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REPORT

Rosen Site Removal Action Work Plan

Rosen CPRP Group
Cortland, New York

April 1998

BBL
BLASLAND, BOUCK & LEE, INC.
engineers & scientists

6723 Towpath Road, P.O. Box 66
Syracuse, New York 13214-0066
(315) 446-9120

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1. Introduction

1.1 General

This document presents a Work Plan for the performance of a removal action identified under an Administrative Order, effective March 26, 1998, for the Rosen Site (Site) in Cortland, New York.

The work efforts associated with this removal action will be conducted on a five-acre portion of the Site during the summer of 1998. Upon completion of this work effort and in accordance with this Work Plan and the Administrative Order, the Contributing Potentially Responsible Parties (CPRP) Group for this Site will perform construction activities to remediate this portion of the Site. The CPRP Group anticipates having this five-acre portion of the Site available for redevelopment by the New York Susquehanna and Western Railway Corporation (Railroad) by the fall of 1998.

This document contains a brief summary of Remedial Investigation (RI) work efforts, a discussion of proposed remedial work efforts, and appendices that detail specific construction related activities.

1.2 Work Plan Organization

This work plan has been organized into the following four sections:

- Section 1: Introduction - Identifies the Work Plan objectives, overall approach, and provides background information;
- Section 2: Delineation and Division of Work Efforts - Identifies the division of construction work efforts between the CPRP Group and the Railroad;
- Section 3: Scope of Work - Details the specific work efforts associated with the implementation of the construction activities;
- Section 4: Summary Report and As-Built Drawings - Summarizes the contents of the Summary Report and As-Built Drawings for the project.

1.3 Work Plan Objectives

The objective of this Work Plan is to detail the construction activities proposed for the remediation and redevelopment of the affected 5-acre portion of Site.

1.4 Site Description and History

The Site occupies approximately 19 acres on the south side of the City of Cortland in Cortland County, New York. The Site is bordered on the north, east and south by Perplexity Creek, a Perplexity Creek tributary, and a shallow swale to the west. Miscellaneous scrap materials cover portions of approximately 16 acres of the Site. An additional approximately three-acre area, referred to as the Cooling Pond Area, contains mounded construction and demolition debris.

Overhead Door Corporation, Monarch Machine Tool Company, and Niagara Mohawk Power Corporation agreed to conduct a Remedial Investigation/Feasibility Study (RI/FS) in accordance with an Administrative Order on Consent, Index Number II CERCLA-00204 with the United States Environmental Protection Agency (USEPA) Region 2 effective January 7, 1990 (USEPA, 1990a). Cooper Industries, Inc., Keystone Consolidated Industries, Inc., and Potter Paint Company, Inc. agreed to conduct a RI/FS in compliance with the terms of a Unilateral Administrative Order, Index Number II CERCLA-00205 effective February 22, 1990 (USEPA, 1990b). These companies are collectively referred to as the CPRP Group.

The USEPA ordered three other respondents to participate in the RI/FS under Order No. 00205: Agway, Inc., Harvey M. Rosen, and Smith Corona Corporation. The USEPA later withdrew the Order to Agway, Inc; Harvey M. Rosen and the Smith Corona Corporation have failed to comply with the USEPA's Unilateral Administrative Order.

On March 10, 1998, the USEPA issued an Administrative Order to the members of the CPRP Group and Agway, Inc./Motor Transportation Services, Inc, BMC Industries, Inc., ELF Atochem North America, Inc., Mack Trucks, Inc., New York State Electric and Gas Corp., Pall Trinity Micro Corp., Potter Paint Company, Inc., Raymond Inc., Redding-Hunter, Inc., Harvey Rosen, and Wilson Sporting Goods, Company for the remediation of a five-acre portion of the Site. Development of this document is a result of this Administrative Order.

1.5 Background

The CPRP Group for the Site conducted a RI/FS in accordance with the Administrative Order on Consent, Index number II CERCLA-00204 (USEPA, 1990a). Blasland, Bouck & Lee, Inc. (BBL) was retained by the CPRP Group to conduct the Baseline Risk Assessment (Baseline RA) and the RI/FS.

The Sampling and Analysis Plan, the Health and Safety Plan, and the Work Plan for the RI were developed by BBL and submitted to the USEPA in December, 1990. At the request of the USEPA, BBL submitted four addenda to the Work Plan for the RI dated January 1992, November 1992, October 1993, and October 1994. These addenda were subsequently approved by the USEPA. In addition, two additional investigations were performed. The first was a Geophysical Investigation/Test Pit Excavation Program conducted in December, 1996. This investigation resulted in the conclusion that the Cooling Pond was not the source of TCA in well W-06. No intact drums were found. The second investigation was conducted in the summer of 1997 and focused on investigating the Cooling Pond Area. The results of this investigation demonstrated that the Cooling Pond Area was not a significant source of Site constituents.

The Baseline RA for the Site was submitted to the USEPA in January 1995 and was approved in June 1995. The Baseline RA identified no unacceptable risks to human health under current Site conditions. The ecological risks were more difficult to assess with potential unacceptable risks identified for a limited number and species of animals (e.g., mice, raccoons).

In June 1995, a draft of the FS was submitted to the USEPA. The USEPA commented on the draft FS in January 1997, and the revised FS was re-submitted in April 1997. The FS identified a recommended remedial alternative (Alternative #2) that consisted of an approximately three-acre NYS Part 360 Cap over the former Cooling Pond Area, a surface cover (e.g. asphalt, soil, or other material) over the remainder of the Site, source removal (excavation of the PCB and TCA "hot spot" areas), and groundwater monitoring/institutional controls.

In March 1997, the Railroad expressed a strong interest in the redevelopment of a five-acre portion of the Site as a transportation facility. The Railroad also has expressed interest in obtaining an option for the redevelopment of the remaining 11-acres, excluding the approximately three-acre area to be capped, for development of a light industrial park.

In November 1997, the USEPA issued a Proposed Remedial Action Plan (PRAP) for the remediation of the Site. Following the PRAP, in April 1998, the Record of Decision (ROD) was issued.

2. Delineation and Division of Work Efforts

2.1 General

In general, the CPRP Group's responsibilities under this Work Plan are to provide the necessary construction efforts to successfully implement the requirements of the March 10, 1998 Administrative Order. Upon the completion of the CPRP Group's construction activities, the Railroad will have the construction responsibilities to redevelop a five-acre portion of the Site as a transportation terminal.

The following subsections provide specific details regarding the division of work between the CPRP Group and the Railroad for the three phases of construction tasks.

2.2 Construction Efforts

Phase I
CPRP Group Construction Tasks: • Site preparation and access control • Site survey • Excavation and relocation of the PCB hotspots near Pendleton Street and the former Gantry Crane Area to the Cooling Pond Area after temporary staging and analytical testing; • Debris relocation to the Cooling Pond Area after temporary staging and analytical testing; • Site rough grading to facilitate geotextile installation over the five-acres; • Underground storage tank removal; and • Environmental monitoring during construction activities.
Phase II
CPRP Group Construction Tasks • Installation of the geotextile cover system (geotextile fabric only, no protective soil/stone cover); [Please note that the use of either a soil or stone cover may impact future redevelopment. For example, redevelopment by the Railroad would prefer use of a stone cover; however, other types of redevelopment may prefer a grass-covered lawn area (soil cover). As a result, the installation of soil or a protective stone cover is assumed to occur during Phase III unless an agreement has been reached in advance between the CPRP Group and the Railroad.]

Phase III
Railroad Construction Tasks: • Installation of a minimum of one-foot of protective crushed soil/stone cover across the surface of the geotextile; • Installation of railroad tracks and a stream crossing to facilitate the development of the transportation terminal; • Securing all necessary permits not required under the CPRP's work tasks (e.g., stream crossing); • Performing all necessary construction efforts associated with the development of the transportation facility; and • Performing environmental monitoring during construction activities, if necessary.

Additional details associated with the proposed work efforts are provided in Section 3.

3. Scope of Work

3.1 General

As discussed in Section 2, the work efforts associated with the redevelopment of the five-acre parcel are as follows:

- Site Preparation and Access Control - Includes work efforts such as the development of a Health and Safety Plan, Sampling and Analysis Plan, Site Operations Plan, Quality Assurance/Quality Control Plan, installation of erosion control barriers, temporary fence, and other miscellaneous items.

- Site Survey - Develops a topographic map, locates monitoring wells to be abandoned, if any, and provides a construction base map;

- PCB Hotspot Excavation - Excavates the PCB areas from near the Pendleton Avenue access gate and former Gantry Crane Area;

- Surface Debris Relocation - Removes scrap material from across the surface of the Site to the Cooling Pond Area;

- Geotextile Cover System Installation - Provides a geotextile cover and one-foot of crushed soil/stone cover to isolate surface materials from potential receptors; and

- Underground Storage Tank (UST) Removal - Removal of a 10,000 gallon UST from the southwest corner of the Site.

Each of these work tasks is described in detail below:

3.2 Subtask 1 - Site Preparation and Access Control

Before the initiation of major construction activities, the following work efforts will be performed:

- Development of a Health and Safety Plan, Sampling and Analysis Plan, Site Operations Plan, and Quality Assurance/Quality Control Plan;

- Construction of decontamination facilities for equipment and personnel. Previously constructed facilities will be evaluated for potential reuse.

- Installation of appropriate erosion control barriers;

- Installation of a temporary Site fencing; and

- Protection or abandonment of certain existing monitoring wells.

Equipment will be stored on-site within the fenced area after the completion of each day's construction activities. Security will be provided during working hours.

3.3 Subtask 2 - Site Survey

A topographic survey with one-foot contours will be performed prior to construction activities. All elevations will be surveyed to the nearest 0.01 foot complying with the National Geodetic Survey Horizontal Control Network specification for a third-order, Class I survey. As a component of this surveying effort, a baseline will be established to facilitate any future construction surveying efforts that may be necessary. This effort will also locate monitoring wells that will be abandoned, if any, due their potential impact on future Site redevelopment.

3.4 Subtask 3 - PCB Hotspot Removal

Two areas are located immediately adjacent to the access gate on Pendleton Avenue and the former Gantry Crane Area and have an estimated total volume of 2,000 cys. Any soils containing PCBs above the specified limit will be excavated and temporarily stockpiled in the vicinity of these areas, sampled, and disposed of in the Cooling Pond Area or off-site depending on PCB concentration. Soils remaining on-site for disposal will be temporarily covered with plastic sheeting in the Cooling Pond Area until the final cap is installed.

As identified in the FS (BBL, 1997), in accordance with NYSDEC *Technical and Administrative Guidance Memorandum No. 94, HWR, 4046* (TAGM), soils containing PCB concentrations equal to or greater than 10 ppm will be excavated. Excavated soil concentrations greater than or equal to 10 ppm and less than or equal to 50 ppm will be disposed of in the Cooling Pond Area. PCB soils greater than 50 ppm will be disposed off-site at the Toxic Substances Control Act (TSCA) compliant facility in Niagara Falls, New York. Excavation activities will be conducted in accordance with the verification procedure specified in Appendix A. The excavation will be backfilled with clean material upon construction completion.

3.5 Subtask 4 - Surface Debris Relocation

To date, several recycling efforts have been performed to recover scrap materials. The materials that remain at the Site at this time do not have any recycling value and; consequently, they will be removed and relocated to facilitate redevelopment. Non-recyclable materials such as telephone housings, bricks, white goods, Site vegetation, and miscellaneous materials will be transported to the Cooling Pond Area for on-site disposal. This material will be compacted by heavy construction equipment and used to develop the final grade for the surface of the Cooling Pond Area before the installation of the NYS Part 360 Cap.

Materials not suitable for on-site disposal at the Cooling Pond Area, such as discarded pressure vessels, will be staged on-site at a location identified by the on-site engineer. These materials will be decontaminated and properly disposed of off-site.

The surface of the five-acre portion of the Site will be prepared for placement of geotextile after removal of all debris. Objects that could puncture the geotextile cover or similarly inhibit placement will be removed. The five-acre area will be rough graded to facilitate drainage.

Relocated material will not initially be relocated in the vicinity of monitoring well MW-6 until the TCA removal efforts are completed under future construction efforts.

3.6 Subtask 5 - Geotextile Cover System Installation

As identified in the FS, a cover system will be constructed across the surface of the Site to isolate subsurface soils from potential receptors. The cover system will be composed of a geotextile material and one-foot of crushed soil/stone cover placed across the surface of the geotextile. The advantages of this type of cover system are as follows:

- Provides a permanent visual isolation layer; and
- Provides improved subsurface bearing capacity to facilitate future construction efforts;

This cover system will be installed across the five-acre portion of the Site with the remaining 14 acres to be addressed in the future.

3.7 Subtask 6 - Underground Storage Tank (UST) Removal

During the RI, a 10,000 gallon UST was discovered in the southwest corner of the Site. This UST will require removal and proper closure as a component of this program.

4. Summary Report and As-Built Drawings

4.1 General

A summary report for the Phase I and Phase II construction activities will be prepared for work activities conducted by the CPRP Group. Documentation of the Phase III redevelopment effort will be the responsibility of the Railroad. The Phase I and Phase II construction activities report will present information obtained during the construction effort such as:

- Daily logs detailing construction related activities;
- In-field modifications;
- A summary of analytical results collected during construction activities; and
- As-built drawings showing final grades as well as any shop drawings associated with materials purchased (i.e., geotextile, fill material etc.).

This report as well as the as-built drawings will be provided to USEPA.

Appendix A

Verification Sampling For PCB Hotspot Excavation Program

Overview

Upon completion of the PCB Hotspot excavation effort, the bottom of the excavation will be sampled to ensure that the <10 ppm soil excavation criteria has been obtained. The following procedures will be used for the collection and analysis of soil samples to verify that the specified cleanup goal has been achieved. The collection of all verification samples will be performed by BBLES.

Procedure

Immediately following the initial soil removal, a sample pattern will be constructed for verification sampling. PCB rapid immunoassay field screening tests will be used for field verification to determine the adequacy of the initial removal operation and to identify areas requiring additional excavation, if any. The field-screened samples will be collected at locations determined by the on-site engineer. Additional soil will be removed from any areas identified as having a residual PCB content in excess of the removal criterion of 10 ppm, followed by retesting to determine compliance.

In areas where groundwater is encountered within the excavation, no excavation below the groundwater table will be performed. In addition, no provision has been made for dewatering of excavated material, thus it is imperative that only soils that do not contain free liquids be excavated.

Once all of the field-screened samples for a particular area have met the selected cleanup criteria, discrete soil samples will be collected using the same sampling pattern described below.

Verification Sampling Approach

The sampling approach will consist of the collection of eight verification samples in a 50 by 50-foot excavated grid area. The grid area will be sectioned into 25 by 25-foot grid quadrants, each of which will contain two uniformly spaced verification samples. The verification sampling approach is illustrated in Figure A-1. The grid pattern will be laid over the proposed excavation area. All sample locations contained within the boundary of the excavation and those immediately adjacent to the excavation will be sampled for verification of cleanup. All samples will be collected remotely. Under no circumstances will personnel enter the excavation to conduct sampling activities.

A grid quadrant and associated fractional grid quadrant area shall be considered remediated, and no further excavations or sampling will be required, if both verification samples collected from that area contain concentrations less than or equal to the 10 ppm cleanup criterion. If either verification sample collected from a specific grid quadrant contains concentrations greater than the 10 ppm cleanup criterion, then excavation and verification sampling will continue in that quadrant and associated fractional areas until the specified cleanup level has been achieved, or unless groundwater prevents further excavation.

Verification samples will be collected, packaged, and shipped to the laboratory for analysis. Samples will be analyzed for PCB's in accordance with USEPA SW-846 protocols. Analysis will be completed within 24 hours after samples are received by the laboratory (Buck Environmental Laboratories, Inc.).

Appendix B

Procedure For Determining PCB-containing Soils Disposal Location

Overview

The following details the sampling procedure for characterizing soils excavated from the PCB hotspot areas.

PCB-containing soils greater than or equal to 10 ppm and less than 50 ppm will be disposed of on site in the Cooling Pond Area. Soils having PCB levels greater than or equal to 50 ppm will be transported off-site for disposal at a Toxic Substance Control Act (TSCA) compliant facility. Soils having PCB levels less than 10 ppm will be left in place.

Procedure

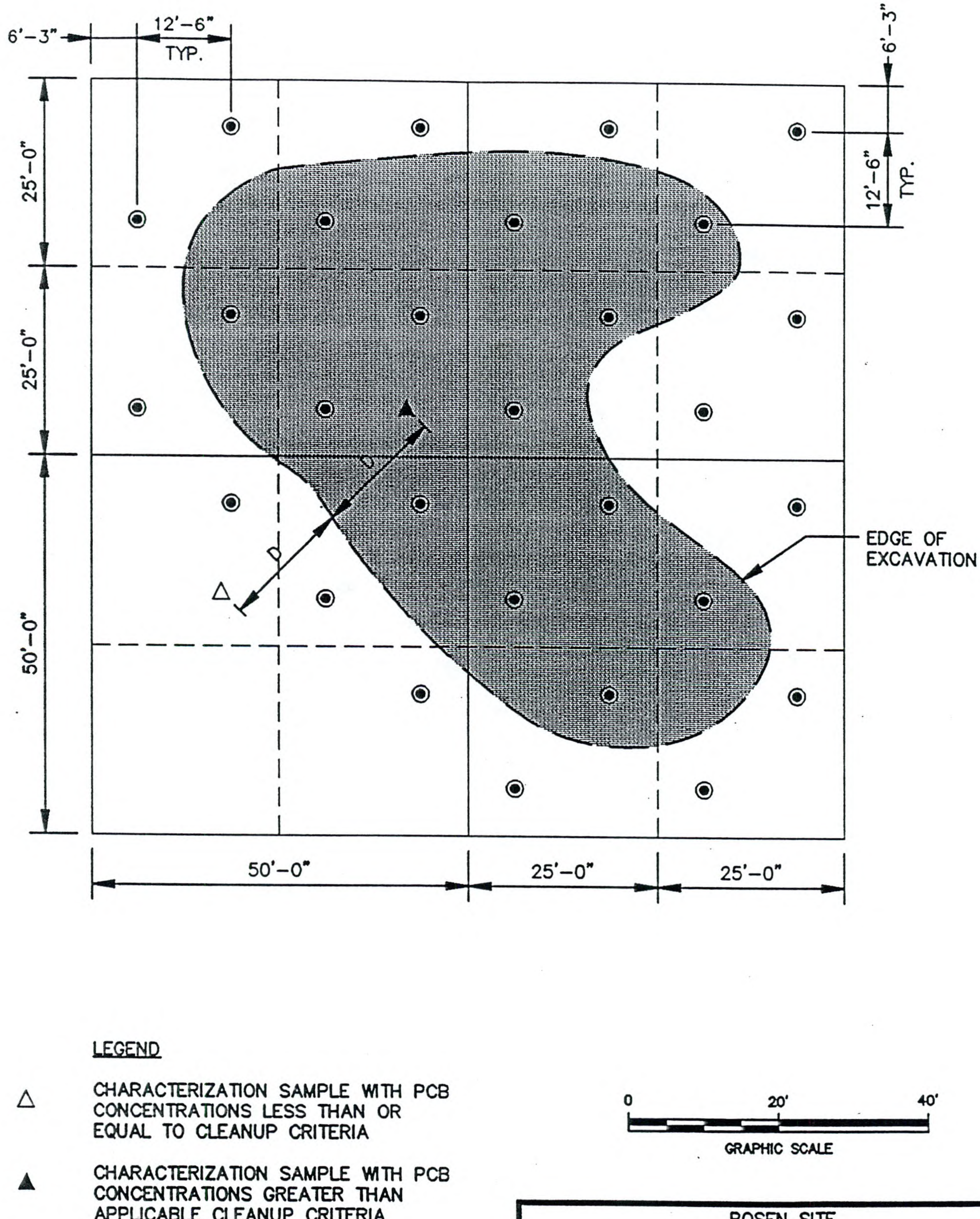
Excavated soils will be sampled using a random and judgmental sampling protocol, due to uncertainty regarding their original location and arrangement, to determine the level of PCBs present in the soil pile. Specific sampling locations will be determined by the on-site engineer. Individual soil samples may be composited together to form a discrete sample. However, no more than 10 discrete samples maybe grouped together to form a composite sample. At a minimum, one discrete sample will be collected for every 10 cys of soil excavated.

Individual samples used to form each composite sample will be retained by the laboratory for later analysis, if necessary.

Analytical results obtained for random sampling will be used to calculate a 95% confidence limit that will have a 95% probability of exceeding the actual average concentration of PCBs in the excavation soils. The 95% confidence limit will be compared to the disposal criteria for the Site.

Verification Sampling Approach

All testing will be initially performed using immunoassay testing for PCBs. Based on field-screening samples, excavated soils having a PCB content greater than or equal to 50 ppm will be tested in the laboratory using USEPA-846 protocols. Analysis will be completed within 24 hours after samples are received by the laboratory (Buck Environmental Laboratories, Inc.). Any additional sampling requirements necessary for off site disposal also will be collected at this time.



