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Environmental Protection
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September 1990

EPA

Superfund Record of Decision:

Solvent Savers, NY

50272-101

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Solvent Savers, NY
First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 13-acre Solvent Savers site is a former chemical waste recovery facility in Lincklaen, Chenango County, New York. The site is bordered by Mud Creek to the east and by an intermittent stream to the north. Between 1967 and 1974, a variety of wastes including solids, liquids, and sludges from a distillation process used to recover solvents were disposed of at the facility. Concurrently, a drum reconditioning process was also operated onsite. EPA and State investigations conducted from 1981 to 1982 revealed metals, VOCs, and other organic compounds including PCBs in onsite soil, and metals and VOCs in the ground water. The site has been separated into five principal source areas, which contain a total of 59,000 cubic yards of contaminated soil, 300 buried and 100 surficial drums, and 578,000,000 gallons of contaminated ground water. In 1989, EPA required seven Potentially Responsible Parties (PRPs) to conduct an extensive removal action, which included removing and/or treating all drums and the associated contaminated soil. To the extent that the work is not completed by the PRPs in a timely fashion or to the extent that any soil contamination will remain on site following completion of that work, the remedial action documented in this ROD will be implemented. The primary contaminants of concern affecting the soil, debris, and

(See Attached Page)

17. Document Analysis a. Descriptors
Record of Decision - Solvent Savers, NY
First Remedial Action - Final
Contaminated Media: soil, debris, gw
Key Contaminants: VOCs (PCE, TCE), other organics (PAHs, PCBs, phenols), metals (arsenic, chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 267
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EPA/ROD/R02-90/111
Solvent Savers, NY
First Remedial Action - Final

Abstract (Continued)

ground water are VOCs including PCE and TCE; other organics including carcinogenic and noncarcinogenic PAHs, PCBs, and phenol; and metals including arsenic, chromium, and lead.

The selected remedial action for this site includes excavating 300 buried drums, followed by treating and disposing of the drums and associated wastes at an offsite RCRA facility; excavating 59,000 cubic yards of contaminated soil from two highly contaminated source areas, followed by treating soil highly contaminated with VOCs onsite using low temperature thermal extraction; treating approximately 1,000 cubic yards of the excavated PCB-contaminated soil using the same thermal process or by incinerating the soil offsite, based on the results of a treatability study; treating soil contaminated with low levels of VOCs using soil flushing and/or vapor extraction processes, based on the results of a treatability study; treating any organic vapors from the soil treatment using an as yet undetermined air pollution control system; backfilling excavated areas with treatment residuals and clean fill; ground water pumping and treatment onsite using chemical precipitation, air stripping, and carbon adsorption, followed by reinjection and/or discharge to surface water; disposing of ground water treatment residuals offsite; and monitoring air and ground water. The estimated present worth cost for this remedial action is $29,350,000, which includes an estimated annual O&M cost of $523,000 for 20 years.

PERFORMANCE STANDARDS OR GOALS: Initial soil cleanup levels are based on an average of model-derived cleanup levels to prevent further contamination of ground water, and include PCE 2.2 mg/kg, TCE 0.8 mg/kg, toluene 1.5 mg/kg and xylenes 3.1 mg/kg. PCB-contaminated soil will be treated to attain the level of 1 mg/kg (TSCA PCB policy). Chemical-specific goals for ground water are based primarily on the more stringent of SDWA MCLs or State standards. Cleanup goals for over 50 contaminants are provided in the ROD, including PCE 5 ug/l (CLP Quantitation Limit), TCE 5 ug/l (MCL), arsenic 25 ug/l (State), noncarcinogenic PAHs 32,340 ug/l (health-based), and phenols 48,500 ug/l (health-based).

RECORD OF DECISION
SOLVENT SAVERS SITE
TOWN OF LINCKLAEN
CHENANGO COUNTY, NEW YORK

PREPARED BY THE
U.S. ENVIRONMENTAL PROTECTION AGENCY
SEPTEMBER 1990

ROD FACT SHEET

SITE

Name:	Solvent Savers
Location:	Town of Lincklaen Chenango County, New York
HRS Score:	35.57-34.47
NPL Rank:	582/849

ROD

Date Signed:	9/28/90	
Remedy:	Source control component:	Low Temperature Thermal Extraction
	Groundwater Component:	Chemical Precipitation/ Air Stripping/Carbon Adsorption
Capital Cost:	$21,271,000	
O & M/Year:	$523,000	
Present Worth Cost:	$29,350,000	

LEAD

EPA Remedial

Primary contact:	Lisa K. Wong (212) 264-9348
Secondary contact:	Elena T. Kissel (212) 264-4877
Main PRPs:	General Electric Company Bristol Laboratories, Inc. International Business Machine Corporation Pass and Seymour, Inc. American Locker Group, Inc. UNISYS Corporation Stauffer Chemical Company U.S. Department of Air Force Allied Corporation Solvents & Petroleum Services, Inc. Carrier Corporation Champion International Corporation (formerly St. Regis Corp.)

WASTE

Type:	Organics, PCBs, metals
Medium:	Soil, groundwater
Origin:	Drums, solids, liquids, and sludges disposed of on-site
Estimated quantity:	Contaminated soil: 59,000 cubic yards Contaminated groundwater: 578,000,000 gallons (flowrate: 55 gpm duration: 20 years)

Declaration for the Record of Decision

Site Name and Location

Solvent Savers Site
Town of Lincklaen, Chenango County, New York

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Solvent Savers site (the "Site"), located in the Town of Lincklaen, Chenango County, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA") and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"). This decision document explains the factual and legal basis for selecting the remedy for the Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. The information supporting this remedial action decision is contained in the administrative record for the Site. The administrative record index is attached.

Assessment of the Site

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this Record of Decision ("ROD"), may present an imminent and substantial threat to public health, welfare, or the environment.

Description of the Selected Remedy

The selected remedy will address the buried drums and soil contamination at the Site (to the extent that the work required under the September 1989 Administrative Order Index No. II CERCLA-90227 is not completed by the Respondents in a timely fashion or to the extent that any soil contamination will remain at the Site following the completion of that work) and contaminated groundwater in the underlying aquifer. This action addresses the principal threats remaining at the Site by removing the buried drums for off-site treatment and disposal, by excavating and treating the most highly contaminated soil and waste materials both on-site and off-site, and by treating the groundwater at the Site. The excavated drums and treatment residuals will be treated and disposed of off-site, and the soil contaminated with polychlorinated biphenyls ("PCBs") will be treated on-site or treated and disposed of off-site (to be determined during the remedial design phase based on treatability study results). The soils that will be treated and redeposited on-site will contain contaminants well below health-based levels. Hence the Site will not require any long-term management, except that treatment of the groundwater will require

a comprehensive management and maintenance program to ensure the effectiveness of the treatment and reinjection and/or discharge system throughout the estimated treatment period of 20 years.

The major components of the selected remedy include the following:

- Excavation and removal of an estimated 300 buried drums for off-site treatment and disposal at an approved Resource Conservation and Recovery Act ("RCRA") hazardous waste facility;

- Excavation of approximately 59,000 cubic yards of contaminated soil (including 1,000 cubic yards of PCB-contaminated soil);

- On-site treatment, using low temperature thermal extraction, of the soil highly contaminated with volatile organic compounds ("VOCs");

- Backfilling of the excavated areas with the treated soil and approximately 1,000 cubic yards of clean fill (if removal of the PCB-contaminated soil for off-site incineration is deemed necessary);

- Performance of treatability studies during the remedial design to determine whether the low temperature thermal extraction process is an appropriate treatment method for the PCB-contaminated soil. If the treatability study results indicate that low temperature thermal extraction is an appropriate treatment method, then this technology will be utilized to treat the excavated soil contaminated with PCBs on-site. Should the findings of the treatability studies indicate that the on-site low temperature thermal extraction process will not provide the desired degree of treatment, then the excavated PCB-contaminated soil will be removed for off-site incineration;

- Performance of treatability studies during the remedial design to determine whether the soil flushing and/or vapor extraction processes are appropriate treatment methods for the excavated soil contaminated with low level VOCs. If the treatability study results indicate that one or both of these technologies are appropriate treatment methods, then one or both of these technologies will be utilized to treat the excavated soil contaminated with low level VOCs. Should the findings of the treatability studies indicate that these on-site treatment processes will not provide the desired degree of treatment, then the contaminated soil will be treated on-site using low temperature thermal extraction.

- Extraction and on-site treatment, using chemical precipitation, air stripping and carbon adsorption, of the contaminated groundwater in the underlying aquifer;

- Reinjection of the treated water into the ground, and/or discharge of the treated water to surface water; and

- Disposal of the treatment residuals at an off-site approved RCRA hazardous waste facility.

Declaration of Statutory Determinations

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will not result in hazardous substances remaining on-site above health-based levels, the five-year review will not apply to this action.

Regional Administrator

9/28/90
Date

DECISION SUMMARY

SOLVENT SAVERS SITE
TOWN OF LINCKLAEN
CHENANGO COUNTY, NEW YORK

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

NEW YORK

TABLE OF CONTENTS

ATTACHMENTS

SITE NAME, LOCATION, AND DESCRIPTION

The Solvent Savers site (the "Site") covers about 13 acres in a rural, sparsely populated area, and is located in the Town of Lincklaen, Chenango County, New York (See Figure 1). The Site is approximately 30 miles south of Syracuse, New York, and 40 miles north of Binghamton, New York.

The Site is bounded by Union Valley Road to the west, Mud Creek to the east, an unnamed intermittent stream to the north, and shrubs and trees to the south (see Figure 2). Mud Creek is classified as a trout stream by the New York State Department of Environmental Conservation ("NYSDEC") and is used for recreational activities and livestock watering.

Two residential homes, which utilize private wells as the source of drinking water, are located near the Site. The Springer residence is located about 300 feet north of the Site, and the Parkin residence is located about 200 feet to the west of the Site.

Two buildings are presently standing on-site (See Figure 2). A vacant house owned by Mr. Robert Lindsey is located near the center of the Site. An abandoned process building is located near the northwest corner of the property. Two small sheds, which were erected during the potentially responsible parties' ("PRPs") remedial investigation and feasibility study ("RI/FS") work for the storage of the drums containing drill cuttings and well development water, are located along the northeast boundary of the property. A well house that existed along the driveway entrance to the Lindsey house is now an open sunken basement. A second well house located along the cliff near Mud Creek at the northeast corner of the Site is presently a covered sunken basement filled with stone. A concrete pad is situated next to the former Solvent Savers process building. This pad was the foundation for a second process building, which was dismantled in 1988. On the north side of this pad is a hatchway that leads down into a cellar-like area. Figure 2 depicts the locations of the existing buildings and structures on-site.

