

**FINAL PROJECT OPERATIONS PLAN  
REMEDIAL INVESTIGATION  
and FEASIBILITY STUDY  
for the  
TRONIC PLATING COMPANY SITE  
NOVEMBER 1988**

**Submitted for:**

**COMMERCE HOLDING COMPANY  
P.O. Box 672  
Hicksville, New York 11802**

**Submitted by:**

**C A RICH CONSULTANTS, INC.  
404 Glen Cove Avenue  
Sea Cliff, New York 11579**

# CA RICH CONSULTANTS, INC.

Certified Ground-Water and Environmental Specialists

November 17, 1988

Commerce Holding Company, Inc.  
PO Box 672  
Hicksville, NY 11802

Attn: Irwin Cain, President

Re: Final Project Operations Plan (P.O.P.)  
Tronic Plating Company Site  
Administrative Order CERCLA II-80206

Dear Mr. Cain:

Attached is a copy of the final P.O.P. for the Tronic Plating Company Site Remedial Investigation/Feasibility Study. This Document is based on the initial work plan prepared for this site by Ebasco Services, Inc., and a modified work plan and draft P.O.P prepared by Galli-Anson Environmental, Inc., dated August 1988.

This final version addresses all of the USEPA's 76 comments to the draft. Included in the Preface of the Final P.O.P. is a copy of the EPA's comments and pertinent responses by C A Rich Consultants, Inc. to each of them.

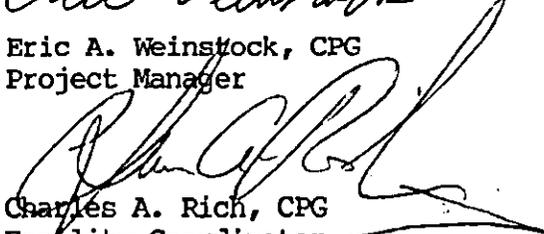
If you have any questions concerning this Document, please do not hesitate to call our office. We look forward to performing this most important project for you in the very near future.

Sincerely yours,

C A RICH CONSULTANTS, INC.



Eric A. Weinstock, CPG  
Project Manager



Charles A. Rich, CPG  
Facility Coordinator

EAW:CAR:njg  
Attachment

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- B. Protocol for Volatile Organic Screening of Soil Samples
- C. Groundwater Sampling Procedures
- D. Chain-of-Custody Records and Sample Management
- E. Contingency Plan
- F. Quality Assurance/Quality Control Plan
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## **PREFACE**

The final project operations plan (P.O.P) presented herein, is based on a November, 1988 draft document compiled by Galli-Anson Environmental, Inc. in association with Roux Associates. The draft document was revised and rewritten in accordance with comments by the U.S. EPA and resubmitted by C A Rich Consultants, Inc. (C A Rich). C A Rich is presently acting as the Facility Coordinator for the respondent as specified in the Administrative Order on Consent No. II CERCLA-80206. A copy of the U.S. EPA comments and the C A Rich response to each comment is included in the Preface.



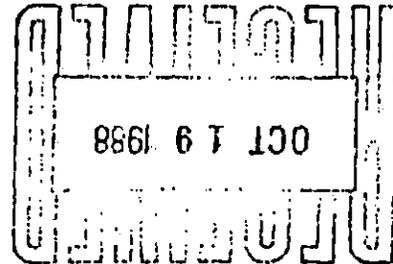
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II  
26 FEDERAL PLAZA  
NEW YORK, NEW YORK 10278

OCT 18 1988

Charles A. Rich, CPG  
CA Rich Consultants, Inc.  
404 Glen Cove Road  
Sea Cliff, New York 11579

Re: Tronic Plating Company Site  
Project Operations Plan



Dear Mr. Rich:

The U.S. Environmental Protection Agency (EPA) has reviewed the Project Operations Plan (POP) for the Tronic Plating Company Site submitted by Galli-Anson Environmental. EPA has also received comments by the New York State Department of Environmental Conservation which have been incorporated in this letter.

The following comments must be addressed before the POP can be approved:

**Section 2.1.4 Hydrogeology of the Site:**

1. The references used for this information should be cited.

**Section 2.3 Discussion, page 2-15:**

2. The lack of knowledge of other sources of contamination in the area is not a reason for phasing the RI/FS. However, phasing does present an opportunity to incorporate information on other sources as the data on them is being generated.

**Section 2.5 Field Operations Schedule, page 2-24:**

3. The method of disposal of well development water should be spelled out in the POP. Such water may be disposed of by returning it to the aquifer of withdrawal by use of a pit located at least 20 feet off the well head.

**Section 3.1.1 Subcontractor, page 3-2:**

4. NYTEST Environmental Laboratory participates in the Contract Laboratory Program for organic analyses only. For metals and

**C A Rich Responses to USEPA Comments (letter dated 10/18/88)**

1. The references are Franke & McClymonds (1972); Jensen & Soren (1974); and Pluhowski & Kantrowitz (1964) - see Section 7.0, References.
  
2. No response.
  
3. Each monitoring well will have a purge water return well (PWRW) located 20 feet from the monitoring well. This will consist of a 2-inch PVC screen installed to a depth of 5 feet with a locking cover.
  
4. The laboratory is in the process of making arrangements for the performance evaluation (PE). Mr. John Gaspari is the contact at Nytest Environmental, Inc. (Nytest).

cyanide analyses, the lab must pass performance evaluation (PE) samples using the methods required by the project. PE sample results from other agencies less than 6 months old may be submitted for consideration. Otherwise, this office will send PE samples to the lab. The lab must perform acceptably on these samples prior to analysis of environmental samples. It is also probable that a laboratory audit may be required for the lab with respect to the inorganic analyses. Please provide the name of a laboratory contact to whom we may send a sample.

5. Elevations should be measured from existing U.S.G.S. benchmarks.

#### Section 3.1.3.1 Soil Borings, pages 3-6, 3-7, and 3-8:

6. The size and the material that the split spoon is made of must be specified. Allowable materials are stainless steel and rust-free carbon steel.
7. The split spoon soil core must not be split lengthwise unless VOA samples are taken immediately. If the sample is to be screened first, followed by an immediate decision (within 5 minutes) as to whether or not to use the sample for lab analysis, then simply take some soil off one end for the PID screen, then immediately close the split spoon to slow the loss of volatiles, until a decision is made. Otherwise, if a decision is not to be made within 5 minutes of opening the spoon, then 2 40-ml vials must be filled and the rest of the sample stored in a glass jar for a future decision to analyze.
8. The sampler must not use his gloved fingers to fill sample bottles. Instead, a stainless steel or Teflon spatula or spoon must be used. The tool must be decontaminated using the procedure in Attachment 3-A. VOAs are taken immediately, then the rest of the soil is homogenized prior to filling the remaining sample bottles. Homogenizing is done in a stainless steel bowl with a stainless steel or Teflon spatula or spoon, and these tools must also be decontaminated using the method in Attachment 3-A. (Maybe an attachment outlining the soil sampling procedure would be helpful.)
9. Gloves must be changed between each boring.
10. Field blanks, in the form of sampling equipment rinsates, were not discussed in this section. Duplicates also need mentioning here.
11. The source of the sample bottles needs discussing. Bottle specifications need to be outlined somewhere in the POP. Bottle types, cleaning and QC procedures must be equivalent

5. All elevations will be to a USGS benchmark, as stated in the Well Installation Section.
6. The split spoon will be a rust-free carbon steel spoon such as the Acker model number 22017-2 or an equivalent.
7. The 40 mil vials will be filled for each sample immediately after opening the split spoon sampler. The decision as to which vials will be sent to the laboratory for analysis will be made after the boring is completed.
8. The sampler will collect the sample using a stainless steel spoon and/or knife, decontaminated as per Appendix A.
9. Gloves will be changed between each boring.
10. This is addressed in Section 3.1.8 QA/QC Protocol.
11. This is addressed Section 3.1.8 QA/QC Protocol. The bottles will be supplied by Nytest as per USEPA -CLP specifications.

to those outlined in the CLP Sample Bottle Repository Statement of Work (enclosed).

12. Homogenizing tools and small sampling equipment must be decontaminated in the same manner as the split spoons.
13. All decon must follow the procedure listed in Appendix 3-A. All differences found in the text should be changed to correspond with the procedure stated within Appendix 3-A.
14. The deionized water used for the last rinse in the decontamination procedure must be demonstrated analyte-free. Enclosed are the criteria this water must meet. This same water is to be used for field equipment rinse blanks.

**Table 3-1 Summary of Soil Analysis:**

15. A field duplicate sample must be taken for the total organic carbon analysis.

**Section 3.1.4.1 Monitoring Well Installation, pages 3-11, 3-12, and 3-13:**

16. Specify the material the split spoon is constructed of.
17. Cite the section number where the details of soil sampling are to be found.
18. Well casings must be steam cleaned prior to installation. Cleaned casings may rest on polyethylene sheeting during installation.
19. If air is to be used to develop newly installed wells, then an air filter must be used between the compressor pump and the borehole. This controls the purity of air introduced downhole, and controls contamination from petroleum hydrocarbons. A ten to fourteen day waiting period prior to sampling is required for the aquifer to stabilize and recover from the stresses of development.
20. If a submersible pump is used to develop a newly installed well, or to purge a well prior to sampling, the pump used must be stainless steel, and the tubing must be polyethylene or Teflon. The pump and tubing must be rinsed with soapy water and deionized water prior to use, and the tubing must be dedicated to individual wells.
21. Figure 3-3 should show MW-4I as the off-site well rather than MW-2I.

12. No response.
13. No response.
14. The final rinse will be with demonstrated analyte-free deionized water.
15. This will be done.
16. See response #6.
17. This is in Section 3.1.
18. This will be done.
19. This will be done.
20. Stainless steel housed pumps will be used for development and purging. The decontamination procedure is included in Section 3.2.
21. This correction is included.

**Section 3.1.4.2 Piezometer Installation, pages 3-13 and 3-14:**

22. A description of the screen location of each piezometer relative to the water table should be included. It is recommended that the 10 foot piezometer screen be placed 5 feet into the water table and 5 feet above the water table.

**Section 3.1.5 Groundwater Sampling, pages 3-18 and 3-19:**

23. Trip blanks must be discussed in the second paragraph with the other quality assurance samples.
24. Well purging prior to sampling must be discussed. Include the equipment used to purge and the way the equipment is decontaminated prior to use. Samples must be taken within 3 hours of purging.

**Section 3.1.6 Storm Drain Sampling, page 3-20:**

25. The stainless steel hand auger must be decontaminated according to the method in Appendix 3-A.
26. VOA samples must be taken first. For sediments, the remaining parameters must be homogenized in a stainless steel pan with a stainless steel or Teflon spatula, decontaminated according to the method in Appendix 3-A. A duplicate and a field equipment rinse blank are also required for the sediment sampling.
27. If water is present to sample, then take water samples before sampling sediment. A duplicate and a bailer rinse blank will be required for VOAs also. The bailer is to be decontaminated according to Appendix 3-A.

**Table 3-2 Summary of Groundwater Analysis:**

28. Table should read "Target Analyte List" metals (enclosed).
29. Duplicates are required to be analyzed for all parameters that the associated samples are being analyzed for.
30. Trip blanks and field blanks should be listed separately on the table.

**Section 3.1.7 Phase II, page 3-20:**

31. Groundwater modeling will be required after Phase I.

**Section 3.1.7.1 Computer Modeling Program, page 3-21:**

32. No pump test has been proposed in the work plan, but one may

22. This will be done.

23. This is included in Section 3.1.8.

24. This is included in Section 3.1.5.

25. This has been included in Section 3.1.6.

26. This has been included in Section 3.1.6.

27. This has been included in Section 3.1.6.

28. This has been corrected.

29. They will be.

30. This has been added.

31. This was corrected.

32. As this aquifer is very well researched by the USGS, we do not feel a pump test is merited. Each of the 4-inch monitoring wells, however, will be "slug" tested.

be necessary to confirm the accuracy of the groundwater flow/transport model.

**Section 3.2.1 Soil Analysis, page 3-23:**

33. CLP-SOW 8/87 is for organic analyses only (VOAs, semi-VOAs, pesticides and PCBs). CLP-SOW 7/87 is for inorganics (metals and cyanide) and must be used by the laboratory if CLP methods are to be used.
34. Attachment B is the health and safety plan. It seems the wrong attachment was cited.
35. Region II does not require trip blanks for soil samples being analyzed for VOAs.
36. A duplicate sample must also be taken for total organic carbon.

**3.2.3 Water Analysis, page 3-24:**

37. Text should read "Target Analyte List" metals, rather than "priority pollutant" metals. (List enclosed.)
38. Duplicate samples must also be taken for semi-volatile organics and pesticides/PCBs at the time these analytes are sampled for.
39. A field blank must also be taken for dissolved metals. The field blanks must be passed through cleaned filtration apparatus.

**3.2.2 Sample Tracking, page 3-25:**

40. Samples are not being sent to CLP.
41. Data validation is the responsibility of the PRP. Evidence must be provided to EPA that the data has been validated in accordance with the Region's validation SOPs or the approved equivalent.

**Section 3.2.4 Analysis Validation Program, pages 3-25 and 3-26:**

42. Trip blanks are not to be opened once they are acidified, filled and sealed in 2 40-ml vials. The frequency for trip blanks is one set per day when VOAs are taken.
43. The water source for field blanks is the same as that used for the final rinse in the decon procedure. Enclosed is the criteria this water must meet. The frequency for field blanks is one per equipment type per decon event, not to exceed one per equipment type per day. Note: this includes

33. The reference is noted.
34. The correction citation is Attachment C.
35. No response.
36. They will be done.
37. This correction was made.
38. This will be done.
39. This has been included in Section 3.1.8.
40. This has been corrected.
41. C A Rich will validate the data.
42. No response.
43. This is included in Section 3.1.8.

homogenizing equipment and filtering apparatus for those analyses requiring the use of these sampling tools.

44. The frequency for field duplicate samples is one for every 20 samples taken of the same matrix and sample type.

**Section 3.2.5 Data Management, page 3-26:**

45. The attachment cited for the QA/QC plan is incorrect.

**Attachment 3-A Sampling Equipment Decontamination Procedure:**

46. If carbon-steel split spoons are used, then a 1% HNO<sub>3</sub> solution should be used.
47. If the samples are not to be analyzed for organics, then steps 5 and 7 may be omitted.
48. Step 6, a distilled water rinse, should be omitted from between the hexane and methanol rinses.
49. The final deionized water rinse must be demonstrated to be analyte-free. Only one rinse is required at the end of decon prior to air drying. The criteria that this water must meet is enclosed.
50. If the equipment is not to be used immediately, the entire piece of equipment is to be wrapped in aluminum foil, shiny side out.

**Attachment 3-B Protocol for Volatile Organic Screening of Samples:**

51. The sample should only be handled with a stainless steel or Teflon spatula.
52. Step 5 should read "80°C," and should also include a shaking procedure to dissegregate the sample within the bottle.
53. Describe the daily calibration procedure for the photo-ionization meter. This information must be kept in a field notebook.
54. Paragraph 8 incorrectly describes the decontamination procedure. This paragraph is not needed, as decon is described in Attachment 3-A.

**Attachment 3-C Groundwater Sampling Procedure:**

55. Step 5 should give some detail on the most common methods of well purging. The POP must be more specific on the method of purging. Samples must be taken within 3 hours of purging.

44. This is included in Section 3.1.8.
45. The correct citation is Attachment C.
46. This had been added to Attachment A.
47. No response.
48. This has been done.
49. This will be done.
50. This has been added.
51. This has been added.
52. This has been corrected.
53. The photoionization meter will be calibrated daily using 100 ppm isobutylene gas supplied by HNU.
54. This has been added.
55. This has been added to Attachment C.

56. In step 8, if the bailer is deconned according to Attachment 3-A, then the triple rinse with distilled water is not needed. Dedicated bailer cord need only be washed with soapy water and rinsed with deionized water before use. Also, if the well is purged as stated in step 5, then the next 3 bailer volumes must not be discarded. The action of lowering the bailer inside the well degasses the water column, giving lower yields on volatile organics. The first bailer volume is to be used for temperature, pH and specific conductivity. The very next bailer volume(s) is use for volatile organic samples. Extractables are taken next, followed by metals and cyanide.
57. Step 10 should state the VOA acidification procedure, which is outlined on the Parameter Table in the QA/QC Plan (Attachment A).
58. Step 11 should mention the preservation for the other parameters, such as metals and cyanide.
59. When filtering aqueous metals samples, a device made of polyethylene or borosilicate glass should be used. The apparatus should be pre-cleaned by rinsing with a 10% HNO<sub>3</sub> solution, followed by a demonstrated analyte-free deionized water rinse, and should be a cellulose based membrane filter of 0.45 um nominal pore size. Samples must be filtered immediately after their collection to minimize changes in the concentration of the substances of interest. Samples are only passed through the filtration apparatus once, they are not to be passed through repeatedly until they are free of turbidity. Samples are then preserved immediately with undiluted ultrapure HNO<sub>3</sub> and the pH checked to ensure proper pH has been attained. No samples for cyanide, conventional parameters, or organics may be filtered in this manner.

**Attachment A, QA/QC Plan:**

60. What are the "ambient oil samples necessary for completing field sampling and QC requirements" mentioned in Section 6.1?
61. Section 6.1, fourth paragraph, should mention that samples must be shipped to the lab within 24 hours of sampling, via overnight carrier as necessary. If the lab is within driving distance, all the better.
62. Section 6.2 - Samples are not to be discarded by the lab when holding times are reached. Samples are to be held as long as EPA states is necessary.
63. Section 7.2 - The method for calibrating the photoionization meter must be described in the POP.

56. This was included in Attachment C.
57. This has been added to Attachment F.
58. This has been added to Attachment F.
59. This has been added to Section 3.1.8.
60. This has been deleted.
61. This has been added.
62. This has been added.
63. This has been added.

64. Section 8.2 - By the time the data is generated for this project, the Region may be using national functional guidelines for data validation, replacing our Regional SOPs. The data must be validated using the documents the Region is using at that time.
65. Section 9.1 - "Appendix A" which includes information on New York State certifications for NYTEST is not included. Also, the current edition of SW-846 is the third edition, dated November 1986.
66. E. Parameter Table:
- a) 2 40-ml vials with septum caps are now recommended for VOAs in soil samples, not 120-ml vials.
  - b) The CLP-SOW for metals and cyanide is 7/87, rev. 12/87.
  - c) Air sampling is not required by the work plan, so there should be no reference to air sampling on this table.
  - d) Organic sample extracts must be analyzed within 40 days of sample receipt. Holding time for organic extractables should read "40 days until analysis."
  - e) The VOA preservation procedure, Note #1, must also be included in Section 3 of the POP.
  - f) The text of the POP should state that CLP metals will be analyzed as this table states; not priority pollutant metals.

#### Attachment C, QA/QC Summary:

67. The parameter and the QA parameter tables must be added. Sections 8 through 18 must be completed.

#### Attachment D, NYTEST QA/QC Manual:

68. Section 4.1 - All sample bottle specifications and preparation procedures and QC procedures must be equivalent to those found in the CLP Sample Bottle Repository Standard Operating Procedures. This SOP is enclosed. (Specifically; Section 4.1.1 - 1:1 HCl for all volatiles, and Section 4.1.5 - Ascorbic acid should not be used.)

#### Health and Safety Plan

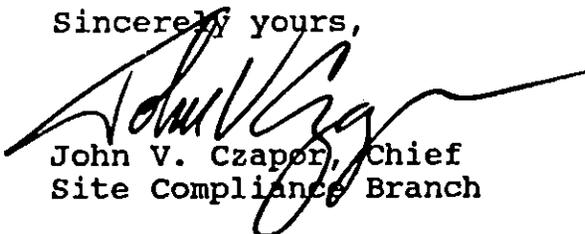
69. Page B-11 - Text should read, "Tronic Plating," not "Albuquerque."
70. Page B-11 - Level C should be worn if elevated concentrations of volatile organics are measured at the borehole, even if the concentration in the breathing zone is less than 5 ppm above background.

64. We will gladly use this new document if one is forwarded to us by the EPA.
65. SW-846, Third Edition will be cited in the future.
66. Table E has been corrected.
67. A new Brossman Form is included as Attachment G.
68. The Nytest QA/QC Manual has been modified.
69. The word Albuquerque has been replaced with the site name 'Tronic'.
70. This will be left to the discretion of the on-site Health and Safety Officer.

71. Page B-14 - Section 9.0 describes writing a site safety plan, which is what this document is. Please delete this section.
72. Page B-17 - The project objective should be to investigate the presence and/or concentrations of contamination on the site. The type of wastes deposited at the site were liquids. Acids were also used and discharged at the site. Finally, the principal disposal method was the underground leaching pools.
73. Page B-18 - It does not appear that the level of protection at the site would be Level A.
74. Page B-19 - Decontamination procedures should be for personnel, not equipment. Procedures must be given in a step fashion for each level of protection that may be utilized at the site.
75. Page B-21 - The directions to the nearest hospital should be outlined on a map, and included in the health and safety plan.
76. Material Safety Data Sheets should be included for compounds that may be found at the site, and for chemicals to be used at the site.

If you have any questions, please feel free to contact Douglas Tomchuk at (212) 264-7508.

Sincerely yours,



John V. Czapor, Chief  
Site Compliance Branch

Enclosure

cc: Jacqueline Merson

**71. The site safety is contained at the end of the overall Health and Safety Plan.**

**72. This has been added.**

**73. This has been corrected.**

**74. A personnel decontamination procedure has been added to the Health and Safety Plan.**

**75. A map of the route to the hospital has been added to the Health and Safety Plan.**

**76. The available material safety data sheets are included in the Health and Safety Plan.**

# SECTION 1

## INTRODUCTION

## 1.0 INTRODUCTION

The Tronic Plating Company occupied a portion of a multi-tenant building in an industrial and commercial area of Farmingdale near the western border of Suffolk County. Tronic Plating Company operated as an electroplating and anodizing metal electronics parts company at 168 Central Avenue site from July 1968 to March 1984. In April of 1984, the company moved to its current location at 37 Potter Street, Farmingdale, Nassau County, New York.

Between 1979 and 1982, Suffolk County Department of Health Services detected substances typically used in the electroplating industry (copper, silver, iron, zinc, lead, cadmium and cyanide) in water samples collected from Plating's industrial discharges, leaching pools and sanitary discharge pools, and the storm drain. This contamination resulted in the USEPA placing the site on the National Priorities List.

The extent of soil and groundwater contamination due to these discharges is unknown at this time. In order to better determine the nature and extent of this contamination, the USEPA requested the performance of a site specific Remedial Investigation and Feasibility Study (RI/FS). The first step in the RI/FS process is the development of the following Project Operations Plan (POP). The POP pertains to the performance of Remedial Investigation at the Tronic Plating Company Site.

The POP for the site is divided into the following parts:

- The Site Management Plan
- The Field Sampling and Analysis Plan
- The Health and Safety Plan (site specific)
- Quality Assurance/Quality Control Plan
- Laboratory Quality Assurance/Quality Control Procedures
- Curricula Vitae

## **1.1 Objectives of the RI/FS**

**The primary objectives of the Remedial Investigation will be to determine the vertical and horizontal extent of soil and groundwater contamination as well as the source(s) of this contamination. The information developed to meet these objectives will be used in the:**

- **risk assessment**
- **treatability tests for the FS**
- **identification of the PRP's**

**The purposes of the Feasibility Study are to identify, screen, evaluate and test remedial alternatives for the site. This information will be used by the EPA to specify the recommended remedial alternative in the EPA's Record of Decision.**

**SECTION 2**

**SITE**

**MANAGEMENT**

**PLAN**

## **2.0 SITE MANAGEMENT PLAN**

### **2.1 Site Description**

#### **2.1.1 Site Location**

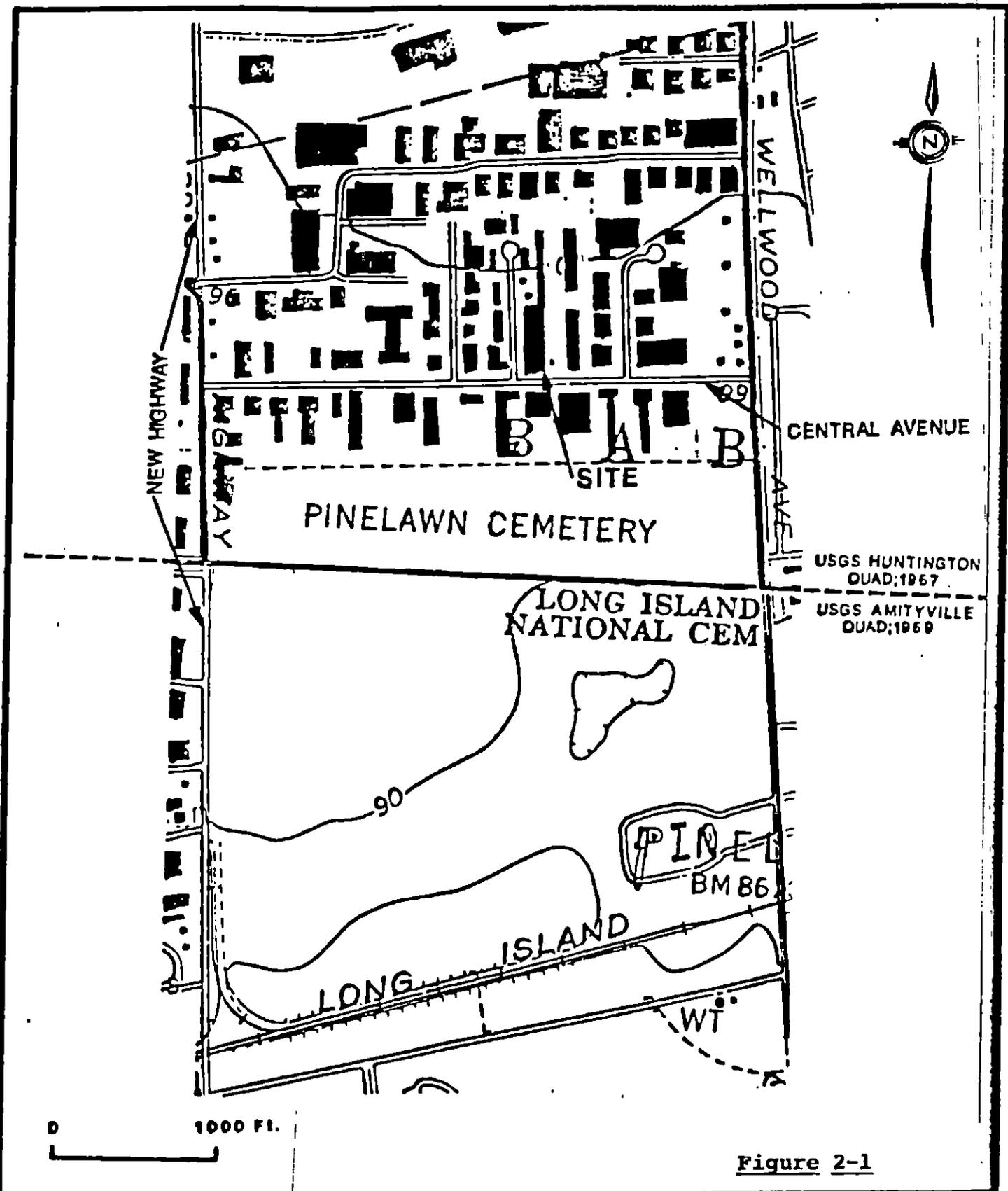
The Tronic Plating Company Site (latitude 40 degrees, 45', 12.42"N, longitude 73 degrees 24' 29.46"W) is located at 168 Central Avenue in Farmingdale, Township of Babylon, Suffolk County, New York. Figures 2-1 and 2-2 present regional and detailed site location maps for the site.

The site occupies approximately 0.5 acres of a 2.68 acre lot (building, lawn and paving) in southwestern Suffolk County, approximately 1.5 miles east of the Nassau County line. The Tronic Plating Company formerly occupied the southeast portion of a long building in an industrial park.

The north-south building located on Commerce Drive is contiguous with the structure located at 162-168 Central Avenue, and is approximately 800 feet long by 50 feet wide. Table 2-1 identifies the street number and occupant at most of the addresses on Commerce Drive. Street numbers on Commerce Drive begin at "4", run south to north, and terminate at "68."

The site is a generally flat area with an average slope of less than 3 percent to the south-southeast. There are no surface water bodies near the site. The surrounding area is paved except for a lawn (50' x 75'), with its longest dimension in an east-west direction. Precipitation run-off flows to existing storm drains on the property. The site is surrounded by light industrial facilities to the north, west and northeast and by large cemeteries to the southeast. The area to the south is heavily wooded and reportedly owned by Pinelawn Cemetery.

Wells in the immediate area provide drinking water and industrial secondary water (fire, irrigation, process water). Local aquifers are totally dependent on precipitation runoff for recharge.



**CA RICH CONSULTANTS, INC.**

*Certified Ground-Water and Environmental Specialists*

Location Map  
 Tronic Plating Co. Site  
 Farmingdale, N.Y.

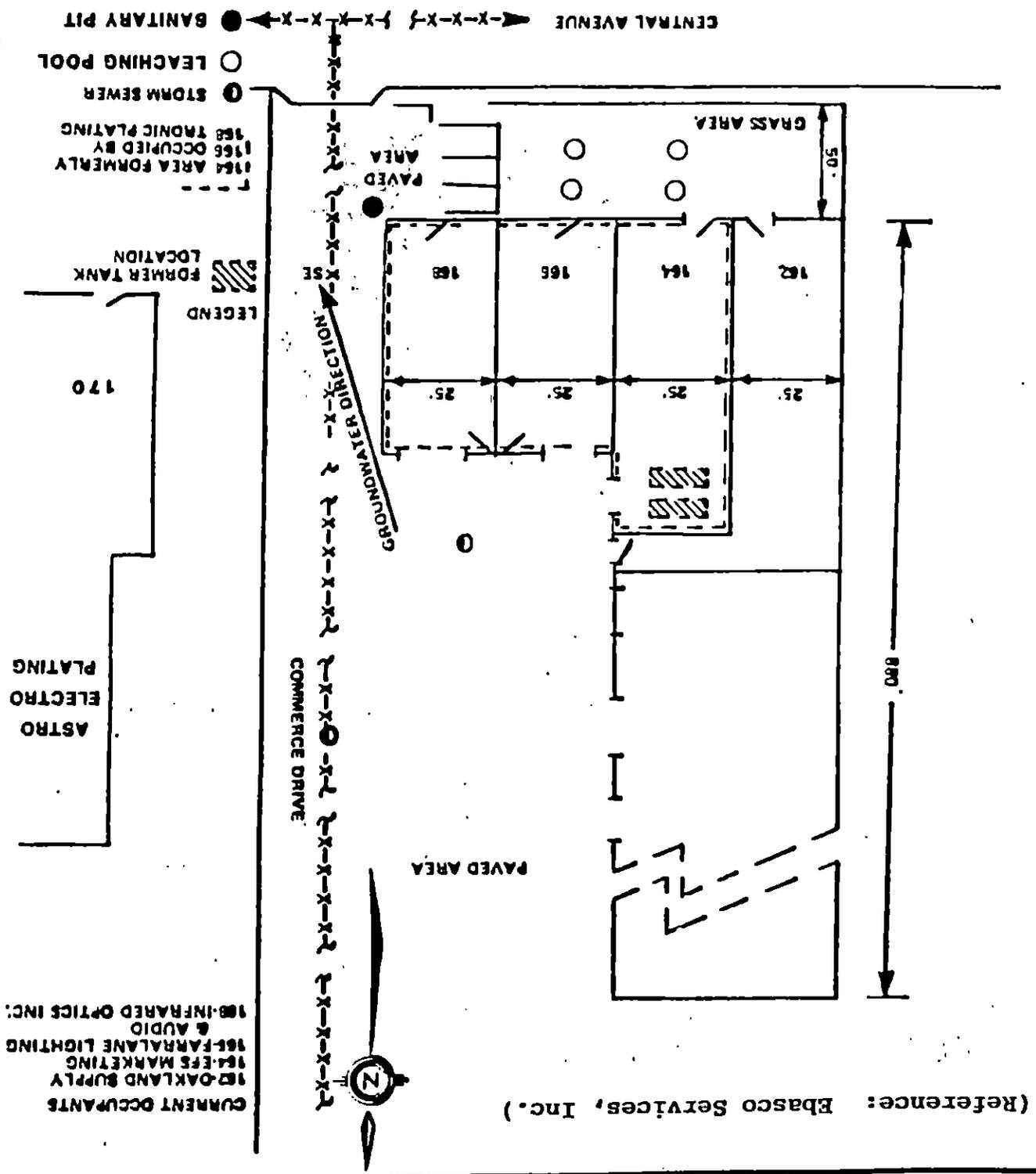


# CA RICH CONSULTANTS, INC.

Site Map  
Tronic Plating Co. Site  
Farmingdale, N.Y.

Figure 2-2

NOT TO SCALE



(Reference: Ebasco Services, Inc.)

TABLE 2-1

## OCCUPANTS OF COMMERCE DRIVE

<u>STREET NO.</u>	<u>OCCUPANT NAME</u>
4.....	Carr Met Industries, Inc.
6.....	Carr Met Industries, Inc. IAM Sheet Metal Inc.
8.....	Diamond Fasteners Inc.
10.....	Regal Insulation Corp.
12.....	Trebor Instrument
16.....	All Seasons Air Conditioning
18.....	Set III Dental Studio
20.....	A & S Precision Specialists
22.....	Certified Copy Co.
24.....	Vendamint Corp.
26.....	D & R Computer
28.....	He-Os Optical Corp.
30.....	Pritchard Services (NY) Inc.
32.....	Superior Air Conditioning & Heating
34.....	Lawn Geni
36.....	North Shore Mechanical, Inc.
38.....	Master Porcelain Studio
40.....	Usuki International Corp.
42.....	JESCO Inc.
44.....	Afford-A-Scan
46.....	Landmark Sheet Metal Co.
48.....	Dabco Machine
50.....	Inner Circle Dental Inc.
52.....	Satellite Neon Corp.
54.....	Yours International
56.....	Sapenoff Machine Co.
58.....	Print-Tek
60.....	P.D. Photographers Ltd.
62.....	Afford-A-Scan
64.....	C.W. Urbach Co.
66.....	Modafine
68.....	Joseph Roberts Co., Inc.

