Alodine Metal Finishing Room

Investigation Report

Hazeltine Corporation

Greenlawn, New York

Prepared for:

Hazeltine Corporation
Cuba Hill Road
Greenlawn, New York 11740

Prepared by:

Radian Corporation
2455 Horsepen Road, Suite 250
Herndon, Virginia 22071

1 February 1991

RADIAN
CORPORATION

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1.0 INTRODUCTION

This report presents the results of voluntary investigation activities conducted in the former Alodine Metal Finishing Room (Alodine Room) at Hazeltine Corporation's main facility, located in the Town of Greenlawn, in Suffolk County, New York. The voluntary investigation was conducted as a result of stains found on the Alodine Room floor during removal of the equipment and materials formerly used in the Alodine Metal Finishing process. The goal of the investigation was to assess the potential for environmental impacts from past operations conducted in the Alodine Room on soils underneath the building floor.

2.0 BACKGROUND AND OBJECTIVES

2.1 Site Description and History

The Hazeltine Corporation (HC) facility is located in the town of Greenlawn, Suffolk County, New York (Figure 2-1), and is involved in the assembly of electronic systems for military applications. The facility covers approximately 23 acres, and is comprised of two parcels of property separated by a public right-of-way (Cuba Hill Road). There are five main buildings (1 through 5): Building 1 is located on the southwest side of Cuba Hill Road, and Buildings 2 through 5 are located on the northeast side of Cuba Hill Road. The topography surrounding the HC facility is generally flat lying. Portions of both parcels are paved for use as parking lots. The remainder of the land in the parcels is unpaved and/or grassed.

The HC facility was owned by Republic Aviation during the 1940s. At that time, operations included the manufacture of metal tubing and electrical harnesses for military aircraft in what is now called Building 2. Hazeltine Corporation acquired the facility in 1957, and has used the facility for the fabrication of sheet metal and machine parts, and the assembly of electronic systems. Buildings 3 through 5 were added between 1960 and 1962. Building 1 was constructed in 1971, and was later expanded in 1986. Operations at the Greenlawn facility have generally remained the same since 1971.

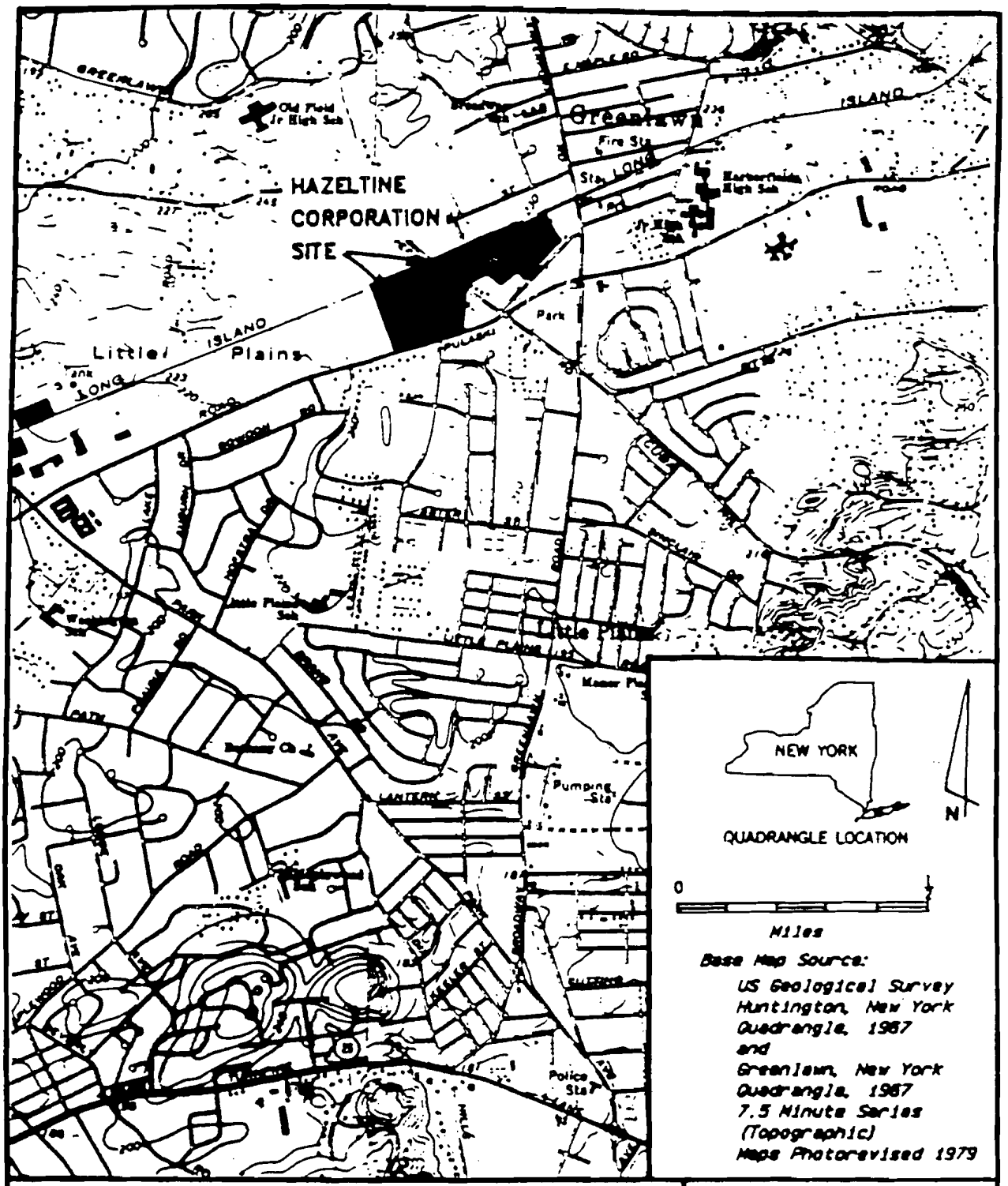

Figure 2-1. Site Location Map,
Hazeltine Corporation, Greenlawn, New York

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Past manufacturing processes at the facility included plating operations, metal working, bench-scale assembly, and photography. Operations conducted in each building are summarized as follows:

Building	Operations
1	Offices, assembly operations, photographic and microelectronics laboratories
2	Offices, plating, metal finishing, painting, deburring
3	Offices, photographic laboratory, environmental test chambers
4	Offices, assembly operations, QA/QC, painting
5	Offices, assembly operations, microelectronics laboratory

In the past, Building 2 operations have included a small printed circuit board plating shop (copper, tin/lead, nickel, and gold plating), and a metal finishing area (Alodine Room).

2.2 Regional Geology

As part of Radian's August 1990 site investigation, Radian reviewed available literature on regional and local geology. The Hazeltine facility is located in north central Long Island in Greenlawn, New York and lies within the northeastern extension of the Atlantic Coastal Plain Physiographic Province (Lubke, 1964). The subsurface geology of Long Island is comprised of several deposits of unconsolidated glacial and nonglacial sediments, which rest unconformably upon a crystalline bedrock that dips gently and uniformly towards the southeast. The September 1990 investigation in the Alodine Room penetrated the shallowest surficial deposits found in the Greenlawn vicinity.

Glacial and interglacial Pleistocene age deposits form the surficial deposits surrounding the Greenlawn area. These deposits have been

mapped as glaciofluvial sediments consisting of stratified (layered) sands and gravels, and are found to depths of 180 to 500 feet below ground surface (Lubke, 1964).

The shallowest aquifer found within the stratigraphic sequences of Long Island is located within the coarse sand and gravel of the upper Pleistocene deposits. The upper limit of the shallow aquifer defines the regional water table on Long Island. In the general area of the Hazeltine Corporation, this upper limit is at approximately 55 feet above sea level, which is approximately at 175 feet below ground surface.

2.3 Alodine Room Operations

Activities in the Alodine Room included deburring, metal conversion coating/finishing, and degreasing (using tetrachloroethene). Metal finishing operations utilized solutions containing aluminum, chromium, and cyanide. Material Safety Data Sheets (MSDSs) for the chemicals used in the metal finishing process are included as Appendix A. The metal finishing operation was discontinued and the associated equipment was removed in April 1990. Tetrachloroethene was replaced by freon as the solvent in the degreaser at this same time.

2.4 Alodine Room Floor Cleanup

As a part of preparation for using the Alodine Room to house a new process activity, Radian and its subcontractor, Chemical Pollution Control, cleaned (scrubbing followed by pressure washing) the Alodine Room floor during May, 1990. The rinsate was drummed and properly disposed of as a characteristic hazardous waste by Chemical Pollution Control. After the floor was cleaned several stained areas remained on the floor of the Alodine Room.

2.5 OBJECTIVES

When the stained areas were noted on the Alodine Room floor, Hazeltine initiated a limited voluntary investigation of the floor and shallow soils beneath the floor. The objective of the investigation was to assess the potential for environmental impacts from past activities within the Alodine Room on soils underneath the building floor and the surrounding environment within the room. The information obtained from this investigation may also be used to determine the necessity, if any, of mitigating future exposure of Hazeltine employees to chemical contaminants from past operations within the room.

Analytical results from concrete core and shallow soil samples collected indicated the presence of tetrachloroethene in all of the soil and concrete samples (a detailed description of the samples collected and analytical results is provided in subsequent sections). Hazeltine determined that the quantities found constituted a reportable quantity and reported these results to NYSDEC on June 25, 1990. The report was designated by NYSDEC as Spill No. 90-03414. NYSDEC and Suffolk County regulations require the submittal of a work plan addressing any reportable releases. Radian performed additional subsurface investigation in the Alodine room in order to obtain the information necessary to evaluate whether additional work or remedial action is warranted.

3.0 SITE INVESTIGATION ACTIVITIES

3.1 Concrete Core and Shallow Soil Sampling

After completion of floor cleaning activities in the Alodine Room, Radian's onsite representative collected three concrete core samples, two from the raised floor within the containment berm (one each from the surface and bottom of the core), and the other from the area near the degreaser. Two soil samples were collected from directly beneath the concrete core samples to a depth of approximately 6 inches below the floor surface. The core holes were then backfilled with ready-mix concrete. Locations of the core and soil samples are depicted in Figure 3-1. These are designated as ARH and ARL, respectively, on Figure 3-1.

The concrete core and soil samples were bottled, preserved, and shipped to Radian Corporation's laboratories for chemical analysis. Each of the samples collected was analyzed for volatile organic compounds (EPA Method 8010/8020), cyanide (EPA Method 9012), and EP Toxicity for metals.

3.2 Subsurface Investigation and Sampling

The subsurface investigation and sampling beneath the Alodine Room floor consisted of the following activities:

- Installation of six shallow soil borings with continuous split spoon sampling from the ground surface to a depth of 18 feet below ground surface (BGS).
- Field screening of all soil samples collected with an HNu photoionization detector.