The Town of Lincklaen is located in the northwestern section of Chenango County, New York. According to the 1980 census, 473 people reside in the Town of Lincklaen. This portion of Chenango County is used primarily for dairy farming. There are presently 15 dairy farms in the Town of Lincklaen. Dairy cattle pastures are located less than two miles from the Site, and these pastures adjoin Mud Creek, downstream of the Site. In addition to the dairy farms in the area, there is also farming of alfalfa, corn and other crops on a small scale.

The Solvent Savers Site is situated in a physiographic region known as the Glaciated Allegheny Plateau. This physiographic region consists of a series of elongated, broad, undulating hills separated by narrow floodplains. The elevation in the valley in which the Site is located ranges from 1150 to 1900 feet above mean

sea level ("MSL"). The valley is approximately 1500 feet wide at the Site location. The Site is situated on a kame terrace approximately 40 feet above the valley floor. The southern half of the terrace is generally flat with a slight grade to the east. The northern half has been partially excavated and graded. This area slopes to the north and northwest and to the intermittent stream that flows along the northern perimeter of the Site. The western portion of the Site ascends to a steep sloping hillside, that rises 750 feet above the valley floor to an elevation of 1920 feet at its apex. The eastern portion of the Site plunges 40 feet nearly straight down to the valley floor. The valley floor is generally flat and is drained by the meandering Mud Creek.

SITE HISTORY

Solvent Savers, Inc. was a chemical waste recovery facility operated by Mr. Dale Hough between approximately 1967 and 1974. Waste industrial solvents were hauled from clients in the Syracuse and Binghamton areas to the facility. A distillation process was used to recover solvents for reuse. It is suspected that a wide variety of wastes from the distillation process, including liquids, solids, and sludges, were disposed of on the Site. In addition, Mr. Hough owned and operated a drum reconditioning business (Cash Barrel, Inc.) at the same location, which reconditioned and sold many of the drums brought to the Site containing waste solvents.

Solvent Savers, Inc. ceased operations in 1974. In October 1978, Mr. Robert Lindsey purchased the property and regraded it, moving some exposed drums and a large tank, and covering them with soil. He also removed some exposed drums from the Site.

In 1981, NYSDEC conducted an initial site characterization, which included sampling of the on-site surface soils, water in Mud Creek, and groundwater from three private wells in the immediate vicinity of the Site. Sample analyses indicated the presence of contaminants that included volatile organics (primarily trichloroethylene and 1,1,1-trichloroethane), polychlorinated biphenyls ("PCBs"), and various inorganic substances (arsenic, cyanide, cadmium, and lead).

In 1982, the EPA Field Investigation Team ("FIT") performed a hazardous waste site inspection at the Site. During the FIT investigation, metals and organic compounds were detected in the surface soils, and organic chemicals were detected in the groundwater beneath the Site and in the surface water in Mud Creek. As a result of the FIT investigation, the Site was listed on the National Priorities List of uncontrolled hazardous waste sites in 1983.

EPA and NYSDEC identified a number of potentially responsible parties ("PRPs") that had arranged for the disposal of wastes at the Site. The State of New York initiated negotiations with the PRPs to begin the site cleanup.

In 1984, a consent agreement between the PRPs and the New York State Department of Law ("NYSDOL") was signed, requiring the PRPs to perform a remedial investigation and feasibility study ("RI/FS") at the Site. In August 1985, a consultant for the PRPs prepared an RI/FS report that recommended the following:

i) Excavate the buried drums for treatment and/or disposal off-site;

ii) Cover portions of the Site with a less permeable soil cover and revegetate;

iii) Restrict future use of contaminated groundwater using institutional controls; and

iv) Allow natural flushing to reduce the levels of contaminants in the groundwater to acceptable levels. (The estimated time to naturally flush the contaminants from the soil was 85 years.)

On the basis of a review of the PRPs' RI/FS report, it was determined that additional RI/FS work was necessary to obtain the data and information needed to characterize the nature and extent of contamination at the Site, and to formulate the optimum cleanup strategy.

In 1988, notification was sent by the EPA to the PRPs, stating EPA's intent to perform a supplemental RI/FS, and offering the PRPs an opportunity to conduct the supplemental RI/FS. The failure of the PRPs to agree to undertake the supplemental RI/FS in an acceptable manner prompted EPA to initiate a supplemental RI/FS independently.

ICF Technology, Inc. ("ICF"), EPA's consultant, commenced field investigations under the supplemental RI/FS in November 1988. Field work was completed in May 1990. The field investigations included surface and subsurface soil sampling, a magnetometer survey, test pit excavations, soil gas sampling, monitoring well installations, depth-to-water measurements, surface water, sediment, groundwater, and air sampling, a pump test, a study of the biota in Mud Creek, a delineation of the wetlands and flood-plains, and cultural and biological resources studies.

During the performance of the field work associated with the supplemental RI, over 100 drums were excavated and overpacked by ICF. An estimated 300 drums remain buried.

Results of the supplemental RI identified five source areas (See Figure 3). Samples collected from surface and subsurface soils in these areas show that the soils are contaminated with volatile organic compounds ("VOCs"), extractable organic compounds, metals,

and PCBs. While contaminated soils have been detected in all five source areas, based upon the preliminary results of a fate and transport model implemented by EPA to determine target soil clean-up levels, it appears that only Areas 2 and 4 will require remediation. During the remedial design, the model will be calibrated and tested using current and additional sampling data, as necessary, to more precisely define the soil cleanup levels and the areal extent of the areas requiring remediation. Should the data collected during the remedial design indicate that Areas 1, 3 and/or 5 also require remediation, the contaminated soil from these areas will also be treated to achieve the target cleanup levels.

Area 1 (about 250 square feet (ft^2))was previously used as a drum storage area. Volatile and extractable organic contaminants were found at a depth of about 12 feet. Chromium and lead were found in surface soils.

Area 2 (about 7,500 ft^2) was previously used as a discharge area for spent solvents and wastewaters and as a drum disposal area. Area 2 has the highest levels of surface and subsurface soil contamination on-site. The primary contaminants detected were tetrachloroethene ("PCE"), trichloroethene ("TCE"), and 1, 1, 1-trichloroethane. In addition, a PCB hot-spot was detected in this area. Barium was detected above the background level.

Area 3 (about 250 ft^2) was the location of an excavation that was backfilled with a 500-gallon tank, a drum, and miscellaneous debris. VOC contamination was detected in this area.

Area 4 (about 11,250 ft^2) is located in the central portion of the Site and includes a large drum burial area. VOC contamination was found consistently in all borings down to the water table (approximately 40 feet). TCE was the chemical found most frequently. Low levels of PAHs and phthalates were detected. PCB contamination was detected in surface soils in this area. The highest level of surface PCB contamination detected was 18,600 ppm.

Area 5 (about 250 ft^2) is located near the former Lindsey residence. VOC contamination was detected at depths down to 32 feet. TCE was the chemical detected most frequently in this area. Barium was detected above the background level.

Groundwater samples collected on-site and downgradient show the presence of contamination by VOCs and metals. The VOC contamination is primarily TCE, PCE, and degradation products of these compounds. The metals include lead, chromium, arsenic, beryllium, and cadmium.

As part of the supplemental RI, EPA, in cooperation with the U.S. Fish and Wildlife Service, completed the field work for a bioassessment at the Site in May 1989. The objective of this study

was to determine whether contaminants from the Site are causing adverse ecological impacts to the fish and wildlife resources in the Mud Creek. , Samples of surface water, sediment, and fish tissues were collected, and analyses were performed for VOCs, PCBs, pesticides, base neutral/acid extractables (BNAs), metals and cyanide. No BNAs were detected in fish tissues. The levels of BNAs detected in surface water and sediment were below detection limits. No pesticides or PCBs were detected n surface water, sediment or fish samples. The levels of VOCs and metals detected in surface water, sediment, and fish tissues do not pose a significant threat to aquatic organisms. VOCs are rapidly biodegraded and exhibit a low potential for bioaccumulation. A number of lesions in fish tissues were found, but none can be attributed to the contamination at the site or are indicative of serious health problems.

ENFORCEMENT ACTIVITIES

Thirteen PRPs, who arranged for the treatment or disposal of hazardous substances which came to be disposed of at the Site, were identified by the EPA in connection with the Solvent Savers Site.

As discussed earlier, the PRPs entered into a consent agreement with the NYSDOL in 1984 and were obligated to conduct an RI/FS to determine the nature and extent of the contamination at the Site, and to evaluate the alternatives for final site remediation.

Following the submission of an inadequate RI/FS report by the PRPs' consultant in August 1985, EPA sent several notice letters to the PRPs, offering them the opportunity to agree to perform the required supplemental investigations at the Site. No PRP volunteered to undertake or finance such activities. An EPA action memorandum was approved on June 25, 1987, authorizing funding for the supplemental RI/FS work.

In September 1989, EPA determined that it was necessary to address the risks posed to the public and the environment due to the potential release and migration of the contaminants in the over 100 surficial drums and in the drums that remained buried on-site, and issued an Administrative Order to seven of the PRPs for which EPA has evidence that they brought drummed wastes to the Site, requiring them to undertake the following removal activities:

- Remove and properly dispose of the overpacked drums;
- Excavate, overpack, remove, and properly dispose of the buried drums;
- Implement a soil sampling program to define the nature and extent of contamination resulting from releases of hazardous constituents from the buried drums; and

- Excavate, treat and/or dispose of the contaminated soil associated with the drums.

In October 1989, the PRPs' consultant submitted to EPA a phase I removal action work plan, which detailed the tasks that would be involved in the removal and disposal of the overpacked drums. The PRPs' consultant sampled the contents of the drums and is currently in the process of obtaining disposal facility approvals for disposal of the overpacked drums. Removal of the overpacked drums containing hazardous substances is anticipated to be completed by the fall of 1990. A phase II removal action work plan, which outlines the activities to be implemented to address the drums that remain buried and the contaminated soils at the Site, has undergone EPA review and is being finalized by the PRPs.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI/FS report and the Proposed Plan for the Solvent Savers Site were released to the public for comment on July 23, 1990. These two documents were made available to the public in both the administrative record and an information repository maintained at the EPA Docket Room in Region II, New York, at the Pond Store in DeRuyter, New York, and at NYSDEC's offices in Albany, New York. A public comment period on these documents was held from July 23, 1990 through September 7, 1990. In addition, a public meeting was held at the Town of Lincklaen Town Hall on August 13, 1990. At this meeting, representatives from the EPA and NYSDEC answered questions about problems at the Site and the remedial alternatives under consideration. Responses to the comments received during the public comment period are included in the Responsiveness Summary, which is appended to this ROD.