LEGEND

△ CHARACTERIZATION SAMPLE WITH PCB CONCENTRATIONS LESS THAN OR EQUAL TO CLEANUP CRITERIA

▲ CHARACTERIZATION SAMPLE WITH PCB CONCENTRATIONS GREATER THAN APPLICABLE CLEANUP CRITERIA

◉ VERIFICATION SAMPLE

ROSEN SITE
CORTLAND, NEW YORK

WORK PLAN

GRID SQUARE REDUCTION FOR VERIFICATION SAMPLING FOR PCB SOILS

BBL BLASLAND, BOUCK & LEE, INC. engineers & scientists

FIGURE A-1

L: ON=*,OFF=REF
P: STD-PCP/AP
9/8/97 SYR-54-YCC
48401070/48401F01.DWG

New York State Department of Health
Center for Environmental Health

Public Health Assessment

ROSEN BROTHERS SITE

CORTLAND, CORTLAND COUNTY, NEW YORK

January 20, 1998

Cerclis No. NYD982272734

Prepared under a Cooperative Agreement with

U.S. Department of Health & Human Services
Public Health Service
Agency for Toxic Substances and Disease Registry

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Center for Environmental Health
Health Liaison Program
2 University Place, Room 240
Albany, NY 12203
1-800-458-1158, Ext. 6402
(518) 458-6402

PUBLIC HEALTH ASSESSMENT

ROSEN BROTHERS SITE

CORTLAND COUNTY, CORTLAND, NEW YORK

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SUMMARY

The Rosen Brothers site, also known as Scrap King, is a 20-acre abandoned industrial facility in the City of Cortland, Cortland County, New York. Between 1908 and 1971 the site was occupied by Wickwire Brothers, Inc., which manufactured wire, screens and nails. Industrial wastes from Wickwire site operations were disposed on-site or discharged to the municipal sewer system and to Perplexity Creek, which borders the site. Between 1972 and 1980, Philip and Harvey Rosen operated a scrap metal processing facility at the site. Municipal, industrial and construction wastes, as well as drums, transformers and other scrap materials were disposed at the site. Past waste disposal practices reportedly included draining of liquid wastes onto the ground surface and crushing and burying drums of liquid wastes in shallow pits. Commercial trash was hauled to the site until 1984.

Past public health concerns about the site included the potential for community exposures to contaminants and hazardous fumes released into the air from burning materials during the numerous fires at the site. The potential for direct contact with wastes was also a concern since site access was not restricted. There was also concern about the physical hazards at the site including the deteriorated structures and stockpiling of old refrigerators.

An investigation was conducted at the Rosen site in 1986 by the New York State Department of Environmental Conservation (NYS DEC). The United States Environmental Protection Agency (US EPA) completed a removal action at the site between July and November 1987. The site was listed by the US EPA on the National Priorities List (NPL) in March 1989.

A remedial investigation (RI) was completed at the site between 1990 and October 1992. A supplemental investigation was completed between November and December of 1993. Findings of the RI showed that on-site groundwater is contaminated with volatile organic compounds (VOCs), polychlorinated biphenyls (PCBs) and metals. On-site soils are contaminated with VOCs, PCBs, lead, polycyclic aromatic hydrocarbons (PAHs) and other semi-volatile organic compounds (SVOCs). No contaminants were found in the surface waters of Perplexity Creek or its tributary, both of which border the site. Sediments are contaminated with VOCs,

PAHs and other SVOCs. Off-site groundwater shows VOC contamination. Physical hazards at the site included remnants of old buildings and other structures, a partially exposed buried tank, piles of scrap metal, surface debris, and trucks and other industrial vehicles. In 1997, the USEPA removed and recycled over 400 tons of scrap metal.

In the past, it is likely that on-site workers and others with access to the site were exposed to on-site wastes and contaminants in surface soil and air.

In 1982, the New York State Department of Health (NYS DOH) reviewed leukemia incidence and mortality in the City of Cortland for the period 1970-1979. No statistically significant excesses of leukemia were found. In May of 1991, the NYS DOH completed a study of cancer cases in the City of Cortland for the years 1978-1987. The total number of observed cancer cases did not show a statistically significant difference from the expected number of cancer cases. Several public meetings have been held during the course of investigations at the site to address community concerns about the site. There are no known new community health concerns about the site.

Based on the Agency for Toxic Substances and Disease Registry's (ATSDR) current guidance for assigning a health hazard category to a site (refer to Appendix D), the Rosen Brothers site posed a public health hazard in the past. Prior to on-site remedial activities, numerous physical and chemical hazards existed at the site. Site access was not restricted and children reportedly walked across the site going to and from the adjacent high school. It is likely that site workers and others with access to the site were exposed to PAHs and PCBs in on-site surface soils. The NYS DOH estimated that past exposures to PAHs in on-site surface soils could pose a high increased cancer risk for on-site workers and a moderate increased cancer risk for trespassers. The NYS DOH estimated that past exposures of site workers and trespassers to PCBs in on-site soils could pose a low increased cancer risk.

Currently, the site poses no apparent public health hazard. Past remedial actions, including fencing, have minimized the potential for exposure to physical hazards at the site and contaminants in on-site surface soils including PCBs,PAHs and lead. However, additional remedial measures are needed to eliminate possible future exposures to site contaminants in on-site soils and groundwater. VOCs have been detected in groundwater at and near the site. Although the area is served by public water and exposure to site contaminants in drinking water is unlikely, private well points likely exist in residential areas near the site. These wells could be affected by site contaminants at levels of public health concern for people who may use them for drinking water, bathing, and showering.

The data and information developed in this public health assessment have been evaluated by ATSDR's Health Activities Recommendation Panel (HARP) for appropriate follow-up with respect to health activities. The findings of this review are included in this public health assessment.

BACKGROUND

Under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), the New York State Department of Health (NYS DOH) will evaluate the public health significance of the Rosen Brothers site. More specifically, ATSDR and the NYS DOH will determine whether health effects are possible and will recommend actions to reduce or prevent possible health effects. ATSDR is a federal agency within the U.S. Department of Health and Human Services. The agency is authorized by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, to conduct public health assessments at hazardous waste sites proposed for the National Priorities List (NPL). The public health assessment (PHA) process for the Rosen Brothers site began when the site was proposed for listing on the NPL in June 1988. In February 1990, the ATSDR received a petition to complete a health assessment for the site.

A. Site Description and History

The Rosen Brothers site, also known as Scrap King, is a 20-acre abandoned industrial facility at 136 South Pendleton Street in the City of Cortland, Cortland County, New York (refer to Figure 1, Appendix A). Prior to 1902, the Rosen site area was vacant land; in 1902, a brick foundry began operations on a portion of the site. Between 1908 and 1971 the site was occupied by Wickwire Brothers, Inc., which manufactured wire, screens and nails (refer to Figure 2, Appendix A). During Wickwire site operations, the tributary to Perplexity Creek was dammed to form a small pond on-site. This pond was used as a source of cooling water for on-site manufacturing activities. Industrial wastes from Wickwire site operations were disposed on-site or discharged to the municipal sewer system and to Perplexity Creek, which borders the site. An on-site incinerator and stack also existed at the site. In 1970, the site buildings caught fire and Wickwire operations ended.

Between 1972 and 1980, Philip and Harvey Rosen (also known as the Rosen Brothers) operated a scrap metal processing facility and industrial landfill at the site. The site was originally licensed to operate as a scrap processor which included crushing and recycling of cars. The Rosen Brothers purchased the site in 1975 and established a second business known as Scrap King. During site operations, municipal, industrial and construction wastes, as well as drums, transformers and other scrap materials were disposed at the site. Past waste disposal practices at the site reportedly included draining of liquid wastes on the ground surface and crushing and burying drums containing liquid wastes in shallow pits. Commercial trash was hauled to the site until 1984.

In March 1972, the site owners were cited for violations of the New York State Sanitary Code. Additional violations were cited in 1985 and the owners were ordered by the Cortland County Health Department (CCHD) to secure the site, stop burning and waste disposal activities, conduct daily inspections, report incidents of trespass and vandalism, secure and cover the waste disposal pit and develop a plan for removal of all waste materials at the site.

Past public health concerns about the site included the potential for community exposures to contaminants and hazardous fumes released into the air from burning materials during the numerous fires at the site. The potential for direct contact with wastes was a concern since site access was not restricted. There was also concern about the physical hazards at the site including the deteriorated structures and stockpiling of old refrigerators.

The New York State Department of Environmental Conservation (NYS DEC) conducted an investigation at the Rosen site in 1986. This investigation included a geophysical survey, installation of five monitoring wells and sampling of groundwater, soil, sediment and waste. Findings of this investigation confirmed contamination of groundwater by volatile organic compounds (VOCs). At the time of this investigation, the site consisted of an open dump and about 500 drums were stored in piles at the site. Piles of tires, crushed cars, old fuel trucks and tanks, scrap metal and metal shavings were also on-site. As part of the investigation, a preliminary review of remedial alternatives and costs was completed. Based on the findings of this review, a detailed remedial investigation (RI) and feasibility study (FS) was recommended for the site.

In March 1987, the NYS DEC requested that the United States Environmental Protection Agency (US EPA) complete a removal action at the site. Through the US EPA, a removal action was completed at the site between July and November 1987. The removal action included installation of fencing around the site, sampling of wastes in drums and waste piles, as well as temporary storage of drums, tanks, cylinders and other contaminated materials for off-site disposal. The site was listed by the US EPA on the NPL in March 1989. In the summer of 1990, a 7 foot high fence with rolled barbed wire along the top was installed along the northern and western site perimeter to connect and replace the existing fencing. In February 1990, the Cortland County Planning Department (CCPD) and the CCHD investigated site contamination. These investigations found contaminants in surface water in Perplexity Creek and the tributary to Perplexity Creek as well as off-site groundwater.

A RI was completed at the site between 1990 and October 1992. The primary objectives of the RI were to: 1) determine the nature and extent of the chemical constituents at the site; 2) identify possible source areas; and 3) provide data to evaluate risks to public health and the environment and evaluate appropriate remedial measures. In July 1993, the US EPA determined that further site characterization was needed to complete the RI. In October 1993, an addendum to the RI workplan was developed to: 1) conduct supplemental surface soil and sediment sampling; 2) characterize the source of 1,1,1-trichloroethane in groundwater near monitoring well W-06; 3) characterize polychlorinated biphenyls (PCBs) in soils near monitoring well W-07; and 4) further evaluate subsurface conditions in the southwest portion of the site. Demolition of the on-site stack and buildings was completed between August and December of 1992. The supplemental investigation was completed between November and December of 1993 and included installation of soil borings and temporary wells, test pit excavations, and collection of surface and subsurface soil, sediment and groundwater samples. Data from the supplemental investigation were included in the final RI report that was approved by the US EPA in November 1994.

In January 1995, a baseline risk assessment was completed as part of the RI and FS process. The baseline risk assessment evaluates potential human health and ecological risks associated with exposure to site contaminants in the absence of remediation under current and possible future site conditions. In June 1995, an initial feasibility study was completed for the site to evaluate possible alternatives for remediation of the site. In August 1995, the US EPA evaluated whether VOCs in groundwater at the site could adversely impact indoor air quality. In December 1995, additional groundwater investigations were conducted at the site to provide information for evaluation of a groundwater remedy in the feasibility study (FS). This additional work included collection of groundwater samples to determine concentrations of VOCs and assess the presence of PCBs as well as evaluate indicators of biodegradation and the presence of microbial activity in groundwater at the site. A geophysical investigation was completed at the site to evaluate the presence of buried drums and a final report of this investigation is pending.

B. Actions Completed During the Public Health Assessment Process

The public health assessment (PHA) process began when the Rosen Brothers site was proposed for listing on the NPL in June 1988. In February 1990, the ATSDR received a petition to complete a health assessment for the site. Since then, numerous actions have occurred as part of the public health assessment process, many of which are summarized in the Site Description and History (subsection A) of this PHA. Such actions include, but are not limited to: removal of on-site wastes and physical hazards; restricting site access; and environmental sampling. Other actions that have occurred since 1988 include the following:

- On January 10, 1990, the NYS DOH held a public meeting to address community concerns about the site. The status of investigative and remedial activities at the site was also reviewed at this meeting;

- The US EPA held a public meeting on November 19, 1990 to present the RI/FS workplan for the site;

- In May 1991, the NYS DOH completed a survey of cancer incidence in the City of Cortland. This study was completed in response to citizens who had expressed concerns about the public health impact of the site. A discussion of the approach of this study is presented in subsection E (Health Outcome Data) of the Background section of this PHA and a discussion of the results of this study is presented under the Public Health Implications section of this PHA, subsection B (Health Outcome Data Evaluation);

- The US EPA held a public meeting on October 25, 1993, to present general Superfund remedial technologies that might be considered for remediation of the Rosen Brothers site;

- Since the RI was completed, liquids in the concrete pit and the buried tank on-site were drained and removed. About 200 tons of metallic surficial debris were also removed from the site; and

- Since 1993, the NYS DOH has provided updates about the status of the health assessment process to the petitioner of this PHA for the Rosen Brothers site.

C. Site Visit

Representatives of the NYS DOH visited the site on April 3, 1985. At that time, site security was needed to prevent trespass by students traveling to the high school south of the site. A second site visit was conducted by Mr. Ronald Heerkens of the NYS DOH in May of 1991. During this site visit, it was noted that a secure chain link fence had been erected around the entire site.

On January 13, 1993, Ms. Susan Van Patten and Ms. Claudine Jones Rafferty of the NYS DOH visited the Rosen Brothers site to evaluate existing site conditions, surrounding land use, and possible exposure pathways to site contaminants. About four inches of snow covered the ground surface and a heavy, wet snow was falling. The site was completely surrounded by a secure six-foot high, chain link fence. Access onto the site property was not made due to the adverse weather conditions. From the fenceline, it was observed that areas of the site were densely vegetated. An inactive crane was observed in the center of the site, near the structural remains of a former building. A portion of the Perplexity Creek tributary flows inside the southern fenceline of the site. At the point where Pendleton Street and the eastern fenceline meet, this drainage ditch converges with Perplexity Creek and passes through a large buried culvert, draining east under Pendleton Street. A small commercial property borders the site perimeter along Pendleton

Street. This commercial property includes a single, two-story building situated in the center of a paved parking lot. At the time of the site visit, this commercial property was not being used, although it was posted for sale. Railroad beds parallel the site perimeter to the north, and there is a paved access road north of these railroad tracks which leads to the rear entrances of several industrial facilities which face Huntington Street to the north. A solid waste recycling center is set back from the road on the east side of Pendleton Street. A federally subsidized, low-income housing project is southeast of the site.

On October 25, 1993, Ms. Claudine Jones Rafferty and Ms. Susan Van Patten of the NYS DOH met with representatives of the NYS DEC, US EPA, CCPD and United States Geological Survey (USGS) at the Rosen Brothers site. The purpose of the visit was to evaluate current site conditions and identify areas of surface soil staining as sampling locations to be considered as part of the planned supplemental investigation at the site. The site was fenced and there were numerous piles of scrap metal including household appliances, auto parts, and scrap shavings from industrial processes. Numerous heavy equipment vehicles, trains and tanker trucks were also dumped at the site. Although the site is densely vegetated, several areas (i.e., "patches") at the ground surface showed no vegetation or grass cover; areas of "stressed" vegetation were also observed. During the site visit, three distinct areas of stained surface soil were observed. In one of these areas, the soil had a distinct chemical odor near the surface. A buried tank was identified near the western fenceline and representatives of the NYS DEC determined that this tank was almost full and contained a thick, black, tar-like substance. A concrete pit was identified near the southwest portion of the site; this pit contained a dark liquid and an oily sheen was visible at the surface.

On October 6, 1995, Ms. Claudine Jones Rafferty and Ms. Christine Canavan of the NYS DOH visited the site to evaluate current site conditions. The site was densely vegetated and the grasses were about one and a half feet high. Both Perplexity Creek and the tributary to Perplexity Creek were dry, although there had been heavy rains within the two days prior to the site visit. There were numerous piles of scrap materials at the site including old telephones and metal shavings. Recently (August, 1997), the USEPA removed and recycled over 400 tons of scrap metal from the site.

D. Demographics, Land Use, and Natural Resource Use

Demographics

The NYS DOH estimated from the 1990 Census that 14,988 people live within one mile of the Rosen site. This population is 97.1 percent of the white race, 1.4 percent of the black race and 1.5 percent of other races. Within one mile of the site, 7.0 percent of the population is under 6 years of age, 22.2 percent is 6-19 years of age, 59.0 percent is 20-64 years of age and 11.7 percent is 65 years or older. There were 151 persons living in nursing homes within one mile of the site. The site is located in census tract 9909.00. The median household income for this census tract was $21,467 in 1989 with 22% percent of the population living below the poverty level.

Land Use

Land use in the immediate area around the site is industrial, residential, recreational and commercial (refer to Figure 3, Appendix A). The southern site boundary borders the Cortland City High School property. A portion of the former City of Cortland municipal disposal site on Valley View Drive is within the southern fenceline of the site. The area north of the site is comprised primarily of commercial and industrial facilities. The western site boundary borders several industrial facilities and a residential area is across from these industrial facilities, west of Main Street. The eastern site boundary borders an abandoned two-story commercial building and parking lot. Across from the site to the east, there is a recycling facility and an apartment complex is southeast of the site. The Randall Elementary School and a child daycare center are within 0.25 miles of the site. There is an adult nursing home within 0.7 miles of the site.

Natural Resource Use

The site overlies the Cortland-Homer-Preble aquifer, a glacial outwash sand and gravel deposit. This aquifer is the sole source of drinking water for approximately 36,000 people within a 3-mile radius of the site. The City of Cortland, the Town of Cortlandville, the Village of Homer, the Village of McGraw and the Preble Water Association rely on this aquifer for potable water. The City of Cortland's municipal supply wells are more than one mile northwest and upgradient of the site. The supply wells for the Town of Cortlandville's public water supply are about two miles southwest of the Rosen Brothers site. A regional well survey completed as part of the RI indicates that there are about 45 wells in areas potentially downgradient of the site. Many of these wells are monitoring wells which were installed as part of environmental investigations at various properties; others are industrial water supply wells.

E. Health Outcome Data

The NYS DOH maintains several health outcome data bases which could be used to generate site specific data, if warranted. These data bases include the cancer registry, the congenital malformations registry, the heavy metals registry, the occupational lung disease registry, vital records (birth and death certificates) and hospital discharge information.

In 1982, the NYS DOH reviewed leukemia incidence and mortality in the City of Cortland for the period 1970-1979. Findings of this review are discussed in the Public Health Implications section of this PHA, subsection B (Health Outcome Data Evaluation).

The NYS DOH has conducted a study of cancer incidence in the City of Cortland. This study was conducted to address community concerns about the possible health impact of the Rosen Brothers site. The cancer incidence study was initiated in June 1990 and completed in May 1991. The area of investigation for the cancer incidence study encompassed the entire City of Cortland including the Rosen Brothers site as well as the majority of residences within a one-mile radius of the site. Cancer cases diagnosed for the period 1978 through 1987 were evaluated in this study. Sixteen of the most common cancer sites in males were evaluated and 18 of the most common cancer sites in females were evaluated. Results of this cancer incidence investigation are discussed in the Public Health Implications section of this PHA, subsection B (Health Outcome Data Evaluation).

COMMUNITY HEALTH CONCERNS

In the past, members of the community near the Rosen Brothers site have expressed health concerns about the incidence of cancer and other non-specific illnesses.

A citizen's action group, Clean Up Rosen Brothers (CURB), was formed to focus on community concerns related to the investigation and remediation of the Rosen Brothers site. CURB is the recipient of a $50,000 Technical Assistance Grant (TAG) from the US EPA. Through this grant, CURB has hired technical consultants to help review and evaluate data and proposals generated during the remedial investigation of the site.

The primary community concerns about the Rosen Brothers site are contamination of groundwater and the potential implications for health effects, particularly cancer. In February 1990, CURB requested, through the US EPA, that an ATSDR health assessment be completed for the Rosen Brothers site.

The CURB citizens action group has expressed concern that the cancer study completed by the NYS DOH did not adequately examine the health risks of nearby residents and students and employees at the Randall Elementary School and the Cortland Junior/Senior High School. The CURB fall/winter 1992 newsletter, CURBPollution, reported that cancer and respiratory illnesses continue to occur among the community and included a brief questionnaire soliciting participants for an independent health survey.

The US EPA held a public meeting on October 25, 1993, to present general technologies that might be considered for remediation of the Rosen Brothers site. Representatives of the NYS DEC, NYS DOH, CCPD and USGS were also present. About 25 people attended the meeting and the primary questions and concerns raised by meeting attendees related to the investigation and remediation of the site. No community health concerns were identified at this meeting and there are no known new community health concerns about the site.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

To evaluate if a site poses an existing or potential hazard to the exposed or potentially exposed population(s), the site conditions are characterized. This site characterization involves a review of sampling data for environmental media (i.e., soil, surface water, groundwater, air), both on- and off-site and an evaluation of the physical hazards near the site which may pose an additional health risk to the community or receptor population(s).

