Pole-Lite Industries
Champlain, New York Site

Remedial Investigation/Feasibility Study Work Plan

ADIRONDACK
ENVIRONMENTAL
ASSOCIATES INC.

63 Bridge Street
Plattsburgh, New York 12901

(518) 563-5726

October 27, 1989

ADIRONDACK ENVIRONMENTAL ASSOCIATES, INC.

63 Bridge Street
Plattsburgh, New York 12901
518-563-5726
FAX 518-563-3320

October 26, 1989

Mr. James Mc Clain
Junior Engineer
NYS Dept. of Environmental Conservation
Route 86
Raybrook, New York 12977

Dear Jim:

Enclosed is our revised RI/FS Workplan for the Pole-Lite site in response to New York State's comments as outlined in your letter to me dated 8/30/89, DOH letter to you dated 9/1/89, your memo to Paul Van Cott dated 9/11/89 and Paul Van Cott's letter and enclosures to Oliver Prat on 9/14/89.

We appreciated your rapid respose to our request to start the 'Soil-Gas' work which as you know is presently underway.

Following your review of the enclosed Plan we would like to set a meeting at your earliest convenience.

Sincerely,

Herbert O. Carpenter
President

enclosure

QA/QC
Paul VanCot

Responce
11/26/89

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REGION
K 12977

ADIRONDACK ENVIRONMENTAL ASSOCIATES, INC.

63 Bridge Street
Plattsburgh, New York 12901
518-563-5726
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December 26, 1989

Mr. James McClain
Junior Engineer
Department of Env. Conservation
Raybrook, New York 12977

Dear Jim:

Pursuant to our conversation, enclosed are 10 complete sets (side punched) of the revised QA/QC and Citizen Participation Plan. All pages are included so you may replace the complete sections with the revision.

Also, as discussed, the remainder of the workplan, placement of the wells and associated samples collected, matrices, etc. are pending your responses to the workplan and analyses of the soil gas work.

As you receive additional comments and responses to this draft, kindly inform me so that we can proceed.

In the event you have any questions give me a call.

Sincerely,

Herbert O. Carpenter
President

Enclosures
cc: File
A. Gagliardi
S. Revell

APPENDIX B

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QUALITY ASSURANCE
AND
QUALITY CONTROL PLAN

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Pole-Lite Industries, Inc.
Champlain, New York

Revised December, 1989

Adirondack Environmental Associates, Inc.
63 Bridge Street
Plattsburgh, NY 12901

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INTRODUCTION

Ground water samples and soil samples at Pole-Lite Industries, Inc., Champlain, New York, have previously been analyzed using United States Environmental Protection Agency (USEPA) methods and New York State Department of Environmental Conservation Contract Laboratory Protocol (CLP). A full round of ground water samples were collected at Pole-Lite during February, 1989. These samples were obtained from monitoring wells 1-3 and 5-8. USEPA Method 624 with CLP Quality Assurance/Quality Control were performed on the ground water collected. All future soil and water samples will be collected in accordance with the sampling protocol the New York State Department of Environmental Conservation appropriate for this site.

All initial ground water samples collected at this site indicate that the ground water at MW-5 contravened the concentration limit established in Title 6, Part 703, of the NYSDEC Compilation of Codes: Ground Water Classifications, Quality Standards, Effluent Stands and/or Limitations. In monitoring wells 1, 2 and 3, no organic contamination was detected. Additional monitoring wells have been installed and sampled (MW 6-8). Results indicate that MW 6 exceeded ground water standards. It is expected that there will be a need for future soil and water sampling at this site. A soil sampling/analytical plan has also been included in this plan to assure that all samples are taken in accordance with a QA/QC plan.

CONCENTRATION LIMITS

The concentration detected will be compared to the concentration limits established by Title 6, Part 703, of the NYSDEC Compilation of Codes; Ground Water Classification, Quality Standards, Effluent Standards and/or Limitations. Due to absence of public water supplies which utilize the upper water bearing zone, the NYS Department of Health maximum contaminate level (mcl) for organic chemicals are not applicable. The concentration limits established in the NYSDEC document will be compared to the concentrations detected in monitoring wells to identify excursions from the established limits. See Attachment 1 for a table which explains the Contract Required Quantitation Limits for volatile compounds.

REPRESENTATIVE SAMPLES

Before ground water is sampled from either the background monitoring point(s) or the downgradient monitoring point(s), the sampling equipment to be used will be decontaminated, and 3 to 5 well volumes will be removed from each well. Details of sampling collection and shipment are described in the following sections. Analytical results have not shown site specific the following sections. Analytical results have not shown site specific contaminants to be present in background monitoring points MW's-1, 2, and 3. Although MW-1 is a downgradient monitoring well it has not been affected by volatile organic contaminants. Monitoring wells 5 and 6 have consistently had the highest level of site specific contaminants present of all on-site wells monitored to date. Samples obtained from MW's-1, 2, and 3 are representative of site background ground water quality, while samples from MW's-5, 6 and 7, are indicative of ground water quality immediately downgradient of the former drum storage area.

In order to ensure that the samples obtained are representative of ground water quality, the analytical methods used will be according to approved USEPA and/or New York State methods. The proposed analytical method to be used will be according to "Statement of Work for Organic Analysis, Multimedia, Multiconcentrations", USEPA Contract Laboratory Program, IFB WA-875001, November, 1986. In order to ensure that samples are representative of their respective sources, a quality control program will be followed. The details of the program and procedures are presented in the appropriate sampling and/or analytical methods.

To ensure that representative samples of the soil are collected, a soil sampling plan will be followed. Details of the samples collecting are described in the following sections. The analytical methods used will be approved USEPA and/or New York State Methods. The proposed analytical method to be used will be according to the "Statement of Work for Organic Analysis, Multimedia, Multiconcentrations," USEPA Contract Laboratory Program, IFB WA-875001, November, 1986. The lowest possible detection limits will be specified for each soil analysis. Due to interferences from other compounds present, the detection limits may be adjusted in specific samples. The following are the general guidelines of the quality control program.

Quality control samples will be obtained and analyzed by the analytical laboratory to detect problems such as contamination, improper calibration of equipment, interferences, and poor analyte recovery. Quality Control samples will be obtained and analyzed for each set of field samples obtained to detect contamination of glassware and/or reagents. Duplicate samples will be regularly submitted to the analytical lab for separate analyses. Spiked samples (i.e., samples spiked with an analyte) will be analyzed, and recovery noted, to determine interference, contamination and/or loss of a particular analyte. The above described quality control procedures will ensure that representative sample results are obtained.

SAMPLE COLLECTION

Prior to sampling, standing water in the wells is purged using either a teflon bailer or stainless steel bailers, or stainless steel or teflon sampling pumps. At a minimum, three (3) well volumes will be removed (if possible) with this water being contained in an appropriate container. Low yielding wells will be evacuated to dryness. Sampling with teflon or stainless steel bailers ensures representative sample collection. The bailers will be lowered slowly to prevent degassing of the water. The sample will be removed from the well in the bailer and placed immediately into the appropriate container. The contents will be transferred in such a manner as to minimize agitation and aeration. No headspace will be allowed in the containers for volatile organics.

Soil sample collection will follow standard soil sampling techniques. Samples will be retrieved using a hand auger and collection tube or a soil boring rig and split spoon depending on the designated sampling depth. Background soil samples will be taken when sampling occurs in areas that have not been previously sampled. Collection devices will be decontaminated prior to each individual sample collection. The tubs and/or split spoon will be washed in soapy water and thoroughly rinsed with distilled water. The recovered sample will be immediately placed in the appropriate volatile organic container. Soil samples being collected to check for volatile constituents will not be composited or mixed in any way. The recovered sample will be promptly placed into the container and sealed with a piece of black tape to ensure that the seal is not broken.

The depth interval will remain discrete (not over one foot), so in the event of soil contamination the discrete zone will allow for a more accurate evaluation of the soil conditions.

SAMPLE PRESERVATION AND SHIPMENT

In general, glass containers will be used for samples to be analyzed for organic constituents.

All containers will be new and furnished by the contract laboratory performing the analyses. All sample containers will comply with USEPA requirements and are presented in Attachment 2, which is a copy of Table 4-1 of "RCRA Ground Water Monitoring Technical Guidance Document". Sample labels will be placed on all containers and will include the sample number, name of collection, date and time of sampling, well number, and parameter(s) required.

All sample preservation will comply with USEPA requirements and is listed in Attachment 1. Samples will be put into covered containers and placed in insulated coolers with sufficient ice to assure a temperature of 4 degrees centigrade (4 C). The coolers will be transported from Pole-Lite Industries site to Adirondack Environmental Services' laboratory by private Automobile. Container seals will be used when Adirondack Environmental Associates, Inc., or laboratory personnel are unavailable to pick up or transport the samples. Samples will be delivered to the laboratory within 48 hours after collection. All water samples collected for analysis of volatile organics will be analyzed within seven days of verifiable receipt at Adirondack Environmental Services.

ANALYTICAL PROCEDURE

Analysis for inorganic metals and organic compounds will be analyzed according to "Statement of Work for Organic Analysis, Multimedia, Multiconcentration", USEPA Contract Lab Program, IFB WA-875001, November, 1986. Organic detection will be determined using EPA method 601 utilizing gas chromatographic methods.

Attachment 3 lists the parameters to be sampled and their corresponding analytical methods.

DECONTAMINATION PROCEDURES

When sampling occurs in areas of high concentration of contaminants, close attention to decontamination will be followed. All monitoring equipment, including split spoons, drilling rods, hollow stems, and other miscellaneous equipment, will be clean thoroughly before their reuse in the next location. The decontamination will consist utilizing methanol as a cleaning compound. The equipment will be first washed in a tub containing the methanol. It will be scrubbed with a soft brush and then rinsed in a tub a clean water. It will then be sent to the next tub where it will be washed with soap and water. Finally, it will be rinsed one last time and either hand dried or allowed to air dry. If sampling occurs in areas of no contamination, then the equipment will only be washed with a soap and water mixture.

CHAIN-OF-CUSTODY

A chain-of-custody record will be completed for all samples collected. The chain-of-custody record shall disclose information such as: sample number, identification number, location, date and time of collection, and matrix and type of analysis to be performed. In addition, personnel involved in sampling, shipping and receiving the samples will be provided on the chain-of-custody form. The method of ship and date and time of shipment will be disclosed as well as the date and time the sample is received at the laboratory. See attachment 3 for a copy of the record.

SAMPLING PERSONNEL

Sampling will be conducted by a qualified representative of Adirondack Environmental Associates, Inc. Chain-of-custody document will be completed by each member of the sampling team. Field procedures and protocols used will be documented. This information will be included in the QA/QC documentation which will be provided to the NYSDEC and NYSDOH.

REPORTING AND DELIVERABLES

Adirondack Environmental Associates will be requiring the analytical laboratory to report all of the results using the forms which are found in attachment 5. The lab will complete the forms and submit them to AEA for approval. The forms will be provide to the lab with every shipment of samples that are to be analyzed. The results will be collected and a final report on the sampling will be prepared and submitted to Adirondack Environmental Associates, Inc.

SECTION I
CLP ORGANICS
Superfund Target Compound List (TCL) and Contract Required Quantitation Limits (CRQL)*

	Volatiles	CAS Number	Quantitation Limits** Low Water µg/L	Low Soil/Sediment[a] 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-Dichloroethylene	75-35-4	5	5
9.	1,1-Dichloroethane	75-35-3	5	5
10.	1,2-Dichloroethylene (total)	540-59-0	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.	cis-1,3-Dichloropropene	10061-01-5	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.	trans-1,3-Dichloropropene	10061-02-6	5	5
26.	Bromoform	75-25-2	5	5
27.	2-Hexanone	591-78-6	10	10
28.	4-Methyl-2-pentanone	108-10-1	10	10
29.	Tetrachloroethylene	127-18-4	5	5
30.	Toluene	108-88-3	5	5
31.	Chlorobenzene	108-90-7	5	5
32.	Ethyl Benzene	100-41-4	5	5
33.	Styrene	100-42-5	5	5
34.	Total Xylenes	1330-20-7	5	5

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[a] Medium Soil/Sediment Contract Required Quantitation Limits (CRQL) for Volatile TCL Compounds are 100 times the individual Low Soil/Sediment CRQL.

*Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

**Quantitation Limits listed for soil/sediment are based on wet weight. The quantitation limits calculated by the laboratory for soil/sediment, calculated on dry weight basis, as required by the protocol, will be higher.

TABLE 4-1

SAMPLING AND PRESERVATION PROCEDURES FOR DETECTION MONITORING[a]

Parameter	Recommended Container[b]	Preservative	Maximum Holding Time	Minimum Volume Required for Analysis
		Indicators of Ground-Water Contamination[c]		
pH	T, P, G	Field determined	None	25 ml
Specific conductance	T, P, G	Field determined	None	100 ml
TOC	G, amber, T-lined cap[e]	Cool 4°C,[d] HCl to pH <2	28 days	4 x 15 ml
TOX	G, amber, T-lined septa or caps	Cool 4°C, add 1 ml of 1.1M sodium sulfite	7 days	4 x 15 ml
		Ground-Water Quality Characteristics		
Chloride	T, P, G	4°C	28 days	50 ml
Iron Manganese Sodium	T, P	Field acidified to pH <2 with HNO_3	6 months	200 ml
Phenols	G	4°C/H_2SO_4 to pH <2	28 days	500 ml
Sulfate	T, P, G	Cool, 4°C	28 days	50 ml
		EPA Interim Drinking Water Characteristics		
Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	T, P Dark Bottle	Total Metals Field acidified to pH <2 with HNO_3 Dissolved Metals 1. Field filtration (0.45 micron) 2. Acidify to pH <2 with HNO_3	6 months 6 months	1,000 ml 1,000 ml
Fluoride	T, P	Cool, 4°C	28 days	300 ml
Nitrate/Nitrite	T, P, G	4°C/H_2SO_4 to pH <2	14 days	1,000 ml

(Continued)

TABLE 4-1 (Continued)

SAMPLING AND PRESERVATION PROCEDURES FOR DETECTION MONITORING

Parameter	Recommended Container[b]	Preservative	Maximum Holding Time	Minimum Volume Required for Analysis
Endrin Lindane Methoxychlor Toxaphene 2,4 D 2,4,5 TP Silvex	T, G	Cool, 4°C	7 days	2,000 ml
Radium Gross Alpha Gross Beta	P, G	Field acidified to pH <2 with HNO_3	6 months	1 gallon
Coliform bacteria	PP, G (sterilized)	Cool, 4°C	6 hours	200 ml
		Other Ground-Water Characteristics of Interest		
Cyanide	P, G	Cool, 4°C, NaOH to pH >12. 0.6 g ascorbic acid[f]	14 days[g]	500 ml
Oil and Grease	G only	Cool, 4°C H_2SO_4 to pH <2	28 days	100 ml
Semivolatile, nonvolatile organics	T, G	Cool, 4°C	14 days	60 ml
Volatiles	G, T-lined	Cool, 4°C	14 days	60 ml

[a] References: *Test Methods for Evaluating Solid Waste - Physical/Chemical Methods*, SW-846 (2nd edition, 1982).
Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.
Standard Methods for the Examination of Water and Wastewater, 16th edition (1985).

[b] Container Types:
P = Plastic (polyethylene)
G = Glass
T = Fluorocarbon resins (PTFE, Teflon®, FEP, PFA, etc.)
PP = Polypropylene

(Continued)

TABLE 4-1 (Continued)

SAMPLING AND PRESERVATION PROCEDURES FOR DETECTION MONITORING

[c] Based on the requirements for detection monitoring (§265.93), the owner/operator must collect a sufficient volume of ground water to allow for the analysis of four separate replicates.

[d] Shipping containers (cooling chest with ice or ice pack) should be certified as to the 4°C temperature at time of sample placement into these containers. Preservation of samples requires that the temperature of collected samples be adjusted to the 4°C immediately after collection. Shipping coolers must be at 4°C and maintained at 4°C upon placement of sample and during shipment. Maximum-minimum thermometers are to be placed into the shipping chest to record temperature history. Chain-of-custody forms will have Shipping/Receiving and In-transit (max/min) temperature boxes for recording data and verification.

[e] Do not allow any head space in the container.

[f] Use ascorbic acid only in the presence of oxidizing agents.

[g] Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before the pH adjustment in order to determine if sulfide is present. If sulfide is present, it can be removed by addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

[7] Greeson, P.E., *et al.* "Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples." U.S Geological Survey, Techniques of Water-Resources Investigations, Book 5, Chapter A4, Laboratory Analysis. 1977.

[8] 0.45 µm membrane filter or other pore size certified by the manufacturer to fully retain organisms to be cultivated, and free of extractables which could interfere with their growth and development.

[9] Since the membrane filter technique usually yields low and variable recovery from chlorinated wastewaters, the MPN method will be required to resolve any controversies.

[10] Approved only if dissolution of the KF Streptococcus Agar (Section 5.1, USGS Method B-0055-77) is made in a boiling water bath to avoid scorching of the medium.

TABLE 1B—LIST OF APPROVED INORGANIC TEST PROCEDURES

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
1. Acidity, as $CaCO_3$, mg/L: Electrometric end point or phenolphthalein end point.	305.1	402(4 a)	1067-82(E)		
2. Alkalinity, as $CaCO_3$, mg/L:					
Electrometric or colorimetric titration to pH 4.5, manual, or.	310.1	403	D1067-82(B)	I-1030-84	33.014 [2].
Automated	310.2			I-2030-84	
3. Aluminum—Total [3] mg/L: Digestion [3] followed by:					
AA direct aspiration	202.1	303C		I-3051-84	
AA furnace	202.2	304			
Inductively coupled plasma, or					200.7 [4]
Colorimetric (Eriochrome cyanine R)		306B			
4. Ammonia (as N), mg/L: Manual distillation (at pH 9.5) [5] followed by:	350.2	417A			33.057. [2]
Nesslerization	350.2	417B	D1426-79(A)	I-3520-84	33.057. [2]
Titration	350.2	417D			
Electrode	350.3	417 E or F	D1426-79(D)		
Automated phenate or	350.1	417G	D1426-79(C)	I-4523-84	
Automated electrode					Note 6.
5. Antimony—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	204.1	303A			
AA furnace, or	204.2	304			
Inductively coupled plasma					200.7. [4]
6. Arsenic—Total [3], mg/L: Digestion [3] followed by	206.5				
AA gaseous hydride	206.3	303E	D2972-84(B)	I-3062-84	
AA furnace	206.2	304			
Inductively coupled plasma, or					200.7. [4]
Colorimetric (SDDC)	206.4	307B	D2972-84(A)	I-3060-84	
7. Barium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	208.1	303C		I-3084-84	
AA furnace, or	208.2	304			
Inductively coupled plasma					200.7. [4]
8. Beryllium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	210.1	303C	D3654-84(A)	I-3095-84	
AA furnace,	210.2	304			
Inductively coupled plasma, or					200.7. [4]
Colorimetric (aluminon)		309B			
9. Biochemical oxygen demand (BOD_5), mg/L:					
Dissolved Oxygen Depletion	405.1	507		I-1578-78 [7]	33.019 [2], p. 17. [8]
10. Boron—Total, mg/L:					
Colorimetric (curcumin)	212.3	404A		I-3112-84	
or Inductively Coupled plasma					200.7. [4]
11. Bromide, mg/L: Titrimetric	320.1		D1246-82(C)	I-1125-84	p. S44. [9]
12. Cadmium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	213.1	303 A or B	D3557-84 (A or B).	I-3135-84 or I-3136-84.	33.089 [2], p. 37. [9]
AA furnace	213.2	304			
Inductively coupled plasma					200.7. [4]
Voltametry [10], or			D3557-84(C)		
Colorimetric (Dithizone)		310B			
13. Calcium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	215.1	303A	D511-84(B)	I-3152-84	

TABLE 1B—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
Inductively coupled plasma, or					200.7. [4]
Titrimetric (EDTA)	215.2	311C	D511-84(A)		
14. Carbonaceous biochemical oxygen demand ($CBOD_5$), mg/L [11]: Dissolved Oxygen Depletion with nitrification inhibitor.		507(5.a 6)			
15. Chemical oxygen demand (COD), mg/L:					
Titrimetric, or	410.1 410.2, or 410.3	508A	D1252-83	I-3560-84 or I-3562-84.	33.034 [2], p
Spectrophotometric, manual or automated	410.4			I-3561-84	Notes 12 o
16. Chloride, mg/L:					
Titrimetric (silver nitrate)		407A	D512-81(B)	I-1183-84	
or (Mercuric nitrate), or	325.3	407B	D512-81(A)	I-1184-84	33.067. [2]
Colorimetric, manual or			D512-81(C)	I-1187-84	
Automated (Ferricyanide)	325.1, or 325.2	407D		I-2187-84	
17. Chlorine—Total residual, mg/L:					
Titrimetric:					
Amperometric direct	330.1	408C	D1253-78(A)		
Starch end point direct	330.3	408A	D1253-76(B) Part 18.3		
Back titration either end point [14], or.	330.2	408B			
DPD-FAS	330.4	408D			
Spectrophotometric, DPD	330.5	408E			
Or Electrode					Note 15.
18. Chromium VI dissolved, mg/L: 0.45 micron filtration followed by:					
AA chelation-extraction, or	218.4	303B		I-1232-84	
Colorimetric (Diphenylcarbazide)				I-1230-84	307B. [16]
19. Chromium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	218.1	303A	D1687-84(D)	I-3236-84	33.089. [2]
AA chelation extraction	218.3	303B			
AA furnace	218.2	304			
Inductively coupled plasma or					200.7. [4]
Colorimetric (Diphenylcarbazide)		312B	D1687-84(A)		
20. Cobalt—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	219.1	303 A or B	D3558-84 (A or B).	I-3239-84 or I-3240-84	P. 37. [9]
AA furnace, or	219.2	304			
Inductively coupled plasma					200.7. [4]
21. Color platinum cobalt units or dominant wavelength, hue, luminance purity:					Note 17
Colorimetric (ADMI), or	110.1	204D			
(Platinum cobalt), or	110.2	204A		I-1250-84	
Spectrophotometric	110.3	204B			
22. Copper—Total [3] mg/L: Digestion [3] followed by:					
AA direct aspiration	220.1	303 A or B	D1688-84 (D or E).	I-3270-84 or I-3271-84.	33.089 [2]
AA furnace,	220.2	304			
Inductively coupled plasma.					200.7. [4]
Colorimetric (Neocuproine), or		313B	D1688-84(A)		
(Bicinchoninate).					Note 18
23. Cyanide—Total, mg/L: Manual distillation with $MgCl_2$ followed by		412B			p. 22. [9]
Titrimetric, or		412C			
Spectrophotometric, manual or	335.2	412D	D2036-82(A)	I-3300-84	
Automated [19]	335.3		D2036-82(A)		

QA/QC Item 3

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed	ASTM	USGS[1]	Other
24. Cyanide amendable to chlorination, mg/L: Manual distillation with MgCl₂ followed by titrimetric or spectrophotometric	335.1	412H	D2036-82(B)		
25. Fluoride—Total, mg/L: Manual distillation[6] followed by		413A			
Electrode, manual or	340.2	413B	D1179-80(B)		
Automated.				I-4327-84	
Colorimetric (SPADNS)	340.1	413C	D1179-80(A)		
Or Automated complexone	340.3	413E			
26. Gold—Total[4], mg/L; Digestion[4] followed by					
AA direct aspiration, or	231.1	303A			
AA furnace.	231.2	304			
27. Hardness—Total, as CaCO₃, mg/L					
Automated colorimetric,	130.1				
Titrimetric (EDTA), or Ca plus Mg as their carbonates, by inductively coupled plasma or AA direct aspiration. (See Parameters 13 and 33.)	130.2	314B	D1126-80	I-1338-84	33.082[2]
28. Hydrogen ion (pH), pH units					
Electrometric, measurement, or	150.1	423	D1293-84 (A or B)	I-1586-84	33.086[2]
Automated electrode					Note 20
29. Iridium—Total[4], mg/L; Digestion[4] followed by					
AA direact aspiration, or	235.1	303A			
AA furnace	235.2	304			
30. Iron—Total[4], mg/L; Digestion[4] followed by					
AA direct aspiration,	236.1	303 A or B	D1068-84 (C or D)	I-3381-84	33.089[2]
AA furnace,	236.2	304			
Inductively coupled plasma, or					200.7[5]
Colorimetric (Phenanthroline)		315B	D1068-84(A)		Note 21
31. Kjeldahl nitrogen—Total, (as N), mg/L: Digestion and distillation followed by	351.3	420 A or B	D3590-84(A)		
Titration	351.3	417D	D3590-84(A)		33.051[2]
Nesslerization	351.3	417B	D3590-84(A)		
Electrode	351.3	417 E or F			
Automated phenate	351.1			I-4551-78[2]	
Semi automated block digestor, or	351.2		D3590-84(A)		
Potentiometric	351.4		D3590-84(A)		
32. Lead—Total[4], mg/L; Digestion[4] followed by					
AA direct aspiration	239.1	303 A or B	D3559-85 (A or B)	I-3399-84	33.089[2]
AA furnace	239.2	304			
Inductively coupled plasma					200.7[5]
Voltammetry[10], or			D3559-85(C)		
Colorimetric (Dithizone)		316B			
33. Magnesium—Total[4], mg/L; Digestion[4] followed by					
AA direct aspiration	242.1	303A	D511-84(B)	I-3447-84	33.089[2]
Inductively coupled plasma, or					200.7[5]
Gravimetric		318B	D511-77(A)		
34. Manganese—Total[4], mg/L; Digestion[4] followed by					
AA direct aspiration	243.1	303 A or B	D858-84 (B or C)	I-3454-84	33.089[2]
AA furnace	243.2	304			
Inductively coupled plasma, or					200.7[5]
Colorimetric (Persulfate), or (Periodate)		319B	D858-84(A)		33.126[2] Note 22

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TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed	ASTM	USGS[1]	Other
35. Mercury—Total[4], mg/L:					
Cold vapor, manual or	245.1	303F	D3223-80	I-3462-84	33.095[2]
Automated	245.2				
36. Molybdenum—Total[3], mg/L; Digestion[3] followed by:					
AA direct aspiration	246.1	303C		I-3490-84	
AA furnace, or	246.2	304			
Inductively coupled plasma					200.7[5]
37. Nickel—Total[3], mg/L; Digestion[3] followed by:					
AA direct aspiration	249.1	303 A or B	D1886-84 (C or D)	I-3499-84	
AA furnace	249.2	304			
Inductively coupled plasma, or					200.7[5]
Colorimetric (Heptoxime)		321B			
38. Nitrate (as N), mg/L: Colorimetric (Brucine sulfate), or Nitrate-nitrite N minus Nitrite N (See parameters 39 and 40)	352.1		D992-71		33.060[2], 419D[18], p. 28[9]
39. Nitrate-nitrite (as N), mg/L: Cadmium reduction, Manual or	353.3	418C	D3867-85(B)		
Automated, or	353.2	418F	D3867-85(A)	I-4545-84	
Automated hydrazine	353.1				
40. Nitrite (as N), mg/L: Spectrophotometric:					
Manual or	354.1	419	D1254-67		Note 24
Automated (Diazotization)				I-4540-84	
41. Oil and grease—Total recoverable, mg/L: Gravimetric (extraction)	413.1	503A			
42. Organic carbon—Total (TOC), mg/L: Combustion or oxidation	415.1	505	D2579-85 (A or B)		33.044[2], p. 4[23]
43. Organic nitrogen (as N) mg/L: Total Kjeldahl N (Parameter 31) minus ammonia N (Parameter 4.)					
44. Orthophosphate (as P), mg/L: Ascorbic acid method:					
Automated or	365.1	424G		I-4601-84	33.116[2]
Manual single reagent	365.2	424F	D515-82(A)		33.111[2]
or Manual two reagent	365.3				
45. Osmium—Total[3], mg/L: Digestion[3] followed by:					
AA direct aspiration, or	252.1	303C			
AA furnace	252.2	304			
46. Oxygen, dissolved, mg/L: Winkler (Azide modification), or	360.2	421B	D888-81(C)	I-1575-78[1]	33.028[2]
Electrode	360.1	421F		I-1576-78[1]	
47. Palladium—Total[3], mg/L: Digestion[3] followed by:					
AA direct aspiration, or	253.1				p. S27[9]
AA furnace	253.2				p. S28[9]
48. Phenols, mg/L:					
Manual distillation[25]	420.1		D1783-80 (A or B)		Note 26
Followed by:					Note 26
Colorimetric (4AAP) manual, or	420.1				
Automated[19]	420.2				Note 27.
49. Phosphorus (elemental) mg/L: Gas-liquid chromatography					33.111[2]
50. Phosphorus—Total, mg/L: Persulfate digestion followed by	365.2	424C(III)			
Manual or	365.2 or 365.3	424F	D515-82(A)		
Automated ascorbic acid reduction, or	365.1	424G		I-4600-84	33.116[2]
Semi automated block digestor	365.4				