SCOPE AND ROLE OF RESPONSE ACTION

The purpose of this response is to prevent current or future exposure to the contaminated soil, to ensure protection of the groundwater, air, and surface water from the continued release of contaminants from the soil and buried drums (to the extent that the work is not completed by the Respondents in a timely fashion or to the extent that any soil contamination will remain at the Site following the completion of that work), to ensure protection of human health and the environment from the migration of contaminants in the groundwater, and to restore the groundwater to levels consistent with the state and federal water quality standards. This remedial action will be the final response action for the Site.

To the extent that any of the drums or soil removal and treatment called for by this ROD is not or will not be completed by the Respondenets pursuant to the September 1989 Administrative Order, the said work will be carried out together with the other remedial measures called for by this ROD.

SUMMARY OF SITE CHARACTERISTICS

Industrial solvents and other wastes were brought to Solvent Savers, Inc., a chemical waste recovery facility for reprocessing or disposal. Operations included distillation to recover solvents for reuse, drum reconditioning, and burial of liquids, solids, sludges, and drums on-site. The quantities and types of wastes disposed of at the Site and their locations are not fully known.

The primary contaminants of concern are associated with the past distillation and drum reconditioning processes and waste handling practices at the Site. Consequently, the operations and waste disposal activities conducted by Solvent Savers, Inc. are believed to be the source of contamination of the soil and groundwater at the Site.

Soil Investigation

Based on the results of the magnetometer survey and test pit excavations, drums were found buried in four areas (Areas 1, 2, 3, and 4). An estimated 300 drums remain buried at the Site (See Figure 4).

The information gathered during the supplemental RI has identified five areas of soil contamination (See Figure 3). The nature and extent of surface soil contamination is directly attributed to the operations and waste handling practices utilized at the Site.

Surface and subsurface soil samples were collected, and analyses were performed for VOCs, extractable organic compounds, PCBs, and inorganic compounds. These sampling locations are shown on Figures 5 to 7. Summaries of analytical results are presented in Table 4 for surface soil samples, and in Tables 5 and 6 for subsurface soil samples.

Soils at the Site are contaminated with VOCs, extractable organic compounds, metals, and PCBs. The extent of VOC contamination is widespread and is concentrated in the five areas. Metals contamination is less widespread (most contamination is near background levels), occurring in areas where VOC contamination also exists. The PCB contamination is limited to two hot spots at the Site (See Figure 6).

Halogenated hydrocarbon compounds such as trichloroethene, tetrachloroethene, and 1,1,1-tricholoroethane were the most frequently detected VOCs, and were found at the highest levels in surface soil samples. Tetrachloroethene, trichloroethene, and toluene are used as industrial solvents. 1,1,1-trichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, and 1,1-dichloroethane are compounds that may have been present in solvents dumped at the Site or formed through natural degradation processes of tetrachloroethene and trichloroethene.

Extractable organics detected in surface soil samples included phthalate esters and polynuclear aromatic hydrocarbons (background levels are presented in Table 3.) Most samples had concentration levels near the detection limit. Benzoic acid, benzo(b)fluoroanthene, benzo(k) fluoroanthene, and bis(2-ethyl-hexyl) phthalate were the compounds detected most frequently.

Four separate aroclors of PCBs (1242, 1248, 1254, and 1260) were identified in surface soil samples. PCBs were found above 10 mg/kg at six locations in the two PCB hot spots which are areas of stressed vegetation (See Figure 6).

Most inorganics found in surface soil samples are within the normal background range for the area where the Site is located (See Table 2). Surface soil samples in Area 1 indicated the presence of chromium and lead above background levels.

High levels of PCE and TCE were detected in subsurface soil samples collected from Areas 2 and 4. These contaminants were also found at lower concentrations in subsurface soil samples from Areas 1, 3, and 5. High levels of 1,1,1-trichloroethane were detected in the subsurface of Area 2. Bromoform was found in subsurface soils in Areas 2 and 3.

Extractable organic contamination is not widespread in subsurface soils. Pentachlorophenol was detected in subsurface soil in Area 1. PCBs, isomers of chlorinated dibenzo dioxin (PCDD, HxCDD, HPCDD, and OCDD), 1, 2, 4-trichlorobenzene, various phthalate esters and polynuclear aromatic hydrocarbon compounds (anthracene, pyrene, napthalene, 2-methylnapthalene, and phenanthrene) were found in subsurface soil in Area 2. Bis(2-ethylhexyl) phthalate was detected in subsurface soil in Area 3. Phthalate esters, polynuclear aromatic hydrocarbons, PCBs, and isomers of chlorinated benzene were found in subsurface soil in Area 4.

Most inorganics found in subsurface soil samples are within the normal background range for the area where the Site is located (See Table 2). Barium was detected in Areas 2 and 5, and cadmium was detected in Area 4 above background levels.

Groundwater Investigation

The groundwater investigation included installation of monitoring wells and groundwater sampling. The monitoring well locations are shown on Figure 8. Table 12 provides data for the depth of each installed well and the total depth of the well boring at each location. Groundwater samples collected from the 34 monitoring wells and the three residential wells were analyzed for VOCs, extractable organic compounds, and PCBs. Summaries of analytical results are presented in Tables 7 and 8.

The findings of the investigation revealed the presence of VOCs and metals in the groundwater samples collected on-site and downgradient of the Site. The VOC contamination is primarily TCE, PCE, and other related organic compounds that could be degradation products of TCE and PCE. Inorganic contaminants of primary concern found in the groundwater include arsenic, cadmium, lead, beryllium, and chromium. Beryllium and chromium are typical chemicals found in waste sludges or spent solvents from metal finishing or electroplating operations. Soluble lead-containing compounds are used in dyes and varnishes, and electroplating processes.

The buried drums and contaminated soil on-site have contributed to the contamination of the groundwater underlying and downgradient. Table 33 provides a comparison of the maximum and geometric mean contaminant concentrations detected to the groundwater action levels.

Surface Water and Sediment Investigation

Surface water and sediment samples were collected from the intermittent stream and Mud Creek, and analyzed for VOCs, extractable organics, PCBs, and metals. The sampling locations are shown on Figure 9.

Summaries of analytical results are presented in Tables 9 and 10. No PCBs were detected in any surface or sediment samples. Only one sample had detected extractable organic compounds. VOCs were found in surface water and sediment samples. As discussed earlier, these organic compounds exhibit a low potential for bioaccumulation, and hence pose no significant threat to fish and wildlife resources.

SUMMARY OF SITE RISKS

A baseline public health evaluation was performed as part of the supplemental RI to define the carcinogenic risks and noncarcinogenic chronic lifetime effects associated with the Solvent Savers Site, assuming that no remedial action occurs. The risk assessment was based on an analysis of the impact of 63 organic and 24 inorganic contaminants identified as chemicals of potential concern (See Table 11) that are present at the Site.

Potential human health risks were evaluated for the following exposure pathways:

- Current exposure of neighboring children and teenagers to surface soil contaminants through direct contact, with subsequent incidental ingestion and dermal absorption during play activities;

- Current exposure of nearby residents to groundwater contaminants through ingestion of drinking water from residential wells;

- Current exposure of neighboring children and teenagers to sediment and surface water contaminants in Mud Creek and the intermittent stream through direct contact, with subsequent incidental ingestion and/or dermal absorption during play activities;

- Current exposure of nearby residents to site contaminants through inhalation of vapors;

- Future exposure of on-site residents to surface soil contaminants through direct contact, with subsequent incidental ingestion and dermal absorption;

- Future exposure of on-site residents to subsurface soil contaminants through direct contact, with subsequent incidental ingestion and dermal absorption during play activities;

- Future exposure of on-site residents to groundwater contaminants through ingestion of drinking water from on-site wells; and

- Future exposure of nearby residents to site contaminants through inhalation of vapors.

For each of the potential exposure pathways identified above, potential risks to human health were estimated. Exposure scenarios were developed for each pathway to represent a reasonable maximum exposure ("RME") case. Quantitative risk estimates were developed by calculating intakes for the potentially exposed populations based on the assumed exposure scenarios and then combining these intakes with reference doses("RfDs") for noncarcinogens or cancer slope factors for carcinogens.

EXPOSURE ASSESSMENT

To determine potential exposures associated with each pathway, the chronic daily intake ("CDI") of each chemical associated with that pathway was estimated. A CDI was averaged over a lifetime for carcinogens and over the exposure period for noncarcinogens.

For each exposure pathway, a RME case was considered. Under this scenario, the 95th upper confidence limit on the arithmetic mean value for exposure concentration was combined with reasonable maximum values describing the extent, frequency, and duration of exposure to estimate the CDI. In a case where the 95th upper confidence limit on the arithmetic mean exceeded the maximum detected value, the maximum concentration was used.

Current Land Use Scenarios

I. Direct Contact with Surface Soils by Children

Children playing on the Site may directly contact contaminated surface soils with subsequent incidental ingestion and dermal absorption of chemicals. Assumptions made in determining CDIs for this scenario under RME conditions are presented in Table 13.

II. Ingestion of Water from Residential Wells by Residents

Assumptions used to evaluate exposure to contaminants in groundwater through ingestion are summarized in Table 14.

III. Direct Contact with Sediments/Surface Water by Children and Teenagers

Children and teenagers who play on or pass through the Site may come into contact with sediments and surface water by wading, riding their bicycles through, or playing in and around the intermittent stream and/or Mud Creek. The exposure parameters used to evaluate this pathway are shown in Tables 15 and 16. The same assumptions used to evaluate direct soil contact were used with two exceptions: the area of exposed skin was taken to be the hands, arms, legs, and feet, and the frequency of exposure for wading in the water was assumed to be lower for playing in and around the stream (four times per week from May through September) than for playing in soils on the ground.

IV. On-Site Inhalation by Children

Children playing on the Site may be exposed to airborne contaminants via inhalation. Most of the assumptions (i.e., exposure frequency and duration, and body weight) made in determining CDIs for this scenario are the same as those made for the direct contact with surface soils by children, which are presented in Table 13. Two additional assumptions regarding exposure time and inhalation rate were made for this scenario. An average duration of exposure of 8 hrs/day was considered a RME condition. A reasonable worst-case inhalation rate of 3.7 m^3/hr was calculated using the inhalation rate of a 10-year-old child (average age) spending 50 percent of the time at a heavy activity level and 50 percent of the time at a moderate activity level.

