Site Investigation/Remedial Alternatives Report (SI/RAR) Work Plan
Brownfields Project No. B-00024-7

Former Brown Manufacturing Site
101 Chester Street - Syracuse, New York

SITE INVESTIGATION/REMEDIAL ALTERNATIVES REPORT (SI/RAR) WORK PLAN

FORMER BROWN MANUFACTURING SITE
101 CHESTER STREET
SYRACUSE, NEW YORK

Brownfields Project No. B-00024-7

June 24, 1998

Prepared For:

City of Syracuse
Department of Public Works
Bureau of Technical Services
401 City Hall
Syracuse, New York 13202

Prepared By:

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Syracuse, New York 13202

(C & H Engineers' Project No. 26042)

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1.1 SITE LOCATION & DESCRIPTION

The Former Brown Manufacturing Site is a ±0.80 acre vacant lot located at 101 Chester Street in the City of Syracuse situated at the southeast corner of the intersection of Chester Street and Bellevue Avenue (see Figure 1-1). The site is bordered to the north by Bellevue Avenue, to the south by residential properties along Chester Street, to the east by residential properties along Huron Street, and to the west by Chester Street (see Figure 1-2). The site is an unimproved and generally flat parcel of land partially covered with grass, concrete, stone, and asphalt. The northeast portion of the site is surfaced with a combination of concrete, stone, and asphalt. A row of trees and a chain-link fence are located along the east property boundary.

1.2 SITE BACKGROUND & HISTORY

Following a fire which occurred at the site on August 21, 1981, approximately 100 drums of waste oil, a waste oil disposal pit, a quenching trough (open-ended, underground storage tank), and a ruptured electrical transformer were identified at the site. Testing was performed at the site in August and September of 1981 which identified the presence of polychlorinated biphenyl (PCB) waste oils and PCB-contaminated concrete and soil. In October 1981, CECOS International, an environmental remediation contractor, apparently removed and disposed of the drums of PCB waste oil, the PCB waste oil/sludge in the disposal pit, the quenching trough and its contents, the PCB-contaminated concrete and soil, and the ruptured electrical transformer. C & H Engineers review of newspaper articles and correspondence, as well as interviews with persons knowledgeable with the events which occurred at the site in 1981, indicated that no post-remediation PCB soil testing was performed at the site to assess the effectiveness of the remediation activities which were conducted.

Based on C & H Engineers review of correspondence and newspaper articles, as well as interviews with persons knowledgeable of the events which occurred at the site in 1981, a waste oil disposal pit may have been located in the "backyard" of the property located at 110 Huron Street, located east of and adjacent to the site. A surface depression was observed in the backyard of the 110 Huron Street property containing settled backfill that could have been the former location of the 12' x 12' waste oil disposal pit which was described in the correspondence and newspaper articles reviewed by C & H Engineers. In addition, real estate information reviewed by C & H Engineers indicated that the site included the 110 Huron Street property until 1988, at which time the 110 Huron Street property was obtained by the City of Syracuse by tax deed and then sold as a separate parcel.

C & H Engineers reviewed newspaper articles obtained from the City of Syracuse Office of the Corporation Counsel. Relevant information contained in the newspaper articles is summarized below.

Date	Source	Summary of Relevant Information
8/22/81	Herald-Journal	Fire occurred at abandoned Brown Corporation factory located at 213 Bellevue Avenue which used to manufacture automobile parts.
9/15/81	Post-Standard	One of 80 barrels found at the site contained 5,000 ppm of PCBs.
10/6/81	Post-Standard	Henry Brown owned the factory until 1968; Truck axles, gears, and other parts were manufactured at the factory which occupied the site; Liquids sampled from a shallow waste oil disposal pit were found to contain 4,800 ppm PCB; Officials found an industrial capacitor at the site which was contaminated with PCBs.

Date	Source	Summary of Relevant Information
10/6/81	Post-Standard	Samples of cinderblock fragments and oil from a quenching trough showed PCB concentrations between 100 ppm and 200 ppm; A 12' x 12' pit at the site was apparently used for disposal of waste oil; A soil sample from the yard at 114 Huron Street showed no PCBs.
10/23/81	Post-Standard	Scheduled for removal and disposal are several yards of dirt in a disposal pit, a large quenching trough, several contaminated cinderblocks, and about 100 barrels of oil.
10/24/81	Post-Standard	The contract for removal and disposal of the PCB contamination will be carried out by CECOS International and is scheduled to begin 10/26/81.
10/27/81	Herald-Journal	About 100 barrels of waste will be solidified for transport to a secure landfill in Niagara Falls; Soil will be excavated from the waste oil disposal pit at the rear of the building which nearly borders a residence, but has been fenced off.
10/29/81	Herald-Journal	Digging and testing will continue until uncontaminated soil is reached or until groundwater is encountered; The PCB waste oil would only seep slowly through the earth and is not water soluble; There is a chance that it may have entered the water table already; The contaminants could reach Onondaga Creek which is 2/5-mile (sic) from the site.
10/29/81	Post-Standard	The walls of the waste oil disposal pit may have cracked and some of the contaminated waste could have leaked into the soil.
10/30/91	Post-Standard	Workers removed ±20 cubic yards of contaminated soil from the waste oil disposal pit; DEC will have to test the waste oil disposal pit after it is cleaned to see if any of the waste oils leached into the soil.
11/3/81	Post-Standard	Re-testing of the area is contingent on whether there is money left once CECOS completes the removal and disposal of the hazardous material; If the money runs out, the pit won't get tested and neither will the soil where the barrels were located until additional money is made available.
Unknown	Post-Standard	Following the cleanup activities, four soil samples collected from the former waste oil disposal pit area yielded PCB concentrations below 50 ppm, and two soil samples collected from the ground where 80 barrels of waste oil had been stored yielded PCB concentrations of 93,000 ppm and 160 ppm; The DEC said more soil samples should be collected to determine how deeply the PCBs have soaked into the ground.

C & H Engineers reviewed reports obtained from the City of Syracuse Office of the Corporation Counsel. Relevant information contained in the reports is summarized below.

Date	Report	Summary of Relevant Information
8/21/81	Fire Investigation Report	Fire occurred at the structure which is reportedly owned by Morris Goldfeld; Site has been vacant for approximately 10 years; Fire appears to have been set intentionally using a flammable liquid; Entire structure was damaged.
9/11/81	Galson Report	Report to John Fietze at the NYSDOT showing PCB results for 49 samples collected from the site on 8/24/81; Samples included sludge, sediment, and oil samples; Results ranged from <5 ppm to 4800 ppm PCB.

Date	Report	Summary of Relevant Information
10/14/81	Galson Report	Report to John Fietze at the NYSDOT showing PCB results for a soil sample collected from 114 Huron Street, and an oil sample and a sludge sample collected from the site; The soil sample collected from 114 Huron Street contained <0.1 ppm PCB, the oil sample contained 224 ppm PCB, and the sludge sample 117 ppm PCB.
11/5/81	O'Brien & Gere Report	Report to John Fietze at the NYSDOT showing PCB results for 45 samples of waste oil collected from drums at the site on 9/17/81; Except for one drum (Drum 43), no PCBs were detected; Drum 43 was found to contain 7 ppm of PCB Aroclor 1254.

Based on C & H Engineers' review of the newspaper articles and reports as summarized above, the following persons were interviewed to obtain new information or to confirm existing information about the about the events which occurred at the site:

Person Interviewed	Results of Interview
John Corbett, Former Fire Investigator	Mr. Corbett recalled 1981 fire and confirmed the location of the former building and the location of drums/barrels; He could not recall the exact location of waste oil disposal pit, but indicated that it was located somewhere behind the building, on the east side of the site.
Richard Brickwedde, Esq., Former DEC Attorney	Mr. Brickwedde recalled that the drums/barrels and area of contamination were located behind (east of) the former building; To the best of his recollection, the waste oil disposal pit was located on the rear (west side) of an adjacent property located on Huron Street.
Thomas Suozzo, DEC Engineer	Mr. Suozzo could not recall what became of the site after the initial clean-up work was completed; In addition, he was not aware of any post-remedial soil sampling or testing conducted at the site, and stated that residual PCB contamination could still remain in subsurface soils.

1.3 TOPOGRAPHY & DRAINAGE

A United States Geologic Survey (USGS) map including the site (Syracuse West, NY, Photorevised 1978) indicated that the site is at an elevation of ±400 feet. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps indicate that the site is not located within or adjacent to a 100-year or 500-year flood plain. C & H Engineers' review of USGS maps, as well as our observation of the site and surrounding areas, suggest that groundwater flows in a south/southeasterly direction towards Onondaga Creek which is ±600 feet from the site.

1.4 GEOLOGY & HYDROGEOLOGY

1.4.1 Regional Geologic Setting

The site is located near the border of two (2) physiogeographic provinces within New York State - the Ontario Lowlands to the north and the Appalachian Uplands to the south. The Ontario Lowlands slope toward the north and represent the southern extension of the Lake Ontario drainage basin, while the northern margin of the Appalachian Uplands includes the Finger Lakes troughs. The geology of the area in which the site is located consists of bedrock and overburden deposits. Bedrock in Central New York is dominated by flat-lying Sulurian-age and Devonian-age sedimentary rocks which have exhibit a slight southerly dip of approximately 100 feet per mile.

The Onondaga Lake Valley is underlain by the Vermon Formation which is a soft shale. The Vermon Formation is overlain by the Syracuse and Camillus Formations. The Syracuse Formation consists of shales, dolostones, gypsum, and rock salt. The Camillus Formation consists of soft, dolomitic shales and thin, gypsiferous shales. Bedrock at the site consists of the Camillus Formation.

The pre-glacial bedrock beneath the site was modified by overriding Pleistocene glaciers. Deepening of the Onondaga Valley by glacial ice, in manner similar to that which formed the Finger Lakes and surrounding valleys, produced a bedrock basin extending below sea level. Glacial sculpting of the area has produced a pronounced north-northwest to south-southeast orientation of hills and valleys. This orientation is partly the result of erosion of the underlying bedrock by glacial ice and till deposits into elliptical hills known as drumlins, which are predominantly composed of till. Till is typically a compact, unsorted, and poorly stratified mixture of sands, silt, clay, gravel, and boulders deposited by glacial ice. A layer of till 10 to 15 feet thick overlies bedrock in this area. In locations such as drumlins, the till is thicker, and in areas such as valleys and on uplands, the till is absent.

During glacial retreat in the Onondaga Valley, pre-glacial drainage to the north was blocked by an ice front producing a proglacial lake in which significant quantities of glaciolacustrine sediments were deposited. Drainage in adjacent north-south valleys, to the east and west of the Onondaga Valley, were also blocked by the ice front producing a series of lakes standing against the ice. As the level of the lakes rose, they utilized the lowest available drainage pathway which was predominantly to the south, over relatively high spillways or to the east or west over inter-valley divides. The large volumes of melt-water from the ice, spilling from one basin to another, cut numerous east-west trending channels into the valley divides. With the decay of the ice, lower spillways opened resulting in drainage of the proglacial lakes and the establishment of the existing system of lakes and surface drainage in the area.

During the time the proglacial lakes existed, they accumulated large volumes of sediment washed out from the ice and from the channels crossing the valley divides. These sediments consist primarily of fine sand and silt. Gravel, sand, and clay, however, are also present in some locations. Surficial soil deposits near the site have been mapped as lacustrine silt and clay, likely deposited as a result of the proglacial lakes.

1.4.2 Regional Hydrogeologic Setting

The site is situated within the Onondaga Lake drainage basin, which covers approximately 230 square miles, is included within the larger Eastern Oswego River drainage basin which covers approximately 2,500 square miles. Surface water drains north from the Onondaga Lake drainage basin into the Seneca River, into the Oswego River, and then into Lake Ontario. Surface water in the area of the site is influenced by Onondaga Lake and its tributaries. The tributary nearest to the site is Onondaga Creek, which is located ±600 feet south/southeast from the site.

Onondaga Creek, which flows from south to north through the Onondaga Valley and the City of Syracuse into Onondaga Lake, drains a watershed of approximately 100 square miles and has an average annual flow rate of approximately 190 cubic feet per second (cfs), before it discharges into the south end of Onondaga Lake. Onondaga Lake has been relocated from its former discharge point which was once located at the southeast corner of Onondaga Lake.

The geology of the Onondaga Valley has a significant impact on the movement of groundwater in the valley and its tributaries. The pre-development groundwater flow patterns and water quality have been changed by construction projects, waste disposal, and groundwater pumping. Groundwater flow in Onondaga Valley and its tributaries is primarily driven by topography. Water flows from the valley divides into the surface and groundwater systems within each tributary valley. Surface and groundwater then flow towards Onondaga Lake. The flow patterns, velocities, and the groundwater/surface water ratio in each tributary valley are dependent on the local geologic conditions within each valley. The site does not appear to directly overlie any aquifers and does not appear to be located near any primary or principal water supply aquifers as classified by the NYSDEC. A surficial aquifer is located approximately five (5) miles south of the site.

1.5 REVIEW OF EXISTING DATA

1.5.1 Soil Sampling Conducted Following 1981 Fire

C & H Engineers reviewed a Post-Standard newspaper article (date unknown) which indicated that, following the cleanup activities (circa November 1981), six (6) soil samples were collected from the site. Four (4) soil samples collected from the former waste oil disposal pit area yielded PCB concentrations below 50 ppm, and two (2) soil samples collected from the area where 80 barrels of waste oil had been stored yielded PCB concentrations of 93,000 ppm and 160 ppm. From the available information reviewed by C & H Engineers, there was no indication of any other "post-remediation" soil sampling or testing conducted at the site.

1.5.2 Soil Sampling Conducted by C & H Engineers

Under separate contract with the City of Syracuse, C & H Engineers collected composite soil samples from the site on October 25, 1995 (see Figure 1-3). The composite soil samples were analyzed for PCBs, polychlorinated dibenzo-dioxins (PCDDs), and polychlorinated dibenzo-furans (PCDFs). The soil sampling was based on EPA Document 560/5-85-026 ("Verification of PCB Spill Cleanup by Sampling & Analysis"), which is a statistically-based method developed for determining if PCB spills have been properly remediated. This method typically requires samples to be collected from a known PCB spill area, including adjacent areas around the PCB spill area The soil sampling methodology recommended by EPA Document 560/5-85-026 was slightly modified, however, to include sampling of soil from the subject property only. Thus, no soil sampling was conducted at adjacent properties. As a result, the modified soil sampling conducted by C & H Engineers in October 1995 was performed only for the purpose of "screening" surficial soils at the site for PCBs, PCDDs, and PCDFs.

The soil sampling performed by C & H Engineers included the collection of soil samples from 19 locations at the site. Each soil sample was collected from a depth of approximately six (6) inches using a hand auger. Five (5) composite samples were formed from the soil samples collected and each composite sample was analyzed as follows:

Composite	Samples	Analysis
1	1, 2, 15, 16, 17	PCBs
2	3, 4, 8, 9, 14	PCBs
3	10, 11, 12, 13	PCBs
4	5, 6, 7, 18, 19	PCBs
5	1, 2, 15, 16, 17	PCDDs, PCDFs

Upstate Laboratories, Inc. analyzed Composites 1, 2, 3, and 4 for PCBs (Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260) using EPA Method 8080 (see Attachment 1A). The PCB laboratory analysis results are summarized below for Composites 1, 2, 3, and 4.

Summary of PCB Analyses[1]

Composite	Samples	Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Total PCB
1	1, 2, 15, 16, 17	ND	ND	ND	ND	ND	ND	ND	ND
2	3, 4, 8, 9, 14	ND	ND	ND	ND	3 ppm	ND	ND	3 ppm
3	10, 11, 12, 13	ND	ND	ND	ND	ND	ND	ND	ND
4	5, 6, 7, 18, 19	ND	ND	ND	ND	ND	ND	ND	ND

As indicated, PCBs were detected in Composite 2 which was formed from five (5) individual soil samples collected from the south portion of the site in an area which appears to have been occupied by the south portion of the former Brown Manufacturing Building (west of residential lots located at 112 Huron Street and 114 Huron Street).

Triangle Laboratories, Inc. analyzed Composite 5 for PCDDs and PCDFs using EPA Method 8280 (see Attachment 1B). The PCDD and PCDF laboratory analysis results are summarized below for Composite 5.

Summary of PCDD/PCDF Analyses[2]

Composite	Samples	TCDD	PeCDD	HxCDD	HpCDD	TCDF	PeCDF	HxCDF	HPCDF
5	1, 2, 15, 16, 17	ND	ND	ND	ND	ND	ND	ND	ND
	MDLs =	<0.168	<1.17	<0.252	<0.337	<0.144	<0.685	<0.192	<0.0361

As indicated, no PCDDs or PCDFs were found in Composite 5 above the MDLs shown.

Following the fire which occurred at the site in 1981, the waste oil disposal pit, which was contaminated with PCBs, was apparently excavated and backfilled, however, no post-remediation soil sampling/testing was conducted to determine if residual PCBs are present in the subsurface soils at the site and/or at adjacent properties. In addition, based on previous use of the site for the manufacture of automobile parts, the existence of PCB wastes/contamination following the 1981 fire at the site, and the presence of PCBs found in Composite 2 formed from soil samples collected at the south end of the site by C & H Engineers in October 1995, soil and/or groundwater at the site may be contaminated with PCBs, metals, and/or petroleum compounds.

Section 2.0 ("Work Plan") discusses activities to be performed at the site, including the collection and analysis of samples of soil and groundwater, to determine if residual subsurface contamination exists at the site. The soil and groundwater samples to be collected will be analyzed for PCBs, Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), and Target Analyte List (TAL) metals.

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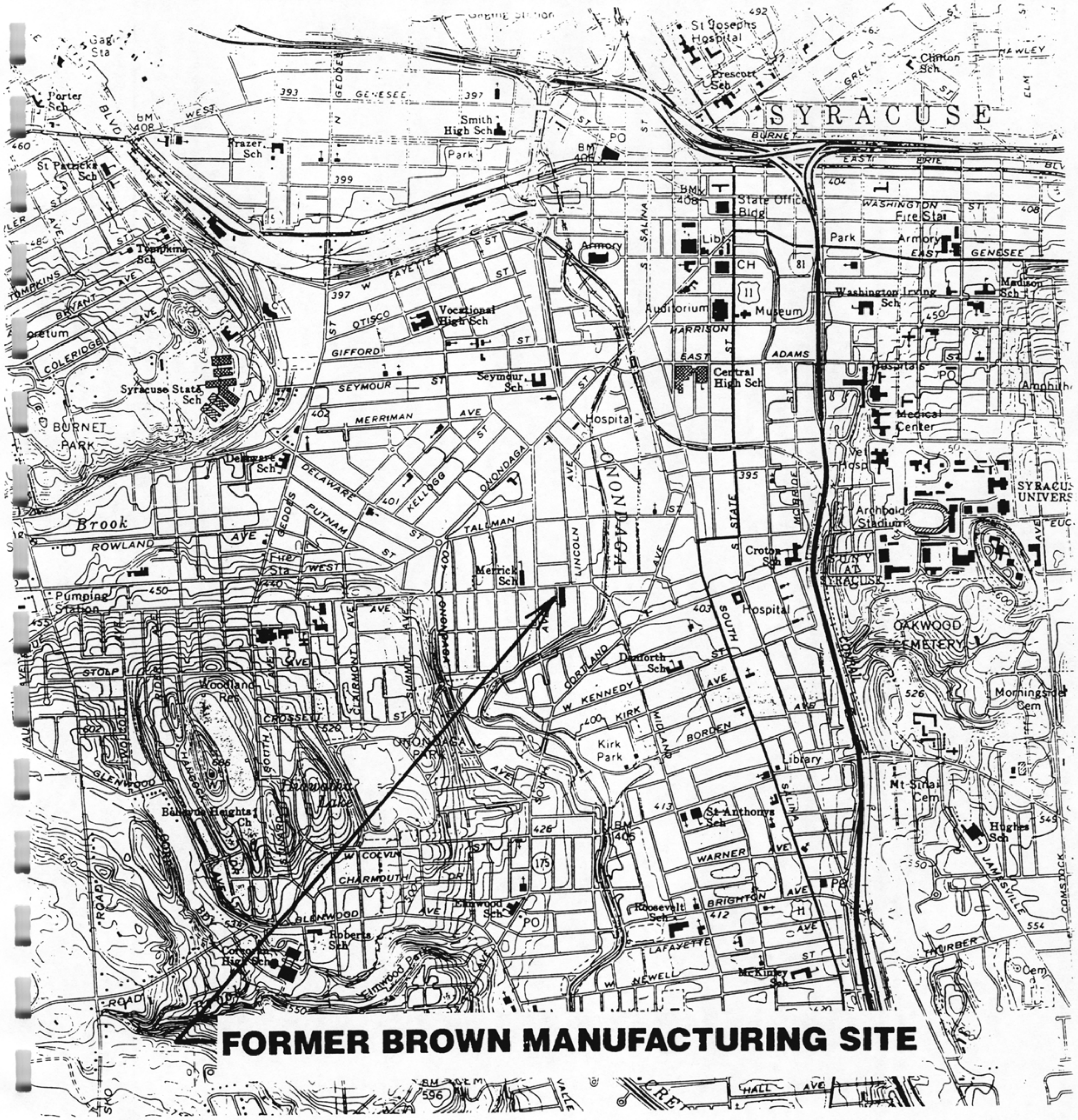
[1] PCB concentrations expressed in milligrams per kilogram (mg/kg) = parts per million (ppm).

[2] PCDD/PCDF Method Detection Limits (MDLs) expressed in parts per billion (ppb).