### 2.1.2 Current Conditions

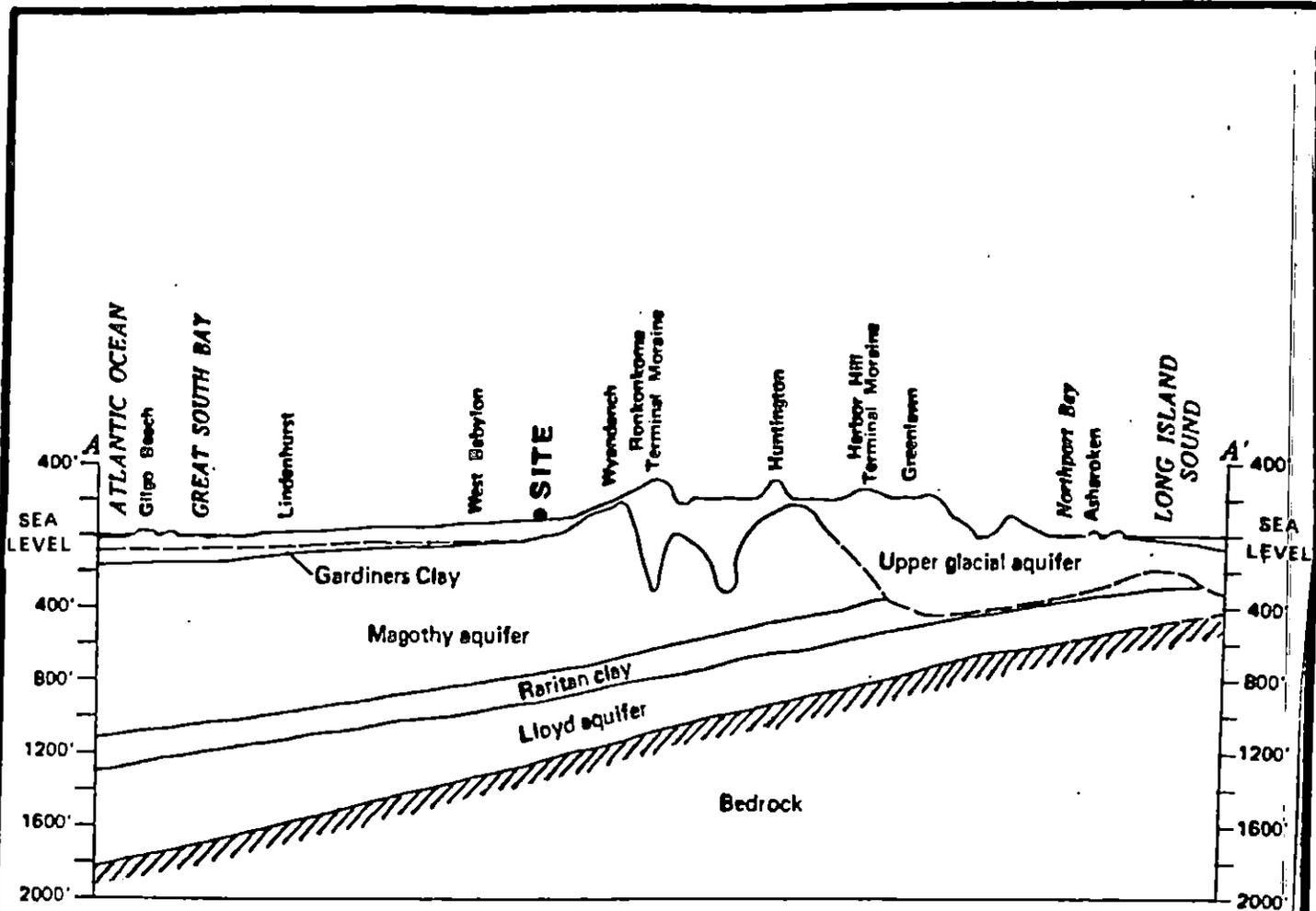
The location of current site occupants are depicted in Figure 2-2. Activities of the tenants are as follows:

- 162 Oakland Supply - supplier of industrial abrasives and tools;
- 164 EFS Marketing - supplier of novelty items;
- 166 Farralane Lighting and Audio - audio and lighting equipment
- 168 Infrared Optics, Incorporated - lens manufacturers.

Exterior conditions at the Tronic Plating Company Site, with the exception of plating activity, are similar to those at the time of the plating company's tenancy. A preliminary site reconnaissance indicated the approximate location (Figure 2-3) of one sanitary pit and four leaching pools. It has been reported that the four leaching pools have been pumped out and then backfilled with clean material. The material from the leaching pool area was reportedly properly disposed of by Tronic Plating Company. Storm drains on the property, allegedly utilized for disposal of potentially hazardous effluent, are located 33 feet to 40 feet from the northern rear door of the former plating operation.

The interior conditions at 168 Central Avenue have changed since Tronic Plating Company vacated the building in March of 1984. According to the EPA, during the tenancy of Tronic Plating Company, certain tanks and fixtures were added, moved or removed. Although only fragmentary information exists, a tentative list of those tanks and fixtures is as follows:

- a) two 4,000 gallon holding tanks located at the northwestern corner of Tronic Plating (now 164 Central Avenue)
- b) A below grade sump/pit/tank (capacity and location unknown) somewhere in the area presently occupied by the Farralane Lighting and Audio Company



Reference: Hydrogeology Of Suffolk County, Long Island, New York  
 By H. M. Jensen And Julian Soren (1974)

0 10 Miles

Figure 2-3

**CA RICH CONSULTANTS, INC.**

Certified Ground-Water and Environmental Specialists

Generalized Geologic  
 Cross-Section  
 Tronic Plating Co. Site  
 Farmingdale, N.Y.

- c) an array of anodizing, plating and rinsing tanks whose locations varied, and were presumably moved about to accommodate cooling water supply, discharge and plant efficiency
- d) below grade outfall piping for both sanitary and process coolant effluent (location undetermined)
- e) possible floor drains (location uncertain); since March of 1984, masonry partitions have been added to accommodate the new tenants (168) Infrared Optics (166) Farralane Lighting and Audio Company and (164) EFS Marketing.

The present owners of the building, Commerce Holding Company, have refurbished the interior of 164-168 Central Avenue by removing curbs, floor drains and mounting locations for the Tronic Plating fixtures.

### 2.1.3 Site History

A review of sampling events at the Tronic Plating Company site was prepared by the EPA referencing sampling date, location, specific analysis and governmental entity which initiated the sampling event.

### 2.1.4 Hydrogeology of the Site

#### General

The following sections on site hydrogeology are based on information reported by Jensen and Soren, (1974); Pluhowski and Kantrowitz, (1964); and McClymonds and Franke, (1972). The Tronic Plating Company Site is situated on outwash plain deposits south of the Ronkonkoma recessional moraine. These deposits, consisting of a mixture of coarse sand and gravel, constitute the sediments of the Upper Glacial aquifer.

Figure 2-3 is a generalized geological cross-section trending north to south across Long Island which shows a southward sloping wedge of unconsolidated deposits unconformably overlying a crystalline bedrock of metamorphic and igneous rocks.

As illustrated in the diagram, three major aquifers, the unconfined Upper Glacial aquifer, the semi-confined Magothy aquifer and the confined Lloyd aquifer, are present beneath the site. The unconsolidated deposits are late Cretaceous, Pleistocene, and Recent in age. The total thickness of the unconsolidated deposits under the site is approximately 1,200 feet.

The two aquifers of concern are the Upper Glacial and the Magothy. As the Lloyd sand is confined and occurs at a depth of approximately 1,000 feet, it is not of concern in this investigation. Previous studies have indicated that the Upper Glacial and Magothy aquifer may be hydraulically connected under the site.

### Upper Cretaceous Series

#### Raritan Formation

The Raritan formation of Late Cretaceous age is the deepest formation of unconsolidated deposits in the site area. It rests directly on the crystalline bedrock and is unconformably overlain by the Magothy formation. The Raritan formation occurs beneath the entire area of Long Island but does not outcrop. Formation thickness ranges from 300 to 600 feet and is approximately 415 feet thick below the site. The formation is divided into a lower unit (the Lloyd sand member) and an upper unit (Raritan clay).

The clay member functions as an aquiclude (confining unit), successfully separating the Lloyd sand member from the overlying Magothy. The clay member also retards the movement of salt water from the overlying Magothy formation into the underlying fresh water in the Lloyd sand member on southeastern Long Island. At the site the Raritan clay is approximately 175 feet thick.

## **Magothy Formation**

The Magothy formation is a thick sequence of non-marine deposits of Late Cretaceous age which overlies the Raritan formation. The Magothy is overlain directly by Pleistocene deposits of the Upper Glacial aquifer. The lower contact, which is an erosional unconformity, can be recognized by a change from gravelly beds at the lower contact of the Magothy to beds of clay or sandy clay in the Raritan formation. The upper contact of the Magothy formation can be recognized by differences in color, texture and composition between these sediments, and the Pleistocene deposits of the Upper Glacial aquifer.

Studies indicate that the surface of the Magothy formation is a gently sloping plain, moderately to highly dissected by streams flowing south and southwest. In response to interfingering of coarse and fine grained materials the permeability of the Magothy formation is greatest in a direction parallel to bedding and considerably less perpendicular to bedding. The Magothy formation is approximately 700 feet thick under the site.

## **Upper Pleistocene and Recent Deposits**

The upper Pleistocene deposits are approximately 120 feet thick at the site and include the following units:

- outwash deposits of stratified medium to coarse sand and gravel,
- terminal moraine deposits consisting of till and ice-contact deposits of stratified sand and gravel,
- till, composed of unstratified clay, sand, gravel, and boulders, and
- glacio-lacustrine deposits of clay and silt.

## **Outwash**

The outwash establishes the bulk of the upper Pleistocene deposits and also underlies the till and deposits of Recent age. These sediments rest conformably on the Magothy at the site.

The outwash ranges in thickness from about 30 to 120 feet, thickening toward the north in the direction of the Ronkonkoma moraine. The sediments consist of stratified beds of fine to coarse sand, and sand with gravel.

The outwash deposits are highly permeable and contain large quantities of water. Hydraulic conductivities of 2,000 gpd/ft<sup>2</sup> and transmissivities of 200,000 gpd/ft are estimated for this area (McClymonds and Franke, 1972). The groundwater in the outwash occurs mainly under water table conditions. Outwash deposits are the most permeable beds of wide extent in the study area.

## **Recent Deposits**

The Recent deposits, not including soil and artificial fill, occur beneath bays, in marshlands, on barrier beaches and in stream valleys. Recent deposits are the upper most and stratigraphically the youngest sediments and are immediately underlain by outwash. The Recent deposits reach a maximum thickness of about 40 feet and are too thin to be represented on geological cross-section.

## **Groundwater Resources**

Groundwater supplies the domestic needs of the entire population of both Nassau and Suffolk Counties, including the approximately 498,000 people who reside within a three mile radius of the Site. The Upper Glacial aquifer is the primary water supply source for agricultural and small industrial wells. The Upper Glacial is not the primary supply for drinking water in the area of the Site. The Magothy is the primary source of drinking water in this area.

In the area of the Site, homes and businesses obtain drinking water from two water companies. The East Farmingdale Water District supplies the Site and areas to the north. Suffolk County Water Authority supplies areas to the south. Each wellfield may consist of one or more wells. Each well generally supplies one million gallons or more of water per day when in operation and each is completed in the Magothy aquifer.

The nearest public water supply wellfield is located about 3000 feet from the Site. The nearest reported private well is located at 222 Central Avenue, approximately 1400 feet east of the Tronic Plating Company Site.

#### 2.1.5 Climate

Long Island is located between 40 degrees and 42 degrees north latitude in a temperature-climate belt. The mean annual temperature on the island, approximately 51 degrees F (11 degrees C), is several degrees higher than the average for all of New York State because of the tempering influence of the bordering Atlantic Ocean and Long Sound. Minimum average monthly temperatures on Long Island occur in February and range from 28 degrees F (-2 degrees C) to 32 degrees F (0 degrees C); maximum average monthly temperatures occur in July and range from about 69 degrees F (21 degrees C) to 75 degrees F (24 degrees C). Average temperatures decrease from east to west, and south shore temperatures are slightly less than north shore temperatures at the same longitude. Maximum and minimum temperatures of record on Long Island are 103 degrees F (39 degrees C) and -14 degrees F (-26 degrees C) respectively (Soil Conservation Service: USDA, p. 96, 1974).

Precipitation averages about 44 inches per year and is fairly well distributed throughout the year on Long Island. The prevailing wind direction is northwest during most of the year, except during the summer months when south and southwest winds are predominant (Franke and McClymonds, 1972).

## **2.2 Existing Site Specific Data**

### **2.2.1 Groundwater**

Since no groundwater monitoring wells currently exist on the site, the regional groundwater quality can only be characterized using data from the U.S. Geological Survey (USGS). The direction of groundwater flow is generally in a southern direction. Site specific groundwater data will be developed as part of the Remedial Investigation.

### **2.2.2 Chemical Characterization of the Site**

No known testing of soil and groundwater have been conducted at the site. Based on the Wastewater Treatment System report for Tronic Plating Company (Benson and Burns, 1974), about 1.25 million gallons of waste were produced each year. The apparent source of these wastes was rinse waters from electroplating, anodizing, and etching processes. An undetermined amount of these liquid wastes were discharged into leaching pools at the Tronic Plating Site.

Between 1979 and 1982, the Suffolk County Department of Health Services tested waste material (effluent) in the leaching pools and detected copper, silver, iron, zinc, lead, cadmium, chromium, (total and hexavalent) and cyanide. Table 2-2 shows the results of analyses performed on various process and waste streams at the Tronic Plating Company facility. In addition, contamination with heavy metal was suspected in a storm drain located northeast of the Tronic Plating office (SCDHS, 1982).

### **2.2.3 Industrial Discharges**

Samples of water taken from Tronic's industrial discharges, as well as from the leaching pools, the sanitary discharge pool and the storm drain contained hazardous substances. Concentrations were found to be as high as 29 parts per million ("ppm") of cyanide and 17.4 ppm of copper in Tronic's industrial discharges, and 3.2 ppm of lead, 10 ppm of cadmium, 12 ppm of zinc, 11



Table 2-2

CONTAMINANT CONCENTRATIONS  
AT TRONIC PLATING COMPANY

MYS CRITERIA DATE	CONCENTRATIONS IN PPM												SAMPLING LOCATION	SAMPLING ORGANIZATION	
	CN	Ni	Cd	Tot.Cr	Cr <sup>+6</sup>	pH	Cu	Fe	Pb	N	Ag	Zn			
	0.4	2.0	0.02	2.0	0.1	6.5-8.5	0.4	0.6	0.1	10.0	0.1	0.6			
Jun 1/30															
						N=16									
						Av 7.35									
7		0.48	1.13	0.12		3.4	1.4	16.0	0.1				0.3	Pipe to industrial pool(?)	SCDEC
7		0.1	0.02	0.01		7.6	0.15	0.09	0.1				0.02	Final anodizing rinse tank	SCDEC
7		0.1	0.02				0.1	0.05	0.1				0.05	City H <sub>2</sub>	SCDEC
7		1.85	1.8	0.23	0.06	3.6	2.0	16.0	0.2				2.3	Industrial leaching pool(?)	SCDEC
Jul 6/29						N=15							N/I		Tronic
						Av 7.15									
Aug 2/28						N=17							N/I		Tronic
						Av 6.97									
Nov 1/29						N=14							N/I		Tronic
1978															
Mar 28		0.1	0.09	0.32		8.5	0.07	0.5	0.1			0.02	0.11	N/I	Tronic
1979															
Jun 26	0.5	0.2	0.2		0.02	6.6	0.32		0.2			0.02		N/I	Tronic
Sep 9		0.4	0.69	0.07		6.0	0.33	1.1	0.2			0.02	0.43	Storm drain by rear door-blue green stain leading to drain	SCDEC
		0.3	2.0	0.15		5.3	0.75	0.85	0.2			1.04	0.48	Old industrial pool w/more than 8.0' of liquid in pool	SCDEC
		0.4	3.1	0.14		6.1	0.93	1.2	0.2			0.21	1.18	N/I	SCDEC
		0.2	0.15	0.02		5.8	0.85	1.5	0.2			0.73	0.2	Pool by rear door	SCDEC
		0.2	0.50	0.22		5.1	0.52	4.5	0.2			0.03	0.7	Cooling water pool(?)	SCDEC
		0.2	1.17	0.07		5.35	0.45	0.7	0.2			0.06	1.0	Third industrial pool, abandoned(?), discharge noted	SCDEC
		0.2	1.10	0.11		5.25	0.44	1.0	0.2			0.06	0.7	Fourth industrial pool, abandoned(?), no discharge noted	SCDEC
		0.2	1.14	0.13		5.5	0.45	1.1	0.2			0.06	0.9	First industrial pool, abandoned(?), actively receiving discharge	SCDEC
		0.2	0.72	0.18		5.1	0.47	2.6	0.2			0.04	0.5	Second industrial pool, abandoned(?), actively receiving discharge	SCDEC
Nov 14			5.4	3.6		6.5	10.0		3.0			1.0	12.0	First cooling water pool	SCDEC
1980															
Jan 3		0.5	0.87	0.36	0.06	6.05	0.60	2.7				0.11	1.0	First cooling water pool(?)	SCDEC
May 21			0.80									0.02		#2 cooling water leaching pool - plating operation	SCDEC
Aug 5		0.18	0.93			5.1	0.48	1.1	0.2			0.02	0.1	Cooling water, first pool(?)	SCDEC
Oct 1		0.1	4.2	0.06		6.9	0.30	4.2	0.2				0.1	001 outfall to first pool	SCDEC
Dec 3		0.4	3.4	0.06			0.98	2.4	0.2			0.02	0.24	Leaching pool southside of building, closest	SCDEC

Table 2-2

CONTAMINANT CONCENTRATIONS  
AT TRONIC PLATING COMPANY

MYS CRITERIA DATE	CONCENTRATIONS IN PPM													SAMPLING LOCATION	SAMPLING ORGANIZATION		
	CN 0.4	Ni 2.0	Cd 0.02	Tot.Cr 2.0	Cr <sup>+6</sup> 0.1	pH 6.5-8.5	Cu 0.4	Fe 0.6	Pb 0.1	N 10.0	Ag 0.1	Zn 0.6					
1981																	
Jun 17		1.0	0.66	0.20	0.021	7.0	0.38	0.8	0.2					0.3	Storm drain rear of Tronic, 33'-40' from north garage door	SCDEC	
17		0.5	0.65	0.06		7.0	0.74	4.1	0.2					0.2	Sanitary pool, front lawn, east series, second toward Central Ave.	SCDEC	
Aug 31		1.7	10.0	1.0	0.2	5.0	9.0	140	2.6				11.0	1.5	Sanitary pool, front lawn, east series, first pool	SCDEC	
1982																	
Aug 18		0.8	2.8	2.1	0.02	7.0	8.8	170	3.2				0.1	1.0	Sanitary pool, first in-line(?) front lawn	SCDEC	
18		0.7	0.3	0.1		7.0	0.37	1.5	0.2				0.02	0.65	Storm drain NE of Tronic rear door	SCDEC	
1983																	
Aug 31		0.1	0.2	0.02		5.0	0.6	0.3	0.2					0.3	Second sanitary pool, farthest from building front lawn, east leaching pool(?) grab sample	SCDEC	
Oct 5			0.076						0.048								Ecotest Labs/Tronic
Oct 6			0.20						0.016								Ecotest Labs/Tronic
Dec 7		0.1	0.02	0.02		6.0	0.05		0.2						Waste water(?) collected by Tronic East side of Tronic, 3"-4" pipe 0.2' abovegrade discharging to storm drain	SCDEC	

ppm of silver and 170 ppm of iron in the leaching pools. These substances are typically utilized in the electroplating industry.

Based on available information (Benson & Burns, 1974), the approximate locations of the four leaching pools and one sanitary pit are shown in Figure 2-2. The dimensions of the leaching pools are given in Figure 2-2.

### 2.3 Discussion

Based on information presented in previous sections and hydrogeological conditions on-site, contaminants could have been introduced to groundwater because:

- Contaminated effluent could have been released to leaching pools and storm drains;
- Leaching pools were allegedly cleaned and filled at the end of plating operations on-site on March 10, 1984;
- Soil permeability and porosity facilitate contaminant access to groundwater, mobilized by precipitation.

The USEPA agrees that the RI/FS should be carried out in a phased approach. During the early phases, work efforts will concentrate on the site, and during the latter phases, work efforts could concentrate on off-site areas. Two phases are recommended as, 1) there is a lack of knowledge about the extent of contamination at the site; as well as, 2) a lack of knowledge regarding other sources of contamination in the general area.

For instance, Astro Electroplating, Inc., located at 170 Central Avenue (see Figure 2-2), is currently listed as a NYSDEC Inactive Hazardous Waste Site and is now undergoing a Phase II investigation. In addition, there are two printed circuit board manufacturers (Diversified Manufacturing, Inc., and P & V Circuit, Inc.) currently located at 176 Central Avenue.

## 2.4 Project Organization

The following are descriptions of the positions for this project. The resumes of all key personnel are provided in Attachment H. An organizational chart showing lines of responsibility is presented on Figure 2-4.

### Facility Coordinator

The Facility Coordinator is ultimately responsible for all contractual and administrative arrangements between the respondent and the USEPA. Mr. Charles Rich will serve the Facility Coordinator for this project. Mr. Rich will be responsible for ensuring that all quality objectives of the project are attained and for the overall coordination of the project tasks. The Facility Coordinator will work closely with the Project Manager.

### Project Manager

Overall, Project Management is centered around our Project Manager, Eric Weinstock. Mr. Weinstock's primary responsibility is the oversight and the implementation of the Administrative Order on Consent Index No. II CERCLA 80206. The Project Manager is the focal point of all activity on the project and is responsible for ensuring that all involved parties are aware of their roles and responsibilities on the project. Mr. Weinstock is responsible for making sure that the work progresses in accordance with the priorities and objectives set forth in this Project Operations Plan. Mr. Weinstock's additional responsibilities include:

- directing the project team by assigning specific duties to each team member
- providing a smooth working relationship with the EPA, its consultant and the public
- monitoring project budgets and schedules
- managing technical resources

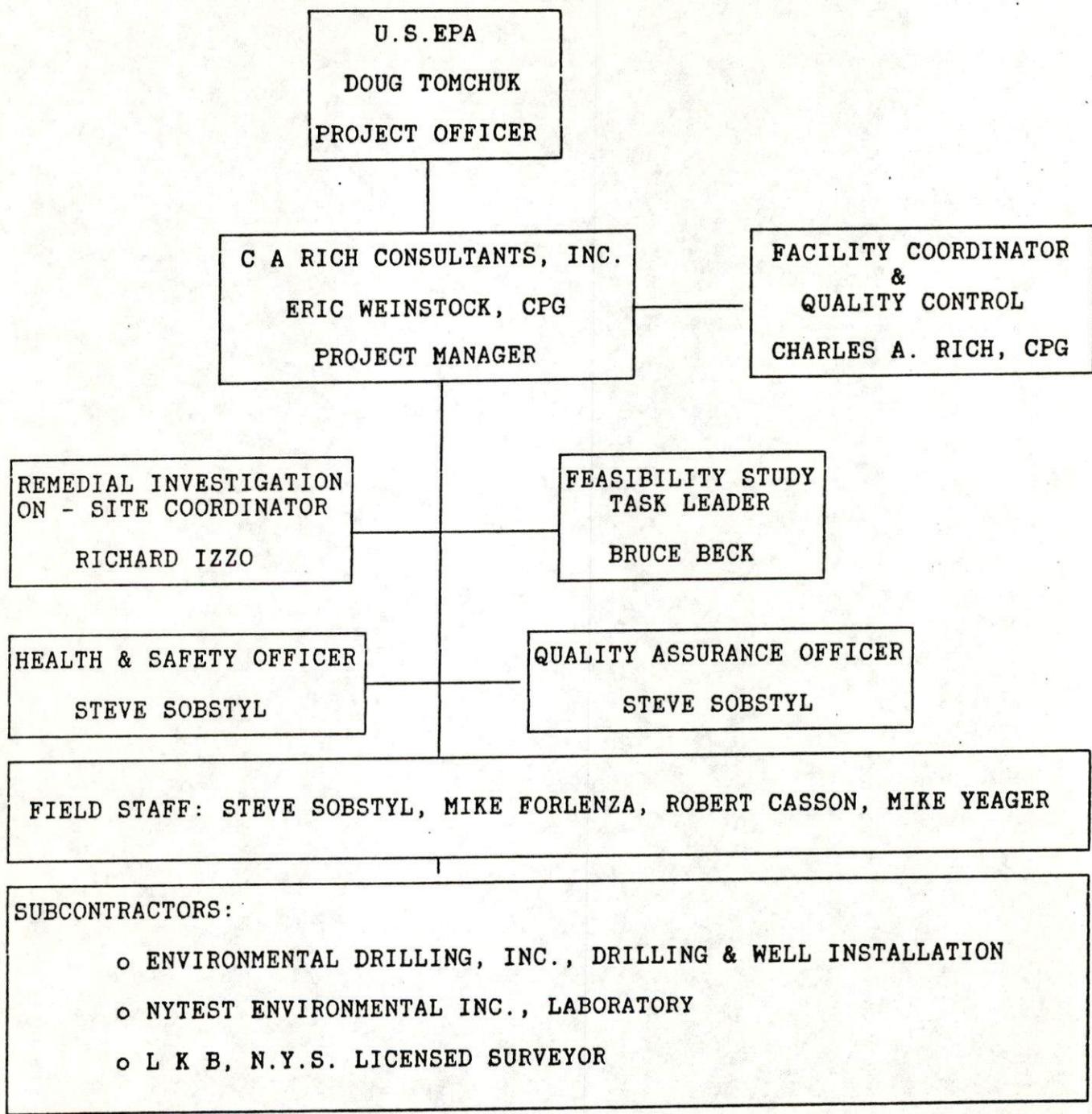


FIGURE 2-4

**CA RICH CONSULTANTS, INC.**

*Certified Ground-Water and Environmental Specialists*

ORGANIZATION CHART  
TRONIC PLATING CO. SITE  
FARMINGDALE, NEW YORK

- ensuring safe working conditions
- monitoring quality assurance/quality control
- communicating with the client
- preparing progress reports
- maintaining evidentiary files
- ensuring that chain-of-custody procedures are followed

#### Quality Assurance Officer

The Quality Assurance Officer will be a member of the project team but will independently monitor the quality of work being performed. He will have the organizational freedom and authority to identify deviations from procedures and protocols. He will be responsible for developing resolutions and determining what corrective actions must be implemented.

#### Health and Safety Officer

The site Health and Safety Officer has primary responsibility for all safety procedures and operations on site. He is responsible for enforcing the site safety plan; upgrading or downgrading the level of personnel protection based upon observations and changing circumstance during the field investigations; enforcing the buddy system (personnel working in at least pairs); posting and briefing the field team of an approved safety plan which outline locations, routes, and telephone numbers of the closest medical facilities and poison control centers; posting other emergency telephone numbers such as the fire and police departments and notifying local public emergency personnel, verifying that team members have met the health and safety requirements for field assignment; controlling site entry and exit at the personnel decontamination station; and visually monitoring the work party for signs of stress such as changes in complexion, coordination,

demeanor, or speech patterns. During adverse weather condition, the site Health and Safety Officer will implement special precautions to guard against heat stress or cold exposure as described in EPA's "Standard Operating Safety Guides" (November, 1984). The Health and Safety Officer has the authority to halt any and all field operations that threaten the health or safety of the team. When the Project Health and Safety Officer is not present on-site during work activities, it is his responsibility to designate a qualified alternate to perform the Health and Safety procedures in his absence.

### Remedial Investigation On-site Coordinator

The On-site Coordinator is responsible for the organization, operation and safety of the Work Party. The On-site Coordinator's responsibilities include:

- proper field operations
- completion of site work plan objectives
- compliance with document control procedures
- documentation of field activities and operating procedures
- determining levels of personnel protection.

When subcontractors, outside observers, or other personnel are onsite, the On-site Coordinator is responsible for enforcing all health and safety procedures. If these procedures are not followed by any person, the On-site Coordinator is responsible for escorting those persons off-site.

### Feasibility Study Task Leader

The Feasibility Study (FS) Task Leader is responsible for developing the remedial alternative selection process for this project. Based on the results

of the Remedial Investigation and the Risk Assessment, the F.S. Task Leader will prepare the following:

- Development of Remedial Response objectives and Response Actions;
- Identification of Applicable Technologies and Development of Alternatives;
- Screening of Remedial Technologies; and Alternatives;
- Evaluation of Remedial Alternatives;
- Preparation of a Feasibility Study Report.

#### Field Staff

Members of the Work Party are ultimately responsible for the safe and successful completion of the project. In order to fulfill the objectives of the investigation, the Work Party must make sure that the:

- personnel decontamination station has been set up
- site hazard characterization has been performed
- specified samples have been collected from various media
- chain-of-custody procedures have been followed
- entire Work Party has been decontaminated prior to leaving the site
- field activities have been documented in the field log and with photographs.

## Subcontractors

Several subcontractors have been identified to support the project team. These are:

- Geophysical Survey:  
S.A. Alsup & Associates, Inc., Gloucester, MA.
- Hollow steam augering, test borings, monitoring well installation, pump test support:  
Environmental Drilling, Inc., West Creek, NJ
- Chemical laboratory analysis of soil and groundwater samples:  
NYTEST Environmental, Inc., Port Washington, NY
- Land surveying  
Lockwood, Kessler & Bartlett, NYS Licensed Surveyor,  
Syosset, N.Y.

## Site Security

The Tronic Plating Company operated in a multi-tenant building in an industrial park. Because of this arrangement, the site is very accessible to the general public as well as to workers whose companies are also tenants in 168 and 170 Central Avenue. The buildings located at 160 and 170 are only separated from each other by telephone poles placed horizontally on the ground.

Because of this arrangement of the site and its accessibility to the public, a secured area will be established on the north side of the property. This area will have a six-foot high cyclone fence with locks. This area will be about 40 feet by 80 feet and will have two gates. One gate will allow the drill rig

access to the area so it can be secured at night. The other gate will allow access and egress for storing drill cuttings. Empty 55 gallon drums and a DOT approved dumpster will be stored in the fenced area. Drill cuttings will be stored in 4 ft. x 8 ft. x 1 1/2 ft. metal tub as the borehole is being drilled. At the end of each borehole, the cuttings will be consolidated into the on-site dumpster.

This area will also house a temporary field office in a trailer. The trailer will be supplied with electrical and telephone service and will be used to store field supplies.

## 2.5 Material Disposal

Drill Cuttings will be stored in 4 ft. x 8 ft. x 1 1/2 ft. metal tub as the borehole is being drilled. At the end of each borehole, the cuttings will be consolidated into a dumpster that will be stored on-site. At the end of the drilling program, a composite sample of the soil in the dumpster will be collected and tested. The testing will consist of:

- Volatile Organics
- E.P. Toxicity Metals
- Ingnitability
- Reactivity
- Corrosivity
- PH
- PCB's
- TCL Metals

Based on the results of these tests, the cuttings will be properly disposed of at a permitted disposal facility.

### Development and Purge Water

At a distance of 20 feet from each monitoring well, the drilling contractor will install a purge water return well (PWRW). The PWRW's will consist of 2-inch PVC well screen installed to a depth of 5 feet below grade. A locking cover and flush mounted valve box will be installed over the PWRW. As the well is developed and/or purged, the water will be piped from the pump to the PWRW. All water entering the PWRW will infiltrate back into the Upper Glacial aquifer, the initial source of the water.

## 2.6 Field Operations Schedule

Phase I of the field investigation portion of the Project Operations Plan will be schedule approximately as follows:

- Week 1** - erect fence around secured area
  - set up field office and stock with supplies
  - conduct kickoff meeting including health and safety training course onsite
  - markout utilities
  - identify sampling locations
- Week 2** - mobilize drilling contractor
  - begin borings, collect soil samples and send for laboratory analysis
  - determine if adjustments are required for health and safety
  - cuttings from soil borings collected and stored in drums dumpster
  - commence geophysical survey
- Week 3** - begin installing wells and piezometers
  - continue collecting cuttings from drilling
  - interpret data gathered from geophysical survey to locate and install off-site well

- Week 4-7** - continue installing wells and piezometers
  - begin collecting groundwater level measurements
- Week 8** - begin round one of sampling of groundwater monitoring wells
  - collect composite sample of soil cuttings
- Week 9** - complete groundwater sampling
- Week 11** - conduct second round of groundwater sampling
  - put all well development water in drums
- Week 12** - receive laboratory data from soil cuttings
  - dispose of soil cuttings.

The above field operations schedule may have to be adjusted because of weather conditions, conditions in the field or other reasons. Any such adjustments will be approved by the USEPA prior to implementation.

**SECTION 3**

**FIELD SAMPLING**

**AND ANALYSIS**

**PLAN**

### **3.0 FIELD SAMPLING AND ANALYSIS PLAN**

The Field Sampling and Analysis Plan (FSAP) incorporates Task 3- Field Investigation and Task 4 - Sample Analysis/Validation of Appendix II Administrative Order on Consent Index Number II CERCLA-80206 and include the following:

- description of sampling and analytical objectives
- the number, type and location of all samples to be collected during the field investigation
- site-specific quality assurance requirements in accordance with the Quality Assurance Project Plan for Guidance for EPA Region 2
- detailed procedures for field activities and data management elements

#### **3.1 Task 3 - Field Investigation**

The field investigation consist of the following subtasks:

- Subcontracting
- Mobilization
- Geophysical Investigation.
- Soil Sampling
- Monitoring-Well and Piezometer Installation
- Groundwater Sampling
- Storm Drain Sampling

##### **3.1.1 Subcontractors**

Several subcontractors have been identified to perform the work on the site and are listed below:

- Monitoring well drilling and installation, soil borings, well development, soil sampling.

