linear velocity in ft/day
K	=	hydraulic conductivity in ft/day
I	=	hydraulic gradient in ft/ft
n	=	porosity, dimensionless

The hydraulic gradient is the difference in groundwater elevation divided by the distance between the observation points. For example, using the July 1993 data presented by ERM, the difference in groundwater elevation between MENMW-10 and MENMW-5 was 353.08 - 352.10, or 0.98 feet. The distance between the two wells is about 900 feet. In July 1993, the hydraulic gradient between MENMW-10 and MENMW-5 was 0.98/900, or 0.0011 ft/ft. Assuming an average hydraulic conductivity of 10 ft/day (the higher values estimated by ERM) and porosity of 0.25 (typical of silty sands), the average groundwater linear velocity in July 1993 was (10) (.0011)/0.25, or 0.044 ft/day, or 15.9 ft/year.

Otherwise stated, VOCs in groundwater at MENMW-10 in July 1991 would have migrated less than 50 feet (3 yrs X 15.9 feet/yr) toward MENMW-5 by July 1994. At 15.9 feet per year, hypothetical releases from the former Airtron lagoons moving through a hypothetical "buried channel" preferential flowpath would require approximately 113 years to reach MENMW-5. By contrast, at 15.9 feet per year, releases from AOC #1 would cover the 600-foot distance to MENMW-5 in about 38 years (or the time between 1956, when the unit was taken out of operation, and 1994). Releases from AOC #3 (the former Mennen leach pit) would take about 19 years (e.g., from unit closure in 1966 until 1985) to reach MENMW-5 if they moved at 15.9 feet per year.

Apparent average linear groundwater velocity calculations strongly suggest that the discrete "pockets" of VOCs at the Mennen-Airtron facilities must have separate discrete sources located near each pocket, rather than a single source.

3.3 CONCLUSIONS

The RI, which included the following components, has been completed:

- Sampling and analysis of stream sediments in the unnamed stream along the rear of the Airtron property;

- Performance of a soil-gas survey and soil sampling and analysis at the former island in the Airtron parking lot. The island was reportedly used for drum storage during the 1950s and/or 1960s;

- Performance of an electromagnetic terrain conductivity survey over approximately 1.4 acres at the former drum storage area of the northern portion of the parking lot. The survey was performed to assist in the delineation of a discontinuous clay lens which has resulted in perched water conditions in the vicinity of MW-301;

- Sampling and analysis of 26 groundwater monitoring wells located at the Airtron facility, the adjacent Mennen Warehouse, and the main Mennen facility located across Hanover Avenue; and

- Review of existing site characterization documents for the Airtron and Mennen (as available) facilities.

Stream sediment sampling and analysis found arsenic at concentrations ranging from 7.26 mg/kg to 65.6 mg/kg. The common range of arsenic concentrations in natural soil is reported at 1 mg/kg to 50 mg/kg (U.S. Environmental Protection Agency. Hazardous Waste Land Treatment, SW-874. April 1983). Airtron's current NJPDES permit allows the discharge of arsenic in treated wastewater with limits of 28,000 mg/day (monthly average) and 71,000 mg/day (daily maximum).

The results of the soil-gas survey and soil sampling at the former parking lot island indicate that former activities in this area have had limited impact. Soil-gas monitoring was performed using both an FID and a PID. No VOCs were detected in soil-gas at the majority of sampling locations. Four soil samples were collected from locations indicating the presence of detectable concentrations of vapor phase VOCs. Laboratory analyses detected VOCs at less than 100 ppb in three of the four soil samples. Tetrachloroethene was detected in one soil sample at 61 ppm.

The electromagnetic survey detected the presence of a terrain conductivity anomaly, covering approximately 15,000 square feet, in the vicinity of MW-301 and vapor

extraction well A-6. The low horizontal conductivity gradients exhibited by the anomaly suggest the source is an "earth feature" such as a clay layer or conductive plume, and not a "cultural feature" such as buried piping or drums. The results of the electromagnetic survey, combined with the known presence of a shallow confining layer at MW-301, suggests that the anomaly represents a clay layer, as opposed to a conductive plume.

Based on the results of investigations performed for Airtron and Mennen since the early 1980s, two different hypotheses have been suggested to explain the presence and distribution of VOCs in groundwater at the Mennen-Airtron facilities. The Airtron Hypothesis (that likely sources of VOCs include waste management areas at Airtron, at Mennen, and at AT&T), which incorporates the results of the recent Airtron RI, is the more plausible and supported by the data, when compared to the Mennen Hypothesis, since:

- It accounts for the fate of the millions of gallons of wastewater containing VOCs discharged beneath the surface of the ground by Mennen.

- It is consistent with current observations of at least three discrete "pockets" of VOC concentrations at the Mennen-Airtron facilities.

- It explains the high historical concentrations in the area of USGS-1 (possible presence of DNAPL in that area).

- It explains the unique chemical signature at MW-205 and MW-304.

The Airtron Hypothesis lacks sufficient information (collected by Mennen) to prove that significant concentrations of VOCs were present beneath Mennen's Main Facility prior to the cessation of pumping well P-1. Because substantially more data were collected by Airtron on its side of P-1, the inference is raised that the principal source of VOCs at the facilities originated at Airtron. Almost no information has been collected by Mennen in the area between its wastewater disposal systems and P-1.

The Mennen hypothesis, in addition to suffering several apparent defects (e.g., the absence of any evidence of a preferential flow path connecting Airtron and MENMW-5

while the Mennen production well was pumping), does not adequately explain the following:

- What happened to the millions of gallons of wastewater containing VOCs discharged by Mennen at AOC #17, AOC #1, and AOC #3? What was the fate of the VOCs released?

- Why have VOC concentrations increased steadily at MENMW-5 while VOC concentrations at MW-306 have decreased steadily over the last four years?

- How could Freon 11 be present in MENMW-5?

- Why are samples from MW-205 and MW-304 free of significant amounts of PCE?

To be considered valid under the scientific method, a hypothesis must be consistent with available factual observations and the laws of nature. The Airtron Hypothesis appears to better represent known conditions at the Mennen-Airtron facilities than does the Mennen Hypothesis, and is more likely to be valid.

3.4 RECOMMENDATIONS

The groundwater pump-and-treat system under construction at the Airtron facility is expected to have an area of influence sufficient to capture VOCs in groundwater migrating from Airtron site. Once operational, performance data (i.e., groundwater elevations and VOC concentrations in nearby wells, and groundwater pumping rates) will be collected (as is planned) to determine the effectiveness of the system. This data will also be used to determine the actual radius of influence of the new Airtron pumping well. This data will also be used to assess whether VOCs disposed by Mennen are being pulled across Hanover Avenue into the Airtron pumping well. The use of Freon 11 as a tracer compound may be useful to indicate that VOCs disposed by Mennen are being recovered.

Alternatives to address the "perched" groundwater zone near MW-301 should be considered. One approach would be to dewater this area by installing one or more

recovery pumps and treating the recovered water using the treatment system now under construction by Airtron. It is anticipated that the relatively small perched zone can be dewatered with the periodic use of portable pumps (as opposed to the dedicated pump and continuous pumping mode to be utilized for the system currently being installed). Once dewatered, soil vapor extraction can be extended to reduce any residual VOCs in soil above the perched layer.

Additional investigation and/or remediation should be undertaken by the responsible parties with respect to releases from the AT&T dump and from the various wastewater disposal systems used by Mennen.

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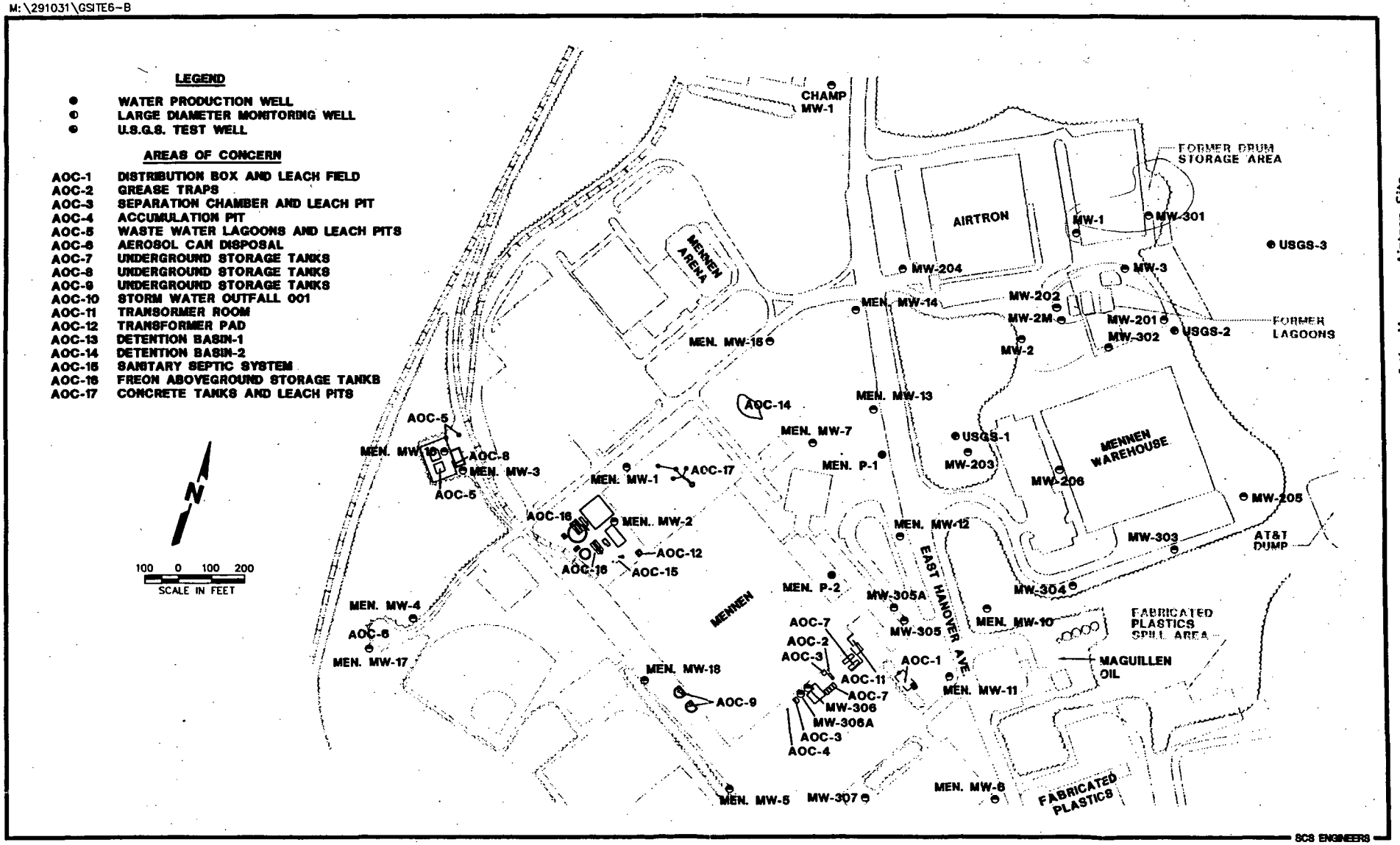

Figure 3-1. Location of Site Features of the Mennan - Airtron Site

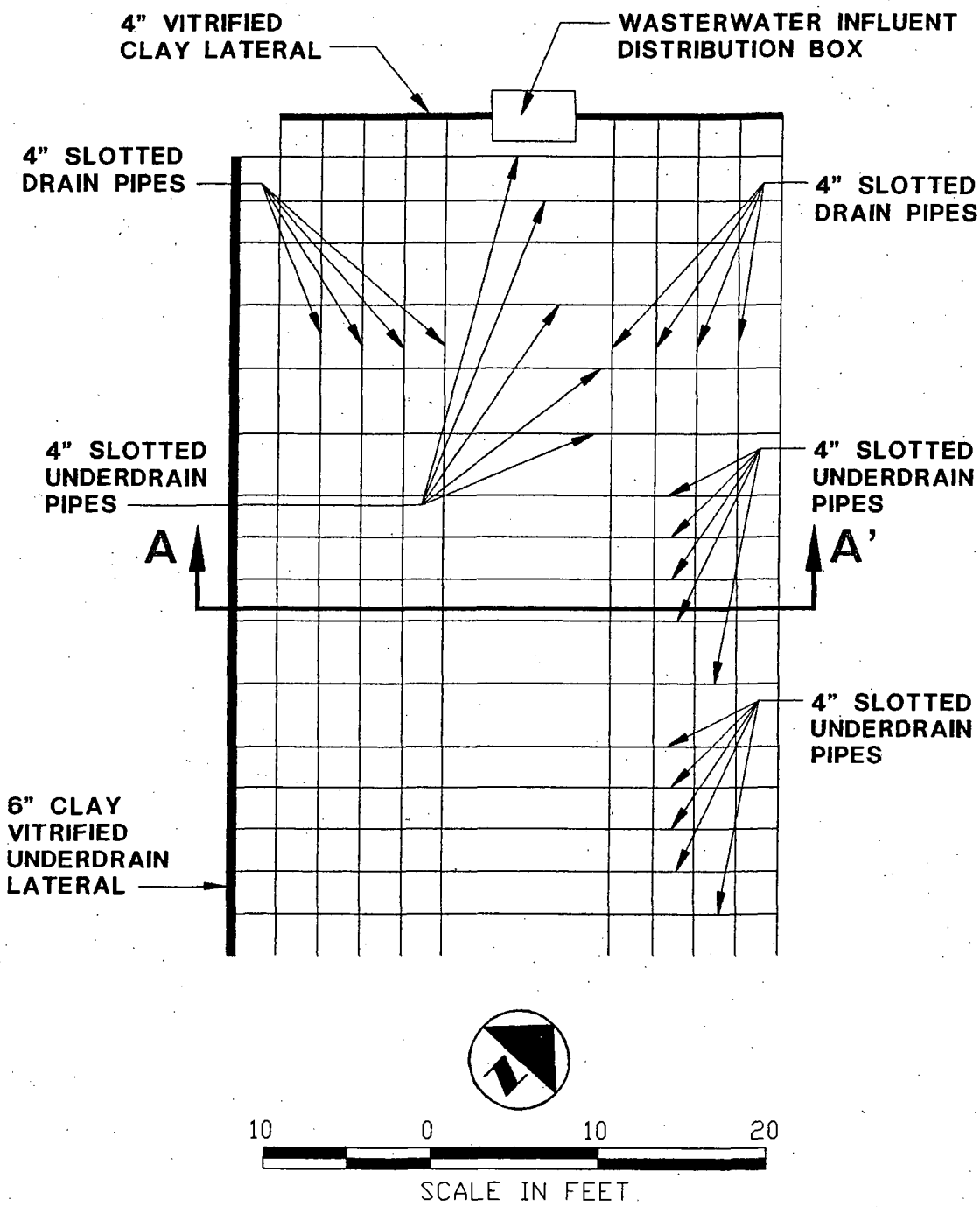

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Figure 3-2. Mennen AOC #1 Leach Field