FORMER BROWN MANUFACTURING SITE

FIGURE 1-1 - LOCATION PLAN

Former Brown Manufacturing Site
101 Chester Street Property
Brownfields Project No. B-00024-7

Syracuse, New York

Scale: 1" = 2,000'

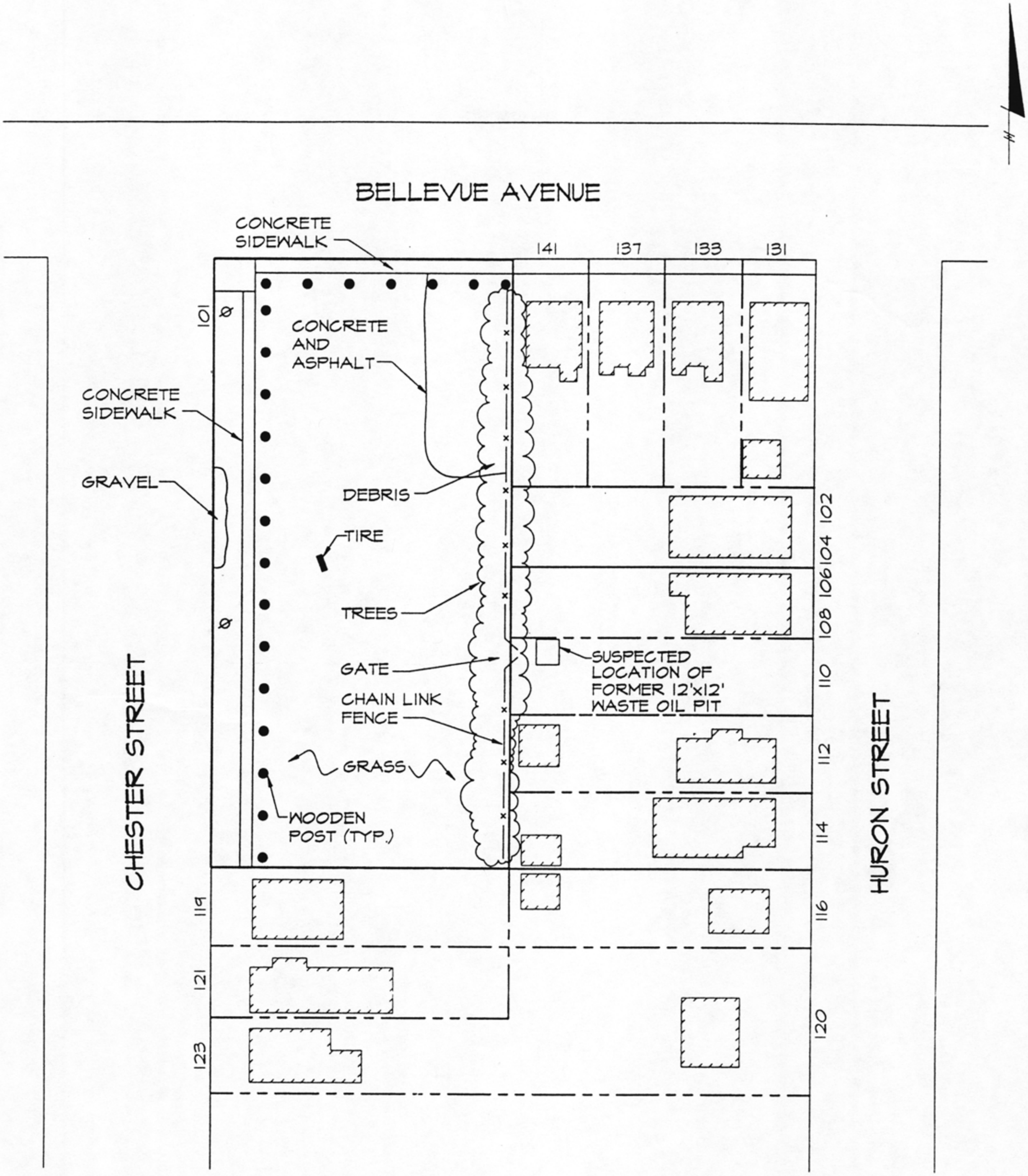


FIGURE 1-2 - PROPERTY BOUNDARY SKETCH

Former Brown Manufacturing Site
101 Chester Street Property
Brownfields Project No. B-00024-7

Syracuse, New York

Scale: 1" = 60'

26042

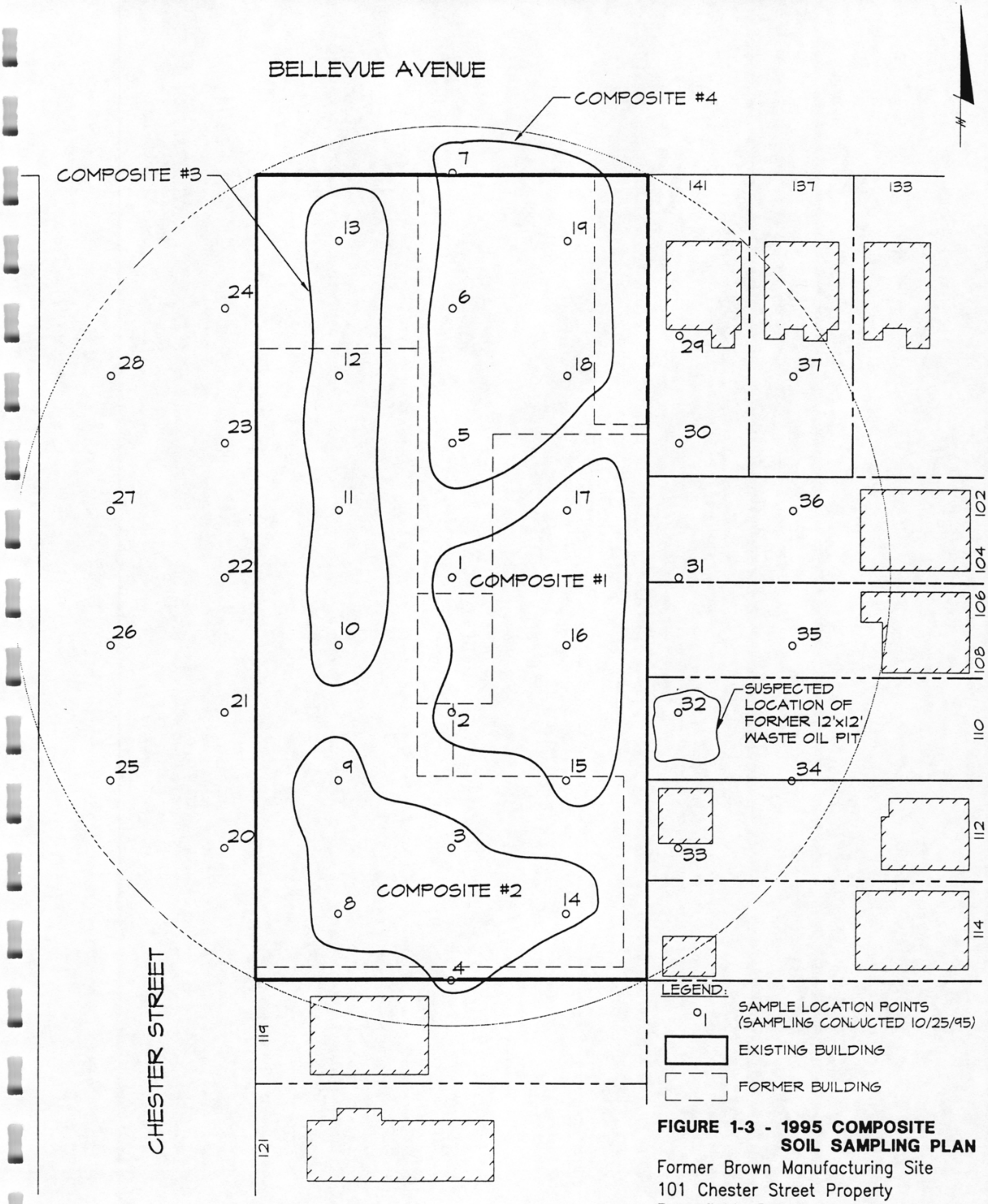


FIGURE 1-3 - 1995 COMPOSITE SOIL SAMPLING PLAN

Former Brown Manufacturing Site
101 Chester Street Property
Brownfields Project No. B-00024-7

Syracuse, New York

Scale: 1" = 40'

ATTACHMENT 1A

PCB Composite Soil Sample Analysis Report

Upstate Laboratories, Inc.

(Soil Samples Collected 10/25/95 by C & H Engineers)

DATE: 11/21/95

Upstate Laboratories, Inc.
Analysis Results
Report Number: 29995173
Client I.D.: C & H ENGINEERS, P.C.

APPROVAL:
QC:
Lab I.D.: 10170
Sampled by: Client

ID:29995173 Mat:Soil 26022/SOIL SCREENING COMP 1 (1,2,15,16,17) 1130-1330H 10/25/95 C

PARAMETERS	RESULTS	KEY	FILE#
Percent Solids	84%		WB0569
EPA Method 8280	See Attached		SC0001
PCB (Aroclors) by EPA Method 8080			
Aroclor 1016	<1mg/kg dw		PA2231
Aroclor 1221	<1mg/kg dw		PA2231
Aroclor 1232	<1mg/kg dw		PA2231
Aroclor 1242	<1mg/kg dw		PA2231
Aroclor 1248	<1mg/kg dw		PA2231
Aroclor 1254	<1mg/kg dw		PA2231
Aroclor 1260	<1mg/kg dw		PA2231
Total PCB	<1mg/kg dw		PA2231

ID:29995174 Mat:Soil 26022/SOIL SCREENING COMP 2 (3,4,8,9,14) 1200H 10/25/95 C

PARAMETERS	RESULTS	KEY	FILE#
Percent Solids	86%		WB0569
PCB (Aroclors) by EPA Method 8080			
Aroclor 1016	<1mg/kg dw		PA2231
Aroclor 1221	<1mg/kg dw		PA2231
Aroclor 1232	<1mg/kg dw		PA2231
Aroclor 1242	<1mg/kg dw		PA2231
Aroclor 1248	3mg/kg dw		PA2231
Aroclor 1254	<1mg/kg dw		PA2231
Aroclor 1260	<1mg/kg dw		PA2231
Total PCB	3mg/kg dw		PA2231

dw = Dry weight

DATE: 11/21/95

Upstate Laboratories, Inc.
Analysis Results
Report Number: 29995173
Client I.D.: C & H ENGINEERS, P.C.

APPROVAL:
QC:
Lab I.D.: 10170
Sampled by: Client

ID:29995175 Mat:Soil 26022/SOIL SCREENING COMP 3 (10,11,12,13) 1230H 10/25/95 C

PARAMETERS	RESULTS	KEY	FILE#
Percent Solids	87%		WB0569
PCB (Aroclors) by EPA Method 8080			
Aroclor 1016	<1mg/kg dw		PA2231
Aroclor 1221	<1mg/kg dw		PA2231
Aroclor 1232	<1mg/kg dw		PA2231
Aroclor 1242	<1mg/kg dw		PA2231
Aroclor 1248	<1mg/kg dw		PA2231
Aroclor 1254	<1mg/kg dw		PA2231
Aroclor 1260	<1mg/kg dw		PA2231
Total PCB	<1mg/kg dw		PA2231

ID:29995176 Mat:Soil 26022/SOIL SCREENING COMP 4 (5,6,7,18,19) 1300H 10/25/95 C

PARAMETERS	RESULTS	KEY	FILE#
Percent Solids	83%		WB0569
PCB (Aroclors) by EPA Method 8080			
Aroclor 1016	<1mg/kg dw		PA2231
Aroclor 1221	<1mg/kg dw		PA2231
Aroclor 1232	<1mg/kg dw		PA2231
Aroclor 1242	<1mg/kg dw		PA2231
Aroclor 1248	<1mg/kg dw		PA2231
Aroclor 1254	<1mg/kg dw		PA2231
Aroclor 1260	<1mg/kg dw		PA2231
Total PCB	<1mg/kg dw		PA2231

dw = Dry weight

Upstate Laboratories inc.

Shipping: 6034 Corporate Drive • East Syracuse, New York 13057 • (315) 437-0255
Mailing: Box 289 • Syracuse, New York 13206
Southern Region (607) 724-0478
Western Region (716) 436-9070
Eastern Region (518) 459-3134
N. Jersey Region (201) 703-1324

INFORMATION REGARDING YOUR CHAIN OF CUSTODY RECORD

Any information on the Chain of Custody Record that appears in parentheses may be information that did not originally appear, and was later added by ULI personnel.

Please let one of our Environmental Project Coordinators (EPC) know if we could provide you with a typed Chain of Custody Record for this or any of our projects. This typed Chain of Custody Record may facilitate a faster turnaround time of your project through our laboratory.

Thank you.

6034 Corporate Drive • E. Syracuse, NY 13057-1017
(315) 437 0255
Fax 437 1209

Chain Of Custody Record

11/8

Client: C&H ENGINEERS		Client Project # / Project Name: 26022 / SOIL SCREENING		Special Turnaround Time 2 WKS (Lab Notification required)
Client Contact: STEVE MAHANA	Phone # 472-6980	Site Location (city/state): 101 CHESTER STREET		

Sample Location:	Date	Time	Matrix	Grab or Comp.	ULI Internal Use Only	No. of Con-tainers	1) PCBs	2) Dioxin + Furans	3)	4)	5)	6)	7)	8)	9)	10)	Remarks
Comp. #1 (1,2,15,16,17)	10/25/95	11:30A	SOIL	Comp.	29995173	5	X		(X)					5	:1		PO#3597 FORM COMPOSITES FROM EQUAL QUANTITIES OF EACH SAMPLE INDICATED FOR EACH COMPOSITE
Comp. #2 (3,4,8,9,14)	10/25/95	12:00P	SOIL	Comp.	174	5	X		(X)					5	:1		
Comp. #3 (10,11,12,13)	10/25/95	12:30P	SOIL	Comp.	175	4	X		(X)					4	:1		
Comp. #4 (5,6,7,18,19)	10/25/95	1:00P	SOIL	Comp.	176	5	X		(X)					5	:1		
Comp. #5 (1,2,15,16,17)	10/25/95	1:30P	SOIL	Comp.		05		X									

parameter and method	sample bottle: type	size	pres.
1) PCBs (COMPOSITES #1, #2, #3, #4)	GLASS	1 QT.	—
2) ~~PCBs~~ DIOXIN & FURANS (COMP. #5 ONLY)	GLASS	1 QT.	—
3) ~~PCBs~~ (% SOLIDS)			
4) ~~PCBs~~			
5)			
6)			
7)			
8)			
9)			
10)			

Note: The numbered columns above cross-reference with the numbered columns in the upper right-hand corner.

Sampled by: (Please Print) STEVE MAHANA
Company: C&H ENGINEERS

ULI Internal Use Only
Delivery (check one):
☐ ULI Sampled
☐ Pickup ☒ Dropoff
☐ CC ______

Relinquished by: (Signature)	Date	Time	Received by: (Signature)
Steph M Mahana	10/25	2:40P	

Relinquished by: (Signature)	Date	Time	Rec'd for Lab by: (Signature)
	10/25/95	1440	C Naydek

Syracuse Rochester Buffalo Albany Binghamton Fair Lawn (NJ)

ATTACHMENT 1B

PCDD/PCDF Composite Soil Sample Analysis Report

Triangle Laboratories, Inc.

(Soil Samples Collected 10/25/95 by C & H Engineers)

TRIANGLE LABS

CASE NARRATIVE

Analysis of Samples for the Presence of

Polychlorinated Dibenzo-*p*-Dioxins and Dibenzofurans by

High-Resolution Chromatography / Low-Resolution Mass Spectrometry

Method 8280 Rev. 0 (9/86)

Date: November 17, 1995

Client ID: Upstate Laboratories, Inc.

P.O. Number: 3597

TLI Project Number: 34747

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Rev. 06/21/95

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729

P.O. Box 13485
Research Triangle Park, NC 27709-3485
Fax # 919-544-5491

Overview

The sample and any associated QC sample were extracted and analyzed according to procedures described in EPA Method 8280. Any particular difficulties encountered during the sample handling by Triangle Laboratories will be discussed in the QC Remarks section below. Results reported relate only to the items tested.

Sample Extraction

The solid samples have been Soxhlet-Dean Stark extracted with toluene to produce a final extract. Eighty percent of the extract was archived while twenty percent was processed through the cleanup procedures.

The cleanup of extracts may include the use of bulk acid/base washes, and acid silica, basic silica, activated alumina, and carbon column liquid chromatography.

Sample Analysis

A five point initial calibration curve was analyzed, in triplicate, on each instrument used for sample analysis. Calibration ranges are listed below and are based on sample size. A continuing calibration check and a column performance evaluation are analyzed at the beginning of each twelve hour period of sample analysis. The column performance solution, which is used to evaluate the GC resolution is also performed at the end of each twelve hour analytical sequence.

Calibration Ranges

Compounds	**Solid** (10 g sample)	**Water** (1 L sample)	
	ppb (µg/Kg)	ppt (ng/L)	ppb (µg/L)
TCDD/TCDF PeCDD/PeCDF	1-20	10-200	0.01-0.2
HxCDD/HxCDF HpCDD/HpCDF	2.5-50	25-500	0.025-0.5
OCDD/OCDF	5-100	50-1000	0.05-1.0

Some of the labeled standards used in the analysis have ion fragments with the same mass as the quantitation mass of some of the analytes. These lower mass fragments appear as peaks or 'breakthrough' in the analyte channels. This can often be witnessed in the cases of $^{13}C_{12}$-TCDF internal standard appearing in the TCDD analyte channels, $^{13}C_{12}$-HxCDD internal and recovery standards appearing the HpCDF analyte channels, and $^{13}C_{12}$-HpCDF internal standard appearing the HpCDD analyte channels. For most of the above situations, the interfering peaks due to the labeled standards lie outside the retention time window of the analyte. In the case of TCDD/TCDF, the interferences usually lie within the retention time window. Whenever breakthrough peaks occur from the labeled standards, these peaks are reported as EMPCs, and may be considered artifacts from the labeled standards. This is a limitation caused by the use of low-resolution mass spectrometry, recommended in the method.

Quality Control Samples

A laboratory method blank, identified as the TLI soil Blank, was prepared along with the sample. One such sample per 20 field samples (or less) of a given matrix is prepared.

The advisory quality control range for internal and clean-up standard percent recoveries is 40-120 percent recovery (25-120 for the OCDD internal standard). If recoveries are below the advisory range, analyte results are judged to be valid as long as the ratio of signal to noise for the standard is greater than ten to one and the percent recovery is greater than ten percent.

Quality Control Remarks

This release of this particular set of Upstate Laboratories, Inc. analytical data by Triangle Laboratories was authorized by the Quality Control Chemist who has reviewed each sample data package individually following a series of inspections/reviews. When applicable, general deviations from acceptable QC requirements are identified below and comments are made on the effect of these deviations upon the validity and reliability of the results. Specific QC issues associated with this particular project are:

Sample receipt: One soil sample was received from Upstate Laboratories, Inc. at 15 °C in good condition October 30, 1995 and was stored in a refrigerator at 4°C until the time of extraction.

Sample Preparation Laboratory: None

Mass Spectrometry: None

Data Review: The internal and cleanup standards for these samples are within the QC advisory limits of 40-120 percent (25-120 percent for the OCDD internal standard) or meet ten to one signal to noise criteria in all cases.

Other Comments: No 2,3,7,8-substituted target analytes were detected in the TLI Blank above the method detection limit (MDL).

Sample Calculations:

Method 8280 does not specify which of the two monitored masses to use for quantitation of all of the isotope-labeled standards. Following the pattern established by the method, we have selected which mass to use for each analyte and standard based on the theoretical ratio. For groups with theoretical ratios that are greater than one (the pentas, hexas and heptas), the first monitored mass should be larger and is therefore used for quantitation. For channels with theoretical ratios of less than one (the tetras and octas), the second monitored mass should generally be larger and is used for quantitation.

Analyte Concentration

The concentration or amount of any analyte is calculated using the following expression.

$$C_{(\sigma)} = \frac{A_\sigma * Q_\beta}{A_\beta * RRF_{(\sigma)} * W}$$

Where:

$C_{(\sigma)}$ is the concentration or amount of a given analyte,

A_σ is the integrated ion current of the quantitation ion of the analyte,

A_β is the integrated ion current of the quantitation ion of the corresponding internal standard,

Q_β represents the amount of internal standard added to the sample before extraction,

$RRF_{(\sigma)}$ is the analyte relative response factor from the continuing calibration and,

W is the sample weight or volume

Detection Limits

The detection limit reported for a target analyte was derived from a method validation study performed by Triangle Laboratories, Inc. The reported detection limit has been adjusted for each sample using the actual sample size extracted and any dilution factors associated with that sample analysis.

Data Flags

In order to assist with data interpretation, data qualifier flags are used on the final reports. Please note that all data qualifier flags are subjective and are applied as consistently as possible. Each flag has been reviewed by two independent Chemists and the impact of the data qualifier flag on the quality of the data discussed above. The most commonly used flags are:

A **'B'** flag is used to indicate that an analyte has been detected in the laboratory method blank as well as in an associated field sample. The 'B' flag will be used only when the concentration of analyte found in the sample is less than 20 times that found in the associated blank. This flag denotes possible contribution of background laboratory contamination to the concentration or amount of that analyte detected in the field sample. Under Triangle Laboratories guidelines, a laboratory blank is acceptable if the analyte levels are all below the target detection limits (TDLS) or if the contamination levels are less than 5% of the levels detected in the associated field samples. If these conditions are satisfied or if the blank is unable to be reextracted, the interpretation of the contamination levels relative to the samples should be as follows: 1) analyte quantitations should be considered valid if the level of blank contamination is less than five percent of the level detected in the field sample, 2) analyte quantitations should be considered estimated if the analyte level in the sample is five to twenty times the level of the analyte in the blank, or 3) analytes whose level in a sample is the same as or less than five times the level detected in the associated blank should be considered present likely due to laboratory contamination and not native to the sample.