Environmental Drilling, Inc. West Creek, NJ

- Surveying locations and elevations of monitoring wells.  
LKB, Syosset, NY
  
- EPA/CLP laboratory to analyze soil and groundwater samples for chemical parameters.  
Nyttest Environmental Inc., Port Washington, NY
  
- Geophysical Survey team to measure terrain conductivity.  
S.A. Alsup & Associates, Inc., Gloucester, MA

### 3.1.2 Mobilization

This subtask consist of field personnel orientation, equipment mobilization, and the staking in the field of the sampling locations and geophysical stations.

Each field team member will attend an orientation meeting to become familiar with the history of the site, health and safety requirements, and field procedures.

Equipment mobilization will entail the ordering, purchasing, and if necessary, the fabricating of all sampling equipment needed for the field investigation. A complete inventory of available equipment required will be secured.

Locations for the soil borings and groundwater monitoring wells will be staked at the start of the site operations. The locations will be measured from existing landmarks and provisions will be made to accommodate site activities currently in progress.

### 3.1.3 Geophysical Investigation

As part of the field investigation a geophysical survey will be undertaken in the Pinelawn Cemetery property south of the site. The area to be investigated is a heavily wooded area located south of Central Avenue and bounded by:

- Central Avenue on the north
- Republic Road/New Highway on the west
- Tracks of the Long Island Railroad to the south, and
- Wellwood Avenue on the east.

The geophysical survey will be accomplished utilizing a Geonics EM-34-3 electromagnetic terrain conductivity meter. The purpose of the survey is two fold:

- 1) to define or delineate any plume(s) which may exist immediately downgradient of the Tronic Plating Company site.
- 2) aid in determining the optimum location for the off-site monitoring well (Figure 3-1).

The geophysical survey will be conducted on approximately three east-west survey lines with stations at 20 meter intervals along their length. Due to the density of the woods in the survey area, the lines will be established at approximate 1,000 foot spacings along existing firebreaks. At each station a vertical profile of the subsurface will be conducted, this will be done by using three different intercoil spacings on the EM-34. The three intercoil spacings will be 10, 20 and 40 meters which will give effective depth of exploration responses of 7.5, 15, and 30 meters respectively. Once the survey is completed the data will be reduced and interpreted, and from this data and known existing groundwater flow trends, the location of the off-site well will be determined.

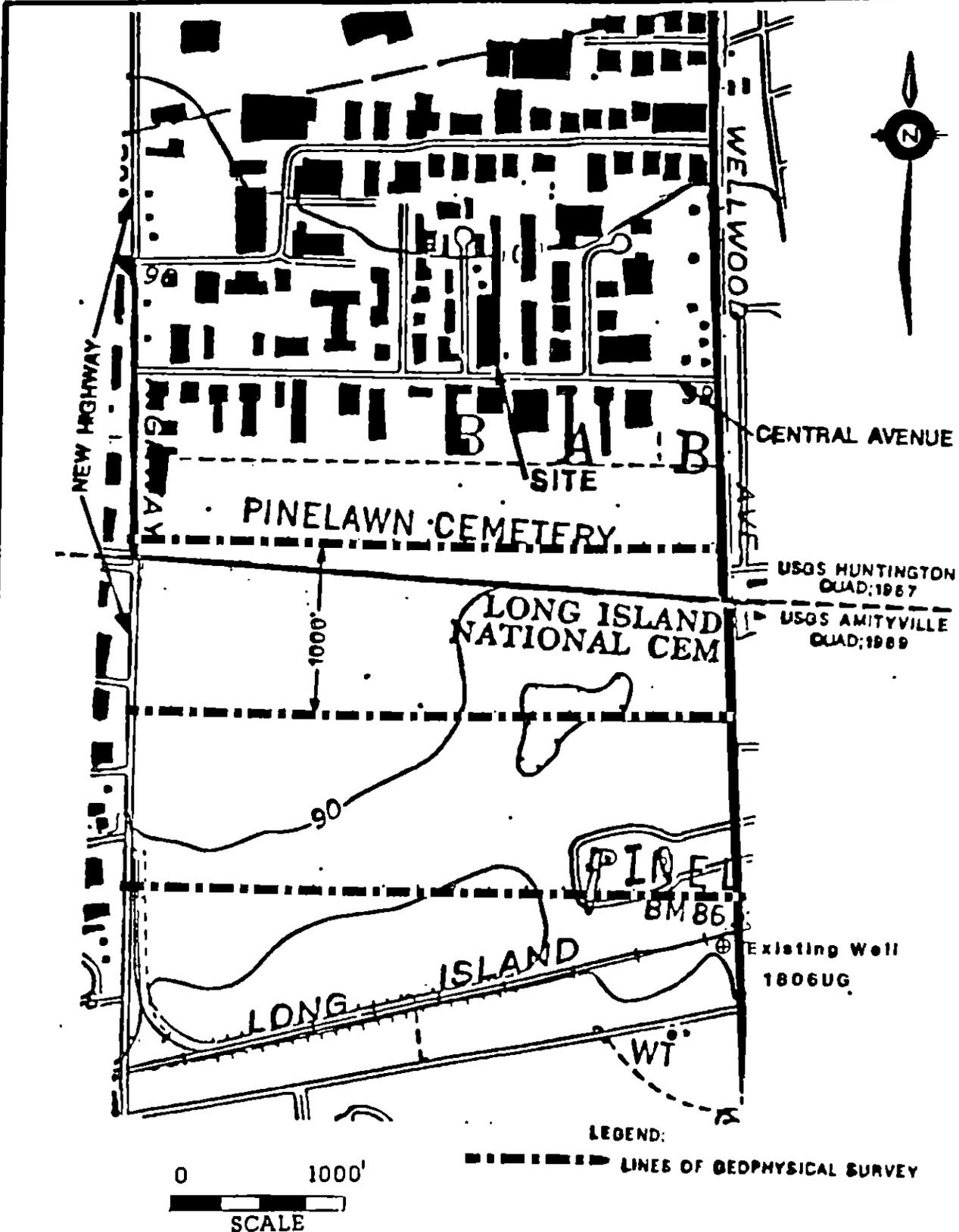


Figure 3-1

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Geophysical Survey Lines  
 Tronic Plating Co. Site  
 Farmingdale, N.Y.

### 3.1.3 Soil Sampling

For this investigation soil samples will be collected in both soil borings drilled in abandoned leaching pools, sanitary pits and drywells, and also in the borings for the monitoring wells. Figure 3-2 shows the locations of the four leaching pools, the sanitary pit, and the drywell and also the on-site monitoring wells. Table 3-1 summarizes the number and types of samples to be collected during the study and also the parameters to be analyzed for.

The purpose of the soil sampling program is to define the vertical and horizontal extent of contamination, if present, at the site, and its potential impact on human resources. Also samples will be collected to determine aquifer coefficients to aid in the modeling program. All samples will be field screened using a portable photoionization detector (PID) for volatile organic compounds and visually inspected for contamination (color, odor, texture, staining). These criteria will be used to determine which samples will be analyzed for Target Compound List (TCL) parameters and metals and cyanide. Samples will not be composited over depth to prevent dilution of contaminant concentration.

#### 3.1.3.1 Borings in Abandoned Sanitary Pit, Leaching Pools and Dry Well

Six soil borings will be drilled to the water table, one in each leaching pool, one in the sanitary pit and one in the drywell. All borings will be drilled using a truck mounted hollow stem auger rig under the supervision of a hydrogeologist from C A Rich. To avoid dilution of any soil samples no water will be used during drilling. Split spoon core barrel samples will be collected continuously (every 2 feet) to the bottom of the boring. Cross contamination is avoided by driving the split spoon sampler ahead of the auger flights into undisturbed sediments using a 140 lb. hammer with a 30 inch fall. To avoid cross contamination of any soil samples several split spoon core barrel samplers will be used and each sampler will be decontaminated thoroughly following the protocols in Attachment A, between each use.

Table 3-1

## Summary of Soil Analysis

Location	Sample no.	Bottom of Pit or Pool	Highest HMu Reading	Groundwater Interface	6 ft. Below Grade
	(1)	(2)	(3)		
Sanitary Pit	(SP-1)	1-Full TCL	1-Full TCL Minus P/P	1-Full TCL Minus P/P	
Leaching Pool #1	(LP-1)	1-Full TCL	1-Full TCL Minus P/P	1-Full TCL Minus P/P	1-Full TCL
Leaching Pool #2	(LP-2)	1-Full TCL	1-Full TCL Minus P/P	1-Full TCL Minus P/P	1-Full TCL
Leaching Pool #3	(LP-3)	1-Full TCL	1-Full TCL Minus P/P	1-Full TCL Minus P/P	1-Full TCL
Leaching Pool #4	(LP-4)	1-Full TCL	1-Full TCL Minus P/P	1-Full TCL Minus P/P	1-Full TCL
Dry Well #1	(DW-1)	1-Full TCL	1-Full TCL Minus P/P	1-Full TCL Minus P/P	
Storm Drain #1	(SD-1)	1-Full TCL			
Storm Drain #2	(SD-2)	1-Full TCL			
Monitoring Well 1D	(MW-1D)		1-Full TCL Minus P/P	1-Full TCL Minus P/P	
Monitoring Well 2I	(MW-2I)		1-Full TCL Minus P/P	1-Full TCL Minus P/P	
Monitoring Well 2D	(MW-2D)		1-Full TCL Minus P/P	1-Full TCL Minus P/P	
Monitoring Well 3I	(MW-3I)			1-Full TCL Minus P/P	

Table 3-1  
(Continued)

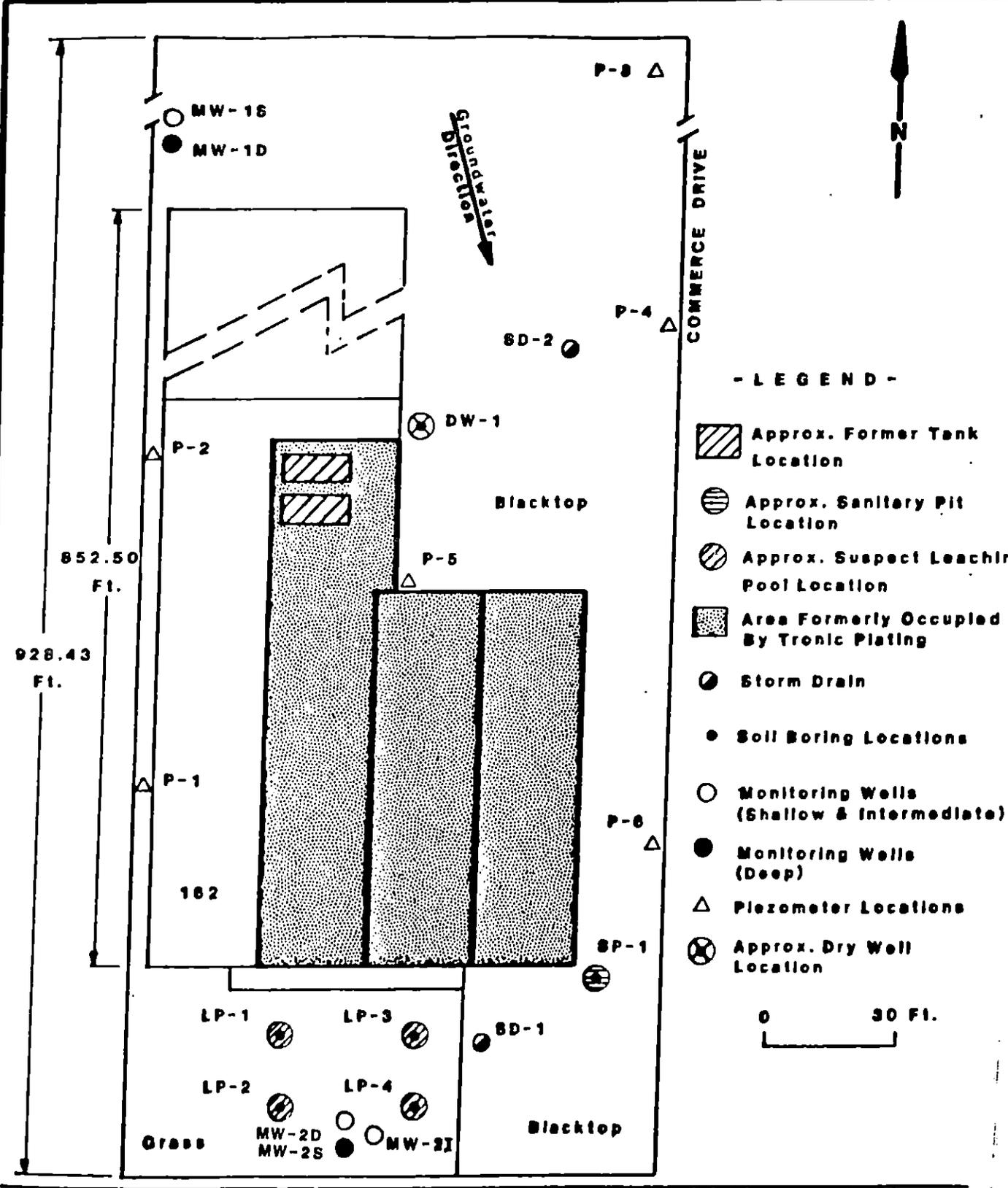
Summary of Soil Analysis

Location	Sample no.	10 ft. Below Grade	50 ft. Below Grade	75 ft. Below Grade	100 ft. Below Grade
Sanitary Pit	(1) (SP-1)				
Leaching Pool #1	(LP-1)				
Leaching Pool #2	(LP-2)		1-composite sample		
Leaching Pool #3	(LP-3)		for		
Leaching Pool #4	(LP-4)		Remedial Parameters (4)		
Dry Well #1	(DW-1)				
Storm Drain #1	(SD-1)				
Storm Drain #2	(SD-2)				
Monitoring Well 1D	(MW-1D)	1-Full TCL		(6) 1-Modeling & 1-Rem. Parameters	(5) 1-Grain Size
Monitoring Well 2I	(MW-2I)	1-Full TCL		1-Grain Size	
Monitoring Well 2D	(MW-2D)	1-Full TCL		1-Modeling	1-Grain Size
Monitoring Well 3I	(MW-3I)	1-Full TCL		1-Remedial Parameters	1-Full TCL Minus P/P 1-Grain Size

Field Blanks - Full TCL - One per equipment type per decon event  
 Trip Blanks - Volatile Organics Analysis - One per day of sampling  
 Duplicates - 1 duplicate will be collected for every 20 samples collected

- (1) Boring will be adjacent to the active sanitary pit
- (2) Full TCL includes volatile organics, semivolatile organics, metals plus Cr (+6), and pest./PCB's
- (3) Full TCL as above, minus the pesticide and PCB scan
- (4) Remedial parameters include - shaker test, (ASTM #D3987 - 81), adsorption isotherm and bulk density
- (5) Sieve analysis of grain size distribution
- (6) Modeling parameters included grain size, moisture content, and cation exchange capacity

(soil)



CENTRAL AVE.

Figure 3-2

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Proposed Locations of Monitoring Wells, Soil Borings & Piezometers  
Tronic Plating Co. Site  
Farmingdale, N.Y.

A hydrogeologist will observe the drilling and log each core sample in detail including any signs of contamination (odor, color, staining, texture, etc.). A sample from each split spoon will be split lengthwise. The majority of the sample will be placed in laboratory cleaned glass bottles, (8 oz. and 40 mil vials) then stored on ice for possible future analysis. A small portion of the sample will be placed in a clean 8 oz. bottle and screened for volatile organics in accordance with Attachment B. A decontaminated stainless steel knife and/or spoon will be used to cut and collect the soil sample.

It is anticipated that three soil samples will be collected from the dry well and adjacent to the sanitary pit (Note: the sanitary pit is part of the active sanitary system and cannot be drilled into). Four soil samples will be collected from each of the leaching pools (See table 3-1). These samples will be from the bottom of each pit, dry well or pool, the sample with the highest PID reading and at the groundwater interface. These samples will be analyzed for TCL volatile organic (VOA), and semivolatile organic compounds as well as metals plus Cr (+6) and cyanide. One sample from each location will also be analyzed for pesticides and PCBs. In addition, one composite sample consisting of soil from split spoon samples collected at a depth of 10 feet below each of the abandoned leaching pools will be compiled. This will be tested for the remedial parameters (ie. the shaker test, adsorption isotherm and bulk density). Also, at each of the leaching pools, a sample of the fill material will be collected at a depth of six feet. These samples will be analyzed for complete TCL parameters. Table 3 summarizes the number and types of analysis to be run at each boring location.

All samples collected for laboratory analysis will be removed from the split spoon sampler by the hydrogeologist. Wearing vinyl gloves to prevent cross contamination, the hydrogeologist will immediately place the sample in the precleaned, laboratory supplied, EPA approved sample jars and place the sample on ice. At the end of each day, the samples will be transported to Nytest Environmental Inc., Port Washington, NY. A chain of custody will be maintained from time of sample collection through to receipt by the laboratory.

Upon completion, each boring will be grouted to land surface with a 3% bentonite/cement grout. All soil removed from the borehole during drilling will be placed in a 4 ft x 8 ft x 1.5 ft metal tub and transferred to the secured on-site dumpster.

After each boring is completed the drill rig and all equipment will be taken to the decontamination pad and thoroughly cleaned. The hollow stem augers, drilling rods and other large equipment will be decontaminated with high pressure steam.

The split spoon core barrel samplers will be cleaned as described in Attachment A.

### 3.1.3.2 Soil Sampling at Monitoring Wells

As part of the soil sampling program soil samplers will be collected every 2 feet on-site from the ground surface to the water table, then every 10 feet thereafter during the monitoring well installation program. Table 3-1 summarizes the number of samples to be collected and the parameters to be analyzed at each well location. It is anticipated that 18 soil samples will be analyzed.

Soil samples from monitoring well locations will be analyzed for TCL volatile organics, semivolatile organics, metals and cyanide. The uppermost samples from each well location will be analyzed for the complete TCL parameters. The locations of the remaining soil samples to be collected will be based on visual inspection and PID readings of soil samples measured by the procedure in Attachment B. One soil sample from the upgradient well and the downgradient well (ie. locations 1 and 3) will also be submitted for the remedial parameters analyses required for the modeling program. These tests will include leachability tests such as ASTM Shaker Test (ASTM Ref. #P39877-81), adsorption isotherm, and bulk density (see Table 3-1). Soil samples will be collected and handled following the same protocols as during the soil boring program.

A volume of approximately one gallon of soil will be collected from the split spoon samples beginning at 50 feet below grade. This soil will be stored in a refrigerator at Nytest Laboratories until the initial soil sample analyses is completed. The remedial parameter testing will be based on these results.

### 3.1.4 Monitoring Well and Piezometer Installation

In order to define groundwater quality under the site and groundwater flow directions both vertically and horizontally it is proposed that a total of six monitoring wells and six piezometers be installed both on and off-site. A detailed description of the practices to be employed for the installation of the wells and piezometers follows in this section.

#### 3.1.4.1 Monitoring Well Installation

A total of five monitoring wells will be installed on-site and one monitoring well will be installed off-site. Figure 3-2 gives the proposed locations of the on-site monitoring wells, the location of the off-site well will depend on the results of the geophysical survey. Figure 3-3 depicts the anticipated depths and screen zones of the six wells (2 deep, 2 intermediate, and 2 shallow).

As indicated by Figure 3-2, there will be a shallow and deep upgradient well (location 1) a shallow, intermediate and deep well adjacent to the leaching pools (location 2) and an intermediate well downgradient (location 3). The shallow wells will be completed so that 10 feet of screened section is below the water table and 5 feet above. This will accommodate water table fluctuations so that representative shallow groundwater samples can be collected at all times. The intermediate wells will be approximately 70 feet deep for the on-site and 80 feet deep for the off-site well (Figure 3-3). The deep wells will be completed at the Upper Glacial/Magothy contact estimated to be at 110 feet below grade.

The purpose of the monitoring is to determine ground-water quality beneath the site, potential off-site impact of the site, groundwater flow velocity and

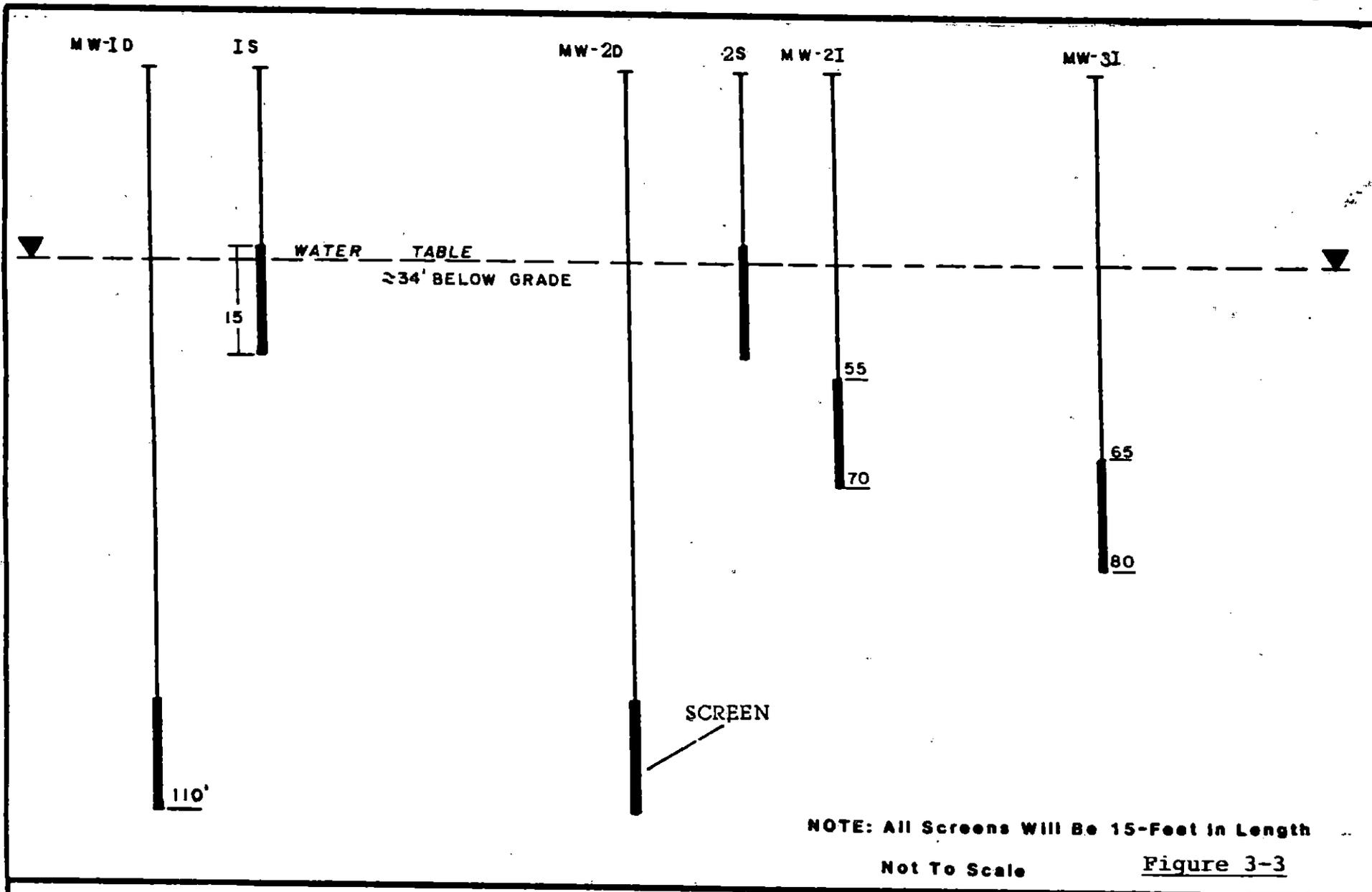


Figure 3-3

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Proposed Monitoring Well Schematic  
 Tronic Plating Co. Site  
 Farmingdale, N.Y.

direction, and also to determine vertical flow patterns at the site between the shallow and deep horizons of the upper glacial aquifer.

A truck-mounted hollow stem auger rig will be used to install the wells. The subcontractor will make every effort to complete all wells using this method. Should the auger method reach refusal before the desired depth is attained, the driller will switch to the drive and wash method using potable water. If this method proves to be unsuccessful or unfeasible, the boring will be completed using the mud rotary method. Split -spoon core barrel samples on-site will be collected continuously (every two-feet) from land surface to the water table and at ten foot intervals from the water table to the bottom of the boring. The off-site well will be sampled at 10 foot intervals from ground surface to the bottom of the boring.

At the well clusters the deep well (110 ft) will be drilled first and split spoon samples collected. For the shallow wells (45 ft) in the cluster no soil samples will be collected.

A hydrogeologist will observe the drilling and log each core sample in detail including any signs of contamination (odor, color, staining, texture etc.). The geologist will then screen the sample using a portable photoionization detector (PID) following the protocols given in Attachment B.

To avoid cross-contamination, all split-spoon samplers and augers will be decontaminated between each use in the same manner as the soil boring program.

When the borehole has been completed, a steam cleaned 4-inch diameter schedule 40 threaded flush joint PVC casing with 15 feet of .020 slotted screen and appropriate length of blank riser pipe will be installed. For the two shallow wells, the screen zone will be set so that it bridges the water table with five feet of screen above and 10 feet below the water table. The annular space opposite the screen zone will be packed with Morie #0 sand. A two foot thick bentonite pellet seal will be placed immediately above the gravel pack. The annular space will then be pressure grouted by tremie method with a 3% bentonite/cement mixture. Six-inch diameter, 2-foot long locking protective casings and a flush mounted valve box will be cemented

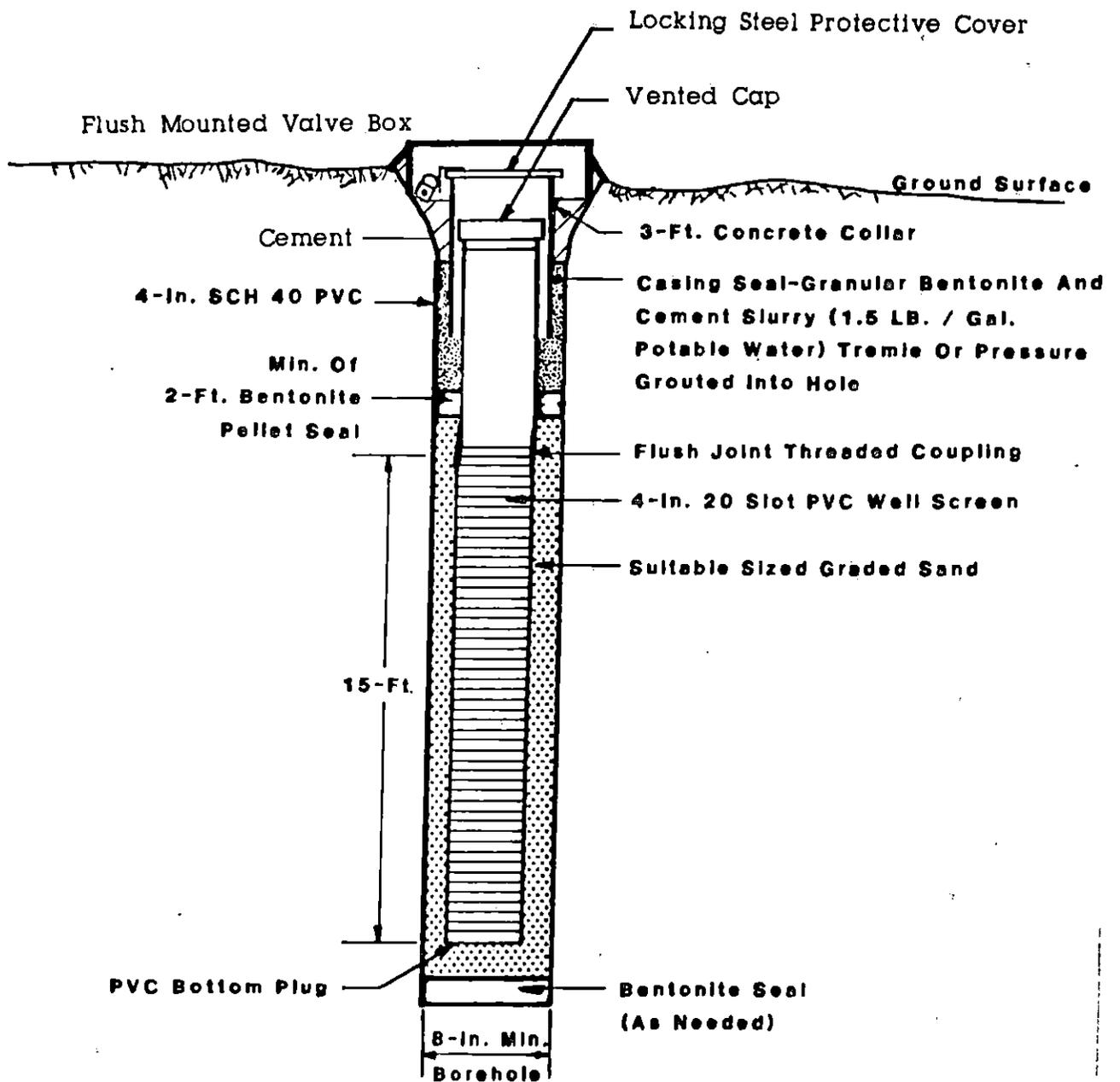
over all wells. Well construction details are given on Figure 3-4. A cement pad will be created around the protective casing base and mounded to direct surface runoff away from the casing.

Each well will be developed by pumping and surging with air, or a submersible pump. If air is used, precautions will be taken so that no air can enter the formation opposite the screen zone. An air filter will be placed inline to prevent hydrocarbon vapors from entering the well. A two pipe eductor system will be set up so that air will be directed straight out the top of the well and not into the well. Development will continue until there is a good hydraulic connection between the aquifer and well, and relatively sediment-free water is obtained from the pump discharge. This will be determined by the hydrogeologist by monitoring the discharge rate, water color, turbidity, pH, and conductivity. All wells will be developed for a minimum of one hour. All development water will be placed in cleaned drums or a suitable container by the driller, then returned to the ground through the purge water return wells (PWRW) described in Section 2.5.

#### 3.1.4.2 Piezometer Installation

In addition to the monitoring wells, six piezometers will be installed on-site to determine shallow ground-water flow direction in conjunction with the shallow monitoring wells. Piezometers are two-inch diameter wells with short screen zones that are used to determine groundwater flow direction at specific horizons in an aquifer. The piezometers will be used to measure water levels only, and not for the collection of groundwater for quality analysis. The proposed locations for the piezometers is shown on Figure 3-2.

All piezometers will be installed under the supervision of a hydrogeologist using a truck mounted hollow stem auger rig. A minimum of 4-1/4 inch ID. hollow stem augers will be used to advance the borings to 10 feet below the water table, no soil sample will be collected during the piezometer installation process. Once the borehole is completed, a two-inch diameter schedule 40, threaded flush point, PVC casing with a 15-foot long, .020 slot screen and appropriate length of blank riser pipe will be installed in the



**Figure 3-4**

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Groundwater Monitoring Well  
Construction Diagram  
Tronic Plating Co. Site  
Farmingdale, N.Y.

borehole. The screen zone will be designed so that the piezometer will monitor the same aquifer horizon as the shallow monitoring wells.

Once the well casing is installed the annular space opposite the screen zone and two feet above will be gravel packed with a suitable size graded sand. A two-foot thick bentonite pellet seal will be placed immediately on top of the gravel pack and the remaining annular space grouted to two-feet below land surface with a 3% bentonite/cement mixture. All piezometers will be completed with a flush mounted valve box and locking cover.

Once the piezometers are installed, they will be developed by the air-lifting method to remove any fine sediments from around the screen zone and to establish a ground hydraulic connection between the piezometer and the aquifer.

The piezometers will be installed before the monitoring wells. Immediately following the installation and development of the piezometers, they will be plotted accurately on a base map and surveyed vertically to an accuracy of  $\pm 0.02$  feet. After the designated measuring points on each piezometer has been surveyed, a complete round of water level measurements will be recorded and a preliminary water table map constructed. From this map, we will be able to fine tune the exact locations of the monitoring wells.

After all the monitoring wells and piezometers are installed, the elevations of ground surface and the measuring points on the wells will be surveyed in vertically and plotted on the base map by Lockwood, Kessler, & Bartlett, a professional land surveyor licensed in the State of New York. All elevations will be tied into an existing USGS benchmark.

### 3.1.4.3 Decontamination Procedures

Prior to any drilling activities on-site all drilling and sampling equipment will be decontaminated. Decontamination of the drilling rig, tools and sampling equipment will be accomplished at the decontamination pad set up on-site. The pad will consist of a bermed area lined with 6 mil thick plastic sheeting. The decontamination area will be maintained so that all water generated during decontamination will be contained and put in a 4 ft x 8 ft x 1 1/2 ft metal tub, then discharged to a PWRW on-site. The larger equipment such as the drilling rig, rods, and augers will be decontaminated with high pressure steam. Split spoon samples and more delicate equipment will be cleaned using methods described in Attachment 3-A. At the end of the study, all material generated and placed in the dumpster during decontamination will also have to be sampled so that the contents can be properly disposed of.

All sampling equipment will be decontaminated between samples and the drilling rig and other equipment will be cleaned between holes. At the end of the drilling program all equipment will be thoroughly decontaminated before leaving the site.