Future Land Use Scenarios

I. Direct Contact with Surface and Subsurface Soils by Residents

The Site is located in a primarily residential/agricultural area. Consequently, possible future uses of the Site include site development for residential purposes and/or agricultural uses. Residents could potentially be exposed to contaminants present in

surface and subsurface soil through dermal absorption and incidental ingestion resulting from activities such as gardening or playing. It was assumed that subsurface soils (up to 10 ft) might be redistributed to the surface during grading or other soil disturbing activities.

Table 17 summarizes the exposure parameter values used to evaluate these two pathways for both surface and subsurface soil.

II. Ingestion of Water from On-Site Wells by Residents

The assumptions used in evaluating future exposure to contaminants in groundwater through ingestion are the same as those employed under current land use conditions, which are presented in Table 14.

III. On-Site Inhalation by Residents

The assumptions used to evaluate exposure of on-site residents to contaminants through inhalation are presented in Table 18.

RISK CHARACTERIZATION

The health effects criteria (cancer slope factors and RfDs) for the chemicals of potential concern at the Solvent Savers Site are presented in Tables 19 and 20 for oral and inhalation exposures, respectively.

Cancer slope factors, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks[1] associated with exposure to potentially carcinogenic chemicals. The cancer slope factors are multiplied by the estimated intakes of potential carcinogens(mg/kg-day) to provide upper-bound estimates of the excess lifetime cancer risks associated with exposures at those intake levels. The term "upper bound" reflects the conservative estimate of the risk calculated from the cancer slope factor. Use of this approach makes underestimation of the actual cancer risk unlikely. Cancer slope factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied.

[1]Excess lifetime cancer risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a maximum upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

RfDs have been developed by EPA for evaluation of the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfD will not underestimate the potential for adverse noncarcinogenic effects to occur.

Estimated CDIs are used to determine the potential health risks associated with exposures to carcinogens and the potential for adverse noncarcinogenic health effects. For potential carcinogens, excess lifetime cancer risks are obtained by multiplying the CDIs of the contaminants under consideration by their respective cancer slope factors.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient ("HQ") (i.e., the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's RfD). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI)[2] can be generated. The HI provides a useful reference point for guaging the potential significance of multiple contaminant exposures within a single medium or across media.

The context within which to judge the relative risk from each of the pathways has been established by EPA. For carcinogens, the target risk range is a 10^{-6} to 10^{-4} excess lifetime cancer risk. For noncarcinogens, where the sum of the expected intake/RfD ratios (HQs), i.e. HI, exceeds unity, observed concentrations pose unacceptable risks of exposure.

The results of the risk characterization for each pathway of exposure evaluated are summarized below:

[2] For noncarcinogens, a hazard index greater than one indicates that adverse noncarcinogenic effects could occur, while a value below one indicates that such effects are unlikely to occur.

Current Land Use Scenarios

I. Direct Contact with Surface Soil by Children

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with this exposure pathway are presented in Table 21. The estimated total excess lifetime cancer risk ($4x10^{-2}$) exceeds EPA's target cancer risk range, due to the presence of PCBs in the soil. The cancer risk for PCBs is at least 4 orders of magnitude higher than the cancer risks for the other chemicals of potential concern. The HI value for noncarcinogenic effects ($4x10^{2}$) also exceeds the threshold level of one for this pathway, due to the presence of PCBs. No other contaminant poses a health threat via this exposure pathway.

II. Ingestion of Water from Residential Wells by Residents

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with this exposure pathway are presented in Table 22. The Lindsey, Springer, and Parkin residential wells were considered separately. The estimated total excess lifetime cancer risk for the Lindsey well (presently not in use) is $1x10^{-5}$, due to the presence of 1,1-dichloroethane, choromethane, and chloroform. The estimated total excess lifetime cancer risk for users of the Parkin well is $8x10^{-6}$, due primarily to the presence of trichoroethene. No chemicals of potential concern exhibiting carcinogenic effects were detected in the Springer well. Hence, the excess lifetime cancer risks for this pathway are well whithin EPA's target risk range. The HI values are less than one for users of both the Lindsey and Parkin wells. No chemicals of potential concern exhibiting noncarcinogenic effects were detected in the Springer well.

III. Direct Contact with Sediment/Surface Water by Children and Teenagers

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with these two exposure pathways are presented in Tables 23 and 24. The estimated total excess lifetime cancer risk for direct contact exposure of children to contaminants in the surface water of Mud Creek is $9x10^{-9}$. No chemicals of potential concern exhibiting carcinogenic effects were detected in the intermittent stream surface water. The HI values are less than one for exposures to the surface water in Mud Creek and the intermittent stream.

The estimated total excess lifetime cancer risk for direct contact exposure of children to contaminants in the sediments of Mud Creek is $1x10^{-5}$, primarily due to the presence of N-nitroso-di-n-propylamine, carcinogenic PAHs, and arsenic. The HI values are less than one for sediments in both Mud Creek and the intermittent stream.

IV. On-Site Inhalation by Children

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with this exposure pathway are presented in Table 25. The estimated total excess lifetime cancer risk for the inhalation of on-site air by children is $4x10^{-6}$, due to the presence of trichloroethene. The estimated HI is two orders of magnitude less than one.

Future Land Use Scenarios

I. Direct Contact with Surface and Subsurface Soils by Residents

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with these two exposure pathways are presented in Tables 26 and 27.

The estimated total excess lifetime cancer risk for direct contact exposure of on-site residents to contaminants in surface soil ($6x10^{-2}$) exceeds EPA's target cancer risk range, due to the presence of PCBs at high concentrations. The HI value for noncarcinogenic effects ($2x10^{2}$) also exceeds the threshold level of one for this pathway, due to the presence of PCBs in the surface soil. No other contaminant poses a health threat via this exposure pathway.

The estimated total excess lifetime cancer risk for direct contact exposure of on-site residents to contaminants in subsurface soil is $2x10^{-2}$, due to the presence of PCBs. The HI value for noncarcinogenic effects ($6x10^{1}$) also exceeds unity, due to the presence of PCBs. No other contaminant poses a health threat via this exposure pathway.

II. Ingestion of On-Site Groundwater

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with this exposure pathway are presented in Table 28.

The estimated total excess lifetime cancer risk for ingestion of groundwater by on-site residents is $3x10^{-3}$, primarily due to the presence of trichloroethene and related chlorinated aliphatics, and PCBs.

The HI value (7) is greater than one, due to PCBs and the combined effects of various organic solvents and arsenic.

III. On-Site Inhalation by Residents

The estimated excess upper-bound lifetime cancer risks and the noncarcinogenic HQs associated with this exposure pathway are presented in Table 29. The estimated total excess lifetime cancer risk is $2x10^{-5}$, due to the presence of trichloroethene. The

estimated HI is $5x10^{-3}$, which is below the target criterion of one.

CLEANUP LEVELS FOR CONTAMINATED MEDIA

Groundwater

The groundwater at the Solvent Savers Site is classified by NYSDEC as class "GA", which indicates that the water is suitable as a drinking water supply. The RI has determined that contaminants from the Site have contaminated the on-site groundwater. The remedial response objectives, therefore, include the following:

- -Protect human health and the environment from current and potential future migration of contaminants in groundwater; and

- -Restore on-site groundwater to levels consistent with federal and state groundwater standards.

Table 33 presents the chemical concentrations and action levels [applicable or relevant and appropriate requirements("ARARs")] for the contaminants of concern at the Site. Chemical concentrations are expressed as the geometric mean and maximum contaminant concentrations in the groundwater samples taken, which were applied in the risk assessment of the supplemental RI. A comparison of the concentration of the chemicals of concern detected in groundwater to the ARARs indicates that most VOCs exceed the regulatory standards.

The risk assessment, using EPA's acceptable risk range of 10^{-4} to 10^{-6}, does not conclusively indicate the need for remediation based upon ingestion of groundwater; however, the federal and state groundwater standards are considered health-based numbers and these are currently being contravened in the aquifer. Hence the more stringent of the ARARs (federal MCLs and New York State groundwater standards) shall be used as the cleanup objectives for the contaminants at the Site.

Soil

The risk asessment indicates that the presence and concentration of VOCs in the soils do not pose a significant threat to human health via inhalation and ingestion, i.e., the potential risks associated with the levels of VOCs are within EPA's acceptable risk range; however, soil-to-groundwater models have indicated the potential for VOCs in soil to contaminate the aquifer above potable water standards. In order to minimize the impact of the VOCs on the groundwater and enhance the groundwater treatment remedy, initial soil cleanup levels have been established for the VOCs based on preliminary modeling results.

While contaminated soils have been detected in all five source

areas, based upon the preliminary model results, it appears that only Areas 2 and 4 require remediation based upon the potential impact of the VOCs on the groundwater. Areas 1, 3 and 5, which contain lesser concentrations of VOCs below health-based levels, depending on the results of soil sampling and analysis to be conducted during the remedial design, may not require remediation. The vast majority of contaminated soil, amounting to approximately 59,000 cubic yards, is located in Areas 2 and 4.

The initial soil cleanup levels, which are based on an average of the model-derived cleanup levels for Areas 2 and 4, are as follows:

Tetrachloroethene	-	2.2 ppm
Trichloroethene	-	0.8 ppm
1,1,1-Trichloroethane	-	0.9 ppm
1,1,2-Trichloroethane	-	0.4 ppm
Toluene	-	1.5 ppm
1,2-Dichloroethene	-	0.8 ppm (Area 2 only)
Xylenes (total)	-	3.1 ppm (Area 2 only)

These levels represent average contaminant concentrations of indicator chemicals in the soil which will theoretically produce contaminant concentrations in the groundwater at the nearest receptor which meet potable water standards. The nearest potential receptor is considered to be Mud Creek.

For cost estimating purposes, the entire areal extent of Areas 2 and 4 down to the water table has been conservatively estimated to be in need of remediation. During the remedial design, further sampling will be conducted to better define the distribution of contamination in the five source areas. In addition, the model will be calibrated and tested during the remedial design using existing and additional sampling data, as necessary, to more precisely define the soil cleanup levels and the associated volume of contaminated soil requiring remediation. Should the data collected during the remedial design indicate that Areas 1, 3, and/or 5 require remediation, the contaminated soil from these source areas will also be treated meet all target cleanup levels.