An **'E'** flag is used to indicate that a PCDF peak has eluted at the same time as the associated diphenyl ether (DPE) and that the DPE peak intensity is ten percent or more of the total PCDF peak intensity. Total PCDF values are flagged 'E' if the total DPE contribution to the total PCDF value is greater than ten percent. All PCDF peaks that are significantly influenced by the presence of DPE peaks are quantitated with EMPC values, regardless of the isotopic abundance ratio. These EMPC values are most likely overestimated due to the DPE contribution to the peak area.

An **'I'** flag is used to indicate labeled standards have been interfered with on the GC column by coeluting, interferent peaks. The interference may have caused the standard's area to be overestimated. All quantitations relative to this standard, therefore, may be underestimated.

A **'PR'** flag is used to indicate that a GC peak is poorly resolved. This resolution problem may be seen as two closely eluting peaks without a reasonable valley between the peak tops, overly broad peaks, or peaks whose shapes vary greatly from a normal distribution. The concentrations or amounts reported for such peaks are most likely overestimated.

An **'RO'** flag is used to indicate that a labeled standard has an ion abundance ratio that is outside of the acceptable QC limits, most likely due to a coeluting interference. This may have caused the percent recovery of the standard to be overestimated. All quantitations versus this standard, therefore, may be underestimated.

An **'S'** flag indicates that the response of a specific PCDD/PCDF isomer has exceeded the normal dynamic range of the mass spectrometer detection system. The corresponding signal is saturated and the reported analyte concentration is a 'minimum estimate'. When the 'S' qualifier is used in the reporting of 'totals', there is saturation of one (not necessarily from a specific isomer) or more saturated signals for a given class of compounds.

A **'U'** flag is used to indicate that a specific isomer cannot be resolved from a large, coeluting interferent GC peak. The specific isomer is reported as not detected as a valid concentration cannot be determined. The calculated detection limit, therefore, should be considered an underestimated value.

A **'V'** flag is used to indicate that, although the percent recovery of a labeled standard may be below a specific QC limit, the signal-to-noise ratio of the peak is greater than ten-to-one. The standard is considered reliably quantifiable. All quantitations derived from the standard are considered valid as well.

The value reported for 'EMPCs' represents the estimated maximum possible concentration reported for GC/MS peaks eluting within the retention time windows established by the daily GC performance analysis, and which are characterized by a signal to noise ratio in excess of 2.5 to 1, but which do not meet the ion abundance ratio criteria. The 'EMPC' is calculated by using the same expression used for reporting the identified analyte concentrations. An EMPC can be reported for a non-detected specific isomers (e.g. 2,3,7,8-TCDD) but can also be reported for 'totals' (e.g. Total TCDD) in which case the 'total' EMPC represents the sum of all the positively identified PCDD/PCDF peaks and of the peaks that do not meet all the identification criteria.

By our interpretation, the analytical data in this project are valid based on the guidelines of EPA Method 8280. Any specific QC concerns or problems have been discussed in the QC Remarks section of this case narrative with emphasis on their affect on the data. Should Upstate Laboratories, Inc. have any questions or comments regarding this data package, please feel free to contact our Project Scientist
Mary McDonald, at 919/544-5729.

For Triangle Laboratories, Inc.,

Report Preparation	Quality Control
	Rose V. West 11-17-95
Bracha Rosenberg Report Preparation Chemist	Rose West Report Preparation Chemist

The total number of pages in the data package is : ________ .

Upstate Laboratories, Inc.

TL-RTP Project: 34747
Client Sample: 29995173
Client Project: n/a

Method 8280 PCDD/PCDF Analysis (b)
Analysis File: B951479
Matrix: SOIL

PCDD/PCDF SUMMARY REPORT

Specific Analytes	Conc. (ppb)	DL (ppb)	Blank (ppb)
2,3,7,8-TCDD	ND	0.168	ND
1,2,3,7,8-PeCDD	ND	1.17	ND
1,2,3,4,7,8-HxCDD	ND	0.0842	ND
1,2,3,6,7,8-HxCDD	ND	0.252	ND
1,2,3,7,8,9-HxCDD	ND	0.252	ND
1,2,3,4,6,7,8-HpCDD	ND	0.337	ND
1,2,3,4,6,7,8,9-OCDD	ND	0.433	ND
2,3,7,8-TCDF	ND	0.144	ND
1,2,3,7,8-PeCDF	ND	0.565	ND
2,3,4,7,8-PeCDF	ND	0.685	ND
1,2,3,4,7,8-HxCDF	ND	0.12	ND
1,2,3,6,7,8-HxCDF	ND	0.12	ND
2,3,4,6,7,8-HxCDF	ND	0.301	ND
1,2,3,7,8,9-HxCDF	ND	0.192	ND
1,2,3,4,6,7,8-HpCDF	ND	0.228	ND
1,2,3,4,7,8,9-HpCDF	ND	0.0361	ND
1,2,3,4,6,7,8,9-OCDF	ND	0.265	ND

Definitions:

Conc. - The concentration of the specific analyte in the units shown.

DL - The detection limit of the specific analyte in the units shown.

Blank - The concentration of the method blank.

ND - (Non-Detect) The concentration of the analyte is less than the detection limit.

Total Analytes	Conc. (ppb)	DL (ppb)
Total TCDD	ND	0.168
Total PeCDD	ND	1.17
Total HxCDD	ND	0.252
Total HpCDD	ND	0.337
Total TCDF	ND	0.144
Total PeCDF	ND	0.685
Total HxCDF	ND	0.192
Total HpCDF	ND	0.0361

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Upstate Laboratories, Inc.

TL-RTP Project: 34747
Client Sample: 29995173

Method 8280 PCDD/PCDF Analysis (b)
Analysis File: B951479

Client Project:	n/a				
Sample Matrix:	SOIL	Date Received:	10/30/95	Spike File:	SP828050
TLRTP ID:	108-152-1	Date Extracted:	11/03/95	ICal:	B85519A
		Date Analyzed:	11/15/95	ConCal:	B951468
Sample Size:	10.020 g	Dilution Factor:	n/a	% Moisture:	17.0
Dry Weight:	8.317 g	Blank File:	B951478	% Lipid:	n/a
GC Column:	DB-5	Analyst:	CA	% Solids:	83.0

Analytes	Conc. (ppb)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.168				—
1,2,3,7,8-PeCDD	ND	1.17				—
1,2,3,4,7,8-HxCDD	ND	0.0842				—
1,2,3,6,7,8-HxCDD	ND	0.252				—
1,2,3,7,8,9-HxCDD	ND	0.252				—
1,2,3,4,6,7,8-HpCDD	ND	0.337				—
1,2,3,4,6,7,8,9-OCDD			2.4			—
2,3,7,8-TCDF	ND	0.144				—
1,2,3,7,8-PeCDF	ND	0.565				—
2,3,4,7,8-PeCDF	ND	0.685				—
1,2,3,4,7,8-HxCDF	ND	0.12				—
1,2,3,6,7,8-HxCDF	ND	0.12				—
2,3,4,6,7,8-HxCDF	ND	0.301				—
1,2,3,7,8,9-HxCDF	ND	0.192				—
1,2,3,4,6,7,8-HpCDF	ND	0.228				—
1,2,3,4,7,8,9-HpCDF	ND	0.0361				—
1,2,3,4,6,7,8,9-OCDF	ND	0.265				—

Totals	Conc. (ppb)	Number	DL	EMPC	Flags
Total TCDD		0		23.6	—
Total PeCDD	ND	0	1.17		—
Total HxCDD	ND	0	0.252		—
Total HpCDD	ND	0	0.337		—
Total TCDF		0		3.62	—
Total PeCDF	ND	0	0.685		—
Total HxCDF	ND	0	0.192		—
Total HpCDF		0		0.163	—

Upstate Laboratories, Inc.

TL-RTP Project: **34747**
Client Sample: **29995173**

Method 8280 PCDD/PCDF Analysis (b)
Analysis File: **B951479**

Internal Standards	Conc. (ppb)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	4.73	78.7	40%-120%	0.81	24:07	—
$^{13}C_{12}$-2,3,7,8-TCDD	4.67	77.7	40%-120%	0.81	24:56	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	5.79	96.3	40%-120%	1.36	32:05	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	7.12	59.2	40%-120%	1.09	33:48	—
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	7.2	59.9	25%-120%	0.90	38:12	—

Clean-Up Standard	Conc. (ppb)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	2.48	82.6	40%-120%	24:57	—

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.82	24:29	—
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.26	32:16	—

Data Reviewer: ______________________ 11/17/95

Upstate Laboratories, Inc.

TL-RTP Project: 34747
Client Sample: 29995173

Toxicity Equivalents Report
Analysis File: B951479

Client Project:	n/a				
Sample Matrix:	SOIL	Date Received:	10/30/95	Spike File:	SP828050
TLRTP ID:	108-152-1	Date Extracted:	11/03/95	ICal:	B85519A
		Date Analyzed:	11/15/95	ConCal:	B951468
Sample Size:	10.020 g	Dilution Factor:	n/a	% Moisture:	17.0
Dry Weight:	8.317 g	Blank File:	B951478	% Lipid:	n/a
GC Column:	DB-5	Analyst:	CA	% Solids:	83.0

Analytes	Conc. (ppb)		TEF		Equivalent
2,3,7,8-TCDD	ND	x	1	=	0
1,2,3,7,8-PeCDD	ND	x	0.5	=	0
1,2,3,4,7,8-HxCDD	ND	x	0.1	=	0
1,2,3,6,7,8-HxCDD	ND	x	0.1	=	0
1,2,3,7,8,9-HxCDD	ND	x	0.1	=	0
1,2,3,4,6,7,8-HpCDD	ND	x	0.01	=	0
1,2,3,4,6,7,8,9-OCDD	ND	x	0.001	=	0
2,3,7,8-TCDF	ND	x	0.1	=	0
1,2,3,7,8-PeCDF	ND	x	0.05	=	0
2,3,4,7,8-PeCDF	ND	x	0.5	=	0
1,2,3,4,7,8-HxCDF	ND	x	0.1	=	0
1,2,3,6,7,8-HxCDF	ND	x	0.1	=	0
2,3,4,6,7,8-HxCDF	ND	x	0.1	=	0
1,2,3,7,8,9-HxCDF	ND	x	0.1	=	0
1,2,3,4,6,7,8-HpCDF	ND	x	0.01	=	0
1,2,3,4,7,8,9-HpCDF	ND	x	0.01	=	0
1,2,3,4,6,7,8,9-OCDF	ND	x	0.001	=	0

Total 2,3,7,8-TCDD Toxicity (1989 ITF) Equivalents: 0 ppb

Printed: 15:31 11/17/95

2.1 INTRODUCTION

The objective of this Work Plan is to describe the steps associated with the Site Investigation (SI) activities to be conducted by C & H Engineers to characterize the extent of contamination at the site and to assess the potential for off-site contamination. The purpose of the SI activities is to identify the presence and concentrations of polychlorinated biphenyls (PCBs), Target Compound List (TCL) volatile organic compounds (VOCs), and TCL semi-volatile organic compounds (SVOCs) which may exist in various soil layers and/or groundwater at the site, and to identify the presence and concentrations of Target Analyte List (TAL) metals which may exist in upper soil layers at the site as a result of former manufacturing operations conducted at the site; as a result of a fire which occurred at the site in August 1981; and as a result of cleanup activities which were performed at the site following the fire.

2.2 SITE INVESTIGATION ACTIVITIES

In general, the SI activities will include installation of 37 soil borings, five (5) trench excavations, and five (5) groundwater monitoring wells at the site. C & H Engineers will utilize a hand-held photoionization detector (PID) to screen exposed and excavated soils for volatile organic compounds (VOCs), and will collect soil samples for PCB immunoassay testing. Based on visual observations, PID readings, and PCB immunoassay testing results, 12 soil samples will be collected for PCBs analysis and 13 soil samples each will be collected for TCL VOCs, TCL SVOCs, and TAL metals analyses. In addition, one (1) round of groundwater sampling will be conducted to include the collection of five (5) groundwater samples each for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses.

Following laboratory analysis of the soil and groundwater samples, C & H Engineers will prepare a Site Investigation/Remedial Alternatives Report (SI/RAR) summarizing the SI activities and presenting Remedial Alternatives (RAs) that may be used to clean up the site. Specific activities related to the soil borings, trench excavations, and groundwater sampling are discussed below.

2.2.1 Soil Borings & Sampling

A total of 37 soil borings will be advanced at the site including 27 soil borings using a truck-mounted "Geoprobe" system and 10 hand-borings using a stainless steel soil sampling auger (see Figure 2-1). The hand-borings will be advanced in a grid-pattern in the vicinity of the "hot spot" where the New York State Department of Health (NYSDOH) has previously identified elevated PCB concentrations. At each of the 27 Geoprobe borings and 10 hand-borings, C & H Engineers will collect one (1) shallow soil boring sample to a depth of six (6) inches below grade for PCB immunoassay testing (37 PCB immunoassay tests). Ten (10) percent of these soil samples (4 samples) will then be subjected to PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses.

Thereafter, 21 of the 27 Geoprobe borings (nos. 1 through 10, 14, 15, and 19 through 27) will be advanced to a maximum depth of 10 feet or to the top of groundwater, whichever is encountered first (see Figure 2-1). The six (6) remaining Geoprobe borings located in the east-central portion of the site (nos. 11, 12, 13, 16, 17, and 18) will be advanced to groundwater (see Figure 2-1). At each of the 27 Geoprobe borings, C & H Engineers will collect soil samples at continuous intervals of two (2) feet deep. The Geoprobe macro-cores will be visually observed and screened for VOCs using a PID. The soil samples from each 2-foot interval will then be placed into re-sealable plastic bags, allowed to warm to approximately 70° F, and then the headspace will be screened for VOCs using the PID. The soil sample interval exhibiting the highest in-situ PID reading, or the highest PID headspace reading, or which otherwise exhibited stains or odors, will be subjected to PCB immunoassay testing (27 PCB immunoassay tests). Ten (10) percent of these soil samples (3 samples) will then be subjected to confirmatory PCBs analysis, and four (4) of these soil samples will be subjected to TCL VOCs, TCL SVOCs, and TAL metals analyses.

2.2.2 Trench Excavations & Soil Sampling

Five (5) trench excavations will be made in a criss-cross pattern on the east-central portion of the site (see Figure 2-1). The three (3) north-south trench excavations will have a maximum length of 100 feet each, and the two (2) east-west trench excavations will have a maximum length of 75 feet each. The five (5) trench excavations will have a maximum depth of five (5) feet.

Upon excavating each 10-foot length of a trench to five (5) feet deep, the bottom and sidewalls of the open excavation will be observed for stains and odors, and will be screened for VOCs using a PID. As the soils in each trench excavation are screened for VOCs using the PID, wooden stakes with labels will be used to mark locations exhibiting elevated PID readings. Thereafter, four (4) soil samples will be collected from the marked locations at each trench excavation where in-situ soils exhibited the highest PID readings and each will be subjected to PCB immunoassay testing (20 PCB immunoassay tests). In addition, one (1) soil sample from each trench excavation (5 samples) will be subjected to confirmatory PCBs analysis.

The four (4) soil samples collected from each trench excavation where in-situ soils exhibited the highest PID readings will also be placed into re-sealable plastic bags, allowed to warm to approximately 70° F, and then the headspace will be screened for VOCs using the PID. The one (1) soil sample from each trench excavation exhibiting the highest PID headspace reading or which otherwise exhibited stains or odors (5 samples), will be subjected to TCL VOCs, TCL SVOCs, and TAL metals analyses. After the sampling activities are conducted, the excavated soil will be backfilled into the trenches and up to 50 cubic yards of "clean fill" material will be placed over the area of the trench excavations.

2.2.3 Groundwater Sampling

A total of five (5) groundwater monitoring wells will be installed at the site (see Figure 2-1). Upon installation and development of the groundwater monitoring wells, turbidity of the groundwater in each well will be measured prior to collection of the groundwater samples. If the turbidity of the groundwater at any well exceeds 50 NTU, the groundwater will be filtered prior to collection of the samples. One (1) groundwater sample will be collected each of the five (5) monitoring wells, (total of 5 groundwater samples) for PCBs, TCL VOCs, TCL SVOCs, and TAL metals.

2.3 SI/RAR PREPARATION

Upon completion of the SI activities and following laboratory analysis of the soil and groundwater samples collected from the site, C & H Engineers will prepare a SI/RAR summarizing the SI activities and the results of the laboratory analyses. In addition, the SI/RAR will discuss proposed RAs that may be used to clean up the site. The SI/RAR will identify or otherwise address the following:

1. The amount, concentration, persistence, mobility, state, and other relevant characteristics of the contaminants identified at the site;

2. Extent to which natural or manmade barriers currently contain the contamination identified at the site;

3. Extent to which the identified contaminants have migrated or could have migrated, and whether such migration could pose a risk to human health or the environment;

4. Potential routes of contaminant exposure;

5. Populations and environmental receptors at risk;

6. Hydrogeologic factors;

7. Groundwater characteristics and current and potential groundwater use;

8. Sampling of private drinking water wells in the immediate vicinity of the site;

9. Surface water classifications and existing use designations, and the impact of the contamination;

10. Potential for the site's contribution to air, land, water, biota, and/or food chain contamination problems; and

11. Extent to which contaminant levels at the site pose an unacceptable risk to public health and/or the environment.

In general, key components of the SI/RAR will include:

1. Executive Summary
2. Introduction
3. Study Area Investigation
4. Physical Characteristics of the Study Area
5. Nature and Extent of Contamination
6. Contaminant Fate and Transport
7. Baseline Risk Assessment (if appropriate)
8. Summary and Conclusions
9. Appendices

C & H Engineers will initially prepare a Draft SI/RAR which will be submitted to the City of Syracuse, New York State Department of Environmental Conservation (NYSDEC), and NYSDOH for review. Following review of the Draft SI/RAR, C & H Engineers will submit a Final SI/RAR to the City of Syracuse, NYSDEC, and NYSDOH.

2.4 PROJECT SCHEDULE

Following C & H Engineers' issuance of the SI/RAR, the NYSDEC will issue a Proposed Remedial Action Plan (PRAP) summarizing the proposed remedy for the subject property based on the findings of the SI/RAR. The City of Syracuse will then notify the public and allow a 45-day comment period to receive written comments on the PRAP. If substantive issues about the proposed remedy for the subject property are raised, a public meeting may be held during the 45-day comment period. After the 45-day comment period, public comments will be addressed through a Responsiveness Summary (RS). The City of Syracuse will assist the NYSDEC in the preparation of the RS. All issues raised and responded to in the RS will be considered by the NYSDEC in formulating a Record of Decision (ROD). Once the ROD has been finalized, the City of Syracuse will be notified in writing by the NYSDEC that it may proceed with remedial action at the subject property.

Key components of the project include preparation and approval of a SI/RAR Work Plan, subcontractor procurement, conducting the SI activities, preparation of a SI/RAR, preparation of a PRAP, public notification and 45-day comment period, holding a public hearing (if deemed necessary), preparation of a RS, and formulation of a ROD. A project schedule is presented as Figure 2-2 identifying approximate timeframes for the key components of the project. The timeframes for completion of the key components of the project, however, are directly dependent on review and approval of this Work Plan, subcontractor procurement, and weather conditions.