### 3.1.4.4 Water Levels

Water Levels in all seven monitoring wells (including 1806UG, if possible) and six piezometers will be measured on at least three occasions. Water levels will be measured using an electronic probe and steel tape to an accuracy of  $\pm 0.1$  ft. All water level measurements will be recorded in the field notebook along with time of measurements, well number, and weather conditions. This data will then be reduced to a table for the final report and several water-table maps constructed, along with a summary of ground-water gradients between deep and shallow monitoring wells.

Because of the nature of the site and the number of storm drains and dry wells located in the area, and the recharge basin located adjacent to the northeast corner of the site, it is proposed that at least one round of water

levels be measured after a period of precipitation. This is to determine if surface run-off from the parking lots into the storm drain, dry wells and recharge basin has any mounding effect on the groundwater table, and if flow direction and gradients change between deep and shallow wells.

#### 3.1.4.5 Hydrogeologic Investigation

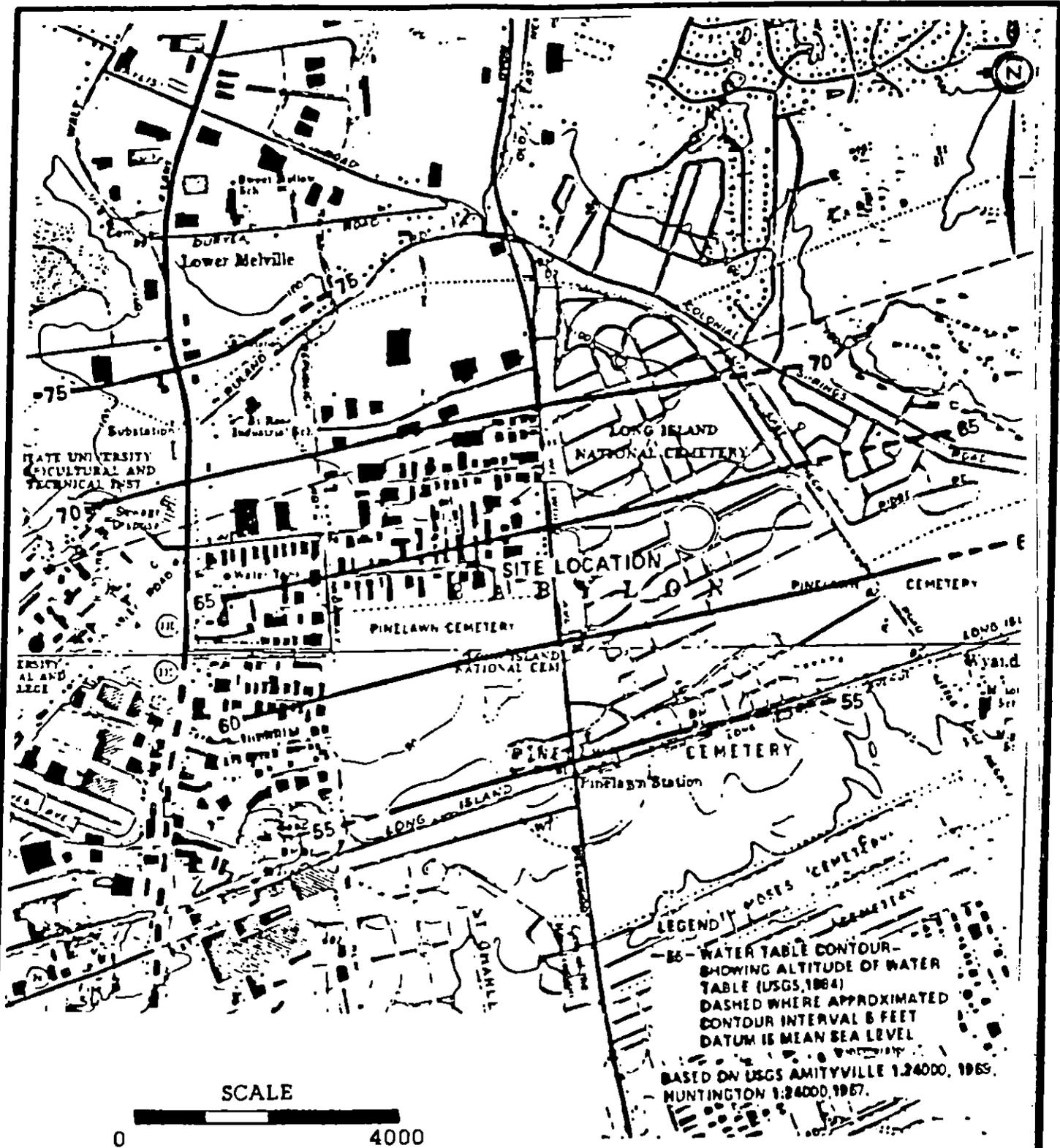
A preliminary hydrogeological investigation to establish general groundwater flow direction within a radius of 0.75 miles of the Tronic Plating Company site (Figure 3-5) has been undertaken. Figure 3-6 illustrates the well locations and indicates the well uses within the previously mentioned radius.

#### 3.1.5 Groundwater Sampling

Two weeks after all of the monitoring wells have been installed and developed, they will be sampled. The six new monitoring wells and the existing well number 1806UG located on Pinelawn Cemetery property will be sampled on two occasions at least one month apart.

The samples will be analyzed for parameters as noted in Table 3-2. In addition, groundwater samples will be taken for remedial technology analyses (Table 3-2, footnote). For quality assurance, a duplicate sample will be collected for each sampling round, and at least one field blank will be collected per equipment type per decontamination event relative to that particular piece of equipment.

The first round of volatile organics samples will be analyzed using USEPA method 624. For the second round of sampling, wells with "non-detect" concentrations using the 624 method will be analyzed using USEPA method 524 which has lower detection limits. Wells that showed detections in the first round of volatile sampling will again be analyzed using method 624 for the second round.



(Ref.- Ebasco Services, 1988)

Figure 3-5

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Infrared Water Table Map  
 Tronic Plating Co. Site  
 Farmingdale, N.Y.

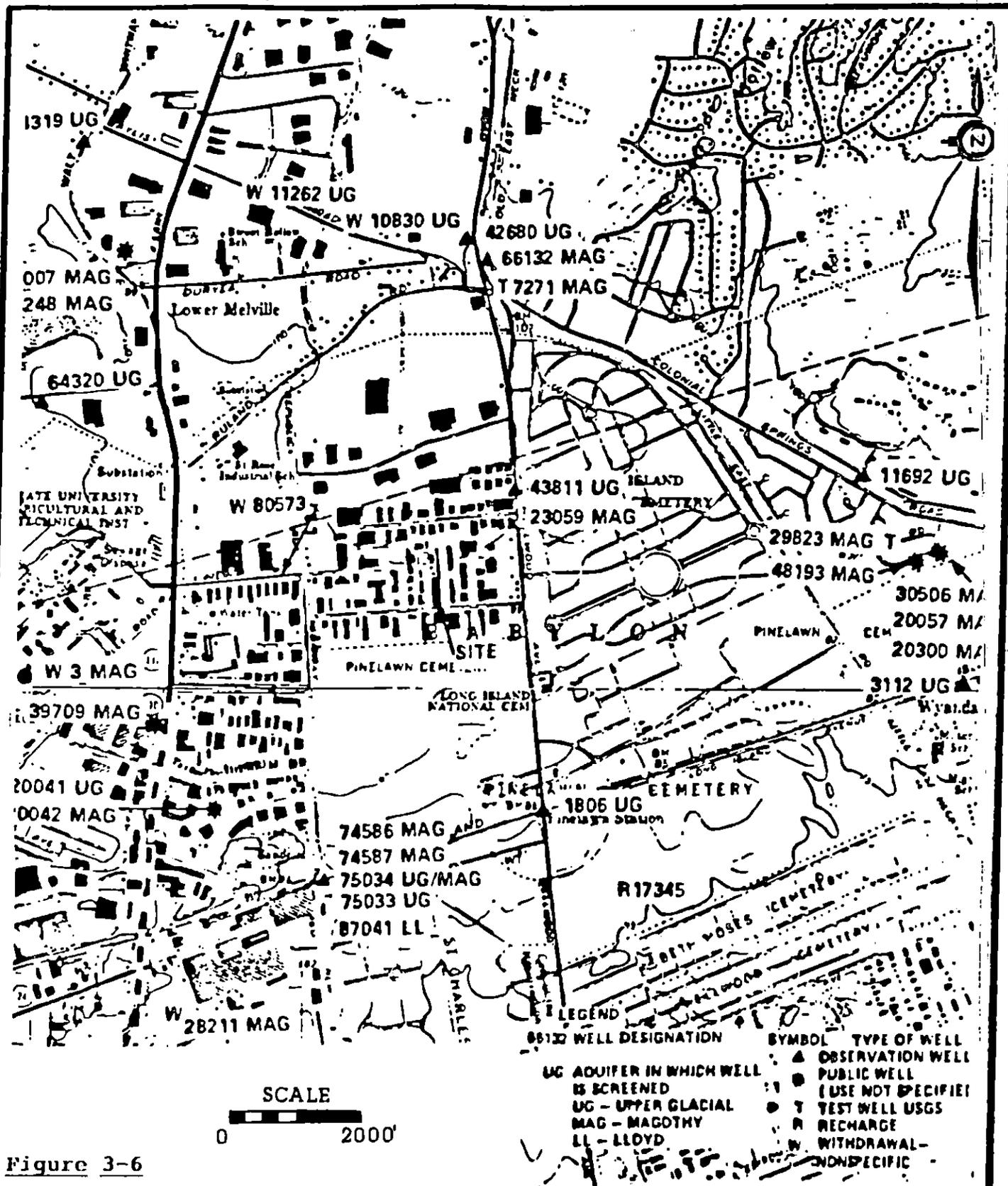


Figure 3-6  
(Ref. - Ebasco Services, 1988)

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Well Inventory Map  
Tronic Plating Co. Site  
Farmingdale, N.Y.

All monitoring well will be sampled following the protocols in attachment C. Three to five well casing volumes will be purged from the well using a stainless steel housed submersible pump and polyethylene tubing prior to sampling. The pump will be flushed with liquinox and water followed by a tap water rinse and a deionized water rinse. Portions of the polyethylene tubing touching the water table will be discarded between wells. The wells will not be allowed to be pumped dry. The ph, conductivity, and temperature will be measured at the start of purging and at the end of each purged well volume. Samples will be collected within 3 hours of purging. Stabilization of these parameters between successive purged volumes will indicate that the groundwater in the well is representative of the aquifer and not stagnant water from the well. Stabilization is considered to be when three consecutive temperature readings are within 1 degree of each other, pH within 0.5 units and conductivity within 5-10%. Samples will be collected with either stainless steel or teflon bottom loading bailers. Precleaned bailers will be provided for each well for each day of sampling.

All samples will be transported to Nytest Environmental Inc., Port Washington, NY, on the same day they are collected. Nytest Environmental Inc. is a certified EPA/CLP Laboratory for RI/FS analytical work and their QA/AC package is on file with NYSDEC. Contract Laboratory Program (CLP) procedures will be followed, but will be reported with each sample result only if requested by EPA. A chain-of-custody form will be filled out and maintained for each sample (Attachment D). The samples will be analyzed for the analytes determined in Table 3-2.

### 3.1.6 Storm Drain Sampling

A total of two sediment samples and two water samples (if water is available in the storm drains) will be collected from the locations shown on Figure 3-2. The results of the analyses of these samples will be used to estimate what contaminants are or may have been introduced to the groundwater at the site from sources other than the former leaching pools.

Storm drain sediment samples will be collected with a decontaminated stainless steel hand auger. The auger will be cleaned as per Attachment A. The VOA vials will be filled immediately upon retrieving the auger. All other sample bottles will be filled after the remaining soil is homogenized in a stainless steel bowl using a stainless steel knife or spoon. All equipment will be cleaned as per Attachment A. These grab samples will be analyzed for the parameters shown in Table 3-1. The terminus of the storm drains will be investigated and included in the R. I. report. If water is available in the storm drains, a water sample will also be collected with a precleaned bottom loading teflon bailer, and analyzed for TCL volatile organics. Water samples will be collected before the sediments are sampled.

### 3.1.7 Field Quality Assurance/Quality Control Protocol

All downhole drilling equipment will be steam-cleaned upon arrival on-site, and between boring locations. Development and purge pumps are to be cleaned between each use by passing cleaning solution through the pump. Cleaning will consist of a scrub-brush wash in a laboratory-grade detergent (Alconox or suitable equivalent) and fresh water solution followed by 2 fresh water rinses.

Provision must be made for decontamination of all sampling equipment. All sampling equipment will be cleaned between each use in the following manner: laboratory grade detergent and fresh water wash using scrub brush, followed by two fresh water rinses. This will be followed by a rinse using a 10% nitric acid solution (hydrochloric acid for stainless steel equipment), double deionized water rinse, pesticide grade acetone rinse, pesticide grade hexane rinse, air dry, double deionized water rinse, and final air dry. Decontaminated sampling equipment will then be wrapped in clean (unused) aluminum foil pending use for sample collection. New polypropylene rope used to suspend the sampling bailer and will be replaced between sampling locations. Gloves worn for sample handling will also be discarded between sample collections.

A daily log book (identified) of the sampling program must be kept in the field. All field observations including soils characterization, OVA/HNU screening results, sample designations and depths are to be recorded in the field book. Entries will be dated and initialed by field sampling personnel on a daily basis. The log book must be paginated and all notes are to be entered in waterproof ink. Full chain-of-custody control will be maintained throughout the sampling program as describes in Appendix III.

Samples will be packaged in laboratory-issued sample containers and stored on ice pending same day or overnite shipment to the laboratory. Soil samples for volatile organic analysis will be collected immediately upon opening the split spoon sampler and packaged in two 40 mil. glass vials with teflon-lined poly caps. Special care should be taken to completely fill the vials so that no head space remains after they are sealed, thus minimizing the loss of volatile organic compounds.

Samples for volatile organic analysis will be handled quickly and carefully to minimize vapor loss to the atmosphere. Material for head-space analysis and soil characterization purposes will be collected separately after the volatile organics vials have been filled. Groundwater samples for volatile organic analysis will be packaged in 40 mil. vials. Care must be taken to completely fill the vials allowing no bubbles when sealed. Groundwater samples for metals and volatiles will be properly preserved in the field according to USEPA Contract Laboratory Program (CLP) protocol prior to laboratory submittal.

Trip blanks and field blanks will also be submitted for analysis along with the field samples. A trip blank will consist of laboratory cleaned sample containers (two 40 mil. VOA vials) filled with laboratory-demonstrated, analyte-free water. The water will be obtained from the Nytest Environmental, Inc. Trip blanks will be collected at a frequency of one per sampling day. They will be handled and transported in the same manner as the field samples acquired on that day, and submitted to the laboratory for volatile organic analysis. A field blank will consist of laboratory cleaned sample containers which are transported empty into the field. Laboratory-demonstrated, analyte-free water is passed through or over the sampling

equipment used on that particular day, and collected in the cleaned containers. Field blanks will be collected at a frequency of one per equipment type per decontamination event, and analyzed for the same parameters as the field samples. The filtering equipment for the metals analysis will also be flushed with field blank water.

In addition, one in every 20 samples submitted for laboratory analysis will be submitted in duplicate. If less than 20 samples are collected for a particular medium, one sample is still to be collected in duplicate. The duplicate sample will be analyzed for the same analytical parameters as each field sample.

Internal laboratory QA/QC procedures must be followed, the methodologies of which are standard under the EPA Contract Laboratory Protocol Quality Control Program. These include: GC/MS instrument tune and mass calibration, system performance check and initial calibration, continuing calibration check, method blank, internal standards, and matrix and surrogate spiking procedures.

### 3.1.8 Insitu "Slug" Permeability Tests

To measure the hydraulic conductivity of the aquifer zones screened by monitoring wells, all 4-inch diameter wells installed will be "slug" tested. Slug testing is a well established method for measuring the insitu permeability of soil. Slug testing will be performed after the wells are developed and before they are purged for sampling.

The slug tests will be performed by lowering a 2-inch diameter, gravel filled PVC weight into each of the wells. The weights or slugs will be washed in liquinox and rinsed with tap water and deionized water before being lowered into the well.

The slug will be lowered to within one foot of the water surface of the well. An electronic water level indicator will then be used to measure the depth to

water. The slug will then be submersed and water levels, will be measured at the following intervals:

0 to 5 minutes	every 0.5 minute
5 to 10 minutes	every 1 minute
10 to 20 minutes	every 2 minutes
30 to end of test	every 5 minutes

Once the water level is at least 90 % recovered, the slug will be raised up out of the water and the process will be repeated. The slug and water level indicator will be cleaned between each well.

### 3.1.9 Phase II

As noted in previous sections of this Project Operations Plan, a two-phased approach will be employed to determine the nature and extent of contamination resulting from the operation of the Tronic Plating Company facility. Because there is a possibility that off-site migration of contaminants may have occurred, a groundwater modeling effort will be performed at the end of Phase I.

#### 3.1.9.1 Computer Modeling Program

The major objective the Phase I effort is to determine the extent and consequences of potential contaminant plume migration from the Tronic Plating Company Site. To delineate a potential downgradient groundwater contaminant plume and more efficiently implement Phase II efforts, C A Rich will use a computer model to characterize contaminants in the groundwater at and downgradient from the Tronic Plating site. The model will take into account important aspects of aquifer interactions with contaminants such as retardation, adsorption, degradation and dispersion.

C A Rich will employ both a groundwater flow model and a transport model which have been successfully used in the past. The Konikow and Brederhoff/MOC model will initially be utilized. This initial proposal does

not preclude the use of alternative models, such as, PLASM, CGEST, SUTRA, SWIFT OR MODFLOW. However, the actual models applied to the project will be selected based on accuracy and availability of data necessary to perform the modeling. C A Rich will employ only well documented and accepted flow and transport models.

#### **Anticipated Results from Modeling**

Based on the results of the Phase I database, combined with preliminary fate and transport modeling, several important issues regarding off-site contaminant migration can be addressed:

- Potentially immediate health risks can be more accurately defined for downgradient locations at which groundwater is utilized.
- A basis for location and number of Phase II monitoring wells (if needed) will be more readily defined.
- FS efforts will be more effective in determining various groundwater and soil remediation alternatives.

If Phase II work is recommended, based upon the results of Phase I and the modeling program, a Phase II work plan will be prepared and submitted to the EPA for review and approval. The effect of this Phase II work on the schedule proposed for the work specified in this Work Plan is discussed in a later section.

#### **3.2 Task 4 - Sample Analysis/Validation**

A summary of the analytical effort is shown in Tables 3-1 and 3-2. Attachment C describes in detail the Quality Assurance/Quality Control Plan for the remedial investigation. All samples will be analyzed by Nytest Environmental Laboratories Inc., an approved EPA/CLP laboratory.

Table 3-2  
Summary of Groundwater Analysis

Sample Location	Sample no.	TCL Volatile Organics	TCL Semi Volatile Organics	Pesticides PCBs	TCL Metals & Cr (+6) (Filtered)	TCL Metals & Cr (+6) (Unfiltered)	Cyanide	Remedial Parameters
<u>On - Site</u>								
Storm Drain #1 *	(SD-1)	1			1	1	1	
Storm Drain #2 *	(SD-2)	1			1	1	1	
Monitoring Well 15	(MW-15)	2	1	1	2	2	2	1
Monitoring Well 10	(MW-10)	2	1	1	2	2	2	
Monitoring Well 21	(MW-21)	2	1	1	2	2	2	1
Monitoring Well 25	(MW-25)	2	1	1	2	2	2	1
Monitoring Well 20	(MW-20)	2	1	1	2	2	2	1
Duplicates		2	1	1	2	2	2	1
<u>Off - Site</u>								
Existing Well #1806UG		2	1	1	2	2	2	
Monitoring Well 3I (MW-3I)		2	1	1	2	2	2	1
Field Blanks		2	2	2	2	2	2	1
Trip Blanks		10						
		30	10	10	20	20	20	7

Notes:

\* - If water is present

Remedial Parameters - Biological oxygen demand, chemical oxygen demand, oil and grease ase, alkalinity, bicarbonarbonate, carbonate, hardness, sulfate, chloride

Field analysis - pH, temperature, specific conductance

Trip blank - a trip blank will be sent with each shipment container for volatile organic analysis

(tetr)

### 3.2.1 Soil Analysis

Surface and subsurface soils will be sampled from eleven borings around the site, and two storm drains. Thirteen soil samples will be analyzed for the complete Target Compound List (TCL) parameters (volatile and semivolatile organics, metals, cyanide, and pesticide/PCBs). Included in the thirteen samples is a duplicate sample to be analyzed for complete TCL parameters minus pesticides/PCBs (Table 3-1). Analysis for metals and cyanide in soils will also be performed on these thirty-two samples. In addition at least two field blanks will be taken for analysis of complete TCL parameters.

These compounds will be analyzed according to current CLP methodologies, CLP-SOW. A complete list of analytical procedures for the various parameters is given in Attachment C, Appendix 1. A trip blank will be supplied by the laboratory and will remain in each cooler containing samples for volatile organics from the time it leaves the laboratory until the time it is returned. These trip blanks will be analyzed for TCL volatile organics. In addition to the soil samples for chemical analysis, seven soil samples will be collected for the modeling program and two for the remedial technologies study (Table 3-1).

### 3.2.2 Water Analysis

A total of eighteen water samples will be collected during the Phase I remedial investigation (RI); these samples will be collected from the monitoring wells existing well 1806UG (if possible), and two storm drains (if water is present). These locations will be sampled on two occasions at least one month apart and samples will be analyzed for the following: TCL volatile organics; dissolved TCL metals (filtered); total TCL metals (unfiltered), and cyanide. In addition on the first round of sampling, monitoring wells MW-1S, MW-2S, and MW-3I, will be sampled for TCL semivolatile organics and pesticides/PCBs, at this time existing well 1806UG (if possible) will also be analyzed for pesticides (Table 3-2).

As part of the analysis validation program a duplicate sample will be collected on each sampling round and analyzed for the following: TCL volatile organics; dissolved TCL metals (filtered); total TCL metals (unfiltered); stet cyanide. In addition at least one field blank will be collected per equipment type per decontaminant event during monitoring well sampling and analyzed for complete TCL volatile and semivolatile organics, pesticides/PCBs, and total TCL metals (unfiltered), upon receipt by the laboratory. Trip blanks will be provided with each sample cooler containing samples for volatile organics and analyzed for TCL volatile organics.

### 3.2.3 Sample Tracking

C A Rich will track the samples sent to Nytest to assure the continuity and consistency of data and analyses throughout the sampling program. Tracking will include tabulating the data as samples are obtained, dates shipped, analyses performed, holding times, dates extracted and analyzed, and dates validated. The Quality Assurance Officer will notify the Site Manager in the event of problems with the sample analyses.

### 3.2.4 Analysis Validation Program

Trip blanks, field blanks, and duplicate samples will be used to verify the quality of the field sampling and laboratory results. A brief description of each follows:

-- Trip blank: a sample of distilled and deionized water will be put into a sample bottle by the laboratory prior to arriving at the site and then handled in the same manner as the actual samples. This can be an indicator of sample contamination during the entire sampling process.

-- Field blank: a sample of distilled and deionized water will be put into a decontaminated bailer or split spoon sampler and then into a sample bottle while on site. The sample will then be handled in the same manner as the

actual samples. This can be an indicator of sample contamination due to on-site activities or contaminated sampling equipment.

-- Duplicate samples: Duplicate samples will be taken from a single volume of water in the bailer or soil in the split spoon sampler. These will be submitted to the selected laboratory "blind" for comparison of analytical results.

### 3.2.5 Data Management

All data generated during the remedial investigation will be accurately communicated and properly managed. The two components of data management essential to a properly performed remedial investigation are data processing and storage and quality assurance. Data processing and storage techniques to be implemented for this study are described in this section. Quality assurance is described in detail in Attachment C, Quality Assurance/Quality Control Plan for the Tronic Plating Site.

#### 3.2.5.1 Documenting Field Measurements and Observations

All field measurements and observations will be recorded in project log books, field data records, or similar types of record-keeping books. Field measurements will include pH, temperature, conductivity, water flow, and any other parameters essential to the RI. All data will be recorded directly and legibly in field log books with all entries signed and dated. If entries must be changed, the change will be made with a single stroke mark and not obscure the original entry. The reason for the change will be dated or identified at the time the change is made. Field data records will be organized into standard formats whenever possible, and retained in permanent files. At the end of each day in the field, the field books will be photo copied by the field manager and kept in a locked file.

### **3.2.5.2 Sample Identification and Chain-of-Custody**

Field samples will be identified by a sample label. The information on the sample label will include: the date and time the sample was collected, the sampling location or station, the name of the individual collecting the sample, and any pertinent remarks.

Sample possession will be traceable from the time the sample is collected or developed until it and the derived data are introduced as evidence for legal proceedings. Chain-of-custody procedures will be followed to document sample possession. A sample is considered under custody if:

- It is in your possession, or
- It is in your view, after being in your possession, or
- It is in your possession and you locked it up, or
- It is in a designated secure area.

Chain-of-custody procedures are discussed in detail in Attachment D

### **3.2.5.3 Document Control, Inventory, and Filing Systems**

These procedures are described in detail in Attachment D.

**SECTION 4**

**PROJECT**

**SCHEDULE**

## 4.0 PROJECT SCHEDULE

The investigation at the Site consists of a two-phased approach to gather site-specific data. Phase I will consist of an initial site investigation to determine the nature and extent and source of the contamination. During this phase, groundwater, soil and surface water runoff will be collected from the site and sent for chemical analysis. If Phase II is required, it could consist of an investigation to determine the vertical and horizontal extent of contamination. This could include additional sampling of groundwater and soils on and off the Site. The following schedule only applies to Phase I.

TABLE 4-1 Revised Project Schedule-Tronic Plating Co. Site

### TASK 1 PROJECT PLANNING

Prepare POP	--	Completed
Revise POP	--	Completed

### TASK 2 COMMUNITY RELATIONS (USEPA)

### TASK 3 FIELD INVESTIGATION

Collect Soil Samples	--	one week
Install GW Monitor Wells	--	two months
Sample Wells	--	two 1-week events

### TASK 4 SAMPLE ANALYSIS/VALIDATION

Laboratory Analysis	--	one month
Sample Validation	--	one month

TASK 5 DATA EVALUATION	--	one month
------------------------	----	-----------

### TASK 6 RISK ASSESSMENT (USEPA)

TASK 7 TREAT STUDY/PILOT TEST	--	one month
TASK 8 REMEDIAL INVEST. REPORT	--	two months

# SECTION 5

# REFERENCES

## **5.0 REFERENCES**

**Benson and Burns Consulting Engineers, 1974. Tronic Plating Co., Inc. Wast Treatment System. Engineering Report.**

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**Suffolk County Department of Health Services, Analysis Report of Sample Collected from Storm Drain, Northeast of Rear Door of Tronic Plating, August 25, 1982.**

**US Department of Agriculture, Soil Conservation Service, April, 1975. Soil survey of Suffolk County, New York.**

**U.S. Environmental Protection Agency, November, 1984. Standard Operating Safety Guides. Office of Emergency and Remedial Response.**

**Jensen HM, and Julian Soren, 1974, Hydrogeology of Suffolk County, L.I., N.Y., USGS Hydrologic Investigation Atlas HA-501.**

**Pluhowski, E.J. and I.H. Kantrowitz, (1964) Hydrology of Babylon-Islip Area, Suffolk County, L.I., N.Y. USGS Water Supply Paper 1968.**

**ATTACHMENT A**

**SAMPLING**

**EQUIPMENT**

**DECONTAMINATION**

**PROCEDURE**

## SAMPLING EQUIPMENT DECONTAMINATION PROCEDURE

### Procedure

1. Wash with non-phosphate detergent solution.
2. Rinse with distilled water.
3. Rinse with a nitric acid solution (if metals are to be analyzed).
4. Rinse with distilled water
5. Rinse with laboratory grade hexane (if PCBs are to be analyzed).
6. Rinse with methanol (laboratory grade).
7. Rinse with distilled water.
8. Rinse three times with deionized water.
9. Allow to air dry.
10. Wrap with aluminum foil, shiny side out.

**ATTACHMENT B**

**PROTOCOL FOR  
VOLATILE ORGANIC  
SCREENING OF  
SOIL SAMPLES**

## **PROTOCOL FOR VOLATILE ORGANIC SCREENING OF SOIL SAMPLES**

- 1. Open the split-spoon sampler, measure the recovery, separate the wash or cuttings from the true sample by using a dedicated stainless steel spatula.**
- 2. Place the sample in an 8-ounce glass jar (as quickly as possible to avoid loss of volatiles), filling the jar half full. Place an aluminum foil seal between the glass and the metal cap and screw tight.**
- 3. Jars will be labeled with the boring number, depth of sample, date of collection and blow counts. In addition, the hydrogeologist will:**
  - take samples at the appropriate depths**
  - properly discard unrepresentative portions of the sample**
  - decontaminate the sampler between uses**
  - direct the driller to use proper methods during sample collection and not to use oil or grease on tools entering the borehole.**
- 4. Log the sample in detail and record sediment characteristics (color, odor, moisture, texture, density, consistency, layering and mineralogy).**
- 5. After the sample has been collected and bottled, heat the sample to approximately 80 degrees over a two minute period.**
- 6. Pierce the aluminum foil seal with the extension probe from the photoionization meter and measure relative concentration of volatiles in headspace of the soil sample.**
- 7. Any sedimentary material not representative of the interval sampled will be placed in a pile with the other cuttings from the borehole.**

8. The split-spoon core barrels will be cleaned as specified in Attachment A.
9. The photoionization meter will be calibrated daily using 100 ppm isobutylene gas supplied by HNU.

**ATTACHMENT C**

**GROUNDWATER**

**SAMPLING**

**PROCEDURES**

## **GROUNDWATER SAMPLING PROCEDURE - VOLATILE ORGANICS AND OTHER CONSTITUENTS**

- 1. Identify the well and enter presampling information in the field notebook and on the sampling form. Fill out other items on sampling form.**
- 2. Inspect protective casing and note any items of concern such as missing lock or bent casing.**
- 3. Clean the top of the well off with a clean rag and remove the cap placing it on a clean surface.**
- 4. Clean the steel tape with distilled water and measure the depth to water. Record this and compute the volume of water in the well.**
- 5. The pump and polyethylene tubing shall be washed in liquinox and tap water followed by a tap water rinse and a deionized water rinse between each well.**
- 6. Existing wells will be purged by the hydrogeologist on site. All monitoring wells will be pumped using a stainless steel housed submersible pump and polyethylene tubing. The polyethylene tubing that touches the water will be discarded between wells.**
- 7. Record the physical appearance of the water on the field data from (color, odor, turbidity, etc.) at the start and after each time a well volume is purged.**
- 8. Prepare the bottles for receiving their samples (labels, place on ice, etc.).**
- 9. Within 3 hours after the well has been purged, a teflon or stainless steel bailer will be used to collect the groundwater sample. This bailer will have been thoroughly pre-cleaned. Immediately prior to lowering the bailer in the well, rinse one volumes of distilled water through the**

bailer. Use non-absorbent polypropylene cord to lower the bailer into the well. This cord will be discarded after use in the well.

10. Lower the bailer into the well gently, making certain to only submerge in far enough to fill it completely.
11. Standard 40 ml, pre-cleaned, volatile organic sample bottles with teflon caps are required. Fill the bottles to the top creating a convex surface with no air bubbles. Place the cap on tightly. Gently turn the bottle over and tap lightly on the soft surface to insure that no air bubbles are present.
12. Fill the other containers provided by the laboratory in the following order:
  - volatile organics
  - semi volatile organics
  - metals
  - cyanide
  - other parameters of required
13. When sampling for filtered dissolved metals, sample must be field filtered before filling bottle. (Note: A field blank of the filtering dense must be collected).
14. Label the bottle with location number, date and other pertinent information. Record all information on the sampling data form. Cool the sample immediately on ice. Maintain the samples in a secure area and deliver to the laboratory within 24 hours.
15. After the last sample is collected, measure and record the temperature, conductivity, pH and the physical appearance of the water.
16. Replace the well cap and cover the well, locking the protective cap.
17. Rinse out the bailer and/or pump with clean water.

18. Discard the cord, rags, gloves, etc. in an appropriate manner.

19. Complete sampling data forms.

**ATTACHMENT D**

**CHAIN-OF-CUSTODY,**

**RECORDS**

**AND**

**SAMPLE MANAGEMENT**

## **CHAIN OF CUSTODY**

### **1.0 General**

The Chain-of-Custody program allows for the tracing of possession and handling of the sample from the time of collection through laboratory analysis. The chain-of-custody program at the Tronic Plating Company site will include:

- Sample labels**
- Sample seals**
- Chain-of-Custody record**
- Sample analysis request sheets**
- Field records**

### **2.0 Sample Labels**

To prevent misidentification of samples, a label will be affixed to the sample container and will contain the following information:

- a. Site name**
- b. Sample identification number**
- c. Date and time of collection**
- d. Sample designation**
- e. Sample matrix**
- f. Sample location**
- g. Signature sampler**
- h. Preservation**
- i. Type of analysis to be conducted.**

### **3.0 Sample Seals**

Sample shipping containers will be secured to insure that they have not been disturbed during transport to the laboratory, by using nylon tape and custody seals. The custody seals will be placed such that the containers cannot be opened without breaking the seal.

### **4.0 Chain-of-Custody Records**

To establish the documentation that is necessary to trace sample possession from the time of collection, a chain-of-custody record will be filled out and will accompany samples at all times. The record will contain the following information:

- a. Project name: Tronic Plating Company Site
- b. Printed name and signature of samplers
- c. Sample number
- d. Date and time of collection
- e. Grab/composite designation
- f. Sampling location
- g. Number of containers for each sample
- h. Signature of individuals involved in sample transfer  
(when relinquishing and accepting samples)
- i. Inclusive dates and times of possession.

## **5.0 SAMPLE ANALYSIS REQUEST SHEETS**

These documents will accompany the samples and will serve as official communication to the laboratory of the analyses to be performed for each sample. They will also provide further evidence that the chain-of-custody is complete.