The PCBs discovered on-site are regulated under TSCA (40 CFR 761) and RCRA (40 CFR 264 and 268). They are present in sufficient quantities to be of concern with respect to protection of human health according to the risk assessment. EPA's Office of Solid Waste and Emergency Response ("OSWER") issued a directive (No. 9355.4-01) on August 15, 1990 which is to serve as a guide for all remedial actions at Superfund sites with PCB contamination. It basically combines the elements of all applicable laws (including the Clean Water Act and Safe Drinking Water Act for groundwater cleanups) into one cohesive document which is the basis of EPA's PCB policy.

This directive recommends a 1 ppm action level as a starting point for PCB cleanups in residential areas, treatment of 100 ppm or greater PCB hot spots as principal threats, and containment of low threat PCB contamination in the 1-100 ppm range. Treatment may be warranted at sites involving relatively small volumes of cotamination or sensitive environments.

Since the Site is located on a rural agricultural area where residential homes are situated in proximity of the Site, and the amount of PCB-contaminated soil that poses potential human health threat to the public is small (about 1,000 cubic yards), treatment of the contaminated soil to attain the level of 1 ppm is appropriate for this Site.

DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan which was released for public comment on July 23, 1990, identified Alternative SC-5, Excavation /Low-Temperature Thermal Extraction/On-Site Redeposition, and Off-Site Incineration of the PCB-Contaminated Soils, as the preferred alternative. Two of the other alternatives, Alternative SC-4 and Alternative SC-7, which involve vapor extraction and soil flushing technologies respectively, were also presented in the Proposed Plan and the RI/FS report. The preference for Alternative SC-5 was primarily due to the potential of preferential flow in the vadose zone of the subsurface, which is complex and heterogeneous in nature, and thus may render Alternatives SC-4 and SC-7 inappropriate for successful removal of the contaminants in the soil. Based upon the comments received during the public comment period, a more cost-effective approach for site remediation was developed by EPA in consultation with NYSDEC. The remedy set forth in the ROD includes low temperature thermal extraction for the soils highly contaminated with VOCs. Treatability studies will be performed during the remedial design to determine whether the low temperature thermal extraction technology is appropriate for treatment of the PCB-contaminated soil on-site, and whether the soil flushing and/or vapor extraction processes are appropriate for on-site treatment of the excavated soil contaminated with low level VOCs. If the treatability study results indicate that low temperature thermal extraction is an appropriate treatment method, then this technology will be employed to treat the excavated soil contaminated with PCBs on-site. Should the findings of the treatability studies indicate that the on-site low temperature thermal extraction process would not provide the disired degree of treatment, then the PCB-contaminated soil excavated will be removed for off-site incineration/disposal. If the treatability study results indicate that the vapor extraction and/or soil flushing technologies are appropriate treatment methods, then one or both of these technologies will be utilized to treat the excavated soil contaminated with low level VOCs. Should the findings of the treatability studies indicate that vapor extraction and soil flushing would not provide the

desired degree of treatment for the excavated soils contaminated with low levels of VOCs, then the contaminated soil will be treated on-site using low temperature thermal extraction.

DESCRIPTION OF ALTERNATIVES

A total of thirteen alternatives were evaluated in detail for site remediation. Seven remedial alternatives address the contaminated soil that contributes to groundwater contamination, and six remedial alternatives address the groundwater contamination at the Solvent Savers Site. These alternatives are as follows:

SOIL ALTERNATIVES

Alternative SC-1: No Action

The Superfund program requires that the "no-action" alternative be considered at every site. Under this alternative, EPA would take no further action to control the source of contamination. However, long-term monitoring of the Site (for a minimum period of 30 years) would be necessary to monitor contaminant migration. Monitoring would consist of annual soil, sediment, and surface water sampling and analyses for a variety of contaminants.

Because this alternative would result in contaminants remaining on-site above levels that would allow for unlimited use and unrestricted exposure, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions might be implemented to remove or treat wastes.

The estimated total present worth cost for this alternative is $231,000.

Alternative SC-2: Limited Action

The Limited Action alternative would limit public exposure to the contamination at the Site, but would not treat or remove the contamination. This alternative would include the installation of a security fence and the posting of warning signs around the Site; annual soil and groundwater monitoring and site inspections; a public education program, institutional controls to limit site use and site access; and a review of site conditions every five years. If justified by the review, remedial actions might be implemented to remove or treat wastes.

The estimated total present worth cost for this alternative is $462,000.

Alternative SC-3: Site Capping

This alternative would include clearing the vegetation at the Site, grading and compacting the soil, and placing a 40-mil thick high

density polyethylene ("HDPE") liner and a compacted, 18-inch clay layer over the contaminated areas. Additionally, an 18-inch layer of topsoil would be placed on top of the clay, and vegetation would be planted to minimize the erosion of the topsoil. A fence would be constructed to surround the capped area, and land use restrictions would be implemented. This alternative would minimize the risks to the public of direct contact with the contaminated soil. Further, the HDPE liner and impermeable clay layer would limit rainfall infiltration into the subsurface, thereby limiting contaminant transport to the groundwater. The cap and fence would be inspected, and the soil and groundwater would be sampled, in a long-term monitoring program. Five-year reviews would be conducted to determine the effectiveness of the remedy.

The estimated total present worth cost for this alternative is $862,000. The estimated implementation time frame for this alternative is 6 months (after the start of construction).

Alternative SC-4: In-Situ Vapor Extraction

This alternative would employ in-situ vapor extraction to treat the contaminated soils.

Soil vapor extraction involves the collection of soil vapor from the unsaturated (vadose) zone by applying a vacuum at extraction points. The vacuum would draw vapor from the unsaturated zone, at the same time decreasing the pressure around the soil particles and releasing the VOCs. Because of the pressure difference, clean air from the atmosphere would enter the soil and replace the extracted air. The technology depends on factors such as soil permeability and depth to groundwater. Extraction wells, piping, and a positive displacement blower (vacuum pump) would be required to draw the vapor from the vadose zone. The collected air would be treated through an activated carbon unit. Spent carbon would be removed for off-site regeneration or treatment/disposal.

Under this alternative, approximately 1,000 cubic yards of PCB-contaminated soil would be excavated and removed from the Site for off-site incineration and disposal at an approved facility. Incineration of the contaminated soil at the off-site thermal treatment facility would be conducted in conformance with all applicable RCRA requirements, and this facility would be responsible for proper disposal of the treated soil. The buried drums would also be excavated and removed from the Site for off-site treatment/disposal at an approved RCRA hazardous waste facility. Clean fill would be used to backfill the excavated areas. On-site treatment was not considered due to the low volume of PCB-contaminated soil.

Under this alternative, long-term monitoring would not be required. The estimated total present worth cost for this alternative is $7,887,000. The estimated time frame for construction of this

alternative is 6 months. Target cleanup levels would be achieved within 12 months after operation of the system.

Alternative SC-5: Excavation/Low-Temperature Thermal Extraction/ On-Site Redeposition

This alternative involves the excavation and on-site treatment of approximately 59,000 cubic yards of contaminated soil by low-temperature thermal extraction. The excavated soil would be fed to a thermal treatment unit, where application of heat (e.g., injection of hot air) with mechanical agitation would raise the soil temperature above the boiling points of the organic contaminants and allow the moisture and the organic contaminants to be volatilized into gases and removed from the soil. The organic vapors extracted from the soil would then be treated in an air pollution control system to ensure that air emissions are within the federal and state regulatory requirements.

Several thermal treatment units (such as heated screw conveyors, rotary calcination devices, etc.) may be applicable. A variety of air pollution control options are also available, including afterburners, activated carbon adsorbers, and condensers. The specific performance requirements of the thermal treatment method and of the air pollution control system would be determined in the remedial design phase. The specific treatment systems would be determined through the competitive bidding process.

All the residuals from the treatment (such as spent carbon from the carbon adsorption units) would be sent to an off-site hazardous waste facility for treatment and disposal.

Following treatment, the soil would be tested in accordance with the Toxicity Characteristic Leaching Procedure ("TCLP") to determine whether it constitutes a RCRA hazardous waste. Provided that it passes the test, it would no longer contain contaminants above health-based levels, and would be used as backfill material for the excavated areas. Clean topsoil would be placed on the excavated areas, and the Site would be regraded and revegetated.

Under this alternative, approximately 1,000 cubic yards of PCB-contaminated soil would be excavated and removed from the Site for off-site incineration and disposal at an approved facility. Incineration of the contaminated soil at the off-site thermal treatment facility would be conducted in conformance with all applicable RCRA requirements, and this facility would be responsible for proper disposal of the treated soil. The buried drums would also be excavated and removed from the Site for off-site treatment/disposal at an approved RCRA hazardous waste facility. Clean fill would be used to backfill the excavated areas. On-site treatment was not considered due to the low volume of PCB-contaminated soil.

At the completion of the implementation of this alternative, the most mobile of the organic contaminants in the soil would be reduced to concentrations that would result in groundwater levels below the federal and state standards at the receptor nearest to the Site when leached to the groundwater through rainwater infiltration.

Under this alternative, long-term monitoring would not be required. The estimated total present worth cost for this alternative is $19,416,000. The estimated time frame for construction of this alternative is 6 months. Target cleanup levels would be achieved within 12 months after operation of the system.

Alternative SC-6: Off-Site Incineration

This alternative would involve excavation of about 59,000 cubic yards of contaminated soil and transport of the soil to a permitted off-site incinerator for treatment and disposal. Incineration of the contaminated soil at the off-site thermal treatment facility would be conducted in conformance with all applicable RCRA requirements, and this facility would be responsible for proper disposal of the treated soil. The buried drums would also be excavated and removed from the Site for off-site treatment/disposal at an approved RCRA hazardous waste facility.

The contaminated soil and buried drums would be excavated and staged. Contaminated soil would then be placed into 20-cubic yard trucks for shipment to an available hazardous waste incinerator. The excavated drums would also be shipped via trucks to a RCRA hazardous waste facility for treatment/disposal. Clean fill would be used to backfill the excavated areas, and the Site would be regraded and revegetated.

Under this alternative, long-term monitoring would not be required. The estimated total present worth cost for this alternative is $96,800,000. The estimated implementation time frame for this alternative is 1 year (after the start of construction).

Alternative SC-7: In-Situ Soil Flushing

This alternative would consist of the use of treated groundwater to flush the areas of soil contamination. A groundwater extraction and treatment system would be required. Because this is an in-situ contaminant removal process, this alternative would require minimal excavation (well installation, distribution system, and grading of the recharge basins) for implementation.

Since the total volume of groundwater extracted and treated could not be recharged (flushed), discharge of a portion of the treated water to Mud Creek would be required.