Contaminants selected for further evaluation are identified based upon consideration of the following factors:

1. Concentrations of contaminant(s) in environmental media both on- and off-site;

2. Field data quality, laboratory data quality, and sample design;

3. Comparison of on-site and off-site contaminant concentrations in environmental media with typical background levels;

4. Comparison of contaminant concentrations in environmental media both on- and off-site with public health assessment comparison values for (1) non-carcinogenic endpoints, and (2) carcinogenic endpoints. These comparison values include Environmental Media Evaluation Guides (EMEGs), Cancer Risk Evaluation Guides (CREGs), drinking water standards and other relevant guidelines; and

5. Community health concerns.

The selected contaminant(s) are evaluated in the Public Health Implications section (Toxicological Evaluation) of this PHA to determine whether exposure to these chemicals is of public health significance.

The On-site Contamination and the Off-site Contamination subsections include discussions of sampling data for environmental media. Tentatively identified compounds (TICs) and analytical results reported as "estimated" or as being found in the associated quality control blank for environmental samples collected during the RI are not included for evaluation in this PHA. If a chemical is selected for further evaluation in one medium, that contaminant will be reported in all other media, if it is detected. A contaminant selected for further evaluation does not necessarily mean that it will cause adverse health effects from exposure.

For the purpose of evaluating environmental sampling data and site conditions in this PHA, "on-site" refers to the area within the property boundary (i.e., the fenceline) as indicated on Figures 4 and 5 (Appendix A) and "off-site" refers to all areas outside of this property boundary. For this PHA, the data reviewed includes historical data generated as part of the phase II investigation at the site and data generated during the RI. Figure 4 (Appendix A) shows the locations of sampling points for sediment, soil and waste samples collected during the phase II investigation in 1986. Figures 5, 6 and 7 (Appendix A) show the locations of sampling points for surface water, sediment, groundwater, soil borings and leachate samples collected during the RI.

A. On-Site Contamination

<u>Groundwater</u>

During the phase II investigation, four monitoring wells were installed within the site fenceline (refer to Figure 4). Groundwater samples collected from these wells during the phase II investigation were analyzed for organic and inorganic (metal) constituents. Refer to Table 1 for analytical results.

As part of the RI, several existing monitoring wells at the site were inspected and found to be suitable for use as sample points. In addition, 10 monitoring wells were installed at the site during the RI (refer to Figure 5). Groundwater samples from these monitoring wells were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), inorganic constituents and general water quality parameters. No SVOCs or pesticides were detected; the PCB Aroclor 1254 was found in samples from one monitoring well at levels ranging from 4-11 micrograms per liter (mcg/L). VOCs detected in groundwater included 1,1-dichloroethene (3-14 mcg/L), 1,1-dichloroethane (2-430 mcg/L), 1,2-dichloroethene (56 mcg/L), 1,1,1-trichloroethane (4-3,400 mcg/L), trichloroethene (1-45 mcg/L), tetrachloroethene (77-81 mcg/L) and toluene (2 mcg/L). All these VOCs, except toluene, exceeded the NYS DOH drinking water standards and/or public health assessment comparison values (see Table 5). A summary of the metals found above applicable water quality standards and/or public health assessment comparison values (see Table 4) is presented in Table 3.

Three temporary groundwater monitoring wells were installed on-site between the main portion of the site and the former City of Cortland waste disposal area near the southern fenceline, to evaluate possible contaminant migration from this area (refer to Figure 6). Samples of water from these wells were analyzed for VOCs and inorganic constituents. VOCs found included chloromethane (1-3 mcg/L), vinyl chloride (14 mcg/L), 1,1-dichloroethene (3 mcg/L), trichloroethene (180-220 mcg/L), total xylenes (1-2 mcg/L), cis-1,2-dichloroethene (79-110 mcg/L) and trans-1,2-dichloroethene (11-14 mcg/L). A summary of inorganic constituents found in on-site groundwater at levels above the NYS DOH drinking water standards and/or public health assessment comparison values (see Table 5) is included in Table 3.

During the RI, three additional temporary groundwater monitoring wells were installed near monitoring well W-06 and the water was sampled and analyzed for VOCs. Results showed chloromethane (10-14 mcg/L), 1,1-dichloroethane (13-29 mcg/L), ethylbenzene (71 mcg/L) and 1,1,1-trichloroethane (16-24 mcg/L), toluene (1,200-1,500 mcg/L) and total xylenes (670-710 mcg/L) which were reported at levels above the NYS DOH drinking water standards or public health assessment comparison values (see Table 5).

Surface Water

During the RI, one surface water sample was collected from the tributary to Perplexity Creek from a downstream area within the fenceline. This sample was analyzed for VOCs, SVOCs, pesticides, PCBs and inorganic constituents. No VOCs, pesticides, PCBs or SVOCs were found. All metals were below applicable surface water quality standards and/or public health assessment comparison values.

Sediments

As part of the phase II investigation, one sediment sample was collected from a bermed area along a stretch of the tributary to Perplexity Creek which passes through the site (refer to Figure 4). This sample was analyzed for organic and inorganic constituents, including cyanide (refer to Table 1). Total polycyclic aromatic hydrocarbons (PAHs), comprised of chrysene, fluoranthene and pyrene, as well as the inorganic compounds lead, arsenic and antimony, were the only contaminants in sediment that exceeded their expected background levels and/or public health assessment comparison values (see Table 6).

During the RI, an on-site sediment sample was collected from the same general location as the on-site surface water sample and analyzed for VOCs, SVOCs, PCBs, pesticides and inorganic constituents. No pesticides, PCBs or VOCs were found. The only SVOCs found included fluoranthene at 1.7 milligrams per kilogram (mg/kg), pyrene at 1.6 mg/kg and bis(2-ethylhexyl)phthalate at 3.3 mg/kg). All metals were within expected background levels and/or below public health assessment comparison values. (See Table 6).

Three on-site sediment samples were collected from the tributary to Perplexity Creek as part of the supplemental sampling during the RI (refer to Figure 6). These samples were analyzed for SVOCs, PCBs and inorganic constituents. No PCBs were found; SVOCs detected included phenanthrene (1.3 mg/kg), fluoranthene (1.9 mg/kg), pyrene (0.72-2.9 mg/kg), benzo(b)fluoranthene (0.64 mg/kg), benzo(k)fluoranthene (1.0 mg/kg), and benzo(a)pyrene (0.72 mg/kg). All SVOCs as well as metals were within expected background levels and/or below public health assessment comparison values (see Table 6).

Soil Vapor

During the RI, a soil vapor survey was completed at the site; 214 soil vapor samples were collected for analysis of total VOCs. Results showed total VOCs ranging from 0-888 parts per million (ppm).

Surface Soils

One composite surface soil sample was collected from 12 locations throughout the site during the phase II investigation (refer to Figure 4). This sample was analyzed for organic and inorganic contaminants, including cyanide (refer to Table 1, Appendix B). Total PAHs comprised of benzo(a)pyrene, chrysene, benzo(a)anthracene, pyrene, fluoranthene and phenanthrene were the only contaminants in on-site surface soil that exceeded their expected background levels and/or public health assessment comparison values (see Table 6).

Thirty-four surface soil samples were collected from the site as part of the supplemental sampling during the RI (refer to Figure 6). Four of these samples were collected from visibly stained areas. Samples were analyzed for SVOCs, PCBs and metals. Of the five surface soil samples analyzed for PCBs, the PCB Aroclor 1248 was reported in one sample at 0.37 mg/kg and the PCB Aroclor 1254 was reported in four samples at levels ranging from 1.0-7.6 mg/kg. Results of the SVOC analyses showed total PAHs at levels ranging from 0.445 to 2,271 mg/kg, total phthalates from 0.09 to 43 mg/kg and 3-chloro-3-methylphenol up to 0.088 mg/kg. Carcinogenic PAHs found in on-site surface soil samples include benzo(a)anthracene (0.44-130 mg/kg), chrysene (0.52-130 mg/kg), benzo(b)fluoranthene (0.52-75 mg/kg), benzo(k)fluoranthene (0.45-100 mg/kg), benzo(a)pyrene (0.41-86 mg/kg) and indeno (1,2,3-cd)pyrene (4.1-47 mg/kg). The concentrations of total PAHs exceeded public health assessment cancer comparison values for these contaminants (see Table 6). The only metal found above background levels in on-site soils was lead which ranged from 144 mg/kg to 2,940 mg/kg.

Soil

In October 1985, a soil sample was collected and submitted to the NYS DOH Wadsworth Center for Laboratories and Research for analyses of VOCs and SVOCs. Results are summarized in Table 2. There is no information about the sample depth. No contaminants were found at levels above their public health assessment comparison values (see Table 6).

As part of the supplemental investigation, 12 shallow soil borings were installed near monitoring well W-07 and the former capacitor areas to evaluate the presence of PCBs (refer to Figure 6). In general, PCBs were detected in shallow soils (0-3 feet) at levels ranging from 1 to greater than 25 mg/kg. A composite soil sample (0-10 feet) was also analyzed from one boring for VOCs and SVOCs. Results showed benzene (0.008 mg/kg), toluene (0.018 mg/kg), total xylenes (0.022 mg/kg), total phthalates (1.51 mg/kg) and total PAHs (2.40 mg/kg) at levels which did not exceed expected background values and/or public health assessment comparison values (see Table 6).

<u>Subsurface Soil</u>

During the RI, five test borings were installed around the cooling pond (refer to Figure 5). One subsurface soil sample was collected from each boring for analyses of VOCs, SVOCs, pesticides, PCBs and metals. Depths of the samples ranged from 2-8 feet. No pesticides or PCBs were detected in any of the samples. No SVOCs were found above detection limits. The VOCs acetone (0.021-0.085 mg/kg), toluene (0.01-0.076 mg/kg), 1,1-dichloro-ethane (0.04-0.012 mg/kg), 2-butanone (0.039-0.083 mg/kg) and 1,1,1-trichloroethane (0.012-0.027 mg/kg) were found, but at levels below public health assessment comparison values (see Table 6). Arsenic was detected in one sample above background levels (51.4 mg/kg).

On-site subsurface soils samples were also collected from test pits during the RI for analyses of VOCs, SVOCs, pesticides, PCBs and metals (refer to Figure 5). Sample depths ranged from 1 to 12 feet for all samples except for the one taken from test pit 9, which was a composite sample from 0-1 foot deep. However, no VOCs, SVOCs, pesticides or PCBs were found in this sample and all metals were below background levels. For all other samples, the only VOCs found were 2-butanone (0.036 mg/kg), toluene (4.2 mg/kg), ethylbenzene (0.069 mg/kg), total xylenes (0.62-4.3 mg/kg), acetone (0.071-0.1 mg/kg) and 1,1,1-trichloroethane (0.01-0.28 mg/kg). No pesticides were found; the PCB Aroclor 1260 was found in one sample at 0.61 mg/kg and acenaphthylene was found in two samples at 3.5 mg/kg and 3.6 mg/kg. Several other SVOCs, including naphthalene (57-110 mg/kg), 2-methylnaphthalene (26-27 mg/kg), acenaphthene (19 mg/kg), dibenzofuran (19-20 mg/kg), fluorene (22-23 mg/kg), phenanthrene (50-55 mg/kg), anthracene (14-16 mg/kg), di-n-butylphthalate (24 mg/kg), fluoranthene (34-41 mg/kg), pyrene (38-42 mg/kg), benzo(a)-anthracene (17-18 mg/kg), chrysene (14 mg/kg), and bis(2-ethylhexyl)phthalate (15-17 mg/kg) were found in several samples. Of all these contaminants, only benzo(a)anthracene and chrysene were detected at levels above public health assessment comparison values (see Table 6).

Subsurface soil (4-6 feet deep) samples were also collected from three borings near monitoring well W-06 for VOC analysis (refer to Figure 6, Appendix A). Results showed 2-butanone (0.1 mg/kg), chloroethane (0.03 mg/kg), 1,1-dichloroethane (0.052 mg/kg), 1,1,1-trichloroethane (0.017 mg/kg), ethylbenzene (1.2 mg/kg), methylene chloride (11 mg/kg), toluene (24 mg/kg) and total xylenes (13 mg/kg).

During the RI, soil borings were installed at the site as part of monitoring well installation. Several of these borings were installed at the site perimeter, inside the fenceline. Subsurface soil samples were analyzed for VOCs, SVOCs, pesticides, PCBs and metals; sample depths ranged from 2-18 feet. The only VOCs found were 1,1,1-trichloroethane (2.1 mg/kg) and tetrachloroethene (0.48-2.9 mg/kg). SVOCs found included isophorone (0.73 mg/kg), butylbenzylphthalate (0.85 mg/kg) and bis(2-ethylhexyl)phthalate (0.8-11 mg/kg). The PCB Aroclor 1254 was found in one sample at 5.8 mg/kg which is at a level greater than the public health assessment cancer comparison value for this contaminant (see Table 6). No metals were found above background levels.

Air

No on-site air samples were collected as part of the phase II investigation. As part of the RI, an ambient air quality survey was completed for the site to identify possible source areas of VOCs emissions. Results of this survey showed only one area on-site where VOCs exceeded background levels. A reading of 25 ppm for total VOCs was recorded near the opening of the underground storage tank at the northwest corner of the site. Two upwind and five downwind air samples were collected from areas within the fenceline during the RI for analysis of VOCs (refer to Figure 5). The upwind samples were collected along the western fenceline of the site and the downwind samples were collected along the northern fenceline. Results showed that no VOCs were detected at the upwind sample locations. Acetone was detected at three of the downwind locations at levels ranging from 12-57 parts per billion (ppb); toluene (3.7 ppb) was detected at one downwind air sample location. Levels of both contaminants were below the public health assessment comparison values of 148 ppb for acetone and 105 ppb for toluene.

Wastes

During the phase II investigation, two composite solid waste samples were collected from four sample points on-site (refer to Figure 4, Appendix A). These samples were analyzed for organic and inorganic constituents, including cyanide. Additionally, a liquid waste sample was collected from a concrete pit at the site. This sample was evaluated for inorganic constituents, VOCs and PCBs (refer to Table 1).

During the RI, two waste samples were collected from test pits T-06 and T-10 at depths ranging from 2-5 feet (refer to Figure 5). These samples were analyzed for organics and metals. No VOCs, SVOCs or pesticides were detected in these samples. The following metals were found: arsenic (0.0073 mg/kg), barium (0.24-0.49 mg/kg), cadmium (0.0086-0.018 mg/kg), chromium (0.018 mg/kg), lead (0.044-0.058 mg/kg) and silver (0.0087 mg/kg).

B. Off-Site Contamination

Surface Water

In February 1990, the CCPD collected several surface water samples from Perplexity Creek and the tributary to Perplexity Creek. Results showed 1,1-dichloroethene (1.8 mcg/L), 1,1,1-trichloroethane (3.0-5.0 mcg/L) and trichloroethene (5.0 mcg/L) in upgradient samples. 1,1-Dichloroethene was at a level that exceeded this contaminant's public health assessment cancer comparison value of 0.11 mcg/L. The only contaminant found in downgradient samples was 1,1,1-trichloroethane (0.5 mcg/L). This chemical did not exceed its public health assessment comparison value.

In April 1990, four surface water samples were collected from Perplexity Creek and its tributary at areas upstream of the site. The samples were analyzed for VOCs and no contaminants were detected.

As part of the RI, two surface water samples were collected from Perplexity Creek and its tributary upstream of the site (refer to Figure 5). Samples were analyzed for VOCs, SVOCs, PCBs, pesticides and inorganic constituents. One surface water sample was collected from a downstream location near the point where the creek converges with its tributary and discharges to the catch basin at Pendleton Street. No VOCs, SVOCs, pesticides or PCBs were found and all metals detected were below public health assessment comparison values.

Sediment

Off-site sediment samples were collected from the same general locations as the off-site surface water samples during the RI (refer to Figure 5). Sediment samples were analyzed for VOCs, SVOCs, PCBs, pesticides and inorganic constituents. No pesticides or PCBs were found. Acetone was found in all three samples; at the upstream locations, acetone levels ranged from 0.017 mg/kg to 0.19 mg/kg. The highest concentration of acetone (0.23 mg/kg) was found in the downstream sediment sample location in Perplexity Creek. Several SVOCs were found in the upstream off-site sediment sample from Perplexity Creek; however, pyrene (5.3 mg/kg) and fluoranthene (3.2 mg/kg) were the only two SVOCs found in the downstream sediment sample from Perplexity Creek. All metals were within expected background levels or public health assessment comparison values (see Table 6).

Three sediment samples were collected from Perplexity Creek as part of the supplemental sampling conducted during the RI (refer to Figure 6). These samples were analyzed for SVOCs, PCBs and inorganic constituents. No PCBs were found; SVOCs detected included the following PAHs: phenanthrene (1.7-2.6 mg/kg), fluoranthene (1.9-2.0 mg/kg), pyrene (3.8-6.4 mg/kg), benzo(a)anthracene (1.3-1.7 mg/kg), chrysene (1.8-2.2 mg/kg), benzo(b)fluoranthene (1.7-2.3 mg/kg), benzo(k)fluoranthene (1.9-2.5 mg/kg), benzo(a)pyrene (1.5-1.9 mg/kg) and benzo(g,h,i)perylene (0.94-1.6 mg/kg). Public health assessment cancer comparison values were exceeded by the carcinogenic PAHs (see Table 6). All metals were within expected background ranges and/or below public health assessment comparison values.

Surface Soils

Six surface soil samples were collected from both industrial and non-industrial settings in off-site areas to evaluate background concentrations of SVOCs and metals (refer to Figure 7). Total phthalates and PAHs for the industrial setting ranged from 0.16-3.2 mg/kg and 18-76 mg/kg, respectively. Total PAHs exceeded background levels and public health assessment cancer comparison values for these contaminants (see Table 6). Carcinogenic PAHs included benzo(a)anthracene (1.3-7.7 mg/kg), chrysene (1.3-6.9 mg/kg), benzo(b)fluoranthene (1.3-6 mg/kg), benzo(k)fluoranthene (0.96-4.9 mg/kg), benzo(a)pyrene (1.0-5.8 mg/kg) and indeno (1,2,3-cd)pyrene (3-4.3 mg/kg). Total phthalates and PAHs for the non-industrial setting ranged from 0.08-0.23 mg/kg and 0.08-0.073 mg/kg, respectively, and did not exceed expected background levels and/or public health assessment comparison values. In addition, all metals were within expected background ranges for both industrial and non-industrial soils.

Subsurface Soil

During the RI, subsurface soil samples were collected from soil borings that were drilled along the site perimeter. Two of these borings were situated just outside the fenceline along the western site perimeter. One subsurface soil sample was collected for analyses of VOCs, SVOCs, pesticides, PCBs and metals. No VOCs, pesticides or PCBs were found in this sample. Pyrene (0.94 mg/kg) was the only SVOC found, but at a level below its public health assessment comparison value (see Table 6). No metals were found above background levels.

Groundwater

During the phase II investigation, one monitoring well was installed outside the western fenceline boundary (refer to Figure 4, Appendix A). Groundwater samples collected from this well during the phase II investigation were analyzed for organic and inorganic constituents. The analytical results are shown in Table 1.

Several monitoring wells were installed at off-site areas during the RI (refer to Figure 5). Groundwater samples from these wells were analyzed for VOCs, SVOCs, pesticides, PCBs and inorganic constituents. VOCs detected included chloromethane (11 mcg/L), vinyl chloride (2-31 mcg/L), 1,1-dichloroethene (1-12 mcg/L), 1,1-dichloroethane (3-100 mcg/L), cis-1,2-dichloroethene (29-79 mcg/L), trans-1,2-dichloroethene (10 mcg/L), 1,1,1-trichloroethane (5-340 mcg/L) and trichloroethene (2-200 mcg/L). No SVOCs, PCBs or pesticides were found in off-site groundwater. A summary of the metals found is presented in Table 3.

C. Quality Assurance and Quality Control

In preparing this public health assessment, ATSDR and the NYS DOH rely on the information in the referenced documents and assume that adequate quality assurance and quality control (QA/QC) measures were followed with regard to chain-of-custody, laboratory procedures, and data reporting, unless otherwise noted. The validity of the analyses and conclusions drawn for this public health assessment is determined by the completeness and reliability of that information.

During laboratory analyses of environmental samples collected during the phase II investigation, appropriate QA/QC measures were followed to ensure the validity of sample data. Tentatively identified compounds (TICs) and analytical results qualified as "estimated" or found in the associated quality control blank for samples collected during the phase II investigation are not included as part of evaluations in this PHA.

During the RI, field and laboratory data were reviewed to ensure that quality assurance/quality control (QA/QC) measures and objectives were followed. Field data calculations, interpretations, field data records, and documents were reviewed and all laboratory analytical data were reviewed and validated. The field equipment was checked daily for proper maintenance and the accuracy of field measurements with field equipment was assessed by review of the calibration and maintenance logs. All sampling methods and sampling point strategies followed approved US EPA or other applicable protocols used in site characterization to ensure that data gathered were representative.