## **6.0 FIELD RECORDS**

Field records will be maintained during each sampling effort in a logbook. All aspects of sample collection, handling and visual observations will be recorded. All sample collection equipment, field analytical equipment and equipment utilized to make physical measurements will be identified in the field logbook.

All calculations, results and calibration data for field sampling, field analytical and field physical measurement equipment will also be recorded in the field logbook. Entries will be dated and initialed. Entries will be made in ink, and will be legible. The bottom of each page will be signed.

**ATTACHMENT E**

**CONTINGENCY**

**PLAN**

## **1.0 CONTINGENCY PLAN**

**The Contingency Plan provides a mechanism for addressing unexpected situations which may arise throughout the implementation of the Project Operations Plan. Such situations might be:**

- prolonged periods of inclement weather**
- unexpected field conditions that would prevent the installation of borings in at least the approximate location identified in Section 3.0**
- determination that sampling techniques are inappropriate**
- identification of quality assurance/quality control problems**

**During the implementation of the Project Operation Plan, the USEPA's Project Manager will be notified of any situations that warrant revisions to the Plan. The notification will occur prior to any revision except in the case where such revision involves health or safety. In such a case, the Site Health and Safety Officer will have authority to make such revisions and will be responsible for the documentation of these changes in the field log.**

**If quality assurance/quality control problems are identified, the USEPA will be notified at once. Deficiencies, errors and significant defects discovered during system audits or data validation will require corrective actions. Corrective action will be implemented by revision of the analytical procedure, recalibration of instrument systems or reinstruction of analysts where necessary. Corrective action will include, where possible, the re-analysis of samples which remain with published holding times. Such a re-analysis will occur under strict adherence to the specified analytical protocols.**

**ATTACHMENT F**

**QUALITY ASSURANCE/**

**QUALITY CONTROL**

**PLAN**

**(BROSSMAN FORM)**

QUALITY ASSURANCE WORK PLAN

(Brossman Form)

for the

Tronic Plating Company Site

RI/FS

Farmingdale, New York

Project Manager:

*Eric Weinstock*

Eric A. Weinstock

Quality Assurance Officer:

*Steven Sobstyl*

Steven Sobstyl

1. Project Name: Tronic Plating Company Site RI/FS
2. Project Requested By: U.S. EPA
3. Date of Request: May 20, 1988
4. Date of Project Utilization: July, 1988
5. Project Manager: Eric A. Weinstock
6. Quality Assurance Officer: Steven Sobstyl
7. Project Description

Objective and Scope Statement:

The Tronic Plating Company occupied a portion of a building located at 164-168 Central Avenue, Farmingdale, New York, from July 1968 to March 1984. In April, 1984, Tronic Plating moved to another building at 37 Potter Street in Farmingdale. Tronic Plating operated an electroplating and anodizing company.

Between 1979 and 1982, Suffolk County Department of Health Services collected samples of industrial discharges, leaching pools, sanitary discharge pools and a storm drain onsite. Samples were found to contain copper, silver, iron, zinc, lead, cadmium and cyanide in differing concentrations.

Details of the history of the site and site description are found in previous sections of this Project Operations Plan.

Data Usage:

The data collected from the RI/FS will be used by the U.S. EPA to perform a risk assessment and by C A Rich to prepare a Feasibility Study.

Monitoring Network Design and Rationale:

Soil samples will be collected in and around the old septic system. Groundwater monitoring wells will be installed upgradient and at two downgradient locations. Wells will be installed at approximately 40, 80 and 110 feet below grade.

## Monitoring Parameters and their Frequency of Collection

One round of soil samples will be collected and analyzed for the full TCL Scan plus hexavalent chromium. Two rounds of ground-water samples will be collected, one for the full TCL Scan plus hexavalent chromium, one for organics and TCL metals plus hexavalent chromium.

### Parameter Table:

See Table F-1

## 8. Schedule of Tasks and Products

A project schedule is included in Section 4.0

## 9. Project Organization and Responsibility

The following is a list of key project personnel and their corresponding responsibilities:

Richard Izzo - sampling operations

Steven Sobstyl - sampling QC

Nytest Environmental, Inc. - laboratory analysis

Dr. Parag Shah - laboratory QC

Daryl Shoemake - data processing activities

Steven Sobstyl - data processing QC

Steven Sobstyl - data quality review

Steven Sobstyl - performance auditing

Steven Sobstyl - systems auditing

Charles Rich - overall QA

Eric Weinstock - overall project coordination

Table F-1

## Sampling Parameters, Containers, and Holding Times

Soils Analysis

Parameter	No. of Samples *	Analytical Method	Sample Preservation	Holding Time	Container
Volatiles	38	EPA-624	Cool to 4 deg. C	10 days	2-40ml. vials
Semivolatiles minus Pest./PCB's	38	EPA-625	Cool to 4 deg. C	10 days to extraction 40 days to analysis	1-8oz. glass bottle
Pest./PCB's	18	EPA-608	Cool to 4 deg. C	10 days to extraction 40 days to analysis	1-8oz. glass bottle
TCL Metals plus Cr(+6)	38	EPA-200 Series	Cool to 4 deg. C	6 months (24 hrs. for Cr +6) (26 days for Hg)	1-8oz. glass bottle
Cyanide	38	EPA-3010	Cool to 4 deg. C	14 days	1-8oz. glass bottle
Remedial Parameters	3				
-Shaker Test		ASTM #D3987-81	None	None	1-8oz. glass bottle
-Adsorption Isotherm		Note 1	None	None	1-1 gallon glass bottle
-Bulk Density		ASTM C128	None	None	1-8oz. glass

Table F-1  
(Continued)

Sampling Parameters, Containers, and Holding Times

Soils Analysis  
-----

Parameter	No. of Samples *	Analytical Method	Sample Preservation	Holding Time	Container
Modeling Parameters	2				
-Grain Size		ASTM D422-63 (1972)	None	None	1-8oz. glass bottle
-Organic Content		Note 2	None	None	1-8oz. glass bottle
-Moisture Content		ASTM D2216-80	None	None	1-8oz. glass bottle
-Cation Exchange Capacity		EPA Manual SW 846 Method 9080	None	None	1-8oz. glass bottle

\* - Includes blanks

(1) - Ill. State Geol. Survey Publication PB87-146155

(2) - Std Method of Chem. Anal. VI Ed. Vol. 2 Part B page 2314 Oxidation by chromic acid

(3) - Methods for Chemical Analysis of Water & Waste EPA 600/4-79-020

Table F-1  
(Continued)

Sampling Parameters, Containers, and Holding Times

Groundwater Analysis

Parameter	No. of Samples *	Analytical Method	Sample Preservation	Holding Time	Container
Volatile Organics	20	EPA-624	Cool to 4 deg. C HCl to pH 2	10 days	2-40ml. vials
Volatile Organics	10	EPA-524	Cool to 4 deg. C HCl to pH 2	10 days	2-40ml. vials
Semivolatile Organics	10	EPA-625	Cool to 4 deg. C	5 days to extraction 40 days to analysis	1-80oz. amber bottle
Pest./PCB's	10	EPA-608	Cool to 4 deg. C	5 days to extraction 40 days to analysis	1-80oz. amber bottle
TCL Metals plus Cr +6		EPA 200 Series	Cool to 4 deg. C HNO3 to pH 2	6 months (24 hrs. for Cr +6) (26 days for Hg)	
-(Filtered)	20				1-1liter poly bottle
-(Unfiltered)	20				1-1liter poly bottle
Cyanide	20	EPA-335.2	Cool to 4 deg. C NaOH to pH 12	14 days	1-1liter poly bottle

Table F-1  
(Continued)

Sampling Parameters, Containers, and Holding Times

Groundwater Analysis

Parameter	No. of Samples *	Analytical Method	Sample Preservation	Holding Time	Container
Remedial Parameters	7	Note 3			
-BOD		405.1	Cool to 4 deg. C	48 hours	1-1liter poly bottle
-Chloride		325.3	"	28 days	1-1liter poly bottle
-Bicarbonate		310.1	"	48 hours	1-1liter poly bottle
-Sulfate		375.4	"	28 days	1-1liter poly bottle
-Alkalinity		310.1	"	48 hours	1-1liter poly bottle
-COD		410.1	Cool to 4 deg. C H2SO4 to pH 2	28 days	1-500 ml glass bottle
-Oil and Grease		413.1	"	28 days	1-1 liter glass wide-mouth jar
-Hardness		130.2	Cool to 4 deg. C HNO3 to pH 2	6 months	1-500 ml poly bottle

(F-1A)

Table F-1  
(Continued)

Quality Assurance Parameters

	Parameter	Estimated Number of Samples	Matrix
Trip Blanks	Volatile Organics	10	Water
Field Blanks	Full TCL Scan plus Cr +6	4	Water
	Remedial Parameters	4	Water
Duplicates	Full TCL Scan plus Cr +6	2	Water
	Remedial Parameters	1	Water
	Full TCL Scan plus Cr +6	2	Soil
	Remedial Parameters	1	Soil

(QAP)

An Organization Chart is included in Section 2.4.

10. Data Quality Requirements and Assessments

See Table F-1

Accuracy, Precision and Sensitivity: The laboratory will follow the CLP-SOW for organics and inorganics. The accuracy, precision, and sensitivity are as specified in this document.

Data Representativeness: Prior to sampling groundwater monitoring well, at least three well volumes of water will be purged from the well to ensure that representative groundwater is collected. Duplicate samples will be collected in a ratio of one duplicate to every twenty samples (or fraction thereof) collected in the field.

Data Comparability: All of the analysis will be performed by the same laboratory, Nytest Environmental, Inc., using the same procedures.

Data Completeness: The laboratory is required to provide all of the back-up data needed to assess the completeness of the analysis. This will be reviewed by the Quality Assurance officer as part of his QA review.

11. Sampling Procedure: These are described in detail in the P.O.P.

12. Sample Custody Procedures

Field Documentation

As described in detail in the Project Operation Plan, following sampling, the sealed sample containers will be rinsed with tap water, dried and labeled. The sample label will contain, at a minimum, the following information:

- Matrix
- Sample ID Number
- Sample Location
- Name of Sampling Procedure
- Name of Sampling Organization
- Date and Time Sampled
- Analysis Requested.

Sample labels shall be completed in waterproof ink. Following labeling, sample containers will be placed in sealed clear plastic zip-lock type bags and placed in a cooler for storage and shipment. At least two bags of ice, sealed in double plastic bags, will be placed in each cooler and cushioned using vermiculite, foam rubber or other similar packaging material to maintain all samples at between 0°C and 4°C.

A chain-of-custody form will be maintained for each sample collected. The chain-of-custody procedure will provide an accurate written record which can be used to trace the possession and holding of samples from the time of collection through data analysis and reporting. The following information will be specified for each sample on the chain-of-custody form: 1) Sequential sample number; 2) Sample media; 3) Sample date and time; 4) Sample location; and 5) Analysis requested. One chain-of-custody form will be used for each sample shuttle shipped for analysis. Figure 6-1 provides a sample of the chain-of-custody form.

The chain-of-custody form will be signed by each participant. The forms will be placed in a water-tight plastic bag and taped to the underside of the lid of the cooler containing the samples designed on the form. The lid of the cooler will be securely taped shut. Sample coolers will be shipped the same day as sampling via Federal Express to the analytical laboratory.

Nytest Environmental, Inc. will provide the field personnel with sample shuttles containing all sample containers. Each lot of sample containers are checked for cleanliness by the laboratory and closed to prevent contamination. Field blanks, trip blanks, preservatives, etc., will be added as required by the analytical procedures. All shipping containers will be sealed with custody seals.

Samples will be received at the laboratory within 24 hours by the sample custodians who examine each sample to ensure that it is the expected sample, inspect the sample containers or possible damage, and ensure that the documentation is complete and adequate. The sample custodians will ensure that each sample has been preserved in the manner required by the particular test to be conducted and stored according to the correct procedure. Preservation and storage will require maintenance of 4°C until analysis begins.

Field log books will provide the means of recording data collection activities performed. Entries into the field log book will be described in as much detail as possible so that a new individual to the Site could reconstruct a particular situation without reliance on memory.

Field log books will be bound field survey notebooks. Log books will be assigned to field personnel but will be sorted in the field project file when not in use. Each log book will be identified in the project number. The title page of each notebook will contain: 1) the person or organization to whom the book is assigned; 2) the book number; 3) project name; and 4) start and end times and dates.

Measurements made and samples collected will be recorded in field log books. All entries will be made in waterproof ink and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark. Whenever a sample is collected or a measurement is made, a detailed description of the location of the station will also be documented. All equipment used to make measurements will be identified, along with the date of calibrations.

#### Laboratory Documentation

Upon arrival at the laboratory, samples will be checked in by the laboratory representative. All samples contained in the shipment will be compared to the chain-of-custody form to ensure that all samples designated have been received. Sample custody within the laboratory includes:

- Identification of responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment and verify the data entered onto the sample custody records.
- Provision for laboratory sample custody log consisting of numbered standard lab tracking report sheets.
- Specifications of laboratory sample custody procedures for sample handling, storage and disbursement of analysis.

Samples must be protected from light and refrigerated at 4°C until extraction or analysis. Samples will be held by the laboratory until notice from EPA to discard them is received.

## Project Documentation

A project file will be maintained by the Project Manager which will contain complete project documentation. This file will include project plans and specifications, field log books and data records, photographs, maps and drawings, sample identification documents, chain-of-custody records, the entire analytical data package provided by the laboratory including QC documentation, copies of raw data, computer printout, gas chromatographs, mass spectrum, data validation notes, reference and literature, report notes and calculations, progress and technical reports, correspondence and other pertinent information.

### 13. Equipment Calibration Procedures and Preventative Maintenance

A maintenance, calibration and operation program is implemented to ensure that routine calibration and maintenance is performed on all field instruments. The program provides equipment of the proper type, range, accuracy and precision to provide data compatible with the specified requirements and desired results. Calibration of measuring and test equipment is performed internally using in-house reference standards or externally by agencies or manufacturers.

#### Responsibility

The project Quality Assurance Officer shall be responsible for developing calibration, maintenance and field operating procedures suitable to the field instruments to be used, and to perform the scheduled monthly and annual calibration and maintenance. Field team members shall be familiar with the field calibrations, operation and maintenance of the equipment, maintain proficiency and will perform the prescribed field operating procedures outlined in the operation and field manuals accompanying the prospective instruments. They will keep records of all field instrument calibrations and field checks in the field log books.

#### Calibration

Documented and approved procedures are used for calibrating, measuring and testing equipment such as those published by the ASTM, the EPA or procedures provided by manufacturers in equipment are calibrated at prescribed intervals and/or as part of the operational use. Frequency is based on the type of equipment, inherent stability, manufacturers' recommendations, values given in national standard, intended use and experience. ; Equipment is calibrated, whenever possible, using reference

standards having known relationships to nationally recognized standards (e.g., National Bureau of Standards) or accepted values of natural physical constants. If national standards do not exist, the basis for calibration is documented.

Equipment that fails calibration or becomes inoperable during use will be removed from service and tagged to prevent inadvertent use. If on-site monitoring equipment should fail, the Site Safety Officer will either provide replacement equipment or have the malfunction repaired immediately.

Records shall be prepared and maintained for each piece of calibrated measuring and test equipment to indicate that established calibration procedures have been followed (e.g., results of calibration, problems, corrective action). A record for field equipment used only for this specific project shall be kept in the project files.

The photoionization meter will be calibrated on a daily basis using 100 ppm isobutylene supplied by HNU, Inc.

#### Preventive Maintenance

Periodic preventive maintenance is required for sensitive equipment. Instrument manuals are kept on file for reference purposes should equipment need repair. Troubleshooting section of manuals assist personnel performing maintenance tasks.

#### 14. Documentation, Data Reduction, Validation and Reporting

##### Documentation

All field data will be entered into bound serialized notebooks. Field notebooks, chain-of-custody forms, field data sheets, and laboratory reports will be filed and stored at C A Rich Consultants, Inc., Sea Cliff, N.Y. office. The documents will be tracked and the tracking sheet will be submitted as part of the QA/QC report.

##### Data Reduction, Validation and Reporting

The analytical laboratory will review appropriate laboratory quality control data to assure the validity of the analytical results provided to the consultant. The analytical laboratory will prepare and retain full analytical and QC documentation as required by the contract laboratory program (CLP).

The analytical laboratory will supply one hard copy of the retained information to the contractor where it shall remain in the project file.

The analytical laboratory will provide the following information to the contractor in each analytical data package submitted:

- Analytical test methods and results for submitted samples, with appropriate data quality notations.
- Narrative including statement of samples received, description of any deviation from the P.O.P, explanation of qualifications regarding data quality and other significant items encountered during analysis.
- According to CLP protocol, the laboratory is required to tentatively identify unknown compounds not included in the TCL list. This includes twenty (20) semivolatile organic compounds, ten (10) volatile organic compounds and ten (10) pesticide/PCB compounds.
- A QA-QC report including:

Organic Parameters

- surrogate spike results for each sample
- matrix spike and matrix spike duplicate results
- method blank results
- initial calibration verification results
- continuous calibration check

Inorganic Parameters

- spike and duplicate results
- method blank results
- initial calibration verification results
- continuous calibration check

Data assessment will be accomplished by the joint efforts of the QA Officer and Facility Coordinator will be based on the criteria that the sample was properly collected and handled according to the sampling plans and the QA/QC.

The QA Officer will conduct a systematic review of the data for compliance with the established QA/QC criteria based on the spike, duplicate and blank results provided by the laboratory. An evaluation of data accuracy, precision, sensitivity and completeness will be performed and presented in

the submittal to the USEPA, along with the laboratory results of each analysis, within two weeks of completion of such analysis. Protocols from the following documents will be used to validate the organic and inorganic data for all materials:

1. Organics-SOP No. HW-4, Revision 3, Nov. 8, 1987.
2. Inorganics-SOP No. HW-2, Revision 7, Feb. 26, 1987.

The QA Officer will identify an out-of-control data points and data omissions and interact with the laboratory to correct data deficiencies. Decisions to repeat sample collection and analyses may be made by the Facility Coordinator based on the extent of the deficiencies and their importance in the overall context of the project.

Following data review, all data generated will be entered into a computer in a format organized to facilitate data review and evaluation. The computerized data set will include the data flags provided by the laboratory in accordance with the CLP Statement of Work as well as additional comments of the data reviewer. The laboratory will provide data flags to include such items as: 1) concentrations below required detection limit; 2) estimated concentration due to poor spike recovery; and 3) concentration of chemical also found in the laboratory blank. Additional comments will address whether the data is: 1) usable as a quantitative concentration; 2) usable with caution as an estimated concentration; or 3) unusable due to out-of-control QA results.

A QA/QC evaluation of laboratory data and sampling and analytical procedures used for the samples obtained will be completed and submitted to the USEPA.

## 15. Performance and Systems Audits

### Laboratory performance and Systems Audits

Nytest Environmental, Inc. (NYTEST) must conduct both internal and external quality control checks. External quality control checks may include participation in various certification programs with various governmental agencies and/or analysis of QC samples of known concentrations received from the USEPA. Internal quality control checks (replicates, spikes and duplicates) are performed in accordance with specific methodologies and criteria required by the state in which analyses are completed. The minimum criteria used for analysis consists of a daily calibration analysis,

instrument blank analysis and sample blank analysis. In addition, at least one spike and one control are analyzed daily for each parameter. If greater than 10 analyses are performed, that 10% of analyses will consist of controls, duplicate samples or spikes. The selected analytical laboratory shall furnish the consultant performing the RI with a Quality Assurance Plan detailing internal and external quality control checks used by the laboratory.

NYTEST has been selected for the chemical analyses. Inorganic and organic testing will be performed in accordance with the procedures specified in the CLP statements of work. NYTEST is a USEPA CLP laboratory as well as a New York State certified Superfund laboratory. They have analyzed recent performance and received a Certificate of Approval on NYTEST's statement of qualification is attached in Appendix A. There are two types of quality assurance used by the CLP to ensure the production of analytical data of known and documented usable quality: 1) analytical method quality control (QC); and 2) program quality assurance (QA). Quality control checks on laboratory analyses will be performed as discussed in this section.

#### Field Team Performance and Systems Audits

The QA Officer will be responsible for auditing the field team. A minimum of one performance audit will be conducted during the monitoring program to ensure that proper procedures are followed and that subsequent data will be valid. The audit will focus on the details of the QA program, and will evaluate the following:

- Project Responsibilities
- Sample Custody Procedures
- Document Control
- Sample Identification System
- QC Corrective Action Procedures
- Sampling Techniques
- Adherence to the Approved QA Project Plan

The audit will evaluate the implementation of the project QA program. The audit checklist for field procedures is shown in Table F-2. This document will serve as a guide for the performance audit.

The QA Officer will also be responsible for conducting an evidence audit. The purpose of the evidence audit is to ensure that proper project documentation is maintained. The evidence audit checklist is shown in Table F-3. This document will serve as the guide for the evidence audit.

TABLE F-2

PERFORMANCE AUDIT CHECKLIST

Field Investigation Audit

Project No.: \_\_\_\_\_ Date: \_\_\_\_\_  
Project Location: \_\_\_\_\_ Signature: \_\_\_\_\_  
Team Members: \_\_\_\_\_

- Yes \_\_\_ No \_\_\_ 1) Has a project coordinator been appointed?  
Comments \_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 2) Was a project plan prepared?  
Comments \_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 3) Was a briefing held for project  
participation?  
Comments \_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 4) Were additional instructions given to  
project participants?  
Comments \_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 5) Is there a written list of sampling  
locations and descriptions?  
Comments \_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 6) Is there a list of accountable field  
documents?  
Comments \_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 7) Is the transfer of field documented in a  
logbook?  
Comments \_\_\_\_\_  
\_\_\_\_\_

- Yes \_\_\_ No \_\_\_ 8) Are samples collected as stated in the project plan?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 9) Are samples collected in the type of containers specified in the project plan?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 10) Are samples preserved as specified in the project plan?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 11) Are the number, frequency, and type of samples collected as specified in the project plan?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 12) Are the number, frequency, and type of measurements and observations taken as specified in the project plan?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 13) Are samples identified with sample tags?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 14) Are blank and duplicate samples properly identified?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 15) Are sample and serial numbers for samples split with other organizations recorded in a logbook or on a chain-of-custody record?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 16) Are samples listed on a chain-of-custody record?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 17) Is chain-of-custody documented and maintained?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 18) Are quality assurance checks performed as directed?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 19) Are photographs documented in logbooks as required?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 20) Have any accountable documents been lost?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 21) Have any accountable documents been voided?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yes \_\_\_ No \_\_\_ 22) Have any accountable documents been disposed of?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

TABLE F-3

EVIDENCE AUDIT CHECKLIST

Document Control Audit

Project No.: \_\_\_\_\_ Date: \_\_\_\_\_

Project Location: \_\_\_\_\_ Signature: \_\_\_\_\_

File Location: \_\_\_\_\_

- Yes \_\_\_ No \_\_\_ 1) Have the individual fields been assembled (field investigation, laboratory)?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 2) Is there a list of accountable field documents?  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
- Yes \_\_\_ No \_\_\_ 3) Are all accountable field documents present or accounted for? (Fill out additional checklist.)  
Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

#### **16. Corrective Action**

Corrective action on a day-to-day basis for field sampling will be handled by consultation between team members and the team leader. The project manager will make immediate decisions with the team members on new protocols to be followed. All changes in field sampling procedures will be documented in the field log book and reported in the final report.

Corrective action in the laboratory will be handled by consultation between the laboratory's QA Officer and the consultant's QA Officer. All changes in laboratory procedures will be documented in the final report.

#### **17. Quality Assurance Reports to Management**

Monthly reports will be issued by the Project Manager in consultation with the Field Team Leader and the QA Officer. The reports will include assessment of the status of the project in relation to the agreed upon timetable. The reports will also include, as appropriate, the results of the performance audit and evidence audit and any necessary corrective action procedures.

## Parameters and Detection limits for EPA method 524

### 1. VOCs FOR WHICH EPA HAS ESTABLISHED MCLs

<u>Compound</u>	<u>Detection Limit</u> <u>ppb</u>
Trichloroethylene	0.5
Carbon Tetrachloride	0.5
1,2-Dichloroethane	0.5
Vinyl Chloride	0.2
Benzene	0.5
para-Chlorobenzene	7.5
1,1-Dichloroethylene	0.7
1,1,1-Trichloroethane	20.0

### 2. UNREGULATED CONTAMINANTS

Detection limits range from 1 to 5 ppb

Bromobenzene	1,1-Dichloroethane
Bromodichloromethane (THM)	1,1-Dichloropropene
Bromoform (THM)	1,3-Dichloropropene
Bromomethane	1,2-Dichloropropane
Chlorobenzene	1,3-Dichloropropane
Chlorodibromomethane (THM)	2,2-Dichloropropane
Chloroethane	Ethylbenzene
Chloroform (THM)	Styrene
Chloromethane	1,1,2-Trichloroethane
o-Chlorotoluene	1,1,1,2-Tetrachloroethane
p-Chlorotoluene	1,1,2,2-Tetrachloroethane
Dibromomethane	Tetrachloroethylene
m-Dichlorobenzene	1,2,3-Trichloropropane
o-Dichlorobenzene	Toluene
trans-1,2-Dichloroethylene	p-Xylene
Cis-1,2-Dichloroethylene	o-Xylene
Dichloromethane	m-Xylene
Ethylene dibromide (EDE)	1,2-Dibromo-3-Chloropropane

TABLE F-4

## TARGET COMPOUND LIST (TCL) ESTIMATED DETECTION LIMITS

	Volatiles <sup>a,b</sup>	CAS Number	Estimated Detection Limits <sup>a, **</sup>	
			Water µg/l	Soil/Sediment µg/kg
1.	Chloromethane	74-87-3	10	10
2.	Bromomethane	74-83-9	10	10
3.	Vinyl chloride	75-01-4	10	10
4.	Chloroethane	75-00-3	10	10
5.	Methylene chloride	75-09-2	5	5
6.	Acetone	67-64-1	10	10
7.	Carbon disulfide	75-15-0	5	5
8.	1, 1-Dichloroethene	75-35-4	5	5
9.	1, 1-Dichloroethane	75-35-3	5	5
10.	Trans-1, 2-dichloroethene	156-60-5	5	5
11.	Chloroform	67-66-3	5	5
12.	1,2-Dichloroethane	107-06-2	5	5
13.	2-Butanone	78-93-3	10	10
14.	1,1,1-Trichloroethane	71-55-6	5	5
15.	Carbon tetrachloride	56-23-5	5	5
16.	Vinyl acetate	108-05-4	10	10
17.	Bromodichloromethane	75-27-4	5	5
18.	1,1,2,2-Tetrachloroethane	79-34-5	5	5
19.	1,2-Dichloropropane	78-87-5	5	5
20.	Trans-1,2-dichloropropene	10061-02-6	5	5
21.	Trichloroethene	79-01-6	5	5
22.	Dibromochloromethane	124-48-1	5	5
23.	1,1,2-Trichloroethane	79-00-5	5	5
24.	Benzene	71-43-2	5	5
25.	Cis-1,3-dichloropropene	10061-01-5	5	5
26.	2-Chloroethyl vinyl ether	110-75-8	10	10
27.	Bromoform	75-25-2	5	5
28.	2-Hexanone	591-78-6	10	10
29.	4-Methyl-2-pentanone	108-10-1	10	10
30.	Tetrachloroethene	127-18-4	5	5
31.	Toluene	108-88-3	5	5
32.	Chlorobenzene	108-90-7	5	5
33.	Ethyl benzene	100-41-4	5	5
34.	Styrene	100-42-5	5	5
35.	Total Xylenes	100-42-5	5	5

TABLE F-4

(continued)

	Semi-Volatiles <sup>a, b</sup>	CAS Number	Estimated Detection Limits*, **	
			Water µg/l	Soil/Sediment µg/kg
36.	N-nitrosodimethylamine	62-75-9	10	330
37.	Phenol	108-95-2	10	330
38.	Aniline	62-53-3	10	330
39.	Bis (2-chloroethyl) ether	111-44-4	10	330
40.	2-Chlorophenol	95-57-8	10	330
41.	1, 3-Dichlorobenzene	541-73-1	10	330
42.	1,4-Dichlorobenzene	106-46-7	10	330
43.	Benzyl alcohol	100-51-6	10	330
44.	1,2-Dichlorobenzene	95-50-1	10	330
45.	2-Methylphenol	95-48-7	10	330
46.	Bis (2-chloroisopropyl) ether	39638-32-9	10	330
47.	4-Methylphenol	106-44-5	10	330
48.	N-nitroso-dipropylamine	621-64-7	10	330
49.	Hexachloroethane	67-72-1	10	330
50.	Nitrobenzene	98-95-3	10	330
51.	Isophorone	78-59-1	10	330
52.	2-Nitrophenol	88-75-5	10	330
53.	2,4-Dimethylphenol	105-67-9	10	330
54.	Benzic acid	65-85-0	50	1600
55.	Bis (2-chloroethoxy) methane	111-91-1	10	330
56.	2,4-Dichlorophenol	120-83-2	10	330
57.	1,2,4-Trichlorobenzene	120-82-1	10	330
58.	Naphthalene	91-20-3	10	330
59.	4-Chloroaniline	106-47-8	10	330
60.	Hexachlorobutadiene	87-68-3	10	330
61.	4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	330
62.	2-Methylnaphthalene	91-57-6	10	330
63.	Hexachlorocyclopentadiene	77-47-4	10	330
64.	2,4,6-Trichlorophenol	88-06-2	50	1600
65.	2,4,5-Trichlorophenol	95-95-4	10	330
66.	2-Chloronaphthalene	91-58-7	50	1600
67.	2-Nitroaniline	88-74-4	10	330
68.	Dimethyl phthalate	131-11-3	10	330
69.	Acenaphthylene	208-98-8	50	1600
70.	3-Nitroaniline	99-09-2	10	330
71.	Acenaphthene	83-32-9	50	1600
72.	2,4-Dinitrophenol	51-28-5	50	1600
73.	4-Nitrophenol	100-02-7	10	330
74.	Dibenzofuran	132-64-9	10	330
75.	2,4-Dinitrotoluene	121-14-2	10	330

TABLE F-4

(continued)

	Semi-Volatiles <sup>o,d</sup>	CAS Number	Estimated Detection Limits*, **	
			Water µg/l	Soil/Sediment µg/kg
76.	2,6-Dinitrotoluene	606-20-2	10	330
77.	Diethylphthalate	84-66-2	10	330
78.	4-Chlorophenyl phenyl ether	7005-2-3	10	330
79.	Fluorene	88-73-7	10	330
80.	4-Nitroaniline	100-01-6	50	1600
81.	4,6-Dinitro-2-methylphenol	534-52-1	50	1600
82.	N-Nitrosodiphenylamine	86-30-6	10	330
83.	4-Bromophenyl phenyl ether	101-55-3	10	330
84.	Hexachlorobenzene	118-74-1	10	330
85.	Pentachlorophenol	87-86-5	50	1600
86.	Phenanthrene	85-01-8	10	330
87.	Anthracene	120-12-7	10	330
88.	Di-n-butylphthalate	84-74-2	10	330
89.	Fluoranthene	206-44-0	10	330
90.	Benzidine	92-87-5	50	1600
91.	Pyrene	129-00-0	10	330
92.	Butyl benzyl phthalate	85-68-7	10	330
93.	3, 3'-Dichlorobenzidine	91-94-1	20	660
94.	Benzo (a) anthracene	56-55-3	10	330
95.	Bis (2-ethylhexyl) phthalate	117-81-7	10	330
96.	Chrysene	218-01-9	10	330
97.	Di-n-octyl phthalate	117-84-0	10	330
98.	Benzo (b) fluoranthene	205-99-2	10	330
99.	Benzo (k) fluoroanthene	207-08-9	10	330
100.	Benzo (a) pyrene	50-32-8	10	330
<b>Pesticides<sup>e,f</sup></b>				
101.	Ideno (1, 2, 3-cd) pyrene	193-39-5	10	330
102.	Dibenz (a, h) anthracene	53-70-3	10	330
103.	Benzo (g,h,l) perylene	191-24-2	10	330
104.	Alpha-BHC	319-84-8	0.05	2.0
105.	Beta-BHC	319-85-7	0.05	2.0
106.	Delta-BHC	319-86-8	0.05	2.0
107.	Gamma-BHC (lindane)	58-89-9	0.05	2.0
108.	Heptachlor	76-44-8	0.05	2.0
109.	Aldrin	309-00-2	0.05	2.0
110.	Heptachlor epoxide	1024-57-3	0.05	2.0

TABLE F-4  
(continued)

Pesticides <sup>a, f</sup>	CAS Number	Estimated Detection Limits <sup>a, **</sup>	
		Water µg/l	Soil/Sediment µg/kg
111. Endosulfan I	959-98-8	0.05	2.0
112. Dieldrin	60-57-1	0.10	4.0
113. 4,4' -DDE	72-55-9	0.10	4.0
114. Endrin	72-20-8	0.10	4.0
115. Endosulfan II	33213-65-9	0.10	4.0
116. 4,4' -DDD	72-54-8	0.10	20.0
117. Endrin aldehyde	7421-93-4	0.10	20.0
118. Endosulfan sulfate	1031-07-8	0.10	40.0
119. 4,4' -DDT	50-29-3	0.10	20.0
120. Endrin ketone	53494-70-5	0.10	20.0
121. Methoxychlor	72-43-5	0.5	20.0
122. Chlordane	57-74-9	0.5	20.0
123. Toxaphene	8001-35-2	1.0	20.0
124. AROCLOR-1016	12674-11-2	0.5	40.0
125. AROCLOR-1221	11104-28-2	0.5	40.0
126. AROCLOR-1232	11141-16-5	0.5	
127. AROCLOR-1242	53469-21-9	0.5	
128. AROCLOR-1248	12672-29-6	0.5	
129. AROCLOR-1254	11097-69-1	1.0	
130. AROCLOR-1260	11096-82-5	1.0	

- <sup>a</sup> Medium Water Contract Required Detection Limits (CRDL) for Volatile Target Compound List (TCL)  
Compounds are 100 times the Individual Low Water CRDL
- <sup>b</sup> Medium Soil/Sediment CRDL for Volatile TCL Compounds are 100 times the Individual Low Soil/Sediment CRDL
- <sup>c</sup> Medium Water CRDL for Semi-Volatile TCL Compounds are 100 times the Individual Low Water CRDL
- <sup>d</sup> Medium Soil/Sediment CRDL for Semi-Volatile TCL Compounds are 60 times the Individual  
low Soil/Sediment CRDL
- <sup>e</sup> Medium Water CRDL for Pesticide TCL Compounds are 100 times the Individual Low Water CRDL
- <sup>f</sup> Medium Soil/Sediment CRDL for Pesticide TCL compounds are 60 times the Individual Low Soil/Sediment CRDL
- <sup>\*</sup> Detection limits listed for soil/sediment are based on wet weight. The detection limits calculated by the  
laboratory for soil/sediment, calculated on dry weight basis as required by the contract, will be higher.
- <sup>\*\*</sup> Specific detection limits are highly matrix dependent. The detection limits listed herein are provided  
for guidance and may not always be achievable.