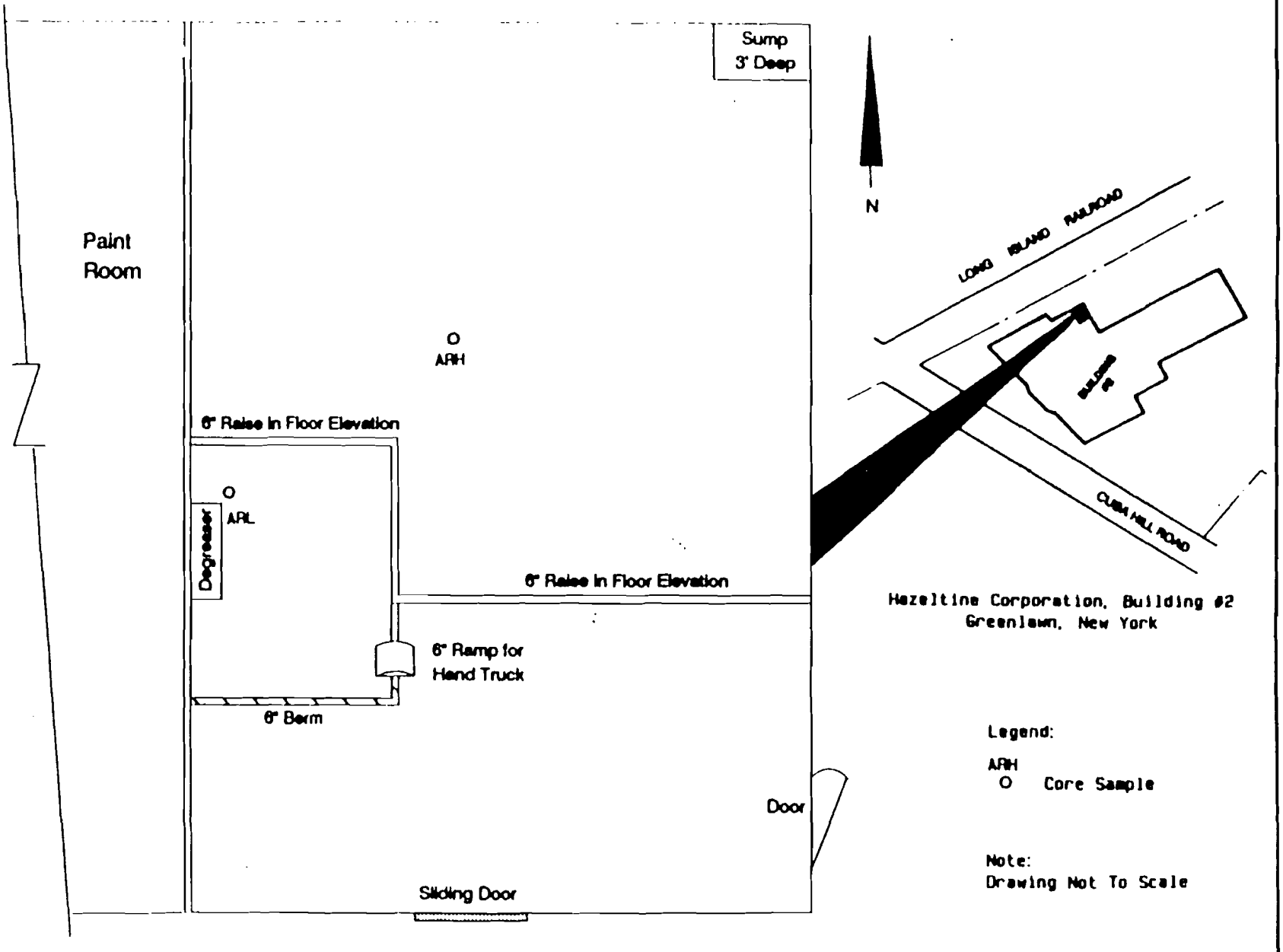

FIGURE 3-1. CONCRETE CORE AND SOIL SAMPLE LOCATIONS - ALODINE ROOM
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

- Laboratory analysis of at least three soil samples from each shallow test boring for volatile organic compounds.

Figure 3-2 shows the locations of the six borings installed in the Alodine Room of the Hazeltine site. Soil borings were drilled by East Coast Drilling under the direction of Radian personnel. The drilling procedures and soil sampling procedures discussed in the following sections. The field data collected are provided in Appendix B, and include boring logs from the six boring locations. Table 3-1 summarizes the samples collected from each of the six boreholes, their depth below ground surface, and the chemical analyses conducted. All of the samples collected were analyzed for chlorinated volatile organic compounds. The samples from boring B-6 were also analyzed for aromatic volatile organic compounds since aromatics are used in the adjacent paint room.

3.2.1 Placement of Soil Borings

The configuration of soil borings was chosen to define the horizontal and vertical extent of tetrachlorethene within the soils. The six soil borings were placed as depicted in Figure 3-2. Boring B-1 was located near the former concrete core sample ARL. Boring B-3 was located near the former concrete sample ARH, B-5 was in the northwest corner of the room. B-2 was located to the south of B-1, near the corner of the degreaser and within the berm. B-4 was located just southeast of B-2, outside the berm, near the room's entrance. B-6 was located in the adjoining paint room, at a location corresponding to the degreasers position in the Alodine Room.

3.2.2 Soil Boring Installation

A 12-inch diameter core was cut through the concrete floor using a coring machine with a diamond tipped core bit for B-3 and B-5. Concrete for boreholes B-1, B-2, B-4, and B-6, was opened using a 75-pound jackhammer run on compressed air.

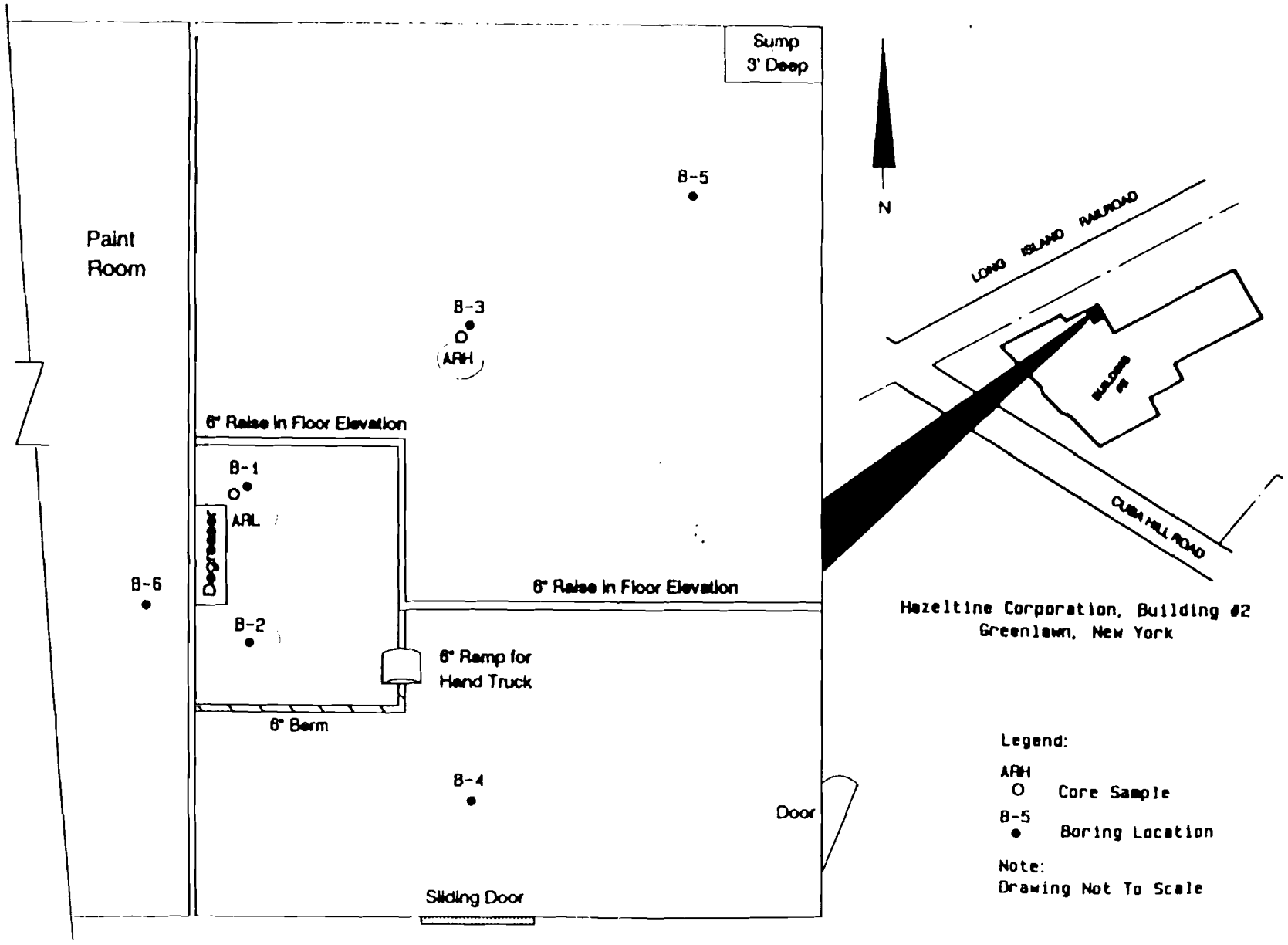

FIGURE 3-2. BORING LOCATIONS IN THE ALODINE ROOM, BUILDING NO. 2
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Table 3-1

SAMPLE LOCATIONS AND ANALYSES
ALODINE ROOM, HAZELTINE CORPORATION
GREENLAWN, NEW YORK

Boring Location	Soil Sample Number and Depth	Analysis Conducted
B-1 Alodine Room	B-1A (0.4'-0.8') B-1B (9'-10') B-1C (16'-18')	EPA Method 8010 Halogenated Volatile Organic Compounds
B-2 Alodine Room	B-2A (0.0'-0.4') B-2B (2'-4') B-2C (14'-16')	EPA Method 8010 Halogenated Volatile Organic Compounds
B-3 Alodine Room	B-3A (0.1'-3') B-3B (12'-14') B-3C (16'-18')	EPA Method 8010 Halogenated Volatile Organic Compounds
B-4 Alodine Room	B-4A (0.2'-0.6') B-4B (7'-9') B-4C (15'-17')	EPA Method 8010 Halogenated Volatile Organic Compounds
B-5 Alodine Room	B-5A (0.9'-2.9') B-5B (7'-9') B-5C (16'-18')	EPA Method 8010 Halogenated Volatile Organic Compounds
B-6 Paint Room	B-6A (0.3'-0.6') B-6B (7'-9') B-6C (15'-17') B-6E (2'-4')	EPA Methods 8010 and 8020 Halogenated and Aromatic Volatile Organic Compounds

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table.3-1.1

The six soil borings were drilled to a depth of 18 feet below ground surface using a Diedrich D-25 skid-mounted drill rig using hollow stem augers.

3.2.3 Sample Collection and Analysis

The borings were continuously sampled using a standard 2-inch diameter, 24-inch long split spoon. Each split spoon sample was screened for the presence of volatile organic compounds with an HNu photoionization detector. Samples were collected from specific shallow (usually 0'-4' intervals), middle (7'-12' intervals), and deep (15'-18') depth intervals. The highest HNu and/or headspace readings for these specific intervals were used as criteria for choosing which sample interval would be analyzed. Table 3-1 summarizes the sample intervals chosen for analysis. The boring logs in Appendix B contain the direct HNu and headspace HNu data which was collected from each split spoon sample.