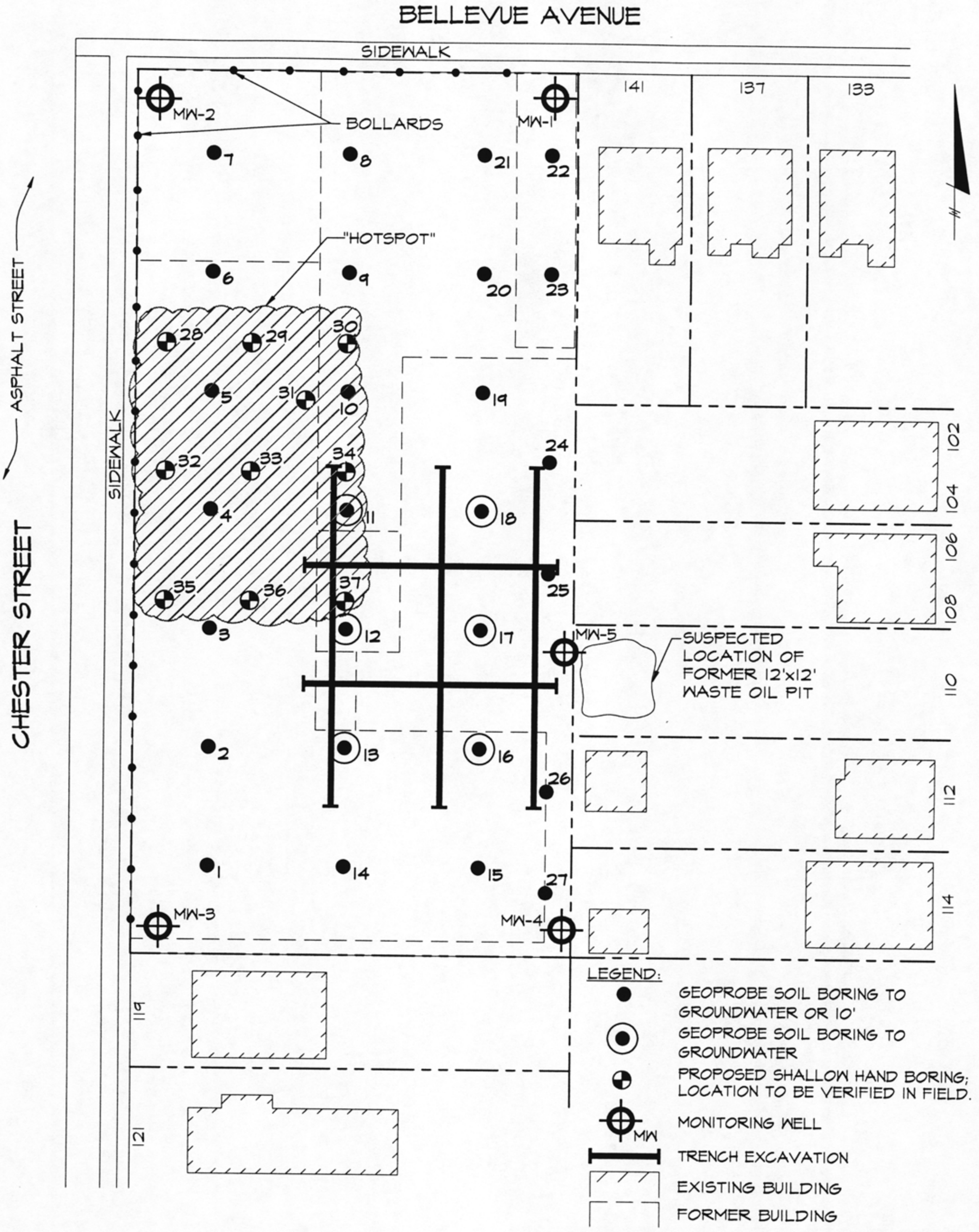


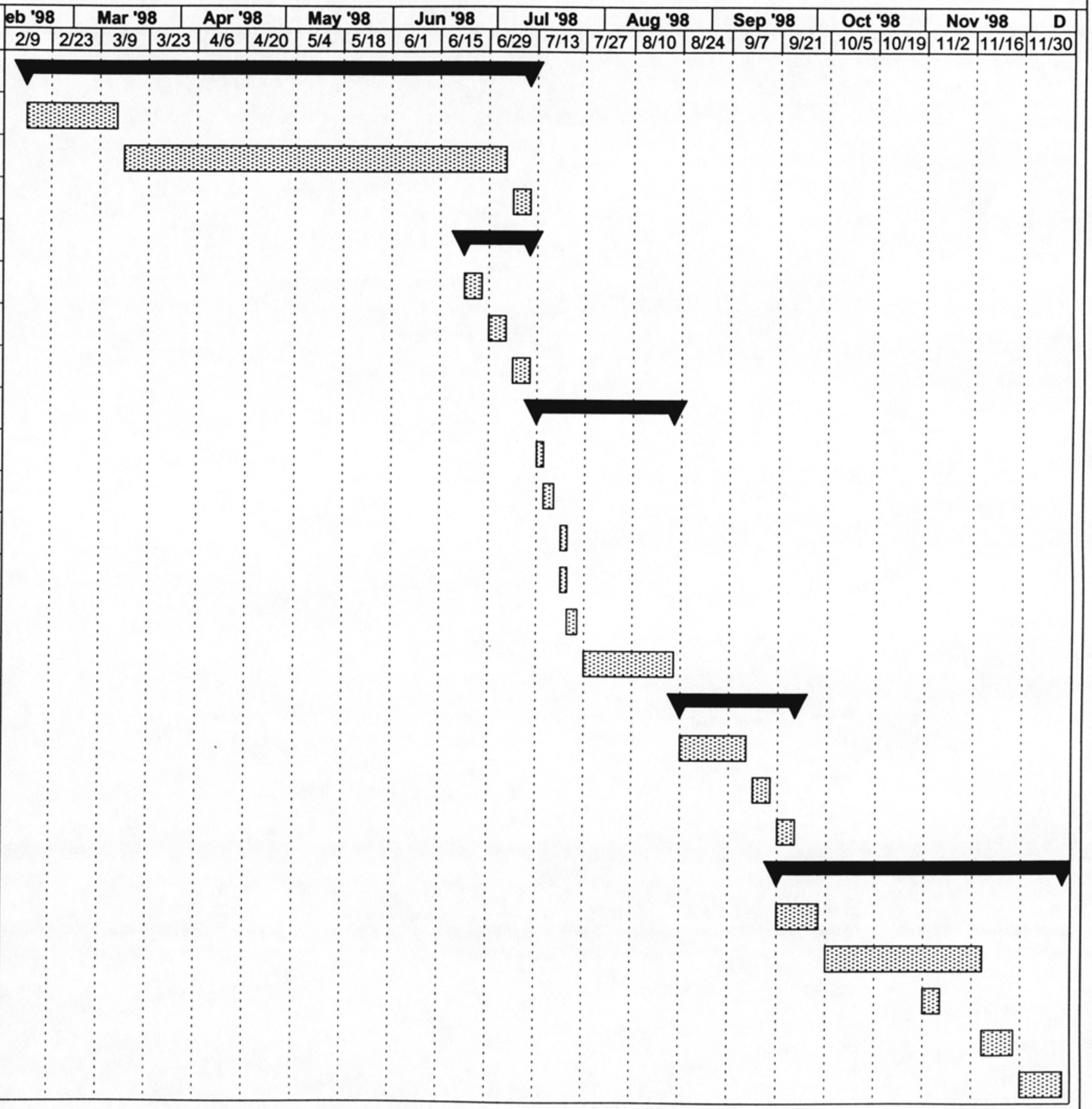
FIGURE 2-1 - SITE INVESTIGATION PLAN

Former Brown Manufacturing Site
101 Chester Street Property
Brownfields Project No. B–00024–7
Syracuse, New York
Scale: 1" = 40'
6/24/98

PROJECT SCHEDULE
Former Brown Manufacturing Site
Brownfields Project No. B-00024-7

Figure 2-2

ID	Task Name	Start	Finish
1	**SI/RAR Work Plan**	**2/16/98**	**7/10/98**
2	Draft Work Plan	2/16/98	3/13/98
3	City, DEC, DOH Review	3/16/98	7/3/98
4	Finalize Work Plan	7/6/98	7/10/98
5	**Subcontractor Procurement**	**6/22/98**	**7/10/98**
6	Prepare Affirmative Action Plan	6/22/98	6/26/98
7	Obtain Subcontractor Quotes	6/29/98	7/3/98
8	Retain Subcontractors	7/6/98	7/10/98
9	**SI Activities**	**7/13/98**	**8/21/98**
10	Coordinate Start-Up	7/13/98	7/14/98
11	Soil Borings & Sampling	7/15/98	7/17/98
12	Trench Excavations & Sampling	7/20/98	7/21/98
13	Monitoring Well Installation	7/20/98	7/21/98
14	Develop & Sample Wells	7/22/98	7/24/98
15	Laboratory Analyses	7/27/98	8/21/98
16	**SI/RAR**	**8/24/98**	**9/25/98**
17	Draft SI/RAR	8/24/98	9/11/98
18	City, DEC, DOH Review	9/14/98	9/18/98
19	Finalize SI/RAR	9/21/98	9/25/98
20	**Other Activities**	**9/21/98**	**12/11/98**
21	Proposed Remedial Action Plan	9/21/98	10/2/98
22	45-Day Public Comment Period	10/5/98	11/18/98
23	Public Meeting	11/2/98	11/6/98
24	Responsiveness Summary	11/19/98	11/27/98
25	Record of Decision	11/30/98	12/11/98



3.1 FIELD SAMPLING PLAN

3.1.1 Introduction

This Field Sampling Plan discusses the sampling procedures and methods to be used on the project for the collection of soil samples and groundwater samples for laboratory analysis. As described in Section 2.0, the Site Investigation (SI) activities will include installation of 27 "Geoprobe" borings, 10 hand-borings, five (5) trench excavations, and five (5) groundwater monitoring wells. Prior to conducting the soil borings, trench excavations, and groundwater monitoring well installations, the following activities will be conducted:

1. The 37 boring locations will be marked at the site with wooden stakes and appropriately labeled as shown on Figure 2-1;

2. The five (5) trench excavations will be marked at the site using spray paint as shown on Figure 2-1; and

3. The five (5) groundwater monitoring well locations will be marked at the site with wooden stakes and appropriately labeled as shown on Figure 2-1.

After the 37 borings locations, five (5) trench excavations, and five (5) groundwater monitoring well locations have been identified at the site, the SI activities will commence beginning with the soil borings, followed by the trench excavations, and followed by the installation of the groundwater monitoring wells. On a daily basis during the SI activities, samples of soil and groundwater which are collected will be delivered to the laboratory for polychlorinated biphenyls (PCBs), Target Compound List (TCL) volatile organic compounds (VOCs), TCL semi-volatile organic compounds (SVOCs), and Target Analyte List (TAL) metals analyses. The soil and groundwater sampling procedures are described in more detail below.

3.1.2 Soil Sampling Procedures

The soil sampling to be conducted at the site will be conducted in accordance with SOP #2012, "Soil Sampling" (see Attachment 3A). In general, the following steps will be followed for the collection of soil samples for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses at the soil borings locations and trench excavations:

A. Geoprobe Soil Boring Sampling

1. Upon initial advancement of the Geoprobe auger to a depth of six (6) inches below grade at each location, the sampling tube will be removed and placed onto plastic sheeting.

2. To minimize the volatilization of VOCs, a portion of the extracted soil will be placed into a re-sealable plastic bag and allowed to warm to approximately 70° F prior to conducting PID headspace screening. After the soil samples have attained a temperature of approximately 70° F, the seal on the plastic bag will be broken and VOCs concentrations will be measured with the PID and the results recorded.

3. Thereafter, the remaining portion of the soil extracted from each Geoprobe soil boring will be placed into glass jars, sealed, and appropriately labeled for subsequent PCB immunoassay testing and for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses.

4. The label on each glass sample jar will identify the sample location, sample depth range, sampling date and time, and analytical method (i.e., PCBs, TCL VOCs, TCL SVOCs, and TAL metals).

5. The sealed, labeled soil sample jars will then be packed into a cooler containing ice or ice packs prior to delivery of the samples to the area where the PCB immunoassay testing will occur, and prior to delivery of the samples to the laboratory for analysis. Packing material will be placed inside the cooler around the sample jars to minimize the potential for breakage. A thermometer will be affixed to the inside of each cooler to document the temperature of the samples upon receipt at the laboratory.

6. The soil sampling equipment will be decontaminated in accordance with SOP #2006, "Sampling Equipment Decontamination" (see Attachment 3B).

7. Following decontamination of the sampling equipment, the Geoprobe auger will be advanced at continuous intervals of two (2) feet deep to a maximum depth of 10 feet or to the top of groundwater, whichever is encountered first, at 21 of the 27 Geoprobe borings (nos. 1 through 10, 14, 15, and 19 through 27). The Geoprobe macro-cores will be screened for VOCs using a PID.

8. Upon advancement of the Geoprobe auger to each specified depth at each location, the sampling tube will be removed and placed onto plastic sheeting. [Steps 2 through 7, as listed above, will then be repeated until the 21 soil borings have been completed.]

9. Following decontamination of the sampling equipment, the six (6) remaining Geoprobe borings located in the east-central portion of the site (nos. 11, 12, 13, 16, 17, and 18) will be advanced to groundwater. The Geoprobe macro-cores will screened for VOCs using a PID.

10. Upon advancement of the Geoprobe auger to each specified depth at each location, the sampling tube will be removed and placed onto plastic sheeting. [Steps 2 through 6, and 9, as listed above, will then be repeated until the 6 remaining Geoprobe borings located in the east-central portion of the site have been completed.]

11. PCB immunoassay testing will be conducted for the soil sample interval exhibiting the highest in-situ PID reading or the highest PID headspace reading, or which otherwise exhibited stains or odors (27 PCB immunoassay tests). Ten (10) percent of these soil samples (3 samples) will then be analyzed for PCBs, and four (4) of these soil samples will be analyzed for TCL VOCs, TCL SVOCs, and TAL metals.

B. Hand Auger Soil Boring Sampling

1. Upon advancement of the hand auger to a depth of six (6) inches below grade at each soil boring location, the hand auger will be removed and placed onto plastic sheeting.

2. To minimize the volatilization of VOCs a portion of the extracted soil will be placed into a re-sealable plastic bag and allowed to warm to approximately 70º F prior to conducting PID headspace screening. After the soil samples have attained a temperature of approximately 70º F, the seal on the plastic bag will be broken and VOCs concentrations will be measured with the PID and the results recorded.

3. Thereafter, the remaining portion of the soil extracted from each soil boring will be placed into glass jars, sealed, and appropriately labeled for subsequent PCB immunoassay testing and for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses.

4. The label on each glass sample jar will identify the sample location, sample depth range, sampling date and time, and analytical method (i.e., PCBs, TCL VOCs, TCL SVOCs, and TAL metals).

5. The sealed, labeled soil sample jars will then be packed into a cooler containing ice or ice packs prior to delivery of the samples to the area where the PCB immunoassay testing will occur, and prior to delivery of the samples to the laboratory for analysis. Packing material will be placed inside the cooler around the sample jars to minimize the potential for breakage. A thermometer will be affixed to the inside of each cooler to document the temperature of the samples upon receipt at the laboratory.

6. The soil sampling equipment will be decontaminated in accordance with SOP #2006, "Sampling Equipment Decontamination" (see Attachment 3B).

C. Trench Excavation Soil Sampling

1. After each trench excavation has been made and in-situ screening of the bottom and sidewalls has been conducted with the PID identifying the four (4) highest PID readings, a 2-inch layer of soil from will be removed from the area where the sample will be collected using a stainless steel spoon and placed into a stainless steel pan. The soil sample will then be evenly-mixed in the stainless steel pan.

2. To minimize the volatilization of VOCs a portion of the evenly-mixed soil will be placed into a re-sealable plastic bag and allowed to warm to approximately 70º F prior to conducting PID headspace screening. After the soil samples have attained a temperature of approximately 70º F, the seal on the plastic bag will be broken and VOCs concentrations will be measured with the PID and the results recorded.

3. Thereafter, the remaining portion of the evenly-mixed, extracted soil will be placed into glass jars, sealed, and appropriately labeled for subsequent PCB immunoassay testing and for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses.

4. The label on each glass sample jar will identify the sample location, sample depth range, sampling date and time, and analytical method (i.e., PCBs, TCL VOCs, TCL SVOCs, and TAL metals).

5. The sealed, labeled soil sample jars will then be packed into a cooler containing ice or ice packs prior to delivery of the samples to the area where the PCB immunoassay testing will occur, and prior to delivery of the samples to the laboratory for analysis. Packing material will be placed inside the cooler around the sample jars to minimize the potential for breakage. A thermometer will be affixed to the inside of each cooler to document the temperature of the samples upon receipt at the laboratory.

6. The soil sampling equipment will be decontaminated in accordance with SOP #2006, "Sampling Equipment Decontamination" (see Attachment 3B).

3.1.3 Groundwater Sampling Procedures

At each of the five (5) monitoring wells, C & H Engineers will collect samples of groundwater for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses. In general, the following steps will be followed for the collection of the groundwater samples for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses:

1. After installation of the monitoring wells, the static water level will be recorded and the turbidity of the groundwater in each well will be measured prior to collection of the groundwater samples. If the turbidity of the groundwater at any well exceeds 50 NTU, measures will be taken to filter the groundwater when collecting the groundwater samples.

2. Using disposable PVC bailers, each monitoring well will be purged of at least three (3) well volumes of groundwater by hand-bailing to limit the turbidity prior to the collection of each groundwater sample. Purged groundwater removed from each monitoring well will be dispensed into separate 55-gallon drums which will be labeled corresponding which each monitoring well number. The 55-gallon drums will be temporarily stored at the site until the laboratory analyses have been completed to determine the appropriate discharge or disposal method.

3. A sufficient volume of groundwater will be collected to fill three (3) zero-headspace glass vials, and each vial will be sealed. One (1) groundwater sample will be collected from each of the five (5) monitoring wells, (total of 5 groundwater samples) for PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses.

4. Each glass vial will be labeled to identify the sample location, approximate groundwater depth, sampling date and time, and analytical method (i.e., PCBs, TCL VOCs, TCL SVOCs, and TAL metals analyses).

5. After each groundwater sample is collected at each monitoring well, the PVC bailer will be discarded and disposed of.

3.1.4 Sample Handling & Chain-of-Custody

Upon completion of the soil and groundwater sampling for a particular day or period of time, the following procedures will be followed:

1. The sealed, labeled samples of soil and groundwater will be carefully packed into a cooler refrigerated to 4°C for delivery to the laboratory for analysis; A thermometer will be affixed to the inside of the cooler to document the temperature upon receipt at the laboratory; and

2. Packing material will be placed around the sample jars inside the cooler to minimize the potential for sample container breakage that could occur during sample handling and delivery to the laboratory;

3. A chain-of-custody form will be properly completed, and signed and dated by all persons responsible for collection and delivery of the soil and groundwater samples;

4. The chain-of-custody form will be attached to the exterior of the cooler and accompany the soil and groundwater samples from the time of collection until delivery to the laboratory; and

5. The soil and groundwater samples will be delivered to the laboratory within 48 hours from the time of collection.

3.1.5 Sample Identification

Samples of soil and groundwater will be identified and labeled to include the site name, the sample location, and the sampling time and date. The following alpha-numeric system will be used to identify each sample and will correspond with the sample location to be identified on a field-generated sampling diagram:

Sample Type	+	Boring No.	+	Sample No.	+	Depth(s)	=	Label/I.D. Example
Soil (S)		01, 02...37		01, 02, or 03		(#'-#')		S-08-03 (10-15 feet)
Groundwater (GW)		01, 02...5		01		(#')		GW-01-01 (10 feet)

Duplicate samples of soil and groundwater will include an upper-case letter "D" as a suffix to the sample number (i.e., 01D, 02D, 03D, etc.). Using the examples shown above, duplicate samples would be identified as S-08-03D (10-15 feet) and GW-01-01D (10 feet), respectively.

3.1.6 Laboratory Analysis of Samples

Collectively, 12 soil samples will be collected and analyzed for PCBs, 13 soil samples will be collected and analyzed for TCL VOCs, TCL SVOCs, and TAL metals, and 5 groundwater samples will be collected and analyzed for PCBs, TCL: VOCs, TCL SVOCs, and TAL metals. The following analytical methods will be utilized for analysis of the soil and groundwater samples:

	Contaminant	Analytical Method
1.	PCBs	EPA Method 8080
2.	TCL VOCs	EPA Method 8240
3.	TCL SVOCs	EPA Method 8270
4.	TAL Metals	EPA Method 200.7

Specific details related to quality assurance/quality control procedures are discussed in Section 3.2 of this Work Plan.

3.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PROCEDURES

3.2.1 Project Team

Members of the Project Team, to meet the SI/RAR objectives as described in this Work Plan, include the following:

Project Team

Team Member	Organization	Telephone	Role/Title
Peter Marschall, P.E.	City of Syracuse	(315) 448-8495	City Contact
William Owens	City of Syracuse	(315) 448-8756	Minority Affairs
Michael Ryan, P.E.	NYSDEC	(518) 457-4343	NYSDEC Contact
Ron Heerkens	NYSDOH	(315) 426-7627	NYSDOH Contact
Thomas Heenan, P.E.	C & H Engineers	(315) 472-6980	Project Coordinator
Stephen Mahana	C & H Engineers	(315) 472-6980	Project Manager
Michael Matto	C & H Engineers	(315) 472-6980	Project Technician

On behalf of the City of Syracuse, C & H Engineers will be responsible for coordination and performance of the SI activities, interpretation of the analytical data, evaluation of the need for Interim Remedial Measures (IRMs), and preparation of the SI/RAR. Project direction and related assistance will be provided by the City of Syracuse, and observation of the SI activities will be provided by the New York State Department of Environmental Conservation (NYSDEC), the New York State Department of Health (NYSDOH), and the Onondaga County Health Department (OCHD).

3.2.2 C & H Engineers' Key Personnel

C & H Engineers' key personnel anticipated for the project will include the following:

1. *Thomas Heenan, P.E. - Principal*: Mr. Heenan will be responsible for design and development of SI activities and review of the draft and final SI/RARs.

2. *Stephen Mahana - Industrial Hygienist*: Mr. Mahana will serve as the primary point of contact for the project and will be responsible for overall project management, risk assessment evaluations, and implementation of the health and safety plan (HASP) at the site.

3. *Michael Matto - Engineering Technician*: Mr. Matto will be responsible for coordination of field sampling activities and delivery of soil and groundwater samples to the laboratory.

Resumés of C & H Engineers' key personnel are presented in Attachment 3C.

3.2.3 Subcontractors

Subcontractors to be utilized on the project will be procured by C & H Engineers upon approval of this Work Plan. Procurement of subcontractors to be utilized on the project will be performed by C & H Engineers in accordance with all City of Syracuse and NYSDEC requirements to endeavor to meet the designated WBE/MBE and EEO goals. A Subcontractor Procurement/Affirmative Action Plan will be prepared by C & H Engineers and either included in the final SI/RAR Work Plan or submitted under separate cover after the SI/RAR Work Plan is approved. Subcontractor services to be procured for this project include a geotechnical subcontractor for installation of soil borings and an environmental laboratory for analysis of the soil and groundwater samples to be collected by C & H Engineers.