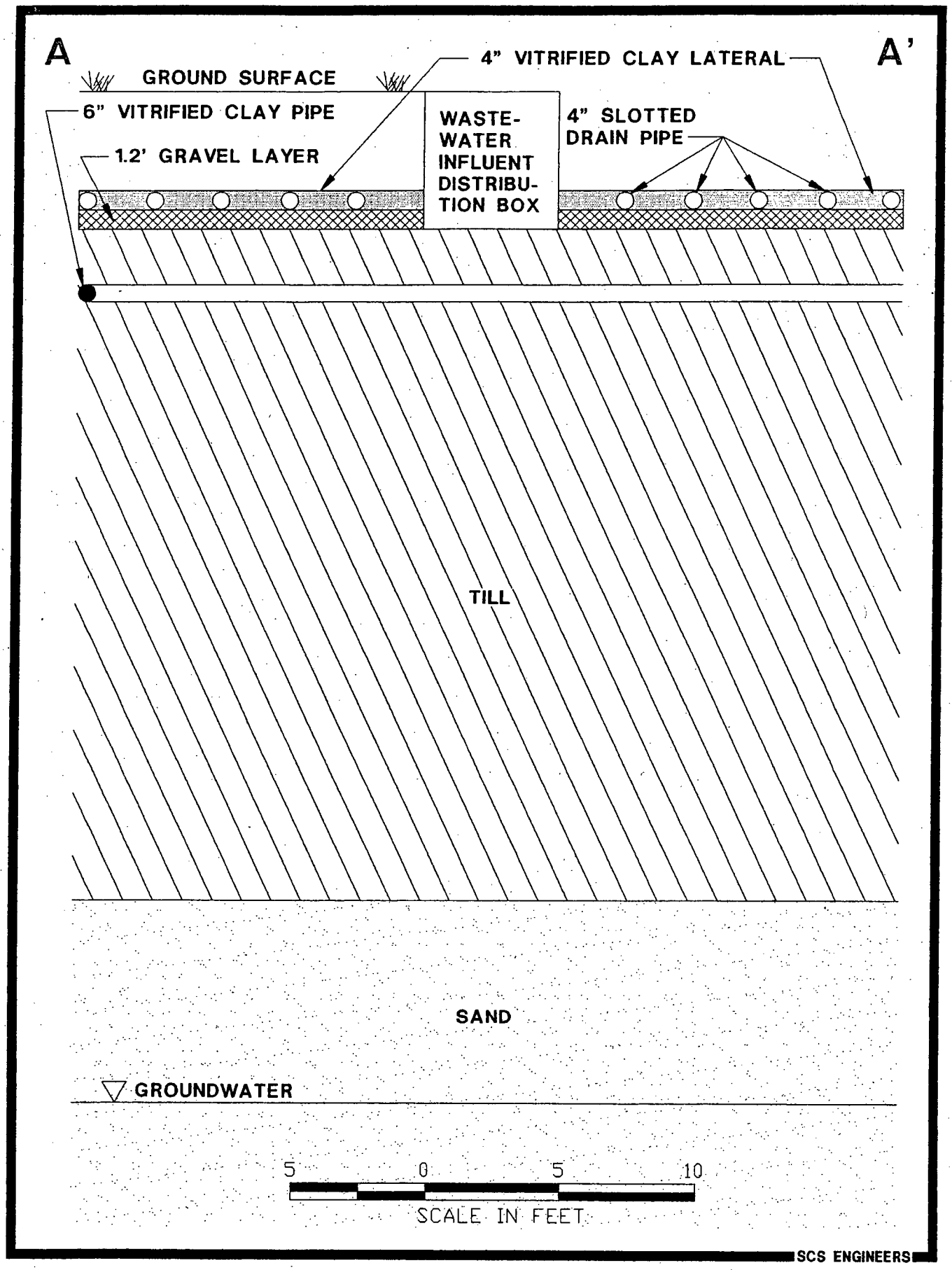


Figure 3-3. Cross-Section of Mennen AOC #1

M:\291031\FIG3-4-B

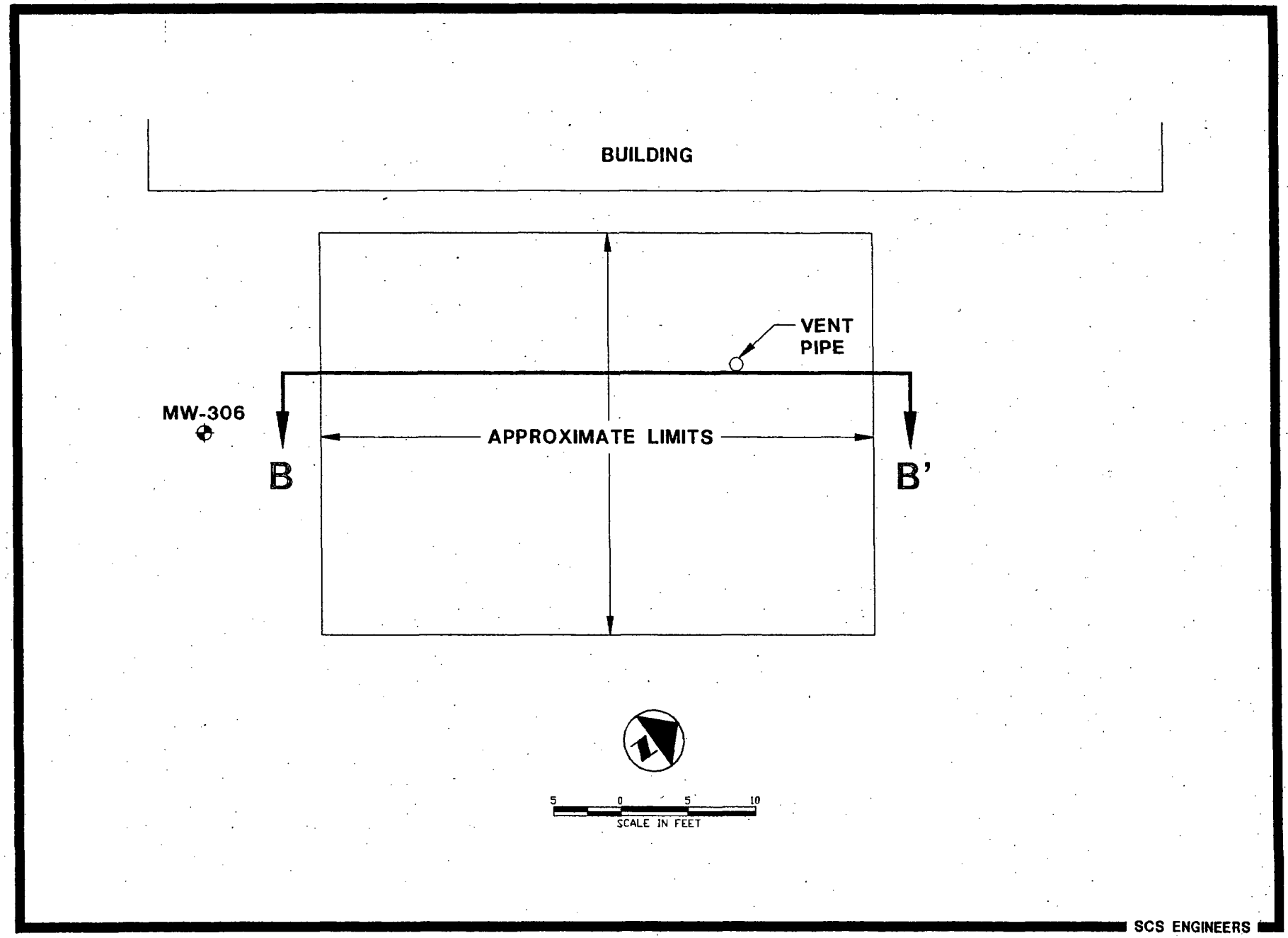


Figure 3-4. Mennen AOC #3 Leach Pit

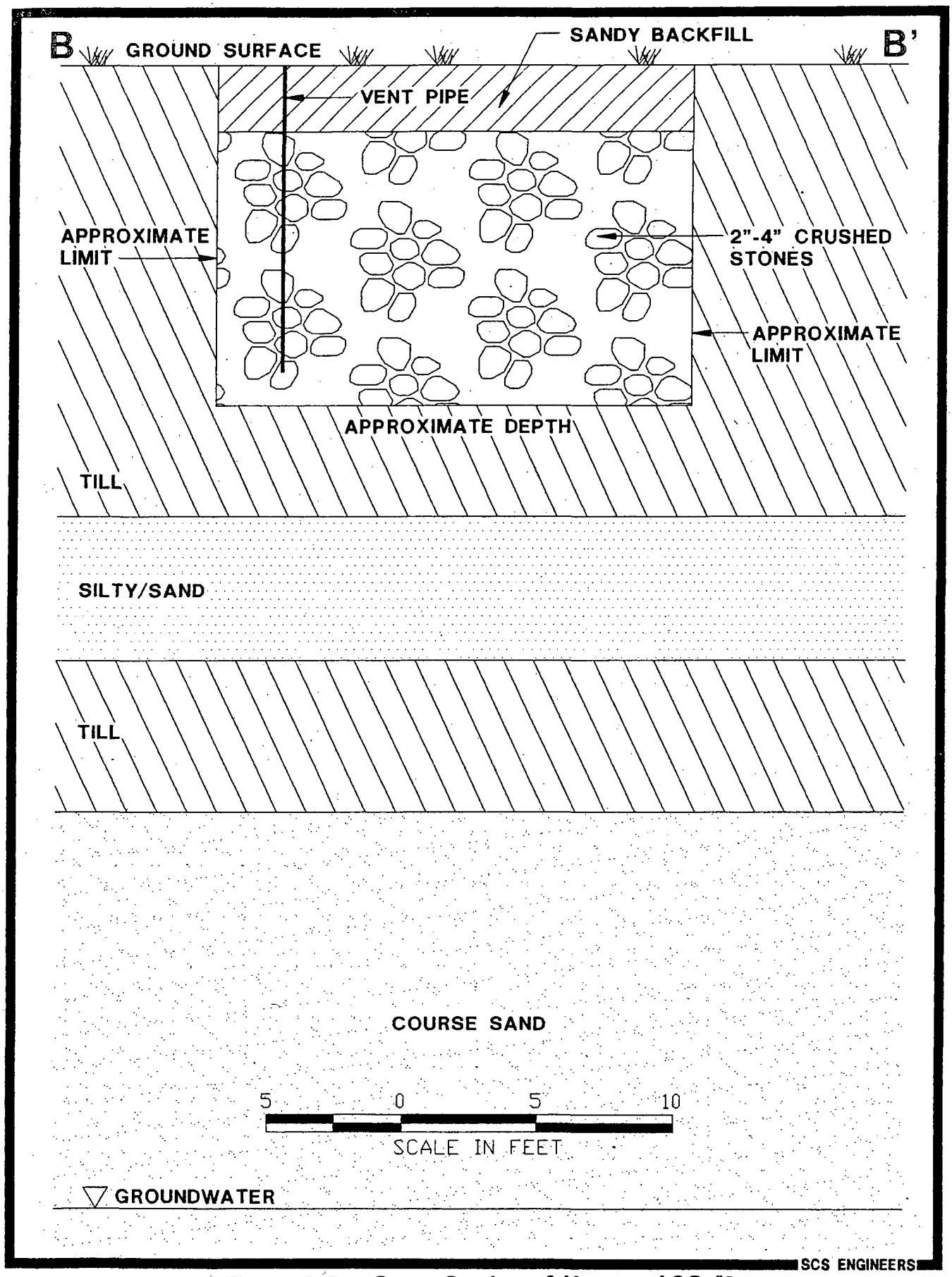


Figure 3-5. Cross-Section of Mennen AOC #3

M:\291031\FIG3-6-B

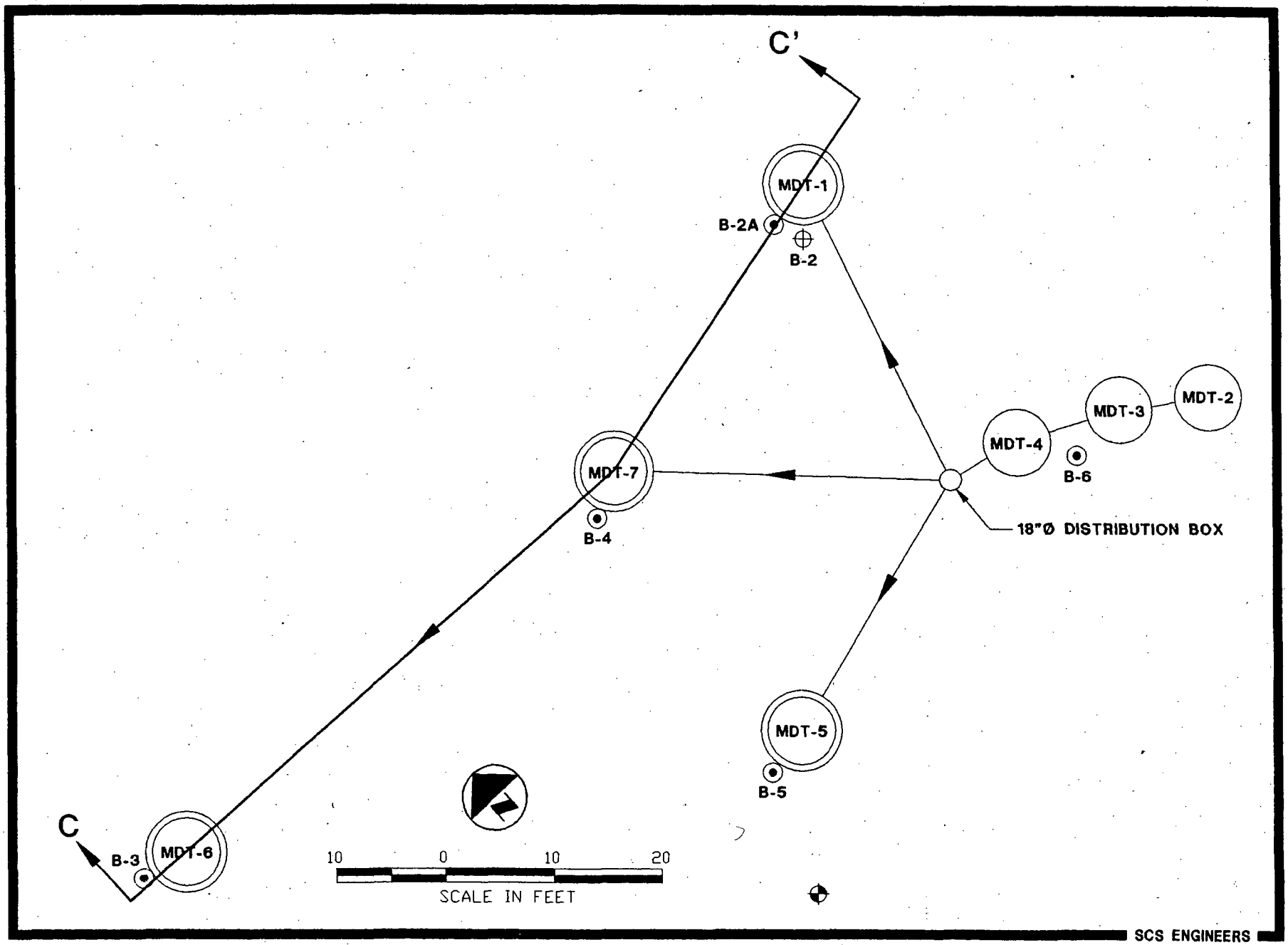


Figure 3-6. Mennen AOC #17 Wastewater Injection System

M:\291031\FIG3-7-B

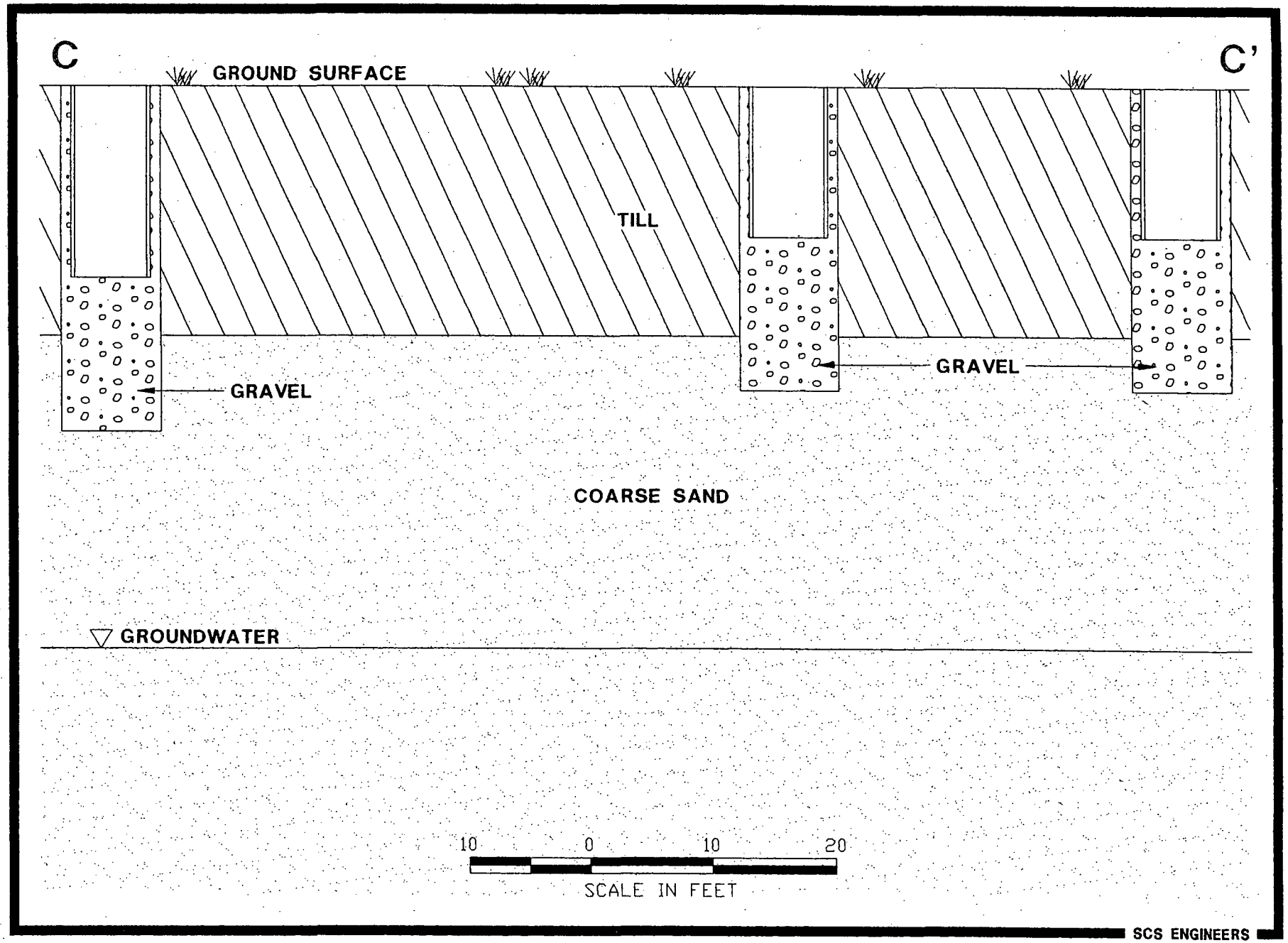
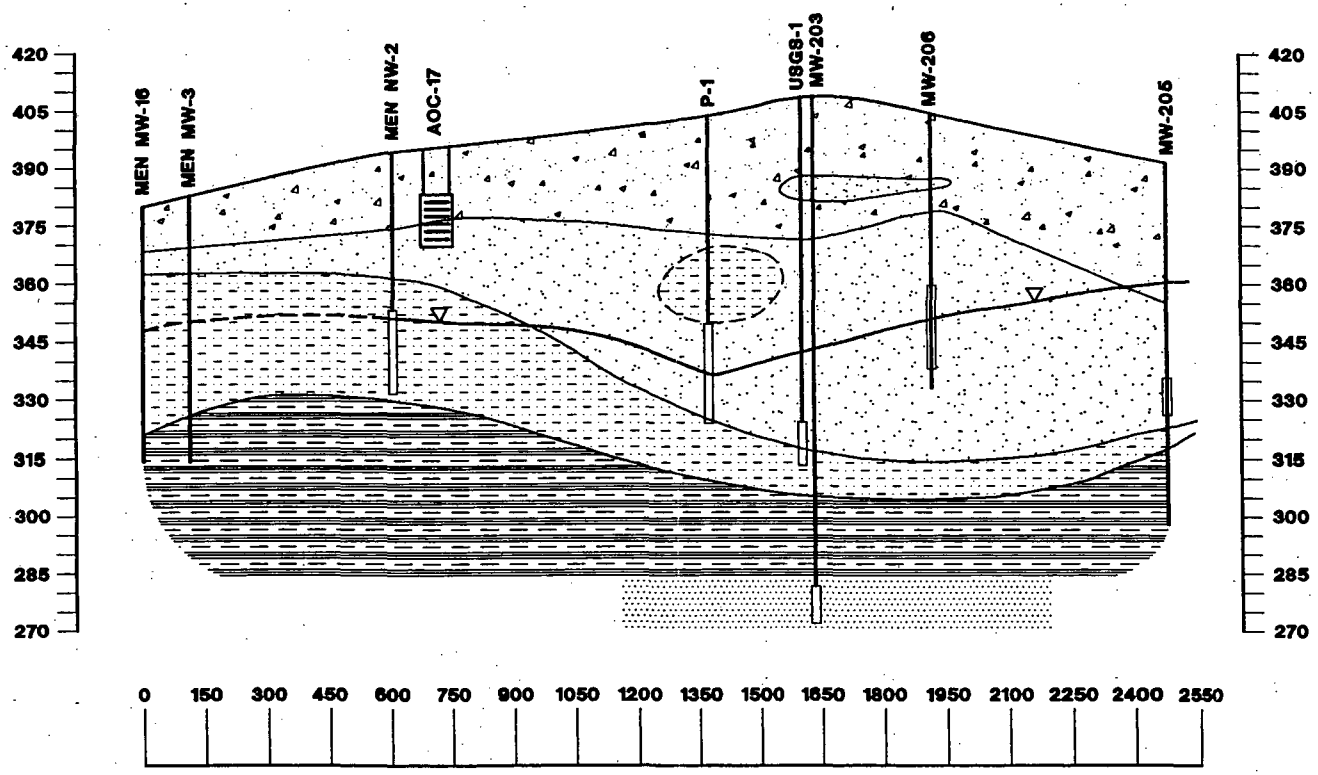