4.0 SITE GEOLOGY

The Hazeltine Corporation Greenlawn site, including the Alodine Room area, is underlain by glacial deposits of gravelly sand, sand, silt, and clay. Data on the shallow geology of the Alodine Room area were obtained from six 18-foot boreholes drilled through the Alodine Room floor. Field observations and classifications of soils indicate that the Alodine Room concrete floor is a maximum of one foot thick and is underlain by a 1 and 1/2- to 3-foot thick layer of clayey silt containing gravel. Underlying the clayey silt layer is fine to coarse sand containing gravel and cobbles down to 18 feet, the maximum depth penetrated by the borings. Isolated thin layers of silt or gravel were occasionally encountered in the sand unit.

While the gravelly sand materials encountered are considered relatively permeable, the overlying building floor slab and clayey silt would likely limit vertical migration and recharge of precipitation and surface runoff to the sandy formation underlying the area.

Shallow groundwater was not encountered down to the maximum depth penetrated by the borings. Information on regional groundwater flow in this area indicates that the saturated zone is expected to occur at a depth significantly below the surface, approximately 90 feet (in intermittent perched zones) to 180 feet below ground surface. This depth to water has been confirmed by monitoring wells located on the property.

5.0 ANALYTICAL RESULTS

The sample locations and the analyses performed on the soil and concrete samples collected as part of this investigation are described in Section 3 of this report. A brief discussion of the analytical results is provided in the following subsections.

5.1 Concrete Core and Shallow Soil Samples

Analytical results for the concrete cores and shallow (0" to 6") soil samples collected from the Alodine Room are summarized in Tables 5-1 and 5-2. All of the soil and concrete core samples were analyzed for leachable-metals (by EP Toxicity), volatile organic compounds, cyanide, pH, and percent moisture.

Cyanide was not detected in any of the samples collected. The concentrations of metals detected in the leachates from the EP Toxicity tests performed were below the regulatory limits for each of the samples collected. Tetrachloroethene was detected in each of the concrete core and soil samples. Concentrations of tetrachloroethene detected in the concrete samples ranged from 0.1 to 0.5 milligrams per kilogram. Tetrachlorethene was detected in the soil samples at concentrations of 7.0 milligrams per kilogram in the sample from the containment berm and at 3.9 milligrams per kilogram in the sample from near the degreaser. No other volatile organic compounds were detected in any of the 5 samples at levels considered to be statistically significant (greater than five times the instruments detection limit) or at concentrations greater than those detected in blanks.

5.2 Soil Boring Analytical Results

Three soil samples were collected from each of borings 1 through 5 and analyzed for chlorinated volatile organic compounds. Four soil samples were collected from boring B-6 and analyzed for both chlorinated and aromatic

TABLE 5-1: SUMMARY OF ANALYTICAL RESULTS, ALODINE ROOM CONCRETE CORE SAMPLES
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	ARHC-1 Concrete Core 05/10/90	ARHC-2 Concrete Core 05/10/90	ARLC-1 Concrete Core 05/10/90
Halocarbons - Method 8010 (ug/kg)			
Benzyl Chloride	<1200	<1200	<1200
Bromobenzene	<600	<600	<600
Bromodichloromethane	<12	<12	<12
Bromoform	<60	<60	<60
Bromomethane	<140	<140	<140
Carbon Tetrachloride	<14	<14	<14
Chlorobenzene	<30	<30	<30
Chloroethane	<62	<62	<62
2-Chloroethylvinylether	<60	<60	<60
Chloroform	<12	<12	<12
1-Chlorohexane	<600	<600	<600
bis-Chloroisopropylether	<1200	<1200	<1200
Chloromethane	<36	<36	<36
Chlorotoluene (total)	<3000	<3000	<3000
Dibromochloromethane	<24	<24	<24
Dibromomethane	<600	<600	<600
1,2-Dichlorobenzene	<60	<60	<60
1,3-Dichlorobenzene	<38	<38	<38
1,4-Dichlorobenzene	<29	<29	<29

TABLE 5-_ (Continued): SUMMARY OF ANALYTICAL RESULTS, ALODINE ROOM CONCRETE CORE SAMPLES
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	ARHC-1 Concrete Core 05/10/90	ARHC-2 Concrete Core 05/10/90	ARLC-1 Concrete Core 05/10/90
Halocarbons - Method 8010 (ug/kg)			
1,1-Dichloroethane	<60	<60	<60
1,2-Dichloroethane	<12	<12	<12
1,1-Dichloroethene	<24	<24	<24
cis-1,2-Dichloroethene	<24	<24	<24
trans-1,2-Dichloroethene	<24	<24	<24
1,2-Dichloropropane	<12	<12	<12
cis-1,3-Dichloropropene	<24	<24	<24
trans-1,3-Dichloropropene	<41	<41	<41
Methylene chloride	150 CB@	160 CB@	150 CB@
1,1,1,2-Tetrachloroethane	<600	<600	<600
1,1,2,2-Tetrachloroethane	<18	<18	<18
Tetrachloroethene	120 C	250 C	470 C
1,1,1-Trichloroethane	<24	<24	<24
1,1,2-Trichloroethane	<24	<24	<24
Trichloroethene	<24	<24	<24
Trichlorofluoromethane	<24	<24	<24
1,2,3-Trichloropropane	<600	<600	<600
Vinyl Chloride	<24	<24	<24

C - Confirmed on second column or by GC/MS.
B - Detected in blank.
@ - Estimated result less than five times detection limit.

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table.5-1.2

TABLE 5-1 (Continued): SUMMARY OF ANALYTICAL RESULTS, ALODINE ROOM CONCRETE CORE SAMPLES
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	ARHC-1 Concrete Core 05/10/90	ARHC-2 Concrete Core 05/10/90	ARLC-1 Concrete Core 05/10/90
EP Toxicity Metals - Method 6010 (mg/L)			
Arsenic	<0.053	<0.053	<0.053
Barium	0.55	0.67	0.20
Cadmium	<0.0040	<0.0040	<0.030
Chromium	0.12	0.069	0.059
Lead	<0.042	<0.042	<0.042
Selenium	<0.075	<0.075	<0.075
Silver	<0.0070	<0.0070	<0.0070
Total Cyanide - Method 9012 (mg/kg)	<0.50	<0.50	<0.50
Mercury - Method 7470 (mg/L)	<0.0002	<0.0002	<0.0002
Percent moisture inorganic (%)	<0.1	<0.1	<0.1
pH - Method 9045 (pH units)	12.4	12.3	11.8

TABLE 5-2: SUMMARY OF ANALYTICAL RESULTS, ALODINE ROOM SOIL SAMPLES
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	ARH-1 Soil 05/10/90	ARL-1 Soil 05/10/90
Halogenated Volatiles - Method 8010 (ug/kg)		
Bromodichloromethane	<62	<25
Bromoform	<310	<120
Bromomethane	<740	<300
Carbon Tetrachloride	<75	<30
Chlorobenzene	<160	<62
Chloroethane	<320	<130
2-Chloroethylvinylether	<310	<120
Chloroform	<62	<25
Chloromethane	<190	<75
Dibromochloromethane (1)	<120	<50
1,2,-Dichlorobenzene	<310	<120
1,3-Dichlorobenzene	<200	<80
1,4-Dichlorobenzene	<150	<60
1,1-Dichloroethane	<310	<120
1,2-Dichloroethane	<62	<25
1,1-Dichloroethene	<120	<50
trans-1,2-Dichloroethene	<120	<50
1,2-Dichloropropane	<62	<25
cis-1,3-Dichloroprene (1)	<190	<75

(1) - Dibromochloromethane, 1,1,2-Trichloroethane,a nd cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.

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table.5-2.1

TABLE 5-2 (Continued): SUMMARY OF ANALYTICAL RESULTS, ALODINE ROOM SOIL SAMPLES
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	ARH-1 Soil 05/10/90	ARL-1 Soil 05/10/90
Halogenated Volatiles (continued) - Method 8010 (ug/kg)		
trans-1,3-Dichloropropene	<210	<85
Methylene Chloride	<250	<100
1,1,2,2-Tetrachloroethane (2)	<94	<38
Tetrachloroethene (2)	[redacted]	[redacted]
1,1,2-Trichloroethane (1)	<120	<50
1,1,1-Trichloroethane	<120	<50
[redacted]	[redacted]	<50
Trichlorofluoromethane	<120	<50
Vinyl Chloride	<120	<50
Volatile Aromatics - Method 8020 (ug/kg)		
Benzene	16	<2.5
Chlorobenzene	<2.5	<2.5
1,2-Dichlorobenzene	<5.0	<5.0
1,3-Dichlorobenzene	<5.0	<5.0
1,4-Dichlorobenzene	<3.8	<3.8
Ethylbenzene	<2.5	<2.5
Toluene	[redacted]	[redacted]
Total Xylenes	24 B	25B

(1) - Dibromochloromethane, 1,1,2-Trichloroethane,a nd cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
(2) - Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.
B - Detected in blank.
@ - Estimated result less than five times detection limit.

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table.5-2.2

TABLE 5-2 (Continued): SUMMARY OF ANALYTICAL RESULTS, ALODINE ROOM SOIL SAMPLES
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	ARL-1 Soil 05/10/90	ARH-1 Soil 05/10/90
EP Toxicity Metals - Method 6010 (mg/L)		
Arsenic	<0.053	<0.053
Barium	<0.0020	0.14
Cadmium	<0.0040	<0.0040
Chromium	0.013@	<0.0070
Lead	<0.042	<0.042
Selenium	<0.075	<0.075
Silver	<0.0070	<0.0070
Mercury - Method 7270 (mg/L)	<0.0002	<0.0002
Total Cyanide - Method 9012 (mg/kg)	<0.50	<0.50
Percent moisture inorganic (%)	10.3	11.6
pH - Method 9045 (pH units)	6.0	7.5

volatile organic compounds. A summary of the compounds detected is presented in Table 5-3.

Volatile organic compounds were detected in several of the soil boring samples. The predominant compound detected in each location was tetrachloroethene.

In the shallow soil samples (0 to 4 feet BGS) collected from each of the six borings, tetrachloroethene was detected at concentrations ranging from 0.001 to 23 milligrams per kilogram. Lower concentrations of tetrachloroethene were detected in the middle depth interval samples (samples collected from between 7 and 14 feet BGS), with the highest concentration ranging up to 0.003 milligrams per kilogram. Tetrachloroethene was not detected in the deepest samples from borings B-1 and B-5 (16 to 18 feet BGS) and it was not detected above 0.002 milligrams per kilogram in the deepest samples from the other borings (15 to 18 feet BGS).

Trans-1,2-dichloroethene, 1,1,1-trichloroethane, and trichlorethene were detected in the shallow samples from borings 1 through 5 at concentrations below that of tetrachlorethene detected. None of these compounds were detected in samples collected from the middle or deep sample intervals for these borings. Toluene, ethylbenzene, and xylene were detected in one of the shallow samples from boring B-6 but were not detected in the samples collected from the middle or deep intervals. Chloroform was detected in five samples, but at concentrations less than that detected in the field blank sample which was collected and analyzed along with the boring samples.