3.2.4 QA/QC Sampling Procedures

This Section describes QA/QC procedures to be followed when collecting soil and groundwater samples for laboratory analysis. Upon collection of the soil and groundwater samples, a chain-of-custody will be completed identifying the name of the person collecting the samples, sample numbers, sample locations, sample matrix, time and date of sampling, analysis to be conducted, name of the person transporting the samples to the laboratory, and the name of the person receiving the samples at the laboratory (see Attachment 3D). In addition, to ensure accurate and reliable data, QA/QC procedures, such as the collection and analysis of sample blanks and duplicates, will be conducted to verify field sampling techniques and procedures and laboratory analysis procedures.

3.2.4.1 Trip Blanks

Trip blanks will be submitted for laboratory analysis along with soil and groundwater samples which are collected from the site. Trip blanks will be prepared by the laboratory and included in each shipment of clean, unused, and new sample jars, and will consist of analyte-free water contained in a sealed 40-milliliter glass vial. One trip blank will be submitted by C & H Engineers for each cooler containing samples which are collected as a result of a particular sampling event. The trip blanks will be analyzed by the laboratory along with the samples to determine if any cross-contamination between sample jars occurred during sample handling, or during shipment or delivery of the samples to the laboratory.

3.2.4.2 Rinse Blanks

Rinse blanks will be submitted for laboratory analysis along with soil and groundwater samples which are collected from the site. Rinse blanks will be collected in the field by C & H Engineers and will be prepared by pouring analyte-free water over clean, uncontaminated sampling equipment used for the collection of the soil and groundwater samples. The analyte-free water which is poured over the sampling equipment will be collected in a 40-milliliter glass vial supplied by the laboratory. One rinse blank will be collected by C & H Engineers for each piece of sampling equipment used (i.e., mixing pan, spoon, scoop, bailer, etc.) for every 20 samples collected. The rinse blanks will be analyzed by the laboratory along with the samples to verify that the sampling equipment decontamination procedures are being properly performed and to verify that cross-contamination between the sampling equipment and the samples has not occurred.

3.2.4.3 Field Duplicates

C & H Engineers will collect duplicate soil and groundwater samples to assess the reproducibility of the sampling procedures conducted in the field. One field duplicate will be collected for every 20 samples of each sample matrix for each analytical method. As necessary, field duplicates will submitted along with the samples collected during each sampling event and will be analyzed by the laboratory along with the samples.

3.2.4.4 Matrix Spike/Matrix Spike Duplicates (MS/MSDs)

MS/MSDs will be submitted for laboratory analysis along with soil and groundwater samples which are collected from the site. A MS/MSD will consist of triple volumes of each sample matrix. One MS/MSD will be collected for every 20 samples of each sample matrix for each analytical method. As necessary, MS/MSDs will submitted along with the samples collected during each sampling event and will be analyzed by the laboratory along with the samples.

3.2.5 QA/QC Analytical Procedures

The laboratory will be responsible for calibration of analytical equipment in accordance with the applicable analytical methodology; conduct routine performance and systems audits of in-house procedures, instruments, and analytical equipment; and conduct routine preventative maintenance of in-house instruments and analytical equipment to ensure accurate and reliable data. The precision and accuracy of the data will be assessed by the laboratory based on performance and systems audits conducted, as well as based on review of the QA/QC data obtained for sample blanks and field duplicates. If assessment of the data reveals discrepancies, corrective actions will be implemented.

In the event that the laboratory's internal QA/QC mechanisms and/or performance audits reveal improper operation of in-house instruments and analytical equipment, corrective actions will be implemented. The laboratory will prepare QA/QC reports for the soil and groundwater sample analyses conducted. In addition, accuracy and precision control limits for MS/MSDs will be maintained by the laboratory as a means of validating data generated for the samples of soil and groundwater which are collected from the site and submitted to the laboratory for analysis.

ATTACHMENT 3A

Standard Operating Procedure #2012

“Soil Sampling”

2.0 SOIL SAMPLING: SOP #2012

2.1 SCOPE AND APPLICATION

The purpose of this Standard Operating Procedure (SOP) is to describe the procedures for collecting representative soil samples. Analysis of soil samples may determine whether concentrations of specific soil pollutants exceed established action levels, or if the concentrations of soil pollutants present a risk to public health, welfare, or the environment.

2.2 METHOD SUMMARY

Soil samples may be collected using a variety of methods and equipment. The methods and equipment used are dependent on the depth of the desired sample, the type of sample required (disturbed versus undisturbed), and the type of soil. Near-surface soils may be easily sampled using a spade, trowel, and scoop. Sampling at greater depths may be performed using a hand auger, a trier, a split-spoon, or, if required, a backhoe.

2.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

Chemical preservation of solids is not generally recommended. Refrigeration to 4°C, supplemented by a minimal holding time, is usually the best approach.

2.4 INTERFERENCES AND POTENTIAL PROBLEMS

There are two primary interferences or potential problems associated with soil sampling. These include cross-contamination of samples and improper sample collection. Cross-contamination problems can be eliminated or minimized through the use of dedicated sampling equipment. If this is not possible or practical, then decontamination of sampling equipment is necessary. Improper sample collection can involve using contaminated equipment, disturbance of the matrix resulting in compaction of the sample, or inadequate homogenization of the samples where required, resulting in variable, non-representative results.

2.5 EQUIPMENT/APPARATUS

- sampling plan
- maps/plot plan
- safety equipment, as specified in the health and safety plan
- compass
- tape measure
- survey stakes or flags
- camera and film
- stainless steel, plastic, or other appropriate homogenization bucket or bowl
- 1-quart mason jars w/Teflon liners
- Ziploc plastic bags
- logbook
- labels
- chain of custody forms and seals
- field data sheets
- cooler(s)
- ice
- decontamination supplies/equipment
- canvas or plastic sheet
- spade or shovel
- spatula
- scoop
- plastic or stainless steel spoons
- trowel
- continuous flight (screw) auger
- bucket auger
- post hole auger
- extension rods
- T-handle
- sampling trier
- thin-wall tube sampler
- Vehimeyer soil sampler outfit
    - tubes
    - points
    - drive head
    - drop hammer
    - puller jack and grip
- backhoe

2.6 REAGENTS

Reagents are not used for the preservation of soil samples. Decontamination solutions are specified in

ERT SOP #2006, Sampling Equipment Decontamination.

2.7 PROCEDURES

2.7.1 Preparation

1. Determine the extent of the sampling effort, the sampling methods to be employed, and which equipment and supplies are required.

2. Obtain necessary sampling and monitoring equipment.

3. Decontaminate or preclean equipment, and ensure that it is in working order.

4. Prepare schedules, and coordinate with staff, client, and regulatory agencies, if appropriate.

5. Perform a general site survey prior to site entry in accordance with the site-specific health and safety plan.

6. Use stakes, buoys, or flagging to identify and mark all sampling locations. Consider specific site factors, including extent and nature of contaminant, when selecting sample location. If required, the proposed locations may be adjusted based on site access, property boundaries, and surface obstructions. All staked locations will be utility-cleared by the property owner prior to soil sampling.

2.7.2 Sample Collection

Surface Soil Samples

Collect samples from near-surface soil with tools such as spades, shovels, and scoops. Surface material can be removed to the required depth with this equipment, then a stainless steel or plastic scoop can be used to collect the sample.

This method can be used in most soil types but is limited to sampling near surface areas. Accurate, representative samples can be collected with this procedure depending on the care and precision demonstrated by the sampling team member. The use of a flat, pointed mason trowel to cut a block of the desired soil can be helpful when undisturbed profiles are required. A stainless steel scoop, lab spoon, or plastic spoon will suffice in most other applications. Avoid the use of devices plated with chrome or other materials. Plating is particularly common with garden implements such as potting trowels.

Follow these procedures to collect surface soil samples.

1. Carefully remove the top layer of soil or debris to the desired sample depth with a pre-cleaned spade.

2. Using a pre-cleaned, stainless steel scoop, plastic spoon, or trowel, remove and discard a thin layer of soil from the area which came in contact with the spade.

3. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled container(s) and secure the cap(s) tightly.

Sampling at Depth with Augers and Thin-Wall Tube Samplers

This system consists of an auger, a series of extensions, a "T" handle, and a thin-wall tube sampler (Appendix A, Figure 1). The auger is used to bore a hole to a desired sampling depth, and is then withdrawn. The sample may be collected directly from the auger. If a core sample is to be collected, the auger tip is then replaced with a thin-wall tube sampler. The system is then lowered down the borehole, and driven into the soil at the completion depth. The system is withdrawn and the core collected from the thin-wall tube sampler.

Several types of augers are available. These include: bucket, continuous flight (screw), and posthole augers. Bucket augers are better for direct sample recovery since they provide a large volume of sample in a short time. When continuous flight augers are used, the sample can be collected directly from the flights, which are usually at 5-feet intervals. The continuous flight augers are satisfactory for use when a composite of the complete soil column is desired. Posthole augers have limited utility for sample collection as they are designed to cut through fibrous, rooted, swampy soil.

Follow these procedures for collecting soil samples with the auger and a thin-wall tube sampler.

1. Attach the auger bit to a drill rod extension, and attach the "T" handle to the drill rod.

2. Clear the area to be sampled of any surface debris (e.g., twigs, rocks, litter). It may be advisable to remove the first 3 to 6 inches of surface soil for an area approximately 6 inches in radius around the drilling location.

3. Begin augering, periodically removing and depositing accumulated soils onto a plastic sheet spread near the hole. This prevents accidental brushing of loose material back down the borehole when removing the auger or adding drill rods. It also facilitates refilling the hole, and avoids possible contamination of the surrounding area.

4. After reaching the desired depth, slowly and carefully remove the auger from boring. When sampling directly from the auger, collect sample after the auger is removed from boring and proceed to Step 10.

5. Remove auger tip from drill rods and replace with a pre-cleaned thin-wall tube sampler. Install proper cutting tip.

6. Carefully lower the tube sampler down the borehole. Gradually force the tube sampler into the soil. Care should be taken to avoid scraping the borehole sides. Avoid hammering the drill rods to facilitate coring as the vibrations may cause the boring walls to collapse.

7. Remove the tube sampler, and unscrew the drill rods.

8. Remove the cutting tip and the core from the device.

9. Discard the top of the core (approximately 1 inch), as this represents material collected before penetration of the layer of concern. Place the remaining core into the appropriate labeled sample container(s). Sample homogenization is not required.

10. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into the appropriate, labeled container(s) and secure the cap(s) tightly.

11. If another sample is to be collected in the same hole, but at a greater depth, reattach the auger bit to the drill and assembly, and follow steps 3 through 11, making sure to decontaminate the auger and tube sampler between samples.

12. Abandon the hole according to applicable state regulations. Generally, shallow holes can simply be backfilled with the removed soil material.

Sampling at Depth with a Trier

The system consists of a trier, and a "T" handle. The auger is driven into the soil to be sampled and used to extract a core sample from the appropriate depth.

Follow these procedures to collect soil samples with a sampling trier.

1. Insert the trier (Appendix A, Figure 2) into the material to be sampled at a 0° to 45° angle from horizontal. This orientation minimizes the spillage of sample.

2. Rotate the trier once or twice to cut a core of material.

3. Slowly withdraw the trier, making sure that the slot is facing upward.

4. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly.

Sampling at Depth with a Split Spoon (Barrel) Sampler

The procedure for split spoon sampling describes the collection and extraction of undisturbed soil cores of 18 or 24 inches in length. A series of consecutive cores may be extracted with a split spoon sampler to give a complete soil column profile, or an auger may be used to drill down to the desired depth for sampling. The split spoon is then driven to its sampling depth through the bottom of the augured hole and the core extracted.

When split tube sampling is performed to gain geologic information, all work should be performed in accordance with ASTM D 1586-67 (reapproved 1974).

Follow these procedures for collecting soil samples with a split spoon.

1. Assemble the sampler by aligning both sides of the barrel and then screwing the bit onto the bottom and the heavier head piece onto the top.

2. Place the sampler in a perpendicular position on the sample material.

3. Using a sledge hammer or well ring, if available, drive the tube. Do not drive past the bottom of the head piece or compression of the sample will result.

4. Record in the site logbook or on field data sheets the length of the tube used to penetrate the material being sampled, and the number of blows required to obtain this depth.

5. Withdraw the sampler, and open by unscrewing the bit and head and splitting the barrel. If a split sample is desired, a cleaned, stainless steel knife should be used to divide the tube contents in half, longitudinally. This sampler is typically available in diameters of 2 and 3 1/2 inches. However, in order to obtain the required sample volume, use of a larger barrel may be required.

6. Without disturbing the core, transfer it to an appropriate labeled sample container(s) and seal tightly.

Test Pit/Trench Excavation

These relatively large excavations are used to remove sections of soil, when detailed examination of soil characteristics (horizontal structure, color, etc.) are required. It is the least cost effective sampling method due to the relatively high cost of backhoe operation.

Follow these procedures for collecting soil samples from test pit/trench excavations.

1. Prior to any excavation with a backhoe, it is important to ensure that all sampling locations are clear of utility lines and poles (subsurface as well as above surface).

2. Using the backhoe, dig a trench to approximately 3 feet in width and approximately 1 foot below the cleared sampling location. Place removed or excavated soils on plastic sheets. Trenches greater than 5 feet deep must be sloped or protected by a shoring system, as required by OSHA regulations.

3. Use a shovel to remove a 1- to 2-inch layer of soil from the vertical face of the pit where sampling is to be done.

4. Take samples using a trowel, scoop, or coring device at the desired intervals. Be sure to scrape the vertical face at the point of sampling

to remove any soil that may have fallen from above, and to expose fresh soil for sampling. In many instances, samples can be collected directly from the backhoe bucket.

5. If volatile organic analysis is to be performed, transfer a portion of the sample directly into an appropriate, labeled sample container(s) with a stainless steel lab spoon, plastic lab spoon, or equivalent and secure the cap(s) tightly. Place the remainder of the sample into a stainless steel, plastic, or other appropriate homogenization container, and mix thoroughly to obtain a homogenous sample representative of the entire sampling interval. Then, either place the sample into an appropriate, labeled container(s) and secure the cap(s) tightly; or, if composite samples are to be collected, place a sample from another sampling interval into the homogenization container and mix thoroughly. When compositing is complete, place the sample into appropriate, labeled container(s) and secure the cap(s) tightly.

6. Abandon the pit or excavation according to applicable state regulations. Generally, shallow excavations can simply be backfilled with the removed soil material.

2.8 CALCULATIONS

This section is not applicable to this SOP.

2.9 QUALITY ASSURANCE/ QUALITY CONTROL

There are no specific quality assurance activities which apply to the implementation of these procedures. However, the following QA procedures apply:

- All data must be documented on field data sheets or within site logbooks.

- All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation, and they must be documented.

2.10 DATA VALIDATION

This section is not applicable to this SOP.

2.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA, and specific health and safety procedures.

ATTACHMENT 3B

Standard Operating Procedure #2006

"Sampling Equipment Decontamination"

1.0 SAMPLING EQUIPMENT DECONTAMINATION: SOP #2006

1.1 SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures at a hazardous waste site. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel.

Removing or neutralizing contaminants that have accumulated on sampling equipment ensures protection of personnel from permeating substances, reduces or eliminates transfer of contaminants to clean areas, prevents the mixing of incompatible substances, and minimizes the likelihood of sample cross-contamination.

1.2 METHOD SUMMARY

Contaminants can be physically removed from equipment, or deactivated by sterilization or disinfection. Gross contamination of equipment requires physical decontamination, including abrasive and non-abrasive methods. These include the use of brushes, air and wet blasting, and high-pressure water cleaning, followed by a wash/rinse process using appropriate cleaning solutions. Use of a solvent rinse is required when organic contamination is present.

1.3 SAMPLE PRESERVATION, CONTAINERS, HANDLING, AND STORAGE

This section is not applicable to this SOP.

1.4 INTERFERENCES AND POTENTIAL PROBLEMS

- The use of distilled/deionized water commonly available from commercial vendors may be acceptable for decontamination of sampling equipment provided that it has been verified by laboratory analysis to be analyte free.

- An untreated potable water supply is not an acceptable substitute for tap water. Tap water may be used from any municipal water treatment system for mixing of decontamination solutions.

- Acids and solvents utilized in the decontamination sequence pose the health and safety risks of inhalation or skin contact, and raise shipping concerns of permeation or degradation.

- The site work plan must address disposal of the spent decontamination solutions.

- Several procedures can be established to minimize contact with waste and the potential for contamination. For example:

  - Stress work practices that minimize contact with hazardous substances.

  - Use remote sampling, handling, and container-opening techniques when appropriate.

  - Cover monitoring and sampling equipment with protective material to minimize contamination.

  - Use disposable outer garments and disposable sampling equipment when appropriate.

1.5 EQUIPMENT/APPARATUS

- appropriate personal protective clothing
- non-phosphate detergent
- selected solvents
- long-handled brushes
- drop cloths/plastic sheeting
- trash container
- paper towels
- galvanized tubs or buckets
- tap water

- distilled/deionized water
- metal/plastic containers for storage and disposal of contaminated wash solutions
- pressurized sprayers for tap and deionized/distilled water
- sprayers for solvents
- trash bags
- aluminum foil
- safety glasses or splash shield
- emergency eyewash bottle

1.6 REAGENTS

There are no reagents used in this procedure aside from the actual decontamination solutions and solvents. In general, the following solvents are utilized for decontamination purposes:

- 10% nitric acid(1)
- acetone (pesticide grade)(2)
- hexane (pesticide grade)(2)
- methanol

(1) Only if sample is to be analyzed for trace metals.
(2) Only if sample is to be analyzed for organics.

1.7 PROCEDURES

As part of the health and safety plan, develop and set up a decontamination plan before any personnel or equipment enter the areas of potential exposure. The equipment decontamination plan should include:

- the number, location, and layout of decontamination stations
- which decontamination apparatus is needed
- the appropriate decontamination methods
- methods for disposal of contaminated clothing, apparatus, and solutions

1.7.1 Decontamination Methods

All personnel, samples, and equipment leaving the contaminated area of a site must be decontaminated. Various decontamination methods will either physically remove contaminants, inactivate contaminants by disinfection or sterilization, or do both.

In many cases, gross contamination can be removed by physical means. The physical decontamination techniques appropriate for equipment decontamination can be grouped into two categories: abrasive methods and non-abrasive methods.

Abrasive Cleaning Methods

Abrasive cleaning methods work by rubbing and wearing away the top layer of the surface containing the contaminant. The following abrasive methods are available:

- Mechanical: Mechanical cleaning methods use brushes of metal or nylon. The amount and type of contaminants removed will vary with the hardness of bristles, length of brushing time, and degree of brush contact.

- Air Blasting: Air blasting is used for cleaning large equipment, such as bulldozers, drilling rigs or auger bits. The equipment used in air blast cleaning employs compressed air to force abrasive material through a nozzle at high velocities. The distance between the nozzle and the surface cleaned, as well as the pressure of air, the time of application, and the angle at which the abrasive strikes the surface, determines cleaning efficiency. Air blasting has several disadvantages: it is unable to control the amount of material removed, it can aerate contaminants, and it generates large amounts of waste.

- Wet Blasting: Wet blast cleaning, also used to clean large equipment, involves use of a suspended fine abrasive delivered by compressed air to the contaminated area. The amount of materials removed can be carefully controlled by using very fine abrasives. This method generates a large amount of waste.

Non-Abrasive Cleaning Methods

Non-abrasive cleaning methods work by forcing the contaminant off of a surface with pressure. In general, less of the equipment surface is removed using non-abrasive methods. The following non-abrasive methods are available:

- High-Pressure Water: This method consists of a high-pressure pump, an operator-controlled directional nozzle, and a high pressure hose. Operating pressure usually ranges from 340 to 680 atmospheres (atm) which relates to flow rates of 20 to 140 liters per minute.

- Ultra-High-Pressure Water: This system produces a pressurized water jet (from 1,000 to 4,000 atm). The ultra-high-pressure spray removes tightly-adhered surface film. The water velocity ranges from 500 m/sec (1,000 atm) to 900 m/sec (4,000 atm). Additives can enhance the method. This method is not applicable for hand-held sampling equipment.

Disinfection/Rinse Methods

- Disinfection: Disinfectants are a practical means of inactivating infectious agents.

- Sterilization: Standard sterilization methods involve heating the equipment. Sterilization is impractical for large equipment.

- Rinsing: Rinsing removes contaminants through dilution, physical attraction, and solubilization.

1.7.2 Field Sampling Equipment Cleaning Procedures

Solvent rinses are not necessarily required when organics are not a contaminant of concern and may be eliminated from the sequence specified below. Similarly, an acid rinse is not required if analysis does not include inorganics.

1. Where applicable, follow physical removal procedures specified in section 1.7.1.

2. Wash equipment with a non-phosphate detergent solution.

3. Rinse with tap water.

4. Rinse with distilled/deionized water.

5. Rinse with 10% nitric acid if the sample will be analyzed for trace organics.

6. Rinse with distilled/deionized water.

7. Use a solvent rinse (pesticide grade) if the sample will be analyzed for organics.

8. Air dry the equipment completely.

9. Rinse again with distilled/deionized water.

Selection of the solvent for use in the decontamination process is based on the contaminants present at the site. Use of a solvent is required when organic contamination is present on-site. Typical solvents used for removal of organic contaminants include acetone, hexane, or water. An acid rinse step is required if metals are present on-site. If a particular contaminant fraction is not present at the site, the nine-step decontamination procedure listed above may be modified for site specificity. The decontamination solvent used should not be among the contaminants of concern at the site.

Table 1 lists solvent rinses which may be required for elimination of particular chemicals. After each solvent rinse, the equipment should be air dried and rinsed with distilled/deionized water.

Sampling equipment that requires the use of plastic tubing should be disassembled and the tubing replaced with clean tubing, before commencement of sampling and between sampling locations.

1.8 CALCULATIONS

This section is not applicable to this SOP.