Figure 3-7. Cross-Section of Mennen AOC #17

M:\291031\PROFILE



KEY TO SOIL DESCRIPTION

1 BROWN SANDY SILTS AND SILTY SANDS, LITTLE GRAVEL INCLUDES SANDY CLAYS IN SOME LOCATIONS (UPPER TILL)

2a BROWN OLIVE-BROWN, AND GREY FINE TO COARSE SAND (OUTWASH)

2b BROWN TO GREY FINE TO MEDIUM SAND WITH SOME SILT AND CLAY LENSES (OUTWASH SAND TRANSITION ZONE)

3 GREY-BROWN SILTY CLAY, AND CLAYEY SILT, GRAVELLY IN SOME LOCATIONS (LOWER AQUIFER)

4 GREY FINE TO MEDIUM SAND (LOWER AQUIFER)

SOURCE: 1993 ERM ECRA/ISRA SITE INVESTIGATION REPORT CROSS SECTIONS

GROUNDWATER ELEVATIONS BASED ON FEBRUARY 1990 DATA (UNDER PUMPING CONDITIONS)

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Figure 3-10. Cross-Section through AOC #17

-345-

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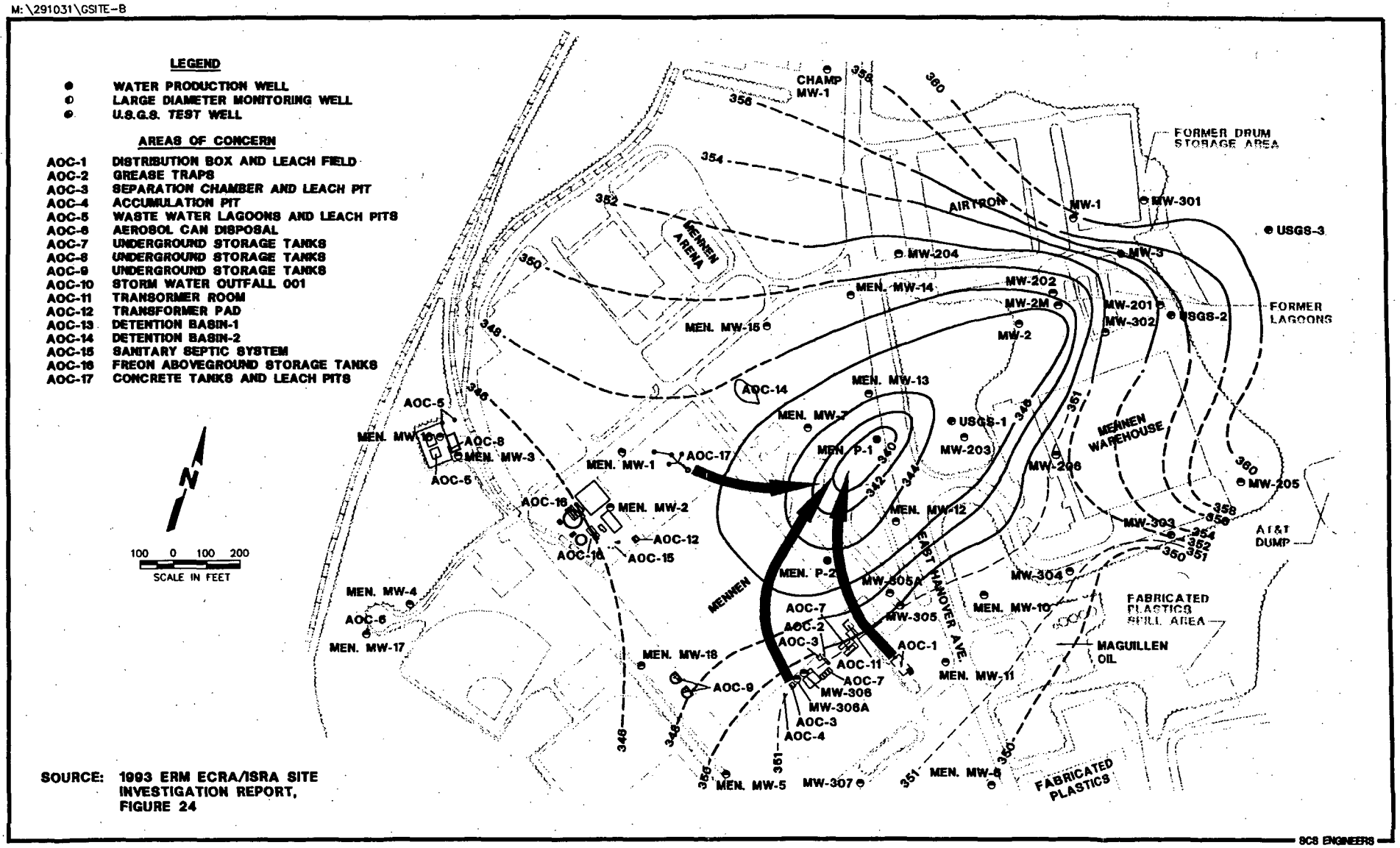

Figure 3-12. Expected Flow Paths for Dissolved VOCs (February 1990 Groundwater Contours)

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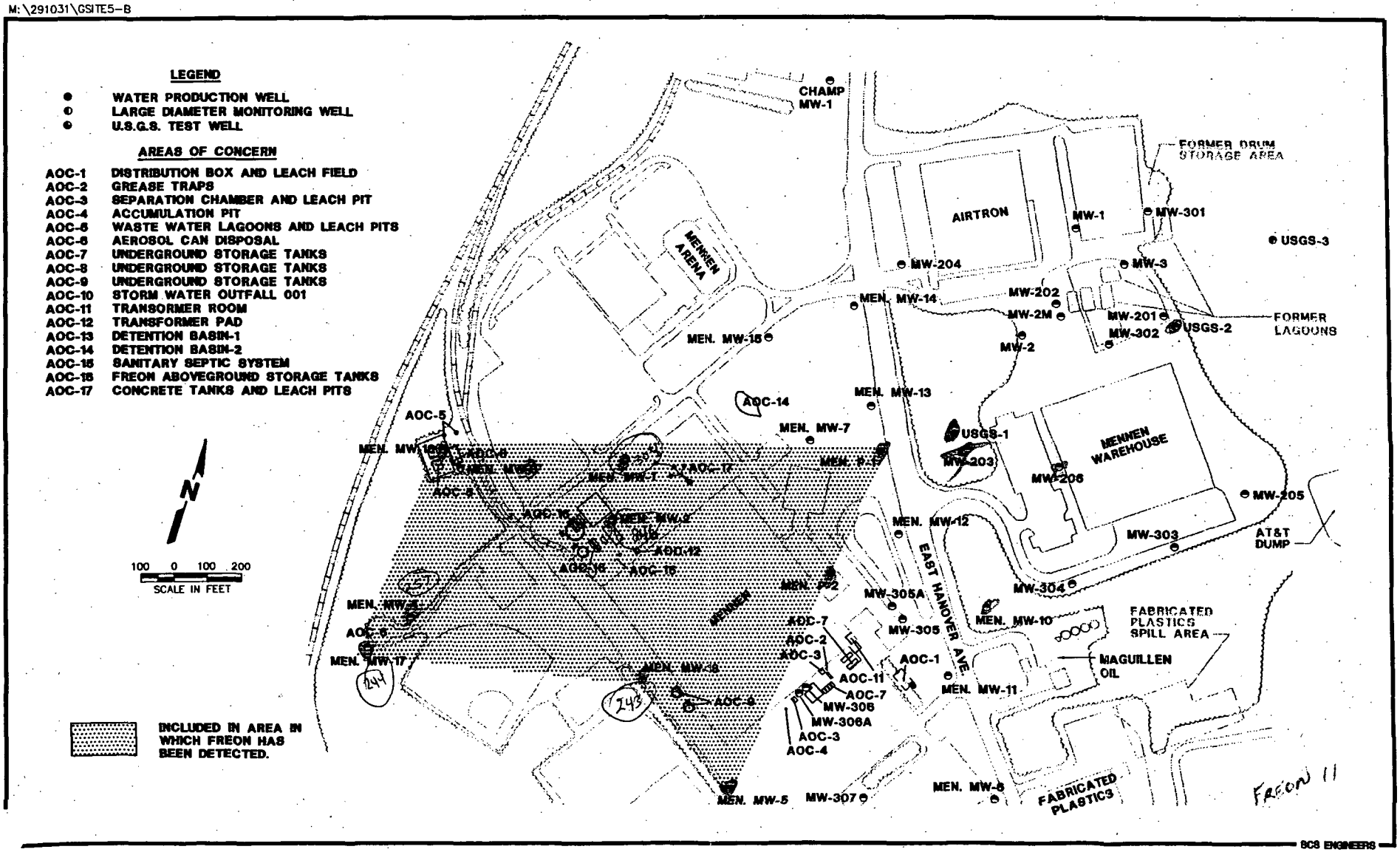
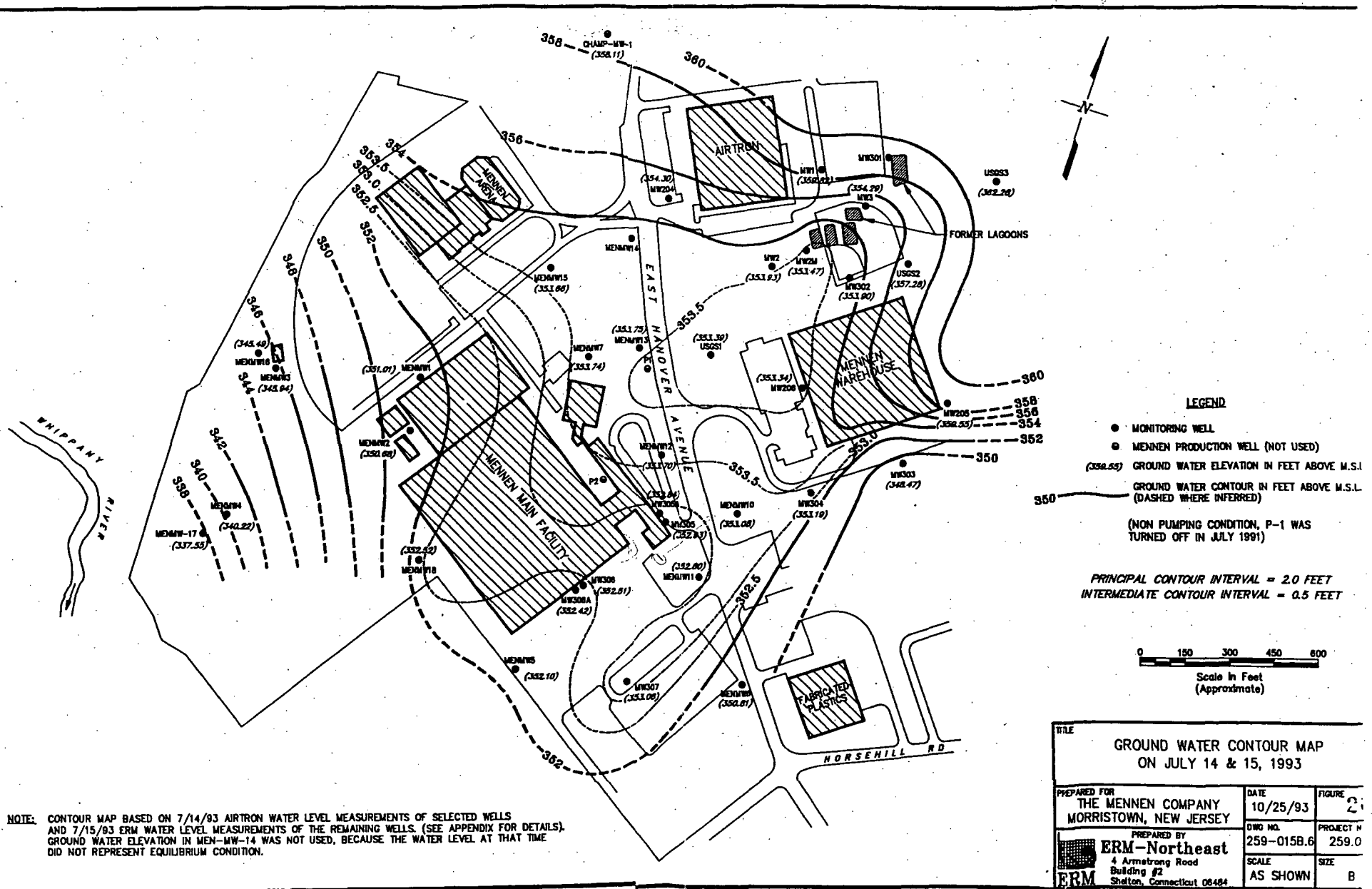


Figure 3-14. Spatial Distribution of Freon 11 Detections

-347-



NOTE: CONTOUR MAP BASED ON 7/14/93 AIRTRON WATER LEVEL MEASUREMENTS OF SELECTED WELLS AND 7/15/93 ERM WATER LEVEL MEASUREMENTS OF THE REMAINING WELLS. (SEE APPENDIX FOR DETAILS). GROUND WATER ELEVATION IN MEN-MW-14 WAS NOT USED, BECAUSE THE WATER LEVEL AT THAT TIME DID NOT REPRESENT EQUILIBRIUM CONDITION.