TABLE 5-3: SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
ALODINE ROOM SOIL BORINGS
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	B-1A 0.4'-0.8' 10/3/90	B-1B 9'-10' 10/3/90	B-1C 16'-18' 10/3/90	B-2A 0.0'-0.4' 10/3/90	B-2B 2'-4' 10/4/90	B-2C 14'-16' 10/4/90	B-3A 1'-3' 10/3/90	B-3B 12'-14' 10/3/90	B-3C 16'-18' 10/3/90
Halogenated Volatile Organic Compounds - Method 8010 (mg/kg)									
Chloroform	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00068
t-1,2-Dichloroethene	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0025	<0.0002	<0.0002
Tetrachloroethene	0.098	0.0005a	<0.0001	[illegible]	0.0046	0.0022	1.3	0.0031	0.0011
Trichloroethene	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0098	<0.0002	<0.0002

a <5 times detection limit.

B Detected in blank.

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table.5-3.1

TABLE 5-3 (Continued): SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
ALODINE ROOM SOIL BORINGS
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	B-4A 0.2'-0.6' 10/3/90	B-4B 7'-9' 10/4/90	B-4C 15'-17' 10/4/90	B-5A 0.9-2.9' 10/1/90	B-5B 7'-9' 10/1/90	B-5C 16'-18' 10/1/90
Halogenated Volatile Organic Compounds - Method 8010 (mg/kg)						
Chloroform	<0.0005	0.00028B	0.001B	<0.04	<0.0005	<0.0005
t-1,2-Dichloroethene	<0.0002	<0.0002	<0.0002	0.3B	<0.0002	<0.0002
Tetrachloroethene	0.0014	0.002	0.0005	[illegible]	0.0002a	<0.0001
Trichloroethene	<0.0002	<0.0002	<0.0002	0.6	<0.0002	<0.0002

a <5 times detection limit.

B Detected in blank.

tlr-wp24
table.5-3.2

TABLE 5-3 (Continued): SUMMARY OF DETECTED VOLATILE ORGANIC COMPOUNDS
ALODINE ROOM SOIL BORINGS
HAZELTINE CORPORATION, GREENLAWN, NEW YORK

Sample Number Sample Description Sample Date	B-6A 0.3'-0.6' 10/3/90	B-6E 0.5'-2' 10/5/90	B-6B 7'-9' 10/5/90	B-6C 15'-17' 10/5/90	B-6D Field Blank 10/5/90
Halogenated and Aromatic Volatile Organic Compounds - Method 8010/8020 (mg/kg)					
Chloroform	<0.0001	<0.0001	<0.0001	0.000208	0.0038
Tetrachloroethene	0.052	[redacted]	<0.0001	0.00039	<0.0001
1,1,1-Trichloroethane	<0.0002	0.0007a	<0.0002	<0.0002	<0.0002
Ethylbenzene	<0.0002	0.004	<0.0002	<0.0002	<0.0002
Toluene	<0.0002	0.006	<0.0002	<0.0002	0.00039
Total Xylenes	0.002	0.024	<0.0002	<0.0002	<0.0002

a <5 times detection limit.

B Detected in blank.

tlr-wp24
table.5-3.3

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

During the course of removing the Alodine Metal Finishing process equipment and the subsequent investigation described herein, tetrachloroethene was detected in concrete core samples and soil samples from and beneath the Alodine Room floor. Several other volatile organic compounds were also detected in the concrete core samples and the shallow soil samples (0' to 4' BGS) at levels below that detected for tetrachloroethene. The analytical data cited in the previous section clearly demonstrates a significant decrease in the concentration of tetrachloroethene and other volatile organic constituents with depth below the building floor. Volatile organic compounds other than tetrachloroethene were detected only in the samples collected from the shallowest interval (0' to 4' BGS). Tetrachlorethene was not detected above 0.003 milligrams per kilogram in any of the samples collected from the medium (7 to 14 feet BGS) or deep (16 to 18 BGS) intervals.

Unsaturated conditions in the near surface horizon and the permeable nature of materials encountered suggest that vertical percolation of recharging surface water would be the primary mechanism of hydraulic transport in the upper reaches of the unconsolidated deposits underlying the site. Existing hydrologic information from previous studies and local water supply well data indicate that ground water in the Greenlawn area occurs at approximately 170 to 180 feet BGS and in intermittent perched zones at approximately 90' BGS. Since the floor of the Alodine Room prevents surface water from carrying any volatile organics through the vadose zone and into the underlying vadose zone, and the operation which was the source of the release has been removed, further migration of the organic compounds is unlikely. Impacts to the perched ground water and the uppermost aquifer underlying the site are unlikely because of the depth of water (90' to 180') beneath the facility and because the mechanism of hydraulic transport is blocked by the Alodine Room floor.

6.2 Recommendations

Radian does not recommend any further investigation or remediation of the soils beneath the Alodine Room floor. This recommendation is supported by the following:

- The source of compounds detected in the soils has been removed;
- Levels of tetrachloroethene and other volatile organics detected decrease significantly with depth;
- The floor of the room should act as a barrier to the primary mechanism of hydraulic transport in the soils, preventing migration of the compounds detected in the shallow soils; and
- Ground water is unlikely to be impacted since the groundwater in the Greenlawn area is relatively deep in comparison to the location of the compounds detected in the soils.

Radian does recommend that the floor and the base of the walls of the Alodine Room be sealed with an impervious material to prevent any possible migration of organic vapors into the room and to insure that any liquids subsequently used in the room can not permeate the floor.

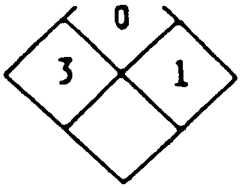
Appendix A

Alodine Metal Finishing Process
Material Safety Data Sheets

Aluminum Etchant 33

Parker+Amchem

HENKEL CORPORATION
32100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

PRODUCT TRADE NAME	ALUMINUM ETCHANT 33
DOT PROPER SHIPPING NAME	Corrosive Solid, NOI, UN1759
DOT HAZARD CLASSIFICATION	Corrosive
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER 1-517-263-9430

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
Sodium Hydroxide	1310-73-2	90-100	Corrosive	C 2 mg/M³ 2 mg/M³

This product contains a chemical subject to the reporting requirements of Section 313, Title III of SARA, Part 372.

2 PHYSICAL DATA

APPEARANCE	White powder		
SOLUBILITY IN WATER	Appreciable		
ODOR	None	pH of CONCENTRATE	Not applicable
SPECIFIC GRAVITY	Not applicable	BOILING POINT, °F.	Not applicable

OTHER: Not applicable

3 FIRE & EXPLOSION DATA

FLASH POINT: None
TEST METHOD: Not applicable
EXTINGUISHING MEDIA: As required to extinguish surrounding fire.
UNUSUAL FIRE OR EXPLOSION HAZARDS
None
SPECIAL FIRE FIGHTING PROCEDURES
None

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐

CONDITIONS TO AVOID

INCOMPATIBLE MATERIALS

Keep separate from acids.
Water added to this chemical may cause localized overheating and splattering.

HAZARDOUS POLYMERIZATION WILL OCCUR ☐
WILL NOT OCCUR ☒

CONDITIONS TO AVOID

Not applicable

HAZARDOUS DECOMPOSITION PRODUCTS

None

5 HEALTH HAZARD DATA

EYES: Contact with eyes will cause severe burn and possible blindness.

SKIN: Contact with skin or mucous membrane will cause severe burns and possible ulceration.

INGESTION: Can result in gastrointestinal damage; burns of the digestive tract.

INHALATION: Inhalation of dust can cause injury (burns) to the entire respiratory tract.

No component of this chemical is listed in the NTP Annual Report on Carcinogens, IARC Monographs or is regulated as a carcinogen by OSHA.

Medical Conditions Generally Aggravated by Exposure: Pre-existing eye, skin and respiratory disorders.

6 FIRST AID RECOMMENDATIONS

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air and remove contaminated clothing. If breathing is difficult, administer oxygen. If respiration stops, give mouth to mouth resuscitation. GET MEDICAL ATTENTION.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Wear protective clothing.
Sweep up or otherwise collect and store in suitable drum.

WASTE TREATMENT

Contact a licensed disposal agent.
Dispose of in compliance with all applicable federal, state and local regulations.
This chemical contains a chelating agent.

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION	Chemical goggles or face shield.
SKIN PROTECTION	Neoprene or polyvinyl gloves and appropriate protective clothing.
RESPIRATORY PROTECTION	MSHA/NIOSH dust filter mask or respirator if dusting occurs.
OTHER REQUIRED EQUIPMENT	Eye wash facility and emergency shower should be in close proximity.

9 SPECIAL PRECAUTIONS & STORAGE

DO NOT GET IN EYES, ON SKIN OR ON CLOTHING.

For industrial use only.

PREPARED BY Product Acceptance Office DATE 09/20/88

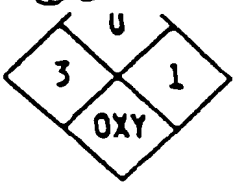
TITLE

65

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

Parker+Amc Alodine - 600

HENKEL CORPORATION
32100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

PRODUCT TRADE NAME	[redacted]
DOT PROPER SHIPPING NAME	Chromic acid mixture, dry, NA1463.
DOT HAZARD CLASSIFICATION	Oxidizer.
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER 1-517-263-9430

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
+Chromic Acid	1333-82-0	30-40	Carcinogen,	0.05mg/m³ as Cr
			NTP, IARC	0.5mg/m³ as Cr
			Oxidizer	
Sodium Fluoborate	13755-29-8	40-50	Irritant	2.5 mg/m³ as F
				2.5 mg/m³ as F
Potassium Fluozirconate	16923-95-8	10-15	Irritant	2.5 mg/m³ as F
				2.5 mg/m³ as F

This product contains a chemical (+) subject to the reporting requirements of Section 313, Title III of SARA, Part 372.

2 PHYSICAL DATA

APPEARANCE	Dark red powder		
SOLUBILITY IN WATER	Appreciable		
ODOR	None	pH of CONCENTRATE	N/A
SPECIFIC GRAVITY	N/A	BOILING POINT, °F.	N/A
OTHER:	N/A		

3 FIRE & EXPLOSION DATA

FLASH POINT: None.

TEST METHOD: Not applicable.

EXTINGUISHING MEDIA: Water.

UNUSUAL FIRE OR EXPLOSION HAZARDS

Violent reactions may occur with organic materials or reducing agents.

SPECIAL FIRE FIGHTING PROCEDURES

Wear positive pressure self-contained breathing apparatus and full protective clothing.

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐

CONDITIONS TO AVOID

Not applicable.

INCOMPATIBLE MATERIALS

Organic materials, reducing agents, alkaline materials.

HAZARDOUS POLYMERIZATION WILL OCCUR ☐

WILL NOT OCCUR ☒

CONDITIONS TO AVOID

Excessive heat.

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen fluoride

5 HEALTH HAZARD DATA

EYES: Eye contact may result in loss of vision with severe burns.

SKIN: Skin contact is corrosive to tissues.

INGESTION: Ingestion could result in tissue destruction of the digestive tract and severe irritation in the respiratory tract.

INHALATION: Inhalation of dust can be an irritant to the respiratory tract.