Quality control samples, such as laboratory duplicates (splits), laboratory blanks, standards, matrix spikes and matrix spike duplicates (MS/MSD), field duplicates, and trip blanks were analyzed to assess the quality of laboratory and field data. Laboratory duplicates (splits) samples and MS/MSD samples were analyzed to check analytical reproducibility. Field duplicates were submitted to check the variability of chemical constituents in the field. Trip blanks that were supplied by the laboratory were analyzed for VOCs to check for analytes introduced during shipping and handling of the samples prior to, during, and after sample collection. Rinse blanks were submitted for analysis to check the cleanliness of the sampling devices and effectiveness of the cleaning procedures.

Performance and system audits were periodically performed during the RI to ensure that data of high quality were collected. System audits involved comparisons of the scheduled QA/QC activities from the RI work plan with the QA/QC activities actually performed in the field and laboratory. Performance audits were conducted as a quantitative assessment of precision and accuracy of the data gathered and the laboratory results generated. For all sampling events, the completeness of the data is reported to be at least 100 percent. TICs and analytical results qualified as "estimated" or found in the associated quality control blank for samples collected during the RI are not included for evaluation in this PHA.

D. Physical and Other Hazards

Currently, there are some physical hazards at the site left over from US EPA's August 1997 collection and recycling effort. Remnants of old buildings and other structures and a partially exposed buried tank pose additional physical hazards at the site.

Before secure fencing was installed, numerous physical hazards at the site posed serious public health concerns. Of particular concern was the potential for children who played at the site to become trapped inside old refrigerators. The southern site perimeter is adjacent to the Cortland City High School property and in the past children traveled across the site going to and from the school. Additionally, an elementary school is within 0.25 miles of the site.

E. Toxic Chemical Release Inventory (TRI)

The Toxic Chemical Release Inventory (TRI) has been developed by the US EPA from chemical release information provided by those industries that are required to report contaminant emissions and releases annually. The NYS DOH reviewed air emissions data reported to the TRI by industrial facilities identified to be within a 2.5 mile radius of the Rosen Brothers site for the years 1988 through 1993. These data were reviewed to evaluate other sources of contamination that may pose an additional health risk to the exposed population at or near the Rosen Brothers site.

The NYS DOH has developed a screening model to estimate if potential contaminant concentrations resulting from air emissions at a facility may be contributing to community (receptor population) exposures to contaminants at a site. This model uses information about the facility location (distance from the exposed population) and annual air emission data to calculate annual average air concentrations at a distance of 0.5 miles from the site.

Seven industrial facilities that report emissions to the TRI were identified within a 2.5 mile radius of the Rosen Brothers site (refer to Figure 8). These facilities are Rubbermaid-Cortland, Inc.; Bestway Enterprises, Inc.; Pall Trinity Micro Corporation; Brewer-Titchner Merrill; Buckbee-Mears Cortland; Potter Paint Company, Inc.; and Cortland Line Company, Inc. A summary of the TRI-reported air releases by these facilities for the year 1993 is presented in Table 4. The 1993 data appear to adequately represent releases from previous years (i.e., 1988-1992). For Rubbermaid-Cortland, Inc., which did not file TRI data for 1993, data from previous years (i.e., 1988 and 1989) were also evaluated.

Results of the screening evaluation indicate that TRI-reported air emissions from the facilities identified would not increase contaminant levels in ambient air near the Rosen Brothers site to levels above the NYS DOH screening criteria of 0.1 microgram per cubic meter (mcg/m^3) for chromium, 0.02 mcg/m^3 for nickel, and 1 mcg/m^3 for other compounds. Based on the results of the screening evaluation, the public health significance of contaminant air emissions from TRI facilities as an additional source of community exposures at Rosen Brothers site will not be evaluated further in this PHA.

PATHWAYS ANALYSES

This section of the PHA identifies potential and completed exposure pathways associated with past, present and future use of the site. An exposure pathway is the process by which an individual may be exposed to contaminants originating from a site. An exposure pathway is comprised of five elements, including: (1) a contaminant source; (2) environmental media and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population.

The source of contamination is the source of contaminant release to the environment (any waste disposal area or point of discharge); if the original source is unknown, it is the environmental media (soil, air, biota, water) which are contaminated at the point of exposure. Environmental media and transport mechanisms "carry" contaminants from the source to points where human exposure may occur. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (i.e., ingestion, inhalation, dermal adsorption). The receptor population is people who are exposed or may be exposed to contaminants at a point of exposure.

Two types of exposure pathways are evaluated in the PHA. A completed exposure pathway exists when the criteria for all five elements of an exposure pathway are documented; a potential exposure pathway exists when the criteria for any one of the five elements comprising an exposure pathway is not met. An exposure pathway is considered to be eliminated when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present and will never exist in the future.

A. Completed Exposure Pathways

Wastes

In the past, it is likely that people working at the site were exposed to contaminants in on-site wastes through dermal contact, ingestion and inhalation of volatile organic compounds. Worker exposure to contaminants in wastes most likely occurred during waste handling and transfer operations at the site.

Unauthorized persons and others who accessed the site before it was fenced may have been exposed to on-site wastes via dermal contact and inhalation of volatile compounds. Site access was not restricted and children reportedly walked across the site going to and from school. These past exposures may have occurred daily but were most likely for short periods of time.

On-site Surface Soil

In the past, it is likely that unauthorized persons, including school children, or individuals working at the site were exposed to contaminants in on-site surface soil. Possible exposures to contaminants in surface soils may have occurred via dermal contact, incidental ingestion and inhalation of contaminated soil particulates. Historical information indicates that drummed and liquid wastes were drained onto the ground during past site operations. The site was fenced in 1990, reducing access by unauthorized persons.

Air

In the past, people working at and near the site and people who walked across the site were most likely exposed to VOCs in ambient air through inhalation. Past exposures may have also occurred via inhalation of contaminated particulates. On-site workers and others who worked or lived near the site in the past were likely exposed to contaminants in air emissions from the on-site incinerator prior to 1970. Historical air sampling data do not exist and the public health significance of past exposures to contaminants in air cannot be fully evaluated.

In the past, there was a buried tank and an open pit at the site which contained liquids from which VOCs could volatilize. Since the RI was completed, the buried tank has been emptied and the open concrete pit drained and removed. Sampling of air during the RI showed acetone and toluene in samples collected along the northern site fenceline (downwind). However, as discussed under the Environmental Contamination and Other Hazards section (subsection A, On-Site Contamination), the maximum concentrations of these contaminants are below the public health assessment comparison values and exposure to these levels is not likely to result in adverse health effects.

The Potter Paint Company, which is within 0.5 mile west of the Rosen Brothers site, has reported emissions of both acetone and toluene to the TRI for the years 1989 through 1993. This includes the timeframe during which air samples were collected at the site.

B. Potential Exposure Pathways

Groundwater

There is no indication at this time that this pathway is complete. Groundwater contamination from the site is not known to exist at residential properties. However, supplemental groundwater sampling performed since the completion of the remedial investigation shows contamination in downgradient monitoring wells along Huntington Street north of the site. Although the area is served by public water, and contaminated groundwater is unlikely to be used as a source of drinking water, the CCHD has indicated that well points likely exist in residential areas near the site. Water from these wells, if used, is most likely used for such outdoor activities as watering lawns and washing cars. It is possible, however, that some people may choose to use this water for drinking and bathing. Groundwater contamination exists on-site (VOCs, metals, PCBs) and has not yet been remediated. VOCs have been identified in groundwater at off-site non-residential areas. There is a potential that future exposures to contaminants in groundwater could occur if the contamination is not remediated and it continues to migrate towards residential areas. People who use contaminated groundwater for gardening or other non-potable purposes could be exposed to contaminants in groundwater via ingestion of homegrown vegetables, inhalation, and dermal contact. These exposures would likely be infrequent and for periods of short duration.

Contaminated Particulates

Because surface and subsurface soil contamination exists at the site, contaminated particulates may become airborne during any intrusive activities which disturb soils. Sampling of surface soils during the RI has shown PCBs, lead, VOCs and PAHs; subsurface soil samples on-site have shown VOCs, arsenic, PCBs and SVOCs. The site is well vegetated, minimizing the potential for dusts to blow off-site. During the winter months, snow cover further reduces the potential for off-site migration of dusts. During the October 1993 site visit, several areas (i.e., "patches") of the ground surface showed no vegetation or grass cover. Although the unvegetated areas are not considered to be significant sources of dust, contaminated dust could become airborne from uncovered areas by winds blowing across the site. People who work at or near the site could be exposed to contaminated dusts blowing off-site. Airborne particulates could also deposit on homegrown fruits and vegetables. Sampling of particulates in air was not completed during the RI. Given that the site is well-vegetated and that contaminant levels in surface soil are low, the potential for significant exposure, if any, from fruits and vegetables or inhalation of dusts is unlikely.

Use of appropriate work practices and personal protective equipment will minimize the potential for exposure to contaminated particulates by on-site workers and others in off-site areas during remedial activities at the site.

Sediments

Sampling of sediments in Perplexity Creek and the unnamed tributary on-site showed VOCs, SVOC and metals. Sampling of sediments in these waterbodies at off-site areas showed VOCs and SVOCs. There is no information to suggest that children play in Perplexity Creek or the unnamed tributary. Neither of these waterbodies are known to support edible fish populations and it is unlikely that fishing occurs in these streams at or downgradient of the site. The potential for people to be exposed to site contaminants through ingestion, dermal contact and inhalation of contaminated sediments is minimal. However, such exposures would most likely be infrequent and for short periods of time.

On-Site Soils

On-site surface and subsurface soils are contaminated with VOCs, SVOCs, PCBs and metals. Past exposures to contaminants in soil have been discussed in the Completed Pathways section. Currently the potential for direct contact with these soils is minimal because of the existing fencing and site access restrictions. Only authorized personnel working under an approved health and safety plan are allowed onto the site. Use of personal protective equipment and approved work practices should minimize worker exposure to contaminants in on-site soils during remedial activities at the site.

Off-Site Surface Soil

PAHs were detected in off-site surface soil samples collected from industrial areas north and east of the site at concentrations above background levels and/or public health assessment comparison values. It is possible that wind-borne deposition of contaminated particulates from the Rosen Brothers site may have contributed, in part, to this contamination. The potential for exposure to PAHs in off-site soils at nearby industrial properties is likely limited primarily to workers and maintenance personnel. These exposures would tend to be infrequent and of short duration. The potential for off-site migration of contaminants in surface water runoff onto adjacent properties is minimal because the Rosen site is surrounded by two creeks; any surface water runoff from the site will most likely drain into the creeks.

C. Eliminated Exposure Pathways

Biota) (Fish and Wildlife)

Perplexity Creek, a small intermittent stream, does not support an edible fish population that might bioaccumulate contaminants in sediments or surface water. Therefore, the potential for exposure to site contaminants by ingestion of fish is not likely to occur. Exposure to contaminants that may bioaccumulate in wildlife that is hunted for food is unlikely. Due to existing site access restrictions and the location of the site within the Cortland City limits, this exposure pathway is not likely to occur. There are no known fisheries downstream of the site.

Private Drinking Water Supply Wells

All residences and businesses in the area near the site are served by a municipal water supply. The CCHD has established a well drilling permit process and no permits are issued to private individuals for installation of potable supply wells if they reside within areas served by the City's public water supply. There are no known potable supply wells near the site.

Public Water Supply Wells

Public water supply wells that serve the City of Cortland and other nearby communities rely on groundwater from the aquifer which underlies the site. Groundwater flow from the site is not likely to affect these public water supply wells because of hydrogeological and topographic conditions. The nearest public water supply wells serve the City of Cortland and are about one mile west and two miles northwest of the site. These public water supply wells are hydraulically upgradient of the Rosen site and are not likely to be affected by site contamination. The Town of Cortlandville's public water supply wells are more than two miles southwest of the site; these wells are not likely to be affected by groundwater contamination at the Rosen Brothers site because of topographic and geologic conditions.

Surface Water

Perplexity Creek runs along the northern fenceline of the site and merges with an unnamed tributary at the northeast corner of the site near Pendleton Street. The combined drainage flows through a buried culvert under Pendleton Street, eventually draining to the Tioughnioga River. No contaminants were detected in surface water on-site. In February 1990, 1,1,1-trichloroethane was found in one surface water sample downgradient of the site. However, sampling during the RI did not confirm off-site migration of site contaminants in surface water.

D. Data Gaps

Soil Vapor

During the RI, VOCs were identified during a soil vapor survey at the site. In response to concerns expressed by the citizens action group, CURB, the potential for migration of VOCs in on-site groundwater to affect indoor air quality in a hypothetical building at the site was evaluated through the US EPA. This screening level analysis assumed that a building existed at the site and that VOCs volatilized from groundwater at the site. The highest on-site groundwater concentrations for each chemical were used to estimate possible indoor air contaminant levels. Findings of this screening evaluation showed that adverse health effects associated with the estimated indoor air concentrations would not occur.

VOCs have been detected in groundwater at off-site areas. VOCs can volatize from groundwater into the adjacent soils. VOCs in soil gas at the site can also migrate to off-site areas through the subsurface. The site is bordered by two intermittent streams which may minimize off-site migration of shallow soil gas to adjacent properties. There is insufficient information to fully characterize possible exposures to contaminants in soil gas at and near the site. However, there are no homes bordering the site and the nearest residential facilities (apartments) are built above ground and do not have basements which could accumulate vapors. In addition, groundwater contamination is not known to exist at residential properties near the site.

PUBLIC HEALTH IMPLICATIONS

A. Toxicological Evaluation

An analysis of the toxicological implications of the human exposure pathways of concern is presented below. To evaluate the potential health risks from contaminants of concern associated with the Rosen Brothers site, the NYS DOH has assessed the risks for cancer and non-cancer health effects. The health effects are related to contaminant concentration, exposure pathway, exposure frequency and duration. For additional information on how the NYS DOH determined and qualified health risks applicable to this health assessment, refer to Appendix C.

1. Past completed and potential ingestion, dermal contact and inhalation exposure to contaminants in on-site surface soils and wastes.

In the past, it is likely that workers at the Rosen Brothers site were exposed to contaminants in on-site surface soils. It is also possible that prior to the site being completely fenced in 1990, trespassers including school children could have come in contact with these contaminated soils. Major on-site soil contaminants detected were total polycyclic aromatic hydrocarbons (PAHs) at levels as high as 2,271 mg/kg, polychlorinated biphenyls (PCBs) at levels ranging from 1 to greater than 25 mg/kg and lead as high as 2,940 mg/kg.

Individual PAHs detected include benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene and chrysene. These PAHs cause cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR, 1995c). Common cancers associated with exposure to PAHs include skin, respiratory and gastrointestinal tract cancers. Chemicals that cause cancer in laboratory animals may also increase the risk in humans who are exposed to lower levels over long periods of time. Whether or not these chemicals cause cancer in humans is not known. Based on the results of animal studies, it is estimated that chronic past exposure of workers and trespassers to PAHs found in on-site surface soils at the Rosen Brothers site could pose a moderate and low increased cancer risk, respectively. In addition, PAHs cause noncarcinogenic effects, primarily to the immune and blood cell-forming systems. Although the risks of noncarcinogenic effects from exposure to PAH-contaminated soils are not completely understood, the existing data suggest that they would be minimal for both worker and trespasser exposures in the past.

The other contaminants in on-site soil selected for further evaluation are PCBs and lead. PCBs cause primarily liver cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR, 1995b). Based on the results of animal studies, it is estimated that chronic exposure of workers and trespassers to PCBs found in on-site surface soils at the Rosen Brothers site could pose a low increased cancer risk. PCBs also cause noncarcinogenic toxic effects. Human effects reported after occupational exposures to PCBs include skin, eye and respiratory tract irritation and less frequently, effects on the liver and the nervous and digestive systems (ATSDR, 1995b). There may be a link between a mother's increased exposure to PCBs and effects on her child's birthweight and behavior (ATSDR, 1995b; Rogan and Gladen, 1991, 1992). PCBs have also caused skin, liver, nervous system, immune system and reproductive effects in animals (ATSDR, 1995b). Although the risks of noncarcinogenic effects from exposure to on-site soils contaminated with PCBs are not completely understood, the existing data suggest that they would be minimal and low for worker and trespasser exposure, respectively.

Chronic exposure to lead is predominantly associated with neurological and hematological effects and the developing fetus and young children are particularly sensitive to lead-induced neurological effects (ATSDR, 1993c). However, the relatively low potential for continuous daily exposure to on-site surface soil at the Rosen site particularly by young children indicates that the risk of adverse health effects from lead is minimal.

2. <u>Potential exposure to site contaminants in groundwater.</u>

On-site and off-site groundwater are contaminated with organic chemicals and metals at concentrations that exceed New York State drinking water standards and/or public health assessment comparison values (Table 5). Therefore, these chemicals have been selected for further evaluation (see below). Although the area is served by public water, well points likely exist in residential areas near the site. Water from these wells, if used, is most likely used for outdoor purposes such as watering gardens and lawns, and washing cars. Although unlikely, some people may choose to use these wells for drinking water, bathing, showering, and washing dishes. If off-site migration of contaminated groundwater is not controlled, shallow well-points could be affected by site contaminants. People who use their private groundwater wells for household purposes such as drinking, and bathing, could be chronically exposed to contaminants by ingestion, skin contact and inhalation. Potential exposures from non-potable uses such as watering gardens and lawns are much lower and would likely be infrequent and for short periods of duration.

Organic Compounds

Vinyl chloride is a known human carcinogen (ATSDR, 1995g). Chronic exposure to drinking water contaminated with vinyl chloride at the highest level (31 mcg/L) found in off-site groundwater could pose a high increased cancer risk. Trichloroethene, also known as trichloroethylene, was detected in off-site groundwater (highest level, 200 mcg/L) and has been found to cause cancer in laboratory animals exposed to high levels over their lifetimes (ATSDR, 1995f). Chemicals that cause cancer in laboratory animals may also increase the risk of cancer in humans who are exposed to lower levels over long periods of time. Based on the results of animal studies, chronic exposure to trichloroethene at the highest level found in off-site groundwater could pose a low increased cancer risk.

PCB Aroclor 1254 (11 mcg/L), ethylbenzene (71 mcg/L) and toluene (1,500 mcg/L) were detected in on-site groundwater. The toxicological properties of Aroclor 1254 have already been discussed and based on the results of animal studies, chronic exposure to this contaminant at the highest level found in on-site groundwater could pose a high increased cancer risk. Toxicological data are inadequate to assess the carcinogenic potential of ethylbenzene and toluene (ATSDR, 1990c, 1994c).

Contaminants that were found in on-site and off-site groundwater are: chloromethane (14 mcg/L), 1,1-dichloroethane (430 mcg/L), 1,1-dichloroethene (98 mcg/L), cis- and trans-1,2-dichloroethene (124 mcg/L), tetrachloroethene (81 mcg/L), 1,1,1-trichloroethane (3,400 mcg/L) and xylene (710 mcg/L). 1,1-Dichloroethene, tetrachloroethene (also known as tetrachloroethylene) and chloromethane have been found to cause cancer in laboratory animals exposed to high levels of these chemicals over their lifetimes (ATSDR, 1990a, 1995d, 1994a). Based on the results of animal studies, chronic exposure to the highest levels of 1,1-dichloroethene, tetrachloroethene and chloromethane found in on-site and off-site groundwater could pose a high, moderate and low increased cancer risk, respectively. Toxicological data are inadequate to assess the carcinogenic potential of 1,1,1-trichloroethane, cis- and trans-1,2-dichloroethene and xylene (ATSDR, 1994b; 1995e,h). Also, although toxicological data are inadequate to assess the carcinogenic potential of 1,1-dichloroethane, this chemical has been classified as a possible human carcinogen by the U.S. Environmental Protection Agency (ATSDR, 1990b).

The chlorinated contaminants found in on-site and/or off-site groundwater as well as ethylbenzene, toluene and xylene can also produce noncarcinogenic toxic effects, primarily to the liver, kidneys and central nervous system. 1,1,1-Trichloroethane can also damage the cardiovascular system. The toxicological properties of Aroclor 1254 have already been discussed. Vinyl chloride and Aroclor 1254 are known to cause noncarcinogenic effects at exposure levels about one order of magnitude greater than potential exposure from off-site and on-site groundwater, respectively. The other contaminants are known to produce their noncarcinogenic effects at exposure levels that are several orders of magnitude greater than potential exposure to these chemicals in on-site and/or off-site groundwater. Although the risks of noncarcinogenic effects from potential exposure to contaminants in drinking water are not completely understood, the existing data suggest that they would be high for vinyl chloride and Aroclor 1254, low for trichloroethene and 1,1,1-trichloroethane, with the remaining organic contaminants posing a combined low risk.

Inorganic Contaminants

Inorganic contaminants selected for further evaluation in on-site and off-site groundwater are arsenic (25 mcg/L), aluminum (351,000 mcg/L), cadmium (90 mcg/L), chromium (54.2 mcg/L), iron (594,000 mcg/L), lead (266 mcg/L), magnesium (268,000 mcg/L), manganese (24,000 mcg/L), nickel (420 mcg/L), vanadium (631 mcg/L) and sodium (62,700 mcg/L).