Figure 3-16. ERM Interpretation of Ground Water Contours (July 1993 Conditions)

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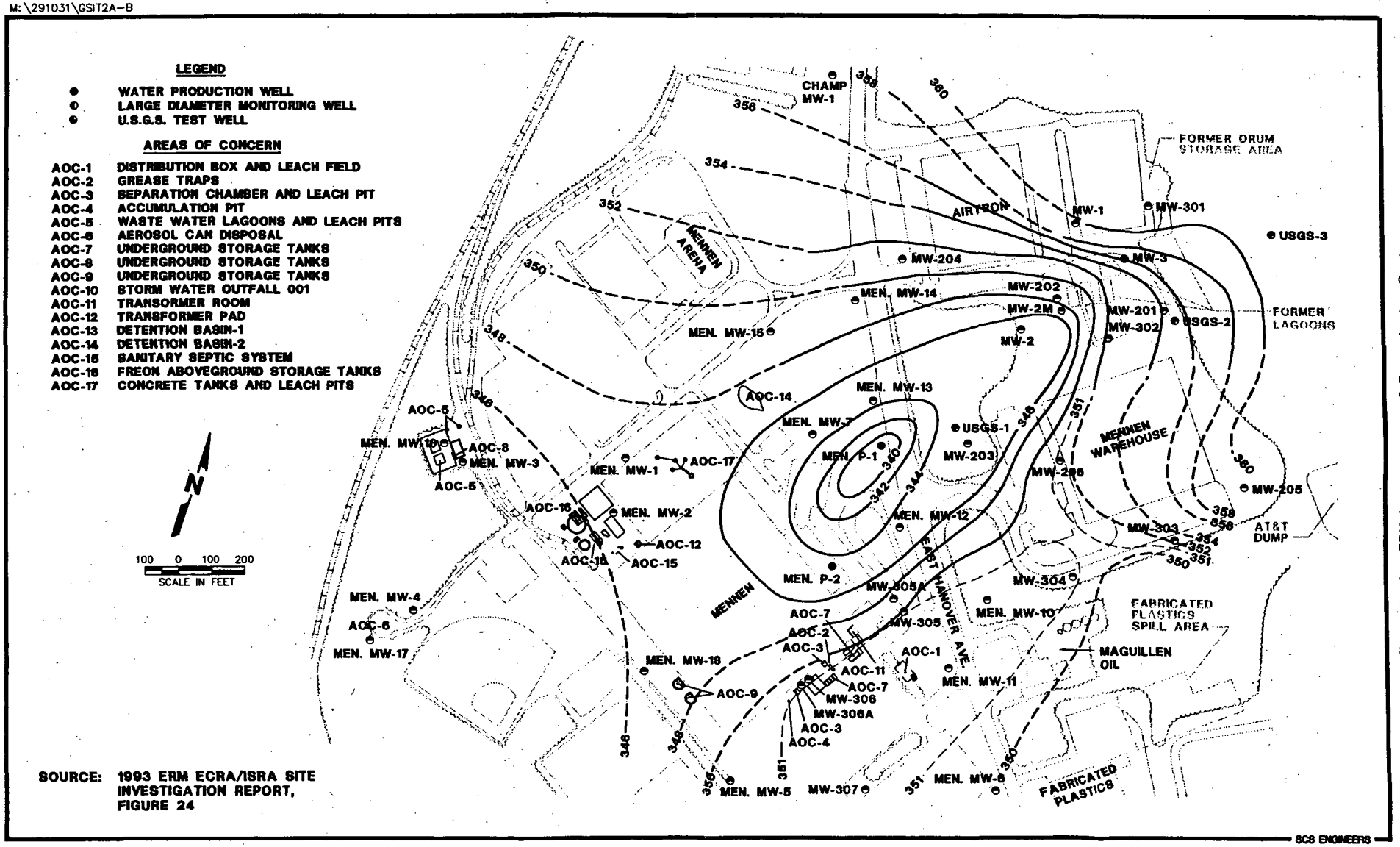

Figure 3-19. ERM Interpretation of Groundwater Contours (February 1990 Conditions)

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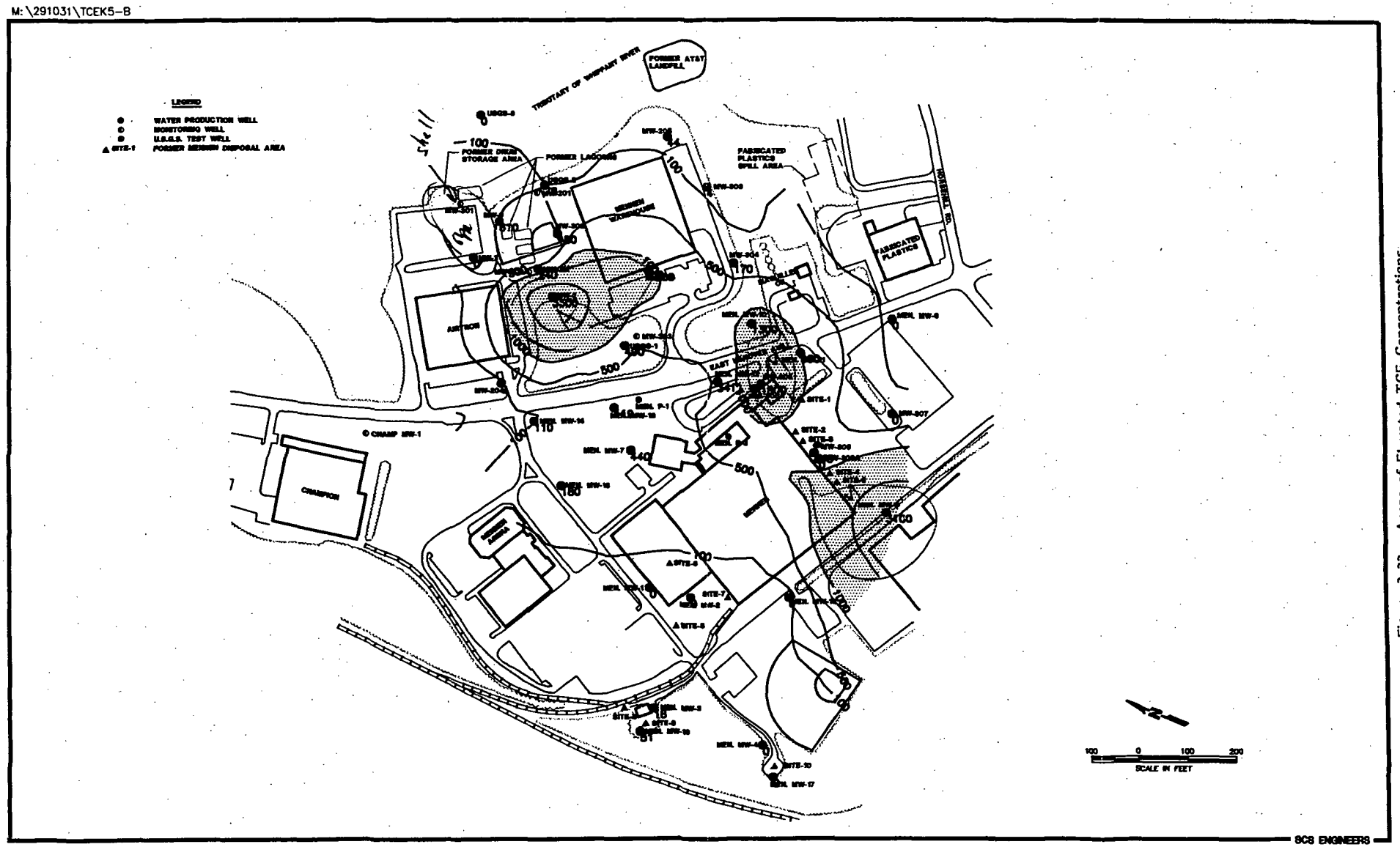

Figure 3-22. Areas of Elevated TCE Concentrations (May 1994)

-350-

TABLE 3-1
SUMMARY OF HISTORICAL GROUND WATER ANALYTICAL RESULTS, 1985-1994 PERIOD (in ug/l)
Mennen-Airtron Facilities, Morristown, NJ

WELL ID (Screen interval in ft below ground)	SELECTED VOCs (in ug/l)	SAMPLING EVENT DATE																													
		4/85	3/86	8/87	10/87	11/87	1/88	4/88	8/88	10/88	1/89	4/89	8/89	11/89	2/90	4/90	7/90	10/90	1/91	4/91	7/91	8/91	10/91	1/92	4/92	7/92	10/92	1/93	7/93	5/94
MW-203	TCE			ND	ND		ND	ND	ND																7					ND
(122-130)	PCE			ND	ND		ND	ND	ND																ND					ND
(confined aquifer)	T 1,2-DCE			ND	ND		ND	ND	ND																ND					ND
MW-205	TCE			32	43		ND	45	49	42	38	50	38	40	43	35	41	36	50	34	41		24	47	34	35	41	34	9.75	44
(43-63)	PCE			ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
	T 1,2-DCE			ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
MW-206	TCE			3,300	3,200		3,400	3,200	3,100	3,300	2,300	2,400	2,400	3,100	2,900	2,500	2,800	2,700	1,500	2,700	4,700		1,600	2,400	2,100	2,000	2,300	1,400	1,200	1,200
(43-63)	PCE			2,00	2,500		2,200	2,100	2,00	2,200	1,300	1,600	1,800	1,900	2,300	1,700	2,500	2,400	1,200	2,300	2,000		ND	2,400	1,800	1,500	2,200	1,500	1,160	1,300
	T 1,2-DCE			510	510		690	780	520	510	420	ND	ND	ND	660	ND	ND	620	430	610	720		420	ND	330	ND	510	600	331	7
MW-303	TCE														ND	ND	ND	ND	ND	ND	5		2	5	ND	4	ND	ND	ND	4J
(39-69)	PCE														ND	ND	ND	ND	ND	ND	1		ND	ND	ND	ND	ND	ND	ND	ND
	T 1,2-DCE														ND	ND	ND	ND	ND	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND
MW-304	TCE														104	140	110	130	52	89	100		83	110	120	120	130	120	164	170
(29-79)	PCE														ND	ND	ND	ND	ND	ND	2		ND	ND	ND	ND	ND	ND	ND	ND
	T 1,2-DCE														ND	ND	ND	110	61	83	77		65	ND	77	ND	110	130	121	ND
MEN-MW-16	TCE																												50.8	
(29.5-39.5)	PCE																												ND	
	T 1,2-DCE																												11.7	
	FREON 11																												35.3	
MEN-MW-17	TCE																												ND	
(50-60)	PCE																												ND	
	T 1,2-DCE																												ND	
	FREON 11																												244	
MEN-MW-18	TCE																												ND	
(37-47)	PCE																												ND	
	T 1,2-DCE																												ND	
	FREON 11																												203	
MW-306-A	TCE																												318	
(39-49)	PCE																												653	
	T 1,2-DCE																												24	
	FREON 11																													
MW-305-A	TCE																												2,030	
(37-47)	PCE																												1,150	
	T 1,2-DCE																												376	
	FREON 11																													

SECTION 4.0
QUALITATIVE RISK ASSESSMENT

Performance of a rigorous, site specific risk assessment typically involves the following components:

- Identification of the contaminants of concern, followed by the identification of the fate and transport properties and toxicological parameters of these contaminants;
- Identification and assessment of migration pathways;
- Identification of potential human and ecological receptors;
- A qualitative or quantitative estimation of the concentrations of the contaminants of concern (i.e., fate and transport assessment) at the exposure point(s); and
- A qualitative or quantitative estimation of potential risks at the exposure point(s).

This approach can be considerably streamlined based on site-specific and regional factors. A simple comparison of laboratory results with constituent-specific regulatory cleanup standards or action levels can be substituted for the fate and transport evaluation and the risk calculations. The results of the risk assessment are typically used to assist in assessing the need, if any, for remediation at the source(s).

Identification of contaminants of concern is a relatively straightforward procedure for the Airtron and Mennen facilities. As discussed in Section 3, the primary VOCs detected at the Airtron and Mennen facilities are TCE and PCE. Freon 11 has also been detected in several of the Mennen wells, including both production wells and monitoring wells on the south and southwest portions of the property.

Assessment of the contribution of TCE and PCE by the Mennen and Airtron facilities is a subject of contention. However, a systematic, scientific evaluation of the available data indicates that the majority, if not all of the TCE and PCE migrating from the Mennen facility was captured by Mennen P-1 during its operation. Based upon the documents that have been made available concerning the Mennen facility, no attempt has been made to qualitatively or quantitatively evaluate the risk posed by VOCs which have been released by Mennen and are migrating from the Mennen site.

Groundwater quality criteria are specified in N.J.A.C. 7:9-6 (Ground Water Quality Standards). These regulations define water quality criteria as "concentrations of constituents that, when not exceeded, will not prohibit or significantly impair a designated use of water." Constituent-specific criteria for Class II aquifers (defined as groundwater for potable water supply) are provided in Table 1 of the referenced regulation. Specifically, the criteria for TCE and PCE are 1.0 and 0.4 μg/l, respectively. No standard is provided for Freon 11. For evaluation purposes, the maximum contaminant level (MCL) established by the Environmental Protection Agency under the Safe Drinking Water Act for total halomethanes (THM) is 100 μg/l. THMs include Freon 11, also referred to as trichlorofluoromethane.

TCE and PCE have been detected in excess of the New Jersey groundwater quality criteria in monitoring wells at both the Airtron and Mennen facilities. Freon 11 has been detected at concentrations exceeding the MCL in several Mennen monitoring wells. Specific concentrations are presented in Sections 2 and 3 of this report.

Based on the results of RI activities, as well as prior site investigations, Airtron has initiated and/or completed a series of remedial actions at the facility, including:

- Design, construction, and operation of the soil vapor extraction system to remove VOCs from soils in the vicinity of the former lagoons, former UST, and former drum storage area;

- Closure (excavation) of several USTs and excavation of impacted soils;

- Design of a groundwater pump-and-treat system (to be completed and operational by October 29, 1994).

The soil vapor extraction system and the UST closures were performed to remove known or suspected sources of VOCs in the subsurface, thereby eliminating the possibility of future exposure. The groundwater pump-and-treat system is being designed and installed to capture the VOC plume at the downgradient property boundary, thereby providing hydraulic control and minimizing the migration of VOCs to potential off-site receptors.

A concern of the groundwater pump-and-treat system is that it may pull VOC-impacted groundwater from off-site sources to the new Airtron extraction well. An effectiveness monitoring program will likely be implemented to evaluate the capture zone of the Airtron extraction well. Groundwater elevation data and VOC concentration data for surrounding wells could be used to evaluate the effects of the pumping system on VOC-impacted groundwater at neighboring properties.

ATTACHMENT F

SITE INVESTIGATION/
REMEDIAL INVESTIGATION
WORKPLAN
for
AIRTRON - LITTON

Prepared for:

Airtron - Litton
200 East Hanover Avenue
Morris Plains, New Jersey 07950

Prepared by:

SCS Engineers
11260 Roger Bacon Drive
Reston, Virginia 20190
(703) 471-6150

March 31, 1997
Revised: July 30, 1997
File No. 0291031.03

CERTIFICATION

The following certification shall be signed by a principal executive officer of at least the level of vice president:

> "I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of these individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties."

Type/Printed Name: Robert A. Lagno Title: President

Signature: Date: 7/30/97

STATE OF NEW JERSEY

COUNTY OF MORRIS

Sworn to and subscribed before me this 30th day of July, 1997.
Witness my hand and official seal.

JOANNA MATTOS
Notary Public of New Jersey
My Commission Expires Mar. 15, 2000

jm
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7/30/97

CERTIFICATION

The following certification shall be signed by a by the highest ranking individual with overall responsibility for implementing the investigation and/or remediation of a site:

> "I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties."

Type/Printed Name: Paul W. Deroo Ph.D. Title: Director/Environmental, Health and Safety

Signature: Paul W. Deroo Ph.D. Date: 07/30/97

STATE OF NEW JERSEY

COUNTY OF MORRIS

Sworn to and subscribed before me this 30th day of July, 1997.
Witness my hand and official seal.

Joanna Mattos

JOANNA MATTOS
Notary Public of New Jersey
My Commission Expires Mar. 15, 2000

jm
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7/18/97

TABLE OF CONTENTS

Revised: July 30, 1997

Section		Page
1.0	INTRODUCTION	1-1
1.1	BACKGROUND	1-1
1.2	PURPOSE	1-3
1.3	SUMMARY	1-5
2.0	SITE DESCRIPTION AND HISTORY	2-1
2.1	OPERATIONAL AND OWNERSHIP HISTORY	2-1
2.2	CURRENT PROCESSES	2-4
2.2.1	Gallium Arsenide	2-5
2.2.2	Waveguide and Microwave Components	2-7
2.2.3	Diamonair	2-8
2.3	RAW MATERIALS	2-9
2.3.1	Gallium Arsenide	2-9
2.3.2	Waveguide and Microwave Components	2-9
2.4	PAST PROCESSES	2-10
2.4.1	Aluminum Alloy Castings	2-10
2.4.2	Ferrites	2-10
2.4.3	YAG	2-11
2.4.4	KTP	2-11
2.4.5	GGG	2-12
2.4.6	YIG	2-14
2.4.7	YLF	2-14
2.4.8	Gallium Arsenide	2-15
2.5	ADDITIONAL SOURCES OF CHEMICAL USAGE INFORMATION	2-15
2.6	HISTORICAL SITE PLANS AND AERIAL PHOTOGRAPHS	2-16
2.6.1	Historical Site Plans	2-16
2.6.2	Aerial Photographs	2-16
2.6.2.1	April 1959	2-18
2.6.2.2	March 1963	2-18
2.6.2.3	March 1969	2-19
2.6.2.4	March 1974	2-19
2.6.2.5	April 1990	2-20
2.7	SITE AND SURROUNDING PHYSICAL CONDITIONS	2-21
2.7.1	Water Bodies Within One-Half Mile	2-21
2.7.2	Wetlands	2-22
2.7.3	Land Use Within 1,000 Feet of Site	2-22
2.7.4	Estimate of Land Within 1,000 Feet Covered by Impermeable Surfaces	2-22

Section Page

2.8 HISTORIC BORING LOGS 2-23
2.9 REGIONAL GEOLOGY 2-24

3.0 AREAS OF CONCERN (AOC) 3-1

3.1 HAZARDOUS MATERIALS STORAGE BUILDING AREA (AOC-1) 3-1

3.1.1 Description and Current Status 3-1
3.1.2 History 3-4
3.1.3 Proposed Investigation 3-4
3.1.4 Analytical Parameters 3-6

3.2 FORMER PARKING ISLAND DRUM STORAGE AREA #1 (AOC-2) 3-6

3.2.1 Description and Current Status 3-6
3.2.2 History 3-7
3.2.3 Proposed Investigation 3-11
3.2.4 Analytical Parameters 3-14