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
51. Platinum—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	255.1	303A			
AA furnace	255.2	304			
52. Potassium—Total [3], mg/L: Digestion followed by:					
AA direct aspiration	258.1	303A		I-3630-84	33.103 [2]
Inductively coupled plasma					200.7 [4]
Flame photometric, or		322B	D1428-82(A)		
Colorimetric (Cobaltinitrate)					317B [9]
53. Residue—Total, mg/L: Gravimetric, 103-105°C.	160.3	209A		I-3750-84	
54. Residue—filterable, mg/L: Gravimetric, 180°C.	160.1	209B		I-1750-84	
55. Residue—nonfilterable, (TSS), mg/L: Gravimetric, 103-105°C post washing of residue.	160.2	209C		I-3765-84	
56. Residue—settleable, mg/L: Volumetric, (Imhoff cone) or gravimetric.	160.5	209E		1	
57. Residue—Volatile, mg/L: Gravimetric, 550°C	160.4	209D		I-3753-84	
58. Rhodium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	265.1	303A			
AA furnace	265.2	304			
59. Ruthenium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	267.1	303A			
AA furnace	267.2	304			
60. Selenium—Total [3], mg/L: Digestion [3] followed by:					
AA furnace	270.2	304			
Inductively coupled plasma, or					200.7 [4]
AA gaseous hydride	270.3	303E	D3859-84(A)	I-3667-84	
61. Silica—Dissolved, mg/L: 0.45 micron filtration followed by:					
Colorimetric, Manual or	370.1	425C	D859-80(B)	I-1700-84	
Automated (Molybdosilicate), or				I-2700-84	
Inductively coupled plasma					200.7 [4]
62. Silver—Total [3,8], mg/L: Digestion [3] followed by:					
AA direct aspiration	272.1	303 A or B		I-3720-84	33.089 [2], p. 37 [8]
AA furnace,	272.2	304			
Colorimetric (Dithizone), or					319B [9]
Inductively coupled plasma					200.7 [4]
63. Sodium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	273.1	303A		I-3735-84	33.107 [2]
Inductively coupled plasma, or					200.7 [4]
Flame photometric		325B	D1428-82(A)		
64. Specific conductance, micromhos/cm at 25°C: Wheatstone bridge	120.1	205	D1125-82(A)	I-1780-84	33.002 [2]
65. Sulfate (as SO_4), mg/L:					
Automated colorimetric, (barium chloranilate).	375.1				
Gravimetric, or	375.3	426 A or B	D516-82(A)		33.124 [2]
Turbidimetric	375.4		D516-82(B)		426C [29]
66. Sulfide (as S), mg/L:					
Titrimetric (Iodine) or	376.1	427D		I-3840-84	228A [29]
Colorimetric (methylene blue)	376.2	427C			
67. Sulfite (as SO_3), mg/L: Titrimetric (iodine iodate).	377.1	428A	D1339-84(C)		
68. Surfactants, mg/L: Colorimetric (methylene blue).	425.1	512B	D2330-82(A)		
69. Temperature, °C: Thermometric	170.1	212			Note 31.
70. Thallium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	279.1	303A			
AA furnace, or	279.2	304			
Inductively coupled plasma					200.7 [4]
71. Tin—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	282.1	303A		I-3850-78 [7]	
AA furnace,	282.2	304			
72. Titanium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	283.1	303C			
AA furnace	283.2	304			
73. Turbidity, NTU: Nephelometric	180.1	214A	D1889-81	I-3860-84	
74. Vanadium, Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	286.1	303C			
AA furnace	286.2	304			
Inductively coupled plasma, or					200.7 [4]
Colorimetric (Gallic acid)		327B	D3373-84(A)		
75. Zinc—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	289.1	303A or B	D1691-84 (C or D).	I-3900-84	33.089 [2], p. 37 [8]
AA furnace	289.2	304			
Inductively coupled plasma, or					200.7 [4]
Colorimetric (Dithizone) or		328C			
(Zincon)					Note 32.

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[1] "Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments," U.S. Department of the Interior, U Geological Survey, Open-File Report 85-495, 1986, unless otherwise stated.

[2] "Official Methods of Analysis of the Association of Official Analytical Chemists," methods manual, 14th ed. (19

[3] For the determination of total metals the sample is not filtered before processing. A digestion procedure is required solubilize suspended material and to destroy possible organic-metal complexes. Two digestion procedures are given "Methods for Chemical Analysis of Water and Wastes, 1979." One (section 4.1.3), is a vigorous digestion using nitric acid less vigorous digestion using nitric and hydrochloric acids (Section 4.1.4) is preferred; however, the analyst should cautioned that this mild digestion may not suffice for all sample types. Particularly, if a colorimetric procedure is to employed, it is necessary to ensure that all organo-metallic bonds be broken so that the metal is in a reactive state. In the situations, the vigorous digestion is to be preferred making certain that at no time does the sample go to dryness. Samp containing large amounts of organic materials would also benefit by this vigorous digestion. Use of the graphite furna technique, inductively coupled plasma, as well as determinations for certain elements such as arsenic, the noble met mercury, selenium, and titanium require a modified digestion and in all cases the method write-up should be consulted specific instruction and/or cautions.

NOTE. If the digestion included in one of the other approved references is different than the above, the EPA procedure m be used.

Dissolved metals are defined as those constituents which will pass through a 0.45 micron membrane filter. Follow filtration of the sample, the referenced procedure for total metals must be followed. Sample digestion for dissolved metals n be omitted for AA (direct aspiration or graphite furnace) and ICP analyses provided the sample solution to be analyzed me the following criteria:

a. has a low COD (< 20)
b. is visibly transparent with a turbidity measurement of 1 NTU or less.
c. is colorless with no perceptible odor, and
d. is of one liquid phase and free of particulate or suspended matter following acidification.

[4] The full text of Method 200.7, "Inductively Coupled Plasma Atomic Emission Spectrometric Method for Trace Elem Analysis of Water and Wastes," is given at Appendix C of this Part 136.

[5] Manual distillation is not required if comparability data on representative effluent samples are on company file to show this preliminary distillation step is not necessary; however, manual distillation will be required to resolve any controvers

[6] Ammonia, Automated Electrode Method, Industrial Method Number 379-75 WE, dated February 19, 1976, Techni AutoAnalyzer II, Technicon Industrial Systems, Tarrytown, NY. 10591.

[7] The approved method is that cited in "Methods for Determination of Inorganic Substances in Water and Fl Sediments", USGS TWRI, Book 5, Chapter A1 (1979).

[8] American National Standard on Photographic Processing Effluents, Apr. 2, 1975. Available from ANSI, 1430 Broad New York, NY 10018.

[9] "Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency," Supplemen the Fifteenth Edition of *Standard Methods for the Examination of Water and Wastewater* (1981).

[10] The use of normal and differential pulse voltage ramps to increase sensitivity and resolution is acceptable.

[11] Carbonaceous biochemical oxygen demand ($CBOD_5$) must not be confused with the traditional BOD_5 test which meas "total BOD." The addition of the nitrification inhibitor is not a procedural option, but must be included to report the CB parameter. A discharger whose permit requires reporting the traditional BOD_5 may not use a nitrification inhibitor in procedure for reporting the results. Only when a discharger's permit specifically states $CBOD_5$ is required, can the perm report data using the nitrification inhibitor.

[redacted] mical [redacted] Dema[redacted]al Ox[redacted]ity In[redacted]l Corp[redacted] [redacted] P O [redacted] Gal[redacted]
TX 77010

Chemical Oxygen Demand, Method 8000, Hach Handbook of Water Analysis, 1979, Hach Chemical Company, P.O. Box 9, Loveland, CO 80537.

The back titration method will be used to resolve controversy.

Orion Research Instruction Manual, Residual Chlorine Electrode Model 97-70, 1977, Orion Research Incorporated, 840 morial Drive, Cambridge, MA 02138.

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 14th Edition, 76.

National Council of the Paper Industry for Air and Stream Improvement, (Inc.) Technical Bulletin 253, December 1971.

Copper, Biocinchoinate Method, Method 8506, Hach Handbook of Water Analysis, 1979, Hach Chemical Company, P.O. 389, Loveland, CO 80537.

After the manual distillation is completed, the autoanalyzer manifolds in EPA Methods 335.3 (cyanide) or 420.2 (phenols) simplified by connecting the re-sample line directly to the sampler. When using the manifold setup shown in Method 335.3, buffer 6.2 should be replaced with the buffer 7.6 found in Method 335.2.

Hydrogen Ion (pH) Automated Electrode Method, Industrial Method Number 378-75WA, October 1976, Technicon Auto yzer II, Technicon Industrial Systems, Tarrytown, NY 10591.

Iron, 1,10-Phenanthroline Method, Method 8008, 1980, Hach Chemical Company, P.O. Box 389, Loveland, CO 80537.

Manganese, Periodate Oxidation Method, Method 8034, Hach Handbook of Wastewater Analysis, 1979, pages 2-113 and 17, Hach Chemical Company, Loveland, CO 80537.

Goerlitz, D., Brown, E., "Methods for Analysis of Organic Substances in Water," U.S. Geological Survey Techniques of ter Resources Inv., book 5, ch. A3, page 4 (1972).

Nitrogen, Nitrite, Method 8507, Hach Chemical Company, P.O. Box 389, Loveland, CO 80537.

Just prior to distillation, adjust the sulfuric-acid preserved sample to pH 4 with 1 + 9 NaOH.

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 14th Edition. The imetric reaction is conducted at a pH of 10.0 ± 0.2. The approved methods are given on pp. 576-81 of the 14th Edition: thod 510A for distillation, Method 510B for the manual colorimetric procedure, or Method 510C for the manual ctrophotometric procedure.

R. F. Addison and R. G. Ackman, "Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography," *rnal of Chromatography*, vol. 47, No. 3, pp. 421-426, 1970.

Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/L and above are dequate where silver exists as an inorganic halide. Silver halides such as the bromide and chloride are relatively insoluble in gents such as nitric acid but are readily soluble in an aqueous buffer of sodium thiosulfate and sodium hydroxide to a pH of Therefore, for levels of sliver above 1 mg/L, 20 mL of sample should be diluted to 100 mL by adding 40 mL each of 2 M S_2O_3 and 2M NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/L the approved thod is satisfactory.

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 15th Edition.

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 13th Edition.

Stevens, H. H., Ficke, J. F., and Smoot, G. F., "Water Temperature—Influential Factors, Field Measurement and Data esentation," U.S. Geological Survey, Techniques of Water Resources Investigations, Book 1, Chapter D1, 1975.

Zinc, Zincon Method, Method 8009, Hach Handbook of Water Analysis, 1979, pages 2-231 and 2-333, Hach Chemical mpany, Loveland, CO 80537.

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS

Parameter[1]	EPA Method Number			Other
	GC	GC/MS	HPLC	
Acenaphthene	610	625, 1625	610	
Acenaphthylene	610	625, 1625	610	
Acrolein	603	'624, 1624		
Acrylonitrile	603	'624, 1624		
Anthracene	610	625, 1625	610	
Benzene	602	624, 1624		
Benzidine		'625, 1625	605	Note 3, p. 1;
Benzo(a)anthracene	610	625, 1625	610	
Benzo(a)pyrene	610	625, 1625	610	
Benzo(b)fluoranthene	610	625, 1625	610	
Benzo(g,h,i)perylene	610	625, 1625	610	
Benzo(k)fluoranthene	610	625, 1625	610	
Benzyl chloride				Note 3, p. 130; Note 6, p. S102.
Benzyl butyl phthalate	606	625, 1625		
Bis(2-chloroethoxy) methane	611	625, 1625		
Bis(2-chloroethyl) ether	611	625, 1625		
Bis(2-ethylhexyl) phthalate	606	625, 1625		
Bromodichloromethane	601	624, 1624		
Bromoform	601	624, 1624		
Bromomethane	601	624, 1624		
4 Bromophenylphenyl ether	611	625, 1625		
Carbon tetrachloride	601	624, 1624		Note 3, p. 130.
4 Chloro-3 methylphenol	604	625, 1625		
Chlorobenzene	601, 602	624, 1624		Note 3, p. 130;
Chloroethane	601	624, 1624		
2 Chloroethylvinyl ether	601	624, 1624		

[redacted] E IC [redacted] OF A[redacted] D T[redacted] OCE[redacted] FOR [redacted] ESTIC[redacted] RGANIC COMPOUND[redacted] [redacted]
Continued

Parameter[1]	EPA Method Number			Other
	GC	GC/MS	HPLC	
27 Chloroform	601	624, 1624		Note 3, p. 130;
28 Chloromethane	601	624, 1624		
29 2 Chloronaphthalene	612	625, 1625		
30 2 Chlorophenol	604	625, 1625		
31 4 Chlorophenylphenyl ether	611	625, 1625		
32 Chrysene	610	625, 1625	610	
33 Dibenzo(a,h)anthracene	610	625, 1625	610	
34 Dibromochloromethane	601	624, 1624		
35 1,2 Dichlorobenzene	601, 602, 612	624, 625, 1625		
36 1,3 Dichlorobenzene	601, 602, 612	624, 625, 1625		
37 1,4 Dichlorobenzene	601, 602, 612	625, 1624, 1625		
38 3,3 Dichlorobenzidine		625, 1625	605	
39 Dichlorodifluoromethane	601			
40 1,1 Dichloroethane	601	624, 1624		
41 1,2 Dichloroethane	601	624, 1624		
42 1,1 Dichloroethene	601	624, 1624		
43 trans-1,2 Dichloroethene	601	624, 1624		
44 2,4 Dichlorophenol	604	625, 1625		
45 1,2 Dichloropropane	601	624, 1624		
46 cis 1,3 Dichloropropene	601	624, 1624		
47 trans 1,3 Dichloropropene	601	624, 1624		
48 Diethyl phthalate	606	625, 1625		
49 2,4 Dimethylphenol	604	625, 1625		
50 Dimethyl phthalate	606	625, 1625		
51 Di-n butyl phthalate	606	625, 1625		
52 Di-n octyl phthalate	606	625, 1625		
53 2,4 Dinitrophenol	604	625, 1625		
54 2,4 Dinitrotoluene	609	625, 1625		
55 2,6 Dinitrotoluene	609	625, 1625		
56 Epichlorohydrin				Note 3, p. 130; Note 6, p. S102.
57 Ethylbenzene	602	624, 1624		
58 Fluoranthene	610	625, 1625	610	
59 Fluorene	610	625, 1625	610	
60 Hexachlorobenzene	612	625, 1625		
61 Hexachlorobutadiene	612	625, 1625		
62 Hexachlorocyclopentadiene	612	'625, 1625		
63 Hexachloroethane	612	625, 1625		
64 Ideno(1,2,3-cd)pyrene	610	625, 1625	610	
65 Isophorone	609	625, 1625		
66 Methylene chloride	601	624, 1624		Note 3, p. 130;
67 2 Methyl-4,6 dinitrophenol	604	625, 1625		
68 Naphthalene	610	625, 1625	610	
69 Nitrobenezene	609	625, 1625		
70 2 Nitrophenol	604	625, 1625		
71 4 Nitrophenol	604	625, 1625		
72 N Nitrosodimethylamine	607	625, 1625		
73 N Nitrosodi n propylamine	607	'625, 1625		
74 N Nitrosodiphenylamine	607	'625, 1625		
75 2,2'-Oxybis(1-chloropropane)	611	625, 1625		
76 PCB-1016	608	625		Note 3, p. 43;
77 PCB-1221	608	625		Note 3, p. 43;
78 PCB-1232	608	625		Note 3, p. 43;
79 PCB-1242	608	625		Note 3, p. 43;
80 PCB-1248	608	625		Note 3, p. 43;
81 PCB-1254	608	625		Note 3, p. 43;
82 PCB-1260	608	625		Note 3, p. 43;
83 Pentachlorophenol	604	625, 1625		Note 3, p. 140;
84 Phenanthrene	610	625, 1625	610	
85. Phenol	604	625, 1625		
86 Pyrene	610	625, 1625	610	
87 2,3,7,8 Tetrachlorodibenzo-p dioxin		'613		
88 1,1,2,2 Tetrachloroethane	601	624, 1624		Note 3, p. 130;
89 Tetrachloroethene	601	624, 1624		Note 3, p. 130;
90 Toluene	602	624, 1624		
91 1,2,4-Trichlorobenzene	612	625, 1625		Note 3, p. 130;

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS—Continued

Parameter [1]	EPA Method Number [2, 3]			Other
	GC	GC/MS	HPLC	
92. 1,1,1-Trichloroethane	601	624, 1624		
93. 1,1,2-Trichloroethane	601	624, 1624		Note 3, p. 130.
94. Trichloroethene	601	624, 1624		
95. Trichlorofluoromethane	601	624		
96. 2,4,6-Trichlorophenol	604	625, 1625		
97. Vinyl chloride	601	624, 1624		

Table IC Notes

[1] All parameters are expressed in micrograms per liter (μg/L)

[2] The full text of Methods 601-613, 624, 625, 1624, and 1625, are given at Appendix A, "Test Procedures for Analysis of Organic Pollutants," of this Part 136. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at Appendix B, "Definition and Procedure for the Determination of the Method Detection Limit," of this Part 136.

[3] "Methods for Benzidine; Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater," U.S. Environmental Protection Agency, September, 1978.

[4] Method 624 may be extended to screen samples for Acrolein and Acrylonitrile. However, when they are known to be present, the preferred method for these two compounds is Method 603 or Method 1624.

[5] Method 625 may be extended to include benzidine, hexachlorocyclopentadiene, N-nitrosodimethyamine, and N-nitrosodiphenylamine. However, when they are known to be present, Methods 605, 607, and 612, or Method 1625, are preferred methods for these compounds.

[6] 625, Screening only

[7] "Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency," Supplement to the Fifteenth Edition of *Standard Methods for the Examination of Water and Wastewater* (1981)

[8] Each analyst must make an initial, one-time, demonstration of their ability to generate acceptable precision and accuracy with Methods 601-613, 624, 625, 1624, and 1625 (See Appendix A of this Part 136) in accordance with procedures each in section 8.2 of each of these Methods. Additionally, each laboratory, on an on-going bases must spike and analyze 10% (5% for Methods 624 and 625 and 100% for methods 1624, and 1625) of all samples to monitor and evaluate laboratory data quality in accordance with sections 8.3 and 8.4 of these Methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect and cannot be reported to demonstrate regulatory compliance.

NOTE: These warning limits are promulgated as an "interim final action with a request for comments."

TABLE ID—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES [1]

Parameter μg/L)	Method	EPA [2, 7]	Standard Methods 15th Ed	ASTM	Other
1. Aldrin	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
2. Ametryn	GC				Note 3, p. 83; Note 6, p. S68
3. Aminocarb	TLC				Note 3, p. 94; Note 6, p. S16
4. Atraton	GC				Note 3, p. 83; Note 6, p. S68
5. Atrazine	GC				Note 3, p. 83; Note 6, p. S68
6. Azinphos methyl	GC				Note 3, p. 25; Note 6, p. S51
7. Barban	TLC				Note 3, p. 104; Note 6, p. S64
8. α-BHC	GC	608	509A	D3086	Note 3, p. 7.
	GC/MS	[5] 625			
9. β-BHC	GC	608		D3086	
	GC/MS	625			
10. δ-BHC	GC	608		D3086	
	GC/MS	[5] 625			
11. γ-BHC (Lindane)	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
12. Captan	GC		509A		Note 3, p. 7.
13. Carbaryl	TLC				Note 3, p. 94; Note 6, p. S60
14. Carbophenothion	GC				Note 4, p. 30; Note 6, p. S73
15. Chlordane	GC	608	509A	D3086	Note 3, p. 7.
	GC-MS	625			
16. Chloropropham	TLC				Note 3, p. 104; Note 6, p. S64
17. 2,4-D	GC		509B		Note 3, p. 115; Note 4, p. 35
18. 4,4'-DDD	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC MS	625			
19. 4,4'-DDE	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
20. 4,4'-DDT	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
21. Demeton-O	GC				Note 3, p. 25; Note 6, p. S51.
22. Demeton-S	GC				Note 3, p. 25; Note 6, p. S51.
23. Diazinon	GC				Note 3, p. 25; Note 4, p. 30; Note 6, p. S51.
24. Dicamba	GC				Note 3, p. 115
25. Dichlofenthion	GC				Note 4, p. 30; Note 6, p. S73.
26. Dichloran	GC		509A		Note 3, p. 7.
27. Dicofol	GC			D3086	
28. Dieldrin	GC	608	509A		Note 3, p. 7; Note 4, p. 30.
	GC/MS	625			
29. Dioxathion	GC				Note 4, p. 30; Note 6, p. S73.
30. Disulfoton	GC				Note 3, p. ; Note 6, p. S51.
31. Diuron	TLC				Note 3, p. 104; Note 6, p. S64.
32. Endosulfan I	GC	608	509A	D3086	Note 3, p. 7.
	GC/MS	[5] 625			
33. Endosulfan II	GC	608	509A	D3086	Note 3, p. 7
	GC/MS	[5] 625			
34. Endosulfan sulfate	GC	608			
	GC/MS	625			
35. Endrin	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	[5] 625			
36. Endrin aldehyde	GC	608			
	GC/MS	625			
37. Ethion	GC				Note 4, p. 30; Note 6, p. S73.
38. Fenuron	TLC				Note 3, p. 104; Note 6, p. S64.
39. Fenuron-TCA	TLC				Note 3, p. 104; Note 6, p. S64
40. Heptachlor	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
41. Heptachlor epoxide	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30; Note 6, p. S73.
	GC/MS	625			
42. Isodrin	GC				Note 4, p. 30; Note 6, p. S73
43. Linuron	TLC				Note 3, p. 104; Note 6, p. S64.
44. Malathion	GC		509A		Note 3, p. 25; Note 4, p. 30; Note 6, p. S51.
45. Methiocarb	TLC				Note 3, p. 94; Note 6, p. S60
46. Methoxychlor	GC		509A	D3086	Note 3, p. 7; Note 4, p. 30.
47. Mexacarbate	TLC				Note 3, p. 94; Note 6, p. S60
48. Mirex	GC		509A		Note 3, p. 7.
49. Monuron	TLC				Note 3, p. 104; Note 6, p. S64.
50. Monuron-TCA	TLC				Note 3, p. 104; Note 6, p. S64
51. Neburon	TLC				Note 3, p. 104; Note 6, p. S64.
52. Parathion methyl	GC		509A		Note 3, p. 25; Note 4, p. 30
53. Parathion ethyl	GC		509A		Note 3, p. 25.
54. PCNB	GC		509A		Note 3, p. 7.
55. Perthane	GC			D3086	
56. Prometon	GC				Note 3, p. 83; Note 6, p. S68
57. Prometryn	GC				Note 3, p. 83; Note 6, p. S68.
58. Propazine	GC				Note 3, p. 83; Note 6, p. S68
59. Propham	TLC				Note 3, p. 104; Note 6, p. S64
60. Propoxur	TLC				Note 3, p. 94; Note 6, p. S60
61. Secbumeton	TLC				Note 3, p. 83; Note 6, p. S68.
62. Siduron	TLC				Note 3, p. 104; Note 6, p. S64.
63. Simazine	GC				Note 3, p. 83; Note 6, p. S68.
64. Strobane	GC		509A		Note 3, p. 7.
65. Swep	TLC				Note 3, p. 104; Note 6, p. S64
66. 2,4,5-T	GC		509B		Note 3, p. 115; Note 4, p. 35.
67. 2,4,5-TP (Silvex)	GC		509B		Note 3, p. 115
68. Terbuthylazine	GC				Note 3, p. 83; Note 6, p. S68
69. Toxaphene	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
70. Trifluralin	GC		509A		Note 3, p. 7

Table ID Notes

[1] Pesticides are listed in this table by common name for the convenience of the reader. Additional pesticides may be found under Table IC, where entries are listed by chemical name.

CHAIN OF CUSTODY RECORD
FOR
ADIRONDACK ENVIRONMENTAL ASSOCIATES, INC.