Studies of people exposed to high levels of arsenic in drinking water in foreign countries provide evidence of an association between arsenic ingestion and skin cancer (ATSDR, 1993a). To date, however, studies in the United States have not shown such an association. The existing data suggest that drinking water contaminated with arsenic at the highest levels (25 mcg/L) found in on-site and off-site groundwater could pose a high increased cancer risk. Arsenic also can cause nerve, liver, blood vessel damage and behavioral problems, including learning and hearing deficiencies (ATSDR, 1993a). Chronic exposure to drinking water contaminated with arsenic at the highest concentrations found in groundwater monitoring wells could pose a low risk of noncarcinogenic health effects.

Although little is known about the chronic toxicity of aluminum in humans, some animal toxicity studies indicate that aluminum may cause nerve and skeletal damage and may also adversely effect the reproductive system (NYS DOH, 1990). Chronic exposure to drinking water contaminated with aluminum at the highest concentrations found in groundwater monitoring wells could pose a high risk of adverse health effects.

The most sensitive effect from chronic elevated exposure to cadmium is kidney damage (ATSDR, 1993b). Chronic exposure to drinking water contaminated with cadmium at the highest concentrations found in groundwater monitoring wells at the site could pose a low risk of adverse health effects.

The primary toxic effects associated with ingestion of large amounts of chromium have been kidney damage, birth defects and adverse effects on the reproductive system (ATSDR, 1993d). Chronic exposure to drinking water contaminated with chromium at the highest concentrations found in groundwater monitoring wells could pose a low risk of adverse health effects.

Although iron is an essential nutrient, ingestion of large amounts can lead to iron toxicity characterized primarily by gastrointestinal effects and liver damage (Henretig and Temple, 1984). Its presence in drinking water, however, is objectionable primarily due to its affect on taste and staining of laundry and plumbing fixtures (WHO, 1984). Chronic exposure to drinking water contaminated with iron at the highest concentrations found in groundwater monitoring wells could pose a high risk of adverse health effects.

Chronic exposure to lead is predominantly associated with neurological and hematological effects and the developing fetus and young children are particularly sensitive to lead-induced neurological effects (ATSDR, 1993c). Chronic exposure to drinking water contaminated with lead at the highest concentrations found in groundwater monitoring wells could pose a high risk of adverse health effects.

Magnesium is an essential element in human nutrition. However, at very high levels (greater than about 250,000 mcg/L) magnesium may have a laxative effect, although the human body can adapt to this effect with time (NAS, 1977). Chronic exposure to drinking water contaminated with magnesium at the highest concentrations found in groundwater monitoring wells could pose a low risk of adverse health effects.

Exposure to high levels of nickel can cause reproductive effects and allergic reactions (ATSDR, 1995a). Chronic exposure to drinking water contaminated with nickel at the highest concentrations found in groundwater monitoring wells could pose a minimal risk of adverse health effects.

Exposure to high manganese concentrations primarily causes nervous system effects (ATSDR, 1991). Chronic exposure to drinking water contaminated with manganese at the highest concentrations found in groundwater monitoring wells could pose a high risk of adverse health effects.

Effects on the gastrointestinal tract (cramps, diarrhea, nausea) have been observed following ingestion of large amounts of vanadium (ATSDR, 1992b). Chronic exposure to drinking water contaminated with vanadium at the highest concentrations found in groundwater monitoring wells could pose a low risk of adverse health effects.

The main health concern about sodium ingestion is its association with high blood pressure and possibly heart disease (WHO, 1984). Chronic exposure to drinking water contaminated with sodium at the highest concentrations found in groundwater monitoring wells could pose a low risk of adverse health effects.

3. <u>Potential ingestion, dermal contact and inhalation exposure to contaminated sediments in Perplexity Creek and the Unnamed Tributary.</u>

In the past, it is possible that workers at the Rosen Brothers site, as well as trespassers, were exposed to contaminated sediments in Perplexity Creek and the unnamed tributary which border the site. The contaminants selected for further evaluation in on-site sediments (see Tables 1 and 6) are the carcinogenic PAH chrysene, arsenic, lead and antimony. The toxicological properties of the carcinogenic PAHs as well as arsenic and lead have already been discussed. Antimony can cause alterations in blood chemistry (ATSDR, 1992a). Based on the low potential for exposure, it is estimated that worker and trespasser exposure to chrysene and arsenic in on-site sediments could pose a very low to low increased risk of cancer. Furthermore, the risks of noncarcinogenic effects from possible exposure to these two contaminants, as well as lead, could be minimal, whereas the noncarcinogenic risk from possible exposure to antimony could be low to moderate.

Although it is unlikely, people could be exposed to off-site sediments contaminated with carcinogenic PAHs at levels as high as 11 mg/kg. Such exposures would most likely be infrequent and for short periods of time. Based on the low potential for exposure, it is estimated that exposure to PAHs in off-site sediment could pose a very low to low increased risk of cancer. In addition, the risk of noncarcinogenic effects from this exposure would be minimal.

4. <u>Potential ingestion, dermal contact and inhalation exposure to contaminants in off-site surface soils at nearby industrial areas.</u>

Potential exposure to off-site surface soils in industrial areas north and east of the site, contaminated with PAHs at concentrations as high as 76 mg/kg, could pose a low level of increased cancer risk to employees. The risk of noncarcinogenic adverse effects would be minimal.

B. Health Outcome Data Evaluation

Evaluation of health outcome data may present a general picture of the health of a community and may confirm the presence of adverse health outcomes. However, elevated rates of a particular disease may not be due to hazardous substances in the environment. Similarly, a contaminant may still have caused adverse health effects even if elevated rates are not found. Pre-existing health outcome data are usually reported for much larger population units, such as counties, than are likely to be affected by the contaminants associated with a particular site. Any evidence of adverse health effects on the smaller population may be hidden within the larger population. Also, when populations are small, the number of people who have a particular adverse health effect is also small. Small changes in the number of affected people from year to year can cause a large change in the rate, so the rate is considered "unstable." For those reasons, health outcome data must be evaluated with caution.

In 1982, the NYS DOH reviewed leukemia incidence and mortality in the City of Cortland for the period 1970-1979. No statistically significant excesses were found in comparison with expected numbers based on leukemia incidence and mortality rates for Upstate New York.

In May of 1991, the NYS DOH completed a study of newly diagnosed cancer cases in the City of Cortland for the years 1978-1987. The observed number of cancer cases was determined from the New York State Cancer Registry and compared to the expected number calculated based on age, sex and population density. The total number of observed cancer cases did not show a statistically significant difference from the expected number of cancer cases for males or females. An examination of the individual cancer sites did show a significant excess of prostate cancer in males (84 cases observed, 62 cases expected). This was the only type of cancer showing a statistically significant excess. Prostate cancer is a common type of cancer found in older males. In the City of Cortland, more cases were reported during 1983-1987 than during 1978-1982, which is consistent with increases in prostate cancer incidence in recent years both in New York State and nationally. The stage at which the prostate cancer cases was detected was reviewed. When a comparison was made with staging information for prostate cancer cases in New York State (exclusive of New York City) for the same time period, there were more cases in Cortland identified at the very earliest stage and fewer cases at the most advanced stage of disease. This suggests that the excess of prostate cancer cases might be due in part to a higher level of prostate cancer screening activity in the area.

C. Community Health Concerns Evaluation

In response to community health concerns about cancer, the NYS DOH reviewed leukemia incidences and mortality in the City of Cortland for the period 1970-1979. In 1991, the NYS DOH completed a study of cancer incidence in the City of Cortland for the period 1978-1987. The results of both of these studies have been discussed in subsection B (Health Outcome Data Evaluation) of this Public Health Implications section of this PHA. In response to CURB's request that a health assessment be completed for the site, this PHA has been developed for the Rosen Brothers site.

In response to other community concerns about the site, the NYS DOH coordinated a public meeting which was held on January 10, 1990. Representatives of the citizens action group, CURB, were also present. The participating agencies included the US EPA, the New York State Department of Environmental Conservation (NYS DEC), the NYS DOH and the Cortland County Health Department (CCHD). The purpose of the meeting was to clarify the various agency roles, summarize the status of the site in terms of investigation and remediation, answer questions and determine the nature of the concerns of nearby residents. No community health concerns related to the Rosen Brothers site were expressed by citizens at this public meeting.

No additional information about past community concerns regarding the cancer study completed by the NYS DOH has been obtained. The current status of the independent health survey initiated by CURB in 1992 is unknown.

The US EPA has met with representatives of CURB and other community members on numerous occasions during the course of investigations at the Rosen Brothers site. The purpose of these meetings was to provide the community with updated information about the site, provide the public with a clear explanation of technical issues related to the site and maintain an open dialogue with the community. There are no known new community health concerns about the site.

CONCLUSIONS

- Based on ATSDR's current guidance for assigning a health hazard category to a site (refer to Appendix D), the Rosen Brothers site posed a public health hazard in the past. Prior to on-site remedial activities, numerous physical and chemical hazards existed at the site. Site access was not restricted and children reportedly walked across the site going to and from school. It is likely that site workers and others with access to the site were exposed to PAHs and PCBs in on-site surface soils. The NYS DOH estimated that past exposures to PAHs in on-site surface soils could pose a moderate increased cancer risk for on-site workers and a low increased cancer risk for trespassers. The NYS DOH estimated that past exposures of site workers and trespassers to PCBs in on-site soils could pose a low increased cancer risk.

- Currently, the site poses no apparent public health hazard. Installation of the fence around the site has restricted unauthorized persons from entering the site. This action has minimized the potential for direct contact with lead, PCBs and PAHs in surface soils as well as exposure to on-site physical hazards. However, additional remedial measures are needed to eliminate possible future exposures to contaminants in on-site soils, dust and groundwater.

- VOCs have been detected in groundwater at and near the site. Information from the Cortland County Health Department indicates there are no private drinking water wells in the immediate area of the site. All area residences and businesses are served by public water supplies. The CCHD does not issue permits to private individuals for installation of private drinking water wells in areas that are served by the City's public water supply.

- Although the area is served by public water, well points likely exist in residential areas near the site. Some people may choose to use water from these wells for household purposes such as drinking and showering. There is a potential for downgradient private wells to be affected in the future by continued off-site migration of contaminated groundwater. Since the remedial investigation was completed, supplemental off-site groundwater sampling has shown contamination in downgradient monitoring wells north of the site along Huntington Street.

- The nearest public water supply wells are upgradient of the site. Based on the information reviewed, contamination from the site is not likely to affect the City of Cortland or other public water supply wells in the area.

- The NYS DOH evaluated leukemia incidence and mortality in the City of Cortland for the years 1970 through 1979 and no statistically significant excesses were found. Additionally, the NYS DOH evaluated cancer incidence in the City of Cortland for the period 1978 through 1987 and no statistically significant excess was found for the total number of cancer cases observed.

- There is insufficient information to fully characterize possible exposures to contaminants in soil vapor. A screening level analysis was completed to address community concerns about the potential for site-related contaminants to affect indoor air quality. Findings of the screening evaluation showed that adverse health effects associated with estimated indoor air concentrations would not occur.

- There is insufficient information to fully characterize potential exposures to contaminants in surface soil particulates that may be blown off-site and be inhaled or be deposited on homegrown vegetables and fruits. It is unlikely, however, that these are significant routes of exposure. The site is well vegetated, minimizing the potential for particulate migration in air and there are no residential properties bordering the site.

RECOMMENDATIONS

- Site access restrictions should be maintained to reduce the possibility of trespassing and possible exposures to physical and chemical hazards (i.e., lead, PCBs and PAHs in surface soil) at the site by unauthorized persons.

- The CCHD should continue oversight of local well installation permits to ensure that private wells are not installed in areas affected by or downgradient of groundwater contamination at the site.

- Remediation of contaminants in soil and groundwater should occur as appropriate to ensure that future exposures to site contaminants do not occur at levels of public health concern.

- Groundwater sampling should occur, as appropriate, to evaluate the extent of contaminant migration to off-site areas, including possible impacts on any existing private wells in areas downgradient of the site.

HEALTH ACTIVITIES RECOMMENDATION PANEL (HARP) RECOMMENDATIONS

The data and information developed in this public health assessment for the Rosen Brothers site, Cortland, New York, have been reviewed by ATSDR's Health Activities Recommendation Panel to determine appropriate follow-up actions. The panel determined that community health education is indicated; however, the state has performed site-specific environmental health education in relation to the site and will continue to perform these activities during remediation, as needed. No other follow-up health actions are indicated at this time.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Rosen Brothers site contains a description of actions to be taken by ATSDR and/or the NYS DOH at and near the site, following completion of this public health assessment. For those actions already taken at the site, please refer to the Background section of this public health assessment. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from past, present and/or future exposures to hazardous substances at or near the site. Included is a commitment on the part of ATSDR and/or the NYS DOH to follow up on this plan to ensure that it is implemented. The public health actions to be implemented by ATSDR and/or the NYS DOH are as follows:

1. ATSDR and the NYS DOH will coordinate with the appropriate environmental agencies to develop plans to implement the recommendations contained in this Public Health Assessment.

2. ATSDR will provide follow up to this PHAP as needed, outlining the actions completed and those in progress. This follow-up report will be placed in repositories that contain copies of this public health assessment, and will be provided to persons who request it.

3. The NYS DOH will continue to perform community health education, as needed.

ATSDR will reevaluate and expand the Public Health Action Plan when needed. New environmental, toxicological, or health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.

PREPARERS OF THE REPORT

Claudine Jones Rafferty
Public Health Specialist II
Bureau of Environmental Exposure Investigation
New York State Department of Health

and

Joel H. Kaplan
Research Scientist
Bureau of Toxic Substance Assessment
New York State Department of Health

ATSDR Regional Representative

Arthur Block
Regional Operations
Office of the Assistant Administrator
Agency for Toxic Substances and Disease Registry

ATSDR Technical Project Officer

David Hutchins
Technical Project Officer
Division of Health Assessment and Consultation
Superfund Site Assessment Branch
Agency for Toxic Substances and Disease Registry

CERTIFICATION

This Public Health Assessment was prepared by the Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health assessment was begun.

Technical Project Officer
Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this Public Health Assessment and concurs with its findings.

Chief, SPS, SSAB, DHAC, ATSDR

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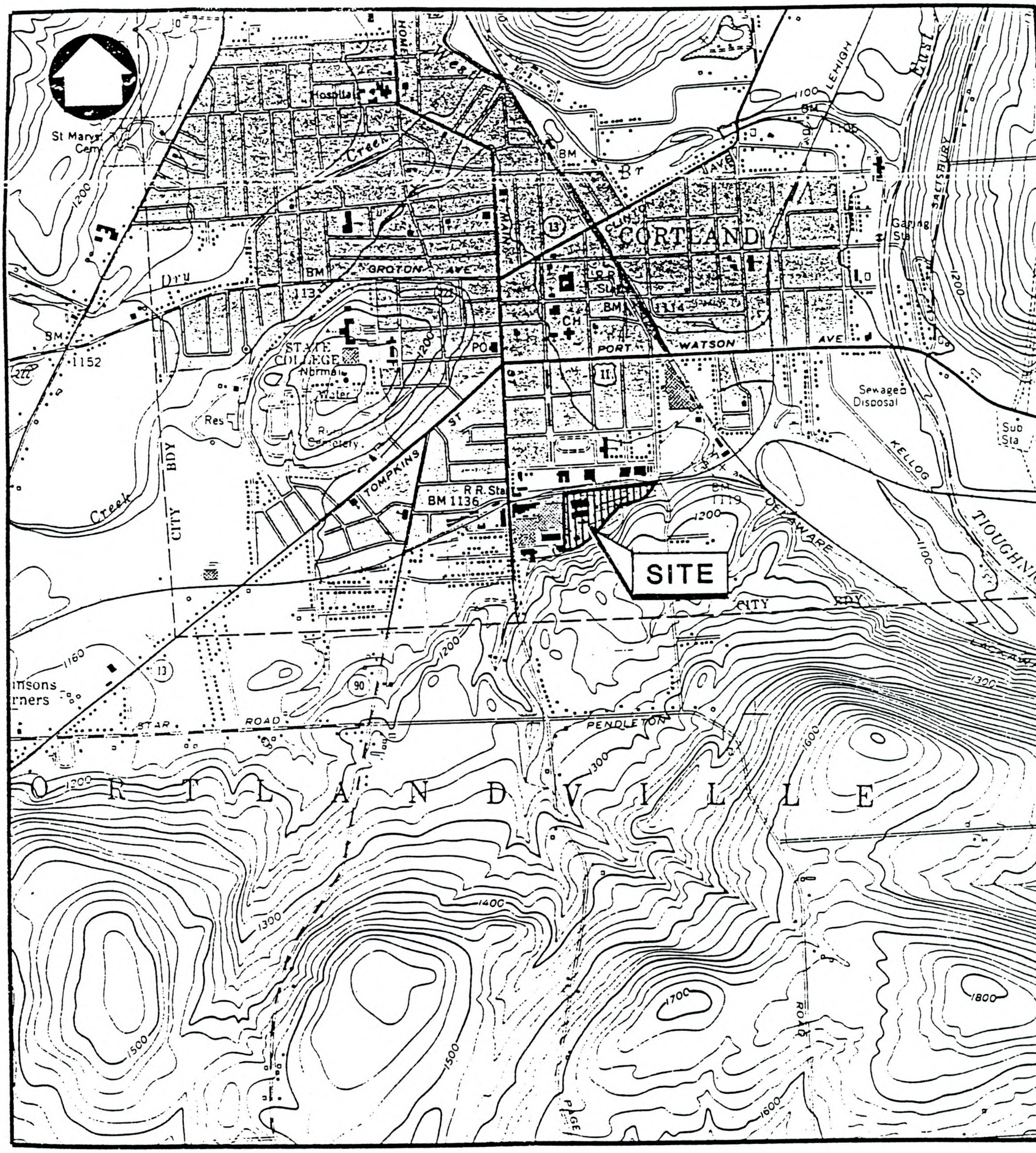
APPENDIX A

FIGURES



SOURCE: 1955 CORTLAND NY.,
U.S.G.S. QUADRANGLE,
7.5 MIN. SERIES

SCALE: 1" = 2000'

QUADRANGLE LOCATION

Adapted from:Wehran Engineering, P.C. (April 1987).