3.3 FORMER DRUM STORAGE AREA #2 (AOC-3) 3-15

3.3.1 Description 3-15
3.3.2 History 3-15
3.3.3 Proposed Investigation 3-19
3.3.4 Analytical Parameters 3-20

3.4 FORMER SLUDGE LAGOON 5 (AOC-4) 3-21

3.4.1 Description 3-21
3.4.2 History 3-21
3.4.3 Proposed Investigation 3-25
3.4.4 Analytical Parameters 3-28

3.5 FORMER WASTEWATER LAGOONS 1-4 (AOC-5) 3-29

3.5.1 Description 3-29
3.5.2 History 3-29
3.5.3 Proposed Investigation 3-35
3.5.4 Analytical Parameters 3-36

3.6 STREAM SEDIMENTS 3-37

3.6.1 Description 3-37
3.6.2 History 3-39

3.6.2.1 Township of Hanover, Department of Health 3-40
3.6.2.2 Assessment of Adjacent Mennen Warehouse Property 3-42
3.6.2.3 Airtron Remedial Investigation 3-42

Section Page

3.6.3 Evaluation of Existing Data 3-43

3.6.3.1 Evaluation of Sediment Results Using NOAA Guidelines 3-43
3.6.3.2 Comparison of Arsenic Sediment Results with NJPDES Allowable Discharge Limits 3-46

3.6.3.2.1 Identification of annual allowable arsenic discharge 3-47
3.6.3.2.2 Estimation of sediment mass 3-47
3.6.3.2.3 Calculation of allowable annual increase in arsenic sediment concentration 3-48
3.6.3.2.4 Interpretation 3-48

3.6.4 Proposed Investigation 3-48

3.6.4.1 Analytical Parameters for Sediment Characterization . . 3-48
3.6.4.2 Sediment Sampling Locations 3-50
3.6.4.3 Analytical Parameters for Surface Water Characterization 3-50
3.6.4.4 Surface Water Sampling Locations 3-51

3.7 PAINT STRIPPING AREA/FORMER 10,000-GALLON UNDERGROUND STORAGE TANK (UST) (AOC-7) 3-51

3.7.1 Description 3-51
3.7.2 History 3-53
3.7.3 Proposed Investigation 3-54
3.7.4 Analytical Parameters 3-55

3.8 GALLIUM ARSENIDE WING TRENCH (AOC-8) 3-56

3.8.1 Description 3-56
3.8.2 History 3-56
3.8.3 Proposed Investigation 3-57

3.9 ABANDONED 15,000-GALLON HEATING OIL UST (AOC-9) 3-58

3.9.1 Description 3-58
3.9.2 History 3-58
3.9.3 Proposed Investigation 3-58
3.9.4 Analytical Parameters 3-60

3.10 FORMER 20,000-GALLON UST (AOC-10) 3-61

3.10.1 Description 3-61
3.10.2 History 3-61
3.10.3 Proposed Investigation 3-61

Section Page

3.11 GROUNDWATER (AOC-11) 3-62

3.11.1 Description 3-62
3.11.2 History 3-62
3.11.2.1 Hydrogeologic Setting and Groundwater Flow 3-62
3.11.2.2 Airtron Site 3-74
3.11.2.3 Mennen Property and Other Properties 3-75
3.11.2.4 Current Activities at Airtron Property 3-76

3.11.3 Proposed Investigation 3-76

4.0 HEALTH AND SAFETY PLAN 4-1

5.0 QUALITY ASSURANCE CONSIDERATIONS FOR FIELD SAMPLING PROCEDURES 5-1

5.1 INTRODUCTION 5-1

5.1.1 Quality Assurance (QA) Program Responsibility 5-1
5.1.2 Data Quality Objectives 5-2

5.1.2.1 Representativeness 5-2
5.1.2.2 Precision 5-3
5.1.2.3 Accuracy 5-3
5.1.2.4 Completeness 5-3
5.1.2.5 Project-Specific Data Quality Objectives 5-3

5.1.3 Data Validation 5-3

5.1.3.1 Field Data Integrity 5-3
5.1.3.2 Field Data Validation 5-4
5.1.3.3 Project Data Validation 5-4

5.2 DECONTAMINATION PROCEDURES 5-5

5.2.1 Equipment to be Decontaminated: Groundwater Sampling 5-5
5.2.2 Procedures for Field Decontamination 5-6

5.2.3.1 Dedicated Groundwater Sampling Tips 5-6
5.2.3.2 Water Level Indicator 5-6
5.2.3.3 Steel Sampling and Drill Equipment 5-7

5.2.4 Disposal of Purge/Decontamination Liquids 5-7

5.2.4.1 Purge Waters from Monitoring Wells 5-7
5.2.4.2 Decontamination Reagents 5-8

5.3 EQUIPMENT CALIBRATION AND PREVENTIVE MAINTENANCE 5-8

5.3.1 Equipment Calibration 5-8
5.3.2 Preventive Maintenance 5-9

Section Page

5.4 PROCEDURES FOR QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) SAMPLING: GROUNDWATER 5-10

5.4.1 Sample Bottle Preparation and Preservation 5-10
5.4.2 Groundwater QA/QC Samples 5-11

5.4.2.1 Field Blanks 5-11
5.4.2.2 Trip Blanks 5-12
5.4.2.3 Distilled Water Blanks 5-12
5.4.2.4 Duplicate Field Samples 5-12
5.4.2.5 Split Samples 5-13

5.4.3 Sample Holding Times 5-13
5.4.4 Field Storage and Shipment of Samples 5-13

5.5 FIELD DOCUMENTATION 5-14

5.5.1 Documenting Sampling Points: Field Log Book 5-14
5.5.2 Well Sampling Log 5-15
5.5.3 Sample Collection and Custody Paperwork 5-16

5.5.3.1 Sample Labels 5-16
5.5.3.2 Chain of Custody (COC) 5-17
5.5.3.3 Sample Shipment 5-18

5.6 LABORATORY ANALYSES 5-18

5.6.1 Identification of Laboratory/Analytical Methods 5-18
5.6.2 Identification of Laboratory Data Deliverables 5-19

6.0 SI/RI REPORT OUTLINE 6-1

7.0 REMEDIAL INVESTIGATION IMPLEMENTATION 7-1

7.1 SCHEDULE 7-1
7.2 KEY PERSONNEL 7-2

LIST OF FIGURES

Number		Page
2-1.	Site Vicinity Map	2-2
2-2.	Current Site Plan	2-3
2-3.	Current Plant Floor Plan	2-6
3-1.	Locations of Areas of Concern (AOC)	3-2
3-2.	Proposed Soil Borings Around AOC-1	3-3
3-3.	Detail of Former Parking Lot Islands (AOC-2)	3-8
3-4.	Phase II RI Sample Locations at AOC-2 and Proposed Locations of SI/RI Borings	3-12
3-5.	Detail of AOC-3	3-16
3-6.	Detail of AOC-4	3-22
3-7.	Detail of AOC-5	3-30
3-8.	Detail of Intermittent Stream (AOC-6)	3-38
3-9.	Detail of Former Underground Storage Tanks and Crushed Drum Excavation Area (AOC-7, AOC-9, and AOC-10)	3-52
3-10.	Monitoring Well and Sampling Point Locations	3-64
3-11.	Groundwater Contours During Mennen P-1 Operation (February 1990)	3-69
3-12.	Groundwater Contours Under Non-Pumping Conditions (July 1993)	3-71
3-13.	Groundwater Contours During Airtron RW-1 Operation (April 1996)	3-73
3-14.	Locations of Monitoring Wells in Effectiveness Monitoring Program	3-77
3-15.	Locations of Wells for Proposed Groundwater Investigation	3-78

LIST OF TABLES

Number		Page
1-1.	Sample Summary Table	1-4
2-1.	Additional Drawings Available	2-17
2-2.	Summary of Soil Borings Performed at Airtron / Litton	2-25
3-1.	Summary of Areas of Concern	3-1
3-2.	Summary of VOCs Detected in Soil Samples Near AOC-2 During the Phase I Remedial Investigation	3-9
3-3.	Summary of Soil Gas Readings at AOC-2 During Phase II RI	3-10
3-4.	Summary of Soil Samples Analyzed from Boring B-117 - AOC-3 in 1987	3-17
3-5.	Summary of Soil Samples Analyzed from AOC-3 in 1993	3-18
3-6.	Summary of Soil Samples Analyzed from AOC-4 in 1987	3-23
3-7.	Summary of Soil Samples Analyzed from AOC-4 in 1993	3-25
3-8.	Summary of Soil Samples Analyzed from the East of AOC-5 in 1987	3-32
3-9.	Summary of Soil Samples Analyzed from the North of AOC-5 in 1987	3-32
3-10.	Summary of Soil Samples Analyzed from the West of AOC-5 in 1987	3-33
3-11.	Summary of Soil Samples Analyzed from the South of AOC-5 in 1987	3-33
3-12.	Summary of Soil Samples Analyzed from AOC-5 in 1993	3-34
3-13.	Summary of Sediment Sample Results and Sediment Evaluation Criteria for Arsenic	3-41

List of Tables (continued)

Number Page

3-14. Summary of Dames & Moore 1986 Sediment Sample Results and Sediment Evaluation Criteria 3-45
3-15. Summary of VOCs Detected During 1991 UST Removal 3-53
3-16. Summary of Previous Investigations at the Airtron and Mennen Sites 3-63
3-17. Area-Wide Observation/Monitoring Well Network Details 3-65

5-1. Preventive Maintenance Activity Schedule 5-9
5-2. Summary of Containers for Groundwater Laboratory Analyses 5-10
5-3. Summary of Soil and Groundwater Analytical Methods 5-19

7-1. SI/RI Implementation Schedule 7-1

APPENDICES

2A 1981 New Jersey Selected Substances Report
2B SARA Title III Community Right-to-Know Surveys Since 1987
2C NPDES Discharge Permit No. NJ0025739 Monitoring Requirements
2D Historic and Present Chemical Constituents Used At Airtron
2E Aerial Photographs
2F FEMA Flood Map
2G Soil Boring Logs

3A Sediment Sampling Results, May 1986
3B Storage Vault Drawing, LAN Associates, February 23, 1982
3C UST Closure Report, Litton-Airtron. SCS Engineers, August 24, 1992
3D Abbreviated Guide to Classifying Soils—Burmister Method

5A Resumes of Key Personnel

SECTION 1.0

INTRODUCTION

This section presents a brief discussion of the background of the facility, an identification of the purpose and objectives of the proposed site investigation/remedial investigation (SI/RI), and a summary and outline of this SI/RI Workplan (SI/RIWP).

This SI/RIWP presents details concerning environmental investigation activities that will be performed at the Airtron Division of Litton Systems, Incorporated (Airtron) site, located at 200 East Hanover Avenue, Morris Plains, New Jersey. This SI/RIWP also provides a detailed site history, including a summary of the considerable volume of investigative and remedial activities that have been performed at the site in recent years.

1.1 BACKGROUND

The Airtron facility produces high technology microwave components and semiconductor substrate which are used in the commercial aviation, semiconductor, and defense industries. The facility has been involved in the manufacturing of high technology equipment since its construction in 1952. The specific operations performed at the site have changed since operations began. Such change has been required to keep pace with the current state-of-the-art as the field has matured over the last few decades. Approximately 225 persons currently are employed in various departments, including manufacturing, engineering, research and development, environmental safety and compliance, sales, and accounting.

On December 16, 1992, Airtron and the New Jersey Department of Environmental Protection (NJDEP, formerly the New Jersey Department of Environmental Protection and Energy) executed an Administrative Consent Order (ACO). Subsequently, a remedial investigation workplan (RIWP) was developed to fulfill the ACO requirement of Section II (Remedial Investigation and Cleanup), Subsection D (Remedial Investigation), paragraph 25. The RIWP was conditionally approved by NJDEP on December 3, 1993. The

Remedial Investigation was performed in the late spring of 1994; and a Phase I Remedial Investigation Report dated August 15, 1994, was submitted to NJDEP.

Based on the findings of the Phase I RI, a Phase II RI was developed. A Phase II RIWP was prepared and submitted to NJDEP on April 25, 1995, and was approved by NJDEP correspondence dated February 22, 1996. Implementation of the Phase II RIWP began in May 1996. A soil gas survey in the vicinity of the former parking islands was performed on June 6 and 7, 1996. The findings of the soil gas survey were provided to NJDEP in a June 21, 1996, letter report prepared by SCS Engineers. The soil gas survey in the former drum storage area and former rinsewater pond was not completed due to perched water in these areas. Litton correspondence dated July 11, 1996, proposed a modification to the investigation approach for these areas.

On October 21, 1996, Mr. Mark Walters (NJDEP) issued a letter addressing the Phase II RI and the proposed modifications. This letter also provided extensive comments on many of the environmental investigation and remediation activities performed under and prior to the ACO. This letter proposed modifications to the approach that had been implemented under the ACO. The modified approach will address each of the 11 areas of concern (AOCs) individually. The NJDEP letter requires Airtron to prepare and submit a new SI/RIWP detailing additional investigation to address each AOC under the Department's *Technical Requirements for Site Remediation* (Technical Rules) at N.J.A.C. 7:26E.

In response to the October 21, 1996, letter from NJDEP, a review meeting was held at Airtron on December 11, 1996. Attendees included representatives of Airtron, Litton, NJDEP, SCS Engineers, and Geraghty and Miller. The issues addressed in the NJDEP comment letter were discussed in detail. NJDEP provided an updated version of the letter (dated December 11, 1996), which corrected a typographical error in the numbering system for the 11 AOCs. At the meeting, NJDEP provided a checklist of items that should be addressed in the SI/RIWP.

This document, the SI/RIWP, is prepared in conformance with the requirements contained in the December 11, 1996, NJDEP letter and N.J.A.C. 7.26E.

1.2 PURPOSE

Each of the eleven AOCs will be addressed independently. The eleven AOCs are:

- AOC-1: Hazardous Materials Storage Building Area
- AOC-2: Former Parking Island Drum Storage Area #1
- AOC-3: Former Drum Storage Area #2 (Rear of Parking Lot)
- AOC-4: Former Sludge Lagoon 5
- AOC-5: Former Sludge Lagoons 1-4
- AOC-6: Stream Sediments
- AOC-7: Paint Stripping Area/Former 10,000-Gallon UST
- AOC-8: Gallium Arsenide Wing Trench
- AOC-9: Former 15,000-Gallon Heating Oil UST
- AOC-10: Former 20,000-Gallon UST
- AOC-11: Groundwater

Table 1-1 presents a summary of proposed sampling activities at those AOCs where additional data are needed.

The objectives of this SI/RIWP are as follows:

1. To provide an updated site history, summary of past investigation and remediation activities, site description, and description of each of the 11 AOCs.

2. To compare the previously completed investigative activities in each AOC to the requirements outlined in the Technical Rules cited in N.J.A.C. 7:26E effective June 7, 1993.

3. To present the specific procedures and schedule to be implemented to investigate further those AOCs requiring additional characterization.

4. To provide an updated Quality Assurance Project Plan (QAPP) for the additional investigation activities.

Table 1-1. Sample Summary Table

Area of Concern	Media	Minimum Number of Borings	VOCs+15	B/N+15	Priority Pollutant Metals	TPH	pH	Cyanide
1. Hazardous Materials Storage Building	Soil Borings	7	14	2	7	7	7	7
2. Former Parking Island Drum Storage Area #1	Soil Borings	6	12	1	6	6	6	6
3. Former Drum Storage Area #2 (Rear of Parking Lot)	Soil Borings	3	6	1	3	3	3	3
4. Former Sludge Lagoon 5	Soil Borings	2	4	1	2	2	2	2
5. Former Sludge Lagoons 1-4	Soil Borings	4	8	4	4	4	4	4
6. Stream Sediments *See Notes 4 and 5*	Sediment Surface Water				8 2		8	
7. Paint Stripping Area/Former 10,000 Gallon UST	Soil Borings	1	2	1	1	1	1	1
8. Gallium Arsenide Wing Trench	NFA							
9. Former 15,000 Gallon Heating Oil UST and Crushed Drum Excavation Area	Soil Borings	2	4	1	2	2	2	2
10. Former 12,000 Gallon UST	NFA							
11. Groundwater	Groundwater		9				9	

Notes:
1. Quantities represent the minimum number of samples to be analyzed from each corresponding AOC. If field evidence indicates contamination, then the depth sample from each boring will be analyzed for the same full suite of parameters as the surface sample.
2. NFA = No Further Action.
3. TPH = Total Petroleum Hydrocarbons (diesel range organics).
4. Sediment samples also will be analyzed for total organic carbon and grain size.
5. Surface water samples will be analyzed for hardness and field-analyzed for dissolved oxygen, temperature, and pH.

5. To provide an updated Health and Safety Plan (H&SP) for the additional investigation activities.

1.3 SUMMARY

This SI/RI Workplan is presented in two volumes, as follows:

- Volume I: SI/RIWP Text and Appendices
- Volume II: Health and Safety Plan

Volume 1 presents the SI/RIWP text and includes:

- Certification
- Section 2.0: Site Description and History
- Section 3.0: Areas of Concern (Description, History and Current Status, and Proposed Investigation Plan for each AOC)
- Section 4.0: Health and Safety Plan (Reference to Volume II)
- Section 5.0: Quality Assurance Plan
- Section 6.0: Proposed SI/RI Report Outline
- Section 7.0: Schedule of RI Activities

During the December 11, 1996, review meeting held at Airtron, NJDEP provided a checklist of administrative requirements for the SI/RIWP. Each item contained in the NJDEP checklist is identified below, along with the section in this document where the requirement is addressed.