CHRONIC: Prolonged or repeated skin contact may cause "chrome sores". Long-term exposure can cause liver damage, kidney damage and dermatitis. Prolonged or repeated inhalation of mist may cause ulceration and performation of the nasal septum.

CHRONIC: Contains fluorides. Exposure to fluorides over years may cause fluorosis.

POSSIBLE CANCER HAZARD: There is laboratory evidence that aqueous sodium dichromate administered directly into the lung, at the highest tolerated dose, over the lifetime of rats, causes a significantly increased incidence of lung cancer. It is expected that if chromic acid was tested in the manner as aqueous sodium dichromate, it would give similar response. There is sufficient evidence for the carcinogenicity of chromium and certain chromium compounds both in humans and experimental animals.
Reference: NTP (National Toxicology Program), Annual Report on Carcinogens, 1983.
IARC (International Agency for Research on Cancer), Annual Report, 1982.

Medical Conditions Generally Aggravated by Exposure: Persons with a history of asthma, allergies or known sensitizations to chromic acid or chromates.

6 FIRST AID RECOMMENDATIONS

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air. If breathing is difficult, give oxygen. GET MEDICAL ATTENTION.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Transfer any excess to a clean polyethylene container. Treat the residue with a dilute solution of metabisulfate to reduce the chrome. Neutralize with lime to pH = 7-8.

WASTE TREATMENT

This chemical contains chromium compounds and fluoride compounds Waste treatment and neutralization may be required prior to discharge to a sewer.
This chemical is a hazardous waste as defined by EPA Hazardous Waste and Consolidated Permit Regulations (or consult equivalent state regulations).
Hazardous Waste Characteristic: Ignitability, Title 40, Code of Federal Regulations, 261.21, Hazardous Waste Number D001. (Contains an oxidizer.)
Dispose of in compliance with all applicable federal, state and local regulations.

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION	Chemical goggles or face shield.
SKIN PROTECTION	Neoprene or polyvinyl gloves and appropriate protective clothing.
RESPIRATORY PROTECTION	Use NIOSH-approved respirator as required to prevent overexposure.
OTHER REQUIRED EQUIPMENT	Eye wash facility and emergency shower should be in close proximity.

9 SPECIAL PRECAUTIONS & STORAGE

DO NOT GET IN EYES, ON SKIN OR ON CLOTHING.

For industrial use only.

Contact with combustible material may cause fire.

PREPARED BY Product Acceptance Office DATE 11/28/88

TITLE

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

(56) (9)

DU PONT

SUPPLIER: TRIDON CHEMICAL

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

Name
Nitric Acid, 38°, 40°, 42° Bé Tech and Reagent Grades

Synonyms
Weak Nitric Acid

Chemical Family
Inorganic Acid

CAS Name
Nitric Acid

CAS Registry No.
7697-37-2

I.D. Nos./Codes NIOSH Registry No: QU 57750
Wiswesser Code = HN-03

Chemical Formula: HNO_3 (in water)

Manufacturer/Distributor
E. I. Du Pont de Nemours & Co., (Inc.)

Product Information and Emergency Phone
(302) 774-2421

Address
Wilmington, DE 19898

Transportation Emergency Phone
(800) 424-9300

HAZARDOUS COMPONENTS

Material(s)	*Approximate %*
Nitric Acid 38°	56.5
40°	61.7
42°	64.4
Reagent	67.2
	70.4

PHYSICAL DATA

Boiling Point, 760 mm Hg
119-122°C (246-252°F)

Melting Point
-20° to -41°C (-4° to -42°F)

Specific Gravity
1.355-1.422 @ 15.6°C (60°F) (H_2O = 1)

Vapor Pressure
mm Hg @ 25°C (77°F) = 9-10; @ 37.7°C (100°F) = 19-20

Vapor Density
1 (Air = 1)

Solubility in H_2O
100%

% Volatiles by Vol.
100%

Evaporation Rate (Butyl Acetate = 1)
~1

Form	*Appearance*	*Color*	*Odor*
Liquid	Clear	Colorless to light brown	Acrid

pH Information
< 1

Octanol/Water Partition Coefficient

FIRE AND EXPLOSION DATA

Flash Point *Method*
Will not burn

Autoignition Temperature

Flammable Limits in Air, % by Vol. *Lower* *Upper*

Fire and Explosion Hazards Oxidizer. Nitric acid increases combustibility and can cause ignition of organic or oxidizable materials. Fire or spillage may produce extremely toxic nitrogen oxide gases. Reaction with many metals gives flammable/explosive hydrogen gas.

Extinguishing Media: For Fires in area, use water spray to cool nitric acid tanks or containers.

Special Fire Fighting Instructions Wear self-contained breathing apparatus and full acid protective clothing (see PROTECTION INFORMATION on back of page) where possibility of fumes or acid contact exists.

HAZARDOUS REACTIVITY

Instability
Releases toxic gases with heat.

Incompatibility Cyanides and sulfides. Reacts vigorously with organics (especially turpentine), oxidizable inorganics, metals (especially powders), and carbides.

Decomposition
Can occur, as above.

Polymerization
Will not occur.

HEALTH HAZARD INFORMATION

Exposure Limits
OSHA 8-hour Time Weighted Average (TWA) Nitric Acid = 2 ppm, 5 mg/m^3; ceiling (nitrogen dioxide) = 5 ppm, 9 mg/m^3; ACGIH TLV® - 2 ppm, 5 mg/m^3 (Nitric Acid).

Routes of Exposure and Effects
Liquid and vapor cause severe burns.
Harmful if inhaled. May cause delayed lung injury.
Toxic oxides of nitrogen and other dangerous gases may be released when nitric acid is used.

First Aid

SEE ATTACHED.

PROTECTION INFORMATION

Ventilation Use only with ventilation adequate to maintain air concentration below exposure limit. Keep in well ventilated room.

Personal Protective Equipment Coverall chemical safety glasses, rubber gloves and footwear. If potential for major exposure, wear full protective clothing including rubber acid suit, hard hat and air-supplied respirator.

DISPOSAL PROCEDURES

Aquatic Toxicity
TLm 96 = 100-10 ppm.

Spill, Leak or Release Keep upwind of leak; evacuate until gas has dispersed. Dike major spills. Neutralize with lime or soda ash. Flush spill area with plenty of water to wastewater treatment system. Do not flush concentrated acid into sewers.

Waste Disposal: Dispose of in accordance with Federal, State & local regulations. If approved, drain neutralized or dilute acid to sewer to waste tratment plant.

SHIPPING PRECAUTIONS

Transportation DOT Shipping Name - Nitric Acid (over 40%). DOT Hazard Class = oxidizer. STC Code 49 185 28. UN No. 2031. IMCO Class 8.

Shipping Containers
Railroad tank cars, tank trucks.

Storage Conditions

SEE ATTACHED.

REFERENCES AND ADDITIONAL INFORMATION

Do not breathe vapor.
Do not get in eyes, on skin or clothing.
Wash thoroughly after handling.
For more information refer to: Du Pont Nitric Acid Storage & Handling Bulletin
Du Pont Nitric Acid Data Sheet

DATE: 2/80

DUPONT

NITRIC ACID, 38°, 40°, 42° & REAGENT MSDS ATTACHMENT

HEALTH HAZARD INFORMATION

First Aid

In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse.

If inhaled, remove person to fresh air immediately. Have patient lie down and keep quiet. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.

If swallowed, call a physician. Do not induce vomiting. Give large quantities of water containing any of the following: Milk of Magnesia, milk, magnesium oxide, whites of eggs, or olive oil. Avoid carbonates. Never give anything by mouth to an unconscious person.

SHIPPING PRECAUTIONS

Storage Conditions

Keep container closed. Keep out of sun and away from heat. Keep away from fire, sparks and flame. Loosen closures carefully. Never use pressure to empty. Container must not be washed out or used for other purposes. Do not store near cyanides, sulfides, organics, metal powders, carbides, or other readily oxidizable materials.

DATE: 2/80

Sulfuric - Acid

General Chemical

PRODUCT SAFETY DATA SHEET

SULFURIC ACID

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)	☒ C.A.S. NO. ☐ GENERAL PRODUCT CODE #
SULFURIC ACID	7664-93-9

CHEMICAL NAME AND/OR SYNONYM

SULFURIC ACID Synonym: battery acid

FORMULA	MOLECULAR WEIGHT
H_2SO_4 (Various Concentrations) in water	98.08

ADDRESS (No., STREET, CITY, STATE AND ZIP CODE)

GENERAL CHEMICAL CORPORATION
90 East Halsey Road
Parsippany, N.J. 07054

CONTACT	PHONE NUMBER	LAST ISSUE DATE	CURRENT ISSUE DATE
Manager of Product Safety	(201) 515-1840	October, 1987	July, 1989

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER
(800) 631-8050

SKIN OR EYES: Immediately flush with plenty of water continuing for at least 15 minutes. Remove contaminated clothing while washing. Continue flushing with water if medical attention is not immediately available.

INGESTION: Do not induce vomiting. If conscious, give several glasses of milk (preferred) or water.

INHALATION: Remove to fresh air. Observe for possible delayed reaction. If breathing has stopped, give artificial respiration. If breathing with difficulty, give oxygen, provided a qualified operator is available.

GET IMMEDIATE MEDICAL ASSISTANCE for ingestion, inhalation, eye contact, irritation, or burns.

C. HAZARDS INFORMATION

HEALTH

INHALATION

Inhalation of fumes or acid mist can cause irritation or corrosive burns to the upper respiratory system, including nose, mouth, and throat. Lung irritation and pulmonary edema can also occur. LC_{50} (mist, animals): 20-60 mg/cu.m. – Ref. (a).

INGESTION

Can cause irritation and corrosive burns to mouth, throat, and stomach. Can be fatal if swallowed. Applicable to dilute solutions: LD_{50} (rat): 2140 mg/kg – Reference (b).

SKIN

Can cause severe burns.

EYES

Liquid contact can cause irritation, corneal burns, and conjunctivitis. Blindness may result, or severe or permanent injury. Mist contact may irritate or burn. Reference (b).

PERMISSIBLE CONCENTRATION: AIR (SEE SECTION 4)	BIOLOGICAL
1 mg/m³ (as H_2SO_4) (OSHA) IDLH 80 mg/m³ TLV: same (ACGIH)	None.

UNUSUAL CHRONIC TOXICITY

(1) Erosion of teeth, (2) lesions of the skin, (3) tracheo-bronchitis, (4) mouth inflammation, (5) conjunctivitis, (6) gastritis. – Reference (a).

C. HAZARDS (Cont.)

FIRE AND EXPLOSION

FLASH POINT	AUTO IGNITION TEMPERATURE	FLAMMABLE LIMITS IN AIR (% BY VOL.)
°C Not flammable ☐ OPEN CUP ☐ CLOSED CUP	°C Not applicable	LOWER - Not applicable UPPER - Not applicable

UNUSUAL FIRE AND EXPLOSION HAZARDS

Flammable and potentially explosive hydrogen gas can be generated inside metal drums and storage tanks. Concentrated sulfuric acid can ignite combustible materials on contact.

D. PRECAUTIONS PROCEDURES

FIRE EXTINGUISHING AGENTS RECOMMENDED

If involved in a fire, use water spray; avoid spraying water into containers. If only a small amount of combustibles is present, smother fire with dry chemical.