TABLE F-4 (cont'd)

## SECTION II

## CLP INORGANICS

Superfund Target Compound List (TCL) and  
Contract Required Quantitation Limit

Parameter	Contract Required Quantitation Level <sup>1 2</sup> (µg/L)
1. Aluminum	200
2. Antimony	60
3. Arsenic	10
4. Barium	200
5. Beryllium	5
6. Cadmium	5
7. Calcium	5000
8. Chromium	10
9. Cobalt	50
10. Copper	25
11. Iron	100
12. Lead	5
13. Magnesium	5000
14. Manganese	15
15. Mercury	0.2
16. Nickel	40
17. Potassium	5000
18. Selenium	5
19. Silver	10
20. Sodium	5000
21. Thallium	10
22. Vanadium	50
23. Zinc	20
24. Cyanide	10

# ATTACHMENT G

HEALTH

AND

SAFETY

PLAN

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APPENDIX

## HEALTH AND SAFETY PLAN

### 1.0 Introduction

This Health and Safety Program exists to protect employees from the hazards encountered during field investigations of uncontrolled hazardous waste sites. It is the result of experience gained from working on hazardous waste sites and handling hazardous materials, as well as consideration of all applicable government regulations and guidelines, and consultation with health and safety experts.

Personnel engaged in field investigations of hazardous waste storage, treatment and disposal sites and remedial response activities encounter a wide variety of hazards, including potential exposure to toxic chemicals and radiation, fire and explosion hazards, and other physical hazards due to unstable, deteriorating structures. There is a great degree of uncertainty about an abandoned or uncontrolled site at all stages of an investigation, and there may always be a significant risk encountered at these sites.

This Health and Safety Program is intended to comply with Section III(c) of CERCLA, EPA Order 1440.1-Respiratory Protection and EPA Order 1440.3 - Health and Safety Requirements for Employees Engaged in Field Activities, the December 19, 1986 OSHA regulations in 29 CFR Part 1910, the Occupational Health and Safety Act (OSHA) of 1970, 5 U.S.C. 7902(c)(1) and the Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities prepared by NIOSH, OSHA, USCG and EPA, October 1985 and any applicable New York Health Statutes.

### 2.0 Safety Consideration For Remedial Investigations

This section describes the administrative policies and procedures applicable to the Tronic Plating Company Site.

Although the degree and type of hazard encountered by field teams varies greatly depending on the type of site (e.g., abandoned hazardous waste site or active facility) and the detail of field activity (e.g., preliminary site inspection or multimedia sampling), certain administrative policies and procedures must be adhered to. These include the use of properly trained personnel who regularly participate in a health surveillance monitoring program, specific criteria for field team organization and size, site characterization to establish hazard level, proper selection, use and maintenance of personnel protective equipment, and basic safety procedures.

### 3.0 Health Surveillance Program

The Health Surveillance Program at C A Rich Consultants, Inc. is designed to monitor the health of employees whose work regularly poses the possibility of exposure to toxic materials. It provides for an initial (baseline) health evaluation and periodic follow-up examinations.

The Health Surveillance Program will be administered by the Health and Safety Directors in consultation with the Medical Consultant. The C A Rich Health and Safety Director in consultation with the Medical Consultant will be responsible for establishing the specific medical testing program, for selecting medical facilities to perform the examinations, and for establishing and administering procedures for the program. Each office will have a designated medical facility to perform the medical examinations. These examinations must be conducted or evaluated by a Board-certified medical doctor. Examination results and the physician's evaluation are submitted to the Medical Consultant for review.

#### 3.1 Medical Examinations, Contents and Frequency.

Participation in the Health Surveillance Program is mandatory for all employees involved in hazardous waste site investigations requiring on-site work. The first, or baseline examination, will be given to each new employee. The examination consists of a complete medical examination designed to screen for evidence of adverse effects of occupational exposure, particularly exposure to toxic substances. The examination is not a direct substitute for "general" check-ups or other periodic examinations designed to monitor or promote general health.

3.1.1 Medical History. A complete medical history will be taken to include current symptoms, review of systems (including reproductive) history and relevant aspects of behavioral history, hospitalizations, immunizations, medications, family history of significant diseases, allergies, use of alcohol and drugs, smoking history, and previous disability claims. Review of systems will include a systematic inventory of past or present disorders of each major organ system. Particular attention will be given to behavioral or psychological conditions that may interfere with frequent travel; wearing confining protective gear, observing detailed safe work practices; and interacting constructively with public officials, members of the public, and media representatives. Particular attention must also be given to previous episodes of possible heat injury; cardio-respiratory disorders; skin disorders that would preclude wearing burdensome protective clothing and respirators; renal disorders; back disorders; previous malignancies (including skin); pre-malignant conditions and reproductive history (especially reproductive failures such as infertility, miscarriages, stillbirths, small-for-dates, prematurity, neonatal deaths, birth defects, and genetic disorders).

3.1.2 Occupational History. A complete occupational history will be recorded to identify a chronological account of every job ever held, including dates, name of company, type of industry, toxic exposures, and known adverse health effects.

3.1.3 Physical Examination. Each individual will receive a complete physical examination by a state licensed institution, and will include general appearance, vital signs, height and weight, skin, head, eyes, ears, nose and throat, hearing and vision, thyroid gland, lymph nodes, chest and respiration, heart, abdomen, extremities [including muscles and joint, hernias (ventral, inguinal, and femoral)], veterbral column, and rectal examination with stool testing for occult blood and complete neurological examination. Pelvic examination with Pap smear and breast examination is included for females.

3.1.4 Basic Laboratory Tests. Each individual will receive a basic group of blood tests to evaluate blood-forming, kidney, liver, and endocrine/metabolic function. Other laboratory tests include: a routine urinalysis, electrocardiogram, chest x-ray, pulmonary function test, vision test and an audiogram.

3.1.5 Employment Criteria. The following criteria for hazardous waste investigation team personnel are recommended for individuals selected for arduous duty positions:

Vision--Binocular vision is required and must be at least 20/40 (Snellen) in one eye and 20/20 in the other, with or without corrective lenses. Near vision must be sufficient to read, without strain, printed material the size of typewritten characters. Normal depth perception, accommodation, and field of vision are required, as is the ability to distinguish basic colors.

Hearing--Without using a hearing aid, applicant must have no hearing loss in either ear of more than 30 decibels at 500-, 1000-, or 2,000- cps range.

Speech--Diseases or conditions resulting in indistinct speech are disqualifying.

Olfactory Sense--Applicant must possess a normal sense of smell.

Respiratory System--Any chronic disease or condition affecting the respiratory system that would impair the full performance of duties is disqualifying: e.g., conditions that result in reduced pulmonary function, shortness of breath, or painful respiration.

Cardiovascular System--The following conditions are disqualifying:

- a. Organic heart disease (compensated or not)
- b. Hypertension with repeated readings that exceed 150 systolic and 90 diastolic without medication
- c. Symptomatic peripheral vascular disease and severe varicose veins

Gastrointestinal System--Chronic symptomatic disabling diseases or conditions of the gastrointestinal tract are disqualifying.

Endocrine System--An uncontrolled systematic metabolic disease, such as diabetes or gout, is disqualifying.

Genitourinary Disorders--Chronic, symptomatic diseases or conditions of the genitourinary tract are disqualifying.

Extremities and Spine--Any deformity or disease that would interfere with range of motion or dexterity or that is severe enough to affect adversely the full performance of position duties is disqualifying.

Miscellaneous--Although not mentioned specifically above, any other disease or condition that interferes with the full performance of duties is also grounds for medical rejection.

3.1.6 Annual and Exit Examinations. Each individual will receive an annual medical examination similar to the pre-study examination with the exception of the chest X-ray which is taken based on the advice of the physician and/or medical consultants. In this way, any irregularities or trends can be easily detected and evaluated. Upon termination of employment or leaving the program, each employee who worked at hazardous sites is required to receive an exit examination identical to the annual examination.

3.1.7 Post-Exposure Examinations. Following accidental exposure to hazardous materials, a post-exposure examination may be required. The examination must be approved by the Health and Safety Director. Post-exposure examinations include all tests performed in the annual exam; in addition, other tests oriented towards collecting data regarding known or suspected contaminants involved in the exposure incident will be performed. In most cases, tests that monitor tissue damage after an exposure will be performed three to four months following the exposure to ensure that any effects which have a latency period will be detected.

Any accidental exposure to a material will necessitate a full analysis of that material to enable proper steps to be taken to protect the health of the person(s) involved. If, after an examination, the physiological data are observed to be outside of normal and acceptable ranges, the physician in charge of the examination, in consultation with the medical consultant, must

determine whether the individual must be removed from work assignments in the field and what additional treatment, if any, is warranted.

**3.2 Medical Records.** Copies of medical records for medical examinations are maintained by the medical center or clinic at which the examination was conducted. Copies of the medical history, the physical exam screens, the laboratory test data and results, and the physician's evaluations are forwarded to the Health and Safety Director and the Medical Consultant. Employees may request, in writing, a copy of their medical records from the Health and Safety Director. A copy of the individual's medical record will be given to the individual on termination of employment.

**3.3 Confidentiality.** Medical records will be held strictly confidential. To participate in this program, the employee must sign a consent from authorizing the examining physician to release all relevant medical records related to the Health and Safety Program to the Health and Safety Director and to the Medical Consultant. Medical records will be kept in a secure file for 30 years, in accordance with OSHA's rule on Access to Employee Exposure and Medical Records (20 CFR 1919 p. 35270). In a medical emergency the Health and Safety Director may release these records to an emergency medical facility.

#### **4.0 Field Team Organization**

A field team must be organized to efficiently and safely carry out the objectives of the project. These objectives may include such activities as sampling of hazardous wastes, monitoring well installation, site mapping, performing geophysical surveys, or drum excavation. The team will typically include individuals with many different technical skills, such as chemists, geologists, and engineers. In addition to performing its task objectives, the team must provide for its own safety to prevent injury or exposure to hazardous materials. This can be accomplished by assignment of specific roles and responsibilities to members of the field team and by assuring that the proper team size is used to effectively accomplish specific objectives.

There are a number of roles which are required for the safe and competent operation of a field investigation team. The five roles which are necessary at every site where a field team will be working are: Project Manager, Field Team Leader, Site Safety Officer, Equipment Specialist, and the Work Party. Additional roles, such as Command Post Supervisor, Personnel Decontamination Station Operator and an Emergency Response Team, are added to the field team when the scope, magnitude, or hazard of the investigation justifies the need for them. A team member may take on more than one role, but the roles must be clearly assigned and must cover all those required rather than describe one team organization for all the different types of field investigations.

Guidelines are presented here for assignment of responsibilities to team members to ensure safety and to establish the team size.

4.1 Project Manager. The Project Manager is responsible for the overall effectiveness of remedial action activities. The specific responsibilities of the Project Manager include preparing and organizing all project work assignments, briefing team personnel on specific duties, obtaining permission for site access from the owner or responsible party, completing reports and maintaining the evidentiary file, complying with chain-of-custody procedures, and coordinating with government representatives and subcontractors.

4.2 Field Team Leader. The Field Team Leader is accountable for the organization, operation, and safety of the field team. This role may be filled by the Project Manager. The Field Team Leader is responsible for proper field operations, completion of the objectives of the site work plan, compliance with document control procedures, and determining the level of personal protection necessary to ensure the health and safety of the field team. If subcontractors or outside observers are present, the Field Team Leader must enforce health and safety procedures.

4.3 Site Safety Officer. The Site Safety Officer has primary responsibility for all safety procedures and operations on-site. This role may be filled by the Project Manager. The Site Safety Officer is responsible for preparing the site safety plan; upgrading or downgrading, if necessary, the level of personal protection based upon observations and changing circumstances during the field investigation; enforcing the buddy system (personnel working in pairs); posting and briefing of the field team on the approved safety plan which outlines locations, routes, and telephone numbers of the closest medical facilities and poison control centers; posting other emergency telephone numbers, such as the fire and police department and Health and Safety Director; notifying local public emergency personnel; verifying that team members have met the health and safety requirements for field assignment; controlling site entry and exit at the personnel decontamination station; and monitoring the work party for signs of stress such as changes in complexion, coordination, demeanor, or speech patterns through visual observation. During adverse weather conditions, the Site Safety Officer will implement special precautions to guard against heat stress or cold exposure as described in EPA's "Standard Operating Safety Guides" (November, 1984). The Site Safety Officer has the authority to halt any operation that threatens the health or safety of the team.

4.4 Equipment Specialist. The Equipment Specialist is responsible for obtaining, inspecting, and maintaining all equipment in proper operating order. This requires specialized training in maintenance of equipment, such as self-contained breathing apparatus. The Equipment Specialist is responsible for preparing all sampling equipment.

**4.5 Work Party.** The work party is ultimately responsible for the safe and successful completion of the work assignment. The members of the work party share many active and important functions which are necessary to fulfill the objectives of the investigation. These include setting up the personnel decontamination station, performing site hazard characterization, taking photographs, collecting samples of various media, decontaminating sample containers, packaging and shipping the samples in accordance with chain-of-custody procedures, and decontaminating the entire work party prior to leaving the site.

#### **5.0 Field Investigation Team Size**

The size of an investigation team is determined by the hazard level of the investigation, the level of protection employed, the investigation, objectives, and the site characteristics and type. The team must be large enough to ensure safety, but not so excessively large as to sacrifice economy.

A two-person team consisting of C A Rich personnel will be adequate at the Tronic Plating Company Site for surface soil, surface water, sediment and groundwater sample collection in Level D. A two-person team is appropriate for tasks which do not require extensive personal decontamination and where the likelihood of emergency rescue is minimal.

A two-person team is suitable when up to Level C protection is required. For all tasks requiring Level C and above, the field team will consist of a minimum of two C A Rich personnel and two subcontractors. In addition, the field team leader will routinely check in with the field team to ensure all operations are running smoothly. In the event of an emergency, the team member can summon outside assistance. Team responsibilities for the study are identified in the enclosed Site Safety Plan.

#### **6.0 Selection, Use and Maintenance of Personal Protective Equipment**

Proper selection, use and maintenance of respiratory protective equipment and other personal protective equipment is extremely important in protecting the health and safety of field investigation personnel. An inadequate level of protection may result in unnecessary exposure to toxic chemicals or other hazards. An excessively high level of protection may encumber field personnel unnecessarily and result in decreased efficiency, fatigue, and other hazards. Improper use of maintenance of protective equipment also exposes field personnel to unnecessary risks.

The site hazard assessment will be based on a site characterization obtained from previous site investigations. Once the site hazard assessment is completed, the Site Safety Officer will select the level of protection. The appropriateness of the

level of protection will be assessed continually during all field investigative tasks. This level must be approved by both the Office Safety Director and Corporate Health and Safety Director. The level of protection will be selected in accordance with EPA's "Standard Operating Safety Guides" (November, 1984). The selection is based on the potential for exposure to substances in air, splashes of liquids, or other direct contact with material due to work being done, the toxicity of the suspected or measured chemical substances, and professional experience and judgment. Criteria used to determine the level of protection are discussed below.

**6.1 Respiratory Protection.** The selection of adequate respiratory protection depends primarily on the type of hazardous substances to be encountered. Proper respirator use requires formal training and continued maintenance of the equipment, in accordance with 30 CFR Part 11 and provisions of the National Institute for Occupational Safety and Health. OSHA regulations pertaining to respiratory protection require a training program that encompasses user responsibilities, training for proper use, and respirator maintenance. OSHA also requires qualitative fit testing of face-pieces. Facial hair (beards) and wearing contact lenses are prohibited.

The following factors will be used to select adequate respiratory protection: exposure limits, oxygen level, warning properties, protection factor, maximum use limit and service concentration limit. These factors are discussed in Section

6.1.2.

**6.1.1 Self-Contained Breathing Apparatus (SCBA).** The positive pressure SCBA provides the highest level of protection against air-borne toxic hazards and oxygen deficiency.

SCBA's will be used at the Tronic Plating Company Site;

- When hazardous chemicals are known to be present in the air in concentrations exceeding 25 ppm above background in the breathing zone as detected by the OVA;
- In enclosed spaces where hazardous materials are present or suspected, such as in abandoned waste chemical storage buildings or manholes which have received spilled chemicals; or
- At the Site Safety Officer's discretion.

In the donning and use of SCBA, the following precautions must be observed:

- SCBAs must be NIOSH-approved.
- SCBAs must provide positive pressure in the mask area.
- SCBAs must provide a tight face seal. Qualitative fit testing is required.
- Users of SCBAs must obtain formal hands-on training to guarantee operator proficiency and equipment maintenance.
- Users of SCBAs must follow the manufacturer's instructions for the donning and use of the equipment, in addition to formal training.

6.1.2 Air-Purifying Respirator (APR). The APR will be used at the site during on-site drilling activities if levels of organic vapors exceed 5 ppm but are less than 25 ppm. The APR removes contaminants from the atmosphere to some degree and can be used only in atmospheres containing sufficient oxygen to sustain life (in open air this is usually not a problem) and when other criteria, discussed below, are met.

Specific concentration limitations exist for specific devices. The chemical-cartridge respirator provides respiratory protection against certain gases and vapors in concentrations not to exceed those labeled on the cartridge. An APR can only be used in an area where minimal concentrations might occur and where a SCBA has been determined unnecessary. Ambient air concentrations at the site will be determined by constant monitoring with the OVA or other appropriate air monitoring device. Many types of cartridges are available and field personnel should select the appropriate one for the contaminants expected.

Air purifying respirators or cartridge respirators are worn when:

- Any unidentified and potentially hazardous odor is detected.
- Hazardous materials in the air are not greater than 10 times the permissible exposure limit (PEL), and have good warning properties.
- The Project Manager judges that respirators are needed as a precaution against generation of low levels of toxic substances in air due to sampling, handling, decontaminating or other operations.
- The capacity of the cartridge will not be exceeded by extended periods of use on-site. (If used for extended periods, cartridges must be changed.)

Users of air purifying respirators must comply with the following:

- At least 19.5 percent oxygen must be present for respirator use, or unprotected breathing.
- Cartridge respirators do not supply oxygen and are of no use in oxygen-deficient atmospheres.
- Air purifying respirators provide less protection than SCBAs and supplied air devices.
- Air purifying respirators must be NIOSH-approved.
- Cartridges must also be NIOSH-approved and should be matched to the respirator by the manufacturer.
- Cartridges must not be used past the expiration date.
- Air purifying respirators will provide adequate protection only if they have good face seals. A qualitative fit test is required for each employee using these respirators.
- Upon experiencing any warning property such as difficulty breathing, dizziness, or other distress, strong taste, or smell, the user must immediately leave the site. The Field Team Leader or Site Safety Officer may require that a user of an air purifying respirator carry an emergency escape air mask.
- Users of air purifying respirators must follow the manufacturer's instructions on the donning and use of the equipment.
- Cartridges must sometimes be replaced as often as each hour of use, or when the user senses or smells the vapor. If the contaminant of interest does not have warning properties, the APR cartridge must not be used.

6.2 Protective Clothing. Protective clothing must be worn by all personnel at hazardous waste sites to prevent skin exposure and to minimize spread of contamination. All on-site operations require protective clothing. Protective clothing may include, but is not limited to chemical-resistant pants and jackets or coveralls, disposable coveralls, steel toe and shank boots, protective gloves, hard hats, face shields or chemical safety glasses. Once adequate protective clothing is chosen, employees must also note that alertness is a significant safety factor. Since protective clothing is cumbersome, it hastens the onset of fatigue and heat exhaustion, can decrease alertness, and limits stay-time.

The following sections describe Level B, C and D protective equipment which are appropriate for different tasks at the Tronic Site.

6.2.1 Level B. Level B protection will be worn by all personnel if the concentration of volatile organics exceeds 25 ppm in the breathing zone. Level B protection is used when the highest level of respiratory protection is judged to be needed, but hazardous material exposure to the few unprotected areas of the body (i.e., the back of the neck) is unlikely with Level B protective clothing.

Level B protection consists of:

- Open-circuit pressure-demand SCBA
- Chemical protective overalls and long-sleeved jacket, or tyvek coveralls
- Gloves, inner, surgical type
- Gloves, outer, chemical protective
- Boots, chemical protective steel toe and shank
- Booties, chemical protective
- Butyl rubber apron or rain gear

6.2.2 Level C. Level C protection will be worn during on-site well drilling activities when volatile organic concentrations consistently exceed background concentrations by 5 ppm. Level C protection is known, or reasonably assumed to be, not greater than the level of protection afforded by air-purifying respirators. During any Level C activities, the ambient air will be constantly monitored with the Organic Vapor Analyzer (OVA) or other appropriate instrument to determine concentrations of volatile organics. If volatile organics are consistently detected at background levels during a particular activity, the Site Safety Officer may choose to downgrade the operation to Modified Level D.

Level C protection consists of:

- Air-Purifying respirator (previously described) with appropriate cartridges for organic vapors and dusts

- Tyvek coveralls
- Boots/shoes, safety, with steel toe and shank
- Hard hat with optional face-shield
- Gloves, inner, surgical type
- Gloves, outer, chemical protective

6.2.3 Level D. Level D protection will be adequate during non-soil disturbance activities such as geophysical surveys. Modified Level D will be appropriate during perimeter well-drilling operations and during the sampling of sediment, soil, and groundwater. Modified Level D will necessitate wearing tyvek with respirators on hand in the event of an organic volatile release. Level D is the basic work uniform and is used where significant exposure to hazardous materials is unlikely.

During drilling and sampling in Level D, the ambient air will be constantly monitored with an OVA or other appropriate instrument to determine volatile organic concentrations. Should volatile organic concentrations consistently exceed background concentrations in the breathing zone by 5 ppm, the work party will don air-purifying respirators.

Modified Level D protection consists of:

- Tyvek (for perimeter well drilling only)
- Coveralls, cotton
- Boots/shoes, safety with steel toe and shank
- Safety glasses or chemical splash goggles
- Hard hat with optional face-shield
- Air-Purifying respirator (readily available)
- Gloves

## 7.0 Heat Stress Prevention Plan

7.1 Heat Exhaustion. The symptoms for heat exhaustion are muscular weakness, dizziness, nausea, and a staggering gait. Vomiting is frequent. The bowels may move involuntarily. The victim is very pale, his skin is clammy, and he may perspire profusely. The pulse is weak and fast, his breathing is shallow. He may faint unless he lies down. This may pass, but sometimes it remains and death could occur.

First aid for heat exhaustion includes the immediate removal of the victim to a shady or cool area with good air circulation. Remove all protective outer wear. Call a physician. Treat the victim for shock. (Make him lie down, raise his feet 6-12 inches, and keep him warm but loosen all clothing.) If the victim is

conscious, it may be helpful to give him sips of a salt water solution (1 teaspoon of salt to 1 glass of water). Transport victim to a medical facility.

7.2 Heat Stroke. Heat stroke is the most serious of heat casualties due to the fact that the body excessively overheats. Body temperatures often are between 107-110 degrees F. The symptoms include pain in the head, dizziness, nausea, oppression, and a dryness of the skin and mouth. Unconsciousness can quickly follow and death is imminent if exposure continues. The attack will usually occur suddenly.

The initial step in the first aid process is to immediately evacuate the victim to a cool and shady area. Remove all protective outer wear and all personal clothing. Lay him on his back with the head and shoulders slightly elevated. It is imperative that the body temperature be lowered immediately. This can be accomplished by applying cold wet towels, ice bags, etc., to the head. Sponge off the bare skin with cool water or rubbing alcohol, if available, or even place him in a tub of cool water. The main objective is to cool him without chilling him. Give no stimulants. Transport the victim to a medical facility as soon as possible.

7.3 Prevention of Heat Stress. One of the major causes of heat casualties is the depletion of body fluids. On the site there will be plenty of fluids available. Personnel should replace water and salts loss from sweating. Salts can be replaced by either a 0.1% salt solution, more heavily salted foods, or commercial mixes such as Gatorade. The commercial mixes are advised for personnel on low sodium diets.

A work schedule will be established so that the majority of the work day will be during the morning hours of the day before ambient air temperature levels reach their highs.

A work/rest guideline will be implemented for personnel required to wear Level B protection, if this situation arises. This guideline is as follows:

Ambient Temperatures

Maximum Wearing Time

Above 90 F	1/2 hour
80 - 90 F	1 hour
70 - 80 F	2 hours
60 - 70 F	3 hours
50 - 60 F	4 hours
40 - 50 F	5 hours
30 - 40 F	6 hours
Below 30 F	8 hours

A sufficient period will be allowed for personnel to "cool down". This may require shifts of workers during operations.

#### 8.0 Basic Safety Practice

Field personnel will observe basic safety practices. The Health and Safety Director will be responsible for informing all field personnel of these practices during a preliminary health and safety meeting to be held prior to the start of field activities. Additional meetings will also be held whenever new people come on-site or when field conditions or field activities change. They will include, but not be limited to, the following:

- o Observe the buddy system (work in pairs)
- o Eating, drinking, and smoking are prohibited on-site
- o Alcohol consumption is prohibited 24 hours prior to and 24 hours after being on a hazardous waste site
- o Contact lenses cannot be worn
- o Practice contamination avoidance by avoiding obviously contaminated objects/areas and by not sitting or kneeling on the ground
- o Do not climb over drums or obstacles
- o Maintain contact with the Site Safety Officer

#### 9.0 Site Safety Plan

A written Site Safety Plan must be prepared prior to any field operation. The purpose of the form is to provide information about the site being investigated, an evaluation of the hazards present, and the plan developed to protect the field personnel and to prepare for emergency action. The plan is prepared by the Project Manager and submitted to the Health and Safety Director for review and approval prior to the operation.

A standard form is used for the Site Safety Plan which has five parts. The first part provides general information, including the name and location of the site and the objective(s) of the investigation. The second part provides information on the site and waste characteristics, including a description of the facility and its history. The third part of the form is a hazard evaluation, which assesses the potential hazards to site inspection personnel, based on available information. The fourth part of the form is the work plan itself. It establishes the work area, the personal protection (level of protection and equipment) to be used, decontamination procedures, site entry procedures, the

site entry team members and their responsibilities, and work limitations. The last part of the form provides emergency information, including emergency contacts and resources, and emergency routes to hospitals or other facilities.

The Site Safety Plan must contain specific information describing the safety precautions and procedures to be used and justification for them. The hazard evaluation is a key part of the form, since the plan must be developed on the basis of the evaluation of known or potential hazards. If hazard information (e.g., possibility of explosive or toxic atmospheres) is not available, the safety plan must include a procedure for obtaining the necessary information or for protecting personnel from unknown but potential hazards.

9.1. Reporting Incidents Involving Personal Injury or Exposure to Hazardous Materials. All incidents involving personal injury or exposure to potentially hazardous materials during any field activity must be documented and reported immediately to the Health and Safety Director. A standardized incident report is used for this purpose.

It is important to report all exposures and injuries, even though the incident is not considered serious or no adverse health effects or symptoms are apparent at the time. Often exposure to a toxic agent may have delayed or latent effects which may only be detected by specific diagnostic tests. Documenting an exposure may aid in identifying the cause of symptoms or changes in health status indicators (diagnostic blood tests or pulmonary function, for example) at a later time. Likewise, an injury, such as an eye injury caused by dust particles, may result in delayed damage to the eye.

9.2 Site-Specific Safety Plan. The Site-Specific Safety Plan for the Tronic Plating Company Site is detailed in this plan. The safety plan provides information on site/waste characterizations, hazards, work plan, investigation-derived material disposal plan and emergency/contingency information.

Modified Level D is expected to be adequate during drilling of monitoring wells as long as OVA readings are not greater than 5 ppm in the breathing zone. Modified D will consist of tyvek and readily available respirators in addition to standard Level D clothing. Modified Level D also will be necessary for surface soil and surface water and sediment sampling of groundwater. Level D is adequate for non-soil disturbance activities, such as geophysical surveys. However, during all sampling activities, the ambient air will be monitored constantly with the OVA to determine volatile organic concentrations. The work party will upgrade to Level C if volatile organics consistently exceed 5 ppm above background in the breathing zone. Level B will be considered when volatile organics exceed 25 ppm above background in the breathing zone.

Field investigations and sampling activities may result in the generation of contaminated materials. Proper sampling planning must include a management plan for the disposal of materials encountered during field investigations in order to minimize the impact to the environment and the risk to public health. The contaminated materials which may be generated include soil samples, auger cuttings, decontamination rinse water and used disposable clothing. Disposable clothing will be containerized for proper disposal. All soil samples and auger cuttings will be drummed and decontamination water will be collected at the decon pad and stored in drums until the completion of field activities. A pool will be constructed of corrugated panels and lined with a 10 ml plastic or visqueen liner to facilitate steam cleaning of equipment. An effort will be made to separate cuttings and water with suspected levels of contamination from clean cuttings and water. Upon completion of field activities, grab samples will be collected for determination of appropriate disposal alternatives.

**SITE SAFETY PLAN**

**A. GENERAL INFORMATION**

Site: Tronic Plating Company

Project Number:

Street/City/State: 168 Central Avenue  
Farmingdale, County of Suffolk, New York

Submitted by: CA Rich Consultants Inc.

Date: November 1988

Approved by: *Eric Weinstein*

Date: *Nov. 17, 1988*

Project Objective(s): To investigate the presence and/or concentration of contamination on the site.

Proposed Date(s) of Investigation: December 1988

Previous Site Characterization or safety purposes:

Inadequate:

Adequate: X

Complete:

Overall Hazard Assessment:

Serious:

Moderate:

Low: X

**B. SITE/WASTE CHARACTERISTICS**

**Waste Type(s):** Liquid: X Solid: Sludge: Gas/Vapor:

**Characteristic(s):** Corrosive: Ignitable: Radioactive:

Volatile: Toxic: X Reactive: Unknown:

**Other Characteristics:** Heavy metals and cyanide

**Other Name(s):**

**Facility Description:** electroplating and anodizing operation

**Principal Disposal Method (Type & Location):** Unknown

**Unusual Features (dike integrity, power lines, terrain, etc):** none

**Status: (active, inactive, unknow):** inactive

History: (worker or non-worker injury; complaints from public, previous agency action: complaints from Suffolk County Department of Health

---

C. HAZARD EVALUATION

(toxic effects, reactivity, flammability, stability, operational hazards from sampling and decontamination)

Contaminants found on-site in soils, groundwater and sediments include: heavy metals and cyanide in storm drain

---

D. SITE SAFETY WORK PLAN

Perimeter Establishment: Map/sketch attached Site Secured? no

Perimeter Identified: no Zone(s) of Contamination Identified? no

Personal Protection: Level of Protection A B C **D**

Modifications: Protection will be upgraded to Level C based on results from OVA (5 ppm volatile organics in breathing zone will constitute upgrade to C. >25ppm volatile organics constitutes Level B or job is shut down). Protection from potential metals, phthalates, cyanide and arsenic exposure will be insured through use of nitrile gloves, tyvek, and by performing work upwind when possible.

**Surveillance Equipment, Clothing, and Material:** Ambient air monitoring with an Organic Vapor analyzer. Air purifying respirators, tyvek suits and nitrile gloves will be available as needed.

**Decontamination and Disposal Procedures**

All drilling equipment will be steam cleaned before leaving the site at the end of the project.

Field personnel will be required to walk through a decontamination zone before leaving the work area. As they walk through this zone, each member of the work party will step through a tub of soap water and scrub their boots, gloves and tyveks. This will be followed by clean water rinse. The used gloves and tyveks, after being cleaned, will be consolidated in plastic trash bags before being taken off-site as refuse.