- Certification: prior to Section 1
- Schedule of RI Activities: Section 7
- Role Description of Principal Personnel: Subsection 5.1.1

- Historical Site Plans: Subsection 2.6.1
- Aerial Photos: Subsection 2.6.2
- Description of Site and Surrounding Physical Conditions: Subsection 2.7.1
- Description of Water Bodies Within One-Half Mile: Subsection 2.7.2
- United States Geological Survey (USGS) 7.5 minute Topographic Map: Figure 2.1
- Wetlands Map: Subsection 2.7.2
- Boring Logs from On-site Construction: Subsection 2.8, Table 2-2, and Appendix 2G; AOC discussions throughout Section 3
- Land Use Within 1,000 Feet: Subsection 2.7.3
- Estimate of Land Within 1,000 Feet Covered by Impermeable Surfaces: Subsection 2.7.4
- Description of Each AOC: Section 3
- AOC Sampling Summary Table: Table 1-1
- Sample Location Map: Several Figures throughout Section 3
- Sampling Protocols if Conducting Treatability, NJPDES, or Characterization Sampling: protocols for characterization sampling are provided in Section 3
- Quality Assurance Project Plan: Section 5
- Health and Safety Plan: Section 4

SECTION 2.0

SITE DESCRIPTION AND HISTORY

Information pertaining to current and historical site use, manufacturing and disposal practices, and environmental investigations previously conducted was compiled from the following sources:

- Airtron files
- Litton real estate files
- Interviews with Airtron employees
- Historical aerial photographs
- USGS open files and reports

2.1 OPERATIONAL AND OWNERSHIP HISTORY

The Airtron facility is located at 200 East Hanover Avenue in Morris Plains, New Jersey. The 18.822-acre parcel is defined as Block No. 0601, Lot 1, Zone 1, within the Township of Hanover (Dunn & Bradstreet Number 00-829-7848). Figure 2-1 is a general site vicinity plan, and Figure 2-2 is the most recent, detailed site plan of the property. The following timeline summarizes the owner and operator history of the facility.

Date	Site Status/Activity
1940s	Site owned by the North Jersey Quarry Company. The site consisted of a vacant, undeveloped tract of land.
April 30, 1951	Monroe Calculating Machine Company (Monroe), a Delaware Corporation, purchased the property from North Jersey Quarry Company.

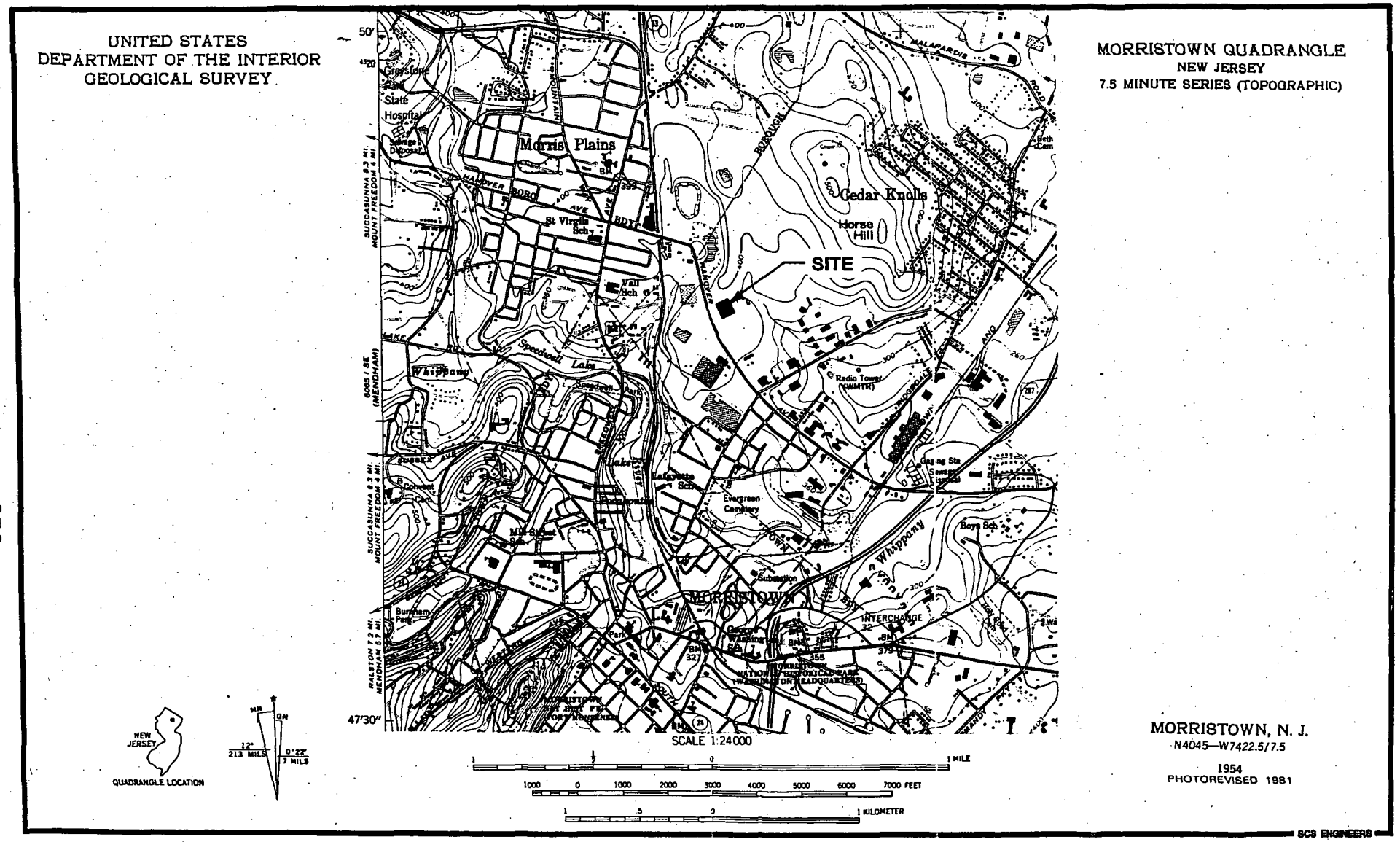

Figure 2-1. Site Vicinity Plan

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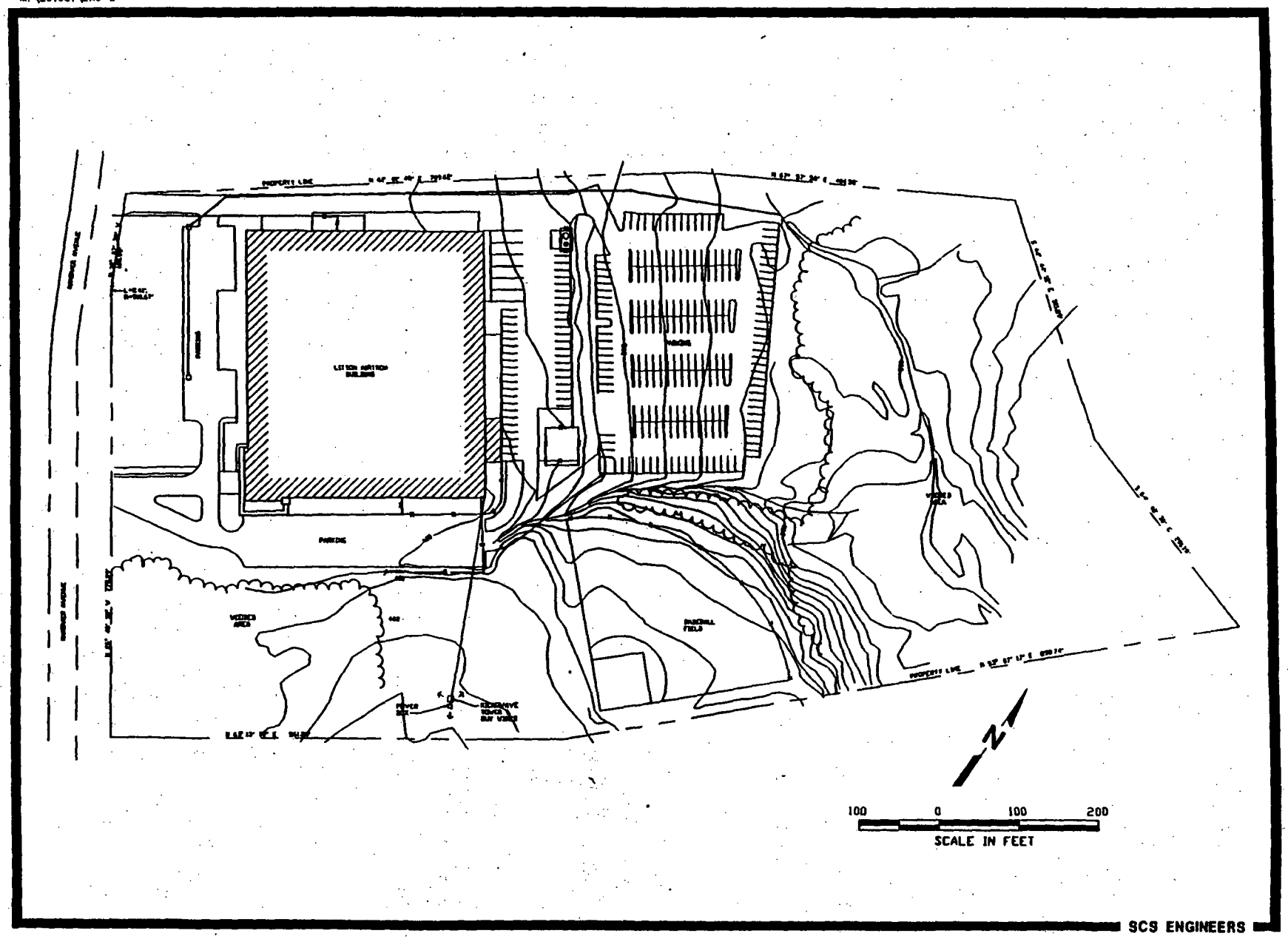


SCS ENGINEERS

Figure 2-2. Current Site Plan.

1952	Monroe constructed the single-story brick and steel structure currently present at the site.
Jan. 15, 1958	Litton Business Systems, Incorporated purchased Monroe.
1958	Monroe removed its operations from the site; Litton moved its Airtron Division into the facility.
1973	Litton conveyed the site to Digital Control Systems, Incorporated (Digital), a California Corporation, that was wholly owned by Litton.
July 27, 1973	Digital Control Systems conveyed the site to Brookwood Energy and Properties (Brookwood). Brookwood then leased the property back to Airtron Division of Litton Systems, Incorporated. Brookwood then conveyed the property to its wholly-owned subsidiary, North Crescent Properties, Incorporated; and North Crescent immediately conveyed the property back to Brookwood.
March 25, 1976	Brookwood conveyed the title to Cresticon, Incorporated (Cresticon), an Ohio Corporation which is wholly owned by Litton. At this time, the Brookwood-Digital lease was assumed; the Airtron sublease became a direct lease with Cresticon.
1976 to Present	Airtron leases the property from Cresticon.

2.2 CURRENT PROCESSES

Airtron currently manufactures two products at this facility:

- Gallium arsenide ingots and wafers for use as semi-conductor substrates
- Waveguide and microwave components constructed of metal alloys and ferrite materials for use in aerospace guidance systems

Each operation is described below. The current floor layout of the facility is illustrated in Figure 2-3.

2.2.1 Gallium Arsenide

Airtron purchases gallium and arsenic from outside vendors. The gallium and arsenic are combined in specially designed pullers (devices in which the gallium arsenide crystals are grown) to become gallium arsenide. The ingots that are pulled are of two types: single crystal and polycrystalline. Semi-conductor wafers produced by Airtron require the high-quality, single crystal material.

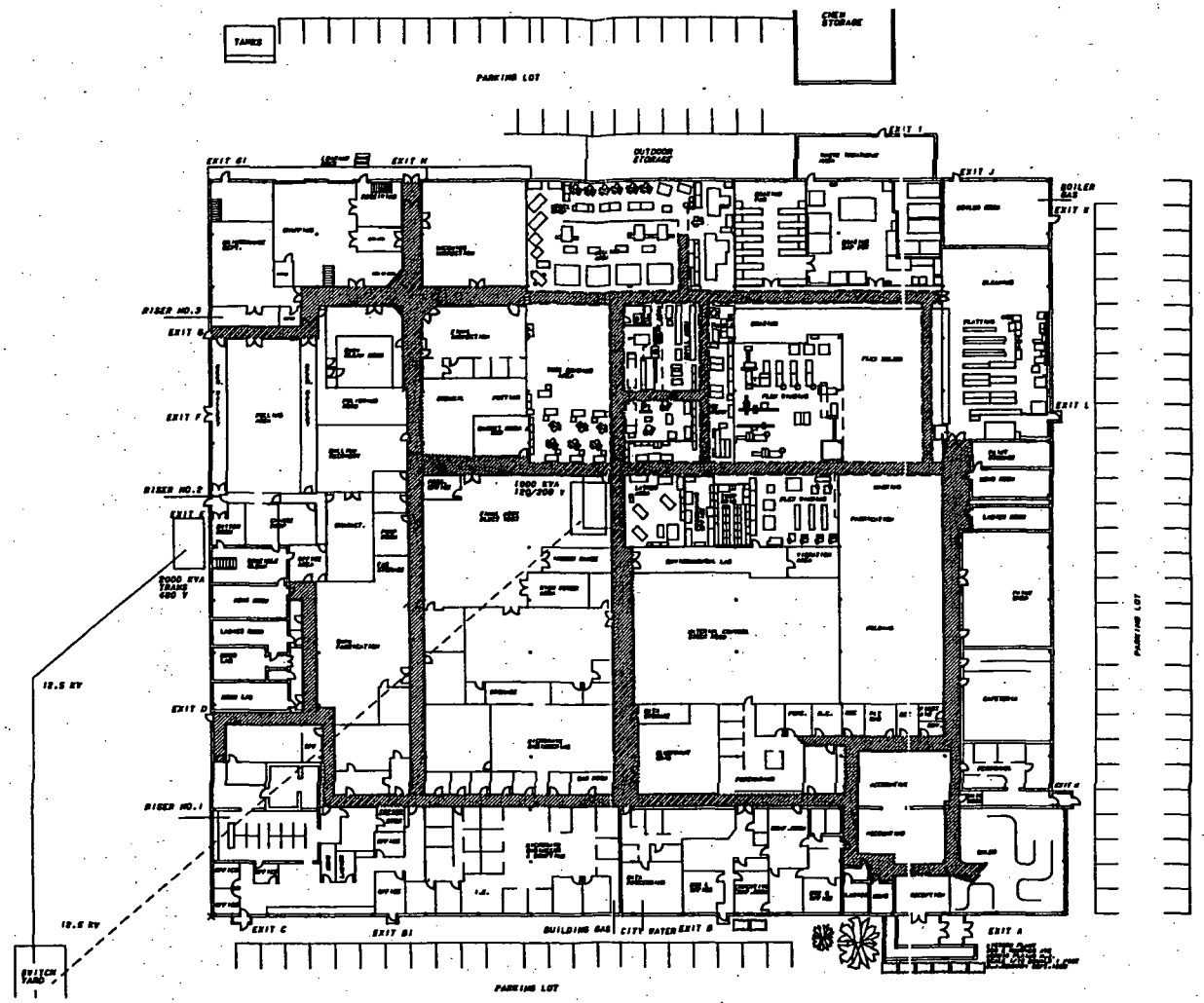
Polycrystalline gallium arsenide is used as a starting material for use in producing single-crystal materials. Single-crystal material is sliced into wafers by an inner diameter (ID) saw. The wafers are polished to a mirror-like finished product and then shipped to Airtron's customers.

Borax powder is dried under heat and vacuum to form boric oxide. The boric oxide is poured into molds under an argon atmosphere, and sealed into special containers until used in the gallium arsenide growth process. Argon currently is stored in a cryogenic aboveground tank located outside the northeast corner of the facility

After a gallium arsenide ingot is grown, excess boric oxide remaining in the crucible is softened and dissolved with methanol. The methanol is reused. Fresh methanol is added to replenish it.

The ingots are etched with *aqua regia* (a mixture of hydrochloric and nitric acid). The *aqua regia* is used until it loses its strength, after which it is neutralized in the on-site wastewater treatment system. After the ingot is etched, a wafer is sliced for a characterization process. The slicing of the wafers is a water-cooled process that uses surfactants. The slicing device is on a closed-loop recirculating system which has the solids removed by a centrifuge and the liquid recirculated. The dry solids are sent to a recycler to recover the gallium and arsenic.

The gallium arsenide wafer is orientated with an X-ray unit. A slice is removed from the ingot for electrical and physical characterization. Several different solutions might be used



SCS ENGINEERS

Figure 2-3. Floor Plan of Facility

for the etching, depending on the intended use of the ingot. The spent etchant solution is managed as a hazardous waste. Deionized (DI) water rinses are used on the gallium arsenide wafers for cleansing. Used DI water goes to the above-mentioned wastewater treatment system.

After the test ingot passes the inspection process, the entire ingot is sliced into wafers. The sliced wafers are polished with a dilute sulfuric acid/hydrogen peroxide solution. Spent polishing materials are pumped to a waste treatment holding tank, which then is pumped to a mixing tank with a lime solution to destruct the peroxide and precipitate arsenic. The solids are removed by filter pressing. The filter cake from this process is manifested as a Resource Conservation and Recovery Act (RCRA) hazardous waste (see Subsection 2.5.2 for a discussion of RCRA waste classification and disposal practices) and transported off-site for disposal. The filter cake is classified as a hazardous waste using the following codes:

- F006: Metal hydroxides from electroplating operations
- D004: Toxicity Characteristic for arsenic

As a final process, the polished gallium arsenide wafers are cleaned in a Class 10 clean room. The final rinse water goes to a lift station from which it is pumped to the wastewater treatment plant for neutralization and precipitation. Spent polishing solutions are batch treated at the wastewater treatment plant.