SITE NAME: ______________________________

SAMPLING DATE: __________ TIME SAMPLING OCCURED: __________

WELL NO. OR SAMPLING POINT: ______________________________

____

SAMPLE ANALYZED FOR: INORGANIC, ORGANIC, BOTH (Circle one)

SAMPLE MEDIA: LIQUID, SOLID, GAS (Circle one)

EPA SAMPLE METHOD(S): ______________________________

SAMPLE IDENTIFICATION NO.(S): ______________________________

____

COLLECTOR'S NAME: ______________________________

FIELD NOTES: ______________________________

____

CHAIN OF POSSESSION:

COLLECTOR OUT:

Signature	Shippment date / Time Sent
Print Name	Title

LABORATORY IN:

Signature	Shippment Date / Time Rcvd
Print Name	Title

Please complete this form and return it to:

Adirondack Environmental Assoc., Inc.
63 Bridge Street, Plattsburgh, NY 12901

QA/QC Item 4

To be included with
all lab data and with
each workplan

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE IDENTIFICATION AND ANALYTICAL REQUIREMENT SUMMARY

Customer Sample Code	Laboratory Sample Code	Analytical Requirements*					
		*VOA GC/MS	*BNA GC/MS	*VOA GC	*PEST PCB	*METALS	*OTHER

* Check Appropriate Boxes

* CLP, Non-CLP
* HSL, Priority Pollutant

PLEASE INDICATE YEAR OF PROTOCOL USED

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
B/N-A
ANALYSES

SAMPLE ID	MATRIX	DATE COLLECTED	DATE REC'D AT LAB	DATE EXTRACTED	DATE ANALYZED

YOU,OPREP,1

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

ORGANIC ANALYSES

SAMPLE ID	MATRIX	ANALYTICAL PROTOCOL	EXTRACTION METHOD	AUXILARY CLEAN UP	DIL/CONC FACTOR

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
VOA
ANALYSES

SAMPLE ID	MATRIX	DATE COLLECTED	DATE REC'D AT LAB	DATE EXTRACTED	DATE ANALYZED

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY
PESTICIDE/PCB
ANALYSES

SAMPLE ID	MATRIX	DATE COLLECTED	DATE REC'D AT LAB	DATE EXTRACTED	DATE ANALYZED

QA/QC Item 5

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

INORGANIC ANALYSES

SAMPLE ID	MATRIX	METALS REQUESTED	DATE RECEIVED	DATE DIGESTED	DATE ANALYZED

:OU,IPREP,1

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

SAMPLE PREPARATION AND ANALYSIS SUMMARY

INORGANIC ANALYSES

LABORATORY SAMPLE CODE	MATRIX	ANALYTICAL PROTOCOL	DIGESTION PROCEDURE	MATRIX MODIFIER	DIL/CONC FACTOR

APPENDIX D

CITIZEN PARTICIPATION PLAN

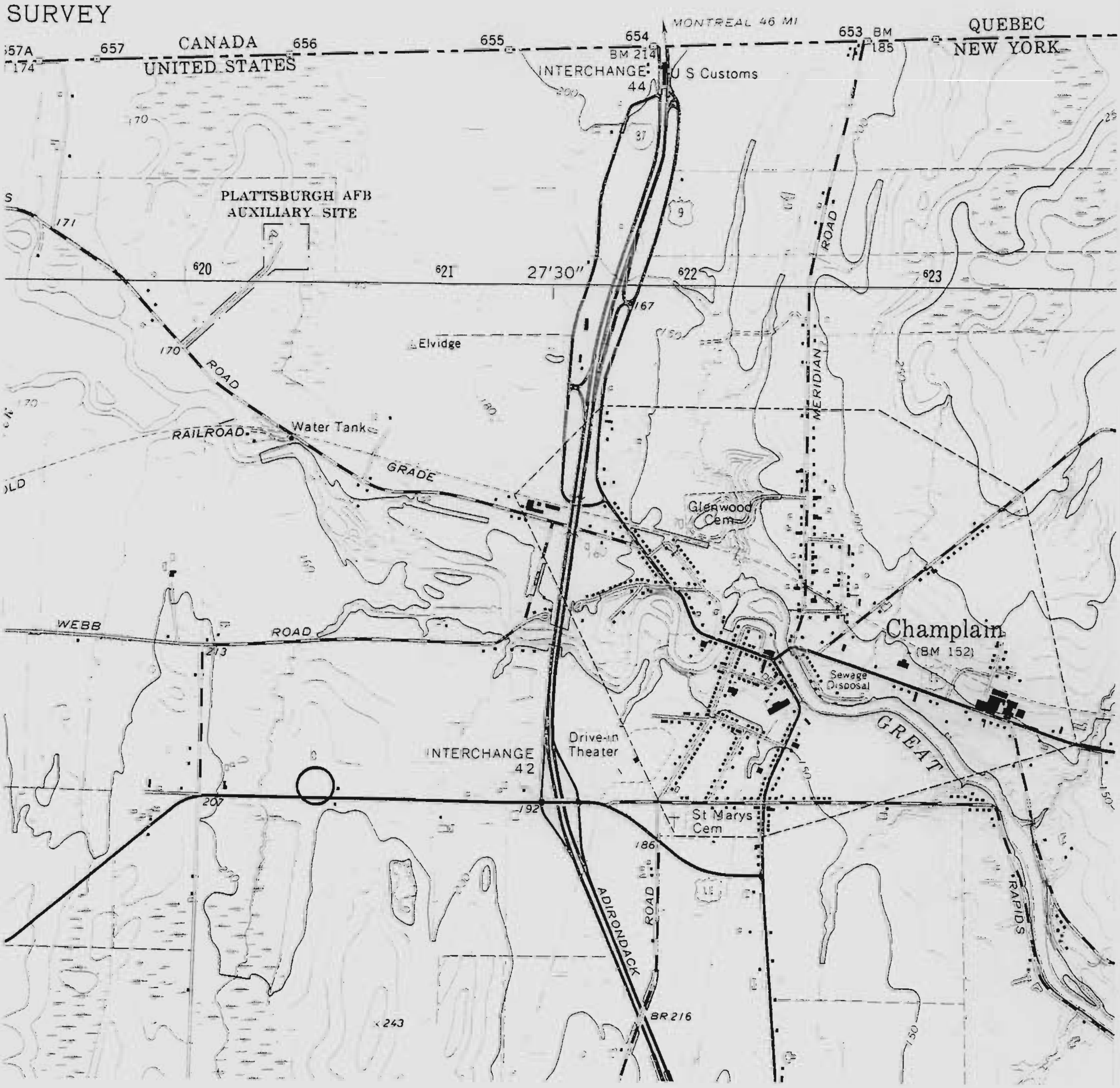
Remedial Investigation & Feasibility Study

Pole-Lite Industries, Inc.
Champlain, New York

December 1989 revision

Adirondack Environmental Assoc., Inc.
Plattsburgh, New York

Figure 1 **GENERAL LOCATION MAP**



Source: USGS 7 1/2 minute topographic map
Scale: 1"=2,000'

TABLE OF CONTENTS

1.0 Introduction to Plan

New York State Department of Environmental Conservation (NYSDEC) and Pole-Lite Industries, Inc. (Pole-Lite) are committed to a citizen participation program as part of their responsibilities under the New York State Inactive Hazardous Waste Site Remedial Program. Citizen participation promotes public understanding of overall responsibilities, planning and remedial activities at inactive hazardous waste disposal sites. It provides an opportunity for the public to provide input and information enabling the development of a more comprehensive remedial program which is protective of both public health and the environment. This plan details the program that Pole-Lite intends to implement to involve the public in the project.

In addition to the citizen's participation activities required by law, Pole-Lite plans to provide the public with general project information as the program progresses.

2.0 Basic Site Information

Pole-Lite, in cooperation with NYSDEC, is conducting this Remedial Investigation and Feasibility Study (RI/FS) pursuant to a negotiated Order on Consent (T111886) entered into between Pole-Lite and NYSDEC in December 1986.

The Pole-Lite facility is located on Route 11 in the Town of Champlain, Clinton County, New York approximately 1 mile west of interstate I-87 (hereafter referred to as the "site"). Figure 1 is a USGS 7.5 minute Topographic Series map showing the general location of the site. Pole-Lite began manufacturing aluminum light and flag poles at the site in 1973, ceasing operations in the mid 1980's. As part of the manufacturing process aluminum poles were cleaned with solvents (namely, mineral spirits and 1,1,1-Trichloroethane) to remove machine oil prior to welding. Sawdust was used as an absorbent and stored on the site in addition to the storage of drums of solvent fluids.

3.0 Project Description

A general contamination evaluation was initiated on the site in the Fall of 1985 which identified the presence of hydrocarbon contamination generated during the manufacturing process. The consequence of this preliminary finding was the Order on Consent under which Pole-Lite retained engineering and consulting services to perform further investigation and testing. The result was the submission of a Phase II Remedial Investigation by the engineering firm of Malcolm Pirnie, Inc., to the NYSDEC in May 1989.

The objective of this RI/FS is to develop a remediation strategy designed to eliminate hazards to human health and the environment in accordance with the following timeline:

<u>October 89 to Spring 1990</u> - Conduct groundwater elevation surveys on existing and new monitoring wells;

<u>October/December 1989</u> - Determine placement of additional monitoring wells immediately outside the area of contamination;

<u>Early Spring 1900</u> - Install additional monitoring wells and conduct soil sampling during installation;

Spring 1990 - Analyze and evaluate data to determine final remediation strategy;

Spring/Summer 1990 - Install remedial system.

4.0 Affected/Interested Public

The following individuals and/or organizations will be notified of any public hearings and periodically informed of the work plan progress:

Adjacent property owners

Champlain Town Board Town Hall Champlain, New York 12919 518-298-8160	Leo Letourneau, Supervisor
Clinton County Legislature Clinton County Gov't. Center 137 Margaret Street Plattsburgh, New York 12901 518-565-4600	Donald Garrant, Chairman William Bingel, Administrator
County Chamber of Commerce West Bay Plaza Plattsburgh, New York 12901 518-563-1000	Amy Whitehead, Exec. Director
Press Republican 170 Margaret Street Plattsburgh, New York 12901 518-561-2300	Daily Newspaper Brenda Tallman, Publisher
WIRY Radio 301 Cornelia Street Plattsburgh, New York 12901	Gordy Little, News Director
WCFE-TV 1 Sesame Street Plattsburgh, New York 12901	Gerald Bates, President
WPTZ-TV Old Moffit Road Plattsburgh, New York 12901	Robert Shields, Gen. Manager

5.0 Official Contacts

NYSDEC
Region 5
Raybrook, New York
518-891-1370

Daniel Steenberge, P.E.
Ms. Elizabeth Lowe
Public Participation

New York State
Dept. of Health
Corning Tower
State Campus
Albany, New York 12237
518-458-6306

Richard Fedigan
Senior Sanitarian

Clinton County Dept. of Health
9 Margaret Street
Plattsburgh, New York 12901
518-565-3250

Jack Andrus, Director

6.0 Document Repositories

NYSDEC
Region 5
Route 86
Raybrook, New York 12977
518-891-1370

Clinton-Essex-Franklin
Library System
17 Oak Street
Plattsburgh, New York
518-563-5190

Stan Ransom, Director

7.0 Citizen Participation Activities

The activities identified herein were developed to inform the public during this RI/FS Workplan in compliance with 6NYCRR Part 375.7. The NYSDEC has made copies of previous reports on the site available to the public at the document repositories. Following approval by NYSDEC of this RI/FS Workplan, including this Citizen Participation Plan, and prior to commencement of field activities, public participation and comment on the Workplan will be sought. The following activities will take place:

1- Copies of the Workplan will be supplied to the local document repositories;

2- Legal notice will be published in the Press Republican and notification given those individuals and organizations listed in Section 4 concerning availability of the final draft workplan for the RI/FS. The notice will:
  - briefly describe the site
  - discuss objectives of RI/FS
  - provide overview of RI/FS
  - identify local document repositories
  - identify DEC and DOH contact persons

3- Place a minimum of one copy of the final workplan for the RI/FS in local repositories

4- Place a minimum of one copy of the report for the first phase of the RI/FS in the project's local document repository

5- Use contact list to notify interested and affected parties about 1st phase of RI/FS. Notice will include the following information:
  - Site description
  - objectives of RI/FS
  - summary of work completed in the first phase of the RI/FS
  - summary of findings
  - schedule for remainder of RI/FS
  - location of local document repository
  - DEC and DOH contact persons

6- Place a minimum of one copy of final draft RI/FS in local document repository

7- Publish legal notice in the Press Republican with the following information:
  - brief analysis of the proposed remedial program
  - summary of rational for selecting the proposed program over proposed alternatives
  - construction and operational requirements of the proposed program

8- Mail notice to contact list on final draft RI/FS with following information:
  - brief summary of the site
  - overview of work completed in the RI/FS
  - brief analysis of proposed remedial program
  - summary of reasons for selecting the proposed program over proposed alternatives
  - information on 30 day comment period
  - local document repository
  - DEC and DOH contacts
  - date, time and place of public meeting

9- Hold public meeting on final draft RI/FS and prepare meeting transcript for document repository

10- Following 30 day comment period, publish legal notice in the Press Republican to include:
  - brief analysis of remedial program selected
  - significant changes from proposed remedial program
  - responses to significant comments, criticisms and new data

11- Prepare and send to contact list a brief responsiveness summary with the following:

- brief analysis of remedial program selected
- significant changes from proposed remedial program
- responses to significant comments, criticisms and new data

12- If remedial program implemented differs significantly publish legal notice in the Press Republican explaining significant differences and the reasons such changes were made.

13- Press releases and fact sheets summarizing significant activities in non-technical terms throughout the project will be prepared. Such information sheets will be provided the document repositories and individuals/organizations listed above.

14- Additional public meetings will be held during this project as deemed desirable by NYSDEC and Pole-Lite. Such meetings will be conducted in accordance with the above procedure.

8.0 Glossary

<u>Definitions of Commonly Used Citizen Participation Terms</u>

Citizens Participation - A process to inform and involve the interested/affected public in the decision-making process during identification, assessment and remediation of inactive hazardous waste sites. This process helps to assure that the best decisions are made from environmental, human health, economic, social and political perspectives.

Citizen Participation Plan - A document that describes the site-specific citizen participation activities that will take place to complement the "technical" (remedial) activities. It also provides site background and rationale for the selected citizen participation program for the site. A plan may be updated or altered as public interest or the technical aspects of the program change.

Consent Order - A legal and enforceable negotiated agreement between the Department and responsible parties where responsible parties agree to undertake investigation and cleanup or pay for the costs of investigation and cleanup work at a site. The order includes a description of the remedial actions to be undertaken at the site and a schedule for implementation.

Document Repository - Typically a regional DEC office and/or public building, such as a library, near a particular site, at which documents related to remedial and citizen participation activities at the site are available for public review. Provides access to documents at times and a location convenient to the public. Environmental Management Councils (EMCs), Conservation Advisory Committees (CACs) as well as active local groups often can serve as supplemental document repositories.

Feasibility Study (FS) - A process for developing, evaluating and selecting remedial actions, using data gathered during the remedial investigation to: define the objectives of the remedial program for the site and broadly develop remedial action alternatives; perform an initial screening of these alternatives; and perform a detailed analysis of a limited number of alternatives which remain after the initial screening stage.

Public - The universe of individuals, groups and organizations: a) affected (or potentially affected) by an inactive hazardous waste site and/or its remedial program; b) interested in the site and/or its remediation; c) having information about the site and its history.

Public Meeting - A scheduled gathering of the Department staff and the public to give and receive information, ask questions and discuss concerns. May take one of the following forms: large-group meeting called by the Department; participation by the Department at a meeting sponsored by another organization such as a town board or Department of Health; working group or workshop; tour of the hazardous waste site.

Public Notice - A written or verbal informational technique for telling people about an important part of a site's remedial program coming up soon (examples: announcement that the report for the RI/FS is publicly available; a public meeting has been scheduled). The public notice may be formal and meet legal requirements (for example: what it must say, such as announcing beginning of a public comment period; where, when and how it is published).

Publish - For purposes of 6NYCRR Part 375.7, at a minimum requires publication of legal notice in a local newspaper of general circulation. Another kind of public notice may be more informal and may not be legally required (examples: paid newspaper advertisement; telephone calls to key citizen leaders; targeted mailings).

Remedial Design - Once a remedial action has been selected, technical drawings and specifications for remedial construction at a site are developed, as specified in the final RI/FS report. Design documents are used to bid and construct the chosen remedial actions. Remedial design is prepared by consulting engineers with experience in hazardous waste disposal site remedial actions.

Remedial Investigation (RI) - A process to determine the nature and extent of contamination by collecting data and analyzing the site. It includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for, and proposed extent of, a remedial program for the site.

Site Placed on Registry of Inactive Hazardous Waste Sites -Each inactive site known or suspected of containing hazardous waste must be included in the Registry. Therefore, all sites which state or county environmental or public health agencies identify as known or suspected to have received hazardous waste should be listed in the Registry as they are identified. Whenever possible, the Department carries out an initial evaluation at the site before listing.

Remedial Investigation/Feasibility Study

CONTENTS

Pole-Lite Industries

Champlain, New York Site

Remedial Investigation/Feasibility Study

Work Plan

Prepared For:	Pole-Lite Industries 1 Edouard VII Boulevard St-Phillippe, Laprairie Quebec, Canada JOL 2K0
Prepared By:	Steve Revell, C.P.G.S. Adirondack Environmental Associates, Inc. 63 Bridge Street Plattsburgh, N.Y. 12901
Date :	October 27, 1989

I. Overview of Problem

A potential chlorinated hydrocarbon contamination problem was identified in 1985 at Pole-Lite Industries Champlain, N.Y. site shown on Figure 1. A general contaminant evaluation was initiated in Fall of 1985 which identified the presence of hydrocarbon contamination associated with the sawdust piles and the former drum storage area shown on Figure 1. In response to these findings, the New York State Department of Environmental Conservation (NYSDEC) requested that a ground water investigation be conducted to determine the presence and extent of the contamination. Between February 1986 and the present, Atlantic Testing Laboratories, Inc. and Malcolm Pirnie Inc. conducted soil and ground water investigations to determine the presence and extent of the hydrocarbon problems.

The results of these phased investigations are presented as conclusions in the Malcolm Pirnie Inc. Phase II Remedial Investigation Report dated May 1989. The results indicate that the sawdust contamination problem has been eliminated while soil and ground water related chlorinated hydrocarbon (i.e. solvent type) contamination (requiring remedial action) is present beneath and downgradient (to the southeast) of the former drum storage area.

The results of the investigation were reviewed by NYSDEC resulting in a number of comments which indicate that the Remedial Investigation (RI) was deficient. The deficiencies regard:

1. the lack of determination of the extent of the soil and ground water contamination,
2. the lack of definition of applicable, appropriate remedial technologies and measures which could readily mitigate the problems on-site,
3. the lack of definition of the ground water flow conditions beneath the site, and
4. the lack of definition of whether the floor drains, construction joints and surfaces (i.e. along foundation and beneath floor), and septic system have been impacted by the release of contaminants.

The general results of the Malcolm Pirnie investigation, and the part of the property which was evaluated in detail are shown on Figure 2. Unfortunately, the investigation was conducted in a much too localized fashion which has led to the need for extending the RI.

In an attempt to initiate a remedial solution in the near future (before winter), a combination Remedial Investigation and Feasibility Study (RI/FS) is proposed which will address NYSDEC concerns while determining the

I. Overview of Problem (Cont.)

feasibility of constructing a laterally extended recovery system which would collect contaminated ground water, treat it, and recharge it in the contaminated area. This type of remedial system is proposed because the results of the remedial investigations to date indicate that the contamination is localized to the area shown on Figure 2 and to the upper brown till unit (i.e. top 15 feet) found beneath the site. If the extent of the contamination can be accurately defined and/or is limited to the estimated contaminated area shown on Figure 2, then the proposed laterally extended pump, treat, and recharge system has direct application.

The following RI/FS work plan is intended to answer NYSDEC concerns while providing information to properly evaluate design, and implement the proposed remedial action.

II. General Work Plan

A phased RI/FS work plan is proposed. The individual components of the plan include:

1. The conduction of an expanded soil gas survey in the areas shown on Figure 3.
2. The placement of additional monitoring wells at locations upgradient, downgradient, and along gradient of the contaminated area as defined from the existing data base and the expanded soil gas survey.
3. The collection of soil samples during monitoring well placement for laboratory analysis and for in-field head space evaluation using a photoionization detector (PID).
4. The sampling and analysis of ground water samples collected from all wells (new and old) on-site (including the drilled water supply well).
5. The conduction of ground water elevation surveys on all new and old monitoring wells during Fall 1989, Winter 1989-1990, and Spring 1990.

All on-site work related to this RI/FS is intended to be accomplished between late Fall 1989 and Spring 1990 and would start immediately following work plan approval. The evaluation of all data and the design of a remedial solution and remedial action plan is expected to be completed within this evaluation and study period. If the remedial proposal and plan are well received, installation of the remedial system is expected to take place in late Spring 1990.

The Health and Safety Plan (HASP) is presented with this work plan as Appendix A and will be adopted for use during the RI/FS. Compliance with this plan is mandatory for all Adirondack Environmental Associates Inc. (AEA) site workers, as well as, for any other personnel entering the site. All site workers and other personnel will be required to read and be familiar with the HASP before initially entering the site. The AEA Project and Health and Safety Manager, and the site Health and Safety Officers identified below will determine and enforce compliance. A copy of the HASP will be available on-site during all site activities. Activities included in the RI/FS include soil gas analysis; soil boring and soil sampling; well installation; water quality, water level, and other site surveys; and the construction and operation of a recovery, treatment, and recharge system.

-Project Manager
Name: Mr. Herb Carpenter
Phone: Office 518 563-5726

-Health and Safety Manager
Name: Mr. Herb Carpenter
Phone: 518 563-5726

-Site Health and Safety Officer
Name: Mr. Steve Revell or
Mr. John Humphreys
Phone: 802 453-4384

III. Detailed Work Plan

The individual components of the general plan are defined in detail in the following sections.

1. Proposed Soil Gas Survey

A PID based soil gas survey will be conducted as the first phase of the remedial investigation. The survey is intended to help define the presence of hydrocarbon contaminants in and around the known source area, around and beneath the Pole-Lite building, and in the sewage disposal system (the only system which drains from the building). The areas initially proposed for evaluation are shown on Figure 3.

The first part of the survey will center around the known contaminant source area shown on Figure 3. A 20 foot center survey grid will be imposed on the area shown in an attempt to define the appropriate limits of obvious contamination upgradient, along gradient, and down gradient of the known contaminant source area. At each point on the grid, a clean soil gas probe will be driven mechanically to depths of 2, 4, and 6 feet. At each of these depths, an 11.7eV calibrated PID will be used to

1. Proposed Soil Gas Survey (Cont.)

measure organic vapor levels through the soil gas probe. If 6 feet is not accomplishable, then the maximum depth to which the probe is advanced will be evaluated. Following the 6 foot reading, the soil probe will be removed and a PID level measured from the open hole. The survey grid will be expanded appropriately until the horizontal extent of the contmainant's presence is defined.

Between holes, the soil probe will be appropriately cleaned by air, nitrogen, and clean water purging methods. Before re-installation in the next hole, the probe will be checked with the PID to ensure background quality is present both on the inside and outside of the probe.

Upon completion of the 20 foot centered array of points, the areas defined as showing the positive presence of contaminants will be further evaluated on 5 to 10 foot centers if necessary. The results of the soil gas survey will be used to compile a plan view and cross sectional soil gas contour map of the source area. The maps will be evaluated to determine optimum locations for future monitoring well placement. The ultimate goal of the soil gas evaluation in the source area is to allow the reasonable prediction of the horizontal and vertical components of the contaminant travel path away from the source.

The second part of the survey will be focused around the building. The building foundation is composed of concrete frost walls and footers which extend approximately 20 feet around the perimeter of the building to a depth of 6 feet. In this manner, the potential presence of contaminants migrating from beneath the building can be determined. A PID survey will also be conducted on the interior of the building. Since the floor is a concrete floor laid directly on a vapor barrier, there will be no initial need of penetrating the floor for survey purposes. Instead, construction joints and seams will be evaluated with a PID. No floor drains are present on the interior of the building other than the sanitary plumbing which will be evaluated separately with the sewage system.

The third part of the proposed soil gas survey will involve an evaluation of the existing sewage disposal system shown on the attached figure. The disposal system is the only direct tie between the interior of the former manufacturing plant, and the soil and ground water environments. Both the septic tank and the disposal field will be accurately located and separately evaluated. The septic tank will be exposed, opened, and the interior evaluated with a PID. The disposal field consists of 7-3 foot x 60 foot seepage trenches whose bottoms lie about two feet below grade. The trenches will be located and a soil gas measurement will be taken every 20 feet at the base of each trench. The soil gas measurements will be initiated at the septic tank end of each trench. If positive PID readings are generated, the soil gas survey will be expanded away from the disposal system (using a 20 foot survey grid) until background readings are consistently received. A positive PID reading from the disposal system

1. Proposed Soil Gas Survey (Cont.)

(tank and trenches) may not indicate the positive presence of volatile organic contaminants. The 11.7eV PID is incapable of differentiating between methane gas (a common constituent of sewage) and the volatile organic contaminants which have been positively identified at the rear of the Pole-Lite building. If positive PID readings are generated from either or both the septic tank and the seepage trenches, either or both the liquid contents of the septic tank or the soil directly below the seepage trench with the highest PID reading will be sampled and analyzed in accordance with the AEA QA/QC plan presented with this work plan as Appendix B.

The combined results of the three parts of the soil survey will be used to evaluate the obvious presence of hydrocarbon contaminants associated with the Pole-Lite site. The results will be used as input toward the determination of additional, necessary monitoring well locations. In this regard, additional monitoring well placement locations will be considered in and around the previously defined contaminated area shown on Figure 2, adjacent to the perimeter of the Pole-Lite building, and in the area of the existing sewage disposal system.

2. Monitoring Well Placement

Based on the existing data base and the results of the expanded soil gas survey, it is anticipated that a minimum of four additional monitoring wells will need to be placed. The most probable locations will be northeast, southeast, southwest, and northwest of the source area and the previously evaluated area shown on Figure 2. The project goal is to accurately place each well just beyond the edge of the contaminated area so that the extent of ground water plume can be accurately defined. The accurate definition of the contaminant plume will allow the proper installation of a remedial system which will immediately initiate clean-up of the site.

All proposed monitoring wells will be placed using hollow stem auger methods. Split spoon samples will be collected at every other 2 foot intervals starting with the 2-4 foot intervals. All spoon samples will be monitored after recovery with a 11.7eV PID. Spoon samples will be collected at 2 foot intervals until the underlying gray till surface is intercepted. Upon reaching the gray till, the augering will be stopped and monitoring well construction will be initiated.

During the augering and spoon sampling, two discrete soil samples will be collected from each borehole for USEPA Method 624 analysis. The first sample will be collected from the spoon sample from the 6 to 8 foot interval. The discrete point of soil sampling will be chosen based on the part of the spoon sample which generated the highest PID reading. The second sample would be collected from the spoon which penetrated the top of the gray till. Again, the discrete point of sampling will be based upon the part of the spoon sample which generated the highest PID reading.

The analytical results of the soil samples will be related to the

2. Monitoring Well Placement (Cont.)

results of the PID survey of the spoon samples and the results of the soil gas survey. It is hoped that correlation can be developed between these soil based data source methods to allow the progress of the remediation to be evaluated with soil gas survey methodology.

The augering of each well will be terminated at the point the gray till is penetrated. At this point, a 5 foot long, 2-inch PVC 10 slot well screen will be placed and surrounded by clean, quartz sand (size 0). The sand will extend from the bottom of the hole to two feet above the screen. The 2-inch well will be extended above grade with a 2-inch solid riser. A 2 foot bentonite pellet seal will be placed above the sand pack. The remainder of the borehole will be filled with a 30:1 neat cement: bentonite grout to grade. Each well will be completed with locking vandal guard which is cemented into place. The placement of each well will allow both water table monitoring and water quality sampling to be conducted. The graphic details of the proposed monitoring wells are shown on Figure 5 which is titled-Standard Ground Water Monitoring Well.

To prevent possible cross-contamination between borings, all downhole equipment, including hollow stem augers, rods and split spoon samplers, will be pressure washed or steam cleaned. In addition, split spoon samplers will be washed in detergent solution and then rinsed after every sample is taken. Water will be taken from the Town of Champlain or City of Plattsburgh water systems supplying potable water. Drill cuttings, development water, and steam condensate will be collected in DOT approved drums for subsequent disposal and will be stored on Pole-Lite property.

At the completion of well installation, all new wells will be developed using both surging and bailing, and non-turbulent pumping techniques. All water developed from each well will be collected in 55 gallon drums for proper disposal. A minimum of ten well volumes will be removed from each well in an attempt to develop low turbidity water. The conductivity of the developed waters will be monitored until stability is demonstrated. At this point well development will cease.

The monitoring wells and soil borings will be surveyed for accurate location and elevation (to the nearest 0.01 feet). Their locations will be determined relative to the site plan presented on Figure 1. The top of casing, riser, and ground elevations will be established using an assumed elevation of 100 feet, with the northeastern corner of the plant buildings used as the reference point (benchmark 1).

3. Soil Quality Sampling and Analysis

Two discrete soil samples will be collected from each of the proposed monitoring wells by the method specified above in the monitoring well placement section. Additionally, there is the possibility that a soil sample(s) will need to be collected from beneath the sewage disposal

3. Soil Quality Sampling and Analysis (Cont.)

trenches for volatile organic analysis. If this is required, the soil samples will be collected using manual augering methods from beneath the aggregate in the disposal trenches at the point where the highest soil gas survey reading was recorded.

All soil sampling and analysis will be conducted in accordance with the AEA QA/QC plan submitted with this plan as Appendix B. All analyses will be conducted using USEPA Method 624 with NYSDEC-Contract Laboratory Protocol (CLP).

4. Water Quality Sampling and Analysis

Following well installation and proper development, all wells including the on-site drilled water supply well will be purged, sampled, and analyzed using USEPA Method 624. The AEA QA/QC plan presented as Appendix B will be followed for all ground water samples. The results of the analyses will be used to determine the extent of the contaminated ground water plume. Knowing accurately the extent of the contaminated ground water plume will allow the proper placement of the remedial system which will be proposed to remediate the contamination problem.