Under this alternative, approximately 1,000 cubic yards of PCB-

contaminated soil would be excavated and removed from the Site for off-site incineration and disposal at an approved facility. Incineration of the contaminated soil at the off-site thermal treatment facility would be conducted in conformance with all applicable RCRA requirements, and this facility would be responsible for proper disposal of the treated soil. The buried drums would also be excavated and removed from the Site for off-site treatment/disposal at an approved RCRA hazardous waste facility. Clean fill would be used to backfill the excavated areas. On-site treatment was not considered due to the low volume of PCB-contaminated soils.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would continue for at least five years after the completion of the remediation to ensure that the goals of the remediation have been met.

The estimated total present worth cost for this alternative is $1,076,000. The estimated time frame for construction of this alternative is 6 months, but this alternative would require 20 years to achieve target cleanup levels.

GROUNDWATER ALTERNATIVES

Alternative GW-1: No Action

Under this alternative, no action would be taken to remedy the groundwater contamination at the Site or to control its spread. This alternative would not ensure protection of human health and the environment, and is used as a basis of comparison for other groundwater remediation alternatives. Under this alternative, the contaminants would remain on-site, hence the Site would need to be reviewed every five years.

The estimated total present worth cost for this alternative is $231,000.

Alternative GW-2: Limited Action

This alternative would include long-term groundwater monitoring and institutional restrictions on on-site groundwater use. The monitoring would consist of annual groundwater sampling to track the movement of contaminated water and assess the need for future remediation. Institutional restrictions would prohibit the use or installation of water supply wells on-site. Under this alternative, the Site would be reviewed every five years.

The estimated total present worth cost for this alternative is $985,000.

Alternative GW-3: Groundwater Extraction/Chemical Precipitation/ Carbon Adsorption

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be pumped to an equalization tank. Chemical precipitation would be employed to remove inorganic contaminants, followed by carbon adsorption to remove organic contaminants. The treated water would be reinjected into the aquifer and/or discharged to Mud Creek.

The chemical precipitation process would consist of the addition of chemical substances (e.g., lime) to precipitate dissolved metals. A coagulant would be added to induce flocculation. The sludge generated would undergo filtration and would be transported to an off-site treatment/disposal facility.

Carbon adsorption would expose the contaminated groundwater to units filled with carbon. The contaminants would come out of the solution with the water and adhere to (adsorb onto) the carbon surface. The spent carbon would be collected by the carbon supplier and shipped off-site for treatment/disposal or regeneration for reuse.

In order to prevent the loss of vapors to the atmosphere, the equalization tank, the chemical precipitation unit, and the filtration unit would be equipped with floating covers to prevent volatilization.

The number and location of extraction wells, the specifications for the chemical pretreatment and carbon adsorption systems, and the specific type of reinjection and/or discharge system would be determined during the remedial design phase of the project.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

At the completion of the remedial alternative, the organic contaminants found in groundwater would meet groundwater quality standards, and the migration of those contaminants to the surface water would be prevented.

The estimated total present worth cost for this alternative is $14,279,000. This alternative could be implemented within 18 months (after the start of construction). The estimated aquifer restoration time frame for this alternative is about 20 years.

Alternative GW-4: Groundwater Extraction/Chemical Precipitation/ Air Stripping/Carbon Adsorption

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be pumped to a centrally located treatment plant on-site, where it would be treated by chemical precipitation to remove inorganic contaminants, and by air stripping and carbon adsorption to remove organic contaminants. The treated water would be reinjected and/or discharged to Mud Creek.

The groundwater extraction, chemical precipitation, and carbon adsorption processes would be the same as Alternative GW-3.

Air stripping is a mass transfer process in which volatile organics in water are transferred to the air blown in from the bottom of the air stripper. The air and VOC mixture exiting the air stripper would then be treated by a vapor phase carbon adsorption unit for the removal of the stripped VOCs. Clean air would be emitted to the atmosphere. The air-stripped groundwater, which may contain some contaminants, would be processed through liquid phase carbon adsorbers. The spent carbon in the carbon adsorption units would be removed for off-site regeneration or incineration, thus destroying all organic contaminants.

The number and location of extraction wells, the specifications for the chemical pretreatment, air stripping, and carbon adsorption systems, and the specific type of reinjection and/or discharge system would be determined during the remedial design phase of the project.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

At the completion of this remedial alternative, the organic contaminants found in groundwater would meet groundwater quality standards, and the migration of those contaminants to the surface water would be prevented.

The estimated total present worth cost for this alternative is $9,934,000. This alternative could be implemented within 18 months (after the start of construction). The estimated aquifer restoration time frame for this alternative is about 20 years.

Alternative GW-5: Groundwater Extraction/Chemical Precipitation/ UV Oxidation

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted

groundwater would be pumped to an equalization tank, and then to a rapid mixing tank, where inorganic contaminants would be removed by chemical precipitation. Next, the water would be treated by UV oxidation to remove organic contaminants. The treated water would be reinjected and/or discharged to Mud Creek.

The groundwater extraction and chemical precipitation processes would be the same as Alternative GW-3.

Following chemical precipitation, the groundwater would enter an oxidation tank. There, it would be mixed with a metered dose of an oxidant (e.g., hydrogen peroxide or ozone) and exposed to high intensity ultraviolet ("UV") radiation. In the presence of UV light, the oxidant molecules would decompose to form hydroxyl radicals. Also, some organic contaminants would absorb UV light and become more reactive. The hydroxyl radicals would break down the organic molecules into smaller blocks and eventually to carbon dioxide, water, and non-hazardous salts. The treated water would be filtered for the removal of suspended particles and collected in a storage tank. To prevent the loss of vapors to the atmosphere, the equalization tank, the chemical precipitation unit, and the filtration process unit would be equipped with floating covers to prevent volatilization.

The number and location of extraction wells, the specifications for the chemical pretreatment and UV oxidation systems, and the specific type of reinjection and/or discharge system would be determined during the remedial design phase of the project.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

The estimated total present worth cost for this alternative is $15,094,000. This alternative could be implemented within 18 months (after the start of construction). The estimated aquifer restoration time frame for this alternative is about 20 years.

Alternative GW-6: Groundwater Extraction/Chemical Precipitation/ Biological Treatment

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be treated by chemical precipitation to remove inorganic contaminants, and by activated carbon biological treatment to remove organic contaminants. The treated water would be reinjected and/or discharged to Mud Creek.

The groundwater extraction and chemical precipitation processes would be the same as Alternative GW-3.

After chemical precipitation, the water would be pumped into the aeration tank, where it would be mixed with granular activated carbon and biological solids. The water-carbon-biological solids mixture would be aerated so that the biodegradable content of the groundwater could be biologically oxidized and assimilated. After aeration, the mixture would be sent to a clarifier, where the granular carbon and the biological solids would settle and be separated from the treated water. The clarifier overflow (treated water) would be filtered and collected in a storage tank. The clarifier underflow solids would be recycled to the aeration tank to maintain the appropriate concentration of granular activated carbon and biological solids. A portion of the clarifier underflow containing granular activated carbon and excess biological solids would be wasted daily, dewatered, and aerobically digested and disposed of. Make-up granular activated carbon would be added to the aeration tank daily to account for the loss of that substance. The equalization tank, the chemical precipitation unit, and the filtration unit would be equipped with floating covers to prevent the loss of volatile chemicals prior to adsorption in the biological unit.

The number and location of extraction wells, the specifications for the chemical pretreatment and biological treatment systems, and the specific type of reinjection and/or discharge system would be determined during the remedial design phase of the project.

Under this alternative, treatability studies would need to be performed during remedial design to provide design information and verification of the effectiveness of the alternative in achieving removal efficiencies required to ensure compliance with all federal MCLs and state groundwater standards.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

The estimated total present worth cost for this alternative is $5,739,00. This alternative could be implemented within 18 months (after the start of construction). The estimated aquifer restoration time frame for this alternative is about 20 years.

All alternatives described above would include pre-construction, construction and post-construction air monitoring.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely overall protection of human health and the environment, compliance with ARARs, long-term effectiveness and permanence, reduction of

toxicity, mobility or volume (including the statutory preference for treatment), short-term effectiveness, implementability, cost, state acceptance and community acceptance.

Each criterion will be briefly addressed with respect to the alternatives for remediation of the soil and groundwater.

SOIL ALTERNATIVES

A. Overall Protection of Human Health and the Environment

Alternative SC-1 provides no protection of human health and the environment from direct contact with contaminated soils. Alternative SC-2 provides a limited measure of protection through the installation of a site perimeter fence and the implementation of site use restrictions. Alternative SC-3 includes the installation of a site perimeter fence and construction of a cap, thereby providing additional protection due to reduction in direct contact risks. Over the long-term, the cap is anticipated to decrease the generation, mobility, and volume of leachate reaching the aquifer.

Alternatives SC-4, SC-5, SC-6, and SC-7 provide even greater protection by direct treatment of contaminated soils and subsequent reduction of leachate within a relatively short time frame. These alternatives, which also remove PCB-contaminated soils and drums, are far more protective of human health and the environment than Alternative SC-3.

The treatment of soils to remove the most mobile wastes would result in the elimination of a long-term source of groundwater contamination and it would mitigate the risks to public health and the environment associated with the migration of those contaminants off-site.

Alternatives SC-3 through SC-7 would mitigate the risks to public health and the environment associated with the leaching of contaminants into the groundwater and their migration off-site. Under Alternatives SC-1 and SC-2, contaminants would continue to leach from the soil into the groundwater and continued off-site migration of contaminants would occur. Monitoring would be implemented to observe contaminant migration, but an indeterminate amount of time would elapse between detection and the implementation of mitigating measures.

B. Compliance with ARARs

All technologies proposed for use in Alternatives SC-3 through SC-7 would be designed and implemented to satisfy all chemical-specific, action-specific, and location-specific ARARs, including all emission standards. ARARs for on-site alternatives would include, but not be limited to, RCRA closure requirements, RCRA landfill requirements, and TSCA PCB requirments. ARARs for off-

site alternatives would include, but not be limited to, RCRA generator and transporter requirements, RCRA land disposal restrictions and TSCA regulations for PCB management and disposal. A complete list of all potential ARARs is included in Tables 30 to 32.

No federal or New York State regulations specify cleanup levels for contaminants in soils. In terms of achieving target levels for soils for the purpose of removing potential sources of groundwater contamination, Alternatives SC-4 through SC-7 would be effective.