**Project Staff**

<b><u>Team Member</u></b>	<b><u>Responsibility</u></b>
Eric Weinstock	Project Manager
Richard Izzo Steven Sobstyl	Field Team Leader/ Site Safety Officer
C A Rich Staff	Hydrogeologist/Work Party

Work Limitations (time of day, etc.): no limitations

---

**E. EMERGENCY INFORMATION**

**Local Resources**

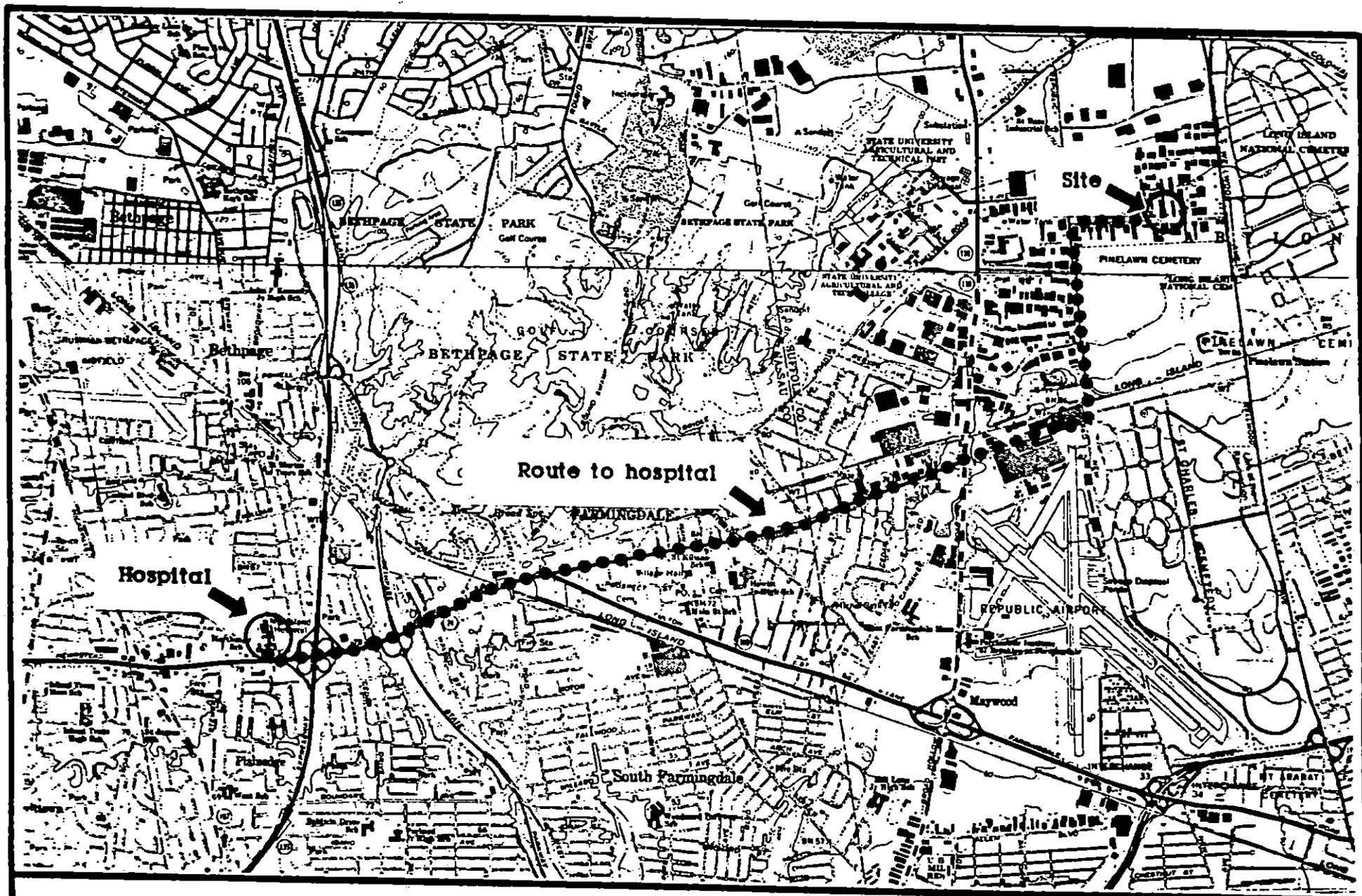
Ambulance: 911  
Hospital Emergency Room: 520-2201  
Poison Control Center: 542-2323  
Police: 911 or 756-1170  
Fire Department: 249-0074  
Airport: 752-7707  
Explosives Unit: 911

**Site Resources**

Water Supply: 249-4211  
Telephone: 1-800-722-2300  
Radio: N/A  
Other:

**Emergency Contacts (if appropriate)**

Office Safety Director: Steven Sobstyl 516/724-4136  
Project Manager: Eric Weinstock 516/378-0961  
Client Contact: Irwin Cain 516-681-6000  
EPA Site Manager: Douglas Tomchuk 212-264-7508

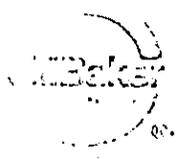


**CA RICH CONSULTANTS, INC.**

*Certified Ground-Water and Environmental Specialists*

Route to Hospital  
Tronic Plating Company Site  
Farmingdale, N.Y.

**MATERIAL SAFETY DATA SHEETS**



# J. T. Baker Inc.

100 School Lane Phillipsburg, N.J. 08865  
24-Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

HAZARDOUS  
SAFETY DATA  
SHEET

12381 -01

Hexane

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Issued: 05/10

## SECTION I - PRODUCT IDENTIFICATION

Product Name: Hexane  
 Formula:  $C_6H_{14}$   
 Formula Wt: 86.18  
 CAS No.: 110-54-3  
 OSHA/RECS No.: MH9275000  
 Common Synonyms: Normal Hexane; Hexyl Hydride  
 Product Codes: 9319, 9303, N168, 9304, 9308, 9262, 9126, 9316

## PRECAUTIONARY LABELLING

BAKER SAF-T-DATA™ System

HEALTH  MODERATE	FLAMMABILITY  SEVERE	REACTIVITY  NONE	CONTACT  MODERATE
------------------------	----------------------------	------------------------	-------------------------

### Laboratory Protective Equipment

 SAFETY GLASSES	 LAB COAT	 VENT HOOD	 PROPER GLOVES	 EXTINGUISHER
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### Precautionary Label Statements

**DANGER!**  
**CAUSES IRRITATION**  
**EXTREMELY FLAMMABLE**  
 HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN  
 Keep away from heat, sparks, flame.  
 Do not breathe vapor. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling. In case of fire, use alcohol foam, dry chemical, carbon dioxide - water may be ineffective. Wash spill area with water spray.

## SECTION II - HAZARDOUS COMPONENTS

Component	%	CAS No.
n-Hexane	>98	110-54-
Methylcyclopentane	<2	96-37-

# J. T. Baker Inc.

1000 School Lane Phillipsburg, N.J. 08865  
24-Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

UNIVERSITY  
SAFETY DIV  
SHEET

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Hexane

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## SECTION III - PHYSICAL DATA

Boiling Point: 69°C ( 156°F) Vapor Pressure(mmHg): 130  
Melting Point: -95°C ( -139°F) Vapor Density(air=1): 3.0  
Specific Gravity: 0.66 Evaporation Rate: 9  
(H<sub>2</sub>O=1) (Butyl Acetate=1)  
Solubility(H<sub>2</sub>O): Negligible (less than 0.1 %) % Volatiles by Volume: 100

Appearance & Odor: Colorless liquid with mild odor.

## SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Closed Cup): -23°C ( -10°F) NFPA 704M Rating: 1-3-0  
Flammable Limits: Upper - 7.7 % Lower - 1.2 %

### Fire Extinguishing Media

Use alcohol foam, dry chemical or carbon dioxide.  
(Water may be ineffective.)

### Special Fire-Fighting Procedures

Firefighters should wear proper protective equipment and self-contained (positive pressure if available) breathing apparatus with full facepiece. Move exposed containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

### Unusual Fire & Explosion Hazards

Vapors may flow along surfaces to distant ignition sources and flash back. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire.

### Toxic Gases Produced

carbon monoxide, carbon dioxide

## SECTION V - HEALTH HAZARD DATA

Food changes have been reported in laboratory animals. Fetal death has been reported in laboratory animals but not found in two additional studies.

Threshold Limit Value (TLV/TWA): 180 mg/m<sup>3</sup> (50 ppm)

Permissible Exposure Limit (PEL): 1800 mg/m<sup>3</sup> (500 ppm)

Toxicity: LD<sub>50</sub> (oral-rat)(g/kg) - 28.7

**C. I. Baker Inc.**

2 School Lane Phillipsburg, N.J. 08865  
4-Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

UNIVERSITY  
**SAFETY DATA  
SHEET**

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Hexane

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**SECTION V - HEALTH HAZARD DATA (Continued)**

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Carcinogenicity: ITP: No IARC: No Z List: No OSHA reg: No

Effects of Overexposure

Inhalation of vapors may cause headache, nausea, vomiting, dizziness, drowsiness, irritation of respiratory tract, and loss of consciousness. Inhalation of vapors may cause narcosis. Contact with skin or eyes may cause irritation. Contact with skin has a defatting effect, causing drying and irritation. Ingestion may cause nausea, vomiting, headaches, dizziness, gastrointestinal irritation. Chronic effects of overexposure may include central nervous system depression.

Medical Conditions Generally Aggravated By Exposure

None Identified

Routes Of Entry

Inhalation, ingestion, eye contact, skin contact

Emergency and First Aid Procedures

CALL A PHYSICIAN.  
If swallowed, do NOT induce vomiting.  
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.  
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes.

=====

**SECTION VI - REACTIVITY DATA**

=====

Stability: Stable Hazardous Polymerization: Will not occur

Conditions to Avoid: heat, flame, other sources of ignition

Incompatibles: strong oxidizing agents, chlorine, fluorine, magnesium perchlorate

Decomposition Products: carbon monoxide, carbon dioxide

=====

**SECTION VII - SPILL AND DISPOSAL PROCEDURES**

=====

Steps to be taken in the event of a spill or discharge

Wear suitable protective clothing. Shut off ignition sources; no flames, smoking, or flames in area. Stop leak if you can do so without risk. Use water spray to reduce vapors. Take up with sand or other non-combustible absorbent material and place into container for later disposal. Flush area with water.

C. I. Baker Inc.

School Lane Phillipsburg, N.J. 08865  
Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

HAZARDOUS  
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SECTION VII - SPILL AND DISPOSAL PROCEDURES (Continued)

for spills of this product.

Disposal Procedure

Dispose in accordance with all applicable federal, state, and local environmental regulations.

Hazardous Waste Number: D001 (Ignitable Waste)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

Ventilation: Use general or local exhaust ventilation to meet TLV requirements.

Respiratory Protection: Respiratory protection required if airborne concentration exceeds TLV. At concentrations up to 1000 ppm, a chemical cartridge respirator with organic vapor cartridge is recommended. Above this level, a self-contained breathing apparatus is recommended.

Skin Protection: Safety goggles, uniform, apron, neoprene gloves are recommended.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

MSDS-Data<sup>TM</sup> Storage Color Code: Red (flammable)

Special Precautions

Bond and ground containers when transferring liquid. Keep container tightly closed. Store in a cool, dry, well-ventilated, flammable liquid storage area.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOTIC (D.O.T.)

Proper Shipping Name: Hexane  
Hazard Class: Flammable liquid  
UN Number: UN1208  
Labels: FLAMMABLE LIQUID

INTERNATIONAL (I.M.C.)

Proper Shipping Name: Hexanes  
Hazard Class: 3.1  
UN Number: UN1208  
Labels: FLAMMABLE LIQUID

# J. T. Baker Inc.

2 d School Lane Phillipsburg, N.J. 08865  
4-Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

MAATERIAL  
SAFETY DV  
SHEET

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Hexane

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NA = Not Applicable or Not Available  
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The information published in this Material Safety Data Sheet has been compiled from our experience and data presented in various technical publications. It is the user's responsibility to determine the suitability of this information for the adoption of necessary safety precautions. We reserve the right to revise Material Safety Data Sheets periodically as new information becomes available. J. T. Baker makes no warranty or representation about the accuracy or completeness nor fitness for purpose of the information contained herein.  
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Methanol

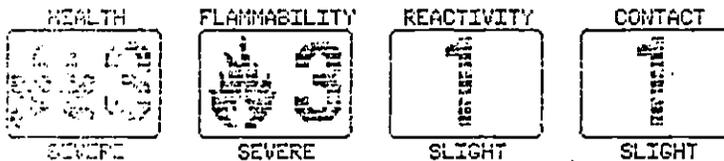
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SECTION I - PRODUCT IDENTIFICATION

Product Name: Methanol  
Formula: CH<sub>3</sub>OH  
Molecular Weight: 32.04  
CAS No.: 67-56-1  
EPA RTECS No.: PC148000  
Other Synonyms: Methyl Alcohol; Wood Alcohol; Carbinol; Methylol; Wood Spirit  
Product Codes: 9074, 9090, 5536, 9076, 9049, 9073, 5217, 9091, 9075, P704, 9071, 9127, 5370, 9068, 9263, 9069, 9070, 9072, 9069, 9093

PRECAUTIONARY LABELLING

OR SAF-T-DATA™ System



Required Protective Equipment



Cautionary Label Statements

POISON! DANGER!  
FLAMMABLE  
HARMFUL IF INHALED  
CANNOT BE MADE NON-POISONOUS  
MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED  
Keep away from heat, sparks, flame. Do not get in eyes, on skin, on clothing.  
Use with breathing apparatus. Keep in tightly closed container. Use with adequate ventilation. Wash thoroughly after handling. In case of fire, use alcohol foam, dry chemical, carbon dioxide - water may be ineffective. Wash spill area with water spray.

SECTION II - HAZARDOUS COMPONENTS

Component 3 CAS No.



... DAKER INC.

2 School Lane Phillipsburg, N.J. 08865  
24 Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

MSDS MANUAL  
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Methanol

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SECTION II - HAZARDOUS COMPONENTS (Continued)

90-100 67-56-1 -

SECTION III - PHYSICAL DATA

Boiling Point: 65°C ( 149°F) Vapor Pressure(mmHg): 96

Boiling Point: -88°C ( -144°F) Vapor Density(air=1): 1.11

Specific Gravity: 0.79 Evaporation Rate: 4.6  
(H<sub>2</sub>O=1) (Butyl Acetate=1)

Solubility(H<sub>2</sub>O): Complete (in all proportions) % Volatiles by Volume: 100

Appearance & Odor: Clear, colorless liquid with characteristic pungent odor.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

Flash Point (Closed Cup): 12°C ( 54°F) NFPA 704M Rating: 1-3-0

Flammable Limits: Upper - 36.0 % Lower - 6.0 %

Extinguishing Media

Use alcohol foam, dry chemical or carbon dioxide.  
(Water may be ineffective.)

Special Fire-Fighting Procedures

Firefighters should wear proper protective equipment and self-contained breathing apparatus with full facepiece operated in positive pressure mode. Move containers from fire area if it can be done without risk. Use water to keep fire-exposed containers cool.

Special Fire & Explosion Hazards

Vapors may flow along surfaces to distant ignition sources and flash back. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire. Burns with a clear, almost invisible flame.

Main Gases Produced

carbon monoxide, carbon dioxide, formaldehyde

SECTION V - HEALTH HAZARD DATA

Listed denotes (TL0-skin).

Threshold Limit Value (TLV/TWA): 260 mg/m<sup>3</sup> (200 ppm)

Short-Term Exposure Limit (STEL): 310 mg/m<sup>3</sup> (250 ppm)

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Methanol

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SECTION V - HEALTH HAZARD DATA (Continued)

Possible Exposure Limit (PEL): 260 1/2 mg/m<sup>3</sup> (200 ppm)

Toxicity:	LD <sub>50</sub> (oral-rat)(mg/kg)	-	5628
	LD <sub>50</sub> (ipn-rat)(mg/kg)	-	9540
	LD <sub>50</sub> (scu-mouse)(mg/kg)	-	9800
	LD <sub>50</sub> (skn-rabbit) (g/kg)	-	20

Mutagenicity: NFP: No IARC: No Z List: No OSHA reg: No

Effects of Overexposure

Inhalation and ingestion are harmful and may be fatal.  
 Inhalation may cause headache, nausea, vomiting, dizziness, narcosis, suffocation, lower blood pressure, central nervous system depression.  
 Contact with skin or eyes may cause irritation. Prolonged skin contact may result in dermatitis. Eye contact may result in temporary corneal damage.  
 Ingestion may cause blindness.  
 Ingestion may cause nausea, vomiting, headaches, dizziness, gastrointestinal irritation, central nervous system depression and hearing loss.  
 Chronic effects of overexposure may include kidney and/or liver damage.

Medical Conditions Generally Aggravated By Exposure

eye disorders, skin disorders, liver or kidney disorders

Routes of Entry

Inhalation, ingestion, eye contact, skin contact, absorption

Emergency and First Aid Procedures

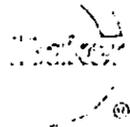
CALL A PHYSICIAN.  
 If swallowed, if conscious, give large amounts of water. Induce vomiting.  
 If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.  
 In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.  
 Wash clothing before re-use.

SECTION VI - REACTIVITY DATA

Stability: Stable Hazardous Polymerization: Will not occur

Conditions to Avoid: heat, flame, other sources of ignition

Incompatibles: strong oxidizing agents, strong acids, zinc, aluminum, magnesium



J. T. Baker Inc.

1 School Lane Phillipsburg, N.J. 08865  
24-Hour Emergency Telephone -- (201) 859-2151

Chemtrec # (800) 424-9300  
National Response Center # (800) 424-8802

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SECTION VI - REACTIVITY DATA (Continued)

Decomposition Products: carbon monoxide, carbon dioxide, formaldehyde

SECTION VII - SPILL AND DISPOSAL PROCEDURES

Steps to be taken in the event of a spill or discharge

Wear self-contained breathing apparatus and full protective clothing. Shut off ignition sources; no flares, smoking or flames in area. Stop leak if you can do so without risk. Use water spray to reduce vapors. Take up with sand or other non-combustible absorbent material and place into container for later disposal. Flush area with water.

J. T. Baker Spulsorb<sup>R</sup> solvent adsorbent is recommended for spills of this product.

Disposal Procedure

Dispose in accordance with all applicable federal, state, and local environmental regulations.

Hazardous Waste Number: U154 (Toxic Waste)

SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

Ventilation: Use general or local exhaust ventilation to meet TLV requirements.

Respiratory Protection: Respiratory protection required if airborne concentration exceeds TLV. At concentrations above 200 ppm, a self-contained breathing apparatus is advised.

Skin Protection: Safety goggles and face shield, uniform, protective suit, rubber gloves are recommended.

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

MSDS-DATA<sup>TM</sup> Storage Color Code: Red (flammable)

Special Precautions

Bond and ground containers when transferring liquid. Keep container tightly closed. Store in a cool, dry, well-ventilated, flammable liquid storage area.

SECTION X - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

Proper Shipping Name: Methyl alcohol  
Hazard Class: Flammable liquid





**D. PRECAUTIONS: REFINERS**

**VENTILATION**

**1. HEAVY HANDLING (e.g. cases of bottles/carboys/drums/pallets of cases/tank trucks):**

Sufficient to reduce acid mists and nitrogen oxide concentrations below permissible TLV levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems.

**2. SPECIALIZED HANDLING (e.g. bottles):**

Handling should be done in a closed ventilated system (e.g. exhausted hood). This must be of corrosion-resistant materials.

**NORMAL HANDLING**

Avoid inhalation of vapors or mists and all bodily contact. Keep away from incompatible substances.

**STORAGE**

Store in cool, well-ventilated, properly drained area out of the sun. Avoid storage on wood floors or near wooden walls, etc. Store away from incompatible materials. Diking of storage tanks is recommended. Protect from physical damage.

**PRECAUTIONARY LABEL**

ATTACHED

NOT ATTACHED

DOT Classification: Oxideizer.

**DANGER!** Causes severe burns. Vapor extremely hazardous. May cause nitrous gas poisoning. May be fatal if inhaled or swallowed. May cause fire or liberate dangerous gas.

**SPILL OR LEAK**

Dilute small spills or leaks with plenty of water. Neutralize residue with (a) alkali, such as soda ash, lime, limestone; or (b) other suitable neutralization materials. Adequate ventilation is required to eliminate any nitrogen oxides released and, if soda ash or limestone is used, CO<sub>2</sub>. (See Section I for disposal methods.)

**FIRE EXTINGUISHING AGENTS RECOMMENDED**

N.A.

**SPECIAL FIRE FIGHTING PRECAUTIONS**

Nitrogen oxides may be present from vented or ruptured containers. If water is added, violent spattering can occur, and considerable heat may be evolved. In such cases full protective equipment is recommended.

**FIRE EXTINGUISHING AGENTS TO AVOID**

N.A.

**SPECIAL PRECAUTIONS/PROCEDURES**

Symptoms from inhalation of HNO<sub>3</sub> vapor and nitrogen oxides may be delayed. Do not breathe these gases. Procedures are detailed in references listed in Section J. Storage reference, see Section K.

**E. PERSONAL PROTECTIVE EQUIPMENT**

(See page 5)

**RESPIRATORY PROTECTION**

**EYES AND FACE**

**HANDS, ARMS, AND BODY**

**OTHER CLOTHING AND EQUIPMENT**



**ENVIRONMENTAL DATA SHEET**

<b>DEGRADABILITY</b>  N.A. (Inorganic)	<b>OCTANOL/WATER PARTITION COEFFICIENT</b> Unknown.
<b>WASTE DISPOSAL METHODS*</b>  Note neutralization step under Section D-Spill or Leak. Disposal of nitric acid may be subject to federal, state, and local regulations. Users of this product should review their operations in terms of applicable federal, state, and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.	
*DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS.	

**REFERENCES**

<b>PERMISSIBLE CONCENTRATION REFERENCES</b>  OSHA standard, 29 CFR, Part 1910.1000 (July 1, 1977). TLV from the 1980 ACGIH List, "Threshold Limit Values for Chemical Substances. . . ."
<b>REGULATORY STANDARDS</b>  RCRA Status: (1) if discarded in aqueous solutions of 40% or stronger, hazardous waste No. D001 (ignitable). 40 CFR 261.21 (a) (4) and (b). (2) If under 40%, Hazardous Waste No. D002 (corrosive). Ibid., 261.22 (a) (1) and (b). DOT Classification-Oxidizer; Placard-Oxidizer; Label-Oxidizer and Corrosive (49 CFR). Designated a hazardous substance for spills by EPA (40 CFR, Parts 116-117).
<b>GENERAL</b>  "Criteria for a Recommended Standard . . . Occupational exposure to Nitric Acid." NIOSH (U.S. Dept. of HEW) 1976. Allied/Signal's nitric wall safety chart and Technical Service Report discussing the storage and handling of nitric acid. Tech. Guide No. 7, "Handbook of Hazardous Materials," 1974, American Mutual Insurance Alliance, 29 No. Wacker Dr., Chicago, IL 60606.

**ADDITIONAL INFORMATION**

Information (hazards, precautions, first aid, etc.) is abbreviated. More detailed information is contained in references found in Section J. . . .

This product is not for food or drug use.

Section D - Precautions/Procedures (Storage), Continued

Follow "Code For The Storage of Liquid and Solid Oxidizing Materials" (NFPA No. 43A).

**PACKAGING:**  
2.2 liter or 7-lb. bottles in box. Box carries white (Corrosive) and yellow (Oxidizer) label  
Carboys with white (Corrosive) and yellow (Oxidizer) labels.  
Drums with white (Corrosive) and yellow (Oxidizer) labels.  
Tank trucks with white (Corrosive) and yellow (Oxidizer) placards.

PSDS FILE# - GC 4020

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## SECTION E (Continued) - PROTECTIVE EQUIPMENT

**1. HEAVY HANDLING (e.g. cases of bottles/  
carboys/drums/pallets of  
cases/tank trucks):**Respiratory Protection

Where required, use a respirator approved by NIOSH for HNO<sub>3</sub> or nitrogen oxide gases or mists, as applicable. Some exposures may require NIOSH-approved, self-contained breathing apparatus or supplied-air respirator.

Eyes and Face

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

Hands, Arms, and Body

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

Other Clothing and Equipment

Eyewash and quick-drench facilities.

**2. SPECIALIZED HANDLING (e.g. bottles):  
(Using closed ventilated system - seed).**Respiratory Protection

Generally not required. For spill or leak or other emergency, use a respirator approved by NIOSH for HNO<sub>3</sub> or nitrogen oxide gases or mists, as applicable. Some exposures may require NIOSH-approved, self-contained breathing apparatus or supplied-air respirator.

Eyes and Face

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

Hands, Arms, and Body

As a minimum, acid-resistant gloves. For leak or spill or other emergency, use full protective clothing (see page 5 under 1. HEAVY HANDLING - Hands, Arms, and Body).

Other Clothing and Equipment

Eyewash and quick-drench facilities.



**D. PRECAUTIONS & PROCEDURES**

## VENTILATION

1. Heavy Handling (e.g. cases of bottles/carboys/drums/pallets of cases/ tank trucks): Sufficient to reduce acid mists and vapor concentrations below permissible TLV levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems.
2. Specialized Handling (e.g. bottles): Handling should be done in a closed ventilated system (e.g. exhausted hood). All must be of corrosion-resistant materials.

## NORMAL HANDLING

Avoid contact with skin or eyes or clothing. Avoid breathing vapor. Keep away from metals and incompatible chemicals (Section G), which are numerous. See Refs. (d) and (e) for additional information.

## STORAGE

Store in dry, well-ventilated area away from heat and highly flammable substances and out of the sun. Do not store near oxidizing substances (nitric acid, etc.) or other incompatible materials, see G. Protect from physical damage and keep containers closed and upright. See Ref. (e) for further information.

PRECAUTIONARY LABEL       ATTACHED       NOT ATTACHED

DOT Classification: Corrosive material. DANGER! Causes Burns. May be Fatal if swallowed. Poison.

## SPILL OR LEAK

Eye-protected personnel should remove spills immediately by flushing away with lots of water. Fully protected\* personnel may carefully neutralize with alkalis such as soda ash or lime. Use ample ventilation when neutralizing with soda ash or limestone to eliminate the carbon dioxide that is formed.

\*Including full face shield.

## FIRE EXTINGUISHING AGENTS RECOMMENDED

If involved in a fire, use water. Also neutralization technique, see "Spill or Leak" above.

## SPECIAL FIRE FIGHTING PRECAUTIONS

Wear self-contained breathing apparatus with full facepiece and full protective clothing. Use water spray to cool fire-exposed containers. Do not splash this material onto other personnel.

## FIRE EXTINGUISHING AGENTS TO AVOID

No standard agent.

## SPECIAL PRECAUTIONS/PROCEDURES

Medical surveillance and employee education are recommended for workers with this acid. To prevent ignition of any hydrogen gas that may be generated from accidental contact of metals with acid, smoking, open flames, and sparks must not be permitted in the storage area. Further information, Ref. (d) and (e).

**E. PERSONAL PROTECTIVE EQUIPMENT**

See Page 5.

## RESPIRATORY PROTECTION

## EYES AND FACE

## HANDS, ARMS, AND BODY

## OTHER CLOTHING AND EQUIPMENT



**II. ENVIRONMENTAL INFORMATION**

DEGRADABILITY	OCTANOL/WATER PARTITION COEFFICIENT Unknown
N.A. (Inorganic)	
WASTE DISPOSAL METHODS*	
Disposal of hydrochloric acid may be subject to federal, state, and local regulations. Users of this product should review their operations in terms of applicable federal, state and local laws and regulations, then consult with appropriate regulatory agencies before discharging or disposing of waste material.	
*DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS.	

**III. REFERENCES**

PERMISSIBLE CONCENTRATION REFERENCES
OSHA Regulations, 29 CFR 1910.1000. TLV from the 1980 ACGIH List, "Threshold Limit Values for Chemical Substances . . . ."
REGULATORY STANDARDS
D.O.T. Hazardous Materials Table: 49 CFR 172.101 as applied by Allied Chemical in the classification. Designated a Hazardous Substance for spills by EPA (40 CFR, parts 116-117). RCRA Status: A hazardous waste (corrosive) if discarded (45 CFR 261.22).
GENERAL
(a) Bransburg, 1946 cited by Fairhall, L.T., <u>Industrial Toxicology</u> , p. 56, Williams & Wilkins, Baltimore (1957). (b) Tech. Guide #7, <u>Handbook of Hazardous Materials</u> , Am. Mutual Insurance Alliance, Chicago 60606 (1974). (c) NIOSH Registry, Sequence No. MW4025000 (1978). (d) Allied/Signal Wall Safety Chart for Muriatic Acid. (e) Allied/Signal Technical Report for Muriatic Acid, discussing Storage and Handling.

**IV. ADDITIONAL INFORMATION**

B. First Aid (Continued)

Ingestion: Drink immediately large quantities of water or milk, repeating if vomiting.\* Aim to dilute acid 100 times approximately. Call a physician.

Skin Contact with Dilute Solutions: Generally the above described treatment involving immediate washing is required if the acid is as strong as pH 3 (or less than 3). Weaker solutions (pH greater than 3) Require a prompt washing.

\*However, do not induce vomiting.

PSDS FILE # - GC 4010

1. Heavy Handling (e.g. cases of bottles/carboys/drums/pallets of cases/tank trucks):

Respiratory Protection

Where required, use a respirator approved by NIOSH for hydrogen chloride gas or hydrochloric acid mist, as applicable. For the gas up to 50 ppm: chemical cartridge respirator with an acid gas cartridge(s). Up to 100 ppm: (a) same with full facepiece or (b) gas mask with acid gas canister (chin-style or front-or-back-mounted canister) or (c) supplied-air respirator with full-facepiece or (d) self-contained breathing apparatus, with full-facepiece. For mist, (c) or (d) are recommended up to 100 ppm (HC1).

Eyes and Face

As a minimum, wear hard hat, chemical safety goggles, full-face plastics shield. Do not wear contact lenses.

Hands, Arms and Body

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

Other Clothing and Equipment

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

2. Specialized Handling (e.g. bottles):

(Only if using the closed ventilation system of Section D)

Respiratory Protection

Generally not required. For spill or leak or other emergency, use a respirator approved by NIOSH for this service, see p. 5., 1. respiratory protection.

Eyes and Face

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

Hands, Arms, and Body

As a minimum, acid-resistant\* gloves. For leak or spill or other emergency, use full protective clothing (see page 5 under 1. HEAVY HANDLING - Hands, Arms, and Body).

Other Clothing and Equipment

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

\*Preferably neoprene or NBR (nitrile-butadiene rubber). Wash immediately any impervious items that become contaminated. Remove immediately any non-impervious items that become contaminated.

# **Dangerous Properties of Industrial Materials**

Sixth Edition

**N. IRVING SAX**

Assisted by:

Benjamin Feiner/Joseph J. Fitzgerald/Thomas J. Haley/Elizabeth K. Weisburger



VAN NOSTRAND REINHOLD COMPANY  
New York

**CADMIUM**CAS RN 7440439  
mf Cd, mw 112.40

NIOSH #: EU 9800000

Hexagonal crystals, silver-white malleable metal. mp: 320.9°, bp: 767 ± 2°, d: 8.642, vap. press: 1 mm @ 394°

**SYNS:**

C.I. 77180

KADMIUM (GERMAN)

**TOXICITY DATA:**

3

**CODEN:**

ivn-rat TDLo: 1250 ug/kg (9D  
preg): TER  
ipr-mus TDLo: 2248 ug/kg (8D  
preg): TER  
ivn-ham TDLo: 2 mg/kg (8D  
preg): TER  
ims-rat TDLo: 45 mg/kg/4W-1: NEO

EVHPAZ 28,245,79

TJADAB 13,33A,76

EXPEAM 25,56,69

NCIUS\* PH-43-64-  
886,SEPT,71

BJCAAI 18,124,64

NATUAS 193,592,62

AEHLAU 28,147,74

AIHAAP 31,180,70

85DCAI 2,73,70

TXAPA9 41,667,77

TXAPA9 41,667,77

TXAPA9 41,667,77

TXAPA9 41,667,77

GTPZAB 22(5),6,78

GTPZAB 22(5),6,78

AMPMAR 34,127,73

PROTA\* --,55

NCIUS\* PH-43-64-886

CGCGBR 26,251,80

TXAPA9 41,194,77

APTOD9 19,A122,80

AEHLAU 23,102,71

ims-rat TD: 70 mg/kg: ETA  
ims-rat TD: 63 mg/kg: ETA  
ihl-man TCLo: 88 ug/m3/8 6Y: SYS  
ihl-hmn TCLo: 39 mg/m3/20M  
unk-man LDLo: 15 mg/kg  
orl-rat LD50: 225 mg/kg  
ipr-rat LD50: 4 mg/kg  
scu-rat LD50: 9 mg/kg  
ivn-rat LD50: 3 mg/kg  
unk-rat LD50: 712 mg/kg  
unk-mus LD50: 636 mg/kg  
orl-rat LDLo: 70 mg/kg  
scu-rat LDLo: 6 mg/kg  
ims-ham LDLo: 25 mg/kg  
cyt-ham\* ovr 1 umol/L  
ipr-rat TDLo: 1124 ug/kg (1D male)  
scu-rat TDLo: 250 ug/kg (19D preg)  
orl-mus TDLo: 448 mg/kg (MGN)

Carcinogenic Determination: Animal Positive IARC\*\*  
2,74,73.

TLV: Air: 0.05 mg/m3 DTLVS\* 4,59,80; TRBMAV  
33(1),85,75; JDSCAE 58(12),1767,75; JFDSAZ  
39,321,74; AMBOCX 3(2),55,74; QURBAW 7(1),  
75,74; AEMBAP 40,239,73; NTIS\*\* PB-221,198;  
KOTTAM 11(11),1300,75; FOREAE 7,313,42;  
STEVAS 2(4),341,74; FCTXAV 9,105,71; AJMEAZ  
38,409,65; ENVRAL 4,71,71; 85CVA2 5,63,70; PEX-  
TAR 12,102,69; PDTNBH 6,204,77; BNYMAM  
54,413,78; AMTODM 3,209,77; GSAMAQ 123,  
109,71. OSHA Standard: Air: TWA 200 ug/m3; CL  
600 (SCP-W) FEREAC 39,23540,74. Occupational Ex-  
posure to Cadmium recm std: Air: TWA 40 ug/m3;  
CL: 200 ug/m3/15M NTIS\*\*. "NIOSH Manual of  
Analytical Methods" VOL 1 191,223,224, VOL 3 S312,  
S313, VOL 5 173#. Reported in EPA TSCA Inven-  
tory, 1980.

**THR:** MUT data. An exper TER, NEO, ETA, CARC.

A human SYS. HIGH hmn ihl, unk. HIGH orl, ipr,

scu, ivn, ims. MOD unk. See also cadmium compounds.