During all water quality sampling surveys, a water sample will be collected from each well for in-field headspace analyses by 11.7eV PID. It is hoped that a correlation can be developed between the in-field PID data and the laboratory generated data which will allow the progress of the remediation to be tracked over time.

If a positive PID response is generated from the the septic tank, a water sample will be collected from the bottom of the tank and evaluated in accordance with the AEA QA/QC plan to determine the positive presence of volatile organic contaminants.

5. Ground Water Elevation Surveys

Bimonthly ground water elevation surveys have already been initiated on-site, as of the beginning of October 1989. Bimonthly ground water elevation surveys will be conducted on all new and old wells (monitoring wells and the drilled water supply well) at the Pole-Lite site. All wells will be monitored using an electric tape during the project period which has been identified as extending from late Fall 1989 to Spring 1990. Ground water elevation monitoring during this period will allow data to be collected during high water table months of Fall and Spring, and normally low water table months of winter. These data collection methods will allow seasonal ground water level fluctuation data to be generated while the true character of the ground water surface beneath the site is defined. In this manner, the presence of a permanent or seasonally induced ground water divide beneath the site can be accurately evaluated. The data generated from the surveys will be used to construct water level contour maps which

5. Ground Water Elevation Surveys (Cont.)

are essential to the design of the proposed remedial system. Ground water elevation data will also be collected on a bimonthly basis in order to establish a pre-remediation data base which can be compared to data collected during remediation. Collection of these data will allow the impacts of the remediation to be evaluated and controlled during the remedial period.

6. Additional Invetigations

Although the results of the Remedial Investigation (RI) conducted by Malcolm Pirnie Inc., indicate that contaminants are not migrating vertically into the gray till and utlimately into the bedrock aquifer, further investigation is necessary to identify the full range of potential receptors of the contamination problem.

To provide some background information regarding the bedrock aquifer and it's usage in the Pole-Lite site area, a well record survey will be conducted. A drilled well location map will be compiled and evaluated to determine whether they are potential receptors of the contamination problem. No sampling of these wells will be considered unless the water quality results from the on-site drilled well indicates it is necessary.

7. Proposed Clean-Up Levels and Preliminary Public Health Risk Assessment

A soil based clean-up level of 10 parts per million (ppm) total volatile organic chemicals (VOC) is proposed for the Pole-Lite site. On this basis, a Public Health Risk Assessment has been presented as Appendix C of this work plan. The results of the assessment indicate that if the soil clean-up goal of 10 ppm is reached, the calculated carcinogenic risk for Pole-Lite falls within the USEPA range of a acceptable carcinogenic risk of 10^{-4} to 10^{-7}. In addition, at the 10 ppm soil clean-up level, the non-carcinogenic risk using a chronic hazard index for soil and a safety factor for water indicates acceptable levels of risk.

Following the compilation of data from the RI/FS, the public health risk will be re-assessed to determine whether the soil based clean-up goal of 10 ppm VOC is acceptable.

8. Citizen Participation Plan

A citizen participation plan has been compiled and presented as Appendix D. The plan is presented as a means of welcoming the input of the public in an attempt to produce the most thorough and effective clean-up of the Pole-Lite Site.

IV. Conceptual Remedial Action Plan

The data collected to date indicates that the contamination problem is limited in both horizontal and vertical extent. The limited extent of the contamination indicates to AEA that a properly placed laterally extended collection, treatment, and recharge system will remediate the problem. The conceptual plan is shown on Figure 4. The laterally extended collection system will be placed to encompass the leading edges of the contaminated ground water plume. Proper placement is critical. The collection system must be placed into the edge of the contaminant plume in order to begin immediately remediating the problem. If the collection system is placed too far downgradient, it may take a few years before contaminated water will flow into the system.

A large diameter collection well will be placed at the furthest downgradient point of the collection system. The collection well will serve as a sump for contaminated waters. A level controlled pump will be placed at the bottom of the well which will pump contaminated water to a treatment system. Because of the high volatility of the contaminants, it is believed that some type of air stripping/diffusing process will be utilized. The discharge from the treatment process will be pumped to a valved recharge gallery where it will be pressure distributed (in a balanced fashion) to all areas of the recharge area. The distribution system will be set-up (using valves) to allow the area of recharge to be modified if unacceptable ground water mounding effects are monitored.

Since the treatment system will probably use an air driven process, the system could be set-up to allow in-situ bioremediation methodology to be initiated, if warranted. The effluent leaving the air driven treatment process will have a somewhat elevated dissolved oxygen (D.O.) content. This elevated D.O. level will enhance natural bacterial degradation. Further natural degradation can be enhanced by adding nutrients (nitrogen and phosphorus) and bacterial seeds (manure water) as weekly/monthly batch additions to the waste stream discharging to the recharge gallery. The formal design of the system will be presented as part of the RI/FS summary report.

V. Reports

The existing data base will be combined with data collected and generated from the RI/FS. The geology, hydrogeology, and nature and extent of contamination associated with the site will be re-evaluated and presented in summary report form. Additionally, the report will re-address risks formally established, define the design details of the proposed remedial system, and defensible remedial goals.

APPENDIX A

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HEALTH

AND

SAFETY PLAN

****

POLE-LITE INDUSTRIES, INC.
CHAMPLAIN, NEW YORK

October, 1989

Adirondack Environmental Associates, Inc.
63 Bridge Street
Plattsburgh, NY 12901

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1.0 INTRODUCTION

In accordance with the work plan submitted by Adirondack Environmental Associates (hereafter referred to as AEA) the following Health and Safety Plan (HASP) for use at the Pole-Lite Industries, Inc. facility in the Town of Champlain, Clinton County, New York, has been adapted from the Supplemental Phase II Remedial Investigation conducted by AEA. Changes have been incorporated into the HASP to reflect its application to the proposed AEA work plan. The available historical information and potential health hazards associated with chemicals detected on-site form the basis for this document. Environmental monitoring will be performed as necessary during field activities to assess the appropriateness of the prescribed levels of protection and procedures. The resulting information will assist in refinement of the HASP to address specific conditions encountered and present corrective procedures.

This HASP is one source of information on site conditions to be used by subcontractors, who are responsible for performing their work in a safe and environmentally acceptable manner.

All AEA personnel involved with the Pole-Lite Industries, Inc., site will be required to familiarize themselves with and abide by this HASP. Compliance with this Plan is mandatory for all AEA site workers. Enforcement and adherence to the HASP will help prevent the loss of life, injury or health hazards to the field investigators and the public. The AEA Project Manager, the Health and Safety Manager and the Site Health and Safety Officer identified below will determine and enforce compliance. A copy of this HASP will be available from the Site Health and Safety Officer or his/her designee during site activities.

Project Manager: Mr. Herb Carpenter
(518) 563-5726 (office)

Health & Safety Manager: Mr. Herb Carpenter
(518) 563-5726 (office)

Site Health & Safety Officer: Mr. Steve Revell
(802) 453-4384

Mr. John Humphrey
(518) 563-5726 (office)

This HASP addresses the requirements outlined in the following documents:

- Standard Operating Safety Guides, USEPA Emergency Response Team; November 5, 1984;

- Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities; NIOSH, OSHA, USCG, USEPA; October, 1985; and

- OSHA Health and Safety regulations contained in 29 CFR 1910 and 1926.

Activities included in the Remedial Investigation/Feasibility Study will include, expanded soil gas survey, soil boring and sampling, monitor well installation, ground water elevation surveys, collection of water samples and construction and operation of groundwater recovery and treatment system.

2.0 CONTAMINANT CHARACTERISTICS AND TOXICOLOGY

The following compounds have been identified at the site. The investigation will determine the extent of impacts on ground water and soil. This section of the HASP has been prepared as a planning document for the site investigation.

2.1 Hazardous Substances on Site

Since 1973, the site has been used to manufacture tapered aluminum light poles. The manufacturing process basically consists of spinning a straight aluminum stock on a lathe-type machine to taper the stock. In the machining process, a heavy weight machine oil is spread on the stock as a lubricant. Once the stock has been tapered, a cleaning solvent (mineral spirits) is used to wash the oil from the finished pole.

In other portions of the manufacturing process, such as welding of bases and arms to poles, another type of cleaning solvent was used. The solvent used for this process was 1,1,1 trichloroethane. The trichloroethane was applied to the area to be welded with sponges, then spoiled into 5-gallon pails. The used trichloroethane was stored in 55-gallon drums along with the used lubricating oil and mineral spirits. From 1973 to 1984, the majority of the used solvents and oils were taken off the site by employees and local farmers the balance was stored on site. Occasional spillage of this stored material is suspected.

Acetone (2-Propanone)

Acetone is a colorless liquid, with a fragrant, mint-like odor at about 20 ppm. An industrial solvent, acetone has not been reported to cause injurious effects, other than skin irritation due to it defatting action, and headache from prolonged inhalation. At 500 ppm it can cause skin and eye irritation. Acetone's toxicity is very low via the dermal route.

Acetone presents a dangerous fire and explosion hazard when exposed to heat or flame. It also reacts vigorously with oxidizers.

Chloroform (Trichloromethane)

Chloroform is a halogenated aliphatic hydrocarbon, with a sweetish odor. It is a colorless, heavy liquid which is slightly soluble in water. Chloroform is non-flammable and in the past was widely used as a medical anesthesia. Chloroform is categorized as a B-2 probable carcinogen through both oral and inhalation routes of exposure.

In the vapor and liquid states, chloroform is an irritant to the eyes and skin. The lower detectable limit for smell is in the 200 - 300 ppm range. The symptoms from exposure to high concentrations are narcosis and anesthesia. Health risks from over exposure are liver, kidney and heart damage. Prolonged exposure leads to paralysis, cardiac failure and death.

Chloroethane (Ethyl Chloride)

Chloroethane is a halogenated hydrocarbon, is a colorless liquid having a pleasant, ether-like odor. It is only slightly soluble in water and floats. Chloroethane is a highly flammable substance and can boil on water. It is incompatible with chemically active metals such as sodium, potassium, calcium and powdered aluminum. Toxic and corrosive fumes are produced upon reaction with steam or water. Phosgene gas is formed as a combustion product.

Chloroethane is an irritant of the skin, eyes and mucus membranes. Routes of exposure may be skin or eye contact, inhalation and ingestion. Vapors cause slight irritations to the eyes and respiratory system. It may result in reddening of the skin if spilled on clothing. Exposure to chloroethane vapors cause drunkenness, anesthesia, abdominal cramps, cardiac arrhythmia, liver and kidney damage.

1,1-Dichloroethane (Ethylidene Chloride)

1,1-Dichloroethane is used as a cleansing agent, a degreaser, a solvent for plastics, rubber, oils and fats, as a grain fumigant, and as an intermediate chemical in organic syntheses. It is slightly soluble in water and sinks. It is combustible and reacts with strong oxidizers such as nitrates, permanganates, and strong caustics (e.g., sodium hydroxide or potassium hydroxide). When heated, 1,1-dichloroethane may form highly toxic phosgene or vinyl chloride fumes.

Short term exposure through inhalation may cause nasal irritation, salivation, sneezing, coughing, drowsiness, numbness in arms and legs, and unconsciousness. Contact may produce skin and eye irritation. Ingestion may cause nausea and vomiting. Long term exposure experiments have produced liver, kidney, and lung damage and birth defects in laboratory animals. It is unknown whether or not it does so in humans.

1,2-Dichloroethane (Ethylene Chloride)

1,2-Dichloroethane, commonly known as ethylene dichloride (EDC), is a chlorinated hydrocarbon used primarily as a component of leaded fuel and as an intermediate in the production of several chlorinated hydrocarbons. EDC is slightly soluble in water, and therefore leaching through the soil into the groundwater is an expected route of dispersal.

The USEPA classifies EDC as Group B2, probable carcinogen via both oral and inhalation routes of exposure. EDC has <been shown to be carcinogenic in mice and rates following oral exposure,

producing a variety of tumors. It is mutagenic when tested using bacterial test systems. Human exposure by inhalation has been shown to cause headaches, dizziness, nausea, vomiting, abdominal pain, irritation of mucous membranes, and liver and kidney dysfunction. Dermatitis may be produced by skin contact.

1,1-Dichloroethene (1,1-Dichloroethylene)

1,1-Dichloroethene (vinylidene chloride) is an intermediate in the production of vinylidene polymer plastics such as Saran and Velon. 1,1-Dichloroethane is insoluble in water and sparingly soluble in organic solvents. Volatilization appears to be the primary transport process and its subsequent photoxidation in the atmosphere by reaction with dydroxl radicals is apparently the predominant fate process.

The USEPA classifies 1,1-dichloroethene as a Group C, possible human carcinogen,a via both oral and inhalation routes of exposure. In one study, this compound was shown to cause kidney tumors in male mice and leukemia in female mice exposed by inhalation but the study was inconclusive. It is regulated in drinking water on the basis of toxicity. 1,1-dichloroethene was mutagenic in several bacterial assays. The compound does not appear to be teratogenic but did cause embryotoxicity and fetotoxicity when administered to rates and rabbits by inhalation. Chronic exposure to low oral doses caused liver changes in rates. Acute exposure to high doses causes central nervous system depression, but neurotoxicity has not been associated with low-level chronic exposure.

Methyl Ethyl Ketone (MEK,2 - Butanone)

Methyl ethyl ketone is used as a solvent in the surface coating industry, in the manufacture of smokeless powder, and in colorless synthetic resins. Based on its relatively high water solubility and low octanol/water partition coefficient, MEK is expected to have a high soil mobility. Two other processes that may account for the significant loss from soil are volatilization and biodegradation.

MEK has not been tested for carcinogenicity and has produced only equivocal evidence of mutagenicity in a few bacterial assays.

Toluene (Methyl Benzene)

Toluene is an organic liquid derived from coal tar. It is used in the manufacture of many organic compounds and as a solvent for paints, lacquers, and resins. It is also used in the extraction of various principle components from plants and as a gasoline additive. Volatilization is the major route of removal of oluene from aquatic environments. Precipitation or dry deposition can deposit toluene and its oxidation product into aquatic and terrestrial systems. In subsurface soil, toluene may undergo variable degrees of biodegradation depending on the nature of the soil, but a certain portion of the undegraded toluene may percolate through soil into groundwater.

There is no conclusive evidence that toluene is carcinogenic or mutagenic in animals or humans. Oral exposure of toluene at low doses produced a significant increase in embryonic lethality in mice; however, other research indicated that it is not teratognic. Acture exposure to toluene may cause narcotic effects (impairment of coordination and reaction time), loss of appetite, headache, nausea and eye irritation. Generally, acute poisoning due to exposure to high concentrations are rare, and individuals recover easily when removed from the exposure.

1,1,1-Trichloroethane (Methyl Chloroform)

1,1,1-Trichloroethane is a volatile chlorinated hydrocarbon. It has been used as an industrial solvent and in consumer products as spot removers. 1,1,1-Trichloroethane can be transported in the groundwater, but the speed of transport depends on the composition of the soil

Studies have indicated that 1,1,1-Trichloroethane increased the incidence of combined hepcetocellular carcinomas and adenomas in female mice when administered by gavage. There is evidence that 1,1,1-Trichloroethane is mutagenic in Salmonella and causes transformation in cultured rate embryo cells. These data suggest that the chemical may be carcinogenic, however the USEPA classified this compound as a non-carcinogen via oral and inhalation routes.

Other toxic effects of 1,1,1-Trichloroethane are seen only at concentrations well above those likely to be in an open environment. The most notable toxic effect in humans and animals are central nervous system depression; including anesthesia at very high concentrations and impairment of coordination, equilibrium, and judgment at lower concentrations; cardiovascular effects; and adverse effects on the lungs, liver and kidneys. Irritation of the skin and mucous membranes have also been reported.

Xylene (Dimethyl Benzene - 3 Configurations: othro, meta and para)

Xylene is an aromatic colorless liquid. It is used as a solvent and in the manufacturing of polyester fibers. It is also used as a cleaning agent in microscopic techniques. Xylenes have three isomers (ortho, meta and para) that exhibit similar chemical properties.

Volatilization and subsequent photooxidation in the atmosphere are probably important and fate processes for xylene in the upper layers of soil and aquatic environments. Xylene binds to sediments in water and to organics in soil and undergoes microbial degradation. Biodegradation is probably the important fate process in both soils and the aquatic environment. Xylenes are unlikely to leach into ground water in high concentrations because of their low water solubility and rapid biodegradation. Xylene is not mutagenic or teratogenic, but has caused fetotoxicity in rates and mice. Acute exposure to high levels of xylene can effect the central nervous system and irritate the mucous membranes.

A summary of chemical characteristics and occupational hazards of the above-mentioned contaminants is provided on Table 1.

2.2 Summary of Projected Risks

Due to the presence of contaminants in the soil and groundwater at the Pole-Lite site, the potential exists that during field activities, workers could be exposed to hazardous substances. Hazards and health risks related to project work are associated with the presence of the contaminants described in the previous section. They may be found in ground water as well as soil on the site. In addition, the use of heavy equipment on-site for excavation and monitoring well installations also presents the potential for physical injury to workers. Further, heat stress for workers wearing protective equipment and clothing may be a possibility.

Although no work at a site containing chemical contamination can be considered completely risk-free, logical and reasonable precautions can be implemented to provide an adequate level of protection for workers. Any contaminants which may be encountered on site could be toxic if ingested or absorbed in sufficient quantity. The integration of medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, work zones and site control, appropriate decontamination procedures, and contingency planning into the project approach minimizes the chances for unnecessary exposures and physical injuries, thereby protecting the health and welfare of on site workers.

3.0 RESPONSIBILITIES OF SAFETY PERSONNEL

The following roles have been identified for the project personnel:

Project Manager - The Project Manager has full responsibility for implementing and executing an effective program of employee protection and accident prevention. The Project Manager may delegate authority to expedite and facilitate any application of the program.

Health and Safety Manager - The Health and Safety Manager serves as the administrator of the corporation's health and safety program. This person is responsible for ensuring that AEA-field personnel are properly trained. Training includes the selection, use and maintenance of personal protective equipment.

The Health and Safety Manager will also serve as scientific advisor for the duration of the project, providing guidance on data interpretation and the determination of appropriate levels of worker protection.

Site Health and Safety Officer - The Site Health and Safety Officer is knowledgeable in safety and worker protection techniques as they relate to the project. Responsibilities include ensuring the day to day compliance of work to this HASP, balanced by the Officer's ability to make needed changes or additions to the plan. This individual or a designee will provide technical assistance to project management on problems relating to industrial hygiene and work site safety.

Regular health and safety briefings will be conducted by the Site Health and Safety Officer. Personal protective equipment, inclement` weather, heat stress or the interpretation of newly available environmental monitoring data are examples of topics which might be covered during these briefings. The frequency of safety briefings will be based upon the potential hazards specific to the designated work tasks.

The Site Health and Safety Officer will also be responsible for monitoring the personal exposures of workers to chemical intoxicants contained in air, soil or water. This will consist of performing workplace air sampling such as organic vapor monitoring, as well as the interpretation and documentation of all generated data. As data are received and evaluated, the Site Health and Safety Officer will adapt this HASP to fit the current worker protection needs at the site. Employees will be informed of the air sampling results.

The Site Health and Safety Officer is responsible for the development and set up of emergency procedures and personal decontaminated procedures. He shall complete a daily diary of activities with health and safety relevance.

At any time unsafe work conditions are determined, the Site Health and Safety Officer is authorized to stop work. Resolution of all on site health and safety problems will be coordinated through the Project Manager with assistance from the Health and Safety Manager.

4.0 MEDICAL SURVEILLANCE

Medical surveillance is as integral a part of a health and safety program as safety equipment, protective clothing, respiratory protection and training programs. The establishment and use of a medical surveillance program in conjunction with personal monitoring is essential to assess and monitor workers' health and fitness both prior to field activities and during the course of work.

Medical monitoring is provided to AEA employees whose work may result in potential chemical exposure or present unusual physical demands. Medical evaluations are performed by an occupational physician designated by AEA and include an evaluation of the workers' ability to use respiratory protective equipment (as per 29 CFR 1910).

The purposes of the medical evaluation are to: (1) determine fitness for duty on hazardous waste sites and (2) establish baseline medical data for future reference.

Supplemental examinations may be performed whenever there is an actual or suspected excessive exposure to chemical contaminants, upon experience of exposure symptoms, or following injuries or temperature stresses.

5.0 EMPLOYEE TRAINING PROGRAM

AEA field personnel are provided with orientation and refresher training consistent with the requirements of 29 CFR 1910.

Prior to any site activities, field personnel, including subcontractor personnel, will participate in a site-specific health and safety orientation program. At a minimum, the training will cover:

- Site evaluations;

- Special chemical and physical hazards and potential health effects;

- Work zone designations;

- Personnel protective equipment use, maintenance, fit and limitations;

- Decontamination procedures;

- Contingency planning;

- Emergency and routine communications;

- First aid (recognition of conditions requiring emergency or medical care and simple steps to take until help arrives).

The orientation training will serve to:

- Ensure that regard for the health and safety of fellow employees, the public and the environment is maximized;

- Increase the ability of employees to react responsibly and to handle emergency situations in a safe manner under normal conditions and when physiological and psychological stresses occur; and

- Educate employees on the potential hazards at the sites, adverse effects of chemical and physical hazards and the importance of safety and industrial hygiene practices.

6.0 SAFE WORK PRACTICES

The understanding of basic, precautionary concepts regarding personal health and safety is essential for workers assigned to sites where chemical contamination is known or suspected to be present, and deserves emphasis here:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice which increases the probability of hand-to-mouth transfer of contaminated material is strictly prohibited inside the exclusion and contamination reduction zones;

- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above. Each individual must shower as soon as possible after the removal of protective clothing and equipment following the completion of the daily field activities;

- Any required respiratory protective equipment and clothing <u>must</u> be worn by personnel as outlined in this Plan. Excessive facial hair (i.e., beards, long mustaches or sideburns), which interferes with the satisfactory respirator-to-face seal is prohibited;

- When it is necessary for a visitor to observe the field work, that person will be allowed on the site only if they are equipped with appropriate personal protective equipment and are familiar with potential hazards, safety practices, decontamination procedures and site communications.

- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for contaminant transfer to personnel, cross-contamination and need for decontamination;

- Medicine and alcohol can exacerbate the effects of exposure to toxic chemicals. Due to possible contraindications, use of prescribed drugs should be reviewed with the AEA occupational physician. Alcoholic beverage and illegal drug intake are strictly forbidden during site work activities;

- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan;

- One-site personnel shall use the "buddy" system. No one may work alone, i.e., out of earshot or visual contact with other workers;

- Ignition of flammable liquids within or through improvised heating devices (e.g. barrels) is forbidden;

- Personnel and equipment in the contaminated area shall be minimized, consistent with effective site operations;

- All employees have the obligation to correct or report unsafe work conditions; and

- Use of contact lenses on-site should be avoided. Contact lenses are prohibited when wearing full-face respiratory protection; spectacle kits for insertion into full-face respirators will be used as required.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Protection Levels

Personnel will wear protective equipment when work activities involve known or suspected atmospheric contamination; when vapors, gases, or particulates may be generated; or when direct contact with dermally active substances may occur. Contractors and subcontractors are responsible for providing their personnel with personal protection equipment appropriate for the on-site activities being performed. Respirators can protect the lungs, the gastrointestinal tract and the eyes against air toxicants. Chemical resistant clothing can protect the skin from contact with skin-destructive and skin-absorbable chemicals. Good personal hygiene and appropriate work practices can limit or prevent the ingestion of materials.

Equipment designed to protect the body against contact with known or anticipated chemical hazards is generally divided into four categories according to the degree of protection afforded:

- Level A: Should be selected when the highest level of respiratory, skin and eye protection is needed;

- Level B: Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required; Level B protection is the minimum level recommended on initial site entries until the hazards have been further defined by on-site studies;

- Level C: Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met; and

- Level D: Should not be worn on any site with respiratory or skin hazards. This is primarily a work uniform providing minimal protection.

In situations where the types of chemicals, concentrations, and possibilities of contact are no known, the appropriate level of protection must be selected based on professional experience and judgment until the hazards may be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components which may be used at this site, based on the widely used USEPA levels of protection, are detailed below.

7.1.1 Level B Protection Ensemble

Recommended

- Pressure-demand, full-facepiece self-contained breathing apparatus (MSHA/NIOSH approved) or pressure-demand supplied-air respirator with escape SCBA:

- Chemical-resistant clothing (overalls and long-sleeved jacket; hooded one- or two-piece chemical splash suit; disposable chemical-resistant one piece suit);

- Inner and outer chemical resistant gloves;

- Chemical-resistant safety boots/shoes; and

- Hard hat.

Optional

- Coveralls;

- Disposable boot covers;

- Face shield; and

- Long cotton underwear.

Level B protection is required when the types and atmospheric concentrations of toxic substances have been identified and require the highest level of respiratory protection, but a lower level of skin and eye protection. Meeting any one of the following criteria warrants the use of Level B protection. These would be atmospheres:

- with concentrations Immediately Dangerous to Life and Health (IDLH);

- exceeding limits of protection afforded by a full-face air-purifying respiration mask;

- containing substances for which air-purifying canisters/cartridges do not exist or have low removal efficiency;

- containing substances requiring air-supplied equipment, but substances and/or concentrations, that do no represent a serious skin hazard;

- containing less than 19.5% oxygen by volume; or

- with evidence of incompletely identified vapors or gases as indicated by direct reading organic vapor detection instruments, but with vapors and gases which are not suspected of containing high levels of chemicals harmful to skin or capable of being absorbed through the intact skin.

Level B equipment provides a high level of protection to the respiratory tract, but a somewhat lower level of protection to skin than that provided by Level A protective clothing, which includes a fully encapsulated suit. The chemical-resistant clothing recommended for Level B protection is available in a wide variety of styles, materials, construction detail and permeability. These factors all affect the degree of protection afforded. Level B skin protection is selected by:

- Comparing the concentrations of identified substances in the air with skin toxicity data; and

- Assessing the effect of the substance (at its measured air concentrations or splash potential) on the small area of the head and neck unprotected by chemical-resistant clothing.

The level of protection selected is based primarily on:

- Types and measured concentrations of the chemical substances in the ambient atmosphere and their associated toxicities; and

- Potential or measured exposure to substances in air, splashes of liquids or other indirect contact with material due to the task being performed.

7.1.2 Level C Protection Ensemble

Recommended

- Full-facepiece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the Health and Safety Manager;

- Chemical-resistant clothing (overalls and long-sleeved jacket, hooded, one- or two-piece chemical splash suit or disposable chemical-resistant one-piece suit);

- Inner and outer chemical-resistant gloves;

- Chemical-resistant safety boots/shoes; and

- Hard hat.

Optional

- Coveralls;

- Disposal boot covers;

- Face shield;

- Escape mask; and

- Safety boots/shoes;

- Safety glasses or chemical splash goggles; and

- Hard hat.

Optional

- Inner and outer chemical-resistant gloves;
- Escape mask; and
- Face shield;
  Escape Mask; and
- Long cotton underwear.

Level C protection is distinguished from Level B by equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing air-purifying devices.

The device must be an air purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection shall be used only with proper fitting, training and approval of a qualified individual. In addition, an air-purifying respirator can be used only if:

- Oxygen content of the atmosphere is at least 19.5% by volume;
- Substances are identified and concentrations measured;
- Substances have adequate warning properties;
- Individual passes a qualitative fit-test for the mask; and
- Appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Since many of these conditions are often not satisfied when investigating sites containing hazardous wastes, use of air-purifying respirators are typically limited to situations where total organic vapor concentration in the breathing zone of the worker are determined to be less than 5 ppm or where the hazard is respirable dust.

An air monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a higher level of respiratory protection.

7.1.3 Level D Protection Ensemble

Recommended

- Coveralls;

The use of Level D protection is sufficient when the following criteria are met:

- No hazardous air pollutants have been measured; and

- Work function preclude splashes, immersion or the potential for unexpected inhalation of any chemicals.

Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, or where there are no inhalable toxic substances.

7.2 Recommended Levels of Protection

Based upon current information regarding the contaminants present at the Pole-Lite Industries, Inc. site and various tasks included in the site investigation, the recommended levels of protection for AEA personnel are outlined in Table 2.

Until otherwise indicated by the on-site air monitoring devices, Level D respiratory protection will be employed during on-site excavation, drilling and sampling activities. The level of respiratory protection will be based on the monitoring results and the action levels cited in this HASP. The levels for any of the activities may be modified based on the results of the activities as they progress. If monitoring results should indicate that Level B protection is necessary, work will be stopped and discussions held on further action.

At a minimum, respirator cartridges (when required) will be replaced daily, when damaged on duty, when breakthrough is indicated or when it is difficult to breathe.

AEA personnel will be responsible for oversight, soil sampling and soil monitoring by head space analysis. During the monitoring well program, AEA personnel will be responsible for oversight, well logging, water level measurements and groundwater sampling.

8.0 ENVIRONMENTAL MONITORING

8.1 General Approach

Whenever feasible, the level of protection established for workers will be based upon qualitative and quantitative determinations of the chemical agents present in the work environment. Respiratory protection may be modified (upgraded or downgraded) based upon the field monitoring data according to the level of persistent readings as described in Section 8.2.

Contaminated materials are most likely to be encountered in known waste spillage areas. The monitoring program will indicate the potential for the volatilization of contaminants when the soil is physically disturbed by drilling, sampling or excavation equipment. The necessary level of respiratory protection will be based upon these sampling results.

A photoionization detector for measuring volatile organic compounds will be utilized as appropriate during the field activities. This photoionizer will be equipped with an 11.7 eV lamp capable of photoionizing the site specific contaminants. Monitoring instruments will be protected from surface contamination (with plastic bags) during use to allow for easy decontamination. Additional monitoring instruments may be added if the situations or conditions change. Readings with the photoionization detector, will be recorded and documented. All instruments will be maintained and calibrated before use and during the field activities as per the manufacturer specifications.

Prior to surface penetration during soil removal activities, background measurements for all detectors will be established and recorded with all support equipment engines turned off to eliminate the interfering effect of exhaust. All field measurements will be obtained and documented on the appropriate forms by the Site Health and Safety Officer. All values generated will be immediately interpreted as a means of checking and ensuring the effectiveness of the existing level of protection.

Upon surface penetration, initial characterization of the disturbed soil will be obtained using the photoionization detector. Observed values will then be recorded and maintained as part of the permanent field record. Breathing zone values will also be periodically determined with the photoionization detector, the frequency of which will be dependent primarily upon values generated by the disturbed soil and the proximity of the workers' breathing zones to the source of contamination. Appropriate action will immediately be taken if contaminant values encountered are in excess of established action levels appropriate for the prescribed level of protection. These action levels are described in Section 8.2.

Sampling and monitoring of the soils will be performed outside the excavation whenever possible. Entry into the excavation for sampling purposes will proceed with extreme caution. Since many of the compounds are denser than air, monitoring in the breathing zone and at the bottom of the excavation will be performed.

8.2 Monitoring Action Levels

Action levels associated with persistent readings obtained with the photoionization detector (for organic vapors), in the breathing zone of the workers are as follows:

- Level B: Total atmospheric concentrations of unidentified vapors or gases ranging from 5 to 50 ppm (vapors not suspected of containing high levels of chemicals toxic to the skin).

- Level C: Total atmospheric concentrations persisting in the breathing zone of unidentified organic vapors ranging from 0 to 5 ppm above background.

- Level D: Total organic vapor readings do not persistently exceed background levels.

9.0 HEAT STRESS MONITORING

Measures should be taken to minimize heat stress to workers. The Site Health and Safety Officer will be cognizant of the signs and symptoms of heat stress and will be responsible for monitoring worker exposure and working conditions. The signs and symptoms of heat stress are as follows:

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include:

    - muscle spasms; and

    - pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include:

    - pale, cool, moist skin;

    - heavy sweating;

    - dizziness;

    - nausea; and

    - fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are:

    - red, hot, usually dry skin;

    - lack of or reduced perspiration;

    - nausea;

    - dizziness and confusion;

    - strong, rapid pulse; and

    - coma.

10.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for excavation, drilling or sampling will be established and communicated to all employees by the Site Health and Safety Officer. The zones include:

- Exclusion Zone ("Hot Zone"): The area where contamination may be present. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment. The hot-line would be initially defined as an area 25 feet in radius originating at the proposed excavation or sampling point;

- Support Zone: Outermost part of the site which is considered non-contaminated or "clean". This area should be located upwind from the Hot Zones with regard to prevailing winds. Support equipment is located in this zone, and personnel may wear normal work clothes within this zone. Any potentially contaminated clothing, equipment and samples must remain in the Contamination Reduction Zone until decontaminated.

- Contamination Reduction Zone: The transition zone between the Exclusive and Support Zones. The zone where decontamination of personnel and equipment takes place.

Once designated, the Exclusive Zone will be conspicuously identified through the use of ropes or colored tape. The decontamination of personnel and equipment will be performed as described before the Support Zone is entered. Access of non-essential personnel to the Exclusion and Contamination Reduction Zones will be strictly controlled. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level of protection. Entrance of non-AEA personnel or subcontractor personnel must be approved by the Site Health and Safety Officer.

A log containing the names of personnel, site entry and exit times and their level of protection will be maintained by the Site Health and Safety Officer.

11.0 DECONTAMINATION PROCEDURES

11.1 Personal Decontamination

The degree of decontamination required is a function of both the particular task and the physical environment within which it takes place. The following decontamination procedure, although somewhat specific to the tasks following decontamination procedure, although somewhat specific to the tasks described herein, will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental and sampling conditions which may arise at sampling sites.

Upon leaving the exclusion zone for lunch or at the end of the day, personnel will be required to remove all contaminated protective clothing/equipment. Upon completion of field activities, the work crew will proceed towards the Contamination Reduction Zone. Field equipment (i.e., shovels, tools, etc.) will remain in the Exclusion Zone. Boot covers and outer gloves will be washed with a soap and water solution, rinsed with fresh water, and removed within the Contamination Reduction Zone. A bristle brush will be used to remove contamination; a pump sprayer can be utilized for rinsing.

Respirator cartridges and other personal protective equipment can be replaced or removed in the zone following the necessary decontamination.

Following the removal of all personal protective equipment, workers will enter the Support Zone. Personal protective equipment (i.e., suits, inner gloves, respirator cartridges, etc.) will be drummed for disposal. Wash and rinse waters will also be drummed for disposal.

11.2 Decontamination for Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern, immediate first-aid may be administered in lieu of further decontamination efforts.

11.3 Decontamination of Field Equipment

Decontamination efforts will be conducted in the Contamination Reduction Zone. Soap and water and mechanical cleaning with a brush will be used to remove all obvious contamination from the tools. The tools will than be rinsed with water.

It is expected that all tools will be constructed of non-porous, non-absorbent materials (i.e., metal) which will aid in the decontamination effort. Any tool or part of a tool which is made of porous, absorbent material (i.e., wood) will be drummed for disposal.

All decontamination wash and rinse waters will be contained and drummed for disposal.

The decontamination of heavy equipment will be undertaken when site activities in a particular work zone have been completed. A high temperature, high pressure spray device will be used to wash the potentially contaminated areas of the equipment. This will continue until there are no visible signs of contamination. All decontamination waters will be collected and drummed for disposal.

12.0 FIRE PREVENTION AND PROTECTION

12.1 Equipment and Requirements

- Fire extinguishers are to be provided by the subcontractor;

- Fire extinguishers are to be inspected, serviced, and maintained in accordance with the manufacturer's instructions. At a minimum, all extinguishers are to be checked monthly and weighed semi-annually, and recharged if necessary; and

- Immediately after each use, fire extinguishers are to be either recharged or replaced.

12.2 Flammable and Combustible Substances

- All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons.

13.0 EMERGENCY INFORMATION

The closest emergency medical treatment can be obtained at Champlain Valley Physicians Hospital located in Plattsburgh, New York. Directions to Champlain Valley Physicians Hospital are as follows:

> Left out of site onto Route 11. Go 1/4 mile and take a right to Route 87 South. Go 18 miles to Plattsburgh exit #38S. Follow blue hospital signs to hospital facility. See Map Figure #1.

13.1 Personnel Exposure

- Skin contact: If appropriate, based on chemical-specific information, use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Champlain Valley Physicians Hospital.

- Inhalation: Move to fresh air and, if necessary, transport to Champlain Valley Physicians Hospital.

- Ingestion: Decontaminate and transport to Champlain Valley Physicians Hospital.

13.2 Personal Injury

Emergency first aid will be applied on-site as deemed necessary. Several individuals trained in first aid should be on-site during all work activities. Decontaminate and transport the individual to Champlain Valley Physicians Hospital if needed. The Site Health and Safety Officer will supply available chemical-specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the Site Health and Safety Officer to ensure that the expended items are replaced.

13.3 Adverse Weather Conditions

In the event of adverse weather conditions, the Site Health and Safety Officer will determine if work can continue without sacrificing the health and safety of AEA and subcontractor personnel. Some of the items to be considered prior to determining if work should continue are:

- Operation of field instruments;

- Potential for heat stress;

- Inclement weather-related working conditions;
- Limited visibility; and
- Potential for electrical or dust storms.

13.4 Emergency Telephone Numbers

Project Manager:	Mr. Herb Carpenter (518) 563-5726
Health and Safety Manager:	Mr. Herb Carpenter (518) 563-5726
Site Health and Safety Officer:	Mr. Steve Revell (802) 453-4384 Mr. John Humphrey (518) 563-5726
AEA Corporate Medical Consultant:	Urgicare (518) 563-5900
Champlain Valley Physicians Hospital:	(518) 561-2000
Fire:	(518) 561-2345
Ambulance:	(518) 561-2345
State Police:	(518) 563-3761
Police:	(518) 298-5200

13.5 Records and Reporting

It shall be the responsibility of the Project Manager of establish and ensure adequate records of all:

- Occupational injuries and illnesses;
- Accident investigations;
- Reports to insurance carrier or state compensation agencies;
- Third party injury or damage claims.

A sample Incident Report is presented in Figure 2. Reports of this nature shall be prepared by the Site Health and Safety Officer and submitted to the Project Manager and Health and Safety Manager in the event of any injury or exposure to any on-site personnel.

14.0 ACKNOWLEDGEMENTS

1. Site Health and Safety Plan Reviewed By:

		Date
	Site Health & Safety Officer	
	Project Leader	
	Health & Safety Manager	
	Project Manager	

2. Employee Acknowledgement:

I acknowledge that I have reviewed the information on this Health and Safety Plan and understand the potential hazards which may confront me during field activities while involved at the Pole-Lite Industries, Inc. site.

Employee	Employer	Date

TABLE 2

RECOMMENDED LEVELS OF PROTECTION

	Respiratory	Clothing	Gloves	Boots	Other
Split Spoon Soil Sampling	D/C	C/T	N/L	L/S	Safety Glasses & Hard Hat
Soil-Gas Survey	D/C	C/T	N/L	L/S	Safety Glasses & Hard Hat
Ground Water Sampling	D/C	C/T	N/L	L/S	Safety Glasses
Decontamination	D	C/T	N/L	L/S	Safety Glasses
Monitoring Well Installation	D/C	C/T	N/L	L/S	Safety Glasses & Hard Hat
Soil Sampling in Excavation	C/D	C/T	N/L	L/S	Safety Glasses & Hard Hat
Water Level Measurement	D/C	C/T	N/L	L/S	

Level of protection based on air monitoring in the breathing zone. The level of protection may be upgraded if indicated by air monitoring.

C = Coveralls
L = Latex
N = Nitrile
S = Safety Boots
T = Tyvek

FIGURE 2

ADIRONDACK ENVIRONMENTAL ASSOCIATES, INC.

INCIDENT REPORT

Project:______________ Site Health & Safety Officer:______________

Site Location:____________________ Project Manager:_______________

Incident Summary:____

____

____

Date and Time of Incident:______________________________________

Exposed Individuals:____

____

____

Exposed to:____

____

Actions Taken:

First Aid Administered
Doctor Examination
Other:____

____

____

____

Submitted by:____

Date:____

APPENDIX B

****

QUALITY ASSURANCE
AND
QUALITY CONTROL PLAN

****

Pole-Lite Industries, Inc.
Champlain, New York

September, 1989

Adirondack Environmental Associates, Inc.
63 Bridge Street
Plattsburgh, NY 12901

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INTRODUCTION

Ground water samples and soil samples at Pole-Lite Industries, Inc., Champlain, New York, have previously been analyzed using United States Environmental Protection Agency (USEPA) methods and New York State Department of Environmental Conservation Contract Laboratory Protocol (CLP). A full round of ground water samples were collected at Pole-Lite during February, 1989. These samples were obtained from monitoring wells 1-3 and 5-8. USEPA Method 624 with CLP Quality Assurance/Quality Control were performed on the ground water collected. All future soil and water samples will be collected in accordance with the sampling protocol the New York State Department of Environmental Conservation appropriate for this site.

All initial ground water samples collected at this site indicate that the ground water at MW-5 contravened the concentration limit established in Title 6, Part 703, of the NYSDEC Compilation of Codes: Ground Water Classifications, Quality Standards, Effluent Stands and/or Limitations. In monitoring wells 1, 2 and 3, no organic contamination was detected. Additional monitoring wells have been installed and sampled (MW 6-8). Results indicate that MW 6 exceeded ground water standards. It is expected that there will be a need for future soil and water sampling at this site. A soil sampling/analytical plan has also been included in this plan to assure that all samples are taken in accordance with a QA/QC plan.

CONCENTRATION LIMITS

The concentration detected will be compared to the concentration limits established by Title 6, Part 703, of the NYSDEC Compilation of Codes; Ground Water Classification, Quality Standards, Effluent Standards and/or Limitations. Due to absence of public water supplies which utilize the upper water bearing zone, the NYS Department of Health maximum contaminate level (mcl) for organic chemicals are not applicable. The concentration limits established in the NYSDEC document will be compared to the concentrations detected in monitoring wells to identify excursions from the established limits.

REPRESENTATIVE SAMPLES

Before ground water is sampled from either the background monitoring point(s) or the downgradient monitoring point(s), the sampling equipment to be used will be decontaminated, and 3 to 5 well volumes will be removed from each well. Details of sampling collection and shipment are described in the following sections. Analytical results have not shown site specific the following sections. Analytical results have not shown site specific contaminants to be present in background monitoring points MW's-1, 2, and 3. Although MW-1 is a downgradient monitoring well it has not been affected by volatile organic contaminants. Monitoring wells 5 and 6 have consistently had the highest level of site specific contaminants present of all on-site wells monitored to date. Samples obtained from MW's-1, 2, and 3 are representative of site background ground water quality, while samples from MW's-5, 6 and 7, are indicative of ground water quality immediately downgradient of the former drum storage area.

In order to ensure that the samples obtained are representative of ground water quality, the analytical methods used will be according to approved USEPA and/or New York State methods. The proposed analytical method to be used will be according to "Statement of Work for Organic Analysis, Multimedia, Multiconcentrations", USEPA Contract Laboratory Program, IFB WA-875001, November, 1986. In order to ensure that samples are representative of their respective sources, a quality control program will be followed. The details of the program and procedures are presented in the appropriate sampling and/or analytical methods.

To ensure that representative samples of the soil are collected, a soil sampling plan will be followed. Details of the samples collecting are described in the following sections. The analytical methods used will be approved USEPA and/or New York State Methods. The proposed analytical method to be used will be according to the "Statement of Work for Organic Analysis, Multimedia, Multiconcentrations," USEPA Contract Laboratory Program, IFB WA-875001, November, 1986. The lowest possible detection limits will be specified for each soil analysis. Due to interferences from other compounds present, the detection limits may be adjusted in specific samples. The following are the general guidelines of the quality control program.

Quality control samples will be obtained and analyzed by the analytical laboratory to detect problems such as contamination, improper calibration of equipment, interferences, and poor analyte recovery. Quality Control samples will be obtained and analyzed for each set of field samples obtained to detect contamination of glassware and/or reagents. Duplicate samples will be regularly submitted to the analytical lab for separate analyses. Spiked samples (i.e., samples spiked with an analyte) will be analyzed, and recovery noted, to determine interference, contamination and/or loss of a particular analyte. The above described quality control procedures will ensure that representative sample results are obtained.

SAMPLE COLLECTION

Prior to sampling, standing water in the wells is purged using either a teflon bailer or stainless steel bailers, or stainless steel or teflon sampling pumps. At a minimum, three (3) well volumes will be removed (if possible) with this water being contained in an appropriate container. Low yielding wells will be evacuated to dryness. Sampling with teflon or stainless steel bailers ensures representative sample collection. The bailers will be lowered slowly to prevent degassing of the water. The sample will be removed from the well in the bailer and placed immediately into the appropriate container. The contents will be transferred in such a manner as to minimize agitation and aeration. No headspace will be allowed in the containers for volatile organics.

Soil sample collection will follow standard soil sampling techniques. Samples will be retrieved using a hand auger and collection tube or a soil boring rig and split spoon,m depending on the designated sampling depth. Collection devices will be decontaminated prior to each individual sample collection. The tubs and/or split spoon will be washed in soapy water and thoroughly rinsed with distilled water. The recovered sample will be immediately placed in the appropriate volatile organic container. Soil samples being collected to check for volatile constituents will not be composited or mixed in any way. The recovered sample will be promptly placed into the container and sealed with a piece of black tape to ensure that the seal is not broken.

The depth interval will remain discrete (not over one foot), so in the event of soil contamination the discrete zone will allow for a more accurate evaluation of the soil conditions.

SAMPLE PRESERVATION AND SHIPMENT

In general, glass containers will be used for samples to be analyzed for organic constituents.

All containers will be new and furnished by the contract laboratory performing the analyses. All sample containers will comply with USEPA requirements and are presented in Attachment 1, which is a copy of Table 4-1 of "RCRA Ground Water Monitoring Technical Guidance Document". Sample labels will be placed on all containers and will include the sample number, name of collection, date and time of sampling, well number, and parameter(s) required.

All sample preservation will comply with USEPA requirements and is listed in Attachment 1. Samples will be put into covered containers and placed in insulated coolers with sufficient ice to assure a temperature of 4 degrees centigrade (4 C). The coolers will be transported from Pole-Lite Industries site to the analytical laboratory by private Automobile. Container seals will be used when Adirondack Environmental Associates, Inc., or laboratory personnel are unavailable to pick up or transport the samples. Samples will be delivered to the laboratory immediately after collection.

ANALYTICAL PROCEDURE

Analysis for inorganic metals and organic compounds from the first round of samples followed "Method for Evaluating Sold Waste, Physical/Chemical Methods," 3rd Edition, USEPA< November, 1986, (SW-846). The second full round of samples was analyzed according to "Statement of Work for Organic Analysis, Multimedia, Multiconcentration", USEPA Contract Lab Program, IFB WA-875001, November, 1986. Organic detection will be determined using gas chromatographic/mass spetroscopic methods. Attachment 2 lists the parameters to be sampled and their corresponding analytical methods.

CHAIN-OF-CUSTODY

A chain-of-custody record will be completed for all samples collected. The chain-of-custody record shall disclose information such as: sample number, identification number, location, date and time of collection, and matrix and type of analysis to be performed. In addition, personnel involved in sampling, shipping and receiving the samples will be provided on the chain-of-custody form. The method of ship and date and time of shipment will be disclosed as well as the date and time the sample is received at the laboratory. See attachment 3 for a copy of the record.

SAMPLING PERSONNEL

Sampling will be conducted by a qualified representative of Adirondack Environmental Associates, Inc. Chain-of-custody document will be completed by each member of the sampling team. Field procedures and protocols used will be documented. This information will be included in the QA/QC documentation which will be provided to the NYSDEC and NYSDOH.

TABLE 4-1

SAMPLING AND PRESERVATION PROCEDURES FOR DETECTION MONITORING[a]

Parameter	Recommended Container[b]	Preservative	Maximum Holding Time	Minimum Volume Required for Analysis
		<u>Indicators of Ground-Water Contamination</u>[c]		
pH	T, P, G	Field determined	None	25 ml
Specific conductance	T, P, G	Field determined	None	100 ml
TOC	G, amber, T-lined cap[e]	Cool 4°C,[d] HCl to pH <2	28 days	4 x 15 ml
TOX	G, amber, T-lined septa or caps	Cool 4°C, add 1 ml of 1.1M sodium sulfite	7 days	4 x 15 ml
		<u>Ground-Water Quality Characteristics</u>		
Chloride	T, P, G	4°C	28 days	50 ml
Iron Manganese Sodium	T, P	Field acidified to pH <2 with HNO_3	6 months	200 ml
Phenols	G	4°C/H_2SO_4 to pH <2	28 days	500 ml
Sulfate	T, P, G	Cool, 4°C	28 days	50 ml
		<u>EPA Interim Drinking Water Characteristics</u>		
Arsenic Barium Cadmium Chromium Lead Mercury Selenium Silver	T, P Dark Bottle	<u>Total Metals</u> Field acidified to pH <2 with HNO_3 <u>Dissolved Metals</u> 1. Field filtration (0.45 micron) 2. Acidify to pH <2 with HNO_3	6 months 6 months	1,000 ml 1,000 ml
Fluoride	T, P	Cool, 4°C	28 days	300 ml
Nitrate/Nitrite	T, P, G	4°C/H_2SO_4 to pH <2	14 days	1,000 ml

(Continued)

TABLE 4-1 (Continued)

SAMPLING AND PRESERVATION PROCEDURES FOR DETECTION MONITORING

Parameter	Recommended Container[b]	Preservative	Maximum Holding Time	Minimum Volume Required for Analysis
Endrin Lindane Methoxychlor Toxaphene 2,4 D 2,4,5 TP Silvex	T, G	Cool, 4°C	7 days	2,000 ml
Radium Gross Alpha Gross Beta	P, G	Field acidified to pH <2 with HNO_3	6 months	1 gallon
Coliform bacteria	PP, G (sterilized)	Cool, 4°C	6 hours	200 ml
	Other Ground-Water Characteristics of Interest			
Cyanide	P, G	Cool, 4°C, NaOH to pH >12. 0.6 g ascorbic acid[f]	14 days[g]	500 ml
Oil and Grease	G only	Cool, 4°C H_2SO_4 to pH <2	28 days	100 ml
Semivolatile, nonvolatile organics	T, G	Cool, 4°C	14 days	60 ml
Volatiles	G, T-lined	Cool, 4°C	14 days	60 ml

[a] References: Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, SW-846 (2nd edition, 1982).
Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.
Standard Methods for the Examination of Water and Wastewater, 16th edition (1985).

[b] Container Types:

P = Plastic (polyethylene)
G = Glass
T = Fluorocarbon resins (PTFE, Teflon®, FEP, PFA, etc.)
PP = Polypropylene

(Continued)

TABLE 4-1 (Continued)

SAMPLING AND PRESERVATION PROCEDURES FOR DETECTION MONITORING

[c] Based on the requirements for detection monitoring (§265.93), the owner/operator must collect a sufficient volume of ground water to allow for the analysis of four separate replicates.

[d] Shipping containers (cooling chest with ice or ice pack) should be certified as to the 4°C temperature at time of sample placement into these containers. Preservation of samples requires that the temperature of collected samples be adjusted to the 4°C immediately after collection. Shipping coolers must be at 4°C and maintained at 4°C upon placement of sample and during shipment. Maximum-minimum thermometers are to be placed into the shipping chest to record temperature history. Chain-of-custody forms will have Shipping/Receiving and In-transit (max/min) temperature boxes for recording data and verification.

[e] Do not allow any head space in the container.

[f] Use ascorbic acid only in the presence of oxidizing agents.

[g] Maximum holding time is 24 hours when sulfide is present. Optionally, all samples may be tested with lead acetate paper before the pH adjustment in order to determine if sulfide is present. If sulfide is present, it can be removed by addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

ATTACHMENT 2.

LIST OF APPROVED INORGANIC/ORGANIC TEST PROCEDURES

USEPA 40 CFR 136.3, TABLE 1B, 1C, 1D

[9] Greeson, P.E., *et al.*, "Methods for Collection and Analysis of Aquatic Biological and Microbiological Samples," U.S. Geological Survey, Techniques of Water-Resources Investigations, Book 5, Chapter A4, Laboratory Analysis, 1977.

[10] 0.45 µm membrane filter or other pore size certified by the manufacturer to fully retain organisms to be cultivated, and free of extractables which could interfere with their growth and development.

[11] Since the membrane filter technique usually yields low and variable recovery from chlorinated wastewaters, the MPN method will be required to resolve any controversies.

[12] Approved only if dissolution of the KF Streptococcus Agar (Section 5.1, USGS Method B-0055-77) is made in a boiling water bath to avoid scorching of the medium.