FIGURE 1

SITE LOCATION MAP

LAT. 42° 35' 30" LONG. 76° 10' 29"

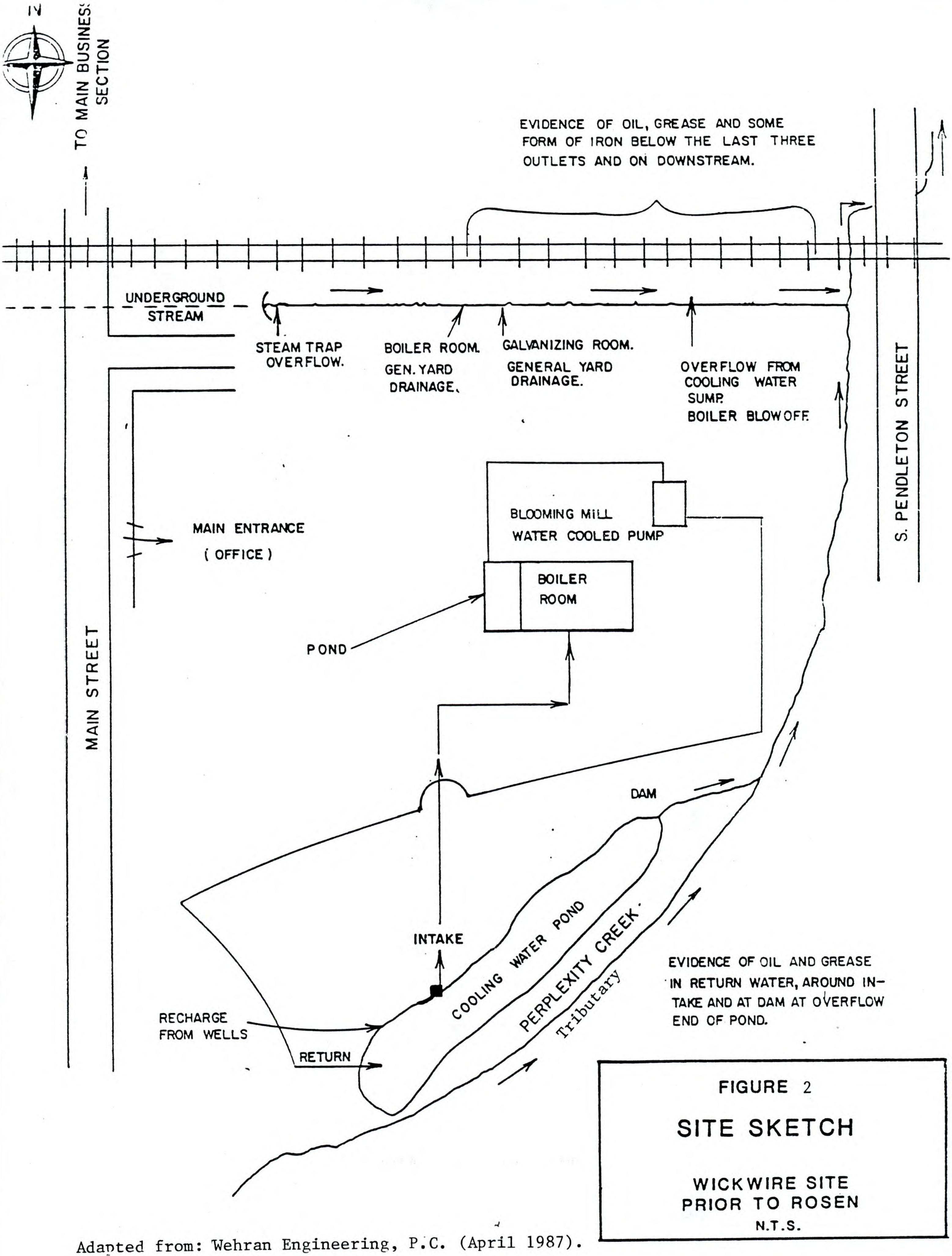
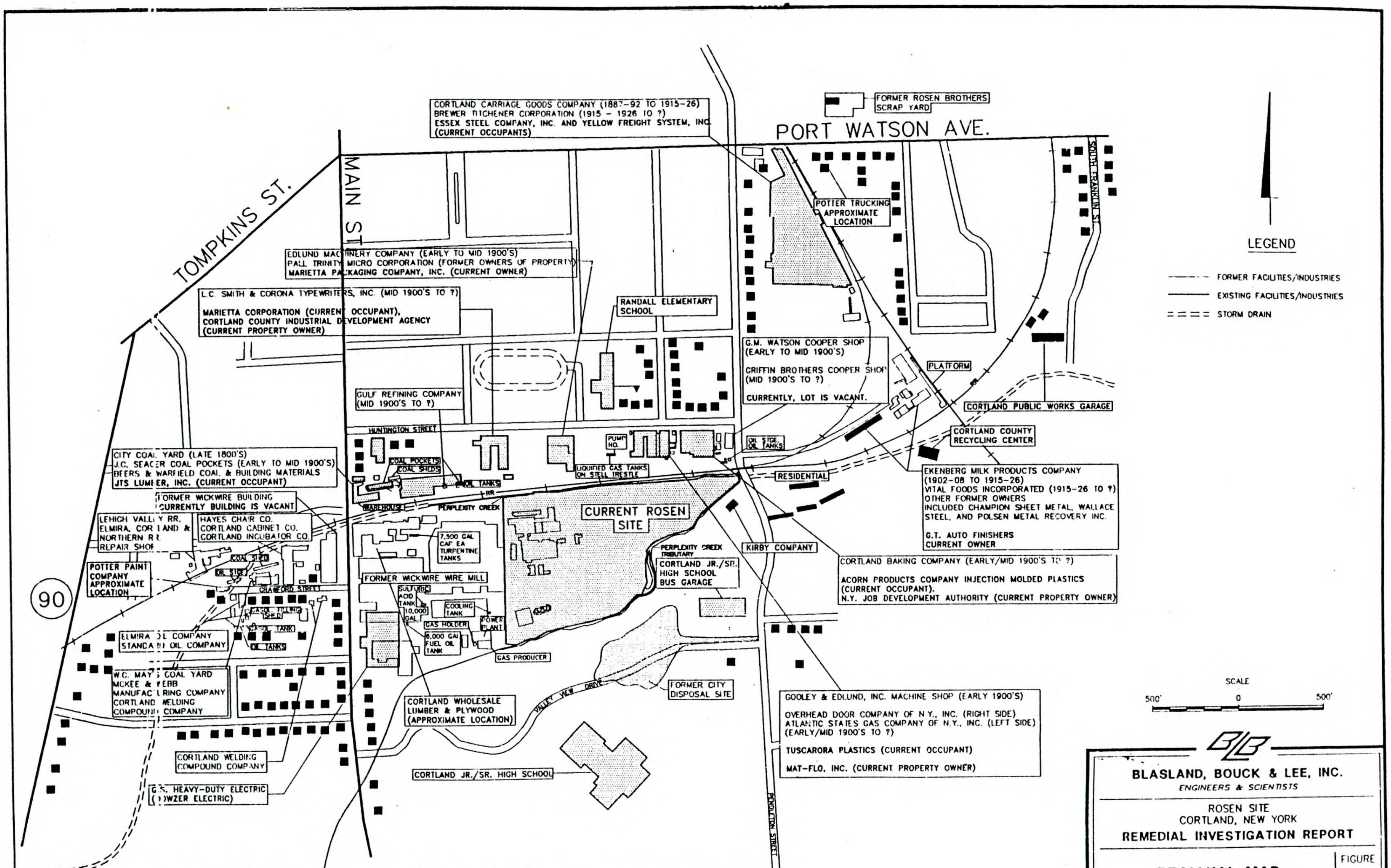


FIGURE 2

SITE SKETCH

WICKWIRE SITE
PRIOR TO ROSEN
N.T.S.

Adapted from: Wehran Engineering, P.C. (April 1987).



Adapted from: Blasland, Bouck and Lee, Inc. (May 1994).

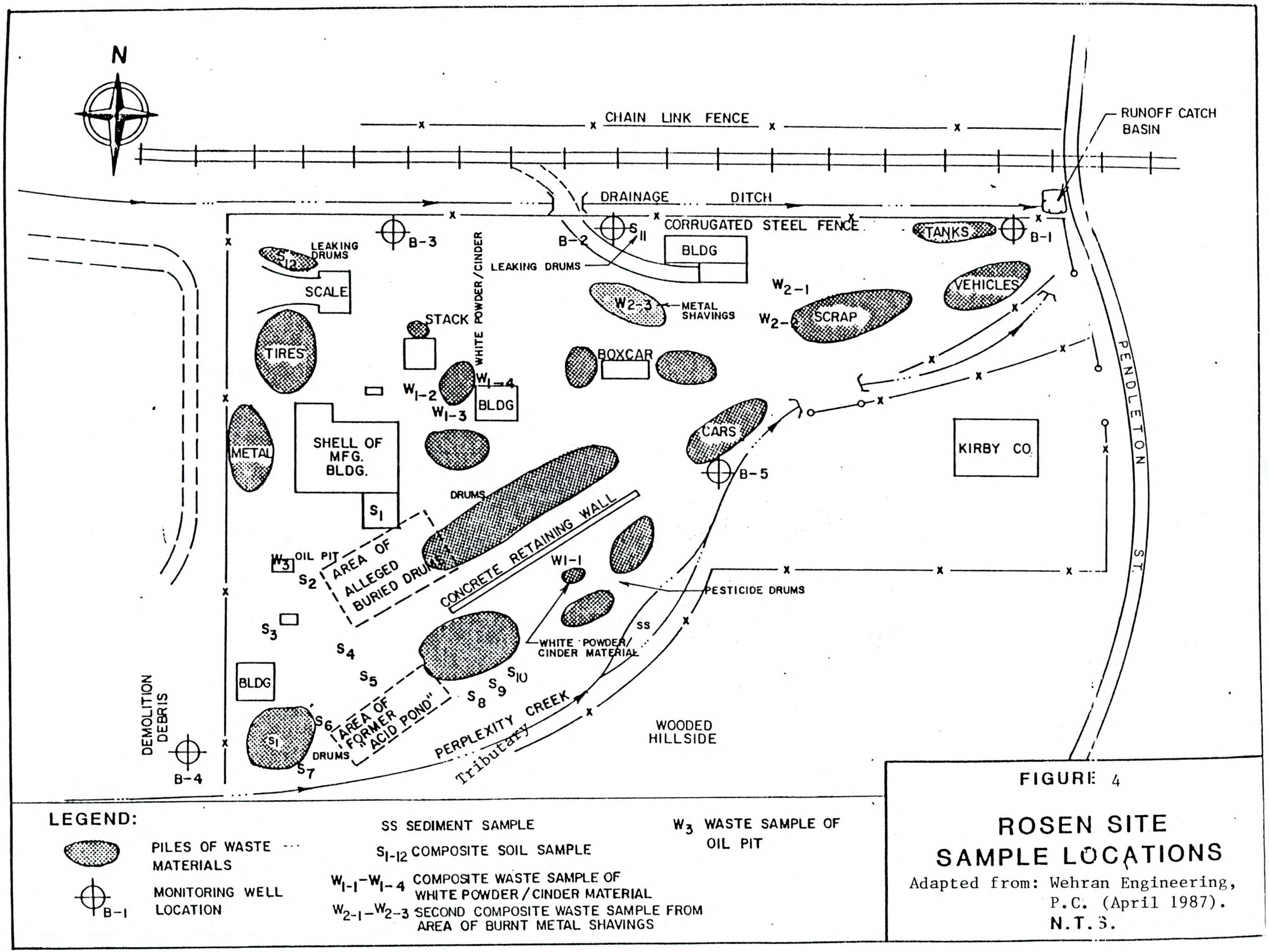
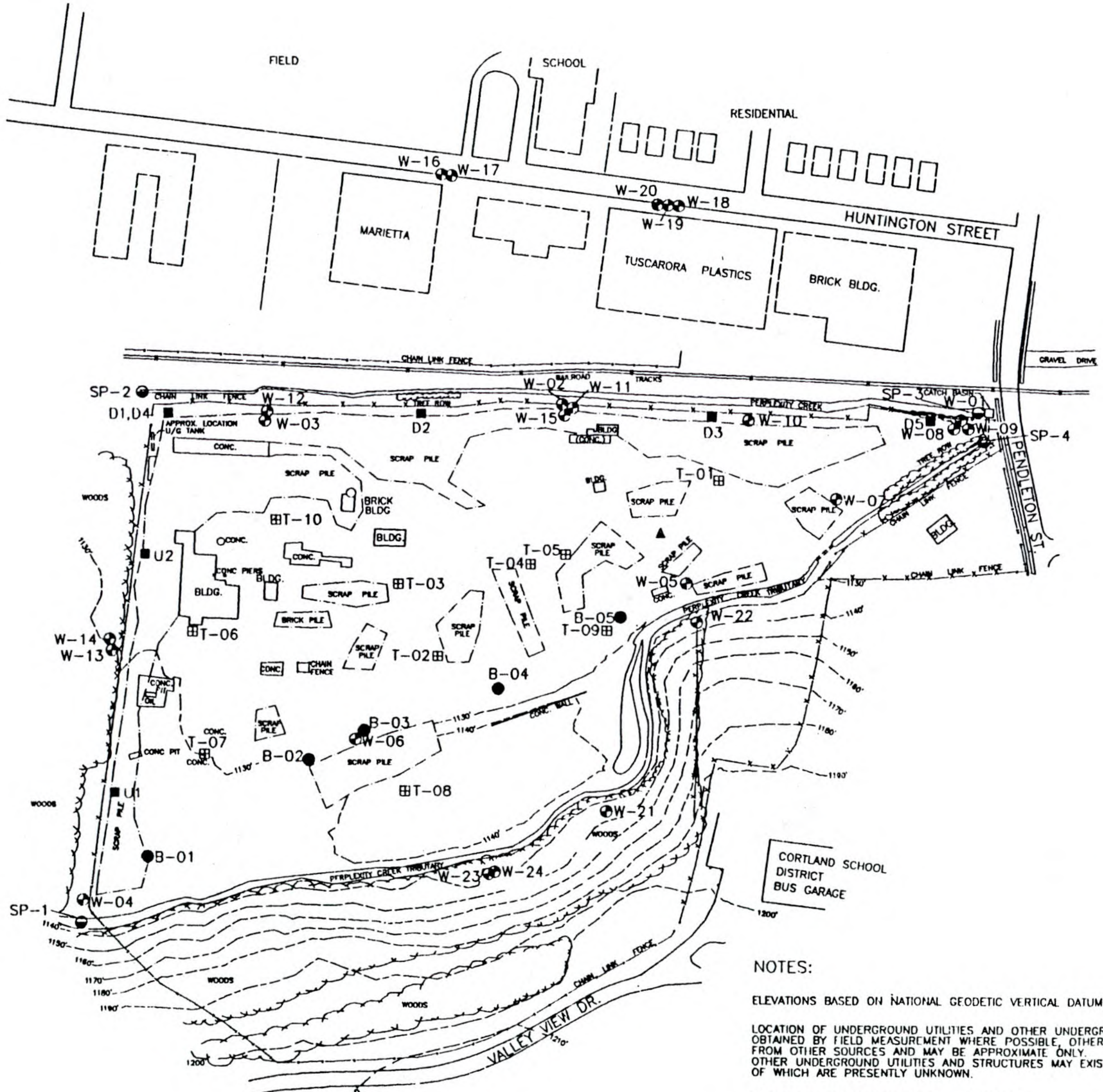


FIGURE 4

ROSEN SITE SAMPLE LOCATIONS

Adapted from: Wehran Engineering, P.C. (April 1987).

N.T.S.



LEGEND

- MONITORING WELL
- TEST BORING
- TEST PIT
- STREAM MONITORING POINT
- METEOROLOGICAL TOWER
- AIR SAMPLING LOCATION

SCALE

200' 0 200'

NOTES:

ELEVATIONS BASED ON NATIONAL GEODETIC VERTICAL DATUM OF 1929.

LOCATION OF UNDERGROUND UTILITIES AND OTHER UNDERGROUND STRUCTURES OBTAINED BY FIELD MEASUREMENT WHERE POSSIBLE, OTHERWISE OBTAINED FROM OTHER SOURCES AND MAY BE APPROXIMATE ONLY. OTHER UNDERGROUND UTILITIES AND STRUCTURES MAY EXIST, THE LOCATIONS OF WHICH ARE PRESENTLY UNKNOWN.

TOPOGRAPHIC CONTOUR INTERVAL = 10 FEET

ALL AIR SAMPLING LOCATIONS ARE APPROXIMATE.

BLASLAND, BOUCK & LEE, INC.
ENGINEERS & SCIENTISTS

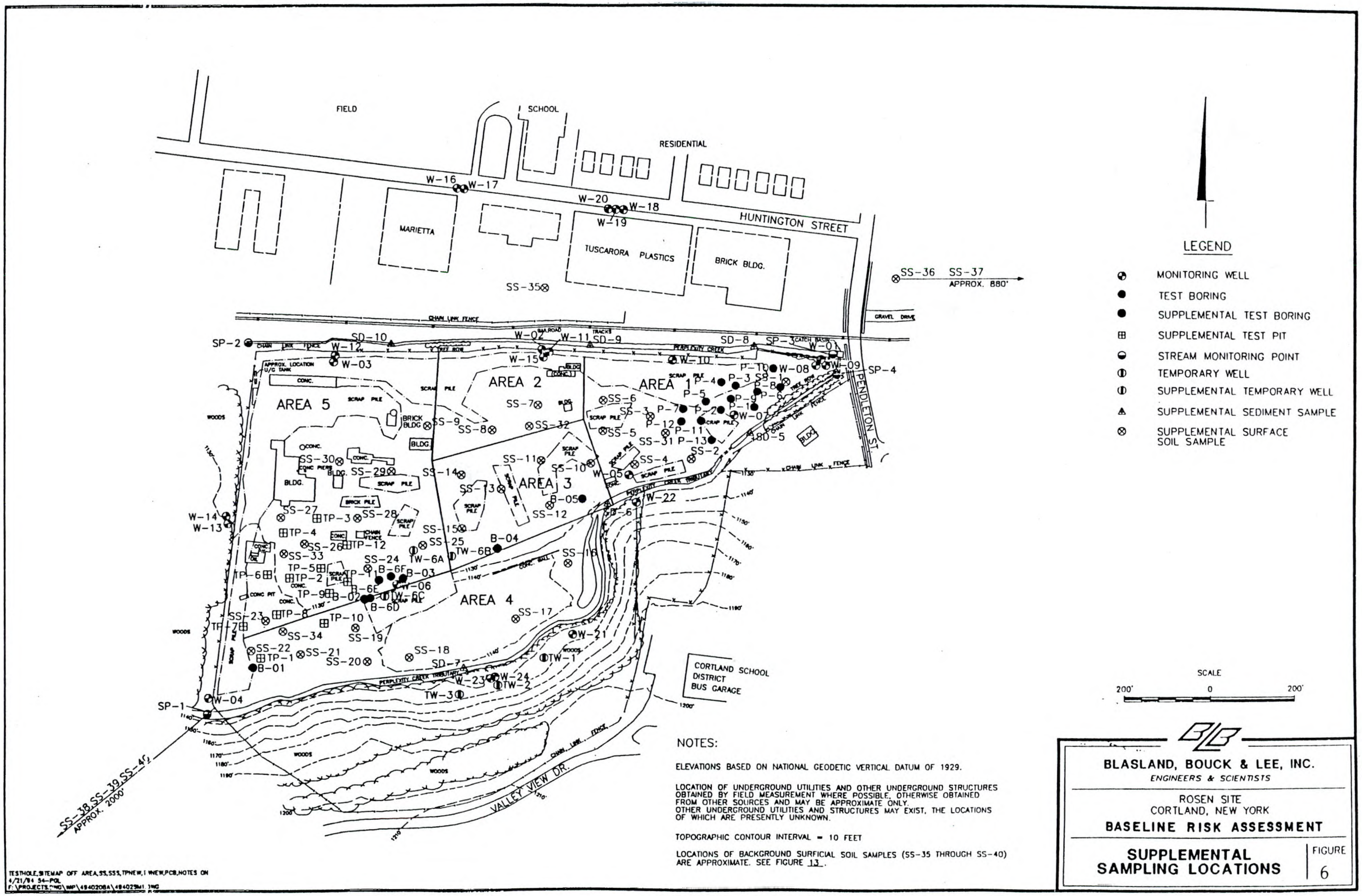
ROSEN SITE
CORTLAND, NEW YORK
REMEDIAL INVESTIGATION REPORT

Site Map

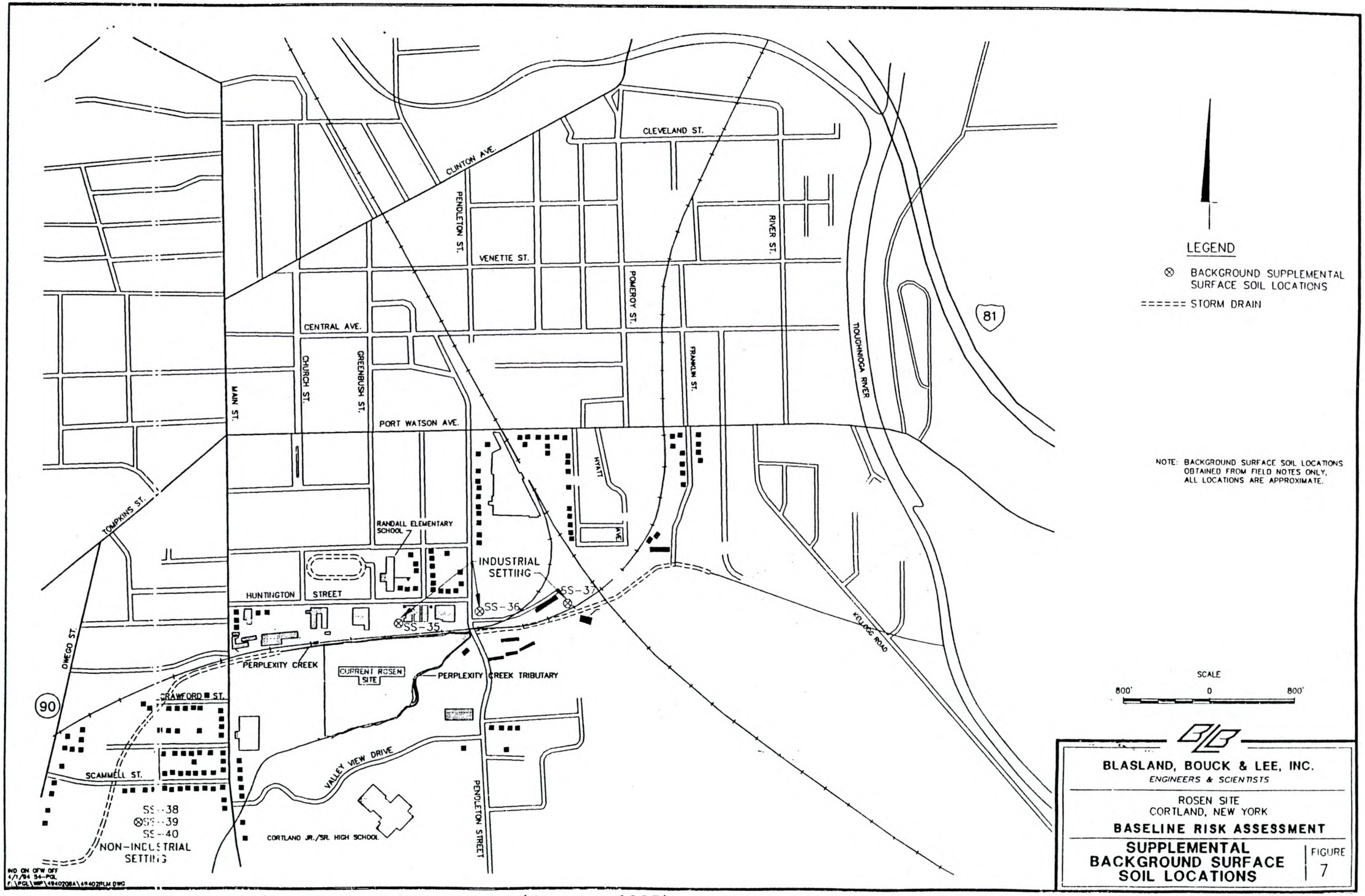
FIGURE 5

AIR,TESTHOLE ON AREA,SS,SSS,TPNEW,TWNEW,J CB,SITEMAP OFF
4/21/94 SA-PCL
F:\PROJECTS.DWG\WP\484020BA\48402[illegible].DWG

Adapted from: Blasland, Bouck,and Lee, Inc. (May 1994).