1.9 QUALITY ASSURANCE/ QUALITY CONTROL

One type of quality control sample specific to the field decontamination process is the rinsate blank. The rinsate blank provides information on the effectiveness of the decontamination process employed in the field. When used in conjunction with field blanks and trip blanks, a rinsate blank can detect contamination during sample handling, storage and sample transportation to the laboratory.

Table 1: Recommended Solvent Rinse for Soluble Contaminants

SOLVENT	SOLUBLE CONTAMINANTS
Water	• Low-chain hydrocarbons • Inorganic compounds • Salts • Some organic acids and other polar compounds
Dilute Acids	• Basic (caustic) compounds • Amines • Hydrazines
Dilute Bases -- for example, detergent and soap	• Metals • Acidic compounds • Phenol • Thiols • Some nitro and sulfonic compounds
Organic Solvents(1) - for example, alcohols, ethers, ketones, aromatics, straight-chain alkanes (e.g., hexane), and common petroleum products (e.g., fuel, oil, kerosene)	• Nonpolar compounds (e.g., some organic compounds)

(1) - WARNING: Some organic solvents can permeate and/or degrade protective clothing.

A rinsate blank consists of a sample of analyte-free (i.e, deionized) water which is passed over and through a field decontaminated sampling device and placed in a clean sample container.

Rinsate blanks should be run for all parameters of interest at a rate of 1 per 20 for each parameter, even if samples are not shipped that day. Rinsate blanks are not required if dedicated sampling equipment is used.

1.10 DATA VALIDATION

This section is not applicable to this SOP.

1.11 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and specific health and safety procedures.

Decontamination can pose hazards under certain circumstances even though performed to protect health and safety. Hazardous substances may be incompatible with decontamination methods. For example, the decontamination solution or solvent may react with contaminants to produce heat, explosion, or toxic products. Decontamination methods may be incompatible with clothing or equipment; some solvents can permeate or degrade protective clothing. Also, decontamination solutions and solvents may pose a direct health hazard to workers through inhalation or skin contact, or if they combust.

The decontamination solutions and solvents must be determined to be compatible before use. Any method that permeates, degrades, or damages personal protective equipment should not be used. If decontamination methods pose a direct health hazard, measures should be taken to protect personnel or the methods should be modified to eliminate the hazard.

ATTACHMENT 3C

Resumés of C & H Engineers' Project Team Members

C&H *engineers, p.c.*
431 East Fayette Street, Syracuse, New York 13202
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RESUME

Thomas W. Heenan, P.E.
Principal

PROFESSIONAL LICENSE

New York 1987

EDUCATION

B.S. Biochemical Engineering; Rutgers University, College of Engineering; 1978
B.A. English; Rutgers University; 1978

CERTIFICATIONS

NYSDOL Asbestos Inspector
NYSDOL Asbestos Management Planner
NYSDOL Asbestos Project Designer

PROFESSIONAL MEMBERSHIPS

American Institute of Chemical Engineers
American Chemical Society
National Society of Professional Engineers

PROFESSIONAL EXPERIENCE

Design of water/wastewater treatment systems for removal of organic and inorganic contaminants. Environmental Assessments for Property Transfer. Negotiation and preparation of environmental permit applications. Design and preparation of Contract Documents for asbestos abatement. Design of industrial wastewater treatment systems. Process engineering and instrumentation for corrosive chemical handling/production. Design of gas/liquid contact systems for heat and mass transfer.

Environmental

Prepared tank cleaning specifications and NYSDEC 10-year inspection reports for petroleum bulk storage facilities.

Prepared 110 air discharge permits for large manufacturing facility in Northeast. Preparation of air discharge permits included quantification of process emissions.

Designed metal finishing wastewater treatment systems to treat copper, silver, zinc, cadmium, chromium, and cyanide for plating facility at electrical transformer manufacturing plant.

Designed activated carbon water purification system for removal of organic and inorganic contaminants from water supplies near gasoline spill site in Jacksonville, New York.

Evaluated and designed air stripping equipment for removal of volatile organic contaminants (primarily TCE) from water supplies near hazardous waste site.

Designed 350 psig, ASME Code chlorine gas containment system. System was designed to capture chlorine gas discharged through overpressure protection rupture discs on chlorine liquefier equipment at a chlorine production facility in Upstate New York.

Industrial

Provided indoor air quality evaluations for 35,000 and 60,000 square foot office buildings following complaints of odors and headaches by occupants.

Prepared and executed Contract Documents and contract supervision for asbestos abatement projects including removal of pipe insulation, vinyl asbestos floor tiles, transite paneling, and exterior asbestos siding. Projects have been conducted in industrial, commercial, and residential environments.

Prepared Resource Conservation and Recovery Act (RCRA) Part B permit applications for General Electric Company in Pittsfield, Massachusetts and Monsanto Chemical Company in Springfield, Massachusetts.

Design hazardous waste storage facilities for compliance with RCRA regulations.

Developed closure plan and costs for PCB incineration facility.

Prepared feasibility study for remedial action alternatives to be implemented at a Massachusetts Superfund site.

Hazardous waste site remedial program for closure of an industrial waste site including leachate treatment facility design and preparation of permit documents.

Developed and implemented program to remove PCB contamination from industrial production equipment at a transformer manufacturing facility. Prepared procedures manual for sampling, handling, and disposal of PCB waste materials.

Conducted water system replacement investigations for residential users at three groundwater contamination sites.

Conducted in excess of 300 confidential environmental assessments for industrial and commercial property transfers. Assessments included identification of environmental concerns and development of remedial programs to address PCBs, asbestos, and contamination from underground storage tanks.

Designed 250 GPM wastewater pH neutralization and free chlorine removal system for chlor-alkali facility in Upstate New York. Design included sizing of pipes, tanks, mixers, chemical feed systems, and level controls.

Prepared a wastewater inventory program designed to identify facility waste streams, wastewater characterization, and volumes in connection with design of a wastewater treatment plant for a western oil refinery.

Evaluated and designed modifications for 35,000 ACFM gas discharge stream to remove submicron particles which were resulting in opacity of the discharge.

Assisted in design and construction of hot gas cooling system for a hazardous waste incinerator at General Electric Company in Waterford, New York. Materials of construction included silicon carbide and acid-resistant brick.

Senior process engineer for 17 projects resulting from an environmental and safety audit at a chlorine production facility in Upstate New York. Projects included a design of redundant pumping, piping and control systems to improve reliability of key chlorine scrubbing systems, design of chlorine scrubber for HCI plant discharge stack, upgrading of plant dry air and instrument air supply systems, and evaluation of key operating procedures.

Construction and Start-up Supervision

Supervised asbestos removal contractors and air monitoring contractors during industrial and commercial asbestos removal projects.

Conducted start-up and operator training of wastewater treatment systems, sulphur burning systems, and air scrubbing systems.

PRESENTATIONS

Response to Gasoline Contamination of Residential Water Wells - A Case Study, Heenan, Thomas W., et al. NWWA Association of Groundwater Scientists and Engineers Eastern Regional Groundwater Conference, Portland, Maine, July 1985.

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RESUME
Stephen N. Mahana
Industrial Hygienist

EDUCATION

B.S. Chemistry; Le Moyne College; 1986
Graduate Studies/Environmental Engineering; SUNY College of Environmental Science & Forestry; 1987

CERTIFICATIONS

NYSDOL Asbestos Inspector
NYSDOL Asbestos Supervisor
NYSDOL Asbestos Project Monitor
NYSDOL Asbestos Project Air Sampling Technician

PROFESSIONAL MEMBERSHIPS

American Chemical Society
American Industrial Hygiene Association

PROFESSIONAL EXPERIENCE

Industrial Hygiene Surveys and Investigations; Environmental Site Assessments and Toxicological Assessments; Occupational Safety & Health Compliance; Asbestos and Lead-Based Paint Sampling, Testing, Assessments, and Abatement Project Design, Air Monitoring, and Oversight; Hazardous Waste Site Investigations and Remediation Design; Petroleum and Chemical Bulk Storage Tank Registration, Investigations, and Closure; Polychlorinated Biphenyl Testing and Remediation; Building Demolition/Renovation Hazardous Material Surveys and Remediation; Indoor Air Quality Testing; Building Ventilation Investigations; Radon Testing and Mitigation; Groundwater Monitoring, Investigations, Treatment, and Remediation; and Soil Sampling and Remediation.

Environmental

Phase I, II, and III environmental site assessments.

Petroleum and chemical bulk storage tank testing, investigation, removal, and disposal.

Soil and groundwater sampling and remediation.

Polychlorinated biphenyl testing and remediation.

Indoor air quality testing to comply with applicable OSHA and ASHRAE standards.

Evaluation of wastewater flow and characteristics to determine compliance with municipal wastewater discharge regulations.

Identification and characterization of chemicals to develop chemical bulk storage Operations and Maintenance (O&M) programs. Written plans were prepared for inventory control, storage, handling, distribution, and corrective actions required in the event of leaks and/or spills.

Hazardous waste/material identification based on toxicity, ignitability, reactivity, and corrosivity characteristics to determine proper material handling, transport, and disposal requirements.

Asbestos

Analysis of asbestos using Phase Contrast Microscopy NIOSH Method 7400: "Sampling & Evaluating Airborne Asbestos".

Asbestos Hazard Emergency Response Act (AHERA) survey, assessment, and management planning for public and private schools.

NYS Department of Health asbestos laboratory design, instrumentation, analysis, quality control, recordkeeping, and training compliance.

Wastewater discharge sampling from asbestos abatement project sites for transmission electron microscopy analysis to determine efficiency of wastewater filtration systems and to establish compliance with municipal wastewater discharge regulations.

Prepared applications to discharge filtered wastewater from asbestos abatement projects into sewers connected to municipal wastewater treatment facilities.

Asbestos survey, assessment, design, air sampling, and project monitoring for public and private schools, colleges, universities, hospitals, churches, housing authorities; and residential, commercial, industrial, and municipal buildings.

Asbestos abatement design including removal of thermal system insulation, floor tiles and mastic, wall and ceiling plaster, transite wall and ceiling panels, transite pipe and shingles, spray-applied fireproofing, built-up and shingle roofing, and roof flashings.

Obtained site-specific asbestos abatement project variances from the NYS Department of Labor for numerous building owners and contractors to conduct asbestos abatement operations at various sites under unique conditions where compliance with Industrial Code Rule 56 was not feasible.

Development, coordination, start-up, and implementation of Asbestos O&M programs for managing asbestos-containing material in buildings.

OSHA Asbestos Right-to-Know training and program development for building owners and managers.

Radon

Radon testing, mitigation design, and modification of heating, ventilating, and air conditioning equipment in buildings to reduce radon concentrations below acceptable the US Environmental Protection Agency recommended level.

Lead-Based Paint

Lead-based paint survey, assessment, testing, and abatement design for public housing authorities in accordance with U.S. Department of Housing & Urban Development (HUD) guidelines.

PRESENTATIONS

Environmental Site Assessment seminar presented to commercial real estate brokerage firm, 1988 & 1996.
Asbestos abatement seminar for New York State Housing & Renewal Organization, 1989.
Asbestos Safety Training Provider for persons attending various New York State and USEPA courses, 1987 - 1990.

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RESUME
Michael C. Matto
Engineering Technician

EDUCATION
B.S. Environmental Science; SUNY at Plattsburgh; 1991

CERTIFICATIONS
NYSDOL Asbestos Inspector
NYSDOL Asbestos Project Monitor
NYSDOL Asbestos Project Air Sampling Technician

PROFESSIONAL EXPERIENCE
Established detailed plans and sampling schemes for the collection of suspect asbestos-containing material (ACM) and lead-based paint (LBP) in commercial buildings; prepared survey reports identifying the location and condition of ACM and LBP; reviewed building plans and records for references to asbestos or asbestos material and LBP used in construction, renovation, or repair. Conducted asbestos project air and bulk sampling, data interpretation, asbestos surveys, building assessments/inspections, management plans, consulting, and project management in public and private schools, universities, hospitals, and commercial buildings. Determined potential risks for occupational and non-occupational exposure to asbestos in public and private schools, colleges, universities, industrial, commercial, and residential buildings, churches, and hospitals where renovation, restoration, and demolition work was scheduled. Assisted in the preparation of specifications drawings, and contract documents, and reviewed contractor submittals for asbestos abatement projects. Asbestos project oversight of abatement methods for various types of ACM including thermal system insulation, wall and ceiling plaster, spray-applied fireproofing, floor tiles and mastic, transite panels, pipes, shingle siding, built-up roofing, roof shingles, roof flashings, and laboratory tables and hoods. Implemented monitoring and evaluation programs for occupational exposures to work place contaminants such as dusts, mists, flammable vapors, and sprays in commercial and industrial settings. Supervised contractors during asbestos abatement projects. Initiated and supervised the planning and execution of underground storage tank removals and sampling plans for soil, water, and air for petroleum contaminants, PCBs, pesticides and priority pollutant metals.

Environmental

Conducted several groundwater investigations in which monitoring wells were installed and soils and groundwater were sampled and analyzed for contaminants related to various historic industrial uses.

Evaluated hydrogeologic data from groundwater monitoring wells and piezometers to determine the extent and migration pathway of contamination plumes from leaking underground storage tanks (USTs).

Conducted environmental site assessments for industrial and commercial property transfers to identify environmental concerns and develop remedial programs to address PCBs, ACMs, and contamination from USTs.

Reviewed EPA and NYSDOH Guidelines for threshold contaminants and made recommendations based upon DEC consumption advisories.

ATTACHMENT 3D

Chain-of-Custody Form

C&H engineers, p.c.
PROFESSIONAL ENGINEERING SERVICES

CHAIN OF CUSTODY RECORD

DUE DATE: ____________________

CLIENT					PROJECT NAME	NO. OF CON- TAINERS										
SAMPLE PRES.	DATE	TIME	COMP.	GRAB	STATION LOCATION											

Sampled by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	

WITNESS: ____________________ DATE/TIME: ____________________

WEATHER CONDITIONS: ____________________

4.1 INTRODUCTION

This Health And Safety Plan (HASP) has been prepared to identify health and safety procedures for the Site Investigation (SI) activities to be conducted at the site. This HASP applies to the activities to be conducted by employees of C & H Engineers and its subcontractors at the site, and outlines procedures for maintaining the health and safety of authorized persons at the site. The employees of other consulting firms and other companies not contracted by C & H Engineers shall work in accordance with their own HASP, provided that the minimum requirements of this HASP are fulfilled.

This HASP addresses health and safety issues related to the presence of specific chemical and physical hazards that may be encountered during performance of the SI activities at the site. An Emergency Response Plan is included in this Section and outlines the procedures to be followed in the event of an emergency situation. This HASP has been prepared in accordance with the applicable Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) standards.

This HASP will be periodically reviewed during the project to verify that it is current and technically correct in accordance with the operations conducted at the site. Changes in site conditions or changes in the SI activities will necessitate a review and modification of this HASP. Changes, modifications, and amendments to this HASP will be made in the form of addenda, and will be attached to this HASP.

4.2 DEFINITIONS

The following definitions shall apply to and are used throughout this HASP:

1. ***Site*** - The Former Brown Manufacturing Site located at 101 Chester Street in Syracuse, New York, where the SI activities are to be conducted.

2. ***Project*** - All on-site work to be conducted at the site.

3. ***On-site personnel*** - C & H Engineers' personnel and subcontractors' personnel.

4. ***Visitor*** - All other personnel, excluding the on-site personnel.

5. ***HSO*** - Health & Safety Officer responsible for maintenance of this HASP.

6. ***Exclusion Zone*** - Any portion of this site where hazardous substances are, or may reasonably be suspected to be present in the air, water, or soil.

7. ***Contamination Reduction Zone*** - Area between the Exclusion Zone and Support Zone that provides a transition between contaminated and clean areas. Decontamination stations are located in this zone.

8. ***Support Zone*** - The remainder of the site where support equipment is located.

4.3 RESPONSIBILITIES

Implementation of this HASP shall be accomplished through an integrated team effort. C & H Engineers shall conduct the SI activities described in Section 2.0 of this Work Plan in a manner consistent with generally accepted professional engineering practices, and shall be responsible for the following during the project:

1. Providing this HASP to C & H Engineers' field personnel;
2. Implementation and maintenance of this HASP;
3. Providing all on-site personnel with proper personal protective equipment (PPE);
4. Compliance with the applicable state and federal health and safety standards; and
5. Maintaining a Daily Sign-In/Sign-Out Log of all on-site personnel and visitors.

The HSO for this project is Stephen Mahana, who is designated with the following responsibilities:

1. Maintain a daily log book for recording all significant health and safety activities;
2. Have authority to suspend work due to health or safety-related concerns;
3. Provide technical assistance and conduct health and safety briefings at the site;
4. Verification that first aid kits, eye wash kits, and fire extinguishers are at the site;
5. Verification that on-site personnel have received the necessary training and physical examinations;
6. Verification that on-site personnel have been provided with and are using PPE;
7. Review and modification of this HASP as necessary during the project; and
8. Preparation of addenda to this HASP and maintenance of required documents for recordkeeping purposes.

4.4 HAZARD EVALUATION

4.4.1 Chemical Hazards

Chemical hazards associated with this project include polychlorinated biphenyls (PCBs) and numerous organic compounds including, but not limited to, benzene, toluene, ethylbenzene, and xylenes. Health effects data and standards for these potential contaminants of concern are attached hereto and form part of this HASP (see Attachment 4A). Due to the nature of the contaminants which may exist at the site, rubber gloves shall be worn by on-site personnel while sampling and handling potentially contaminated equipment, soil, and groundwater.

4.4.2 Physical Hazards

Physical hazards associated with this project include noise, fire, electrical equipment, vehicle traffic, and heavy equipment. Protection mechanisms against such physical hazards shall be utilized by all on-site personnel to minimize risk of injury. Personnel shall be wear Level D and Modified Level D PPE ensembles at the site, as necessary during all phases of the SI activities.

Heat stress can result from a number of contributing factors, including environmental conditions, clothing, and workload as well as the physical condition of the individual. Since heat stress is one of the most common injuries/symptoms associated with outdoor work conducted with direct solar load, and, in particular, because wearing PPE can increase the risk of developing heat stress, workers must be capable of recognizing the signs and symptoms of heat-related illnesses. Signs and symptoms of heat-related illnesses which all on-site personnel should be aware of, include the following:

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

2. Heat cramps are caused by heavy sweating and may include muscle spasms and pain in the hands, feet, and abdomen;

3. Heat exhaustion is indicated pale, cool, and moist skin, heavy sweating, dizziness, nausea, and fainting; and

4. Heat stroke is indicated red, hot, and unusually dry skin, lack of or reduced perspiration, nausea, dizziness and confusion, rapid pulse, and coma; Immediate action must be taken to cool the body before serious injury or death occurs.

Persons working outdoors in temperatures at or below freezing may be subject to frostbite. Extreme cold for a short time may cause injury to exposed body surfaces, or result in a profound generalized cooling which can cause death. Areas of the body such as fingers, toes, and ears, are the most susceptible to cold stress. Ambient air temperature and wind velocity are two factors which influence the development of a cold weather injury. Local injury resulting from exposure to cold temperatures is known as “frostbite”. There are several degrees of damage in which frostbite of the extremities can be categorized, as follows:

1. Frost nip or incipient frostbite is characterized by suddenly bleaching or whitening of the skin;

2. Superficial frostbite occurs when the skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient; and

3. Deep frostbite is characterized by tissues that are cold, pale, and solid; this is an extremely serious injury.

4.5 TRAINING

All on-site personnel and visitors shall be trained commensurate with their job responsibilities. Such training shall be provided prior to personnel being allowed to engage in the SI activities which could expose them to health and safety hazards. The HSO has the responsibility to assure that this training is provided for the site conditions and such training is updated, as needed. C & H Engineers' subcontractors shall attend the site orientation meeting as well as any other periodic health and safety meetings or briefings scheduled by the HSO. All on-site personnel shall attend an initial site orientation meeting. The following is a listing of general site orientation meeting topics:

1. On-site personnel
2. Safe work practices
3. Personal protective equipment
4. Project hazards
5. Site equipment
6. Medical surveillance
7. Site control measures
8. Decontamination procedures
9. Standard operating procedures
10. Emergency response plan

Personnel attending the site orientation meeting are to sign the Site Orientation Meeting Attendance Form (see Attachment 4B). The HSO shall ensure that on-site personnel have received the appropriate training.

4.6 PERIODIC HEALTH & SAFETY MEETINGS

The HSO will conduct periodic health and safety meetings. These meetings will review existing protocols and update personnel of any new conditions at the site, and will provide an opportunity for on-site personnel to discuss any health and safety concerns. Topics for discussion may include the following:

1. Review of the type and frequency of environmental and personal monitoring
2. Task-specific levels of protection and anticipated potential for upgrading
3. Review of existing and new health and safety issues
4. Review of emergency procedures

4.7 PERSONAL PROTECTIVE EQUIPMENT

4.7.1 Level D Protection

The following Level D protection shall be worn by on-site personnel at all times when the SI activities are conducted which do not involve exposure or contact with hazardous chemicals/materials:

1. Standard outer garments (i.e. long pants and long-sleeve shirt)
2. Durable leather work boots
3. Durable leather gloves
4. Eye protection (as needed)
5. Hard hat (as needed)
6. Hearing protection (as needed)

4.7.2 Modified Level D Protection

The following Modified Level D protection shall be worn by on-site personnel at all times when the SI activities are conducted which involve exposure or contact with hazardous chemicals/materials:

1. Disposable coveralls worn over standard outer garments (optional)
2. Durable leather work boots
3. Disposable rubber gloves
4. Rubber boots worn over work boots (as needed)
5. Eye protection (as needed)
6. Hard hat (as needed)
7. Hearing protection (as needed)
8. Respiratory protection (as needed)

The level of protection provided by PPE may be upgraded or downgraded based upon changes in site conditions. When a significant change occurs, the hazards will be reassessed based on changes in the SI activities and discovery of new/additional contaminants other than those previously identified

4.8 MEDICAL SURVEILLANCE

4.8.1 Medical Clearance

Medical clearance is not required for on-site personnel or visitors at the site unless the use of respiratory protection becomes necessary. If medical clearance is required, on-site personnel and visitors shall submit verification of a physician's written opinion regarding the health status of personnel assigned to this project, and such verification must be provided to the HSO and filed on-site with this HASP.