TABLE 1B—LIST OF APPROVED INORGANIC TEST PROCEDURES

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
1. Acidity, as $CaCO_3$, mg/L: Electrometric end point or phenolphthalein end point.	305.1	402(4 a)	1067-82(E)		
2. Alkalinity, as $CaCO_3$, mg/L:					
Electrometric or colorimetric titration to pH 4.5, manual, or.	310.1	403	D1067-82(B)	I-1030-84	33.014[2].
Automated	310.2			I-2030-84	
3. Aluminum—Total [3] mg/L: Digestion [3] followed by:					
AA direct aspiration	202.1	303C		I-3051-84	
AA furnace	202.2	304			
Inductively coupled plasma, or					200.7 [4]
Colorimetric (Eriochrome cyanine R)		306B			
4. Ammonia (as N), mg/L: Manual distillation (at pH 9.5) [5] followed by:	350.2	417A			33.057.[2]
Nesslerization	350.2	417B	D1426-79(A)	I-3520-84	33.057.[2]
Titration	350.2	417D.			
Electrode	350.3	417 E or F	D1426-79(D)		
Automated phenate or	350.1	417G	D1426-79(C)	I-4523-84	
Automated electrode					Note 6.
5. Antimony—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	204.1	303A			
AA furnace, or	204.2	304			
Inductively coupled plasma					200.7.[4]
6. Arsenic—Total [3], mg/L: Digestion [3] followed by	206.5				
AA gaseous hydride	206.3	303E	D2972-84(B)	I-3062-84	
AA furnace	206.2	304			
Inductively coupled plasma, or					200.7.[4]
Colorimetric (SDDC)	206.4	307B	D2972-84(A)	I-3060-84	
7. Barium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	208.1	303C		I-3084-84	
AA furnace, or	208.2	304			
Inductively coupled plasma					200.7.[4]
8. Beryllium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	210.1	303C	D3654-84(A)	I-3095-84	
AA furnace,	210.2	304			
Inductively coupled plasma, or					200.7.[4]
Colorimetric (aluminon)		309B			
9. Biochemical oxygen demand (BOD_5), mg/L:					
Dissolved Oxygen Depletion	405.1	507		I-1578-78 [8]	33.019 [2], p. 17.[8]
10. Boron—Total, mg/L:					
Colorimetric (curcumin)	212.3	404A		I-3112-84	
or Inductively Coupled plasma					200.7.[4]
11. Bromide, mg/L: Titrimetric	320.1		D1246-82(C)	I-1125-84	p. S44.[9]
12. Cadmium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	213.1	303 A or B	D3557-84 (A or B).	I-3135-84 or I-3136-84.	33.089 [2], p. 37.[8]
AA furnace	213.2	304			
Inductively coupled plasma					200.7.[4]
Voltametry [10], or			D3557-84(C)		
Colorimetric (Dithizone)		310B			
13. Calcium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	215.1	303A	D511-84(B)	I-3152-84	

TABLE 1B—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
Inductively coupled plasma, or					200.7.[4]
Titrimetric (EDTA)	215.2	311C	D511-84(A)		
14. Carbonaceous biochemical oxygen demand ($CBOD_5$), mg/L [11]: Dissolved Oxygen Depletion with nitrification inhibitor.		507(5 e 6)			
15. Chemical oxygen demand (COD), mg/L:					
Titrimetric, or	410.1, 410.2, or 410.3	508A	D1252-83	I-3560-84 or I-3562-84.	33.034 [2], p.
Spectrophotometric, manual or automated.	410.4			I-3561-84	Notes 12 or
16. Chloride, mg/L:					
Titrimetric (silver nitrate)		407A	D512-81(B)	I-1183-84	
or (Mercuric nitrate), or	325.3	407B	D512-81(A)	I-1184-84	33.067.[8]
Colorimetric, manual or			D512-81(C)	I-1187-84	
Automated (Ferricyanide)	325.1, or 325.2	407D		I-2187-84	
17. Chlorine—Total residual, mg/L:					
Titrimetric:					
Amperometric direct	330.1	408C	D1253-76(A)		
Starch end point direct	330.3	408A	D1253-76(B) Part 18.3		
Back titration either end point [11], or.	330.2	408B			
DPD-FAS	330.4	408D			
Spectrophotometric, DPD	330.5	408E			
Or Electrode					Note 15.
18. Chromium VI dissolved, mg/L: 0.45 micron filtration followed by:					
AA chelation-extraction, or	218.4	303B		I-1232-84	
Colorimetric (Diphenylcarbazide)				I-1230-84	307B.[10]
19. Chromium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	218.1	303A	D1687-84(D)	I-3236-84	33.089.[2]
AA chelation extraction	218.3	303B			
AA furnace	218.2	304			
Inductively coupled plasma or					200.7.[4]
Colorimetric (Diphenylcarbazide)		312B	D1687-84(A)		
20. Cobalt—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	219.1	303 A or B	D3558-84 (A or B).	I-3239-84 or I-3240-84	P. 37.[8]
AA furnace, or	219.2	304			
Inductively coupled plasma					200.7.[4]
21. Color platinum cobalt units or dominant wavelength, hue, luminance purity:					
Colorimetric (ADMI), or	110.1	204D			Note 17.
(Platinum cobalt), or	110.2	204A		I-1250-84	
Spectrophotometric	110.3	204B			
22. Copper—Total [3] mg/L: Digestion [3] followed by:					
AA direct aspiration	220.1	303 A or B	D1688-84 (D or E).	I-3270-84 or I-3271-84.	33.089[2],
AA furnace,	220.2	304			
Inductively coupled plasma.					200.7.[4]
Colorimetric (Neocuproine), or		313B	D1688-84(A)		Note 18.
(Bicinchoninate)					
23. Cyanide—Total, mg/L: Manual distillation with $MgCl_2$ followed by		412B			
Titrimetric, or		412C			p. 22.[8]
Spectrophotometric, manual or	335.2	412D	D2036-82(A)	I-3300-84	
Automated [18]	335.3		D2036-82(A)		

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed	ASTM	USGS [1]	Other
24. Cyanide amendable to chlorination, mg/L. Manual distillation with MgCl₂ followed by titrimetric or spectrophotometric	335 1	412F	D2036 82(B)		
25. Fluoride—Total, mg/L. Manual distillation[6] followed by		413A			
Electrode, manual or	340 2	413B	D1179 80(B)		
Automated.				I 4327 84	
Colorimetric (SPADNS).	340 1	413C	D1179 80(A)		
Or Automated complexone	340 3	413E			
26. Gold—Total[3], mg/L. Digestion[3] followed by					
AA direct aspiration, or	231 1	303A			
AA furnace.	231 2	304			
27. Hardness—Total, as CaCO$_3$, mg/L. Automated colorimetric,	130 1				
Titrimetric (EDTA), or Ca plus Mg as their carbonates, by inductively coupled plasma or AA direct aspiration (See Parameters 13 and 33.)	130 2	314B	D1126 80	I 1338 84	33 082 [2]
28. Hydrogen ion (pH), pH units. Electrometric, measurement, or	150 1	423	D1293 84 (A or B)	I 1586 85	33 086 [2]
Automated electrode					Note 20
29. Indium—Total[3], mg/L. Digestion[3] followed by					
AA direct aspiration, or	235 1	303A			
AA furnace	235 2	304			
30. Iron—Total[3], mg/L. Digestion[3] followed by					
AA direct aspiration,	236 1	303 A or B	D1068 84 (C or D)	I 3381 84	33 089 [2]
AA furnace,	236 2	304			
Inductively coupled plasma, or					200 7 [4]
Colorimetric (Phenanthroline)		315B	D1068 84(A)		Note 21
31. Kjeldahl nitrogen—Total, (as N), mg/L. Digestion and distillation followed by	351 3	420 A or B	D3590 84(A)		
Titration	351 3	417D	D3590 84(A)		33 051 [2]
Nesslerization	351 3	417B	D3590 84(A)		
Electrode	351 3	417 E or F			
Automated phenate	351 1			I 4551 78 [7]	
Semi automated block digestor, or	351 2		D3590 84(A)		
Potentiometric	351 4		D3590 84(A)		
32. Lead—Total[3], mg/L. Digestion[3] followed by					
AA direct aspiration	239 1	303 A or B	D3559 85 (A or B)	I 3399 84	33 089 [2]
AA furnace	239 2	304			
Inductively coupled plasma					200 7 [4]
Voltammetry[11], or			D3559 85(C)		
Colorimetric (Dithizone)		316B			
33. Magnesium—Total[3], mg/L. Digestion[3] followed by					
AA direct aspiration	242 1	303A	D511 84(B)	I 3447 84	33 089 [2]
Inductively coupled plasma, or					200 7 [4]
Gravimetric		318B	D511 77(A)		
34. Manganese—Total[3], mg/L. Digestion[3] followed by					
AA direct aspiration	243 1	303 A or B	D858 84 (B or C)	I 3454 84	33 089 [2]
AA furnace	243 2	304			
Inductively coupled plasma, or					200 7 [4]
Colorimetric (Persulfate), or		319B	D858 84(A)		33 126 [2]
(Periodate)					Note 22

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed	ASTM	USGS [1]	Other
35. Mercury—Total[3], mg/L:					
Cold vapor, manual or	245 1	303F	D3223 80	I 3462 84	33 095 [2]
Automated	245 2				
36. Molybdenum—Total[3], mg/L: Digestion[3] followed by:					
AA direct aspiration	246 1	303C		I 3490 84	
AA furnace, or	246 2	304			
Inductively coupled plasma					200 7 [4]
37. Nickel—Total[3], mg/L: Digestion[3] followed by:					
AA direct aspiration	249 1	303 A or B	D1886 84 (C or D)	I 3499 84	
AA furnace	249 2	304			
Inductively coupled plasma, or					200 7 [4]
Colorimetric (Heptoxime)		321B			
38. Nitrate (as N), mg/L: Colorimetric (Brucine sulfate), or Nitrate-nitrite N minus Nitrite N (See parameters 39 and 40)	352 1		D992-71		33 063 [2], 419D [10], p. 28 [9]
39. Nitrate-nitrite (as N), mg/L: Cadmium reduction, Manual or	353 3	418C	D3867-85(B)		
Automated, or	353 2	418F	D3867-85(A)	I 4545 84	
Automated hydrazine	353 1				
40. Nitrite (as N), mg/L: Spectrophotometric:					
Manual or	354 1	419	D1254-67		Note 24
Automated (Diazotization)				I 4540 84	
41. Oil and grease—Total recoverable, mg/L. Gravimetric (extraction)	413 1	503A			
42. Organic carbon—Total (TOC), mg/L: Combustion or oxidation	415 1	505	D2579 85 (A or B)		33 044 [2], p. 4 [23]
43. Organic nitrogen (as N) mg/L: Total Kjeldahl N (Parameter 31) minus ammonia N (Parameter 4.)					
44. Orthophosphate (as P), mg/L: Ascorbic acid method:					
Automated or	365 1	424G		I-4601 84	33 116 [2]
Manual single reagent	365 2	424F	D515 82(A)		33 111 [2]
or Manual two reagent	365 3				
45. Osmium—Total[3], mg/L. Digestion[3] followed by:					
AA direct aspiration, or	252 1	303C			
AA furnace	252 2	304			
46. Oxygen dissolved, mg/L: Winkler (Azide modification), or	360 2	421B	D888-81(C)	I-1575-78 [7]	33 028 [2]
Electrode	360 1	421F		I-1576 78 [7]	
47. Palladium—Total[3], mg/L: Digestion[3] followed by:					
AA direct aspiration, or	253 1				P. S27 [9]
AA furnace	253 2				P. S28 [9]
48. Phenols, mg/L:					
Manual distillation[25]	420 1		D1783 80 (A or B)		Note 26
Followed by:					Note 26
Colorimetric (4AAP) manual, or	420 1				
Automated[19]	420 2				Note 27.
49. Phosphorus (elemental) mg/L: Gas-liquid chromatography					33 111 [2]
50. Phosphorus—Total, mg/L: Persulfate digestion followed by	365 2	424C(III)			
Manual or	365 2 or 365 3	424F	D515-82(A)		
Automated ascorbic acid reduction, or	365 1	424G		I 4600 84	33 116 [2]
Semi automated block digestor	365 4				

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
51. Platinum—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	255.1	303A			
AA furnace	255.2	304			
52. Potassium—total [3], mg/L: Digestion followed by:					
AA direct aspiration	258.1	303A		I-3630-84	33.103.[2]
Inductively coupled plasma					200.7.[4]
Flame photometric, or		322B	D1428-82(A)		
Colorimetric (Cobaltinitrate)					317B.[10]
53. Residue—Total, mg/L: Gravimetric, 103-105°C.	160.3	209A		I-3750-84	
54. Residue—filterable, mg/L: Gravimetric, 180°C.	160.1	209B		I-1750-84	
55. Residue—nonfilterable, (TSS), mg/L: Gravimetric, 103-105°C post washing of residue.	160.2	209C		I-3765-84	
56. Residue—settleable, mg/L: Volumetric, (Imhoff cone) or gravimetric.	160.5	209E		I	
57. Residue—Volatile, mg/L: Gravimetric, 550°C.	160.4	209D		I-3753-84	
58. Rhodium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	265.1	303A			
AA furnace	265.2	304			
59. Ruthenium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	267.1	303A			
AA furnace	267.2	304			
60. Selenium—Total [3], mg/L: Digestion [3] followed by:					
AA furnace	270.2	304			
Inductively coupled plasma, or					200.7[4]
AA gaseous hydride	270.3	303E	D3859-84(A)	I-3667-84	
61. Silica—Dissolved, mg/L: 0.45 micron filtration followed by:					
Colorimetric, Manual or	370.1	425C	D859-80(B)	I-1700-84	
Automated (Molybdosilicate), or				I-2700-84	
Inductively coupled plasma					200.7.[4]
62. Silver—Total [3,8], mg/L: Digestion [3] followed by:					
AA direct aspiration	272.1	303 A or B		I-3720-84	33.089 [2], p. 37.[8]
AA furnace,	272.2	304			
Colorimetric (Dithizone), or					319B.[10]
Inductively coupled plasma					200.7.[4]
63. Sodium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	273.1	303A		I-3735-84	33.107.[2]
Inductively coupled plasma, or					200.7.[4]
Flame photometric		325B	D1428-82(A)		
64. Specific conductance, micromhos/cm at 25°C: Wheatstone bridge	120.1	205	D1125-82(A)	I-1780-84	33.002.[2]
65. Sulfate (as SO_4), mg/L:					
Automated colorimetric, (barium chloranilate).	375.1				
Gravimetric, or	375.3	426 A or B	D516-82(A)		33.124.[2]
Turbidimetric	375.4		D516-82(B)		426C.[29]
66. Sulfide (as S), mg/L:					
Titrimetric (iodine) or	376.1	427D		I-3840-84	228A.[30]
Colorimetric (methylene blue)	376.2	427C			
67. Sulfite (as SO_3), mg/L: Titrimetric (iodine iodate).	377.1	428A	D1339-84(C)		
68. Surfactants, mg/L: Colorimetric (methylene blue).	425.1	512B	D2330-82(A)		
69. Temperature, °C: Thermometric	170.1	212			Note 31.

TABLE IB—LIST OF APPROVED INORGANIC TEST PROCEDURES—Continued

Parameter, units, and method	Reference (method No. or page)				
	EPA 1979	Standard methods 16th Ed.	ASTM	USGS [1]	Other
70. Thallium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	279.1	303A			
AA furnace, or	279.2	304			
Inductively coupled plasma					200.7.[4]
71. Tin—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	282.1	303A		I-3850-78 [7]	
AA furnace,	282.2	304			
72. Titanium—Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration, or	283.1	303C			
AA furnace	283.2	304			
73. Turbidity, NTU: Nephelometric	180.1	214A	D1889-81	I-3860-84	
74. Vanadium, Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	286.1	303C			
AA furnace	286.2	304			
Inductively coupled plasma, or					200.7.[4]
Colorimetric (Gallic acid)		327B	D3373-84(A)		
75. Zinc-Total [3], mg/L: Digestion [3] followed by:					
AA direct aspiration	289.1	303A or B	D1691-84 (C or D).	I-3900-84	33.089 [2], p. 37.[8]
AA furnace	289.2	304			
Inductively coupled plasma, or					200.7.[4]
Colorimetric (Dithizone) or		328C			
(Zincon)					Note 32.

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[1] "Methods for Analysis of Inorganic Substances in Water and Fluvial Sediments," U.S. Department of the Interior, U.S Geological Survey, Open-File Report 85-495, 1986, unless otherwise stated.

[2] "Official Methods of Analysis of the Association of Official Analytical Chemists," methods manual, 14th ed. (1985

[3] For the determination of total metals the sample is not filtered before processing. A digestion procedure is required solubilize suspended material and to destroy possible organic-metal complexes. Two digestion procedures are given "Methods for Chemical Analysis of Water and Wastes, 1979." One (section 4.1.3), is a vigorous digestion using nitric acid less vigorous digestion using nitric and hydrochloric acids (Section 4.1.4) is preferred; however, the analyst should cautioned that this mild digestion may not suffice for all sample types. Particularly, if a colorimetric procedure is to employed, it is necessary to ensure that all organo-metallic bonds be broken so that the metal is in a reactive state. In tho situations, the vigorous digestion is to be preferred making certain that at no time does the sample go to dryness. Sampl containing large amounts of organic materials would also benefit by this vigorous digestion. Use of the graphite furna technique, inductively coupled plasma, as well as determinations for certain elements such as arsenic, the noble meta mercury, selenium, and titanium require a modified digestion and in all cases the method write-up should be consulted specific instruction and/or cautions.

NOTE: If the digestion included in one of the other approved references is different than the above, the EPA procedure mu be used.

Dissolved metals are defined as those constituents which will pass through a 0.45 micron membrane filter. Followi filtration of the sample, the referenced procedure for total metals must be followed. Sample digestion for dissolved metals m be omitted for AA (direct aspiration or graphite furnace) and ICP analyses provided the sample solution to be analyzed mee the following criteria:

a. has a low COD (<20)
b. is visibly transparent with a turbidity measurement of 1 NTU or less.
c. is colorless with no perceptable odor, and
d. is of one liquid phase and free of particulate or suspended matter following acidification.

[4] The full text of Method 200.7, "Inductively Coupled Plasma Atomic Emission Spectrometric Method for Trace Elem Analysis of Water and Wastes," is given at Appendix C of this Part 136.

[5] Manual distillation is not required if comparability data on representative effluent samples are on company file to show this preliminary distillation step is not necessary; however, manual distillation will be required to resolve any controversi

[6] Ammonia, Automated Electrode Method, Industrial Method Number 379-75 WE, dated February 19, 1976, Technic AutoAnalyzer II, Technicon Industrial Systems, Tarrytown, NY. 10591.

[7] The approved method is that cited in "Methods for Determination of Inorganic Substances in Water and Flu Sediments", USGS TWRI, Book 5, Chapter A1 (1979).

[8] American National Standard on Photographic Processing Effluents, Apr. 2, 1975. Available from ANSI, 1430 Broadw New York, NY 10018.

[9] "Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency," Supplement the Fifteenth Edition of *Standard Methods for the Examination of Water and Wastewater* (1981).

[10] The use of normal and differential pulse voltage ramps to increase sensitivity and resolution is acceptable.

[11] Carbonaceous biochemical oxygen demand ($CBOD_5$) must not be confused with the traditional BOD_5 test which measu "total BOD." The addition of the nitrification inhibitor is not a procedural option, but must be included to report the CB parameter. A discharger whose permit requires reporting the traditional BOD_5 may not use a nitrification inhibitor in procedure for reporting the results. Only when a discharger's permit specifically states $CBOD_5$ is required, can the permit report data using the nitrification inhibitor.

OIC Chemical Oxygen Demand Method, Oceanography International Corporation, 512 West Loop, P.O. Box 2980, College tion, TX 77840

Chemical Oxygen Demand, Method 8000, Hach Handbook of Water Analysis, 1979, Hach chemical Company, P.O. Box 9, Loveland, CO 80537.

The back titration method will be used to resolve controversy

Orion Research Instruction Manual, Residual Chlorine Electrode Model 97-70, 1977, Orion Research Incorporated, 840 morial Drive, Cambridge, MA 02138

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 14th Edition, 76.

National Council of the Paper Industry for Air and Stream Improvement, (Inc.) Technical Bulletin 253, December 1971

Copper, Biocinchoinate Method, Method 8506, Hach Handbook of Water Analysis, 1979, Hach Chemical Company, P.O. x 389, Loveland, CO 80537.

After the manual distillation is completed, the autoanalyzer manifolds in EPA Methods 335.3 (cyanide) or 420.2 (phenols) e simplified by connecting the re-sample line directly to the sampler. When using the manifold setup shown in Method 335.3, e buffer 6.2 should be replaced with the buffer 7.6 found in Method 335.2.

Hydrogen Ion (pH) Automated Electrode Method, Industrial Method Number 378-75WA, October 1976, Technicon Auto-alyzer II, Technicon Industrial Systems, Tarrytown, NY 10591.

Iron, 1,10-Phenanthroline Method, Method 8008, 1980, Hach Chemical Company, P.O. Box 389, Loveland, CO 80537

Manganese, Periodate Oxidation Method, Method 8034, Hach Handbook of Wastewater Analysis, 1979, pages 2-113 and 117, Hach Chemical Company, Loveland, CO 80537.

Goerlitz, D., Brown, E., "Methods for Analysis of Organic Substances in Water," U.S. Geological Survey Techniques of ater-Resources Inv., book 5, ch. A3, page 4 (1972).

Nitrogen, Nitrite, Method 8507, Hach Chemical Company, P.O. Box 389, Loveland, CO 80537

Just prior to distillation, adjust the sulfuric-acid preserved sample to pH 4 with 1 + 9 NaOH

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 14th Edition. The lorimetric reaction is conducted at a pH of 10.0±0.2. The approved methods are given on pp. 576-81 of the 14th Edition. ethod 510A for distillation, Method 510B for the manual colorimetric procedure, or Method 510C for the manual ectrophotometric procedure.

R. F. Addison and R. G. Ackman, "Direct Determination of Elemental Phosphorus by Gas-Liquid Chromatography," *urnal of Chromatography*, vol. 47, No. 3, pp. 421-426, 1970

Approved methods for the analysis of silver in industrial wastewaters at concentrations of 1 mg/L and above are adequate where silver exists as an inorganic halide. Silver halides such as the bromide and chloride are relatively insoluble in agents such as nitric acid but are readily soluble in an aqueous buffer of sodium thiosulfate and sodium hydroxide to a pH of Therefore, for levels of silver above 1 mg/L, 20 mL of sample should be diluted to 100 mL by adding 40 mL each of 2 M S_2O_3 and 2M NaOH. Standards should be prepared in the same manner. For levels of silver below 1 mg/L the approved ethod is satisfactory

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 15th Edition

The approved method is that cited in *Standard Methods for the Examination of Water and Wastewater*, 13th Edition

Stevens, H. H., Ficke, J. F., and Smoot, G. F., "Water Temperature—Influential Factors, Field Measurement and Data esentation," U.S. Geological Survey, Techniques of Water Resources Investigations, Book 1, Chapter D1, 1975.

Zinc, Zincon Method, Method 8009, Hach Handbook of Water Analysis, 1979, pages 2-231 and 2-333, Hach Chemical mpany, Loveland, CO 80537.

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS

Parameter [1]	EPA Method Number [2, 3]			Other
	GC	GC/MS	HPLC	
Acenaphthene	610	625, 1625	610	
Acenaphthylene	610	625, 1625	610	
Acrolein	603	[4]624, 1624		
Acrylonitrile	603	[4]624, 1624		
Anthracene	610	625, 1625	610	
Benzene	602	624, 1624		
Benzidine		[5]625, 1625	605	Note 3, p. 1;
Benzo(a)anthracene	610	625, 1625	610	
Benzo(a)pyrene	610	625, 1625	610	
Benzo(b)fluoranthene	610	625, 1625	610	
Benzo(g,h,i)perylene	610	625, 1625	610	
Benzo(k)fluoranthene	610	625, 1625	610	
Benzyl chloride				Note 3, p. 130, Note 6, p. S102
Benzyl butyl phthalate	606	625, 1625		
Bis(2-chloroethoxy) methane	611	625, 1625		
Bis(2-chloroethyl) ether	611	625, 1625		
Bis(2-ethylhexyl) phthalate	606	625, 1625		
Bromodichloromethane	601	624, 1624		
Bromoform	601	624, 1624		
Bromomethane	601	624, 1624		
4-Bromophenylphenyl ether	611	625, 1625		
Carbon tetrachloride	601	624, 1624		Note 3, p. 130;
4-Chloro-3-methylphenol	604	625, 1625		
Chlorobenzene	601, 602	624, 1624		Note 3, p. 130;
Chloroethane	601	624, 1624		
2-Chloroethylvinyl ether	601	624, 1624		

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS—Continued

Parameter [1]	EPA Method Number [2, 3]			Other
	GC	GC/MS	HPLC	
27 Chloroform	601	624, 1624		Note 3, p. 130;
28 Chloromethane	601	624, 1624		
29 2-Chloronaphthalene	612	625, 1625		
30 2-Chlorophenol	604	625, 1625		
31 4-Chlorophenylphenyl ether	611	625, 1625		
32 Chrysene	610	625, 1625	610	
33 Dibenzo(a,h)anthracene	610	625, 1625	610	
34 Dibromochloromethane	601	624, 1624		
35 1,2-Dichlorobenzene	601, 602, 612	624, 625, 1625		
36 1,3-Dichlorobenzene	601, 602, 612	624, 625, 1625		
37 1,4-Dichlorobenzene	601, 602, 612	625, 1624, 1625		
38 3,3'-Dichlorobenzidine		625, 1625	605	
39 Dichlorodifluoromethane	601			
40 1,1-Dichloroethane	601	624, 1624		
41 1,2-Dichloroethane	601	624, 1624		
42 1,1-Dichloroethene	601	624, 1624		
43 trans-1,2-Dichloroethene	601	624, 1624		
44 2,4-Dichlorophenol	604	625, 1625		
45 1,2-Dichloropropane	601	624, 1624		
46 cis-1,3-Dichloropropene	601	624, 1624		
47 trans-1,3-Dichloropropene	601	624, 1624		
48 Diethyl phthalate	606	625, 1625		
49 2,4-Dimethylphenol	604	625, 1625		
50 Dimethyl phthalate	606	625, 1625		
51 Di-n-butyl phthalate	606	625, 1625		
52 Di-n-octyl phthalate	606	625, 1625		
53 2,4-Dinitrophenol	604	625, 1625		
54 2,4-Dinitrotoluene	609	625, 1625		
55 2,6-Dinitrotoluene	609	625, 1625		
56 Epichlorohydrin				Note 3, p. 130; Note 6, p. S102.
57 Ethylbenzene	602	624, 1624		
58 Fluoranthene	610	625, 1625	610	
59 Fluorene	610	625, 1625	610	
60 Hexachlorobenzene	612	625, 1625		
61 Hexachlorobutadiene	612	625, 1625		
62 Hexachlorocyclopentadiene	612	[5]625, 1625		
63 Hexachloroethane	612	625, 1625		
64 Ideno(1,2,3-cd)pyrene	610	625, 1625	610	
65 Isophorone	609	625, 1625		
66 Methylene chloride	601	624, 1624		Note 3, p. 130;
67 2-Methyl-4,6-dinitrophenol	604	625, 1625		
68 Naphthalene	610	625, 1625	610	
69 Nitrobenezene	609	625, 1625		
70 2-Nitrophenol	604	625, 1625		
71 4-Nitrophenol	604	625, 1625		
72 N-Nitrosodimethylamine	607	625, 1625		
73 N-Nitrosodi-n-propylamine	607	[5]625, 1625		
74 N-Nitrosodiphenylamine	607	[5]625, 1625		
75 2,2'-Oxybis(1-chloropropane)	611	625, 1625		
76 PCB-1016	608	625		Note 3, p. 43;
77 PCB-1221	608	625		Note 3, p. 43;
78 PCB-1232	608	625		Note 3, p. 43;
79 PCB-1242	608	625		Note 3, p. 43;
80 PCB-1248	608	625		Note 3, p. 43;
81 PCB-1254	608	625		Note 3, p. 43;
82 PCB-1260	608	625		Note 3, p. 43;
83 Pentachlorophenol	604	625, 1625		Note 3, p. 140;
84 Phenanthrene	610	625, 1625	610	
85 Phenol	604	625, 1625		
86 Pyrene	610	625, 1625	610	
87 2,3,7,8-Tetrachlorodibenzo-p-dioxin		613		
88 1,1,2,2-Tetrachloroethane	601	624, 1624		Note 3, p. 130;
89 Tetrachloroethene	601	624, 1624		Note 3, p. 130;
90 Toluene	602	624, 1624		
91 1,2,4-Trichlorobenzene	612	625, 1625		Note 3, p. 130;

TABLE IC—LIST OF APPROVED TEST PROCEDURES FOR NON-PESTICIDE ORGANIC COMPOUNDS—Continued

Parameter[1]	EPA Method Number[2,7]			Other
	GC	GC/MS	HPLC	
92 1,1,1-Trichloroethane	601	624, 1624		
93 1,1,2-Trichloroethane	601	624, 1624		Note 3, p 130.
94 Trichloroethene	601	624, 1624		
95 Trichlorofluoromethane	601	624		
96 2,4,6-Trichlorophenol	604	625, 1625		
97 Vinyl chloride	601	624, 1624		

Table IC Notes

[1] All parameters are expressed in micrograms per liter (µg/l)

[2] The full text of Methods 601-613, 624, 625, 1624, and 1625, are given at Appendix A, "Test Procedures for Analysis of Organic Pollutants," of this Part 136. The standardized test procedure to be used to determine the method detection limit (MDL) for these test procedures is given at Appendix B, "Definition and Procedure for the Determination of the Method Detection Limit," of this Part 136

[3] "Methods for Benzidine; Chlorinated Organic Compounds, Pentachlorophenol and Pesticides in Water and Wastewater," U S. Environmental Protection Agency, September, 1978

[4] Method 624 may be extended to screen samples for Acrolein and Acrylonitrile. However, when they are known to be present, the preferred method for these two compounds is Method 603 or Method 1624

[5] Method 625 may be extended to include benzidine, hexachlorocyclopentadiene, N nitrosodimethyamine, and N nitrosodiphenylamine However, when they are known to be present, Methods 605, 607, and 612, or Method 1625, are preferred methods for these compounds.