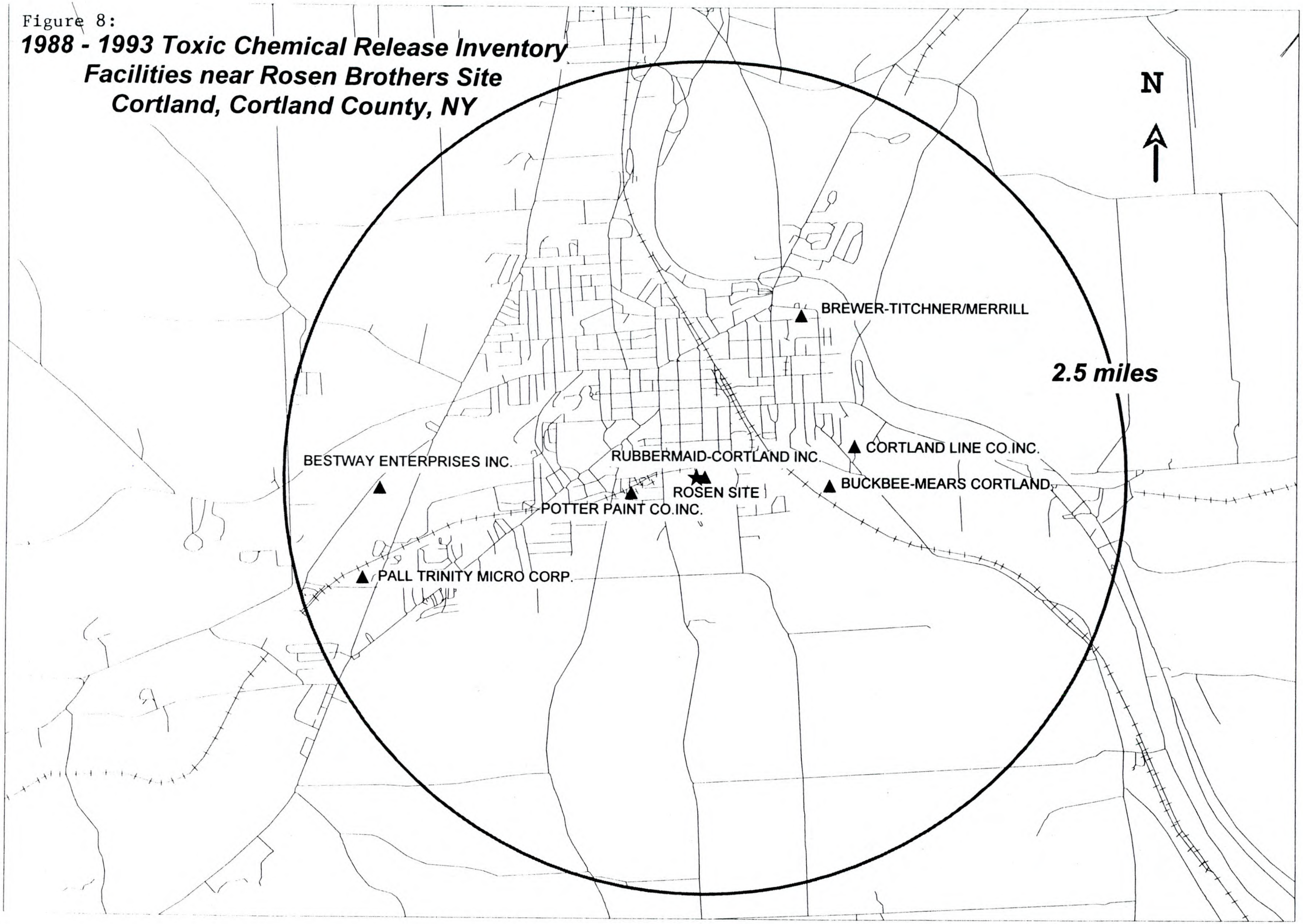
Adapted from: Blasland, Bouck and Lee, Inc. (January 1995).



Adapted from: Blasland, Bouck and Lee, Inc.(January 1995).

Figure 8:

1988 - 1993 Toxic Chemical Release Inventory Facilities near Rosen Brothers Site Cortland, Cortland County, NY



APPENDIX B

TABLES

Table 1.

Summary of Contaminants Detected in Soil, Sediment, Wastes and Groundwater During the Phase II Investigation at and near the Rosen Brothers Site City of Cortland, Cortland County, New York

	On-Site[1]						Off-Site[1]
				Liquid Waste			
Chemical Name	Sediment[2] (mg/kg)	Soil[3] (mg/kg)	Solid Waste[2] (mg/kg)	Oil Phase[2] (mg/kg)	Water Phase[2] (mcg/L)	Ground-water[2] (mcg/L)	Ground-water[2] (mcg/L)
Organics							
*1,1-dichloroethene	-	-	-	NA	-	*98	-
*1,1-dichloroethane	-	-	-	NA	-	*150	-
*1,1,1-trichloroethane	-	-	0.034	NA	-	*980	-
*tetrachloroethene	-	-	-	NA	-	*51	-
toluene	0.02	-	0.045	NA	-	-	-
total xylenes	-	-	0.029	NA	-	-	-
fluoranthene	2.2	1.6	-	NA	#	-	-
phenanthrene	-	2.0	-	NA	#	-	-
pyrene	5.0	3.1	-	NA	#	-	-
butylbenzylphthalate	-	1.9	-	NA	#	-	-
benzo(a)anthracene	-	2.7	-	NA	#	-	-
bis(2-ethylhexyl) phthalate	-	5.3	-	NA	#	-	-
*chrysene	*11	2.7	-	NA	#	-	-
benzo(a)pyrene	-	1.7	-	NA	#	-	-
di-n-octylphthalate	1.8	-	-	NA	#	-	-
4,4-DDD+	0.93	-	-	NA	NA	NA	NA
heptachlor epoxide	-	-	0.530	NA	NA	NA	NA
Metals							
*aluminum	7,040	2,690	1,730	-	-	186,000	*351,000
*antimony	*7,040	-	-	-	-	-	-
*arsenic	*51.3	26.9	4.17	-	-	-	-
barium	-	91.8	33.2	-	-	1,220	1,690
beryllium	-	-	-	-	-	7.3	12.2
*cadmium	19.7	15.7	6.56	-	7.2	*18.9	*20
calcium	-	89,600	170,000	-	41,900	225,000	459,000
*chromium	3,270	104	589	-	-	*542	*384
cobalt	-	9.3	24	-	-	96.2	168
copper	1,720	348	476	2.17	51.4	641	429
*iron	79,100	128,000	411,000	-	36,300	*329,000	*594,000
*lead	*1,190	437	411	2.5	73	*266	*191
*magnesium	1,870	13,300	252,000	-	6,600	88,000	*250,000
*manganese	500	900	3,660	0.91	588	*24,000	*12,500
*nickel	170	93.9	2.64	-	-	*269	*420
potassium	-	-	-	8.0	11,900	42,000	52,000
silver	-	-	-	2.35	-	-	-
tin	114	16.4	14.4	-	-	-	-
*vanadium	-	41.2	123	-	-	*631	*547
zinc	44,500	1,300	860	14.5	1,470	1,680	1,670
Other							
cyanide	8.18	1.18	0.95	NA	NA	NA	NA
*sodium	-	2,210	-	6.1	13,900	18,000	*62,700

Footnotes for Table 1.

Source: Wehran Engineering, April 1987.

Notes: The data summarized do not include tentatively identified compounds (TICs), results reported as "estimated", or found in the associated sample blank and may be indicated as "not detected."

[1]Refer to Figure 5, Appendix A for sample locations.
[2]Highest concentration reported
[3]Data is representative of one composite sample collected from 12 locations throughout the site.

mcg/L = micrograms per liter

- indicates not detected or not reported

NA indicates not analyzed

*Contaminant selected for further evaluation.

+Dichlorodiphenyldichloroethane

# indicates insufficient sample for analysis

Table 2.

Summary of Chemicals Found in an On-Site Soil Sample Collected in October 1985.
Rosen Brothers Site
City of Cortland, Cortland County, New York

Chemical Name	Concentration (mg/kg)
ethylbenzene	0.15
toluene	0.33
1,1,1-trichloroethane	4.8
trichloroethene	0.07
ortho-xylene	0.13
meta-xylene	0.23
para-xylene	0.11
acenaphthene	0.8
anthracene	3.9
bis(2-ethylhexyl)phthalate	0.26
fluoranthene	0.24
fluorene	3.1
phenanthrene	5.2
pyrene	0.2

Source: Adapted from Blasland, Bouck & Lee (May, 1994)

mg/kg = milligrams per kilogram

Table 3.

Summary[1] of Inorganic Constituents in Groundwater
at and near the Rosen Brothers Site
City of Cortland, Cortland County, New York

Chemical Name	On-Site (mcg/L)	Off-Site (mcg/L)
aluminum	11,700-59,000	11,500-121,000
arsenic	13-25	11.4-18
cadmium	18.4-89.8	*
chromium	137-168	*
iron	27,400-177,000	23,400-226,000
lead	20-128	47-180
magnesium	59,300-77,900	69,300-268,000
manganese	303-5,760	509-5,080
nickel	141-202	143-287
sodium	30,700-66,100	48,600-227,000
vanadium	50.9-278	88.5-170

Source: Blasland, Bouck & Lee (May 1994).

[1]This table includes only those metals at levels in groundwater that exceed NYS DOH drinking water standards and/or public health assessment comparison values (refer to Table 5).

mcg/L = micrograms per liter

* indicates that reported concentrations did not exceed NYS DOH drinking water standards and/or public health assessment comparison values.

Table 4.

Summary of Reported Air Emissions and Releases for
Manufacturing Facilities Near the Rosen Brothers Site
as Reported to the Toxic Chemical Release Inventory for 1993
City of Cortland, Cortland County, New York

Facility Name	Approximate Distance from Site+	Chemical Name	Contaminant Emissions (lbs/yr) Stack/ Point Source	Fugitive/ Non-Point Source	Total (#)
Bestway Enterprises, Inc.	1.9	chromium compounds	1-10	1-10	20
		arsenic	1-10	1-10	20
		copper compounds	1-10	1-10	20
Pall Trinity Micro Corp.	2.1	hydrochloric acid	106	-	106
		tert-butyl alcohol	7,512	-	7,512
		methylene chloride	26,238	-	26,238
Brewer-Titchner/Merrill	1.2	sulfuric acid	11-499	-	499
		chromium compounds	-	11-499	499
		nickel compounds	-	11-499	499
		zinc compounds	1-10	1-10	20
Buckbee-Mears Cortland	0.8	nickel	1-10	-	10
		chromium compounds	1-10	-	10
		hydrochloric acid	5,300	11-499	5,799
		ammonia	7,590	1-10	7,600
		nitric acid	1-10	11-499	509
		chlorine	11-499	11-499	998
		ethylene glycol	672	-	672
Potter Paint Company, Inc.	0.5	glycol ethers	450	450	900
		acetone	1,900	1,900	3,800
		2-butanone	1,600	1,500	3,100
		methyl isobutyl ketone	2,000	1,900	3,900
		toluene	7,400	7,400	14,800
		xylene	1,200	1,200	2,400
Cortland Line Co., Inc.	1.0	2-butanone	9,784	-	9,784
		methyl isobutyl ketone	13,063	-	13,063

Adapted from: Toxic Chemical Release Inventory (TRI), Calendar Year 1993.

Note: All air emission data reported in pounds/year (lbs/yr).
# Indicates estimated worst case air emissions based on reported data.
- Indicates no air emissions/release data reported.
+Distance in miles

Refer to Figure 8 (Appendix A) for facility location.

Table 5.
Water Quality Standards/Guidelines and/or Public Health Assessment Comparison Values that are Exceeded by Contaminants Found in Groundwater at or near the Rosen Brothers Site City of Cortland, Cortland County, New York
[All values in micrograms per liter (mcg/L)]

	New York State			U.S. EPA	Comparison Values*			
Contaminant	Ground water	Surface Water	Drinking Water	Drinking Water	Cancer	Basis**	Noncancer	Basis**
Volatile Organics								
1,1-dichloroethane	5	5(g)	5	--	--	--	700	EPA RfD
1,1-dichloroethene	5	0.07(g)	5	7	0.058	EPA CPF	7	EPA LTHA
cis-1,2-dichloroethene	5	5(g)	5	70	--	--	70	EPA LTHA
tetrachloroethene	5	0.7(g)	5	5	0.67	EPA CPF	70	EPA RfD
1,1,1-trichloroethane	5	5(g)	5	200	--	--	200	EPA LTHA
trichloroethene	5	3	5	5	3.3	EPA CPF	52	EPA RfD
vinyl chloride	2	0.3(g)	2	2	0.018	EPA HEAST	0.14	ATSDR MRL
chloromethane	5	--	5	--	2.7	EPA HEAST	3	EPA LTHA
xylenes	5	5(g)	5	10,000	--	--	10,000	EPA LTHA
toluene	5	5(g)	5	1,000	--	--	1,000	EPA LTHA
ethylbenzene	5	5(g)	5	700	--	--	700	EPA LTHA
trans-1,2-dichloroethene	5	5(g)	5	100	--	--	100	EPA LTHA
Aroclor 1254	0.1[a]	0.01[a]	0.5[a]	0.5[a]	0.005[b]	EPA CPF	0.14	ATSDR MRL
Inorganics								
aluminum	--	--	--	50-200[s]	--	--	--	--
arsenic	25	50	50	50++	0.02	EPA CPF	1.1	EPA RfD
chromium	50	50	100	100	--	--	100	EPA LTHA
cadmium	10	10	5	5	--	--	5	EPA LTHA
iron	300	300	300	300[s]	--	--	--	--
lead	25	50	15[l]	15[l]	--	--	--	--
magnesium	35,000(g)	35,000	--	--	--	--	35,000	NYS DOH RfG
manganese	300	300	300	50[s]	--	--	200	EPA RfD
nickel	--	--	--	--	--	--	100	EPA LTHA
sodium	20,000	--	+	--	--	--	--	--
vanadium	--	--	--	--	--	--	25	EPA HEAST

Footnotes for Table 5.

[a] = Value listed applied to sum of these substances.
[b] = Based on oral Cancer Potency Factor (CPF) for Aroclor 1254.
g = Guidance value
l = Action level
s = Secondary maximum contaminant level (MCL)
*Comparison value determined for a 70 kg adult who drinks 2 liters of water per day.
**EPA RfD = EPA Reference Dose
EPA LTHA = EPA Lifetime Health Advisory
EPA HEAST = EPA Health Assessment Summary Tables
ATSDR MRL = ATSDR Oral Minimal Risk Level
+No designated limit; water containing more than 20,000 mcg/L should not be used for drinking by people on severely restricted sodium diets; water containing more than 270,000 mcg/L should not be used for drinking water by people on moderately restricted sodium diets.

++Under review

Table 6.
Public Health Assessment Comparison Values that are Exceeded by Contaminants Found in Soils and Sediments at and near the Rosen Brothers Site
City of Cortland, Cortland County, New York
[All values in milligrams per kilogram (mg/kg)]

Compound	Typical Background Range*	Comparison Values					
		Nonresidential Setting**				Industrial Setting***	
		Cancer	Basis****	Noncancer	Basis****	Cancer	Noncancer
Semi-Volatile Organics							
pyrene	+	--	--	17,000	EPA RfD	--	88,500
benzo(a)anthracene	+	14[a]	b	c	c	3.0[a]	c
chrysene	+	1,400[a]	b	c	c	300	c
benzo(b)fluoranthene	+	14[a]	b	c	c	3.0	c
benzo(k)fluoranthene	+	140[a]	b	c	c	30	c
benzo(a)pyrene	+	1.4	NYS DOH CPF	c	c	0.3	c
indeno(1,2,3-cd)pyrene	+	14	b	c	c	3.0	c
PCBs							
aroclor-1248	<0.01-0.04[d]	2.5	EPA CPF	12	ATSDR MRL	0.7	59
aroclor-1254	<0.01-0.04[d]	2.5	EPA CPF	12	ATSDR MRL	0.7	59
Inorganics (metals)							
antimony	0.6-10	--	--	230	EPA RfD	--	1,200
arsenic	10-20	13	EPA CPF	180	EPA RfD	3.5	890
lead	10-300	--	--	--	--	--	--

Footnotes for Table 6.

ND - not determined

*References: Adriano (1986); Clarke et al. (1985); Connor et al. (1957); Davis and Bennett (1983); Dragun (1988); Frank et al. (1976); McGovern (1988); Schacklette and Boerngen (1984).

**Comparison values for cancer risk are determined for a 70 kg adult who ingests 50 mg soil per day, 2 days per week for 3 months per year; comparison values for noncancer risk are determined for a 21 kg child who ingests 100 mg soil per day, 5 days per week for 6 months per year.

***Comparison values for cancer risk are determined for a 70 kg adult who ingests in the work place 50 mg soil per day, 5 days per week, 8 months per year and assuming that exposure occurs for 40 working years out of a 70 year lifetime; comparison values for noncancer risk are determined for a 70 kg adult who ingests in the workplace 50 mg soil per day, 5 days per week for 8 months per year.

****EPA CPF = US EPA Cancer Potency Factor
EPA RfD = US EPA Reference Dose
EPA HEAST = US EPA Health Effects Assessment Summary Table
ATSDR MRL = ATSDR Minimal Risk Level
NYS DOH CPF = NYS DOH Cancer Potency Factor
NYS DOH RfG = NYS DOH Risk Reference Guideline

[+]Based on reported background levels for total polycyclic aromatic hydrocarbons of 1 to 13 mg in soil (Edwards, 1983).

[a]Comparison value adjusted according to US EPA's interim relative potency factors for polycyclic aromatic hydrocarbons.
[b]See benzo(a)pyrene
[c]See pyrene
[d]Total Aroclors

APPENDIX C

NYS DOH Procedure for Evaluating
Potential Health Risks for Contaminants of Concern

NYS DOH PROCEDURE FOR EVALUATING POTENTIAL HEALTH RISKS FOR CONTAMINANTS OF CONCERN

To evaluate the potential health risks from contaminants of concern associated with the Rosen Brothers site, the New York State Department of Health assessed the risks for cancer and noncancer health effects.

Increased cancer risks were estimated by using site-specific information on exposure levels for the contaminant of concern and interpreting them using cancer potency estimates derived for that contaminant by the US EPA or, in some cases, by the NYS DOH. The following qualitative ranking of cancer risk estimates, developed by the NYS DOH, was then used to rank the risk from very low to very high. For example, if the qualitative descriptor was "low", then the excess lifetime cancer risk from that exposure is in the range of greater than one per million to less than one per ten thousand. Other qualitative descriptors are listed below:

Excess Lifetime Cancer Risk

Risk Ratio	Qualitative Descriptor
equal to or less than one per million	very low
greater than one per million to less than one per ten thousand	low
one per ten thousand to less than one per thousand	moderate
one per thousand to less than one per ten	high
equal to or greater than one per ten	very high

An estimated increased excess lifetime cancer risk is not a specific estimate of expected cancers. Rather, it is a plausible upper bound estimate of the probability that a person may develop cancer sometime in his or her lifetime following exposure to that contaminant.

There is insufficient knowledge of cancer mechanisms to decide if there exists a level of exposure to a cancer-causing agent below which there is no risk of getting cancer, namely, a threshold level. Therefore, every exposure, no matter how low, to a cancer-causing compound is assumed to be associated with some increased risk. As the dose of a carcinogen decreases, the chance of developing cancer decreases, but each exposure is accompanied by some increased risk.

There is general consensus among the scientific and regulatory communities on what level of estimated excess cancer risk is acceptable. An increased lifetime cancer risk of one in one million or less is generally considered an insignificant increase in cancer risk.

For noncarcinogenic health risks, the contaminant intake was estimated using exposure assumptions for the site conditions. This dose was then compared to a risk reference dose (estimated daily intake of a chemical that is likely to be without an appreciable risk of health effects) developed by the US EPA, ATSDR and/or NYS DOH. The resulting ratio was then compared to the following qualitative scale of health risk:

Qualitative Descriptions for
Noncarcinogenic Health Risks

Ratio of Estimated Contaminant Intake to Risk Reference Dose	Qualitative Descriptor
equal to or less than the risk reference dose	minimal
greater than one to five times the risk reference dose	low
greater than five to ten times the risk reference dose	moderate
greater than ten times the risk reference dose	high

Noncarcinogenic effects unlike carcinogenic effects are believed to have a threshold, that is, a dose below which adverse effects will not occur. As a result, the current practice is to identify, usually from animal toxicology experiments, a no-observed-effect-level (NOEL). This is the experimental exposure level in animals at which no adverse toxic effect is observed. The NOEL is then divided by an uncertainty factor to yield the risk reference dose. The uncertainty factor is a number which reflects the degree of uncertainty that exists when experimental animal data are extrapolated to the general human population. The magnitude of the uncertainty factor takes into consideration various factors such as sensitive subpopulations (for example, children or the elderly), extrapolation from animals to humans, and the incompleteness of available data. Thus, the risk reference dose is not expected to cause health effects because it is selected to be much lower than dosages that do not cause adverse health effects in laboratory animals.