2.2.2 Waveguide and Microwave Components

Waveguide and microwave components are mostly aluminum alloy products, although Airtron does make flexible wave guides from copper and various copper alloys. Some components are fabricated in the on-site machine shop; they are wound, pulled, cut, drilled, bent and welded. Once the machining/fabrication of the components is complete, they are chemically cleaned. Until the mid-summer of 1992, 1,1,1-trichloroethane (or other similar chlorinated solvent) was used as a cleaner. Airtron now uses Axarel™ (trade compound from DuPont), followed by an isopropyl alcohol rinse to remove Axarel™ residuals. Axarel™ is a high grade kerosene with diisobutyl additives.

The clean, dry, fabricated components advance to the plating shop, where they are once again cleaned prior to brazing, iriditing or electroplating. A surface finish is placed on the component increasing the component's corrosion resistance. The components are electroplated with a number of different materials, such as nickel, cadmium, or silver, depending on the intended final component use. The finished components have an interior surface that is electrically conductive. Following the plating process, the exterior of the component may be painted.

Finally, electrical testing of the finished component is performed to verify that the component meets specifications and performance criteria for its particular application.

Plating wastes from the electroplating area were batch treated and the sludges transferred for dewatering to the lagoons until 1980. Since 1980, plating wastes have been treated in the NJDPES-permitted on-site wastewater treatment system. Waste flammable solvents and all other waste materials are handled as RCRA wastes; they are manifested to a RCRA facility for energy recovery or other type of disposal.

2.2.3 Diamonair

A group known as Diamonair was created in 1969 to make use of out-of-specification ingots that had been grown for use as laser host material. Diamonair was located on the Airtron Hanover Avenue facility from 1969 to August 1, 1992. Rather than disposing of the off-specification crystal, jewelry-size stones were produced and mounted in gold settings (purchased from outside vendors) for sale to retailers. This subsection describes Diamonair's production process during the time the group was present at the facility.

In 1972, Airtron began manufacturing a yttrium aluminum garnet (YAG). These synthetic garnets were cut, polished, and faceted at the facility. Around 1977, Airtron manufactured another synthetic garnet material - cubic zirconia (yttrium and zirconia) - for a short period of time. This synthetic garnet was cut and polished at the facility.

No additional raw materials were processed at Airtron for Diamonair's production operations. Settings were cleaned on-site with Alconox™, a common biodegradable laboratory detergent. A high-phosphorus detergent cleaner known as Oakite-90™ also was used. When Diamonair operated in the facility, the cleansing solutions were processed through the wastewater treatment system.

Diamonair also used gold electropolishing (the reverse of electroplating). The cyanide solution involved in this process was used repeatedly. When the cyanide was depleted from use through electrolytic oxidation, solid potassium cyanide was added to the solution. This process was conducted at elevated temperatures, resulting in a relatively high evaporation rate. Rinse water for this process was placed into a separate container, and was used to make-up water volume in the electropolisher. The final rinse was discharged to the sanitary sewer. Spent process solutions were treated in the on-site wastewater treatment system.

2.3 RAW MATERIALS

The following subsections describe the raw materials required to produce the products at Airtron.

2.3.1 Gallium Arsenide

The raw materials for the gallium arsenide operations are purchased in sealed glass or polyethylene containers. In the case of the arsenic, the material is packaged in glass bottles, which in turn are enclosed in outer plastic bags. Typically, the gallium is supplied in polyethylene bottles. The spent containers are managed as RCRA hazardous waste.

2.3.2 Waveguide and Microwave Components

Aluminum alloy is delivered to Airtron in either plate, bar, or tube form, and is fabricated into the different wave guide components. The phosphor bronze and other copper alloys

are typically purchased by Airtron as a ribbon and then are wound into a flexible-tube wave guide and soldered.

2.4 PAST PROCESSES

Monroe constructed the facility in 1952. Monroe's operations at the site included stamping of sheet metal, alloy castings, and assembly. Monroe manufactured mechanical adding machines. No records have been identified concerning waste treatment or disposal practices from this time period.

When Airtron moved into the facility in 1958, Airtron fabricated wave guide components, and was involved in various crystal-growing production, research, and development. The items described below have been manufactured at Airtron in the past, but no longer are manufactured at the facility.

2.4.1 Aluminum Alloy Castings

Aluminum alloy castings for microwave guide components were made in plaster molds into which the molten aluminum alloy was poured. The foundry process was dismantled around 1962/1963. When Airtron terminated the foundry operations, prefabricated components were purchased from outside vendors—a practice continued to the present.

2.4.2 Ferrites

Ferrite materials (containing iron oxide) were produced at Airtron from 1958 until the early 1970s. The following are components of the ferrite materials produced at the facility:

- Iron oxide
- Magnesium oxide
- Manganese oxide
- Nickel oxide
- Lead oxide

Ferrite materials are used by Airtron as circulators/isolators in wave guide systems to integrate microwave tubes with antenna components. After Airtron ended production of ferrite materials in the early 1970s, prefabricated materials were purchased from outside vendors. Airtron continues to machine the prefabricated materials to specification at the facility.

These ferrites are a ceramic type of material. The raw materials were purchased by Airtron in a packaged powder form. The powder materials were mixed into a slurry, sintered, then baked in a kiln to produce a bar product. The bar product was machined to specification for particular applications.

The ferrite materials were machined with diamond wheels and cutting devices. Several acidic solutions and dilute solvents were used in the production of the ferrite materials as well as the machining process. These solutions included nitric acid, sulfuric acid, phosphoric acid, hydrochloric acid, acetic acid, trichloroethylene, methanol, and acetone.

2.4.3 YAG

YAG, yttrium aluminum garnet, was first produced at the Airtron facility in 1967. YAG is an oxide crystal which is used as a laser host material. The crystals were grown utilizing yttrium oxide and aluminum oxide, pulled under a nitrogen and argon atmosphere at high temperature. After the crystals were grown, they were cooled *in situ*. The crystal was core-drilled into laser rods and the rods were sold to customers.

Airtron began relocating the production of YAG crystals in 1990. The last YAG crystal growing station was relocated in September 1992.

2.4.4 KTP

KTP, potassium titanyl phosphate, is another type of crystal that was grown at Airtron's facility. The KTP crystal has the unique property of doubling the frequency of a laser; one

frequency enters the crystal and twice that frequency is emitted. Airtron began manufacturing KTP in the late 1970s.

KTP crystals were hydrothermally grown in sealed autoclaves, then cut into wafers and other shapes with saws. Solutions of hydrochloric acid primarily were used to rinse the KTP products. All of the rinsing solutions were processed on site by the wastewater treatment system.

Personnel and equipment for manufacturing KTP were relocated from the New Jersey facility in the summer of 1991, with the exception of one crystal growing station, which was relocated in September 1992.

2.4.5 GGG

The gallium gadolinium garnet, GGG, was first produced at Airtron in 1970 or 1971. This crystalline material was grown from a pure melt composed of gadolinium oxide and gallium oxide. The crystals were cut into wafers and ground. Wastes generated from the growing, cutting, and grinding processes included Evercool lubricant, tensioning fluid (STC), GGG sludge, and silicon carbide (SiC) sludge.

The GGG ground wafers were then lapped. Lapping is the process of producing an extremely accurate, highly-finished surface by means of moving a block-mounted wafer against a cloth pad that is charged with an abrasive. Waste products generated from the lapping process included aluminum oxide sludge and GGG sludge (which were sent to a recycler for reclaim), sulfuric acid, phosphoric acid, acetic acid, Liquinox microcleaner, and methanol.

The wafers were polished with various chemical compounds to prepare them for the thin films laboratory. Chemicals and products used for polishing the GGG included:

- Nalco 1060 Colloidal Silica™ (primarily sodium hydroxide, water, and silica)
- Liquinox™ Microcleaner

- Dilute ammonia hydroxide
- Methanol
- Acetone

Upon completion of polishing, the GGG wafers were delivered to vendors as is, or were processed further by the thin films laboratory (described in Subsection 2.2.1).

The GGG was developed for use as a substrate for magnetic bubble storage devices. However, this technology was outpaced by developments in semiconductor production; Airtron ceased production of GGG materials in 1980.

Starting in 1975, a laboratory within Airtron began producing thin film magnetic materials onto various substrates. These thin films were applied to a GGG substrate. In 1980, GGG production at Airtron ceased.

The laboratory placed a film of magnetic material onto a GGG substrate by immersing and rotating the substrate in molten flux. The rotation rate and exposure time dictated the thickness of the magnetic film. The following materials have been used as magnetic media:

- Lead oxide
- Bismuth oxide
- Thallium oxide
- Iron oxide
- Vanadium oxide
- Gallium oxide
- Chromium trioxide
- Magnesium perchlorate

The thin films were cooled and cleaned using one or more of the following acids and solvents:

- Nitric acid
- Sulfuric acid
- Phosphoric acid
- Hydrochloric acid
- Acetic acid
- Methanol
- Acetone

The waste acid solutions generated from this process were pumped to the on-site wastewater treatment plant (WWTP) for neutralization and precipitation. The flammable solvents were collected and manifested as RCRA hazardous waste.

2.4.6 YIG

YIG is an acronym for yttrium iron garnet. Airtron began producing YIG material in the early 1960s. This crystal is used in microwave applications because it has one of the lowest resonance line widths of any insulating material.

The YIG crystal was grown out of a molten salt flux. The crystals were rinsed in a dilute solution of hydrochloric acid (HCl), which was disposed in the on-site wastewater treatment system. Prior to the installation of the wastewater treatment system in late 1980, the HCl was neutralized in the batch acid treatment tank in the brazing area.

Airtron ceased production of the YIG crystal in 1980. Airtron continues to utilize YIG materials for its microwave guide products, but now purchases these materials from outside vendors.

2.4.7 YLF

Airtron began a laboratory growth program of preparing fluorides for laser crystal hosts in 1973. This process utilized anhydrous hydrogen fluoride (HF) to convert oxides to

fluorides. The fluoride crystals were grown, fabricated, and sold to customers. In 1991, this operation was moved from the building.

Raw materials used in the YLF production process included yttrium oxide, lithium fluoride, and neodymium oxide (used as a dopant).

YLF production involved the use of a scrubber in which potassium hydroxide was used to neutralize the hydrogen fluoride. The scrubber was operated under an air permit. Spent scrubber solution was discharged to the on-site wastewater treatment system. The last of the YLF production operations were removed from the New Jersey facility in May 1992.

2.4.8 Gallium Arsenide

A laboratory-scale research and development program was initiated for gallium arsenide crystals in the early 1960s. Airtron created small boules (a boule is a single crystal ingot) of gallium arsenide for this research. The research and development program for gallium arsenide ended in 1965. Full-scale gallium arsenide production at the facility began in 1982, when major renovations were made to the facility to accommodate the crystal-growing devices, known as pullers. The current production process for gallium arsenide is presented in Subsection 2.2.1 of this report.

2.5 ADDITIONAL SOURCES OF CHEMICAL USAGE INFORMATION

In addition to the sources of chemical usage information presented in Subsection 2.2 (Current Processes), Subsection 2.3 (Raw Materials), and Subsection 2.4 (Past Processes), a review of facility operating documents and reports has been performed to identify other chemicals used at the facility. A list of the chemicals used at the Airtron facility has been compiled based on the information presented in these sections and the following documents:

- The drawings and operations manual of the original WWTP from 1963

- The October 1980 Operations and Maintenance (O&M) Manual from ERC/Lancy for the existing WWTP

- A completed 1981 New Jersey Selected Substances Report (Appendix 2A)

- SARA Title III Community Right-to-Know Surveys since 1987 (Appendix 2B)

- Monitoring requirements specified in Airtron's current NJPDES discharge permit No. NJ0025739 (Appendix 2C)

The list of chemical constituents currently and formerly used at Airtron is included as Appendix 2D. The chemical constituents are classified into the following categories:

- Metals, metal oxides, and alloys
- Solvents, VOCs, and other cleaning solutions
- Acids
- Bases
- Fuels
- Other Miscellaneous Chemicals

2.6 HISTORICAL SITE PLANS AND AERIAL PHOTOGRAPHS

2.6.1 Historical Site Plans

Monroe constructed the facility in 1952. Modifications have been made to the facility over the past 40 years. Airtron has available a significant number of site plans and construction drawings of the facility for review. Table 2-1 summarizes the date, title, and brief description of these drawings.

2.6.2 Aerial Photographs

Another method of ascertaining past property uses is by review of historical aerial photographs. Chronoflex copies of aerial photographs dated 1959, 1963, 1969, 1974, and 1990 were obtained from Robinson Aerial Surveys, Newton, New Jersey, and copies are included in Appendix 2E. No photographs prior to 1959 have been located.

Table 2-1. Additional Drawings Available

DATE	TITLE	DESCRIPTION
3/25/80	Site Plan C-2	Locations of USGS wells, P-1, 5 lagoons; proposed fill-in of lagoons; proposed WWTP addition
No date	No title	As-built sprinkler head layout
3/90	Airtron Plant	Locations of recycling bins for comp paper/bottles/cans
7/87	Final site plan	Proposed site plan & athletic field
12/4/51	Floor plans & details HVAC	Oil tank details
4/28/52	Site plan	Sheet A-1
2/8/82	Gallium Arsenide wing	Set of drawings for build out plumbing, electrical, structural, architectural
4/16/91	Airtron proposal	New floor plan layout (marked-up)
3/90	No title	Locations of fire alarms, horns, control box, etc.
12/4/51	Revised boiler room plan	Sheet HV-2
8/5/52	Revised office & medical area	Sheet HV-5
1/25/52	Toilets & rest rooms for office personnel	Sheet HV-3
5/8/90	Proposed storage shed	Sheets A-1, A-2, A-3 detailing haz waste storage pad/shed
22/7/80	Executive conference area	Oblique detail of conference room
3/15/74	Property map of Airtron Division of Litton Systems	Site plan
3/22/74	Key sheet property of Airtron Division of Litton Systems	Site in relation to Rt 24 improvements
2/12/82	Slab & trench details for gallium arsenide wing	
4/83	Southeast Morris County Municipal Utilities Authority system map	Water lines as of 83; 1958 topo of buildings
1/4/80	Sketch plat	Shows 5 ponds, property line, building zoning, adjacent parcels
11/82	Official map Township of Hanover	Lot lines & streets
5/23/80	Optical coating	Floor plan showing locations of nitrogen lines, water lines, compressed air lines
12/14/90	Floorplan layout	"Dip Pot" room
No date	No title	Miscellaneous electrical details (3 sheets)
7/30/51	Foundation plan & details	Sheet B-1
1/16/52	Architectural	Sheet A-4
6/9/52	Kitchen-cafeteria & toilets	Sheet HV-4

Additionally, a copy of a 1987 aerial photograph of the site prepared by Keystone Aerial Surveys, Incorporated, has been used in numerous environmental reports prepared by Converse Consultants East (Converse).

Several observations contained in this aerial photograph description reference Area of Concerns discussed in further detail in Section 3 of this SI/RI Workplan.

2.6.2.1 April 1959

The resolution quality of the April 14, 1959, aerial photograph (JER-8W-77) is not as clear as later aerial photographs. However, the major features of the Airtron facility and surrounding area are distinguishable. The grass island in the rear parking lot is present (AOC-2). Some objects appear to be located in the grass area of the current hazardous materials storage building (AOC-1), as well as some objects immediately to the south of this area. No surface impoundment(s) is(are) present on the site.

The Magullian Oil facility is present to the southeast, as is the Fabricated Plastic facility. The Mennen factory is present to the south of the site; a race track is present across East Hanover Avenue to the west of the site. The Champion International facility is present to the northwest. No development has occurred to the east of the site at the time of this photograph.

2.6.2.2 March 1963

In the March 26, 1963, aerial photograph (SW-8-122), unidentifiable material is present in the area of the current hazardous materials storage building (AOC-1) and along the drainage swale at the south edge of the rear parking lot (AOC-9).

Across East Hanover Avenue from the site appears to be a race track. The Champion International facility, the Magullian oil distribution facility, and the Fabricated Plastics facility are present.

2.6.2.3 March 1969

In the March 28, 1969, aerial photograph (NJP-1-92), drums and material appear to be located in the grass area where the hazardous materials storage building (AOC-1) was later constructed. Additional unidentifiable material is present just south of this area, along the drainage swale currently present at the facility (AOC-9). Sludge beds #1 and #2 are present (AOC-5), as is the settling bed at the east edge of the rear parking lot (AOC-4).

In the area surrounding the facility, a lighted baseball field is present where the William G. Mennen Sports Arena currently is located. Further west of the baseball field, across the railroad tracks, is a small storage building on Mennen property (this structure still remains). In this photograph, two surface impoundment structures appear to be located on the west side of the storage building. The Champion International facility is present; numerous drums appear to be located off the north side of this facility. Much of the quarry to the north of the Airtron site is dry (in later photographs, standing water appears to be in the quarry).

2.6.2.4 March 1974

In the March 1974 photograph, four sludge lagoons (AOC-5) and a settling bed (AOC-4) are present at the facility. A hazardous materials storage building (AOC-1) is present off the southeast corner of the facility in the current location of the hazardous waste facility. Approximately nine drums are present on the pad in the 1974 aerial photograph. A grass island is present in the center of the rear parking lot (AOC-2).