[5] 625, Screening only

[6] "Selected Analytical Methods Approved and Cited by the United States Environmental Protection Agency," Supplement to the Fifteenth Edition of *Standard Methods for the Examination of Water and Wastewater* (1981)

[7] Each analyst must make an initial, one-time, demonstration of their ability to generate acceptable precision and accuracy with Methods 601-613, 624, 625, 1624, and 1625 (See Appendix A of this Part 136) in accordance with procedures each in section 8.2 of each of these Methods Additionally, each laboratory, on an on-going bases must spike and analyze 10% (5% for Methods 624 and 625 and 100% for methods 1624, and 1625) of all samples to monitor and evaluate laboratory data quality in accordance with sections 8.3 and 8.4 of these Methods. When the recovery of any parameter falls outside the warning limits, the analytical results for that parameter in the unspiked sample are suspect and cannot be reported to demonstrate regulatory compliance

NOTE: These warning limits are promulgated as an "interim final action with a request for comments."

TABLE ID—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES[1]

Parameter µg/L)	Method	EPA[2,7]	Standard Methods 15th Ed	ASTM	Other
1. Aldrin	GC	608	509A	D3086	Note 3, p. 7; Note 4, p 30
	GC/MS	625			
2 Ametryn	GC				Note 3, p 83; Note 6, p S68
3 Aminocarb	TLC				Note 3, p 94; Note 6, p S16
4 Atraton	GC				Note 3, p 83; Note 6, p S68
5 Atrazine	GC				Note 3, p 83; Note 6, p S68
6 Azinphos methyl	GC				Note 3, p 25; Note 6, p S51
7 Barban	TLC				Note 3, p. 104; Note 6, p S64
8. α-BHC	GC	608	509A	D3086	Note 3, p 7.
	GC/MS	[5] 625			
9. β BHC	GC	608		D3086	
	GC/MS	625			
10 δ BHC	GC	608		D3086	
	GC/MS	[5] 625			
11 γ-BHC (Lindane)	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	625			
12 Captan	GC		509A		Note 3, p. 7.
13 Carbaryl	TLC				Note 3, p 94; Note 6, p S60
14 Carbophenothion	GC				Note 4, p. 30; Note 6, p S73
15 Chlordane	GC	608	509A	D3086	Note 3, p. 7.
	GC-MS	625			
16 Chloropropham	TLC				Note 3, p 104; Note 6, p S64
17 2,4-D	GC		509B		Note 3, p. 115; Note 4, p 35
18. 4,4'-DDD	GC	608	509A	D3086	Note 3, p 7; Note 4, p 30
	GC MS	625			
19 4,4'-DDE	GC	608	509A	D3086	Note 3, p. 7; Note 4, p 30
	GC/MS	625			
20. 4,4'-DDT	GC	608	509A	D3086	Note 3, p 7; Note 4, p 30
	GC/MS	625			

TABLE ID—LIST OF APPROVED TEST PROCEDURES FOR PESTICIDES[1]—Continued

Parameter µg/l)	Method	EPA[2,7]	Standard Methods 15th Ed	ASTM	Other
21 Demeton O	GC				Note 3, p 25; Note 6, p S51.
22 Demeton S	GC				Note 3, p 25; Note 6, p S51.
23 Diazinon	GC				Note 3, p 25; Note 4, p. 30; Note 6, p. S51.
24 Dicamba	GC				Note 3, p. 115.
25 Dichlofenthion	GC				Note 4, p 30; Note 6, p S73.
26 Dichloran	GC		509A		Note 3, p. 7.
27 Dicofol	GC			D3086	
28 Dieldrin	GC	608	509A		Note 3, p. 7; Note 4, p. 30.
	GC/MS	625			
29 Dioxathion	GC				Note 4, p. 30; Note 6, p S73.
30 Disulfoton	GC				Note 3, p ; Note 6, p S51.
31 Diuron	TLC				Note 3, p 104; Note 6, p. S64.
32 Endosulfan I	GC	608	509A	D3086	Note 3, p. 7.
	GC/MS	[5] 625			
33 Endosulfan II	GC	608	509A	D3086	Note 3, p. 7.
	GC/MS	[5] 625			
34 Endosulfan sulfate	GC	608			
	GC/MS	625			
35 Endrin	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30
	GC/MS	[5] 625			
36 Endrin aldehyde	GC	608			
	GC/MS	625			
37 Ethion	GC				Note 4, p. 30; Note 6, p. S73.
38 Fenuron	TLC				Note 3, p. 104; Note 6, p. S64.
39 Fenuron-TCA	TLC				Note 3, p. 104; Note 6, p. S64.
40 Heptachlor	GC	608	509A	D3086	Note 3, p. 7; Note 4, p 30
	GC/MS	625			
41 Heptachlor epoxide	GC	600	509A	D3086	Note 3, p. 7; Note 4, p 30; Note 6, p. S73.
	GC/MS	625			
42 Isodrin	GC				Note 4, p 30; Note 6, p S73
43 Linuron	TLC				Note 3, p. 104; Note 6, p. S64.
44 Malathion	GC		509A		Note 3, p. 25; Note 4, p. 30; Note 6, p S51.
45 Methiocarb	TLC				Note 3, p. 94; Note 6, p. S60
46 Methoxychlor	GC		509A	D3086	Note 3, p. 7; Note 4, p. 30.
47 Mexacarbate	TLC				Note 3, p. 94; Note 6, p. S60
48 Mirex	GC		509A		Note 3, p. 7.
49 Monuron	TLC				Note 3, p 104; Note 6, p S64.
50 Monuron TCA	TLC				Note 3, p. 104; Note 6, p S64
51. Neburon	TLC				Note 3, p. 104; Note 6, p S64.
52 Parathion methyl	GC		509A		Note 3, p 25; Note 4, p 30
53 Parathion ethyl	GC		509A		Note 3, p. 25.
54 PCNB	GC		509A		Note 3, p. 7.
55 Perthane	GC			D3086	
56 Prometron	GC				Note 3, p. 83; Note 6, p S68
57 Prometryn	GC				Note 3, p. 83; Note 6, p. S68.
58 Propazine	GC				Note 3, p. 83; Note 6, p S68.
59 Propham	TLC				Note 3, p 104; Note 6, p. S64
60 Propoxur	TLC				Note 3, p 94; Note 6, p. S60.
61 Secbumeton	TLC				Note 3, p. 83; Note 6, p S68
62 Siduron	TLC				Note 3, p 104; Note 6, p. S64.
63 Simazine	GC				Note 3, p. 83; Note 6, p. S68.
64 Strobane	GC		509A		Note 3, p. 7.
65 Swep	TLC				Note 3, p. 104; Note 6, p. S64.
66 2,4,5-T	GC		509B		Note 3, p. 115; Note 4, p 35.
67 2,4,5-TP (Silvex)	GC		509B		Note 3, p. 115.
68 Terbuthylazine	GC				Note 3, p. 83; Note 6, p S68
69 Toxaphene	GC	608	509A	D3086	Note 3, p. 7; Note 4, p. 30.
	GC/MS	625			
70 Trifluralin	GC		509A		Note 3, p 7

Table ID Notes

[1] Pesticides are listed in this table by common name for the convenience of the reader. Additional pesticides may be found under Table IC, where entries are listed by chemical name.

ATTACHMENT 3.

CHAIN-OF-CUSTODY RECORD FORM

CHAIN OF CUSTODY RECORD
FOR
ADIRONDACK ENVIRONMENTAL ASSOCIATES, INC.

SITE NAME: ______________________________

SAMPLING DATE: ________ TIME SAMPLING OCCURED: ________

WELL NO. OR SAMPLING POINT: ______________________________

____

SAMPLE ANALYZED FOR: INORGANIC, ORGANIC, BOTH (Circle one)

SAMPLE MEDIA: LIQUID, SOLID, GAS (Circle one)

EPA SAMPLE METHOD(S): ______________________________

SAMPLE IDENTIFICATION NO.(S): ______________________________

____

COLLECTOR'S NAME: ______________________________

FIELD NOTES: ______________________________

____

CHAIN OF POSSESSION:

COLLECTOR OUT:

______________________	______________________
Signature	Shippment date / Time Sent
______________________	______________________
Print Name	Title

LABORATORY IN:

______________________	______________________
Signature	Shippment Date / Time Rcvd
______________________	______________________
Print Name	Title

Please complete this form and return it to:

Adirondack Environmental Assoc., Inc.
63 Bridge Street, Plattsburgh, NY 12901

APPENDIX C

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PUBLIC HEALTH
RISK ASSESSMENT

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Pole-Lite Industries, Inc.
Champlain, New York

October, 1989

Adirondack Environmental Associates, Inc.
63 Bridge Street
Plattsburgh, NY 12901

TABLE OF CONTENTS

TABLES:

PUBLIC HEALTH RISK ASSESSMENT

INTRODUCTION

The following public health risk assessment due to the Pole-Lite site is an evaluation of the potential health risk from exposure to contaminated soil and ground water at a specified soil cleanup level of 10 parts per million (ppm) total volatile organic chemicals (VOC).

An evaluation of the potential risk due to exposure to contaminated ground water was assessed by predicting the levels of contamination in the ground water, using the Organic Leachate Model (OLM). The OLM was developed by the USEPA and is currently the only methodology the USEPA accepts for delisting waste. It may also be used to determine worst case predictions of contaminant migration from soil into ground water. The basic assumptions of the OLM methodology result in predictions which are overprotective of public health[1].

Two cases of residual soil contamination are assumed in the model to determine the projected ground water contamination. Both cases assume that the ratio of the contaminants to each other remains constant throughout cleanup procedures. Case 1 is the average of the contaminants detected in the soil at the site. Case 2 assumes the highest levels of contaminants detected.

The residual concentrations of soil (10 ppm) and ground water contaminants (result of OLM calculations) are presented in Tables 1 and 2. Represented in the tables are two of the more probable worst case scenarios. These predicted levels of contamination were evaluated for the associated potential risk using the guidelines provided by the USEPA in the Superfund Public Health Evaluation Manual (USEPA), 1986). The evaluation of potential risk involves the following principal steps:

1. Selection of indicator chemicals;
2. Estimation of human intakes;
3. Assessment of human toxicity; and
4. Determination of human health risks.

7.2 Selection of Indicator Chemicals

The Superfund Public health Evaluation Manual provides for a means of reducing large numbers of contaminants to a more

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[1] Soil Contamination and Remedial Alternative Evaluation, Reich Farm Site/Union Carbide, Malcolm Pirnie, Inc., December, 1988

manageable number by identifying those chemicals with the highest relative risk based on known toxicity. At the Pole-Lite site, the number of contaminants is limited, allowing for an evaluation of all contaminants. Table 3 gives a listing of all the indicator chemicals.

A chemical profile for each indicator chemical is presented below. This information was compiled from information provided in the following sources:

1. CHRIS Hazardous Chemical Data, 1984, Department of Transportation/U.S. Coast Guard;

2. Dangerous Properties of Industrial Materials, 1984, N. Irving Sax;

3. NIOSH Pocket Guide to Chemical Hazards, 1985, U.S. Department of Health and Human Services; and

4. Handbook of Toxic and Hazardous Chemicals, 1981, Marshall Sittig.

1,1-Dichloroethene (1,1-Dichloroethylene)

1,1-Dichloroethene (Vinylidene Chloride) is an intermediate in the production of vinylidene polymer plastics such as Saran and Velon. 1,1-Dichloroethene is insoluble in water and sparingly soluble in organic solvents. Volatilization appears to be the primary transport process and its subsequent photo-oxidation in the atmosphere by reaction with hydroxyl radicals is apparently the predominant fate process.

1,2-Dichloroethane (Ethylene Chloride)

1,2-Dichloroethane, commonly known as Ethylene Dichloride (EDC), is a chlorinated hydrocarbon used primarily as a component of leaded fuel and as an intermediate in the production of several chlorinated hydrocarbons. EDC is slightly soluble in water, and therefore leaching through the soil into the ground water is an expected route of dispersal.

1,1-Dichloroethane (Ethylidene Chloride)

1,1-Dichloroethane is used as a cleansing agent, a degreaser, a solvent for plastics, rubber, oils and fats, as a grain fumigant, and as an intermediate chemical in organic syntheses. It is slightly soluble in water, and will sink. It is combustible and reacts with strong oxidizers such as nitrates, permanganates, and strong caustics (e.g., sodium, hydroxide or potassium hydroxide).

Chloroform (Trichloromethane)

Chloroform was once a widely used anesthetic. Although this use is now obsolete, it is still occasionally used as an industrial solvent. More commonly, it is a constituent of industrial solvent mixtures or a laboratory solvent. In addition, it may be formed in water chlorination processes.

Chloroform is a heavy, colorless liquid with a water solubility of 1 g/100 ml of water (at 15°C). It is slightly flammable when exposed to high heat.

1,1,1-Trichloroethane (Methyl Chloroform)

1,1,1-Trichloroethane is a volatile chlorinated hydrocarbon. It has been used as an industrial solvent and in consumer products as spot removers. 1,1,1-Trichloroethane can be transported in the ground water, but the speed of transport depends on the composition of the soil.

Toluene (Methyl Benzene)

Toluene is an organic liquid derived from coal tar. It is used in the manufacture of many organic compounds and as a solvent for paints, lacquers, and resins. It is also used in the extraction of various principal components from plants and as a gasoline additive. Volatilization is the major route of removal of Toluene from aquatic environments. Precipitation or dry deposition can deposit Toluene and its oxidation product into aquatic and terrestrial systems. In subsurface soil, toluene may undergo variable degrees of biodegradation depending on the nature of the soil, but a certain portion of the undegraded Toluene may percolate through soil into ground water.

Methylene Chloride (Dichloromethane)

Methylene Chloride is used as a solvent, degreaser, cleaning fluid, aerosol, propellant, anesthetic, refrigerant, blowing agent in foams, and in paint removers, in the process of decaffeinating coffee and in the extraction of spices. Methylene Chloride is slightly water soluble, and will sink. When exposed to heat, it will decompose into highly poisonous Phosgene. Contact with alkali metals (e.g., Sodium or Potassium) may cause an explosion. Methylene Chloride will corrode iron, stainless steel, and copper.

Methyl Ethyl Ketone (MEK, 2-Butanone)

Methyl Ethyl Ketone is used as a solvent in the surface coating industry, in the manufacture of smokeless powder, and in colorless synthetic resins. Based on its relatively high water solubility and low octanol/water partition coefficient, MEK is expected to have a high soil mobility. Two other processes that may account for the significant loss from soil are volatilization and biodegradation.

Ethylbenzene (Phenylethane)

Ethylbenzene is used for conversion to a styrene monomer and as a resin solvent. Only limited data are available on the transport and fate of Ethylbenzene. Volatilization is probably the major route of elimination from surface water. Its high octanol/water partition coefficient suggests that a significant amount of Ethylbenzene may be absorbed by organic material in the sediment. Small amounts of the compound may also leach from soil into ground water, particularly from sandy soils.

Xylene (Dimethyl Benzene - 3 Configurations: ortho, meta and para)

Xylene is an aromatic, colorless liquid. It is used as a solvent and in the manufacture of polyester fibers. It is also used as a cleaning agent in microscopic techniques. Xylene has three isomers (ortho, meta and para) which exhibit similar chemical properties.

Volatilization and subsequent photo-oxidation in the atmosphere are probably important fate processes for xylene in the upper layers of soil and in aquatic environments. Xylene binds to sediment in water and to organics in soil and undergoes microbial degradation. Biodegradation is probably the most important fate process in both soils and the aquatic environment. Xylene is unlikely to leach into ground water in high concentrations because of its low water solubility and rapid biodegradation.

Acetone

Acetone is an aromatic, highly flammable, colorless liquid. It is used primarily as a solvent and in organic syntheses. It is miscible in water, alcohol and ether. Acetone poses a danger when exposed to heat, flame and oxidizers and may result in fire or explosion.

ESTIMATION OF HUMAN INTAKE

To assess the potential adverse health impacts associated with the site and the 10 ppm soil remediation level, a determination of the amount of human soil and water intake is necessary. The calculation of both chronic hazard and carcinogenic risk requires an estimation of lifetime average daily intake (LADI). This lifetime average daily intake represents human exposure over a 70-year life. It is necessary to make a number of assumptions to calculate the LADI; these assumptions are contained in Table 4.

Soil Ingestion

The exposure route of concern is the inadvertent ingestion of soil from the site due to incidental contact during recreational or miscellaneous activities. The site is private individual property in an unpopulated area. The site is not fenced and therefore access is unrestricted. However, access could be controlled if warranted. A conservative assumption is made that a child (age 5 to 18) would be exposed to contaminated soil 2 days/week, 30 weeks/year for 13 years, and an adult (age 18 to 70) would be exposed 10 days/year for 52 years. It is also assumed that both children and adults would ingest 100 mg of soil and 100 percent of the contaminants in the soil would be absorbed by the body. The resulting LADI value is 1.09 x 10^{-7} kg/kg/day as shown on Table 5.

Dermal Exposure to Contaminated Soil

The route of exposure is the same as for soil ingestion. the assumptions made are that children (age 5 to 18) would be exposed to the soil 2 days/week, 30 weeks/year for 13 years, and an adult (age 18 to 70) would be exposed 10 days/year for 52 years. It is also assumed that both a child and adult would expose 10 percent of their body surface area and that dust adherence would be 2.77 x 10^{-6} kg/cm^2. The dermal absorption of a typical soil contaminant is assumed to be 1.8 percent per day. This is based on a combined direct skin application absorption rate of 12 percent per day and a soil matrix effect of 15 percent. The calculated LADI was 6.14 x 10^{-8} kg/kg/day as shown in Table 6.

Ingestion of Contaminated Water

The regular ingestion of contaminated ground water is a significant concern. The nearest residence to the site located hydraulically downgradient is between 500 and 700 feet and is believed to utilize a private well (deep bedrock) as its primary source of potable water. The assumption is made that a 70 kg person would ingest an average of 2 liters of water per day. From this, the intake of water was calculated by dividing the daily ingestion by the body weight to give a value of 2.86 x 10^{-2} l/kg/day as shown in Table 7. Table 8 gives appropriate guidance levels for the indicator chemicals identified in the ground water.

ASSESSMENT OF HUMAN TOXICITY

This section contains information regarding the toxicity of the indicator chemicals identified in Table 3. It is presented to give an indication of the relative, potential toxicity of these contaminants.

1,1 Dichloroethene

The USEPA classified 1,1-Dichloroethene as a Group C, possible human carcinogen, via both oral and inhalation routes of exposure. In one study, this compound was shown to cause kidney tumors in male mice and leukemia in female mice exposed by inhalation, but the study was inconclusive. It is regulated in drinking water on the basis of toxicity. 1,1-Dichloroethene was mutagenic in several bacterial assays. The compound did not appear to be teratogenic but did cause embryotoxicity and fetotoxicity when administered to rats and rabbits by inhalation. Chronic exposure to low oral doses caused liver changes in rats. Acute exposure to high doses causes central nervous system depression, but neurotoxicity has not been associated with low-level chronic exposure.

1,2-Dichloroethane

The USEPA classifies 1,2-Dichloroethane (EDC) as Group B2, probable carcinogen via both oral and inhalation routes of exposure. EDC ha been shown to be carcinogenic in mice and rats following oral exposure, producing a variety of tumors. It is mutagenic when tested using bacterial test systems. Human exposure by inhalation has been shown to cause headaches, dizziness, nausea, vomiting, abdominal pain, irritation of mucous membranes, and liver and kidney dysfunction. Dermatitis may be produced by skin contact.

1,1-Dichloroethane

When heated, 1,1-Dichloroethane may form highly toxic Phosgene or Vinyl Chloride fumes. Short-term exposure through inhalation may cause nasal irritation, salivation, sneezing, coughing, drowsiness, numbness in arms and legs, and unconsciousness. Contact may produce skin and eye irritation. Ingestion may cause nausea and vomiting. Long-term exposure experiments have produced liver, kidney, and lung damage and birth defects in laboratory animals. It is unknown whether or not it does so in humans.

Chloroform

High concentrations of Chloroform may produce narcosis and anesthesia. Acute exposure depresses the central nervous system and may cause vomiting or other gastrointestinal problems. In addition, cardiac sensitization to adrenalin and liver and kidney injury may occur when high concentrations are involved. Liver injury is particularly common in cases of chronic or repeated exposure. In experiments with laboratory animals, it has been shown to be teratogenic; it is a suspected carcinogen for humans.

1,1,1-Trichloroethane

Studies have indicated that 1,1,1-Trichloroethane increased the incidence of combined hepcetocellular carcinomas and adenomas in female mice when administered by gavage. There is evidence that 1,1,1-Trichloroethane is mutagenic in Salmonella and causes transformation in cultured rat embryo cells. These data suggest that the chemical may be carcinogenic; however, the USEPA classified this compound as a non-carcinogen; however, the USEPA classified this compound as a non-carcinogen via oral and inhalation routes.

Other toxic effects of 1,1,1-Trichloroethane are seen only at concentrations well above those likely to be in an open environment. The most notable toxic effects in humans and animals are central nervous system depression, including anesthesia at very high concentration and impairment of coordination, equilibrium, and judgement at lower concentrations; cardiovascular effects; and adverse effects on the lungs, liver, and kidneys. Irritation of the skin and mucous membranes have also been reported.

Toluene

There is no conclusive evidence that Toluene is carcinogenic or mutagenic in animals or humans. Oral exposure of Toluene at low doses produced a significant increase in embryonic lethality in mice; however, other research indicated that it is not teratogenic. Acute exposure to Toluene may cause narcotic effects (impairment of coordination and reaction time), los of appetite, headache, nausea, and eye irritation. Generally, acute poisoning due to exposure to high concentrations is rare, and individuals recover easily when removed from the exposure.

Methylene Chloride

Methylene Chloride is changed to Carbon Monoxide in the body. Inhalation can cause muscle control loss, chest pain, dizziness, arm and leg pains, loss of feeling, loss of appetite, hot flashes, and death. Skin and eye irritation can occur. Prolonged exposure can cause changes in blood and liver damage. In laboratory studies, Methylene Chloride has been shown to cause tumors and birth defects in animals; it is not known whether this is the case in humans.

Methyl Ethyl Ketone (MEK)

MEK has not been tested for carcinogenicity and has produced only equivocal evidence of mutagenicity in a few bacterial assays. One report indicated that MEK caused retarded fetal development and teratogenic effects. MEK is of relatively low toxicity, but at high doses affects the nervous system and causes irritation of the eyes, nose, and skin. The USEPA designated MEK as a Group D, not classified chemical.

Ethylbenzene

Since there appears to be no data regarding carcinogenicity of Ethylbenzene in either humans or animals, the chemical is designated as Group D, not classified compound. Inhalation exposures to Ethylbenzene have resulted in fetotoxicity in rats and rabbits. Ethylbenzene is a skin irritant, and its vapor is irritating to the eyes. Adequate investigations are not available concerning teratogenic and fetotoxic effects of oral exposure.

Xylene

The USEPA designates Xylene as a Group D, not classified chemical. Xylene is not mutagenic or teratogenic, but has caused fetotoxicity in rats and mice. Acute exposure to high levels of Xylene can affect the central nervous system and irritate the mucous membranes.

Acetone

Acetone may act as a narcotic in high concentrations. In industry, no injurious effects have been reported from its use, other than occasional skin irritation and headaches from prolonged exposure.

DETERMINATION OF HUMAN HEALTH RISK

This section describes the quantification of both chronic hazardous risk and carcinogenic risk associated with contaminants at Pole-Lite.

Chronic Hazard or Non-carcinogenic Effects

Non-carcinogenic effects from soil exposure are described using a hazard index. The hazard index for chronic exposure to a toxic chemical is calculated by multiplying the contaminant concentrations by lifetime average daily intake (LADI) and dividing the product by the Acceptable Chronic Intake (ACI) taken from published literature. The hazard index is not a mathematical prediction of the incidence or severity of an effect, but rather a numerical index to help identify potential exposure problems. A hazard index greater than one (1) indicates a potential health concern. Tables 9 and 10 indicate calculated values for the chronic hazard index for each exposure pathway identified.

In Table 11, an evaluation using Risk Reference Doses (RfD) is presented, using the projected contaminant concentrations determined through modeling of an average case scenario, Case 1 and a worst case scenario, Case 2. A safety factor was derived by dividing the RfD by the contaminant concentration projected for Cases 1 and 2.

In Table 12, a comparison of the most stringent drinking water guidance levels was done. In this comparison, so dose calculations were performed, and the guidance levels are expressed as concentrations in drinking water. The safety factor is calculated by dividing the guidance level by the projected contaminant concentration.

Carcinogenic Effects

Potential carcinogenic risks for soil exposure are calculated by multiply the contaminant concentration by the LADI and a factor known as the carcinogenic potency factor (CPF) of a contaminant which, is an upper, 95 percent confidence limit of the probability of an effect from a unit intake of a chemical contaminant. The calculated risk is the potential incremental risk of a cancer occurrence resulting from exposure. The risk values calculated are given on Tables 5 and 6.

In Table 7, an evaluation of carcinogenic risk from ingestion of contaminated water is provided for the two potential carcinogens, Methylene Chloride and 1,2-Dichloroethane. The calculation is similar to that performed for soil ingestion, with the risk being the product of the water intake, the carcinogenic potency factor and the contaminant concentration.

SUMMARY

Risk assessment guidance provided by the USEPA in the Superfund Public Health evaluation Manual, establishes a range of acceptable carcinogenic risk of 10^{-4} to 10^{-7}, with 10^{-6} generally accepted as the target level. A summary of the calculated carcinogenic risk for Pole-Lite, as indicated in Table 13, shows the risk to be within the specified range. The highest level of risk is associated with ingestion of contaminated water; based on conservative projected levels of contamination present, following the removal of soil contaminants to a level of 10 ppm or less. The evaluation of non-carcinogenic risk using a chronic hazard index for soil and a safety factor for water indicates acceptable levels of risk. The chronic hazard indices are below 10 ppm for both ingestion and dermal exposure to soil. The combined indices for all the contaminants for soil ingestion and dermal exposure are 3.86×10^{-4} and 2.18×10^{-4}, respectively. The comparison of projected ground water contaminant levels to risk reference doses (RfD) indicates the lowest safety factor to be associated with Methylene Chloride at a factor of 100. This means that the contaminant exposure dosage is 10 times less than the guidance level. Methylene Chloride was detected in laboratory blanks and is a common laboratory reagent, which indicates that some of the Methylene Chloride detected in the ground water samples was introduced in the laboratory and that the actual levels in the field may be lower. A comparison of the projected ground water contaminant levels with the most stringent drinking water guidance levels set by the USEPA indicates the lowest safety factor to be associated with 1,2-Dichloroethane at 0.13 and 0.5 for Cases 1 and 2, respectively. It should be noted that the OLM model used to predict levels of contamination in the ground water, is currently the only methodology the USEPA accepts to determine worst case predictions of contaminant migration from soil into ground water. The basic assumptions of the OLM methodology result in predictions which are overprotective of public health. Therefore, the project ground water contaminants levels and associated health risks are likely to be less.

TABLE 1

Contaminant Concentrations* (in Soil)

	Case 1 (Average) (ppm)	Case 2 (Highest Detected) (ppm)	Level
Methylene Chloride	1.3 $\frac{\overline{Conc}}{\Sigma \overline{Conc}} \times 10_{ppm}$	0.86	$\frac{Conc}{\Sigma Conc} \times 10_{ppm}$
1,1,1-Trichloroethane	7.9	8.56	
1,1-Dichloroethane	0.2	0.04	
1,2-Dichloroethane	0.1	0.23	
Toluene	0.2	0.16	
Ethylbenzene	0.3	0.16	

*Based on 10 ppm cleanup level and contaminant ratios remaining constant through remedial activity.