The measure used to describe the potential for noncancer health effects to occur in an individual is expressed as a ratio of estimated contaminant intake to the risk reference dose. If exposure to the contaminant exceeds the risk reference dose, there may be concern for potential noncancer health effects because the margin of protection is less than that afforded by the reference dose. As a rule, the greater the ratio of the estimated contaminant intake to the risk reference dose, the greater the level of concern. A ratio equal to or less than one is generally considered an insignificant (minimal) increase in risk.

APPENDIX D

ATSDR Guidance for Assigning a Public Health Hazard Category

ATSDR Public Health Hazard Categories

Category	Definition	Criteria
A. Urgent public health hazard	This category is used for sites that pose an urgent public health hazard as the result of short-term exposures to hazardous substances.	• evidence exists that exposures have occurred, are occurring, or are likely to occur in the future AND • estimated exposures are to a substance(s) at concentrations in the environment that, upon short-term exposures, can cause adverse health effects to any segment of the receptor population AND/OR • community-specific health outcome data indicate that the site has had an adverse impact on human health that requires rapid intervention AND/OR • physical hazards at the site pose an imminent risk of physical injury
B. Public health hazard	This category is used for sites that pose a public health hazard as the result of long-term exposures to hazardous substances.	• evidence exists that exposures have occurred, are occurring, or are likely to occur in the future AND • estimated exposures are to a substance(s) at concentrations in the environment that, upon long-term exposures, can cause adverse health effects to any segment of the receptor population AND/OR • community-specific health outcome data indicate that the site has had an adverse impact on human health that requires intervention
C. Indeterminate public health hazard	This category is used for sites with incomplete information.	• limited available data do not indicate that humans are being or have been exposed to levels of contamination that would be expected to cause adverse health effects; data or information are not available for all environmental media to which humans may be exposed AND • there are insufficient or no community-specific health outcome data to indicate that the site has had an adverse impact on human health.
D. No apparent public health hazard	This category is used for sites where human exposure to contaminated media is occurring or has occurred in the past, but the exposure is below a level of health hazard.	• exposures do not exceed an ATSDR chronic MRL or other comparable value AND • data are available for all environmental media to which humans are being exposed AND • there are no community-specific health outcome data to indicate that the site has had an adverse impact on human health
E. No public health hazard	This category is used for sites that do not pose a public health hazard.	• no evidence of current or past human exposure to contaminated media AND • future exposures to contaminated media are likely to occur AND • there are no community-specific health outcome data to indicate that the site has had an adverse impact on human health

APPENDIX E

Response to Public Comments

Summary of Public Comments and Responses

This responsiveness summary was prepared to address comments and questions on the draft public health assessment (PHA) for the Rosen Brothers site. The public was invited to review the draft PHA during the public comment period which ran from March 29, 1996 to May 20, 1996. We received comments from only one party. Similar comments may be consolidated or grouped together and some statements were reworded to clarify the comment. If you have any questions about this responsiveness summary, you may contact the New York State Department of Health's (NYS DOH) Health Liaison Program at the toll free number: 1-800-458-1158, extension 6402.

Comment #1

The authors appear to imply that fencing is an adequate means of controlling exposure, disregarding plausible pathways for off-site contaminant migration. A fence does nothing to restrict off-site contaminant migration.

Response #1

Several portions of the text (Summary, Pathways Analyses, Conclusions) refer to fencing around the site as a remedial measure that has been taken to restrict unauthorized access and minimize exposures to physical hazards at the site and contaminants, including PCBs,PAHs and lead, in on-site surface soils. These statements are not meant to imply that fencing is an adequate means of controlling off-site contaminant migration.

Comment #2

The existence of sensitive sub-populations in close proximity to the site, as in the case of Randall Elementary School and the day care center reported to be in its vicinity, as well as the probable population of children in the nearby residential area, needs more explicit consideration.

Response #2

The text has been revised to reflect the presence of sensitive sub-populations near the site (see Background, Section D, Land

Use). Figures 3 and 7 (Appendix B) show the locations of nearby schools.

Comment #3

The qualitative descriptors employed in the public health implications section and Appendix C lack scientific support and are likely to be very misleading to readers. The authors should include the actual risk estimate or Hazard Index when supplying descriptors such as minimal or high.

Response #3

Although quantitative risk calculations were completed to estimate health risks, it is not the intent of the PHA, which is not a risk assessment document, to provide detailed documentation of these calculations. However, Tables 5 and 6 and Appendix C provide the bases of the calculations. We assigned qualitative terms to describe these risks and define these terms in Appendix C although we recognize other qualifiers are possible.

If anyone wants additional information or has a specific question, they should call the NYS DOH's Health Liaison Program at the toll-free number 1-800-458-1158, extension 6402.

Comment #4

The discussion of the 1995 United States Environmental Protection Agency (US EPA) evaluation of volatile organic compounds (VOCs) in groundwater affecting air quality needs to be clarified and referenced to a publicly available document. What were EPA's conclusions and have they been peer-reviewed?

Response #4

The text has been revised (see Pathways Analyses, subsection D, Data Gaps) to clarify that this evaluation was completed in response to concerns of the citizen action group Clean Up Rosen Brothers (CURB) about the potential for site-related contaminants to affect adversely indoor air quality. The PHA includes a general discussion of this evaluation and is based on information in the report titled "Report of Off-Site Soil Gas Modeling for the Remedial Investigation/Feasibility Study Oversight of the

Rosen Brothers Scrap Yard Site - Cortland, New York." The report was prepared by ICF Kaiser, Environment and Energy Group in August 1995. The reference list has been revised to include this report. Results of this screening evaluation indicate that adverse health effects associated with the modeled chemical concentrations would not occur. This general conclusion is included in the PHA. This screening evaluation was not peer-reviewed. The US EPA project manager for the Rosen Brothers site has indicated that this document will be included in the administrative record for the Rosen Brothers site and in the document repository established for the site.

Comment #5

Why is no discussion of the January 1995 baseline risk assessment and the critiques thereof included in the PHA?

Response #5

The text (Background section, subsection A - Site Description and History) has been revised to reflect that a baseline risk assessment was completed as part of the remedial investigation for the site. Distinct differences exist between a baseline risk assessment that is completed as part of a remedial investigation (RI) and feasibility study (FS) for a site through the United States Environmental Protection Agency (US EPA) and a PHA that is completed through the Agency for Toxic Substances and Disease Registry (ATSDR). These differences include the types of data and information that are reviewed, the types of qualitative and quantitative evaluations that are completed and the overall purpose of the document in terms of evaluating the public health impact that a site may pose. It is not the intent of the PHA to evaluate the baseline risk assessment completed for the site. A PHA is a mechanism to provide the community with information on the public health implications of a specific site and identifying those populations for which further health actions or studies are needed.

Comment #6

The discussion of the October 1995 site visit needs to include a quantitative estimate of the extent to which non-vegetated areas still exist on the site, as these would be a prime source for off-site contaminant migration.

Response #6

The purpose of the October 25, 1995 site visit was to evaluate current site conditions. As noted in the discussion of this site visit, the site was densely vegetated. During a previous site visit by the NYS DOH staff (October 23, 1993), several areas (i.e., "patches") at the ground surface showed no vegetation or grass cover; however, a quantitative estimate of these unvegetated areas was not made. Since these site visits were completed, additional remediation has occurred, including the removal of about 200 tons of metallic surficial debris. Therefore, a quantitative estimate of the non-vegetated areas identified at the site in the past may not accurately represent current conditions at the site. Furthermore, the degree of vegetation at the site is likely to vary seasonally.

Comment #7

The discussion of demographics needs to be more reflective of spatial relationships between sensitive subpopulations (e.g., schools) and the site.

Response #7

The text has been revised to give a more detailed picture of the community living near the site, including sensitive sub-populations. Additionally, Figures 3 and 7 (Appendix B) show the locations of nearby schools.

Comment #8

The discussion of Health Outcome Data needs to reflect the severe limitations of epidemiological methods for detecting effects produced by small sites surrounded by limited populations.

Response #8

The text has been revised to include a discussion of the limitations of health outcome data (Public Health Implications section, subsection B - Health Outcome Data Evaluation).

Comment #9

The discussion of community health concerns should address more current concerns of the local community, particularly concerning the exposure potential of various remedial alternatives.

Response #9

The purpose of this section of the PHA is to identify and address community health concerns related to the site. Past known community health concerns have been addressed in this PHA. Representatives of the NYS DOH attended a public meeting for the site in October 1993 and no community health concerns were raised. During the public review period for this PHA, 94 copies of the PHA were distributed to citizens within the community near the Rosen Brothers site. We received comments from one party during the public review period and no new community health concerns related to this site were raised. Since the October 1993 public meeting, the US EPA has met with representatives of the citizens action group CURB and other community members on numerous occasions. The purpose of these meetings was to provide the community with updated information about the site, provide the public with a clear explanation of technical issues related to investigations at the site and to maintain open dialogue with the community. No community concerns about the exposure potential of various remedial alternatives have been expressed to representatives of the US EPA, NYS DEC or NYS DOH.

An initial feasibility study presenting the proposed remedial alternatives for the Rosen Brothers site is under review through the US EPA. As part of the feasibility study, each of the proposed remedial alternatives is evaluated in terms of its effectiveness to protect human health and the environment. Each alternative is evaluated to determine how effectively it will reduce the toxicity, mobility and volume of contaminants at a site. The short-term effectiveness of each remedy is evaluated to determine possible effects to human health and the environment during construction and implementation of the remedy. The long-term effectiveness of each proposed remedy is also evaluated to identify possible effects to human health and the environment after the remedial action is complete. Once the feasibility study process is complete, the US EPA will present the proposed remedies and the preferred remedy for the site for public review and comment.

Comment #10

The comparison of sampled concentrations to public health comparison values needs to make explicit reference to exposure assumptions on which these comparison values are based on the extent to which those assumptions reasonably reflect exposure conditions at or near this site.

Response #10

Exposure parameters that are used to calculate public health assessment comparison values and to determine excess lifetime cancer risk and noncarcinogenic health risks from exposure to contaminants in drinking water and soils/sediments are given in the footnote section of Tables 5 and 6, respectively.

Comment #11

The discussion of off-site samples refers to a number of samples as being upgradient of the site, although the only locational reference is to Figure 5 (Appendix A). All indicated locations on that figure are in such close proximity to the site that the authors incur a significant burden of proof to demonstrate that these samples were in fact upgradient.

Response #11

In the last paragraph of the general discussion in the "Environmental Contamination and Other Hazards" section, we define the terms "on-site" and "off-site." For the purpose of this PHA, "on-site" refers to the area within the property boundary (i.e., the fenceline) as indicated on Figures 4 and 5 (Appendix A) and "off-site" refers to all areas outside of this property boundary. We agree that some of the sampling locations are very close to the fenceline around the site and were careful not to use the term "upgradient" to describe off-site groundwater sample locations. The text has been revised to reflect that off-site surface water and sediment sample locations are either upstream or downstream of the site.

Comment #12

The discussion of quality assurance and quality control (QA/QC) in the "Environmental Contamination" and Other Hazards section, discusses the details of sample control, but not the equally important issues of appropriate sampling location, particularly for "background" samples. There have been significant concerns regarding the appropriateness and adequacy of "background" sampling such that samples treated as background may in fact have been influenced by the site.

Response #12

The discussion of Quality Assurance and Quality Control (QA/QC) in this PHA does address the issue of QA/QC measures with regard to sampling locations. As indicated, all sampling methods and sampling point strategies followed approved US EPA or other applicable protocols used in site characterization to ensure that the data gathered were representative of site conditions. The text has been revised to present this statement earlier in the discussion of QA/QC measures that were undertaken during the RI.

The NYS DOH is not aware of any technical concerns regarding the appropriateness of the background sampling locations. During the RI, off-site surface soil samples were collected from both industrial and non-industrial settings. These off-site sampling locations are shown in Figure 7 (Appendix A). The samples collected from an "industrial" setting were taken from properties north and east of the Rosen site. Figure 3 (Appendix A) presents a brief summary of recent and past site owners and operations at the industrial properties near the sampling locations for off-site "industrial" setting. A more detailed discussion of these properties is included in Appendix A (Volume 2 of 3) of the revised remedial investigation report (May 1994). The surface soil samples collected from a "non-industrial" setting were collected from an area southwest of the site and south of residential properties on Scammel Street. As discussed in the Exposure Pathways Analysis section, the potential for contaminants to migrate from the site to adjacent properties through surface water runoff is minimal because the Rosen site is surrounded by two creeks. Therefore, any surface water runoff from the site will likely drain into the creeks.

<u>Comment #13</u>

The discussion of completed exposure pathways does not adequately reflect the variety of exposure routes for wastes, surface soils and air. In addition to inhalation of volatiles, inhalation of particulates was highly likely.

<u>Response #13</u>

The text has been revised (see Pathways Analyses, subsection A, Completed Exposure Pathways) to reflect that past completed exposures to site contaminants may have also occurred via inhalation of contaminated soil particulates and particulates in air.

<u>Comment #14</u>

The discussion of groundwater exposure as a potential pathway assumes that direct use of water as a potable water supply represents the only pathway of exposure. Clarification is needed as to whether the Cortland County Health Department (CCHD) permits irrigation wells in areas served by the public water supply, a common practice in other areas that can be associated with significant exposure potential. It must be firmly established that the CCHD restrictions are over all wells and not merely domestic wells before reliance is placed on these restrictions as precluding significant exposure.

<u>Response #14</u>

The Cortland County Health Department (CCHD) only issues permits for potable water supply wells that are used for drinking, culinary and/or sanitary purposes. Irrigation wells that may be installed in areas served by the public water supply are not permitted by the CCHD. However, the CCHD has indicated that well points likely exist in residential areas near the site. These well points are believed to be used primarily for gardening. Groundwater contamination exists at the site and has been identified off-site in non-residential areas. The text has been revised to reflect that people who use irrigation wells for gardening and other non-potable purposes could be potentially exposed to site contaminants in off-site groundwater in the future. (See Pathways Analyses, subsection B, Potential Exposure Pathways). A recommendation has been included to reflect that groundwater sampling should occur, as appropriate, to evaluate the extent of contaminant migration to off-site areas, including possible impacts to existing private wells that are used for non-potable purposes in areas downgradient of the site.

<u>Comment #15</u>

The discussion of contaminated particulates in the Potential Exposure Pathways section needs to be more reflective of the fact that there can be significant dust generation from non-vegetated areas in the absence of any intrusive activity. Given the unvegetated areas observed in 1993, this pathway was almost certainly complete at some point in the past.

<u>Response #15</u>

This portion of the text specifically discusses the potential for contaminated dusts to become airborne from uncovered (i.e., unvegetated) areas by winds blowing across the site. However, as discussed in the Background section (subsection C - Site Visit) of the PHA, the site was densely vegetated during the October 25, 1995 site visit and also during the October 6, 1996 site visit. During the October 1993 site visit, we noted that several areas, which can be described as "patches" at the ground surface, showed no vegetation or grass cover. Due to the limited size of these unvegetated areas, it is unlikely that they are sources of "significant" dust generation. However, we agree that exposure(s) to contaminated soil particulates was likely a completed exposure pathway in the past and we discuss this completed exposure in the Pathways Analyses section (subsection A - Completed Exposure Pathways) of the PHA.

<u>Comment #16</u>

The discussion of off-site soil in the Eliminated Exposure Pathways section fails to address the potential for deposition of wind-borne particulates.

Response #16

The text has been revised to include the potential for deposition of wind-borne particulates (see Pathways Analyses, subsection B, Potential Exposure Pathways).

Comment #17
The discussion of biota in the Eliminated Exposure Pathways section fails to address vegetables. Given the potential for off-site dust migration and the confirmed existence of a shallow groundwater contaminant plume off-site, local gardeners may be exposed to contamination via fruits and vegetables.

Response #17

The Pathways Analysis Section (Subsection B - Potential Exposure Pathways) has been revised to include the potential for contaminants in dust and groundwater to migrate off-site and contaminate homegrown vegetables and fruits.

Comment #18

The discussion of off-site soil gas migration does not address exposure to contaminants in the confirmed off-site groundwater plume which subsequently volatilize into soil gas. The description of soil volatization is not supported by the analysis that precedes it.

Response #18

The text has been revised (see Pathways Analyses, subsection D, Data Gaps).

Comment #19

Neither the public health implications section or Appendix C present an adequate discussion of the exposure parameters employed in generating risk estimates or hazard quotients that underlie qualitative descriptions of risk. It is therefore impossible to assess whether an adequate degree of conservationism is incorporated.

Response #19

As discussed in response #10, please see the footnote section of Tables 5 and 6.

Comment #20

The discussion of lead in the public health implications section needs to be modified. A major research effort by US EPA has led to the conclusion that at any non-zero soil concentration for lead there is a non-zero probability that some members of the population will experience toxicity. An uptake biokinetic model is available to address this issue and is far preferable to any direct comparison of soil concentration to some reference concentration.

Response #20

We agree that a biokinetic model for lead uptake is available. This model generates a probability distribution of blood lead levels for a group of children exposed to varying soil lead levels with concurrent exposure to lead from other sources (i.e., air, drinking water, diet). It is designed to estimate blood lead levels resulting from continuous daily exposure to lead rather than from trespasser or other intermittent exposures and has not yet been fully validated by the US EPA. The model predicts that at a soil lead level of 1,000 parts per million (ppm), which is approximately the 95% upper bound concentration in the surface soil on the Rosen site, children (5-7 year olds) continuously exposed would have less than a 1% probability of exceeding a blood lead level of 10 micrograms per deciliter (mcg/dL) which is the Centers for Disease Control level of concern. This prediction coupled with the relatively low potential for continuous daily exposure of children to on-site surface soils at the Rosen site indicates that the risk of adverse health effects is minimal.

Comment #21

In general, the discussion of inorganics in the public health implications section fails to consider the extremely long biological half-lives of these chemicals (estimates for cadmium range as high as 40 years). Given the strong evidence for prior exposures, it would only be reasonable to treat some members of the local population as a sensitive sub-population, reflecting the likelihood of an existing body burden of these contaminants.

Response #21

To estimate noncarcinogenic health risks, the intake of each contaminant (i.e., inorganic contaminants) was compared to a reference dose. A reference dose is an estimate (with an uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population that is likely to be without any appreciable risk of adverse health effects. The reference dose for cadmium takes into accoount sensitive subpopulations, and is based on renal (kidney) toxicity in humans caused by accumulation of cadmium in the kidney after long-term exposure. The toxicokinetic models used to calculate this reference dose assume that cadmium has a half-life in humans of approximately 20 years.

Comment #22

The discussion of health outcome data needs to discuss the statistical power of the methods used. The study of leukemia and cancer may have lacked the statistical power to discover an actual effect. What is the minimal level of increased risk that the study was capable of detecting?

Response #22

The power of the significance tests to detect true differences in the observed incidence of cancer and the expected incidence of cancer will depend on the number of cases expected. For example, the probability of detecting a true doubling of cancer incidence over the expected number will be 90 percent or higher when the expected number is at least 16. In the first review of leukemia incidence in Cortland City (1970-1979), the number of expected cases were 11.2 for males and 10.1 for females. The data suggest that the observed incidence of leukemia is as expected, since the number of expected leukemia cases in males and females together was 21.3, while the observed number of cases was 22. As discussed in the NYS DOH's 1991 report of the cancer incidence study for the years 1978-1987, the power of detecting a doubling was high for the total number of cancer cases for each sex and for several common cancer sites. Because the expected number of cases was low for some types of cancer, including leukemia, in the City of Cortland, moderate increases in cancer rates for these types of cancer may not have been detected.

Comment #23

Data presented in this report are not adequate to support the conclusion that "the site poses no apparent public health hazard".

Response #23

A description of the criteria and actions for levels of the ATSDR public health hazard categories is presented in Appendix D of this PHA. The public health hazard category for a site is determined primarily by existing conditions at the site. For the Rosen Brothers site, two public health hazard categories were assigned to characterize past and existing conditions. The conclusions section of the PHA indicates that the Rosen Brothers site posed a public health hazard in the past and the basis for selecting this public health hazard category. Based on existing site conditions and the information reviewed, we determined that the site currently poses no apparent public health hazard. The basis for this conclusion is that there are no known ongoing exposures to site contaminants. However, we also recommend that additional remedial measures are needed to eliminate possible future exposures to site contaminants in on-site soils and groundwater.

Comment #24

The discussion of remediation of soil contaminants needs to include explicit language about measures to preclude additional off-site contaminant migration during and after remedial activities.

Response #24

Consistent with the ATSDR guidelines, recommendations are given, when appropriate, to reduce exposures but not the specific actions and measures that should be implemented.