FIRE EXTINGUISHING AGENTS TO AVOID

Use water spray or other suitable agent for fires adjacent to non-leaking tanks or other containers of sulfuric acid.

SPECIAL FIRE FIGHTING PRECAUTIONS

Do not use solid water streams near ruptured tanks or spills of sulfuric acid. Acid reacts violently with water and can spatter acid onto personnel.

VENTILATION

Sufficient to reduce vapor and acid mists to permissible levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems. Corrosion-proof construction recommended. Closed ventilation systems (e.g. vapor hoods) are frequently used in the electronics industry.

NORMAL HANDLING

Do not get in eyes, on skin, on clothing. Do not breathe vapor or mist. Use protective equipment outlined in Section E. Procedures are detailed in references listed in Section J. Do not add water to acid. When diluting, always add acid to water cautiously and with agitation. Use only with adequate ventilation.

STORAGE

Protect from physical damage. Store in cool, well-ventilated area away from combustibles and reactive chemicals. Keep out of sun and away from heat. Keep containers upright. No smoking in storage area.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT - SECTION E)

Dilute small spills or leaks cautiously with plenty of water. Neutralize residue with alkali such as soda ash or lime. Adequate ventilation is required for soda ash due to release of CO_2 gas. (See Section I for disposal methods). No smoking in spill area. Major spills must be handled by a predetermined plan. Diking with soda ash is recommended. Consult References, Section J. Attempt to keep out of sewer. Any release to the environment of these products may be subject to Federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

SIGNAL WORD - DANGER!

Loosen closures carefully. For carrying glass bottles, use rubber protective enclosures.
If stored in metal containers, vapors can contain explosive hydrogen gas.

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION

SEE PAGE 5.

EYES AND FACE

SEE PAGE 5.

HANDS, ARMS, AND BODY

SEE PAGE 5.

OTHER CLOTHING AND EQUIPMENT

SEE PAGE 5.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS):	APPEARANCE AND ODOR	
☒ LIQUID ☐ SOLID ☐ GAS ☐ _____	Oily, colorless to slightly yellow, clear to turbid liquid. Odorless.	
BOILING POINT Approx. 310 °C For 94% MELTING POINT Approx. -27 °C	SPECIFIC GRAVITY (H2O = 1) (liquid) 1.842	VAPOR DENSITY (AIR = 1) Not applicable
SOLUBILITY IN WATER (% by Weight) Complete	pH 1% solution: pH = 0.9	VAPOR PRESSURE (mm Hg at 20°C) ☒ (Pa) ☐ < 0.001
EVAPORATION RATE (Butyl Acetate = 1) ☐ (Ether = 1) ☐ Not applicable	% VOLATILES BY VOLUME (At 20°C) Not applicable	

G. REACTIVITY DATA

STABILITY	CONDITIONS TO AVOID
☐ UNSTABLE ☒ STABLE	Temperatures of 300 deg. C or higher: yields sulfur trioxide gas, which is toxic, corrosive, and an oxidizer.

INCOMPATIBILITY (MATERIALS TO AVOID)

Nitro compounds, carbides, dienes, alcohols (when heated): cause explosions -- Refs. (g,h). Oxidizing agents, such as chlorates and permanganates: cause fires and possibly explosions. Allyl compounds and aldehydes: undergo polymerization, possibly violent -- Ref. (g). (continued, Section K).

HAZARDOUS DECOMPOSITION PRODUCTS

Sulfur trioxide gas: see above. Also this is a fire risk if in contact with organic materials.

HAZARDOUS POLYMERIZATION	CONDITIONS TO AVOID
☐ MAY OCCUR ☒ WILL NOT OCCUR	NA

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
NOT APPLICABLE		

I. ENVIRONMENTAL

BIODEGRADABILITY/AQUATIC TOXICITY

Aquatic Toxicity:
24.5 ppm/24 hr./bluegill/lethal/fresh water
42.5 ppm/48 hr./prawn/LC_{50}/salt water

OCTANOL/WATER PARTITION COEFFICIENT: ND

EPA HAZARDOUS SUBSTANCES (CLEAN WATER ACT SEC. 311) ☒ YES ☐ NO — IF SO REPORTABLE QUANTITY: 1000 # (100% H_2SO_4 basis) — 40 CFR 116-117

WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)

Treatment or disposal of waste generated by use of this product should be reviewed in terms of applicable federal, state and local laws and regulations. Users are advised to consult with appropriate regulatory agencies before discarge, treatment or disposal.

RCRA STATUS OF UNUSED MATERIAL IF DISCARDED: EPA Hazardous Waste

HAZARDOUS WASTE NUMBER: (IF APPLICABLE) No. D0002 (corrosive) — 40 CFR 261.22

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES

(1) OSHA standard at 29 CFR 1910.1000 (1989).
(2) TLV from the ACGIH 1988-89 list, "Threshold Limit Values for Chemical Substances...". Am. Conf. of Governmental Industrial Hygienists, Cincinnati 45202.

REGULATORY STANDARDS

D.O.T. CLASSIFICATION: Corrosive material — 49 CFR 173

D.O.T. Hazardous Materials Table 49 CFR 172.101

DOT ID Number: UN 1830.

GENERAL

(a) Documentation of the Threshold Limit Values, 4th Edition, 1981, Am. Conf. of Governmental Hygienists, Cincinnati 45202.
(b) NIOSH, Registry of Toxic Effects of Chemical Substances, 1982-83, Accession #WS 556 00 000, PB81-154478, Nat. Tech. Info. Service, Springfield, VA 22161.
(c) "Criteria for a Recommended Standard...Occupational Exposure to Sulfuric Acid", NIOSH U.S. Dept. of HHS, 1974, PB233096, Nat. Tech. Info. Service, Springfield, VA 22161.

K. ADDITIONAL INFORMATION

J. REFERENCES -- General (continued)

(d) NIOSH/OSHA, "Pocket Guide to Chemical Hazards...", September, 1985.
(e) "NIOSH/OSHA -- Occupational Health Guidelines for Chemical Hazards -- Sulfuric Acid", 1978.
(f) Allied Chemical Technical Service Report for storage and handling procedures.
(g) NFPA Manual 491M, "Manual of Hazardous Chemical Reactions, 1987 Nat. Fire Protection Assoc., Boston 02210.
(h) Bretherick, L., Handbook of Reactive Chemical Hazards, 3rd Ed., 1985 Butterworths, Boston.

Q. REACTIVITY DATA -- Incompatibility (continued)

Alkalis, amines, water, hydrated salts, carboxylic acid anhydrides, nitriles, olefinic organics, glycols, aqueous acids: cause strong exothermic reactions. -- Refs. (g, h). Carbonates, cyanides, sulfides, sulfites, metals such as copper: yield toxic gases. -- Refs. (h). Also for metals, see hydrogen generation, Section C.

PROD FILE NO. - 00-3008

SECTION E PROTECTIVE EQUIPMENT

1. HEAVY HANDLING

Respiratory Protection

Where required, use a respirator approved by NIOSH for sulfuric acid. If misting above 1 mg H_2SO_4/ wear: (a) gas mask with acid gas canister and also with high-efficiency particulate filter; (b) High-efficiency particulate respirator; (c) other choices, Reference (d).

Eyes and Face

As a minimum, wear hat, chemical safety goggles, and optionally full-face plastic shield. Do not wear contact lenses.

Hands, Arms, and Body

As a minimum, wear acid-resistant* apron, protective clothing, boots, and gloves for routine product use. For increased protection, include acid-resistant trousers and jacket.

2. SPECIALIZED HANDLING
(only applicable when using the closed ventilation system mentioned on p. 2):

Respiratory Protection

Generally not required. For emergency, e.g. a misting situation, use a respirator approved by NIOSH for sulfuric acid. See this page, under "1. HEAVY HANDLING – Respiratory Protection".

Eyes and Face

As a minimum, safety glasses with nonperforated sideshields. Add a face shield if pouring liquid. For leak or spill or other emergency, use chemical safety goggles and optionally, full face shield. Do not wear contact lenses.

Hands, Arms, and Body

As a minimum, wear acid-resistant apron and gloves*. For leak or spill or other emergency, use full protective clothing (see this page under "1. HEAVY HANDLING – Hands, Arms, and Body)".

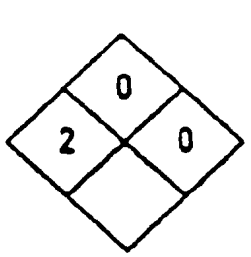
Other Clothing and Equipment

Eyewash and quick-drench shower facilities.
Neutralization supplies and equipment.

*Preferably rubber.

Parker+Amchem

HENKEL CORPORATION
32100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

PRODUCT TRADE NAME	RIDOLINE 53
DOT PROPER SHIPPING NAME	Not DOT Regulated
DOT HAZARD CLASSIFICATION	None
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER 1-517-263-9430

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
Tetrasodium Pyrophosphate	7722-88-5	10-30	Irritant	5 mg/m³ 5 mg/m³
Sodium Metasilicate	6834-92-0	40-70	Irritant	None

2 PHYSICAL DATA

APPEARANCE	White powder		
SOLUBILITY IN WATER	Appreciable		
ODOR	Bland	pH of CONCENTRATE	Not applicable
SPECIFIC GRAVITY	Not applicable	BOILING POINT, °F.	Not applicable

OTHER: None

3 FIRE & EXPLOSION DATA

FLASH POINT: None

TEST METHOD: Not applicable

EXTINGUISHING MEDIA: As required to extinguish surrounding fire.

UNUSUAL FIRE OR EXPLOSION HAZARDS

None

SPECIAL FIRE FIGHTING PROCEDURES

Wear positive pressure self-contained breathing apparatus and full protective clothing.

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐

CONDITIONS TO AVOID

Not applicable

INCOMPATIBLE MATERIALS

Keep separate from acids.

HAZARDOUS POLYMERIZATION WILL OCCUR ☐

WILL NOT OCCUR ☒

CONDITIONS TO AVOID

Not applicable

HAZARDOUS DECOMPOSITION PRODUCTS

None

5 HEALTH HAZARD DATA

EYES: Contact with eyes can cause burn and eye damage.

SKIN: Contact with skin can cause irritation. May cause dermatitis.

INHALATION: Inhalation of dust can be an irritant to the respiratory tract. Severe exposure may result in lung tissue damage.

INGESTION: Can result in gastrointestinal damage; burns of the digestive tract.

Medical Conditions Generally Aggravated by Exposure: None known.

No component of this chemical is listed in the NTP Annual Report on Carcinogens, IARC Monographs or is regulated as a carcinogen by OSHA.

6 FIRST AID RECOMMENDATIONS

EYES: Immediately flush eyes in a directed stream of water for at least 15 minutes while forcibly holding eyelids apart to ensure complete irrigation of all eye and lid tissue. GET MEDICAL ATTENTION.

SKIN: Immediately remove contaminated clothing and shoes. Flush skin thoroughly with water for at least 15 minutes. Rinse clothing. If irritation persists, GET MEDICAL ATTENTION.

INGESTION: Drink large quantities of water. CORROSIVE. DO NOT INDUCE VOMITING. If vomiting occurs, drink more water. GET MEDICAL ATTENTION. Never give anything by mouth to an unconscious person.