**Fire Hazard:** Mod, in the form of dust when exposed  
to heat or flame or by chemical reaction with oxidizing  
agents, metals, HN<sub>3</sub>, Zn, Se and Te..**Explosion Hazard:** Mod, in the form of dust when exposed  
to flame.**Disaster Hazard:** Dangerous; cadmium dust can react  
vigorously with oxidizing materialsFor further information see Vol 1, No. 1 and Vol. 3,  
No. 5 of DPIM Report**CHROMIUM**CAS RN: 7440473  
Af: Cr; Aw: 52.0

NIOSH #: GB 4

SYN: CHROMI

**TOXICITY DATA:**

ivn-rat TDLo: 2160 ug/kg/6W-1

TFX: ETA

imp-rat TDLo: 1200 ug/kg/6W-1

TFX: ETA

imp-rat TDLo: 75 mg/kg: ETA

**CODEN:**

JNCIAM 16,447,5

JNCIAM 16,447,5

ZEKBAI 52,425,41

Carcinogenic Determination: Animal Suspected I.  
2,100,73; Animal Indefinite IARC\*\* 23,205,80  
TWA 500 ug/m3 DTLVS\* 4,98,80. *Toxicology*.  
85CVA2 5,63,70; KOTTAM 11(11),1300,75  
REAE 7,313,42; MIBUBI 9(4),321,75; FC  
9,105,71; PEXTAR 12,102,69; 85DHAX Cr  
BNYMAM 54,413,78; NTIS\*\* Conf-691001.  
Standard: Air: TWA 1 mg/m3 (SCP-0) FE  
39,23540,74. "NIOSH Manual of Analytical Me-  
VOL 1 152,182, VOL 3; S323,352, VOL 5  
NIOSH Current Intelligence Bulletin 4, 1975. Re  
in EPA TSCA Inventory, 1980. Proposed OSHA  
cal Records Rules FEREAC 47,30420,82.

**THR:** An exper ETA, CARC.**Disaster Hazard:** Powder will explode spont in air**Incomp:** Oxidants.

For further information see Vol. 3, No. 3 of DPIM

**COPPER**

CAS RN: 7440508

NIOSH #: GL 5

Af: Cu; Aw: 63.54

A metal with a distinct reddish color. mp: 1083  
2324°, d: 8.92, vap. press: 1 mm @ 1628°.**SYNS:**

BRONZE POWDER

C.I. 77400

COPPER BRONZE

GOLD BRONZE

**TOXICITY DATA:**

3

**CODEN:**

orl-rat TDLo: 152 mg/kg (22W pre)

GISAAA 45(3),8,80

orl-rat TDLo: 1520 ug/kg (22W pre)

GISAAA 45(3),8,80

orl-rat TDLo: 1210 ug/kg (35W pre)

GISAAA 42(8),30,7

ipl-rat TDLo: 100 mg/kg TFX: ETA

AIHAAP 41,836,80

orl-hmn TDLo: 120 ug/kg: GIT

PHRPA6 73,910,58

TLV: Air: 0.2 mg/m3 (fume) DTLVS\* 4,104,80;  
mg/m3 (dust mist) DTLVS\* 4,104,80. *Toxicolog*  
view: TRBMAV 33(1),85,75; QURBAW 7(1),7

JAVMA4 164(3),277,74; IJMDAI 10(4),41

KOTTAM 11(11),1300,75; FOREAE 7,31

MIBUBI 9(4),321,75; PEXTAR 12,102,69; 85D

Cu,41,74; AMTODM 3,209,77. "NIOSH Manu

Analytical Methods" VOL 5 173#. Reported in

TSCA Inventory, 1980.

**THR:** HIGH hmn via orl. See copper compounds.**Fire and Explosion Hazard:** Reacts violently with CNH<sub>4</sub>NO<sub>3</sub>, bromates, chlorates, iodates, Cl<sub>2</sub>, ClF<sub>3</sub>,+ OF<sub>2</sub>, ethylene oxide, F<sub>2</sub>, H<sub>2</sub>O<sub>2</sub>, hydrazine moitrate, hydrazoic acid, H<sub>2</sub>S, Pb(N<sub>3</sub>)<sub>2</sub>, K<sub>2</sub>O<sub>2</sub>, NNa<sub>2</sub>O<sub>2</sub>.**Incomp:** 1-bromo-2-propyne.

For further information see Vol. 1, No. 5 of DPIM

port.

**LEAD**CAS RN: 7439921  
mf: Pb; mw: 207.19

NIOSH #: OF 7525000

Bluish-gray, soft metal. mp: 327.43°, bp: 1740°, d: 11.34 @ 20°/4°, vap. press: 1 mm @ 973°.

**SYNS:**C.I. 77575  
LEAD FLAKELEAD #2  
GLOW (POLISH)**TOXICITY DATA:****3****CODEN:**

rl-rat TDLo: 790 mg/kg (MGN)	AEHLAU 23,102,71
rl-rat TDLo: 1140 mg/kg (14D pre-21D post)	PHMCAA 20,201,78
orf-mus TDLo: 1120 mg/kg (MGN)	AEHLAU 23,102,71
l-mus TDLo: 6300 mg/kg (1-21D preg)	EXPEAM 31,1312,75
l-mus TDLo: 12600 mg/kg (1-21D preg)	EXPEAM 31,1312,75
orf-mus TDLo: 4800 mg/kg (1-16D preg)	BECTA6 18,271,77
l-ham TDLo: 50 mg/kg/(8D preg):TER	EXPEAM 25,56,69
orf-dom TDLo: 662 mg/kg (1-21W preg)	TXAPA9 25,466,73
l-ham TDLo: 50 mg/kg/(8D preg):TER	EXPEAM 25,56,69
orf-wmn TDLo: 450 mg/kg/6Y:CNS	JAMAAP 237,2627,77
lpr-rat LDLo: 1000 mg/kg	EQSSDX 1,1,75
lpgn LDLo: 160 mg/kg	HBAMAK 4,1289,35

Carcinogenic Determination: Indefinite IARC\*\* 23, 325,80.

**TLV:** AIR: 0.15 mg/m<sup>3</sup> DTLVS\* 4,243,80; *Toxicology Review:* TRBMAV 33(1),85,75; PGMJAO 31(601),783,75; JDSCAE 58(12),1767,75; IRXPAT 12,1,73; CTPHBG 55,147,71; CTOXAO 6(3),377,73; QURBAW 7(1),75,74; RREVAH 54,55,75; JAVMA4 64(3),277,74; AEMBAP 40,239,73; CTOXAO 2(2),151,72; FOREAE 7,313,42; KOTTAM 11(11),1300,75; GEIGAI 20(3),291,73; STEVA8 (4),341,74; CLCHAU 19,361,73; AJMEAZ 38,409,65; SDHAX PB,254,72; PDTNBH 6,204,77; AMTODM 3,209,77. OSHA Standard: Air: TWA 200 ug/m<sup>3</sup> (SCP-O) FEREAC 39,23540,74. Occupational Exposure to Inorganic Lead recm std: Air: TWA 0.10 g(Pb)/m<sup>3</sup> NTIS\*\*. "NIOSH Manual of Analytical Methods" VOL 1 102,191,195,200,208,214,262, VOL 3 S341. Reported in EPA TSCA Inventory, 1980.

**Toxicity:** See lead compounds. A hmn CNS. HIGH orl; MOD irr. A common air contaminant. It is a ± CAR to the lungs and kidney and an exper TER.

**Hazard:** Mod, in the form of dust when exposed to heat or flame. See also powdered metals.

**Corrosion Hazard:** Mod, in the form of dust when exposed to heat or flame.

**Incomp:** NH<sub>4</sub>NO<sub>3</sub>, ClF<sub>3</sub>, H<sub>2</sub>O<sub>2</sub>, NaN<sub>3</sub>, Na<sub>2</sub>C<sub>2</sub>, Zr. disodium acetylide; oxidants.

**Dust Hazard:** Dangerous; when heated, emits highly toxic fumes; can react vigorously with oxidizing materials.

For further information see Vol. 1, No. 1 of *DPIM Report*.

**NICKEL**CAS RN: 7440020  
af: Ni; aw: 58.71

NIOSH #: QR 59

A silvery-white, hard, malleable and ductile metal. 8.90 @ 25°, vap. press: 1 mm @ 1810°. Crystalline metallic cubes; mp: 1455°; bp: 2730°; Stable in air at room temp.

**SYNS:**C.I. 77775  
NICKEL CATALYST, WET (DOT)  
NICKEL (ITALIAN)  
NICKEL SPONGEFULVERIZED NICKEL  
RANEY ALLOY  
RANEY NICKEL**TOXICITY DATA:****3****CODEN:**

otr-ham emb 5 umol/L	TOXID9 1,132,81
orf-rat TDLo: 158 mg/kg (MGN)	AEHLAU 23,102,71
acu-rat TDLo: 3000 mg/kg/6W-1:ETA	JNCIAM 16,55,55
ims-rat TDLo: 1000 mg/kg/17W-1:CAR	PAACA3 9,28,68
ipl-rat TDLo: 1250 mg/kg/17W-1:ETA	TRBMAV 10,167,52
par-rat TDLo: 40 mg/kg/52W-1:ETA	AEHLAU 5,445,62
imp-rat TDLo: 250 mg/kg:CAR	JNCIAM 16,55,55
ims-mus TDLo: 200 mg/kg:NEO	NCIUS* PH 43-64-81 SEPT,70
imp-rbi TDLo: 165 mg/kg/2Y-1:NEO	JNCIAM 16,55,55
ihl-gpg TCLo: 15 mg/m <sup>3</sup> /91W-1:ETA	AMPLAO 65,600,58
ims-ham TDLo: 200 mg/kg/21W-1:ETA	PWPSA8 14,68,71
ims-rat TD: 58 mg/kg:ETA	PAACA3 17,11,76
imp-rat TD: 23 mg/kg:ETA	JNCIAM 16,55,55
ims-rat TD: 125 mg/kg/13W-1:NEO	NCIUS* PH 43-64-81 JUL,68
ims-mus TD: 800 mg/kg/13W-1:NEO	NCIUS* PH 43-64-81 JUL,68
ims-rat TD: 90 mg/kg/18W-1:ETA	NCIUS* PH 43-64-81 AUG,69
ims-rat TD: 889 ug/kg:ETA	JPTLAS 97,375,69
ims-rat TD: 200 mg/kg/21W-1:NEO	PWPSA8 14,68,71
lpr-rat LDLo: 12 mg/kg	NTIS** AEC-TR-6710
lpr-mus LDLo: 50 mg/kg	FATOA0 23,549,60
lpr-dog LDLo: 10 mg/kg	14CYAT 2,1120,63
orf-gpg LDLo: 5 mg/kg	AMPMAR 25,247,64
lpr-gpg LDLo: 500 mg/kg	MELAAD 37,140,46

Carcinogenic Determination: Animal Positive IARC 11,75,76.

**TLV:** Air: 1.0 mg/m<sup>3</sup> DTLVS\* 4,295,80. *Toxicology Review:* ACLSCP 3(3),156,73; KOTTAM 11(11),1300; MIBUBI 9(4),321,75; FCTXAV 9,105,71; 85DH Ni,168,75; 85CVA2 5,63,70; 31BYAP -,93,74; NTL CONF-691001; GSAMAQ 123,109,71; PEXT 12,102,69; DICHAK 54,527,68; AMTODM 3,209,77. OSHA Standard: Air: TWA 1 mg/m<sup>3</sup> (s) (SCP-N) FEREAC 39,23540,74. DOT: Flamm. Solid, Label: Flammable Solid FEREAC 41,57018. Occupational Exposure to Inorganic Nickel recm std: Air: TWA 15 ug(Ni)/m<sup>3</sup> NTIS\*\*. "NIOSH Manual of Analytical Methods" VOL 3 S206, VOL 5 17: 298#. Reported in EPA TSCA Inventory, 1980. EPA TSCA 8E No: 09880246—File closed as of April, 1980.

**THR:** An exper CARC, ETA, NEO; HIGH acute irritant, orl. Reacts violently with F<sub>2</sub>, NH<sub>4</sub>NO<sub>3</sub>, hydrazine, NH<sub>3</sub>, (H<sub>2</sub> + dioxane), performic acid, P, Se, S, (Tl, KClO<sub>3</sub>).

**Incomp:** Aluminium; aluminium trichloride, ethylaluminum dichloride; hydrogen; methanol; non-metals; oxidizing sulfur compounds.

**Caution:** May cause dermatitis in sensitive individuals. Ingestion of sol salts causes nausea, vomiting, diarrhea. For further information see Vol. 1, No. 1 and Vol. No. 3 of *DPIM Report*.

**ZINC**CAS RN: 7440-66-6  
af: Zn; aw: 65.37

NIOSH #: ZG 8600000

Bluish-white, lustrous metal. mp: 419.8°; bp: 908°; d: 7.14 @ 25°; vap. press: 1 mm @ 487°.

**SYNS:**

UI POWDLR	GRANULAR ZINC
1. 77945	ZINC DUST
1. PIGMENT BLACK 16	ZINC POWDLR

**SKIN AND EYE IRRITATION**

DATA: 2	CODEN:
ih-hmn 300 ug/3D-1:MLD	85DKA8 -,127,77

**TOXICITY DATA:**

ih-hmn TCLo: 124 mg/M <sup>3</sup> /50M:PUL	CODEN:
	AHYGAJ 72,358,10

*Toxicology Review:* QURBAW 7(1),75,74; ADTEAS 5,51,72; FOREAE 7,313,42; KOTTAM 11(11),1300,7; AMTODM 3,209,77.

"NIOSH Manual of Analytical Methods" VOL 5 173# NIAMAM\*. Reported in EPA TSCA Inventory, 1980. Meets Criteria for Proposed OSHA Medical Records Rule FEREAC 47,30420,82.

*HR:* A hmn skn irr and PUL. See also zinc compounds. Pure zinc powder, dust, fume is relatively non-tox to humans via irr or ihl. The difficulty arises from oxidation of zinc fumes prior to ihal or presence of impurities such as Cd, Sb, As, Pb.

*Fire Hazard:* Mod, in the form of dust when exposed to heat or flame.

*Spontaneous Heating:* No.

*Explosion Hazard:* In the form of dust when reacted with acids.

*Comp:* NH<sub>4</sub>NO<sub>3</sub>; BaO<sub>2</sub>; Ba(NO<sub>3</sub>)<sub>2</sub>; Cd; CS<sub>2</sub>; chlorates; Cl<sub>2</sub>; ClF<sub>3</sub>; CrO<sub>3</sub>; (ethyl acetoacetate + tribromoneopentyl alcohol); F<sub>2</sub>; hydrazine mononitrate; hydroxylamine; Pb(N<sub>3</sub>)<sub>2</sub>; (Mg + Ba(NO<sub>3</sub>)<sub>2</sub> + BaO<sub>2</sub>); MnCl<sub>2</sub>; HNO<sub>3</sub>; performic acid; KClO<sub>3</sub>; KNO<sub>3</sub>; K<sub>2</sub>O<sub>2</sub>; Se; NaClO<sub>3</sub>; Na<sub>2</sub>O<sub>2</sub>; S; Te; H<sub>2</sub>O; (NH<sub>4</sub>)<sub>2</sub>S; As<sub>2</sub>O<sub>3</sub>; CS<sub>2</sub>; CaCl<sub>2</sub>; NaOH; chlorinated rubber; catalytic metals; halocarbons; o-nitroanisole; nitrobenzene; non-metals; oxidants; paint primer base; pentacarbonyliron; transition metal halides; seleninyl bromide.

*To Fight Fire:* Special mixtures of dry chemical.

For further information see Vol. 1, No. 7 of *DPIM Report*.

**SILVER**CAS RN: 7440224  
af: Ag; aw: 107.87

NIOSH #: VW 35000

Soft, ductile, malleable, lustrous, white metal. mp: 961.93°; bp: 2212°; d: 10.50 @ 20°.

**SYNS:**

ARGENTUM	SILBER (GERMAN)
C.I. 77820	SILVER ATOM
SHELL SILVER	

**TOXICITY DATA:**

mul-rat TDLo: 330 mg/kg/43W-1	CODEN:
TFX:ETA	ZEKBAI 63,586,60
imp-rat TDLo: 2400 mg/kg TFX:ETA	CNREA8 16,439,56
imp-mus TDLo: 11 gm/kg TFX:ETA	NATWAY 42,75,55
imp-rat TD: 2570 mg/kg TFX:ETA	NATWAY 42,75,55
ihl-hmn TCLo: 1 mg/m <sup>3</sup> TFX:SKN	DTLVS* 3,231,71

*TLV:* Air: 0.1 mg/m<sup>3</sup> DTLVS\* 4,367,80. *Toxicology Review:* FOREAE 7,313,42; MIBUBI 9(4),321,75; PTPAD4 1,127,76; AJMEAZ 38,409,65; PEXTAF 12,102,69. OSHA Standard: Air: TWA 10 ug/m<sup>3</sup> (SCP-N) FEREAC 39,23540,74. Reported in EPA TSCA Inventory, 1980.

*THR:* An exper ETA. A hmn SKN. See also silver compounds.

*Fire Hazard:* Mod, in the form of dust, when exposed to flame or by chemical reaction with C<sub>2</sub>H<sub>2</sub>, NH<sub>3</sub>, bromoazide, ClF<sub>3</sub>, ethylene imine, H<sub>2</sub>O<sub>2</sub>, oxalic acid, H<sub>2</sub>SO<sub>4</sub>, tartaric acid. See also powdered metals.

For further information see Vol. 1, No. 1 of *DPIM Report*

# ATTACHMENT H

RESUMES

OF KEY

STAFF

# CA RICH CONSULTANTS, INC.

CHARLES ANTHONY RICH, C.P.G. #4433

## TITLE

President, C A Rich Consultants, Inc.  
Project Manager

## EDUCATION

Bachelor of Science, Geology, Syracuse University, Syracuse, NY  
Master of Arts, Geology, City University of New York, Queens  
College Post-Graduate Studies, New York Institute of Technology

## PROFESSIONAL AFFILIATIONS

American Institute of Professional Geologists  
National Water Well Association  
American Water Works Association  
American Water Resources Association

## PROFESSIONAL EXPERIENCE

President, C A Rich Consultants, Inc.

Company capabilities include hydrogeologic field investigations, contaminant transport and ground water monitoring, geotechnical surveys, remedial action and feasibility studies, water resource exploration and development, water-well rehabilitation, sections of environmental impact statements (DEIS), and environmental engineering evaluations. Mr. Rich conceptualized and created the consulting expertise of the Firm which is in successful operation for five years.

Managed aquifer restoration activities and evaluation at several Superfund Sites in the Northeastern United States including the GE Moreau Site and the Bridgeport BROS PCB/Waste Oil Lagoon Site within the past two years; engaged in managing full-stage remedial studies and related cleanup activities for an industrial research facility in N.J.; engaged in managing the investigation of a coal tar site in N.J.; engaged in testing and engineering design of unit treatment processes for reducing volume and toxicity of hazardous waste streams; engaged in securing requisite solid waste permits for municipal landfill expansion in Pennsylvania; engaged in both an abandoned and partially active hazardous waste site evaluation at a manufacturing complex in Ill.; provision of remedial advisory technical support in construction of hazardous waste storage site for chemical complex in San Marcos, Calif.; participated in emergency spill response and remedial planning for MEK spill on Long Island; provided technical field support for requisite sampling activities performed at Love Canal and other sites as Consultant to New York State Attorney General.

## CA RICH CONSULTANTS, INC.

Developed professional seminars for Fortune 500 Corporations concerning underground storage tanks and related waste management activities; engaged in securing NJDEP permits for various applicants in NJ desiring ground water diversion rights and Permit renewals; provided Countywide fracture trace analysis for Putnam County, NY and attendant safe yield and aquifer available yield analysis for targeted areas using ERTS imagery and stereo aerial photography.

### Principal-In-Charge, Dames and Moore, Cranford, New Jersey

Managed conceptual development, pilot and full-scale design of a prototype aquifer decontamination abatement program to correct serious organic groundwater contamination at a large manufacturing complex in downstate New York during late 1970's; design and review of installed monitoring well networks in conformance with preparation of Part B RCRA permits nationwide and in response to 40CFR 264 Subpart F regulatory compliance requirements; Court-appointed 'master of chancellory' to aid Superior Court Judge in apportionment of damages between NJDEP and two Corporations.

Program Management of multi-disciplined water resource investigation of the Lake Minnewaska sky-lake and environs, and testimony in front of State Administrative Law Judge.

### Hydrogeologist, Geraghty & Miller, Inc., Port Washington, New York

Evaluated PCB contamination at a landfill receiving capacitors and transformers in New Bedford, Mass. for EPA Region I; principal investigator for subsurface oil spill into East River, NYC near product storage terminals at Greenpoint, Brooklyn with reports to the Coast Guard and Mayor of NYC; principal investigator of L.I. 208 Study (1977) prepared for the Nassau/Suffolk Regional Planning Board; assessed groundwater availability for low-level rad-waste disposal siting; assessed feasibility of using excess groundwater to store heat for winter heating and chilled water for summer cooling in aquifers underlying Louisville, Kentucky for USDOE.

Supervised development of groundwater for power production for the Puerto Rico Water Resources Authority and supported groundwater availability studies for the Arab Republic of Egypt.

### Hydrogeologist, Holzmacher, McLendon & Murrell, P.C., Melville, New York

Waste disposal and environmental impact statements; public water well supply designs and rehabilitation; Section 201 Wastewater Facility Planning including Town of Riverhead, NY and Hunterdon County, NJ.

Project Management (1975) of Carll's River Stream Augmentation Project to evaluate feasibility of recharging renovated treatment plant effluent into groundwaters of Long Island through streambed permeameters.

## CA RICH CONSULTANTS, INC.

Hydrologic Technician, U.S. Geological Survey, Water Resources Division  
Department of Interior, Mineola, New York

Directed (1973) ground water basic data collection; served as liaison with concerned agencies; maintained long-term network of Island observation and monitoring wells and supervised drilling/logging of new wells; prepared computer storage and retrieval programs on ground water and surface water basic data for Long Island aquifers and prepared hydrologic maps for same.

### Selected Publications

Rich, C.A., 1984; The Necessary Involvement and Responsibility of Separate Entities in Planning and Performance of Aquifer Restoration; Invited Keynote Address presented to the Third National Symposium on Aquifer Restoration and Groundwater Monitoring, In Conference Proceedings, Sponsored by USEPA, NWWA and National Center for Groundwater Research.

Rich, C.A., 1982; Hydrogeologic Considerations for Compliance and Groundwater Protection, IN Risk and Decision Analysis for Hazardous Waste Disposal, HMCRI Library of Congress, Washington, D.C.

Rich, C.A., 1981, Geotechnical Methods Combined with Cluster Wells to Monitor Organic and Inorganic Groundwater Contamination, IN Quality of Groundwater, ed. Duijvenbooden, Glasbergen, Lelyveld: Studies in Environmental Science, V 17; Netherlands National Institute for Water Supply, Elsevier Publications.

Archer, B., Rich, C.A., & Minster, J., 1980; Investigation for the New Jersey Superior Court on Feasibility of Containment and Removal of Contaminated Groundwater and Soil in Pricketts Brook Watershed, Middlesex County, N.J., IN Consultant's Report to the State of New Jersey.

Rich, C.A., Miller, D.W., 1976; Groundwater Pollution Sources on Long Island, In Groundwater Conditions, Rept. No. 4, Long Island 208 for the Nassau-Suffolk Regional Planning Board.

### Recognition

Who's Who in the East

Who's Who in the World

Past-President of the Northeast Section of the American Institute of Professional Geologists

Company Clientele available upon request.

**CA RICH CONSULTANTS, INC.**

**Eric Andrew Weinstock, CPG #7391**

**TITLE**

Senior Scientist/Project Manager

**EDUCATION**

Bachelor of Science, Geology, State University of NY at Oneonta  
Master of Science, Engineering Geology, Georgia  
Institute of Technology

**PROFESSIONAL AFFILIATIONS**

American Institute of Professional Geologists  
National Water Well Association  
American Geophysical Union  
American Society of Testing and Materials

**Registration**

Registered Professional Geologist in the state of Delaware  
(No.379) and South Caroline (No. 544).

**PROFESSIONAL EXPERIENCE**

**Senior Scientist/Project Manager, C A Rich Consultants, Inc., N.Y.**

Mr. Weinstock serves as both a Project Manager and Technical Supervisor for the Firm. He brings with him eight years of consulting experience in hazardous waste and water supply investigations.

Presently, he is the project manager for several ground water supply feasibility and exploration studies. Eric is also leading the investigation and clean-up of two hazardous waste sites in the tri-state area.

**Senior Hydrogeologist, Camp Dresser & McKee, N.Y.**

Mr. Weinstock was the Project Geologist for the Port Washington Landfill remedial investigation, a U.S. EPA Superfund site. He was in charge of developing the scope of work and implementing a subsurface drilling program that included 300 to 400 foot deep groundwater monitoring wells, landfill gas wells and landfill pressure probes. The information collected in this investigation is being used in CDM's Dynflow/Dyntrack computer model to assess the effectiveness of different remedial alternatives.

## CA RICH CONSULTANTS, INC.

Eric developed a simulation of the regional stratigraphy of Nassau County for NCDPW's regional groundwater model. This information, along with local hydrologic data, is being used in CDM's Dynflow/Dyntrack model to simulate the effects of pumping on the areas's water supply aquifers.

At the Metaltec/Aerosystems site in Franklin, N.J., also a U.S. EPA Superfund site, Mr. Weinstock was in charge of developing and implementing a remedial investigation of a metals plating facility. The project included monitoring well installation; soil, surface water and groundwater sampling; and aquifer pump testing. The information collected was used to assess different remedial alternatives in the feasibility study.

### Hydrogeologist, Leeds Hill & Jewett, San Francisco, CA

Eric served as the principal field geologist for the drilling and installation of production water wells for a 1500 megawatt power plant in Nevada. His duties included supervision of drilling contractors, interpretation of geophysical logs, inspection of well construction materials and aquifer pump testing. The wells installed produced in excess of 2,000 gpm.

At the China Lake Naval Weapons Center in southern California, Mr. Weinstock was in charge of a subsurface drilling and monitoring well installation program to determine the nature and extent of a plume of underground jet fuel. The study delineated an underground plume estimated at 50,000 gallons in volume.

### Hydrogeologist, Dames & Moore, San Francisco, CA

As part of the RCRA Part A process, Mr. Weinstock supervised the installation, sampling and testing of an extensive monitoring well network at a Chevron refinery and a Chevron chemical plant in Richmond, California. Eric defined the geometry of the aquifers below the facilities, mapped the water table elevations and determined the direction and velocity of groundwater flow. Duties included supervision of drilling contractors, geophysical logging, aquifer pump testing and groundwater sampling.

**PUBLICATIONS**

Rao, S.G. and Weinstock, E.A., 1981, "Numerical Modeling of Solute Transport in Groundwater; An Application to a Landfill Site in Florida." Paper presented at the 17th American Water Resources Association, National Conference, October 4-8, 1981, Atlanta, Georgia.

**LECTURES**

Guest lecturer in Hydrogeology at Manhattan College and Cooper Union, Spring 1987 and 1988.

**CA RICH CONSULTANTS, INC.**

**BRUCE M. BECK**

**TITLE**

Environmental Engineer/Project Manager

**EDUCATION**

State University of New York  
Associate of Arts & Sciences, Ecology & Marine Science

C.W. Post University  
Geology & Environmental Science, 1985

New York Institute of Technology  
Mechanical Engineering

Institute of Asbestos Awareness  
14-Hour NYC Asbestos Abatement Investigator Course

**PROFESSIONAL ORGANIZATIONS**

APCA - Air Pollution Control Association - Active Member  
NETA - National Environmental Training Association - Active Member  
NEHA - National Environmental Health Association - Active Member

**CERTIFICATIONS**

EPA AHERA Inspector #8802-02-005  
EPA AHERA Management Planner #8802-02-070

**PUBLICATIONS**

'Experimental Screen Design Toward Sediment-Free Sampling',  
B.Beck, C.A. Rich, 1987

**PATENTS**

Double Wall Screen - Patent Pending, 1988

**PROFESSIONAL EXPERIENCE**

C A Rich Consultants, Inc., Sea Cliff, New York 1985 to Present

Provides overview of Federal, State and/or municipal regulations and guidelines for all aspects of Firm's professional services with emphasis upon hazardous waste management, ground water monitoring and allocation permitting, surface water discharge permitting.

Initiated hazardous materials handling procedures required for compliance with State of Connecticut Pollution Abatement Order at non-ferrous metals manufacturing facility, Fairfield County, Connecticut.

**CA RICH CONSULTANTS, INC.**

Initiated the design and product selection for a neutralization and metals removal treatment plant in Orangeburg, NY. Responsible for product recommendation and selection as well as construction of the treatment plant.

Project Manager for various ECRA type Environmental Audits for Real Estate transactions as well as large scale environmental investigations.

Project Manager for Waste Assimilation Capacity Analysis Studies with respect to Sewage Treatment Plant discharges in Putnam, Dutchess and Westchester Counties.

Project Manager for all Asbestos investigations, management planning and third party monitoring.

**Powers Chemco, Inc., Glen Cove, New York 1981-1986**

Assistant Director, Environmental Protection, Health & Safety

Directed operation and maintenance of 100,000 gallon per day waste water treatment plant. Responsible for plant modifications and plant design approval and recommendations. Designed and managed hazardous waste materials handling procedures and protocols, including maintenance of all documentation and inspection of all chemical storage areas as required by appropriate State and Federal regulations (EPA, DOT, NYSDEC, NYSDOH, etc.) and in-house policy. Coordinated drain dye testing program to insure containment of chemical spills and eliminate the possibility of contaminating the nearby creek used for stormwater discharge. Involved in the formation of an SPCC plan for the company. Member of Chemical Spill Response Team.

**Suffolk County Health Services, Riverhead, New York 1980-1981**

Field Technician, Air Pollution and Industrial Waste Division

Collection and analysis of field data obtained during Suffolk County Air Sampling Program. Inspected local commercial and industrial facilities within Suffolk County for compliance with Air Permitting, SPDES & NPDES permits, Hazardous Waste Regulations. etc.

Field Technician, Marine Resources Division

Responsible for the 24 hour suspended solid monitoring of the dredging operation for construction of the Southwest Sewer District Pipeline. Responsibilities also included weir sampling and analysis of dredged material.

**CA RICH CONSULTANTS, INC.**

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**RICHARD J. IZZO**

**TITLE**

Hydrogeologist

**EDUCATION**

Bachelor of Science, Geology, State University of New York  
Oneonta, New York

**CERTIFICATION**

Health & Safety Operations at Hazardous Materials Site  
29 CRF 1910.120

**PROFESSIONAL EXPERIENCE**

C A Rich Consultants, Inc., Sea Cliff, New York 1985 to Present

Designed and implemented several environmental sampling and analysis programs in the Tri-State Area including a remedial investigation for a Superfund Site in Maybrook, New York and a NYSDEC Phase II investigation in Croton-on-Hudson, New York.

Responsibilities include:

- Design of monitoring well network, including well location and depth selection,
- Supervision of drilling and well installation
- Design of sampling and analysis program including sampling methodology, protocol, and analytical parameters,
- Sampling of soil, groundwater, surface water, ambient air, soil vapor, and building materials
- Data reduction including interpretation of laboratory results, determination of ground water flow direction and rate, and
- Interface between responsible parties and regulatory agencies.

## **CA RICH CONSULTANTS, INC.**

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Implemented quarterly water quality monitoring program at a New Jersey Site contaminated with chlorinated hydrocarbons. Directed remedial activities including:

- excavation and disposal of contaminated soil based on soil vapor screening with real-time vapor monitoring equipment;
- removal and disposal of buried 1000 gallon storage tank; removal of contaminated groundwater through installation of small scale recovery well system.

Assisted in the design of a pilot-scale pump and treatment operation involving the installation of an air stripper to mitigate volatile organic contamination in shallow groundwater.

Participated in field activities for an EPA sponsored hydrogeologic investigation at a Superfund site in Port Washington, New York. Field work included groundwater sampling, 72-hour pump test and slug testing. Performed health and safety air monitoring using vapor-detecting instrumentation (Level C respiratory protection required).

Experienced in the use, calibration, and routine maintenance of the following vapor-detecting instruments:

- Foxboro Model 128 Organic Vapor Analyzer
- HNU Systems Photoionization Detector
- MSA Model 261 Combustible Gas and Oxygen Indicator
- Drager Multi Gas Detector

Directed and participated in several groundwater resource investigations for potential developers in Westchester, Putnam, and Dutchess County, New York. Experience includes:

- Participation in seismic exploration
- Fracture trace analysis
- Selection of test well locations
- Supervision of test well installation
- Design and implementation of 24, 48, and 72-hour pumping tests
- Reduction/analysis of pump test data

**CA RICH CONSULTANTS, INC.**

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**STEVEN T. SOBSTYL**

**TITLE**

Environmental Scientist

**EDUCATION**

Bachelor of Arts, Environmental Science: Natural Resource Planning and Management, Suny at Plattsburgh, Plattsburgh, NY

**CERTIFICATION**

Health & Safety Operations at Hazardous Materials Site  
29 CRF 1910.120

**PROFESSIONAL EXPERIENCE**

**Field Technician - C A Rich Consultants, Inc.**

Responsible for various field activities for groundwater exploration and environmental assessments. Activities included: pump testing, water sampling, soil and soil vapor sampling, and asbestos inspection. Responsibilities include report research and preparation.

Participated in field sampling activities for an environmental assessment to remove sub-surface drums filled with hazardous waste at Spring Creek, Brooklyn, New York.

Experienced in the use, calibration and routine maintenance of the following vapor-detecting instruments:

- Foxboro Model 128 Organic Vapor Analyzer
- HNU Systems Photoionization Detector
- MSA Model 261 Combustible Gas & Oxygen Indicator

STEVEN T. SOBSTYL

TITLE

Environmental Scientist

EDUCATION

Bachelor of Arts, Environmental Science: Natural Resource  
Planning and Management, Suny at Plattsburgh, Plattsburgh, NY

CERTIFICATION

Health & Safety Operations at Hazardous Materials Site  
29 CRF 1910.120

PROFESSIONAL EXPERIENCE

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