4.8.2 Respirator Certification

Respirator use is not anticipated for use on this project. If respiratory protection becomes necessary, a determination shall be made regarding each person's physical ability to wear a respirator. Consequently, persons required to wear respirators must provide the HSO with current documentation (not older than 6 months) regarding their physical condition and ability to wear a respirator, as certified by a qualified physician. Failure to provide current, complete respirator certification documentation will be sufficient grounds to preclude personnel from conducting SI activities where respiratory protection is required.

4.9 SITE CONTROL MEASURES

4.9.1 Site Access

Site control measures will minimize potential contamination of on-site personnel, protect the public from potential on-site hazards, and deter vandalism of equipment and materials. Site control measures also enhance response in emergency situations. The work of this project will be conducted under Level D and Modified Level D PPE conditions. Portions of the site will be routinely divided into three distinct areas, as necessary for the SI activities, which will include an Exclusion Zone, a Contamination Reduction Zone (CRZ), and a Support Zone.

4.9.2 Exclusion Zone

The Exclusion Zone will be designated as the area where the highest potential for exposure by dermal or inhalation routes exists. PPE is required and a daily log will be kept of all personnel entering this zone. The Exclusion Zone will be marked off by barricades or barrier tape which will be placed a minimum of 20 feet from the edge of the active operation. Some situations may necessitate distances of less than 20 feet. These situations will be reviewed by the HSO. Visitors will not be permitted into the Exclusion Zone without the approval of the HSO. In addition, visitors must have satisfactorily completed the required training, and be properly fitted with a respirator and have medical clearance, if required.

4.9.3 Contamination Reduction Zone (CRZ)

The CRZ will be designated as the area immediately adjacent to and surrounding the Exclusion Zone. The probability of dermal and inhalation exposure is lower in the CRZ than in the Exclusion Zone. The CRZ includes facilities for personnel and equipment decontamination. PPE worn in the Exclusion Zone may not be worn outside the CRZ, except during emergencies.

4.9.4 Support Zone

The Support Zone includes all areas outside the CRZ. The exposure potential in the Support Zone is minimal. The Support Zone provides a changing area for personnel entering the CRZ and Exclusion Zone, as well as an area for the storage of clean equipment and materials. Protective clothing worn in the Exclusion Zone will not be allowed to be worn in the Support Zone, except in emergencies.

It is the responsibility of the Project Manager to control access to the site and to assure proper security. Any evidence of unauthorized entry will be noted in the daily log.

Visitors will be permitted in the immediate area of active operations only with approval from the HSO. Approval for entry into the Exclusion Zone and CRZ will require physical examination and compliance with OSHA training requirements (29 CFR 1910.120). All site visitors will be briefed on this HASP, and shall sign the Daily Site Sign-In/Sign-Out Log (see Attachment 4C). Visitor's vehicles are restricted to the Support Zone. Subcontractor's equipment will not be permitted to enter the Exclusion Zone without prior authorization and will be subject to site decontamination procedures.

4.10 DECONTAMINATION PROCEDURES

4.10.1 Personal & Equipment Decontamination

On-site personnel conducting the SI activities under the Modified Level D PPE ensemble shall perform decontamination operations in accordance with the following steps:

1. Remove equipment and sampling containers from the Exclusion Zone and place on plastic sheeting staged in the CRZ;
2. Thoroughly wet-wipe equipment which may be contaminated and wash such items with detergent water, and then rinse;
3. Thoroughly wash rubber boots with detergent water and rinse (if applicable);
4. Excess wash/rinse water generated in the decontamination process shall be soaked up with absorbent pads, rags, or towels, and such items shall be placed in the disposal container staged in the CRZ;
5. Remove coveralls first (if applicable) and then rubber gloves, and place in the disposal container staged in the CRZ; All disposable PPE (gloves, coveralls), rags, cloths, etc. will be containerized separately form general site refuse, and disposed of in accordance with the applicable regulations; and
6. Proceed to the Support Zone bringing decontaminated tools, sampling containers, and monitoring instruments.

4.11 STANDARD OPERATING PROCEDURES

4.11.1 General

This Section presents Standard Operating Procedures (SOPs) that shall be followed during the project. These SOPs address potential hazards associated with the collection and handling of soil and groundwater samples. Specific precautions to avoid the potential hazards for the SI activities are presented herein. General SOPs at the site include the following:

1. Strict pedestrian and vehicular traffic control will be maintained on-site;
2. All on-site personnel will be trained and briefed on anticipated hazards, equipment to be worn, safety practices to be followed, emergency procedures, and communications;
3. Required PPE ensembles must be worn by all on-site personnel entering work areas designated for wearing PPE;
4. On-site personnel in the work zone will act as safety backup to each other, and on-site personnel outside the work zone will provide emergency assistance when necessary;

5. Entrance and exit locations, as well as emergency escape routes will be designated and delineated;

6. Communications will be maintained between on-site personnel and the Project Manager at all times;

7. On-Site personnel and equipment in each Work Area will be minimized, to maintain effective site operations;

8. Areas for various operational activities will be established;

9. Work Areas and decontamination procedures will be established based on expected site conditions; Procedures for leaving a Work Area will be planned prior to entering the site;

10. Observation of the site will be conducted to ensure compliance with this HASP and, if any change in occurs, this HASP will be modified to reflect any change;

11. All electrical equipment will conform to 29 CFR 1926.400 Subpart K; and

12. Fire prevention and protection (appropriate signs for flammable liquids, smoking areas, storage areas of combustible or flammable materials, etc.) will be in accordance with OSHA 29 CFR 1926.150 Subpart F.

4.11.2 General Site Safety Rules

The following general site safety rules shall apply to operations conducted at the site:

1. The site will be divided into an Exclusion Zone, Support Zone, and a CRZ.
2. Access to the Exclusion Zone will be through the CRZ.
3. Only on-site personnel and visitors will be allowed to enter the Work Area.
4. Personnel/equipment shall be decontaminated when leaving the Exclusion Zone.
5. Personnel shall enter the CRZ where PPE will be removed.

4.11.3 Work Practices

Workers shall adhere to the established SOP for their respective specialties. Work at the site will be conducted according to established procedures and guidelines for the safety and health of all involved. Safe work practices at the site include:

1. In any unknown situation, assume the worst and plan responses accordingly.
2. Plan work and decontamination procedures to minimize contamination exposure.
3. Contaminated equipment shall not be placed on unprotected surfaces.
4. Use disposable items to minimize cross-contamination during sampling.
5. Smoking, eating, or drinking in the work zone will not be allowed.
6. Breaks should be planned to prevent heat/cold stresses, accidents, and fatigue.
7. Be observant of not only one's own immediate surrounding but also that of others.
8. Extra precautions are necessary when working near heavy equipment.

4.12 EMERGENCY RESPONSE PLAN

4.12.1 General

This Section outlines procedures for evaluating and addressing medical, fire, and other emergency situations which may occur at the site. All emergency situations require concise and timely actions conducted in a manner that minimizes the health and safety risks to on-site personnel and to the public. All on-site personnel shall be familiar with this Emergency Response Plan.

Due to the nature of the SI activities to be conducted at the site, the emergency situations that may occur are most likely limited to personnel accidents requiring first aid and exposure to soil or groundwater containing hazardous chemicals. The following procedures shall be followed in the event of an emergency:

1. On-site personnel shall report all accidents and unusual events to the HSO;
2. The HSO shall conduct the emergency response in an efficient and safe manner;
3. The HSO will decide if off-site assistance and medical treatment is required;
4. First aid will be provided by only those who are properly trained; and
5. All personnel shall remain calm in the event of an accident or emergency.

Following any accident, injury, or other emergency, an Accident Report Form shall be completed and submitted to the HSO within 48 hours of the incident (see Attachment 4D).

4.12.2 Responsibilities

The HSO has the responsibility for directing response activities in the event of an emergency or accident, and shall be responsible for the following:

1. Assess the situation;
2. Determine required response measures;
3. Notify appropriate response teams; and
4. Direct on-site personnel during the emergency.

The HSO will coordinate the response activities of on-site personnel with those of public agencies including, but not limited to local hospitals, health department, ambulance service, fire and police departments.

4.12.3 Accidents & Injuries

Every accident is a unique event that must be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident, the prime consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at unnecessary risk. Several types of emergencies are outlined in the following subsections. These are not intended to cover all emergency situations.

If a person working on the site is physically injured, basic first aid procedures will be followed. Depending on the severity of the injury, outside medical assistance may be sought. If the person can be moved, the person will be taken outside of the Work Area, PPE will be removed, and first aid administered. If necessary, transportation to a medical facility will be provided. If the person can only be moved by emergency medical personnel, the HSO will decide what type of PPE (if any) will be required to be worn by emergency personnel. If the injury to on-site personnel involves chemical exposure, the following first aid procedures will be initiated as soon as possible:

1. *Eye Exposure* - If solid or liquid gets into the eyes, wash eyes immediately at the emergency eyewash station and obtain medial attention immediately.

2. *Skin Exposure* - If solid or liquid contacts the skin, wash skin immediately using water and obtain medical attention immediately.

3. *Inhalation* - If a person inhales large amounts of organic vapor or dust, move the person to fresh air and obtain medical attention immediately. If breathing has stopped, trained personnel or medical personnel should perform cardiopulmonary resuscitation. Keep the affected person warm and at rest.

4. *Ingestion* - If solid or liquid is swallowed, medical attention must be obtained immediately and the Poison Control Center consulted.

An Accident Report Form detailing the causes and consequences of the injury/accident shall be submitted to the HSO within 48 hours of the incident.

On-site personnel shall be knowledgeable in fire-extinguishing techniques or shall otherwise be instructed in the proper use of fire extinguishers supplied at the site. Fire extinguishers should be used only for small fires which are in the early stages of development. Where the fire cannot be controlled through extinguisher use, the area should be evacuated immediately. The local fire department should be called to fight the fire.

In general, field activities can be conducted during mildly adverse weather conditions, including light rain or snowfall, or light fog. If rain or snow becomes moderate to heavy, it may be necessary to cease all activities. All SI activities shall cease in the event of a thunder and lightning storm.

In extraordinary circumstances, emergency evacuation of the site may be necessary. On-site personnel shall be notified of the need to evacuate verbally or by signaling with an air horn. If the situation is deemed an emergency, personnel shall be instructed to leave the site immediately, using the closest available evacuation route, otherwise, personnel will be expected to go through normal decontamination procedures before leaving the site. In either case, on-site personnel will be instructed to meet at a central location. A head count shall be made to ensure that all personnel are safe and accounted for. The HSO shall contact other appropriate response agencies, as warranted. Motorized equipment and machinery shall be shut off before the site is evacuated.

4.13 COMMUNITY PROTECTION PLAN

4.13.1 Engineering Controls

Prior to commencement of the SI activities, a "site perimeter boundary" shall be designated for the duration of the project as the property lines surrounding the site. As necessary, one or more of the following engineering controls shall be implemented to control the generation and migration of dust during the SI activities:

1. Applying water on roadway and driveway surfaces;
2. Wetting equipment and excavation faces;
3. Spraying water on buckets during soil excavation and dumping activities;
4. Hauling materials in properly covered, water-tight containers;
5. Restricting vehicle speeds to 10 miles per hour;
6. Covering excavated areas and soil piles after excavation activities cease; and/or
7. Reducing the size of excavations and/or the number of excavations.

In addition to these engineering controls, materials, equipment, machinery, heavy equipment, and vehicles, required for performance of the SI activities, shall be included (placed or staged) within the work zone, and shall be decontaminated prior to being moved from or leaving the work zone. Such items shall be placed or staged on reinforced plastic sheeting and washed/rinsed so that contaminated soil, dust, and debris are not tracked off-site. The plastic sheeting shall be bermed, as necessary, to contain contaminated soil and rinse water. Contaminated rinse water shall be pumped off or soaked up, and the remaining contaminated soil and plastic sheeting shall be properly disposed of. Multiple layers of plastic sheeting shall be placed beneath such items depending on the size and weight of each item.

ATTACHMENT 4A

Health Effects Data & Standards For Potential Contaminants of Concern

BENZENE

DPIM:	BBL250
Hazard Rating:	3
CAS:	71-43-2
DOT Number:	UN 1114
M Formula:	C6H6
M Weight:	78.12

Properties:

Clear, colorless liquid. Melting point: 5.51°, boiling point: 80.093–80.094°, lower explosive limit: 1.4%, upper explosive limit: 8.0%, flash point: 12°F (CC), density: 0.8794 @ 20°, vapor pressure: 100 millimeter @ 26.1°, vapor density: 2.77, autoignition temperature: 1044°F. Very slightly soluble in H2O; miscible in most organic solvs.

Standards & Recommendations:

OSHA PEL:	TWA 1 ppm; STEL 5 ppm; Pk 5 ppm/15M/8H; Cancer Hazard
ACGIH TLV:	TWA 10 ppm; Suspected Human Carcinogen (Proposed: TWA 0.5 ppm; STEL 2.5 ppm (skin); Confirmed Human Carcinogen); BEI: 50 mg (total phenol)/L in urine at end of shift recommended as a mean value
DFG TRK:	5 ppm (16 mg/m3) Human Carcinogen
NIOSH REL:	TWA 0.32 mg/m3; CL 3.2 mg/m3/15M
DOT Classification:	3; Label: Flammable Liquid

Safety Profile:

Confirmed human carcinogen producing myeloid leukemia, Hodgkins disease, and lymphomas by inhalation. Experimental carcinogenic, neoplastigenic, and tumorigenic data. A human poison by inhalation. An experimental poison by skin contact, intraperitoneal, intravenous, and possibly other routes. Moderately toxic by ingestion and subcutaneous routes. A severe eye and moderate skin irritant. Human systemic effects by inhalation and ingestion: blood changes, increased body temperature. Experimental teratogenic and reproductive effects. Human mutation data reported. A narcotic. In industry, inhalation is the primary route of chronic benzene poisoning. Poisoning by skin contact has been reported. Recent (1987) research indicates that effects are seen at less than 1 ppm. Exposures needed to be reduced to 0.1 ppm before no toxic effects were observed. Elimination is chiefly through the lungs. A common air contaminant.

A dangerous fire hazard when exposed to heat or flame. Explodes on contact with diborane, bromine pentafluoride, permanganic acid, peroxomonosulfuric acid, and peroxodisulfuric acid. Forms sensitive, explosive mixtures with iodine pentafluoride, silver perchlorate, nitryl perchlorate, nitric acid, liquid oxygen, ozone, arsenic pentafluoride + potassium methoxide (explodes above 30°C). Ignites on contact with sodium peroxide + water, dioxygenyl tetrafluoroborate, iodine heptafluoride, and dioxygen difluoride. Vigorous or incandescent reaction with hydrogen + Raney nickel (above 210°C), uranium hexafluoride, and bromine trifluoride. Can react vigorously with oxidizing materials, such as Cl2, CrO3, O2, NClO4, O3, perchlorates, (AlCl3 + FClO4), (H2SO4 + permanganates), K2O2, (AgClO4 + acetic acid), Na2O2. Moderate explosion hazard when exposed to heat or flame. Use with adequate ventilation. To fight fire, use foam, CO2, dry chemical.

Poisoning occurs most commonly via inhalation of the vapor, although benzene can penetrate the skin and cause poisoning. Locally, benzene has a comparatively strong irritating effect, producing erythema and burning, and, in more severe cases, edema and even blistering. Exposure to high concentrations of the vapor (3000 ppm or higher) may result from failure of equipment or spillage. Such exposure, while rare in industry, may cause acute poisoning, characterized by the narcotic action of benzene on the central nervous system. The anesthetic action of benzene is similar to that of other anesthetic gases, consisting of a preliminary stage of excitation followed by depression and, if exposure is continued, death through respiratory failure.

BENZENE (cont.)

The chronic, rather than the acute form, of benzene poisoning is important in industry. It is a recognized leukemogen. There is no specific blood picture occurring in cases of chronic benzol poisoning. The bone marrow may be hypoplastic, normal, or hyperplastic, the changes reflected in the peripheral blood. Anemia, leucopenia, macrocytosis, reticulocytosis, thrombocytopenia, high color index, and prolonged bleeding time may be present. Cases of myeloid leukemia have been reported. For the worker, repeated blood examinations are necessary, including hemoglobin determinations, white and red cell counts, and differential smears. Where a worker shows a progressive drop in either red or white cells, or where the white count remains below <5,000/mm3 or the red count remains below 4.0 million/mm3, on two successive monthly examinations, the worker should be immediately removed from benzene exposure.

Elimination is chiefly through the lungs, when fresh air is breathed. The portion that is absorbed is oxidized, and the oxidation products are combined with sulfuric and glycuronic acids and eliminated in the urine. This may be used as a diagnostic sign. Benzene has a definite cumulative action, and exposure to a relatively high concentration is not serious from the point of view of causing damage to the blood-forming system, provided the exposure is not repeated. In acute poisoning, the worker becomes confused and dizzy, complains of tightening of the leg muscles and of pressure over the forehead, then passes into a stage of excitement. If allowed to remain exposed, he quickly becomes stupefied and lapses into coma. In nonfatal cases, recovery is usually complete with no permanent disability. In chronic poisoning the onset is slow, with the symptoms vague; fatigue, headache, dizziness, nausea and loss of appetite, loss of weight, and weakness are common complaints in early cases. Later, pallor, nosebleeds, bleeding gums, menorrhagia, petechiae, and purpura may develop. There is great individual variation in the signs and symptoms of chronic benzene poisoning.

TOLUENE

DPIM:	TGK750
Hazard Rating:	3
CAS:	108-88-3
DOT Number:	UN 1294
M Formula:	C_7H_8
M Weight:	92.15

Properties:

Colorless liquid; benzol-like odor. Melting point: -95 to -94.5°, boiling point: 110.4°, freezing point: -95°, lower explosive limit: 1.27%, upper explosive limit: 7%, flash point: 40°F (CC), density: 0.866 @ 20°/4°, vapor pressure: 36.7 millimeter @ 30°, vapor density: 3.14, autoignition temperature: 996°F. Insoluble in water; soluble in acetone; miscible in absolute alcohol, ether, chloroform.

Standards and Recommendations:

OSHA PEL:	TWA 100 ppm; STEL 150 ppm
ACGIH TLV:	TWA 50 ppm (skin); BEI: 1 mg(toluene)/L in venous blood at end of shift; 20 ppm toluene in end-exhaled air during shift
DFG MAK:	50 ppm (190 mg/m3); BAT: 340 mg/dL in blood at end of shift
NIOSH REL:	TWA 100 ppm; CL 200 ppm/10M
DOT Classification:	3; Label: Flammable Liquid

Safety Profile:

Poison by intraperitoneal route. Moderately toxic by intravenous and subcutaneous routes. Mildly toxic by inhalation. An experimental teratogen. Human systemic effects by inhalation: CNS recording changes, hallucinations or distorted perceptions, motor activity changes, antipsychotic, psychophysiological test changes, and bone marrow changes. Experimental reproductive effects. Mutation data reported. A human eye irritant. An experimental skin and severe eye irritant.

Toluene is derived from coal tar, and commercial grades usually contain small amounts of benzene as an impurity. Inhalation of 200 ppm of toluene for 8 hours may cause impairment of coordination and reaction time; with higher concentrations (up to 800 ppm) these effects are increased and are observed in a shorter time. In the few cases of acute toluene poisoning reported, the effect has been that of a narcotic, the workman passing through a stage of intoxication into one of coma. Recovery following removal from exposure has been the rule. An occasional report of chronic poisoning describes an anemia and leukopenia, with biopsy showing a bone marrow hypoplasia. These effects, however, are less common in people working with toluene, and they are not as severe. At 200–500 ppm, headache, nausea, eye irritation, loss of appetite, a bad taste, lassitude, impairment of coordination and reaction time are reported, but are not usually.accompanied by any laboratory or physical findings of significance.

With higher concentrations, the above complaints are increased and in addition, anemia, leukopenia, and enlarged liver may be found in rare cases. A common air contaminant, emitted from modern building materials (CENEAR 69,22,91).

Flammable liquid. A very dangerous fire hazard when exposed to heat, flame, or oxidizers. Explosive in the form of vapor when exposed to heat or flame. Explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione, dinitrogen tetraoxide, concentrated nitric acid, $H_2SO_4 + HNO_3$, N_2O_4, $AgClO_4$, BrF_3, UF_6, sulfur dichloride. Forms an explosive mixture with tetranitromethane. Can react vigorously with oxidizing materials. To fight fire, use foam, CO_2, dry chemical. When heated to decomposition it emits acrid smoke and irritating fumes.

ETHYL BENZENE

DPIM:	EGP500
Hazard Rating:	3
CAS:	100-41-4
DOT Number:	UN 1175
M Formula:	C8H10
M Weight:	106.18

Properties:

Colorless liquid; aromatic odor. Boiling point: 136.2°, freezing point: -94.9°, lower explosive limit: 1.2%, upper explosive limit: 6.8%, flash point: 59°F, density: 0.8669 @ 20°/4°, vapor pressure: 10 millimeter @ 25.9°, vapor density: 3.66, autoignition temperature: 810°F. Miscible in alcohol and ether; insoluble in NH3; soluble in SO2.