INHALATION: Remove to fresh air and remove contaminated clothing. If breathing is difficult, administer oxygen. If respiration stops, give mouth to mouth resuscitation. GET MEDICAL ATTENTION.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Wear respiratory protection.
Wear protective clothing.
Sweep up or otherwise collect and store in suitable drum.

WASTE TREATMENT

Contact a licensed disposal agent.
Dispose of in compliance with all applicable federal, state and local regulations.
This chemical contains phosphates. Waste treatment and neutralization may be required prior to discharge to a sewer. Waste Treatment Information Bulletin No. 1007 (Available on request.)

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION	Chemical goggles or face shield.
SKIN PROTECTION	Neoprene or polyvinyl gloves and appropriate protectiv clothing.
RESPIRATORY PROTECTION	MSHA/NIOSH dust filter mask or respirator if dusting occurs.
OTHER REQUIRED EQUIPMENT	Eye wash facility and emergency shower should be in close proximity.

9 SPECIAL PRECAUTIONS & STORAGE

AVOID CONTACT WITH SKIN, EYES AND CLOTHING.

DO NOT BREATHE DUST.

For industrial use only.

Wash thoroughly after handling.

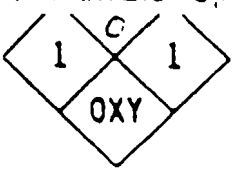
PREPARED BY Product Acceptance Office DATE 08/10/89

TITLE

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

Parker+Am Deoxidizer 7 Make-up

HENKEL CORPORATION
32100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

PRODUCT TRADE NAME	DEOXIDIZER 7 MAKE-UP
DOT PROPER SHIPPING NAME	Oxidizer N.O.S.
DOT HAZARD CLASSIFICATION	Oxidizer
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER (517) 263-9430

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
Potassium Dichromate	7778-50-9	70-80	Carcinogen, NTP; Irritant	N/A
Potassium Nitrate	7757-79-1	15-20	Oxidizer	N/A
Sodium Bifluoride	1333-83-1	5-10	Corrosive	N/A

2 PHYSICAL DATA

APPEARANCE	Orange powder		
SOLUBILITY IN WATER	Appreciable		
ODOR	Slight acidic	pH of CONCENTRATE	N/A
SPECIFIC GRAVITY	N/A	BOILING POINT, °F.	N/A
OTHER:	N/A		

THIS [illegible] CHEMICAL(S)
[illegible] REQUIREMENTS OF
SECTION 302, TITLE III OF SARA, PART 372.

234349

3 FIRE & EXPLOSION DATA

FLASH POINT: None
TEST METHOD: N/A
EXTINGUISHING MEDIA: Water
UNUSUAL FIRE OR EXPLOSION HAZARDS
Do not allow to come in contact with organic materials or reducing agents.
SPECIAL FIRE FIGHTING PROCEDURES
None

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐
CONDITIONS TO AVOID

INCOMPATIBLE MATERIALS
Organic materials, strong reducing agents
HAZARDOUS POLYMERIZATION WILL OCCUR ☐
WILL NOT OCCUR ☒
CONDITIONS TO AVOID

HAZARDOUS DECOMPOSITION PRODUCTS
Hydrogen fluoride

5 HEALTH HAZARD DATA

Skin: Will irritate and burn.
Eyes: Will irritate and burn.
Ingestion: Will irritate and burn mucous membranes.
Inhalation: Corrosive action on mucous membranes.

6 FIRST AID RECOMMENDATIONS

SKIN: Wash with soap and water and rinse thoroughly.

EYES: Flush immediately with copious amounts of water for at least 15 minutes. Call a doctor.

INGESTION: Dilute by drinking several glasses of water or milk. Call a doctor. Do not induce vomiting unless directed by a doctor.

INHALATION: Remove from contaminated area to fresh air. Any exposed person with any respiratory difficulty such as coughing, chest pain, breathing difficulty, dizziness, fatigue, etc., should be examined by a doctor and the doctor made aware of what materials the individual was exposed to.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Transfer any excess to a clean polyethylene container. Treat remaining residue with a dilute solution of sodium metabisulfite to reduce chrome. Neutralize with lime to pH 7-8.

WASTE TREATMENT

Flush reduced and neutralized material to treatment plant with plenty of water and with approval of regulatory agency.

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION	Safety goggles
SKIN PROTECTION	Rubber gloves and safety face shield
RESPIRATORY PROTECTION	Dust mask - NIOSH approved
OTHER REQUIRED EQUIPMENT	None

9 SPECIAL PRECAUTIONS & STORAGE

Store in a dry place away from organic materials and reducing agents.

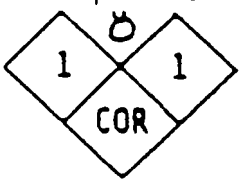
PREPARED BY DATE 10/23/86

TITLE

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

Parker+Am Deoxidizer 17 Replenisher

HENKEL CORPORATION
32100 Stephenson Highway
Madison Heights, Michigan 48071



MATERIAL SAFETY DATA SHEET

CUSTOMER #

PRODUCT TRADE NAME	DEOXIDIZER 17 REPLENISHER
DOT PROPER SHIPPING NAME	Corrosive Solid N.O.S.
DOT HAZARD CLASSIFICATION	Corrosive
TECHNICAL CONTACT (NAME)	Product Acceptance Office
TELEPHONE NUMBER	(313) 583-9300 EMERGENCY NUMBER (517) 263-9430

1 HAZARDOUS INGREDIENTS

MATERIAL	CAS NO.	CONTENTS (% WT/WT)	HAZARD	TLV/PEL
Potassium Dichromate	7778-50-9	70-80	Carcinogen, NTP; Irritant	N/A
Sodium Bifluoride	1333-83-1	20-30	Corrosive	N/A
Potassium Ferricyanide	13746-66-2	2-4	Irritant	N/A

2 PHYSICAL DATA

APPEARANCE	Red powder		
SOLUBILITY IN WATER	Appreciable		
ODOR	None	pH of CONCENTRATE	N/A
SPECIFIC GRAVITY	N/A	BOILING POINT, °F.	N/A
OTHER:	N/A		

THIS PRODUCT CONTAINS TOXIC CHEMICAL(S)
SUBJECT TO THE REQUIREMENTS OF
SECTION 313 OF TITLE III OF SARA PART 372.

3 FIRE & EXPLOSION DATA

FLASH POINT: None

TEST METHOD: N/A

EXTINGUISHING MEDIA: Water

UNUSUAL FIRE OR EXPLOSION HAZARDS

Do not allow to come in contact with organic materials or reducing agents.

SPECIAL FIRE FIGHTING PROCEDURES

None

4 REACTIVITY DATA

STABLE ☒ UNSTABLE ☐

CONDITIONS TO AVOID

INCOMPATIBLE MATERIALS

Organic materials, reducing agents. Addition of acids to this material can generate toxic hydrogen cyanide fumes.

HAZARDOUS POLYMERIZATION WILL OCCUR ☐

WILL NOT OCCUR ☒

CONDITIONS TO AVOID

HAZARDOUS DECOMPOSITION PRODUCTS

Hydrogen cyanide

5 HEALTH HAZARD DATA

Skin:	Will irritate and burn.
Eyes:	Will irritate and burn.
Ingestion:	Will burn mucous membranes.
Inhalation:	Corrosive action on mucous membranes.

6 FIRST AID RECOMMENDATIONS

SKIN: Wash with soap and water and rinse thoroughly.

EYES: Flush immediately with copious amounts of water for at least 15 minutes. Call a doctor.

INGESTION: Dilute by drinking several glasses of water or milk. Call a doctor. Do not induce vomiting unless directed by a doctor.

INHALATION: Remove from contaminated area to fresh air. Any exposed person with any respiratory difficulty such as coughing, chest pain, breathing difficulty, dizziness, fatigue, etc., should be examined by a doctor and the doctor made aware of what materials the individual was exposed to.

7 SPILL PROCEDURES & WASTE DISPOSAL

SPILL PROCEDURES

Transfer any excess to a clean polyethylene container. Treat remaining residue with a dilute solution of sodium metabisulfite to reduce chrome. Neutralize with lime to pH 7-8.

WASTE TREATMENT

Flush reduced and neutralized material to treatment plant with plenty of water and with approval of regulatory agency.

8 PERSONAL PROTECTION

VENTILATION REQUIREMENTS	GENERAL AREA EXHAUST	☐
	LOCAL EXHAUST	☒
	NO EXHAUST NECESSARY	☐

PERSONAL PROTECTIVE EQUIPMENT

EYE PROTECTION	Safety goggles
SKIN PROTECTION	Rubber gloves and rubber apron
RESPIRATORY PROTECTION	Dust mask - NIOSH approved
OTHER REQUIRED EQUIPMENT	None

9 SPECIAL PRECAUTIONS & STORAGE

Store in a cool dry place away from organic materials and reducing agents.

PREPARED BY DATE 10/23/86

TITLE

CHEMICAL EMERGENCY TELEPHONE 1-800-424-9300

PENETONE CORPORATION
A Subsidiary of West Chemical Products, Inc.

74 HUDSON AVENUE, TENAFLY, NJ 07670
EMERGENCY TEL. NO. (201) 567-3000

(#4)

MATERIAL SAFETY DATA SHEET

(Confidential Formula — in confidence, not to be disclosed to other than ... and other regulatory agencies).

DATE February 2, 1986 204

SECTION I. PRODUCT IDENTIFICATION

TRADE NAME	POWER CLEANER 155
FORMULA	Phosphates, aryl sulfonate, chelate (EDTA type) alkyl aryl polyether, phosphate ester, silicates, water
CHEMICAL FAMILY	Liquid Detergent

SECTION II. HAZARDOUS INGREDIENTS

COMPONENT OR MATERIAL CHEMICAL NAMES	CAS NO.	%	TLV (Units)
None			

Seco 22

SECTION III. PHYSICAL DATA

BOILING POINT (°F): Approximately 212	VAPOR PRESSURE: Not applicable
EVAPORATION RATE (ETHER = 1): Equal to water	VAPOR DENSITY: Not applicable
SOLUBILITY IN H_2O, % by wt @ 20°C (68°F): Complete	% VOLATILES IN VOLUME: Negligible
SPECIFIC GRAVITY (H_2O = 1 @ 75°F): 1.170	pH: (as received) 12.0
APPEARANCE & ODOR: Clear liquid; virtually odorless	

SECTION IV. FIRE AND EXPLOSION DATA

FLASH POINT (Method Used)	FLAMMABLE EXPLOSIVE LIMITS	UPPER	LOWER
None	NOT APPLICABLE		

EXTINGUISHING MEDIA
Not applicable

SPECIAL FIRE FIGHTING PROCEDURES
None

UNUSUAL FIRE & EXPLOSION HAZARDS
None Known

SECTION V. EMERGENCY AND FIRST AID PROCEDURES

EYES	Flush with water for 15 minutes. If burns or irritation develop, consult physician.
SKIN	Flush with water for 15 minutes. If burns or irritation develop, consult physician.
INHALATION	Remove to fresh air.
INGESTION	Dilute and neutralize stomach contents with citrus juices or vinegar.