TABLE 2

Contaminant Concentrations* (in Ground Water)

	Case 1 (Average) (ppm)	Case 2 (Highest Detected) (ppm)	Level
Methylene Chloride	0.21	0.16	
1,1,1-Trichloroethane	0.24	0.26	
1,1-Dichloroethane	0.04	0.01	
1,2-Dichloroethane	0.03	0.05	
Toluene	0.02	0.01	
Ethylbenzene	0.01	0.01	

TABLE 3

Indicator Chemicals

Medium	Contaminant	Toxicity Potential*
Soil	1,1-Dichloroethene	Carcinogen and Non-carcinogen
	1,2-Dichloroethane	Carincogen
	Chloroform	Carcinogen and Non-carcinogen
	1,1-Dichloroethane	Non-carcinogen
	1,1,1-Trichloroethane	Non-carcinogen
	Toluene	Non-carcinogen
	Xylene	Non-carcinogen
	Acetone	Non-carcinogen
	Methyl Ethyl Ketone	Non-carcinogen
Ground Water	Methylene Chloride	Carcinogen
	1,1,1-Trichloroethane	Non-carcinogen
	1,1-Dichloroethane	Non-carcinogen
	1,2-Dichloroethane	Carcinogen
	Toluene	Non-carcinogen
	Ethyl Benzene	Non-carcinogen

*Taken from Superfund Public Health Evaluation Manual

TABLE 4

Constants Used to Calculate Lifetime Average Daily Intake

	Child	Adult
Age Range (years)	5-18	18-70
Average Body Weight (Kg)	38	70
Average Soil/Sediment Ingestion (mg/day)	100	100
Absorption Fraction of Soil Through Skin (%)	1.8	1.8
Dust Adherence (Kg/cm^2)	2.77×10^{-6}	2.77×10^{-6}
Total Body Surface Area (cm^2) (10% exposed surface area)	8,800	18,000
Amount of Water Ingested (liters)	-	2

TABLE 5

Carcinogenic Risk from Soil Ingestion

Assuming a residual soil contaminant level of 10 ppm or less of total VOCs, an evaluation of the carcinogenic risk from the ingestion of on-site soil is as follows:

Compound	Potency Factor (CPF) $(mg/Kg/d)^{-1}$	Carcinogenic Risk
1,1 Dichloroethene	5.8×10^{-1}	6.32×10^{-7}
1,2 Dichloroethane	9.1×10^{-2}	9.92×10^{-8}
Chloroform	8.1×10^{-2}	8.83×10^{-8}
	Total Carcinogenic Risk =	8.20×10^{-7} ok

Constants, used in the calculation of incremental risk from soil ingestion, are given in Table 10-4.

Soil Intake = SI

$$SI = \frac{\text{(Amount of Soil Ingested)(Absorption)(Contacts/Lifetime)}}{\text{body weight}}$$

$$SI\text{, child} = \frac{(1 \times 10^{-4}\ \text{kg/day})(1.0)(2\ \text{days/wk} \times 30\ \text{wks/yr} \times 13\ \text{yrs})}{38\ \text{Kg}}$$

$$= 2.05 \times 10^{-3}\ \text{Kg/Kg}$$

$$SI\text{, adult} = \frac{(1 \times 10^{-4}\ \text{Kg/day})(1.0)(10\ \text{days/yr} \times 52\ \text{yrs})}{70\ \text{Kg}}$$

$$= 7.43 \times 10^{-4}\ \text{Kg/Kg}$$

$$\text{Lifetime Average Daily Intake (LADI)} = \frac{\text{SI, Child + SI, Adult}}{\text{Lifetime}}$$

$$\text{LADI} = \frac{2.05 \times 10^{-3}\ \text{Kg/Kg} + 7.43 \times 10^{-4}\ \text{Kg/Kg}}{70\ \text{yrs} \times 365\ \text{days/yr}}$$

$$= 1.09 \times 10^{-7}\ \text{kg/kg/day}$$

Carcinogenic Risk = CPF x Contaminant Concentration x LADI

TABLE 6

Carcinogenic Risk from Dermal Exposure to Soil

At a residual soil contaminant level of 10 ppm or less, the following carcinogenic risk from dermal exposure to on-site soil has been calculated:

Compound	CPF $(\mathrm{mg/Kg/day})^{-1}$	Carcinogenic Risk Index
1,1-Dichloroethene	5.8×10^{-1}	3.56×10^{-7}
1,2-Dichloroethane	9.1×10^{-2}	5.59×10^{-8}
Chloroform	8.1×10^{-2}	4.97×10^{-8}

Total Carcinogenic Risk = 4.62×10^{-7} ok

Constants used in the calculation of incremental risk from dermal exposure to soil are given in Table 10-4.

Dermal Absorption = DA

$$\mathrm{DA} = \frac{(\text{Body Surface Area})(\text{Dust Adher.})(\text{Absorp.})(\text{Contacts/Lifetime})}{\text{Body Weight}}$$

$$\underset{\text{(child)}}{\mathrm{DA}} = \frac{(880\ \mathrm{cm}^2)(2.77\times10^{-6}\ \mathrm{Kg/cm}^2)(0.018/\mathrm{dy})(2\ \mathrm{dys} \times 30\ \mathrm{wks} \times 13\ \mathrm{yrs})}{38\ \mathrm{Kg}}$$

$$= 9.01 \times 10^{-4}\ \mathrm{Kg/Kg}$$

$$\underset{\text{(adult)}}{\mathrm{DA}} = \frac{(1{,}800\ \mathrm{cm}^2)(2.77\times10^{-6}\ \mathrm{Kg/cm}^2)(0.018/\mathrm{dy})(10\ \mathrm{dys} \times 52\ \mathrm{yrs})}{70\ \mathrm{Kg}}$$

$$= 6.67 \times 10^{-4}\ \mathrm{Kg/Kg}$$

$$\mathrm{LADI} = \frac{\mathrm{DA\ (child)} + \mathrm{DA\ (adult)}}{70\ \mathrm{yr} \times 365\ \mathrm{days/yr}}$$

$$= \frac{9.01 \times 10^{-4}\ \mathrm{Kg/Kg} + 6.67 \times 10^{-4}\ \mathrm{Kg/Kg}}{70 \times 365\ \mathrm{days/yr}}$$

$$= 6.14 \times 10^{-8}\ \mathrm{Kg/Kg/day}$$

Carcinogenic Risk = CPF x Contaminant Concentration x LADI

TABLE 7

Carcinogenic Risk From Ingestion of Contaminated Water

The carcinogenic risk from ingestion of contaminated water at levels projected to be present after soil contaminants have been removed to 10ppm VOCs or less, is as follows:

Compound	Contaminant Concentration (mg/l) Case 1	Contaminant Concentration (mg/l) Case 2	Potency Factor (CPF) $(mg/kg/day)^{-1}$	Carcinogenic Risk Case 1	Carcinogenic Risk Case 2
1,2-Dichloroethane	0.03	0.05	9.1×10^{-2}	7.81×10^{-5}	1.30×10^{-4}
Methylene Chloride	0.21 0.021	0.16	7.5×10^{-3}	4.50×10^{-5}	3.43×10^{-5}
			Total Carcinogenic Risk =	1.23×10^{-4}	1.64×10^{-4}

Constants used in calculating the incremental risk from ground water consumption are given in Table 10-4.

$$\text{Water Intake} = \frac{\text{Amount Ingested}}{\text{Body Weight}}$$

$$= \frac{2\ \text{l/day}}{70\ \text{Kg}}$$

$$= 2.86 \times 10^{-2}\ \text{l/Kg/day}$$

Carcinogenic Risk = Contaminant Concentration x CPF x Intake

TABLE 8

Guidance Levels for Exposure to Contaminated Water

1,1-Dichloroethane	
Oral Reference Dose (RfD)	1.2×10^{-1} mg/kg/day
Weight-of-Evidence for Carcinogenicity	None
Oral Potency Factor (CPF)	None
Drinking Water Unit Risk	None
Drinking Water Health Advisory (HA)	None
Safe Drinking Water Act	
Maximum Contaminant Level Goal (MCLG)	None
Maximum Contaminant Level (MCL)	None
1,2-Dichloroethane	
Oral Reference Dose (RfD)	None
Weight-of-Evidence For Carcinogenicity	Group B2--Probable Human Carcinogen
Oral Potency Factor (CPF)	9.1×10^{-2} mg/kg/day
Drinking Water Unit Risk	2.6×10^{-6} ug/L
Drinking Water Health Advisory (HA)	
One Day HA--Child	0.74 mg/L
Ten Day HA--Child	0.74 mg/L
Longer Term HA--Child	0.74 mg/L
Longer Term HA--Adult	0.74 mg/L
Lifetime HA--Adult	2.60 mg/L
Safe Drinking Water Act	
Maximum Contaminant Level Goal (MCLG)	0
Maximum Contaminant Level (MCL)	5 ug/L
1,1,1-Trichloroethane	
Oral Potency Dose (RfD)	9.0×10^{-2} mg/kg/day
Weight-of-Evidence for Carcinogenicity	Group D--Not Classified
Oral Potency Factor	None
Drinking Water Unit Risk	None
Drinking Water health Advisory (HA)	None
Safe Drinking Water Act	
Maximum Contaminant Level (MCL)	200 ug/l
Methylene Chloride	
Oral Reference Dose (RfD)	6.0×10^{-2} mg/kg/day
Weight-of-Evidence for Carcinogenicity	Group B2--Probable Human Carcinogen
Oral Potency Factor (OPF)	7.5×10^{-3} mg/kg/day
Drinking Water Unit Risk	2.1×10^{-7} ug/l
Drinking Water Health Advisory (HA)	
One Day HA--Child	13.3 mg/L
Ten Day HA--Child	1.5 mg/L
Longer Term HA--Child	0.5 mg/L
Longer Term HA--Adult	1.75 mg/L
Lifetime HA	None
Safe Drinking Water Act	None

TABLE 8 (Cont'd)

Guidance Levels for Exposure to Contaminated Water

Toluene	
Oral Reference Dose (RfD)	3.0×10^{-1} mg/kg/day
Weight-of-Evidence for Carcinogenicity	Group D--Not Classified
Oral Potency Factor	None
Drinking Water Unit Risk	None
Drinking Water health Advisory (HA)	
One Day HA--Child	21.5 mg/L
Ten Day HA--Child	3.46 mg/L
Longer Term HA--Child	3.46 mg/L
Longer Term HA--Adult	None
Lifetime HA	2.42 mg/L
Safe Drinking Water Act	
Maximum Contaminant Level Goal (MCLG)	2 mg/L
Maximum Contaminant Level (MCL)	None
Ethylbenzene	
Oral Reference Dose (RfD)	1×10^{-1} mg/kg/day
Weight-of-Evidence for Carcinogenicity	Group D--Not Classified
Oral Potency Factor (CPF)	None
Drinking Water Unit Risk	None
Drinking Water Health Advisory (HA)	
One Day HA--Child	32 mg/L
Ten Day HA--Child	3.2 mg/L
Longer Term HA--Child	1 mg/L
Longer Term HA--Adult	3.4 mg/L
Lifetime Term HA--Adult	0.68 mg/L
Safe Drinking Water Act	
Maximum Contaminant Level Goal	0.68 mg/L
Maximum Contaminant Level (MCL)	None

TABLE 9

Chronic Hazard Evaluation From Soil Ingestion

An evaluation of the 10 ppm cleanup level of VOCs in the soil to determine the chronic hazard (non-carcinogenic) index from soil ingestion is as follows:

Compound	ACI (mg/Kg/day)	Chronic Hazard Index
1,1-Dichloroethene	9.0×10^{-3}	1.21×10^{-4}
1,2-Dichloroethane	1.2×10^{-1}	9.08×10^{-6}
Chloroform	1.0×10^{-2}	1.09×10^{-4}
1,1,1-Trichloroethane	5.4×10^{-1}	2.02×10^{-6}
Toluene	3.0×10^{-1}	3.63×10^{-6}
Xylene	1.0×10^{-2}	1.09×10^{-4}
Acetone	1.0×10^{-1}	1.09×10^{-5}
Methyl Ethyl Ketone	5.0×10^{-2}	2.18×10^{-5}
	Total Chronic Hazard Index =	3.86×10^{-4}

$$\text{Chronic Hazard Index} = \frac{\text{Contaminant Concentration} \times \text{LADI}}{\text{ACI}}$$

TABLE 10

Chronic Hazard Evaluation From Dermal Exposure to Soil

The chronic hazard index from dermal exposure to soil has been determined below assuming a residual soil contaminant level of 10 ppm or less.

Compound	ACI (mg/Kg/day)	Chronic Hazard Index
1,1-Dichloroethene	9.0×10^{-3}	6.82×10^{-5}
1,1-Dichloroethane	1.2×10^{-1}	5.12×10^{-6}
Chloroform	1.0×10^{-2}	6.14×10^{-5}
1,1,1-Trichloroethane	5.4×10^{-1}	1.14×10^{-6}
Toluene	3.0×10^{-1}	2.05×10^{-6}
Xylene	1.0×10^{-2}	6.14×10^{-5}
Acetone	1.0×10^{-1}	6.14×10^{-6}
Methyl Ethyl Ketone	5.0×10^{-2}	1.23×10^{-5}
	Total Chronic Hazard Index =	2.18×10^{-4}

$$\text{Chronic Hazard Index} = \frac{\text{Contaminant Concentration} \times \text{LADI}}{\text{ACI}}$$

TABLE 11

Chronic Hazard Evaluation For Ground Water Ingestion
Comparison with Risk Reference Doses (RfD)

CASE 1

Compound	RfD (mg/kg/day)	Safety Factor
Methylene Chloride	6.0×10^{-2}	10
1,1,1-Trichloroethane	9.0×10^{-2}	13
1,2-Dichloroethane	None	None
1,1-Dichloroethane	1.2×10^{-1}	140
Toluene	3.0×10^{-1}	530
Ethyl Benzene	1.0×10^{-1}	340

CASE 2

Compound	RfD (mg/kg/day)	Safety Factor
Methylene Chloride	6.0×10^{-2}	10
1,1,1-Trichloroethane	9.0×10^{-2}	12
1,2-Dichloroethane	None	None
1,1-Dichloroethane	1.2×10^{-1}	86
Toluene	3.0×10^{-1}	1,000
Ethyl Benzene	1.0×10^{-1}	340

Safety Factor = Guidance Level/Contaminant Dose Level

TABLE 12

Chronic Hazard Evaluation For Ground Water Ingestion Comparison with Most Stringent Drinking Water Guidance Level

CASE 1

Compound	Guidance Level (ug/l)	Source	Safety Factor
Methylene Chloride	500	(1)	2.4
1,1,1-Trichloroethane	None	-	-
1,2-Dichloroethane	5	(2)	0.13
1,1-Dichloroethane	None	-	-
Toluene	2,000	(3)	100
Ethyl Benzene	680	(4)	68

CASE 2

Compound	Guidance Level (ug/l)	Source	Safety Factor
Methylene Chloride	500	(1)	3.1
1,1,1-Trichloroethane	None	-	-
1,2-Dichloroethane	5	(2)	0.5
1,1-Dichloroethane	None	-	-
Toluene	2,000	(3)	200
Ethyl Benzene	680	(4)	68

Sources:

(1) Drinking Water Health Advisory: Longer Term HA for 10-kg child.
(2) Safe Drinking Water Act Maximum Contaminant Level (MCL) Maximum Contaminant Level Goal (MCLG) is zero.
(3) Safe Drinking Water Act proposed MCLG.

TABLE 13

Summary of Carcinogenic Risks for the Pole-Lite Site

Exposure Route	Carcinogenic Risk (10~~-6~~$^{-6}$)	
Soil Ingestion	0.082	.82
Dermal Exposure to Soil	0.046	.46
Ingestion of Contaminated Water		
Case 1	149	82.6
Case 2	60.3	16.4

APPENDIX D

CITIZEN PARTICIPATION PLAN

Remedial Investigation & Feasibility Study

Pole-Lite Industries, Inc.
Champlain, New York

October 27, 1989

Adirondack Environmental Assoc., Inc.
Plattsburgh, New York

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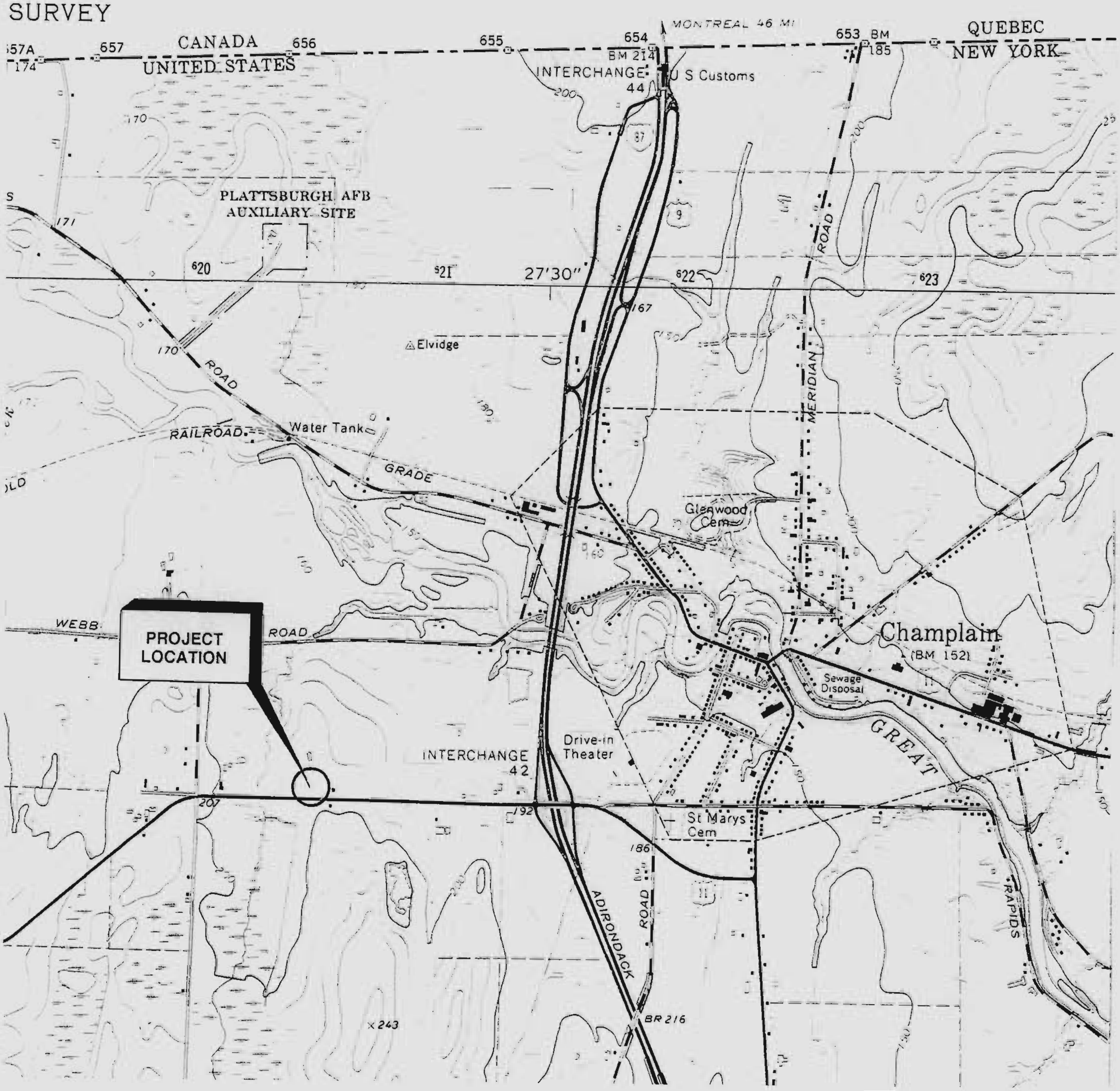
Figure 1 **GENERAL LOCATION MAP**



Source: USGS 7 1/2 minute topographic map
Scale: 1"=2,000'

1.0 Introduction to Plan

New York State Department of Environmental Conservation (NYSDEC) and Pole-Lite Industries, Inc. (Pole-Lite) are committed to a citizen participation program as part of their responsibilities under the New York State Inactive Hazardous Waste Site Remedial Program. Citizen participation promotes public understanding of overall responsibilities, planning and remedial activities at inactive hazardous waste disposal sites. It provides and opportunity for the public to provide input and information enabling the development of a more comprehensive remedial program which is protective of both public health and the environment. This plan details the program that Pole-Lite intends to implement to involve the public in the project.

In addition to the citizen's participation activities required by law, Pole-Lite plans to provide the public with general project information as the program progresses.

2.0 Basic Site Information

Pole-Lite, in cooperation with NYSDEC, is conducting this Remedial Investigation and Feasibility Study (RI/FS) pursuant to a negotiated Order on Consent (T111886) entered into between Pole-Lite and NYSDEC in December 1986.

The Pole-Lite facility is located on Route 11 in the Town of Champlain, Clinton County, New York approximately 1 mile west of interstate I-87 (hereafter referred to as the "site"). Figure 1 is a USGS 7.5 minute Topographic Series map showing the general location of the site. Pole-Lite began manufacturing aluminum light and flag poles at the site in 1973, ceasing operations in the mid 1980's. As part of the manufacturing process aluminum poles were cleaned with solvents (namely, mineral spirits and 1,1,1-Trichloroethane) to remove machine oil prior to welding. Sawdust was used as an absorbent and stored on the site in addition to the storage of drums of solvent fluids.

3.0 Project Description

A general contamination evaluation was initiated on the site in the Fall of 1985 which identified the presence of hydrocarbon contamination generated during the manufacturing process. The consequence of this preliminary finding was the Order on Consent under which Pole-Lite retained engineering and consulting services to perform further investigation and testing. The result was the submission of a Phase II Remedial Investigation by the engineering firm of Malcolm Pirnie, Inc., to the NYSDEC in May 1989. The objective of this RI/FS is to develop a remediation strategy designed to eliminate hazards to human health and the environment in accordance with the following timeline:

October 89 to Spring 1990 - Conduct groundwater elevation surveys on existing and new monitoring wells;

October/November 1989 - Determine placement of additional monitoring wells immediately outside the area of contamination;

November/December 1989 - Install additional monitoring wells and conduct soil sampling during installation;

January/May 1990 - Analyze and evaluate data to determine final remediation strategy;

May 1990 - Install remedial system.

4.0 Affected/Interested Public

The following individuals and/or organizations will be notified of any public hearings and periodically informed on the progress of the work plan:

Champlain Town Board Town Hall Champlain, New York 12919 518-298-8160	Leo Letourneau, Supervisor
Clinton County Legislature Clinton County Gov't. Center 137 Margaret Street Plattsburgh, New York 12901 518-565-4600	Donald Garrant, Chairman William Bingel, Administrator
County Chamber of Commerce West Bay Plaza Plattsburgh, New York 12901 518-563-1000	Amy Whitehead, Exec. Director

Press Republican
170 Margaret Street
Plattsburgh, New York 12901
518-561-2300
Daily Newspaper
Brenda Tallman, Publisher

5.0 Official Contacts

NYSDEC
Region 5
Raybrook, New York
518-891-1370
Daniel Steenberge, P.E.
Ms. Elizabeth Lowe
Public Participation

New York State
Dept. of Health
Corning Tower
State Campus
Albany, New York 12237
518-458-6306
Richard Fedigan
Senior Sanitarian

Clinton County Dept. of Health
9 Margaret Street
Plattsburgh, New York 12901
518-565-3250
Jack Andrus, Director

6.0 Document Repositories

NYSDEC
Region 5
Route 86
Raybrook, New York 12977
518-891-1370

Clinton-Essex-Franklin
Library System
17 Oak Street
Plattsburgh, New York
518-563-5190
Stan Ransom, Director

7.0 Citizen Participation Activities

The activities identified herein were developed to inform the public during this RI/FS Workplan in compliance with 6NYCRR Part 375.7. The NYSDEC has made copies of previous reports on the site available for public information at the document repositories.

Following approval by NYSDEC of this RI/FS Workplan, including this Citizen Participation Plan, and prior to commencement of field activities, public participation and comment on the Workplan will be sought. The following activities will take place:

1- Copies of the Workplan will be supplied to the document repositories;

2- Legal notice will be published in the Press Republican and notification given those individuals and organizations listed above identifying: document repositories; time, date, and location of the public meeting; contact person and directions for submitting written comments;

3- Hold public meeting for the purpose of presenting the Workplan and recieving public comment;

4- Publish and provide a summary of the public meeting to the document repositories and those attendees who signed in at the meeting;

5- Prepare a notice of significant changes to the Workplan as a result of the public meeting and comments. Provide this notice to the document repositories and those meeting attendees who signed in at the meeting.

6- Press releases and fact sheets summarizing significant activities in non-technical terms throughout the project will be prepared. Such information sheets will be provided the document repositories and individuals/organizations listed above.

7- Additional public meetings will be held during this project as deemed desirable by NYSDEC and Pole-Lite. Such meetings will be conducted in accordance with the above procedure.

8.0 Glossary

Definitions of Commonly Used Citizen Participation Terms

Citizens Participation - A process to inform and involve the interested/affected public in the decision-making process during identification, assessment and remediation of inactive hazardous waste sites. This process helps to assure that the best decisions are made from environmental, human health, economic, social and political perspectives.

Citizen Participation Plan - A document that describes the site-specific citizen participation activities that will take place to complement the "technical" (remedial) activities. It also provides site background and rationale for the selected citizen participation program for the site. A plan may be updated or altered as public interest or the technical aspects of the program change.

Consent Order - A legal and enforceable negotiated agreement between the Department and responsible parties where responsible parties agree to undertake investigation and cleanup or pay for the costs of investigation and cleanup work at a site. The order includes a description of the remedial actions to be undertaken at the site and a schedule for implementation.

Document Repository - Typically a regional DEC office and/or public building, such as a library, near a particular site, at which documents related to remedial and citizen participation activities at the site are available for public review. Provides access to documents at times and a location convenient to the public. Environmental Management Councils (EMCs), Conservation Advisory Committees (CACs) as well as active local groups often can serve as supplemental document repositories.

Feasibility Study (FS) - A process for developing, evaluating and selecting remedial actions, using data gathered during the remedial investigation to: define the objectives of the remedial program for the site and broadly develop remedial action alternatives; perform an initial screening of these alternatives; and perform a detailed analysis of a limited number of alternatives which remain after the initial screening stage.

Public - The universe of individuals, groups and organizations: a) affected (or potentially affected) by an inactive hazardous waste site and/or its remedial program; b) interested in the site and/or its remediation; c) having information about the site and its history.

Public Meeting - A scheduled gathering of the Department staff and the public to give and receive information, ask questions and discuss concerns. May take one of the following forms: large-group meeting called by the Department; participation by the Department at a meeting sponsored by another organization such as a town board or Department of Health; working group or workshop; tour of the hazardous waste site.

Public Notice - A written or verbal informational technique for telling people about an important part of a site's remedial program coming up soon (examples: announcement that the report for the RI/FS is publicly available; a public meeting has been scheduled). The public notice may be formal and meet legal requirements (for example: what it must say, such as announcing beginning of a public comment period; where, when and how it is published).

> **Publish** - For purposes of 6NYCRR Part 375.7, at a minimum requires publication of a legal notice in a local newspaper of general circulation.

Another kind of public notice may be more informal and may not be legally required (examples: paid newspaper advertisement; telephone calls to key citizen leaders; targetted mailings).

Remedial Design - Once a remedial action has been selected, technical drawings and specifications for remedial construction at a site are developed, as specified in the final RI/FS report. Design documents are used to bid and construct the chosen remedial actions. Remedial design is prepared by consulting engineers with experience in inactive hazardous waste disposal site remedial actions.

Remedial Investigation (RI) - A process to determine the nature and extent of contamination by collecting data and analyzing the site. It includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for, and proposed extent of, a remedial program for the site.

Site Placed on Registry of Inactive Hazardous Waste Sites - Each inactive site known or suspected of containing hazardous waste must be included in the Registry. Therefore, all sites which state or county environmental or public health agencies identify as known or suspected to have received hazardous waste should be listed in the Registry as they are identified. Whenever possible, the Department carries out an initial evaluation at the site before listing.