Standards and Recommendations:

OSHA PEL:	TWA 100 ppm; STEL 125 ppm
ACGIH TLV:	TWA 100 ppm; STEL 125 ppm; BEI: 2 g (mandelic acid)/L in urine at end of shift; 2 ppm ethyl benzene in end-exhaled air prior to next shift
DFG MAK:	100 ppm (440 mg/m3)
NIOSH REL:	TWA 100 ppm; STEL 125 ppm
DOT Classification:	3; Label: Flammable Liquid

Safety Profile:

Moderately toxic by ingestion and intraperitoneal routes. Mildly toxic by inhalation and skin contact. An experimental teratogen. Other experimental reproductive effects. Human systemic effects by inhalation: eye, sleep, and pulmonary changes. An eye and skin irritant. Human mutation data reported. The liquid is an irritant to the skin and mucous membranes. A concentration of 0.1% of the vapor in air is an irritant to human eyes, and a concentration of 0.2% is extremely irritating at first, then causes dizziness, irritation of the nose and throat, and a sense of constriction in the chest. Exposure of guinea pigs to 1% concentration has been reported as causing ataxia, loss of consciousness, tremor of the extremities, and finally death through respiratory failure. The pathological findings were congestion of the brain and lungs with edema. A very dangerous fire and explosion hazard when exposed to heat or flame; can react vigorously with oxidizing materials. To fight fire, use foam, CO2, dry chemical. Emitted from modern building materials (CENEAR 69,22,91). When heated to decomposition it emits acrid smoke and irritating fumes.

M-XYLENE

DPIM:	XHA000
Hazard Rating:	3
CAS:	108-38-3
M Formula:	C8H10
M Weight:	106.18

Properties:

Colorless, mobile liquid. Melting point: -47.9°, boiling point: 139°, lower explosive limit: 1.1%, upper explosive limit: 7.0%, flash point: 77°F, density: 0.864 @ 20°/4°, vapor pressure: 10 millimeter @ 28.3°, vapor density: 3.66, autoignition temperature: 986°F. Insoluble in water; miscible with alcohol, ether, and some organic solvents.

Standards and Recommendations:

OSHA PEL:	TWA 100 ppm; STEL 150 ppm
ACGIH TLV:	TWA 100 ppm; STEL 150 ppm; BEI: methyl hippuric acids in urine at end of shift 1.5 g/g creatinine
NIOSH REL:	TWA 100 ppm; CL 200 ppm/10M
DOT Classification:	3; Label: Flammable Liquid

Safety Profile:

Moderately toxic by intraperitoneal route. Mildly toxic by ingestion, skin contact, and inhalation. An experimental teratogen. Humansystemic effects by inhalation: motor activity changes, ataxia, andirritability. Experimental reproductive effects. A severe skin irritant. A common air contaminant. A very dangerous fire hazard when exposed to heat or flame; can react with oxidizing materials. Explosive in the form of vapor when exposed to heat or flame. To fight fire, use foam, CO2, dry chemical. Emitted from modern building materials (CENEAR 69,22,91). When heated to decomposition it emits acrid smoke and irritating fumes.

O-XYLENE

DPIM:	XHJ000
Hazard Rating:	3
CAS:	95-47-6
M Formula:	C_8H_{10}
M Weight:	106.18

Properties:

Colorless, mobile liquid. Density: 0.880 @ 20°/4°, melting point: -25.2°, boiling point: 144.4°, lower explosive limit: 1.0%, upper explosive limit: 6.0%, flash point: 62.6°F. Insoluble in water; miscible in absolute alcohol, ether.

Standards and Recommendations:

OSHA PEL:	TWA 100 ppm; STEL 150 ppm
ACGIH TLV:	TWA 100 ppm; STEL 150 ppm; BEI: methyl hippuric acids in urine at end of shift 1.5 g/g creatinine
NIOSH REL:	TWA 100 ppm; CL 200 ppm/10M
DOT Classification:	3; Label: Flammable Liquid

Safety Profile:

Moderately toxic by intraperitoneal route. Mildly toxic by ingestion and inhalation. An experimental teratogen. A common air contaminant. A very dangerous fire hazard when exposed to heat or flame. Explosive in the form of vapor when exposed to heat or flame. To fight fire, use foam, CO_2, dry chemical. Incompatible with oxidizing materials. When heated to decomposition it emits acrid smoke and irritating fumes. Emitted from modern building materials (CENEAR 69,22,91).

P-XYLENE

DPIM: XHS000
Hazard Rating: 3
CAS: 106-42-3
M Formula: C8H10
M Weight: 106.18

Properties:

Clear plates, prisms, or liquid. Melting point: 13–14°, boiling point: 138.3°, lower explosive limit: 1.1%, upper explosive limit: 7.0%, flash point: 77°F (CC), density: 0.8611 @ 20°/4°, vapor pressure: 10 millimeter @ 27.3°, vapor density: 3.66, autoignition temperature: 986°F. Insoluble in water; soluble in alcohol, ether, organic solvs.

Standards and Recommendations:

OSHA PEL: TWA 100 ppm; STEL 150 ppm

ACGIH TLV: TWA 100 ppm; STEL 150 ppm; BEI: methyl hippuric acids in urine at end of shift 1.5 g/g creatinine

NIOSH REL: TWA 100 ppm; CL 200 ppm/10M

Safety Profile:

Moderately toxic by intraperitoneal route. Mildly toxic by ingestion and inhalation. An experimental teratogen. Experimental reproductive effects. May be narcotic in high concentrations. Chronic toxicity not established, but is less toxic than benzene. A very dangerous fire hazard when exposed to heat or flame; can react with oxidizing materials. Explosive in the form of vapor when exposed to heat or flame. To fight fire, use foam, CO2, dry chemical. Potentially explosive reaction with acetic acid + air, 1,3-dichloro-5,5-dimethyl-2,4-imidazolidindione, nitric acid + pressure. When heated to decomposition it emits acrid smoke and irritating fumes.

POLYCHLORINATED BIPHENYL

DPIM:	PJL750
Hazard Rating:	3
CAS:	1336-36-3
DOT Number:	UN 2315

Properties:

Boiling point: 340–375°, flash point: 383°F, density: 1.44 @ 30°. A series of technical mixtures consisting of many isomers and compounds that vary from mobile oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

Standards and Recommendations:

DFG MAK:	Suspected Carcinogen
NIOSH REL:	TWA 0.001 mg/m3
DOT Classification:	9; Label: CLASS 9

Safety Profile:

Confirmed carcinogen with carcinogenic and tumorigenic data. Moderately toxic by ingestion. Some are poisons by other routes. Experimental reproductive effects. Like the chlorinated naphthalenes, the chlorinated diphenyls have two distinct actions on the body, namely, a skin effect and a toxic action on the liver. This hepato-toxic action of the chlorinated diphenyls appears to be increased if there is exposure to carbon tetrachloride at the same time. The higher the chlorine content of the diphenyl compound, the more toxic it is liable to be. Oxides of chlorinated diphenyls are more toxic than the unoxidized materials. In persons who have suffered systemic intoxication, the usual signs and symptoms are nausea, vomiting, loss of weight, jaundice, edema, and abdominal pain. If the liver damage has been severe the patient may pass into a coma and die. Combustible when exposed to heat or flame. When heated to decomposition they emit highly toxic fumes of Cl.

POLYCHLORINATED BIPHENYL (AROCLOR 1016)

DPIM: PJL800
Hazard Rating: 2
CAS: 12674-11-2

Standards and Recommendations:

NIOSH REL: TWA 0.001 mg/m3

Safety Profile:

Moderately toxic by ingestion. Experimental reproductive effects. When heated to decomposition it emits toxic fumes of PCB and Cl^{-}.

POLYCHLORINATED BIPHENYL (AROCLOR 1221)

DPIM: PJM000
Hazard Rating: 2
CAS: 11104-28-2

Standards and Recommendations:

NIOSH REL: TWA 0.001 mg/m3

Safety Profile:

Suspected human carcinogen. Moderately toxic by ingestion and skin contact. Experimental reproductive effects. When heated to decomposition it emits toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides.

POLYCHLORINATED BIPHENYL (AROCLOR 1232)

DPIM: PJM250
Hazard Rating: 2
CAS: 11141-16-5

Standards and Recommendations:

NIOSH REL: TWA 0.001 mg/m3

Safety Profile:

Suspected human carcinogen. Moderately toxic by skin contact. Mildly toxic by ingestion. When heated to decomposition it emits toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides.

POLYCHLORINATED BIPHENYL (AROCLOR 1242)

DPIM:	PJM500
Hazard Rating:	3
CAS:	53469-21-9

Standards and Recommendations:

OSHA PEL:	TWA 1 mg/m3 (skin)
ACGIH TLV:	TWA 1 mg/m3 (skin)
DFG MAK:	0.1 ppm (1 mg/m3)
NIOSH REL:	TWA 0.001 mg/m3

Safety Profile:

Suspected human carcinogen. Poison by subcutaneous route. Mildly toxic by ingestion. Human systemic effects by inhalation: pulmonary and liver effects. Experimental reproductive effects. Mutation data reported. When heated to decomposition it emits toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides.

POLYCHLORINATED BIPHENYL (AROCLOR 1248)

DPIM: PJM750
Hazard Rating: 3
CAS: 12672-29-6

Standards and Recommendations:

NIOSH REL: TWA 0.001 mg/m3

Safety Profile:

Suspected human carcinogen. Moderately toxic by skin contact. Experimental teratogenic and reproductive effects. When heated to decomposition it emits toxic fumes of Cl^{-}. Used in heat transfer, hydraulic fluids, lubricants, and insecticides.

POLYCHLORINATED BIPHENYL (AROCLOR 1254)

DPIM: PJN000
Hazard Rating: 3
CAS: 11097-69-1

Properties:

Composed of 11% tetra-, 49% penta-, 34% hexa, and 6% heptachlorobiphenyls (FCTXAV 12,63,74).

Standards and Recommendations:

OSHA PEL: TWA 0.5 mg/m3 (skin)

ACGIH TLV: TWA 0.5 mg/m3 (skin)

DFG MAK: 0.05 ppm (0.5 mg/m3); Suspected Carcinogen

NIOSH REL: TWA 0.001 mg/m3

Safety Profile:

Confirmed carcinogen with experimental carcinogenic and neoplastigenic data. Poison by intravenous route. Moderately toxic by ingestion and intraperitoneal routes. Experimental teratogenic and reproductive effects. Mutation data reported. When heated to decomposition it emits toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides.

POLYCHLORINATED BIPHENYL (AROCLOR 1260)

DPIM:	PJN250
Hazard Rating:	3
CAS:	11096-82-5

Properties:

Composed of 12% penta-, 38% hexa-, 41% hepta-, 8% octa-, and 1% nonachlorobiphenyls (FCTXAV 12,63,74).

Standards and Recommendations:

NIOSH REL:	TWA 0.001 mg/m3

Safety Profile:

Confirmed carcinogen with carcinogenic and neoplastigenic data. Moderately toxic by ingestion and skin contact. Experimental reproductive effects. Mutation data reported. When heated to decomposition it emits highly toxic fumes of Cl^-. Used in heat transfer, hydraulic fluids, lubricants, and insecticides.

ATTACHMENT 4B

Site Orientation Meeting Attendance Form

SITE ORIENTATION MEETING ATTENDANCE FORM

We, the undersigned, have read, understand, and agree with the information contained in this Health And Safety Program, and acknowledge that we have attended the site orientation meeting.

	Name	Signature	Date
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Site Orientation Meeting Conducted by:

HSO Name	**HSO Signature**	**Date**

ATTACHMENT 4C

Daily Site Sign-In/Sign-Out Log

DAILY SIGN-IN/SIGN-OUT LOG

DATE: ____________

	Person's Name	**Organization/Affiliation**	**Time In**	**Time Out**
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				

ATTACHMENT 4D

Accident Report Form

ACCIDENT REPORT FORM

Name(s) of Victim(s): ______________________ **SSN:** ___ ___ ___

______________________ **SSN:** ___ ___ ___

______________________ **SSN:** ___ ___ ___

Name(s) of Witness(es): ______________________ **SSN:** ___ ___ ___

______________________ **SSN:** ___ ___ ___

______________________ **SSN:** ___ ___ ___

Date of Accident: __________________ **Time of Accident:** ______________

Location of Accident: ______________________________________

____

Cause of Accident: ______________________________________

____

Duration of Accident: ______________________________________

____

Corrective Action(s): ______________________________________

____

Persons/Agencies Notified & Time of Arrival (if applicable): ______________

____

Accident Reported By: ______________________ **Date:** ______________

5.1 KEY COMPONENTS OF THE PROJECT

As described in more detail in other Sections of this Work Plan, the key components of the project are listed below in the order in which each activity is expected to be performed.

1. SI/RAR Work Plan Preparation
2. SI/RAR Work Plan Review & Approval
3. NYSDEC Fact Sheet Preparation
4. Public Notice on SI/RAR Work Plan Availability
5. Affirmative Action Plan Preparation
6. Affirmative Action Plan Review & Approval
7. Subcontractor Procurement
8. Conduct SI Activities
9. SI/RAR Preparation
10. SI/RAR Review & Approval
11. NYSDEC Proposed Remedial Action Plan (PRAP) Preparation
12. Public Notice & 45-Day Comment Period on PRAP
13. Public Hearing on PRAP (if necessary)
14. NYSDEC Responsiveness Summary (RS) Preparation
15. NYSDEC Record of Decision (ROD) Preparation
16. Public Notice - ROD

As referenced in Section 2.0 of this Work Plan, a project schedule is presented as Figure 2-2 and identifies the approximate timeframes for performance of the key components of the project.

5.2 LOCAL DOCUMENT REPOSITORIES

Throughout the course of the project, pertinent documents and reports will be made available for public review at the locations listed below. In addition, a contact person and telephone number are provided for each local document repository for the public to contact to obtain information regarding availability of the documents for review.

Ms. Jean Palmer
Onondaga County Public Library
Robert P. Kinchen Central Library
Local History/Special Collections
447 South Salina Street
Syracuse, NY 13202-2494
(315) 435-1900

Hours: Mon., Thu., Fri., Sat. (9:00 AM to 5:00 PM)
Tue., Wed. (9:00 AM to 8:30 PM)

5.3 AFFECTED & INTERESTED PARTIES

5.3.1 Owners of Properties Adjacent to the Site

Adjacent Property Address	Reputed Owner	Reputed Owner's Address
611-655 South Ave.	[redacted]	[redacted]
131 Bellevue Ave. & Huron	[redacted]	[redacted]
114 Huron St.	[redacted]	[redacted]
100 Chester St.	[redacted]	[redacted]
106 Chester St.	[redacted]	[redacted]
200-202 Bellevue Ave.	[redacted]	[redacted]
222 Bellevue Ave.	[redacted]	[redacted]
210 Bellevue Ave.	[redacted]	[redacted]
208 Bellevue Ave.	[redacted]	[redacted]
106-08 Huron St.	[redacted]	[redacted]
110 Huron St.	[redacted]	[redacted]
218 Bellevue Ave.	[redacted]	[redacted]
227 Bellevue Ave.	[redacted]	[redacted]
104 Chester St.	[redacted]	[redacted]
119 Chester St.	[redacted]	[redacted]
137 Bellevue Ave.	[redacted]	[redacted]
121 Chester St.	[redacted]	[redacted]
116 Huron St.	[redacted]	[redacted]
112 Huron St.	[redacted]	[redacted]
102-04 Huron St.	[redacted]	[redacted]
212-214 Bellevue Ave.	[redacted]	[redacted]
141 Bellevue Ave.	[redacted]	[redacted]
102 Chester St.	[redacted]	[redacted]

5.3.2 Organizations/Groups with Potential Interest in the Project

Syracuse Model Neighborhood /
Southwest Community Center
Mr. Jesse Dowdell
401 South Avenue
Syracuse, NY 13204
(315) 475-8437

Jubilee Homes of Syracuse
901 Tallman Street
Syracuse, NY 13204
(315) 428-0070

Syracuse Habitat for Humanity
308 Otisco Street
Syracuse, NY 13204
(315) 422-2230

New Salem Baptist Church
516 South Avenue
Syracuse, NY 13204
(315) 424-1956

Syracuse United Neighbors
1540 South Salina Street
Syracuse, NY 13205
(315) 476-7475

Bright Chapel Methodist Church
817 South Avenue
Syracuse, NY 13207

Ms. Geneva Hayden
C.U.R.N.
912 Midland Avenue
Syracuse, NY 13205

Mr. Larry King
Brighton Family Center
100 Edmund Avenue
Syracuse, NY 13205
(315) 424-9378

S&R Convenience Store
303 South Avenue
Syracuse, NY 13204
(315) 425-7212

5.3.3 Local News Media

Newspaper:

The Post-Standard
Clinton Square
P.O. Box 4915
Syracuse, NY 13221-4915

Eagle Newspaper
5910 Firestone Drive
Syracuse, NY 13206

Television:

WSTM - Channel 3
1030 James Street
Syracuse, NY 13203

WTVH - Channel 5
980 James Street
Syracuse, NY 13203

WIXT - Channel 9
5904 Bridge Street
East Syracuse, NY 13057

News 10 Now
815 Erie Boulevard East
Syracuse, NY 13210

Radio:

Clear Channel Communications
500 Plum Street, Suite 100
Syracuse, NY 13204

WAER - FM 88
7995 Ostrom Avenue
Syracuse, NY 13244

Citadel Broadcasting Company
1064 James Street
Syracuse, NY 13204

5.3.4 Local Government Officials

City of Syracuse:

Hon. Matthew J. Driscoll, Mayor
City Hall, Room 203
233 East Washington Street
Syracuse, NY 13202
(315) 448-8005

Mr. John Copanas, City Clerk
Office of the City Clerk
231 City Hall
Syracuse, NY 13202
(315) 448-8217

Mr. David S. Michel, Director
Department of Economic Development
233 East Washington Street, Room 312
Syracuse, NY 13202
(315) 448-8100

Mr. Brian Pincelli
Brownfield Coordinator
Department of Economic Development
233 East Washington Street
Syracuse, NY 13202

Planning Department
201 East Washington Street, Room 211
Syracuse, NY 13202
(315) 448-8640

Michael J. Ryan, P.E., Commissioner
Department of Water
101 North Beech Street
Syracuse, NY 13210
(315) 473-2609

Hon. Thomas M. Seals
Syracuse Common Councilor – 4th District
314 City Hall
Syracuse, NY 13202
(315) 448-8466

Onondaga County:

Hon. Joanie M. Mahoney, County Executive
Office of the County Executive
John H. Mulroy Civic Center - 14th Floor
421 Montgomery Street
Syracuse, NY 13202
(315) 435-3516

Hon. Monica Williams
County Legislator – 18th District
Office of the County Legislature
407 Court House, 401 Montgomery Street
Syracuse, NY 13202
(315) 435-2070

Mr. Randy R. Ott, Commissioner
Department of Water Environment Protection
650 Hiawatha Boulevard West
Syracuse, N 13204-1194
(315) 435-2260

Ms. M. Ann Ciarpelli, County Clerk
Office of the County Clerk
200 Court House, 401 Montgomery Street
Syracuse, NY 13202
(315) 435-2226

Lisa Letteney, P.E., Director
Onondaga County Health Department
Environmental Risk Assessment
John H. Mulroy Civic Center – 9th Floor
421 Montgomery Street
Syracuse, NY 13202
(315) 435-3252

Mr. David Coburn, Director
Office of Environment
John H. Mulroy Civic Center – 14th Floor
421 Montgomery Street
Syracuse, NY 13202
(315) 435-2647

5.4 PROJECT CONTACTS

City of Syracuse:

Patrick Corbett
City of Syracuse DPW
Bureau of Technical Services
401 City Hall
Syracuse, NY 13202
(315) 448-8495

Joseph Barry, III, Esq.
City of Syracuse
Office of the Corporation Counsel
300 City Hall
Syracuse, NY 13202
(315) 448-8400

Mr. Andy Maxwell, Planner
City of Syracuse
Office of Community Development
City Hall Commons - Room 412
201 East Washington Street
Syracuse, NY 13202
(315) 448-4750

Consultant:

Mr. Richard D. McKenna
Beardsley Design Associates
431 East Fayette Street
Syracuse, NY 13202
(315) 472-6980

NYSDEC:

Karen Cahill, Environmental Engineer I
NYSDEC – Region 7
615 Erie Boulevard West
Syracuse, NY 13204
(315) 426-7432

NYS Department of Health:

Mr. Richard Jones
Regional Toxics Coordinator
NYS Department of Health
217 South Salina Street - 3rd Floor
Syracuse, NY 13202-3592
(315) 426-7627

5.5 CITIZEN PARTICIPATION ACTIVITIES

This CP Plan is intended to create opportunities for early, inclusive citizen/public participation in the project before the selection of a preferred course of remedial action. The CP Plan will include communication with the public at critical decision points during the project and will include the following activities to promote citizen participation:

1. Public announcement of the availability of the SI/RAR Work Plan for the public to review at local document repositories;
2. Public announcement of the availability of the PRAP for the public to review at local document repositories,
3. Provide for a 45-day comment period period for submission of written comments regarding the PRAP;
4. Prepare a RS which addresses public comments about the PRAP; and
5. Public announcement of the availability of the ROD when it is finalized.

Additional activities may need to be considered at the following stages of the project:

1. During the development of the SI/RAR Work Plan;
2. When the PRAP is released;
3. When the ROD is signed; and/or
4. At other stages during the project where fact sheets, public notices, and public hearings may be necessary.