SECTION VI. HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE

Not applicable

EFFECTS OF OVEREXPOSURE:
INHALATION

Not applicable

SKIN

Dryness or irritation to skin may occur on prolonged contact.

EYES

Will cause irritation and possibly burns on contact in y.

CHRONIC OVEREXPOSURE EFFECTS

Not ascertained.

SECTION VII. REACTIVITY DATA

CONDITIONS CONTRIBUTING TO INSTABILITY

Product is stable

INCOMPATIBILITY

Strong acids.

HAZARDOUS DECOMPOSITION PRODUCTS

None known.

CONDITIONS CONTRIBUTING TO POLYMERIZATION

Will not occur.

SECTION VIII. SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED

Flush away with water or use absorbents

NEUTRALIZING CHEMICALS

Weak acids (eg. diluted vinegar)

WASTE DISPOSAL METHOD

Dispose of in accordance with local, state and Federal EPA regulations.

SECTION IX. VENTILATION AND PERSONAL PROTECTIVE EQUIPMENT

VENTILATION REQUIREMENTS

Not required.

SPECIAL PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY

None needed under normal use conditions.

EYE

Splash proof goggles if splashing is anticipated.

GLOVES

Rubber

OTHER CLOTHING & EQUIPMENT

Rubber apron, boots, eye wash and shower station.

SECTION X. SPECIAL PRECAUTIONS HANDLING STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING & STORAGE

Protect from freezing. If product does freeze, thaw and roll drum (container); product will revert to normal consistency.

D.O.T. SHIPPING CLASSIFICATION

Liquid cleaning compound, N.O.S.

Appendix B

Soil Boring Logs

FIELD LOG OF HOLLOW STEM AUGER DRILLING

Boring or Well No.: B-1 Project Name: Greenlawn Alodine Room
Location: Inside degreaser berm Date: Start October 3, 1990
Logged By: Mia T. Rothwarf Date: End October 3, 1990
Rig Type and Drilling Co.: Diedrich D-25, East Coast Drilling Project No.: 215-018-42-30

Depth (ft)	Sample Interval and Type	Blow Counts	Lithologic Description	Comments
0	0-1'		Concrete with large quartz aggregate	Contact at .5
1	1-3'	7/8-8/8	Brown, clayey silt with 20% gravels, grades down to 40% gravels. Gravels consist of subrounded quartz and glacial till .4 cm to 3 cm. Dry.	
2				
3	3-5'	31/47-53/45	Light brown, fine-to-medium sands and silt grades to pure, fine-to-medium sands with 30% gravels .5 cm to 3 cm in split spoon and large 5 cm to 10 cm cobbles in drill cuttings. Dry. Cobbles and gravels composed of quartz and glacial till.	Contact at 3'
4				
5	5-7'	17/25-30/42		
6				
7	7-9'	69/58-57/51	Brown, silty, fine-to-medium sand with 30% glacial and quartz gravels	Contact at 7'
8			White (fine-to-coarse) sand with layers of quartz gravel, .5-3 cm.	Contact at 7.6'
9	9-10'	27/44	Cobble of Mica schist	Contact at 8.8'
10	10-12'		White sand alternating with brown, silty sand and 30% gravels, dry.	Contact at ≈ 9'
11			Matrix of white, fine-to-coarse sand with 30% gravel of quartz and glacial till, .5-15 cm Dry gravels become larger with depth to .5 to 3 cm.	Contact at 9.4'
12	12-14'			
13				
14	14-16'			
15	15-18'			
16				
17				
18			Bottom of hole at 18'	

FIELD LOG OF HOLLOW STEM AUGER DRILLING

Boring or Well No.: B-2 Project Name: Greenlawn Alodine Room
Location: Inside degreaser berm Date: Start October 4, 1990
Logged By: Mia T. Rothwarf Date: End
Rig Type and Drilling Co.: Diedrich D-25, East Coast Drilling Project No.: 215-018-42-30

Depth (ft)	Sampling Interval	Blow Counts	Lithologic Description	Comments
0	0-.5		Concrete	Contact at .2'
-	.5-2.5	7/7-7/8	Dark brown, clayey silt with 10% gravels, angular quarts. .4 cm -1 cm. Moist.	
1				
-				
2				
-	2.5-4.5	36/34-37/42	Grades from brown, silty sand to fine-coarse, pure white sand with 20% large cobbles, 3 cm to 6 cm, and 20% smaller gravels, .5 cm to 3 cm. Composed of quarts subrounded, dry.	Contact at 2'
3				
-				
4				
-				
5	5-7	15/17-25/26	Grades to a brown, fine-to-medium sand with 45% gravels, .5 cm to 4 cm in size, quarts and glacial till subrounded to subangular.	Contact at 5'
-				
7	7-9	53/61-67/71		
-				
9	9-10	28/35		
10	10-12	26/38-33/27		
-			Orange, fine to medium sand, dry.	Contact at 10.6'
12	12-14	35/21-22/25	Brown, fine-to-medium sand with 45% gravels, .5 cm to 6 cm in size, quarts and glacial till subrounded to subangular. Dry.	Contact at 10.8'
-				
14	14-16	19/21-26/21		
-				
-				
16	16-18	29/31-34/37		
-				
18				
			Bottom of hole at 18'	

FIELD LOG OF HOLLOW STEM AUGER DRILLING

Boring or Well No.: B-3 Project Name: Greenlawn Alodine Room
Location: Near boring ARH Date: Start
Logged By: Mia T. Rothwarf Date: End
Rig Type and Drilling Co.: Diedrich D-25, East Coast Drilling Project No.: 215-018-42-30

Depth (ft)	Sample Interval and Type	Blow Counts	Lithologic Description	Comments
0			Concrete	Contact at 0.45'
1	1-3'	27/21 28/35	1/8" layer Epoxy Concrete with large quarts pebbles Clayey, brown silt with angular glacial gravels 40%. Wet (from water used to bore through concrete)	Contact at 1'
2				
3	3-5'	42/40/47/42	Medium-to-coarse sand with 1 cm gravel quarts, subangular. 30% gravel. Granite gravel cobble 3"	Contact at 2.7' Contact at 3'
4			Clayey silty, medium sand and 5% glacial subangular gravel, moist	Contact at 3.3'
5	5-7'	23/31/38/41		
6				Contact at 6'
7	7-9'	43/51/63/52	Dry, fine and medium, white sands with 40% subrounded gravel, .3 cm - 5 cm 5% large quarts gravel 3 cm. Dry.	Contact at 7'
8			Clayey silt, with 30% medium sands and 5% glacial gravel. Dry.	Contact at 8'
9	9-10'	27/48	Dry, fine, white sand with 40% fine gravel quarts, subrounded .3 cm to .5 cm, grades be 50% and to contain larger gravel, .5 mm to 3 cm of quarts and mixed glacial origins, subrounded to angular. Dry.	
10	10-12'	11/20/26/331		
12	12-14'	39/40/36/38		
14	14-16'	75/17/18/21		
16	16-18'	29/37/39/41		Contact at 15.5'
18			Clean, medium-to-fine, white sand, no gravels, dry. Bottom of hole 18'	

FIELD LOG OF HOLLOW STEM AUGER DRILLING

Boring or Well No.: B-4 Project Name: Greenlawn Alodine Room
Location: Near entrance to Alodine room Date: Start October 4, 1990
Logged By: Mia T. Rothwarf Date: End
Rig Type and Drilling Co.: Diedrich D-25, East Coast Drilling Project No.: 215-018-42-30

Depth (ft)	Sampling Interval	Blow Counts	Lithologic Description	Comments
0			Concrete	Contact at .3'
-	.5-2.5	7/8/7/8	Dense, moist, clayey silt with 25% gravel; quarts subrounded. Dry.	
1				
-				
2				Contact at 2.3'
-	2.5-4.5	26/37/38/41	Dark, clayey silt matrix with brown-to-white sand, fine-to-coarse with cobbles, 5 cm to 8 cm, composing 10% and 30% gravels, .5 cm - 3 cm subrounded glacial tills. Dry.	
3				
-				
4				
-				
5	5-7	21/36/39/41		Contact at 5'
-			Brown-to-white sands, fine-to-coarse with 30% gravels, . 5 cm to 3 cm. Dry.	
7	7-9	47/59/81/87		
-				
8				
-				
9				
-				
10				
-				
-				
-				
15	15-17	12/15/17/17		
-				
17				
-				
18			Bottom of hole at 18'	

FIELD LOG OF HOLLOW STEM AUGER DRILLING

Boring or Well No.: B-5 Project Name: Greenlawn Alodine Room
Location: Near north corner of Alodine room Date: Start October 1, 1990
Logged By: Mia T. Rothwarf Date: End
Rig Type and Drilling Co.: Diedrich D-25, East Coast Drilling Project No.: 215-018-42-30

Depth (ft)	Sample Interval and Type	Blow Counts	Lithologic Description	Comments
0	0-1		Concrete with quartz cobbles	
1	.9-2.9	4/8-7/7	Silty clay with sands and gravels, 40% subrounded gravels .3 cm to 1.5 cm. Dry.	Contact at .85
2				
3	2.9-4.9	28/38-50/40		
4			Very dry, fine-to-coarse white sands with 50% gravels, quartz and chert, .3 cm to 3 cm.	Contact at 4'
5	5-7	25/25-30/25		
6				
7	7-9	40/56-76/60	Fine-to-medium angular pure angular sand, very dry. Grades to fine, coarse sand with 35% gravels, .3 cm to 1.5 cm quartz and gravel tills. Dry.	Contact at 6.5' Contact at 7'
8				
9	9-10	36/40	Orange layer, fine-to-medium sand, 35% with gravels.	Contact at 9.8'
10	10-12	22/25-25/28	Fine-to-coarse, white sand 35% gravels, quartz and glacial tills, .3 cm to 5 cm. Dry.	Contact at 10'
11				
12	12-14	28/33-33/32		
14	14-16	17/18-20/21		
16	16-18	16/18-20/18		
18			Bottom of hole at 18'	

FIELD LOG OF HOLLOW STEM AUGER DRILLING

Boring or Well No.: B-6 Project Name: Greenlawn Alodine Room
Location: Along west wall of paint room Date: Start October 5, 1990
Logged By: Mia T. Rothwarf Date: End October 5, 1990
Rig Type and Drilling Co.: Diedrich D-25, East Coast Drilling Project No.: 215-018-42-30

Depth (ft)	Sampling Interval	Blow Counts	Lithologic Description	Comments
0	0.5-2.5	7/14/10/12	Concrete	Contact at .2'
-			Clayey, brown silt with 40% quarts gravels, subrounded, .5 to 1 cm and large cobbles 3 cm to 8 cm in drill cuttings. Dry.	
1				
-				
2				
-			Gravel bed of large quarts and glacial cobbles, 6 cm and larger, dry.	Contact at 2.5'
3				
-				
4				
-			White-to-brown, fine-to-medium sand with 30% glacial gravels, .5 to 3 cm in diameter, subrounded to angular, dry.	Contact at 4'
5	5-7	17/23/31/37		
-				
6				
-				
7	7-9	43/53/55/58		
-				
-				
-				
-				
-				
-				
15	15-17	9/11/15/18		
-				
-				
17				
-				
-				
18			Bottom of hole at 18'	