In the area surrounding the facility, the William G. Mennen Sports Arena is under construction in the 1974 photograph. The Mennen factory wastewater treatment plant is not present, nor is a significant addition to the northwest side of the Mennen factory. The Mennen warehouse parcel is wooded and undeveloped. The residential development on Horse Hill is not present. A significant disturbed area is present to the north/northeast side of the facility. The disturbance is a result of an office construction. A heavily-traveled dirt road leads to the quarry area from the north, and a dirt road leads to the quarry area from

the north side of the Airtron rear parking lot (this road was not evident in the 1969 photograph). This road may have been the primary access to the quarry.

2.6.2.5 April 1990

The April 19, 1990, aerial photograph (MC-1-158) depicts the facility and surrounding area much as they appear today. The observed changes in the appearance of the facility in comparison to the current site conditions include:

- The former hazardous waste storage pad (AOC-1) is present in the 1990 aerial photograph.
- No concrete pad is present on the southeast corner of the facility. The pad was constructed for the vapor extraction system (VES) blower units.
- The expanded WWTP building is not present.

Located to the north of the facility is a wooded area, beyond which is a water-inundated area (formerly a sand and gravel quarry). East of the facility is a wooded, undeveloped area, beyond which, to the northeast, is a residential development situated on Horse Hill (as referenced on 1981 Morristown USGS Quadrangle). Further to the southeast is an industrial/commercial development, which is accessed by Horsehill Road. Immediately southeast of the facility is the adjacent Warehouse, beyond which is the Magullian oil distribution facility and the Fabricated Plastics facility. The west side of the facility is bound by East Hanover Avenue, across which is the Mennen Company factory, William G. Mennen Sports Arena, and Champion International plant.

No unusual surficial disturbances are observed around the facility, nor are other types of construction activity evident.

No significant changes appear in the March 23, 1987, aerial photograph (16-2541), as compared to the 1990 photograph.

2.7 SITE AND SURROUNDING PHYSICAL CONDITIONS

As shown in Figure 2-2, Airtron has developed approximately two-thirds of the property. The development is composed of the main manufacturing building, asphalt parking lots, and a recreational ball field. The balance of the property is wooded and undisturbed.

The Airtron property is bound to the south by a warehouse that is operated as a distribution center. Located on the southeast side of the warehouse property is an abandoned dump currently owned AT&T. The drainage ditch/unnamed tributary runs through the east portion of the Airtron property bisects this abandoned dump. Beyond the warehouse further to the south is Magullian Oil Company, a petroleum distributor, and Fabricated Plastics. Located to the north of the facility is a wooded area, beyond which is a water-inundated area (formerly a sand and gravel quarry).

East of the facility is a wooded, undeveloped area, beyond which, to the northeast, is a residential development situated on Horse Hill (as referenced on 1981 Morristown USGS Quadrangle). Further to the southeast is an industrial/commercial development, which is accessed by Horsehill Road. The west side of the facility is bound by East Hanover Avenue, across which is the Mennen Company factory, William G. Mennen Sports Arena, and the Champion International plant.

2.7.1 Water Bodies Within One-Half Mile

As stated, a drainage ditch/unnamed tributary to the Whippany River runs across the property towards the southeast. This unnamed tributary joins the Whippany River approximately one mile downstream of the Airtron facility, then flows northeast.

Located southwest of the Mennen facility is Speedwell Lake, a man-made water body impounding the Whippany River. This lake is approximately one-half mile from the Airtron facility.

Surface water is present in the former sand and gravel quarry located to the north of the Airtron facility.

2.7.2 Wetlands

No known wetlands have been identified on the Airtron property. A copy of the flood map, provided by the Federal Emergency Management Agency (FEMA), for Airtron and the vicinity is included as Appendix 2F.

2.7.3 Land Use Within 1,000 Feet of Site

Land use within 1,000 feet of the site is predominantly industrial, commercial, or undeveloped. The closest residential property is located on Horse Hill, approximately 800 feet northeast of the site.

2.7.4 Estimate of Land Within 1,000 Feet Covered by Impermeable Surfaces

With the exception of the undeveloped area to the northeast (i.e., the rear) of Airtron, a significant fraction of the land at and within 1,000 feet of the Airtron site is covered with impermeable surfaces. The majority of the impermeable surface features are buildings, asphalt (parking and roads) and concrete (parking and roads).

Significant impermeable surface features include:

At Airtron

- The main Airtron building
- The asphalt parking lots and roads on the front, sides, and rear of the Airtron building
- The hazardous materials storage building (AOC-1)

Within 1,000 Foot Radius

- Hanover Avenue
- The warehouse building adjacent to Airtron
- Asphalt parking and roads at the adjacent warehouse building
- The large concrete loading/unloading dock area located on the south side of the adjacent Mennen warehouse building
- The Mennen Arena buildings
- Parking and roads at the Mennen Arena
- Several buildings at the main Mennen plant, located south of Airtron, across Hanover Avenue
- Parking, roads, and the inactive water fountain area at the main Mennen plant
- The main building and several outbuildings at the Champion facility
- Parking and roads at the Champion facility

In summary, an estimated 30 percent of the surface within 1,000 feet of Airtron is covered with impermeable materials.

2.8 HISTORIC BORING LOGS

Numerous soil borings have been performed at the facility for the purpose of environmental investigation. The first soil borings were performed in 1981 after the closure of the five

on-site lagoons. The latest soil borings were performed in conjunction with the NJDEP-approved Interim Remedial Measures Workplan (IRMWP) for the installation of a groundwater recovery well and two piezometers. Table 2-2 presents a summary of the soil borings that have been performed at Airtron. The table lists borings for each AOC. The table also identifies the boring number, the firm that performed the boring, the boring date, and the total boring depth. Copies of the soil borings are presented in Appendix 2G.

Rather than discuss all of the previous soil borings under an umbrella discussion, the historical soil boring logs are addressed in Section 3 as they pertain to each AOC.

2.9 REGIONAL GEOLOGY

The Airtron facility is located within the far western portion of the Piedmont Physiographic Province (Triassic lowland subsection) in northern New Jersey. Structurally, this portion of the Piedmont consists of an elongated down-faulted basin frequently referred to as the Newark Basin.

Immediately to the west of the Airtron site is a major normal fault which forms the boundary between the Triassic lowland and New Jersey Highlands. The New Jersey Highlands lie along the upthrown portion of the fault and consist of Paleozoic and Precambrian gneisses, granites, and schists. The Newark Basin is bounded to the east by the Eastern Uplands and to the south by the Watchung Mountains.

Bedrock in the area is composed of interbedded sedimentary and igneous rocks of Jurassic age (Lyttle and Epstein, 1987). These rocks form part of the Newark Supergroup and are (from bottom to top) the Orange Mountain Basalt, Feltville Formation, Preakness Basalt, Towaco Formation, Hook Mountain Basalt, and Boonton Formation. Also an unnamed conglomerate can be found in places that interfingers with the Boonton and Towaco Formations.

The older classification, still used by many drillers, combines the Hook Mountain, Preakness, and Orange Mountain Basalts together as the Watchung Basalts and the Boonton, Towaco, Feltville and Passaic Formations into the Brunswick Formation. The Boonton, Towaco, Feltville and Passaic Formations primarily are comprised of clastic rocks

Table 2-2. Summary of Soil Borings Performed at Litton Airtron

Area of Concern	Monitoring Well/ Soil Boring	Installed By	Date of Installation	Total Depth (feet)	Reference
AOC-1 Hazardous Materials Storage Area	None				
AOC-2 Former Parking Lot Islands	MW-1	CWDD	May 1981	112	Note 5
	B-119	CEE	June 1987	41	Note 1
	B-122	CEE	June 1987	41	Note 1
AOC-3 Former Drum Storage Area #2	B-117	CEE	June 1987	41	Note 1
	SB-4	SCS	November 1990	20	Note 4
	A1	Empire	July 1992	15	Note 3
	A2	Empire	July 1992	13	Note 3
	E1	Empire	July 1992	17	Note 3
AOC-4 Former Sludge Lagoon 5	B-114	CEE	June 1987	41	Note 1
	B-115	CEE	June 1987	40.25	Note 1
	MW-301	CEE	December 1989	26	Note 2
	SB-2	SCS	November 1990	17	Note 4
	SB-3	SCS	November 1990	22	Note 4
	A3	Empire	July 1992	13	Note 3
	A4	Empire	July 1992	15	Note 3
	A5	Empire	July 1992	12	Note 3
	A6	Empire	July 1992	14	Note 3
	A7	Empire	July 1992	13	Note 3
	A8	Empire	July 1992	17	Note 3
	E2	Empire	July 1992	13	Note 3
	E3	Empire	July 1992	13	Note 3
AOC-5 Former Sludge Lagoons 1-4	B-104	CEE	May 1987	41	Note 1
	B-107	CEE	June 1987	51	Note 1
	B-108	CEE	June 1987	56	Note 1
	B-112	CEE	June 1987	96	Note 1
	B-202	CEE	July 1987	128	Note 1
	MW-202	CEE	July 1987	126	Note 1
	MW-1M	CWDD	May 1981	42	Note 5
	MW-2M	CWDD	May 1981	65.5	Note 5
	EW-1	SCS	November 1990	50	Note 4
	EW-2	SCS	November 1990	50.5	Note 4
	OBV-1	SCS	November 1990	35	Note 4
	OBV-2	SCS	November 1990	24	Note 4
	OBV-3	SCS	November 1990	24.8	Note 4
	OBV-4	SCS	November 1990	35	Note 4
	OBV-5	SCS	November 1990	35	Note 4
	OBV-6	SCS	November 1990	35	Note 4
	OBV-7	SCS	November 1990	32.2	Note 4
	OBV-8	SCS	November 1990	35	Note 4
	OBV-9	SCS	November 1990	45	Note 4
	OBV-10	SCS	November 1990	35	Note 4
	SB-1	SCS	November 1990	45	Note 4
	A9	Empire	July 1992	45	Note 3
	A10	Empire	July 1992	50	Note 3
	A11	Empire	July 1992	45	Note 3
	A12	Empire	July 1992	50	Note 3
	A13	Empire	July 1992	50	Note 3
	A14	Empire	July 1992	50	Note 3
	A15	Empire	July 1992	49	Note 3
	A16	Empire	July 1992	49.5	Note 3
	A17	Empire	July 1992	49.5	Note 3
	A18	Empire	July 1992	49.5	Note 3
	E4	Empire	July 1992	50	Note 3
	E5	Empire	July 1992	50	Note 3
	E6	Empire	July 1992	50	Note 3
	E7	Empire	July 1992	50	Note 3

ABBREVIATIONS:

SCS - SCS Engineers
CEE - Converse Environmental East
CWDD - Converse Ward Davis Dixon
Empire - Empire Soil Investigations, Incorporated

NOTES:

1. CEE report entitled, "Soil and Groundwater Investigation, Phase I Results," dated November 24, 1987.
2. CEE report entitled, "Phase II Soil and Groundwater Investigation" dated April 19, 1990.
3. Empire installed 19 air injection wells and 8 vapor extraction wells - no logs are available.
4. SCS report entitled, "Soil Vapor Extration Test Program" dated March 5, 1991.
5. CWDD report entitled, "Final Report of Groundwater Monitoring Program" dated August 10, 1981.

Table 2-2 (continued)

Area of Concern	Monitoring Well/ Soil Boring	Installed By	Date of Installation	Total Depth (feet)	Reference
AOC-6 Stream Sediments	None				
AOC-7 Paint Stripping Area Former 10,000-Gallon UST	E8	Empire	July 1992	49.5	Note 3
	E9	Empire	July 1992	34.5	Note 3
	A19	Empire	July 1992	49.5	Note 3
	A20	Empire	July 1992	49.5	Note 3
AOC-8 Gallium Arsenide Wing Trench	None				
AOC-9 Former 15,000-Gallon UST	None				
AOC-10 Former 20,000-Gallon UST	B-118	CEE	June 1987	51	Note 1
AOC-11 Ground Water	B-101	CEE	May 1987	41	Note 1
	B-102	CEE	May 1987	41	Note 1
	B-103	CEE	May 1987	41	Note 1
	B-105	CEE	May 1987	51	Note 1
	B-106	CEE	June 1987	56	Note 1
	B-109	CEE	June 1987	61	Note 1
	B-110	CEE	June 1987	61	Note 1
	B-111	CEE	June 1987	56	Note 1
	B-113	CEE	June 1987	61	Note 1
	B-116	CEE	June 1987	45	Note 1
	B-118	CEE	June 1987	51	Note 1
	B-120	CEE	June 1987	36	Note 1
	B-121	CEE	June 1987	36	Note 1
	B-201	CEE	June & July 1987	135	Note 1
	B-203	CEE	June & July 1987	134	Note 1
	B-1	CWDD	May 1981	42	Note 5
	MW-2	CWDD	May 1981	82	Note 5
	MW-3	CWDD	May 1981	87	Note 5
	MW-201	CEE	Jun-Jul 87	127	Note 1
	MW-203	CEE	Jun-Jul 87	131	Note 1
	MW-204	CEE	July 1987	68	Note 1
	MW-205	CEE	July 1987	59	Note 1
	MW-206	CEE	July 1987	64	Note 1
	MW-302	CEE	December 1989	82	Note 2
	MW-303	CEE	December 1989	77	Note 2
	MW-304	CEE	December 1989	91	Note 2
	MW-305	CEE	December 1989	77	Note 2
	MW-306	CEE	January 1990	67	Note 2
	MW-307	CEE	January 1990	67	Note 2
	RW-1	SCS	May 1994	90	
	PZ-1	SCS	May 1994	92	
	PZ-2	SCS	May 1994	89	

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NOTES:

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2. CEE report entitled, "Phase II Soil and Groundwater Investigation" dated April 19, 1990.
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ranging from claystone to conglomerate. These rocks were deposited into lakes and streams within a closed terrestrial basin. After consolidation, regional tectonic stresses formed distinct fracture systems within the rocks.

The igneous Hook Mountain, Preakness, and Orange Mountain Basalts were extruded at the surface. Subsequent tectonic activity followed by a period of erosion of the softer sedimentary rocks created the Watchung Mountains to the east.

During the Pleistocene Epoch, the northern portion of North America underwent several periods of major glaciation. These glacial episodes resulted in both erosional and depositional changes on the landscape. The site is located near the southern terminus of these glaciations and underwent a complex history of erosion and deposition.

- Erosional Features: The region is underlain by a vast buried valley system that has been partially delineated. This buried valley system is probably a combination of glacially modified pre-glacial stream valleys and glacial valleys formed from a combination of glacial meltwater action and\or glacial scouring from multiple glaciations. Subsequently, these valleys have been filled with glacial drift which forms and/or contributes to major aquifer systems in the region.

- Depositional Features: Glacial drift can be broadly classified into two types, stratified and unstratified deposits. The age of the drift forming the buried valley fill ranges from Illinoian to Wisconsinian.

  - Unstratified deposits: Till is material that has been eroded at the base of the ice sheet and then redeposited directly by the ice. Till is composed of clay, silt, sand and gravel with occasional cobbles and boulders and generally can be regarded as an aquiclude or aquatard. Even so, the presence of perched layers of water within till is not uncommon.

— Stratified deposits: are those deposited by meltwaters from the glacier or lacustrine deposits accumulated in a proglacial lake. Stratified deposits such as outwash, kames and kame terraces are formed from interbedded sequences of sands and gravels and can form very productive aquifers, particularly when located within the confines of a buried or drift filled valley system.

A general model has been developed for the various deposits within the buried valley system (B. Stone, Personal Communication, 1993). The actual valleys are the product of erosional processes by previous glaciations. These valleys were filled by a combination of till and lacustrine deposits during Illinoian time. Post-glacial erosion of the Illinoian deposits by fluvial systems in the area was limited by bedrock-controlled outlets; thus, the fill was still in place at the onset of Wisconsinian glaciation. As the Wisconsinian ice sheet approached the region, large volumes of meltwater deposited vast quantities of stratified sands and gravels over the pre-existing Illinoian deposits. This outwash unit forms the major aquifer unit in the buried valley system. The advancing ice sheet then over-rode the outwash depositing the till unit found at the surface. This till unit is the same as the till that forms the terminal moraine to the south of the Airtron site. Minor fluctuations within the ice were responsible for some of the chaotic deposition noted in many of the borings such as stratified lenses within the till.

SECTION 3.0

AREAS OF CONCERN (AOC)

This section discusses AOCs at the site. Each AOC is described, its history discussed, its continued investigation proposed, and its analytical parameters and their justification presented. A site plan of the Airtron facility is presented in Figure 3-1, which illustrates the location of all AOCs.

Table 3-1 summarizes the AOCs for this site and the current status of each AOC.

Table 3-1. Summary of Areas of Concern

AOC #	Description of AOC	Status of AOC
1	Hazardous Materials Storage Building Area	Additional Investigation Proposed
2	Former Parking Island Drum Storage Area #1	Additional Investigation Proposed
3	Former Drum Storage Area #2	Additional Investigation Proposed
4	Former Sludge Lagoon #5	Additional Investigation Proposed
5	Former Sludge Lagoons 1-4	Additional Investigation Proposed
6	Stream Sediments	Additional Investigation Proposed
7	Paint Stripping Area/Former 10,000-Gallon UST	Additional Investigation Proposed
8	Gallium Arsenide Wing Trench	No Further Action
9	Former 15,000-Gallon UST	Additional Investigation Proposed
10	Former 20,000-Gallon UST	No Further Action
11	Groundwater	Additional Investigation Proposed

3.1 HAZARDOUS MATERIALS STORAGE BUILDING AREA (AOC-1)

3.1.1 Description and Current Status

Airtron currently operates a hazardous materials storage building located off the southeast corner of the building (shown on Figure 3-2). This hazardous materials storage building is used to store hazardous raw materials and waste for less than 90 days.