C. Reduction of Toxicity, Mobility, or Volume

Alternatives SC-1 and SC-2 would provide no reduction in toxicity, mobility, or volume. Alternative SC-3 would reduce the mobility of the contaminants via capping but would not reduce the toxicity or volume of contaminants and would not satisfy the statutory preference for treatment. Alternatives SC-5 and SC-6 would result in comparable reductions in the toxicity, mobility, and volume through the use of treatment. Alternatives SC-4 and SC-7 would result in the reduction of toxicity, mobility, and volume but to a lesser degree than the thermal treatment alternatives due to the possibility of preferential flow in the vadose zone.

D. Implementability

All of the alternatives are technically feasible, but differ in the complexity of implementation. Alternatives SC-3, SC-4, SC-5, SC-6, and SC-7 would utilize relatively common construction equipment and materials. Alternative SC-4, which requires soil gas extraction wells, piping, a vacuum system, and a mobile treatment system, would be relatively easy to implement. Alternative SC-7 may require extensive start-up testing to determine optimum recharge rates and to monitor changes in groundwater flow directions. Although the technologies employed in Alternatives SC-4 and SC-7 have been successfully pilot tested and have been utilized on a full scale basis for treatment of soils contaminated with VOCs, the complex and heterogeneous nature of the soils at the Site may render Alternatives SC-4 and SC-7 inappropriate for site remediation. Alternatives SC-5 and SC-6, which involve large scale excavation and backfilling operations, would be more difficult to implement than the in-situ remedies due to the volume of soil (about 59,000 cubic yards) required to be handled.

Alternative SC-5, excavation/low temperature thermal extraction/on-site redeposition, has been successfully pilot tested and has preformed on a full-scale basis with similar organic contaminants.

Alternatives SC-4, SC-5, SC-6, and SC-7 include the excavation and off-site treatment/disposal of PCB-contaminated soils and buried drums which would be relatively easy to implement.

E. Long-Term Effectiveness

Alternatives SC-1 and SC-2 do not include any removal, containment, or treatment of contaminated soils, and hence, the health risks present at the Site would remain. Alternative SC-2 would restrict site access and potential direct contact with contaminated soils. Installation of the cap under Alternative SC-3 would provide reduction of the residual risks due to direct contact and of the leaching of contaminants to the groundwater.

Alternatives SC-4, SC-5, SC-6, and SC-7 include the treatment of contaminated soils. In Alternatives SC-5 and SC-6, no residual risks would remain, as the backfilled soils would be clean. In Alternatives SC-4 and SC-7, some levels of contamination below action levels may remain in the soil. These calculated concentration levels are the levels whereby the leachate generated would be below MCLs. However, the effects of this residual contamination would be mitigated by the groundwater extraction and treatment alternative.

Alternatives SC-3, SC-4, SC-5, SC-6, and SC-7 incorporate proven engineering methods that are reliable for the control of leachate generation and protection of the groundwater.

The success of Alternatives SC-4 and SC-7 would be a function of the permeability of the vadose zone. Since the vadose zone is complex and heterogeneous in nature, these two alternatives may not result in the successful removal of the contaminants due to the possibility of preferential flow paths in some areas, and little or negligible flow in other areas.

All risks associated with the buried drums and PCB-contaminated soils in Alternatives SC-4, SC-5, SC-6, and SC-7 would be completely mitigated as these wastes would be properly treated and disposed of at approved Toxic Substances Control Act/RCRA facilities. The capping in Alternative SC-3 would only reduce the risks relating to the direct contact with PCB-contaminated soil and buried drums.

F. Short-Term Effectiveness

All alternatives, with the exception of Alternatives SC-1, SC-2, and SC-3, include activities such as excavation and off-site transport of contaminated soils for disposal that could result in potential exposure of residents to volatilized contaminants and contaminated dust. However, mitigative measures, such as the utilization of vapor suppressive foams and water spraying, to reduce the probability of exposure would be implemented.

Alternatives SC-4 through SC-7 would result in worker exposure to volatilized contaminants and dermal contact with contaminated soils during waste excavation and handling. In addition, Alternative SC-5 might result in low-level emissions exposure from the on-site

treatment unit. The threat to on-site workers and the community, however, would be mitigated through the use of protective equipment by the on-site workers and control of emissions would be accomplished by emissions treatment. Additionally, scrubber wastewater would require removal and treatment prior to complete demobilization from the Site.

The groundwater and site use restrictions of Alternative SC-2 could be implemented within 6 months after start of construction. However, Alternative SC-2 would only reduce the potential risk associated with groundwater ingestion, and not directly address the continued leaching of contaminants. Alternative SC-3 could be completed within 6 months after start of construction. Alternatives SC-4, SC-5, and SC-6 could be completed within 1 year after start of construction. Alternative SC-7 could be implemented within 3 months after start of construction, but would require 20 years to achieve remediation.

G. Cost

The total present worth cost for Alternative SC-5 is $19,416,000. The lowest cost alternative is Alternative SC-1 at $231,000. The highest cost alternative is Alternative SC-6 at $96,800,000. Alternatives SC-2, SC-3, SC-4, and SC-7 have total present worth costs of $462,000, $862,000, $7,887,000, and $1,076,000, respectively.

The total capital, annual operation and maintenance, and present worth costs in all soil alternatives are presented in Table 1 for comparison purposes.

GROUNDWATER

A. Overall Protection of Human Health and the Environment

Alternative GW-2 would prevent exposure to groundwater contaminants by restricting its use as a potable water supply on-site. Protection of the public off-site would be dependent on the effectiveness of state and local governments in restricting groundwater usage.

In the long-term, the extraction and treatment options within Alternatives GW-3, GW-4, GW-5, and GW-6 would reduce contaminant levels in the groundwater to below MCLs, reduce non-carcinogenic risks to acceptable levels, and reduce cumulative carcinogenic risks to acceptable levels, thus protecting human health and the environment.

B. Compliance with ARARs

Alternatives GW-1 and GW-2 would not satisfy contaminant-specific ARARs, i.e., federal MCLs and state groundwater standards (see Table 33). The long-term monitoring and groundwater use restric-

tions would be intended to limit access to contaminated groundwater.

Groundwater treated through implementation of Alternatives GW-3, GW-4, or GW-6 is expected to meet surface water discharge requirements, achieve concentrations below federal MCLs and state groundwater standards, and meet risk-based action levels for chemicals of concern. The ability of Alternative GW-5 to achieve the groundwater quality standards for organic contaminants is of a lower certainty as compared to those of Alternatives GW-3, GW-4 and GW-6 due to limited experience with the UV oxidation treatment process. Alternative GW-6 requires performance of treatability studies during remedial design to ensure that this alternative would attain the removal efficiencies required to achieve the federal MCLs and state groundwater standards.

Alternative GW-4 would include air emission controls meeting the requirements of state and federal regulations should control be deemed necessary based on treatability study results.

C. Reduction of Toxicity, Mobility or Volume

Alternatives GW-1 and GW-2 would not reduce the toxicity, mobility, or volume of contaminants. Alternatives GW-3, GW-4, GW-5, and GW-6 would provide significant overall reduction in toxicity, mobility, and volume of the contaminants in the groundwater through the extraction and treatment of the groundwater.

D. Implementability

All of the alternatives are technically feasible, but differ in the complexity of implementation. All components of Alternatives GW-1 and GW-2 could be easily implemented due to their limited scope.

The treatment technologies associated with Alternatives GW-3, GW-4 and GW-6 employ reliable operations. All components (extraction, treatment and reinjection) of these three alternatives utilize relatively common construction equipment and materials and could be easily implemented. The processes included in Alternatives GW-3 and GW-4 are proven and widely used methods of removing the contaminants of concern in the groundwater, and are readily available. Alternative GW-6, however, requires performance of treatability studies during remedial design to ensure that this alternative would be effective in achieving the removal efficiencies required to attain target groundwater cleanup levels.

In contrast, the treatment technology in Alternative GW-5 (UV oxidation), although successful in pilot runs, has had limited full scale use to date. Therefore, site-specific pilot scale studies would be required to confirm its adequacy for the Site.

Furthermore, the UV oxidation units are currently available from

two vendors nationwide, and the sludge units of Alternative GW-6 are available from only one vendor who holds the patent.

E. Long-Term Effectiveness and Permanence

Alternatives GW-1 and GW-2 allow risks from the long-term migration of contaminants to continue. Alternative GW-2 includes monitoring to track the spread of contamination and instituting groundwater use restrictions to prevent potential exposure. Achievement of concentrations below MCLs and risk-based ARARs would be approached at a rate governed by natural attenuation.

Alternatives GW-3, GW-4, GW-5, and GW-6 would effectively reduce the potential risks associated with the contaminated groundwater by extracting and treating the contaminated groundwater, and returning the treated water to the aquifer and/or discharging the treated water to surface water. After the specified remediation period, i.e. approximately 20 years, there should be little or no long term management required of the aquifer.

F. Short-Term Effectiveness

Alternative GW-1 presents no additional short-term risks to workers or the community during implementation. Alternative GW-2 presents minimal short-term risks to workers during the sampling of the monitoring wells. Neither alternatives, however, is particularly effective in the short term. Alternatives GW-3, GW-4, GW-5, and GW-6 present short-term risks to workers and the community due to potential fugitive dust emissions during construction of the treatment plants, extraction systems, and associated piping. However, mitigative measures, such as the utilization of vapor suppressive foams and water spraying, would be implemented to reduce the potential risk of exposure during remedial activities.

The annual sampling of monitoring wells and implementation of groundwater use restrictions that are contained in Alternative GW-2 could be initiated within 6 months. However, Alternative GW-2 would only reduce the potential for ingestion of groundwater on-site and not directly address remediation of contaminated groundwater. The systems installed in Alternatives GW-3, GW-4, GW-5, and GW-6 would be operational within 18 months following the start of construction. The estimated time for aquifer restoration for all four alternatives is approximately 20 years.

G. Cost

The present worth cost for Alternative GW-4 is $9,934,000. The lowest cost alternative is Alternative GW-1 at $231,000. The highest cost alternative is Alternative GW-5 at $15,094,000. The present worth costs for Alternatives GW-2, GW-3, and GW-6 are $985,000, $14,279,000 and $5,739,000, respectively.

The total capital, annual operation and maintenance, and present worth costs for all groundwater alternatives are presented in Table 1 for comparison purposes.

State Acceptance

NYSDEC concurs with the selected soil and groundwater remedial alternatives.

Community Acceptance

The Town Board of the Town of Lincklaen has expressed overall support for the alternatives selected for remediation of the soil and groundwater. Several residents have expressed concerns associated with volatile emissions and the generation of dust associated with the on-site excavation activities and discharges to the surface water and emissions to the atmosphere associated with the groundwater treatment and thermal treatment alternatives, respectively. These concerns are responded to in the attached Responsiveness Summary.

THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, both EPA and NYSDEC have determined that Alternative SC-5, Excavation/ Low-Temperature Thermal Extraction/On-Site Redeposition (on-site or off-site treatment of PCB-contaminated soil), for treatment of the contaminated soil, and Alternative GW-4, Groundwater Extraction/Chemical Precipitation/ Air Stripping/Carbon Adsorption, for treatment of the groundwater, constitute the appropriate remedy for the Solvent Savers Site. The major components of the selected remedy are as follows:

- The buried drums will be excavated and removed off-site for treatment and disposal at an approved RCRA hazardous waste facility (to the extent that the work required under the September 1989 Administrative Order is not completed by the Respondents in a timely fashion or to the extent that any soil contamination will remain at the Site following the completion of that work).

- Approximately 59,000 cubic yards of contaminated soil (including about 1,000 cubic yards of PCB-contaminated soil from the two hot spots located in Areas 2 and 4) will be excavated from the two source areas (Areas 2 and 4) of the Site. The lateral and vertical extent of the excavation will be more precisely defined by additional sampling during the remedial design phase to determine the extent of the areas where soil contaminant concentrations exceed the soil cleanup levels set to protect the groundwater. Furthermore, during the remedial design phase, the fate and transport model used to derive the soil cleanup levels will be calibrated and further tested using current and additional sampling

data, as necessary, to more precisely define the soil cleanup levels and the areal extent of the source areas requiring remediation. Should the data and information updated during the remedial design indicate that Areas 1, 3, and/or 5 require remediation, the contaminated soil from these 3 areas will also be treated as set forth in this ROD to attain target soil cleanup levels. Contaminated soil in the source areas will be excavated down to the levels required to ensure that all the target soil cleanup levels are met. Fugitive emissions will be controlled during the excavation by such techniques as water spraying, vapor suppression foams, etc.

- The organic contaminants in the highly contaminated soil will be treated on-site using a low temperature thermal extraction technology.

- Treatability studies will be performed during the remedial design phase to determine whether the low temperature thermal extraction technology is an appropriate treatment method for the PCB-contaminated soil. If the treatability study results indicate that low temperature thermal extraction is an appropriate treatment method, then this technology will be utilized to treat the excavated soil contaminated with PCBs on-site. Should the findings of the treatability studies indicate that the on-site low temperature thermal extraction process would not provide the desired degree of treatment, then the PCB-contaminated soil excavated will be removed for off-site incineration.

If removal of the PCB-contaminated soil for off-site treatment/disposal is required, the receiving thermal treatment facility will be responsible for ensuring that incineration of the contaminated soil is conducted in accordance with all applicable RCRA and TSCA requirements and that the treated soil is properly disposed of off-site. Following completion of the excavation and removal activities associated with the PCB-contaminated soil, clean fill will be used to backfill the excavated areas.

- Treatability studies will be conducted during the remedial design phase to determine whether the soil flushing and/or vapor extraction processes are appropriate treatment methods for the excavated soil contaminated with low level VOCs. If the treatability study results indicate that one or both of these technologies are appropriate treatment methods, then one or both of these technologies will be utilized to treat the excavated soil contaminated with low level VOCs. Should the findings of the treatability studies indicate that these on-site treatment processes would not provide the desired degree of treatment, then the contaminated soil will be treated on-site using low temperature thermal extraction.

- The treated soil will be subjected to the TCLP to determine whether all the RCRA hazardous wastes contained in it meet the Land Disposal Restrictions ("LDR") treatment standards (TCLP concentra-

tions). Since the treated soil which passes the test will meet the RCRA LDR standards and will no longer contain hazardous constituents above health-based levels, as determined by the risk assessment, it will not be subject to regulation under Subtitle C of RCRA (including the LDRs imposed by the Hazardous and Solid Waste Amendments to RCRA) and may be replaced into the areas from it was removed. (Clean soil may have to be utilized to supplement the treated soil in filling the excavated areas). Clean top soil will be placed on the fill areas. The Site will be regraded and revegetated.

- In the unlikely event that the treated soil does not pass the TCLP toxicity test, it will be further treated to meet the TCLP requirements prior to its placement in the excavated areas (to the extent that the work required under the September 1989 Administrative Order is not completed by the Respondents in a timely fashion or to the extent that any soil contamination will remain at the Site following the completion of that work).

- Contaminated groundwater will be removed from the underlying aquifers at the Site by a system of extraction wells. The contaminated groundwater will be treated on-site for removal of the inorganic contaminants using the chemical precipitation technology, and removal of the organic contaminants using a combination of air stripping and carbon adsorption technologies.

The treated water will be recharged back into the ground and/or discharged to surface water on-site. The number and locations of the extraction wells, the pumping routes, the specifications for the pretreatment, air stripping, and carbon adsorption systems, as well as the type of the recharge and/or discharge system will be determined during the remedial design phase.

- The groundwater treatment will continue until federal MCLs and state groundwater standards for the organic and inorganic contaminants have been achieved in the groundwater. The goal of this remedial action is to restore groundwater to its beneficial use, which is, at this Site, a drinking water source. Based on information obtained during the supplemental RI and on an analysis of all remedial alternatives, EPA and NYSDEC believe that the selected remedy will achieve this goal. It may become apparent, during implementation or operation of the groundwater extraction system and its modifications, that contaminant levels have ceased to decline and are remaining constant at levels higher than the remediation goal. In such a case, the system performance standards and/or the remedy may be reevaluated.

The selected remedy will include groundwater extraction and treatment via chemical precipitation, carbon adsorption, and air stripping for an estimated period of 20 years, during which the system's performance will be carefully minitored on a regular basis and adjusted as warranted by the performance data collected during

operation.

- Wastes and drums containing wastes generated during the supplemental RI that have been identified as hazardous will be treated on-site with the soil and groundwater treatment systems. RI drums that contain solid matter, other than soil, will be shipped off-site for disposal at a licensed facility.

- All residuals from the treatment of the soil and of the groundwater (such as filtered suspended solids and spent carbon) will be shipped to an off-site RCRA hazardous waste facility for treatment/disposal.

- Air monitoring will be performed prior to, during and following construction at the Site. Air emissions from the treatment units during both the soil and groundwater remediation will meet the air emission ARARs. Environmental monitoring will be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site will be conducted for a period of five years after completion of the remediation, to ensure that the goals of the remedial action have been met.

- A wetlands/floodplains assessment, and/or a stage IB cultural resources survey will be performed, if determined to be necessary, during the remedial design phase.

Remediation Goals

The purpose of this response action is to reduce the present risk to human health and the environment due to the contamination of the on-site soil and groundwater, to restore the groundwater underlying the Site to levels consistent with state and federal ARARs, and to ensure protection of the air, ground and surface water in the vicinity of the Site from the continued release of contaminants from the soil. Since no federal or state ARARs exist for soil which set forth numerical standards to which the soil has to be cleaned up, the action levels for the VOCs in soil were determined through a site-specific analysis. This analysis used fate and transport modeling to determine levels to which VOCs in soils should be reduced in order to ensure that no receptor would be exposed to contaminated groundwater above drinking water standards, i.e., MCLs. Reduction to these levels also would ensure that no excessive risk would result from human contact with soil at the Site.

The PCBs discovered on-site are present in sufficient quantities to be of concern with respect to protection of human health according to the risk assessment. As noted above, EPA's OSWER directive 9355.4-01 serves as a guide for all remedial actions at Superfund sites with PCB contamination. It basically combines the elements of all applicable laws (including the Clean Water Act and Safe Drinking Water Act for groundwater cleanups) into one cohesive

document which is the basis of EPA's PCB policy. The directive recommends a 1 ppm action level as a starting point for PCB cleanups in residential areas, treatment of 100 ppm or greater PCB hot spots as principal threats, and containment of low threat PCB contamination in the 1-100 ppm range. Treatment may be warranted at sites involving relatively small volumes of cotamina-tion or sensitive environments.

Since the Site is located on a rural agricultural area where residential homes are situated in proximity of the Site, and the amount of PCB-contaminated soil that poses potential human health threat to the public is small (about 1000 cubic yards), treatment of the contaminated soil to attain the level of 1 ppm is appropriate for this Site.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when completed, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment through the removal and treatment of the inorganic and organic contaminants in groundwater, using chemical precipitation, air stripping, and carbon adsorption. In addition, the removal of the buried drums and PCB-contaminated soil for off-site treatment/disposal, and treatment of the soil contaminated primarily with VOCs through a low temperature thermal extraction process will remove the most mobile wastes from the soil, resulting in the elimination of a long-term source of groundwater contamination. It will also mitigate the risks to public health and the environment associated with the leaching of contaminants into the groundwater and the migration of those contaminants off-site. There are no short-term threats associated with the selected remedy that cannot be readily controlled.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy, which consists of excavation and removal of the buried drums and PCB-contaminated soil off-site for treatment/-disposal, excavation and on-site treatment of the soil contaminated with VOCs utilizing low-temperature thermal extraction, and extraction of the contaminated groundwater for treatment utilizing chemical precipitation, air stripping and carbon adsorption, will comply with all chemical-, action-, and location-specific ARARs (see Tables 30, 31 and 32).

Cost-Effectiveness

The selected remedy is cost-effective for it provides overall effectiveness proportional to its cost. The estimated net present worth cost for this remedy is $29,350,000. The estimated cost of the source control component of the selected remedy ($19,416,000) is only 20 percent of the estimated cost of the alternative involving off-site incineration, yet the selected remedy mitigates, as effectively as that alternative, all the risks posed by the contaminants at the Site. The effectiveness of the in-situ vapor extraction and soil flushing alternatives would depend on the permeability of the vadose zone. Although the estimated costs for these two alternatives are less than the estimated cost for the selected source control alternative, these two alternatives may not result in the effective removal of contaminants from the soil due to the complex and heterogeneous nature of the subsurface "structure" at the Site. Furthermore, the selected source control alternative would likely enable target cleanup levels to be achieved within 12 months, whereas the alternative involving soil flushing would require an estimated 20 years to achieve target cleanup levels.

The estimated cost of the groundwater component of the remedy ($9,934,000) is 73 percent higher than the estimated cost for the UV oxidation alternative, but it offers a much higher degree of certainty with regard to the effective removal of organic contaminants from the groundwater. The alternative which includes only chemical precipitation and carbon adsorption, and the selected groundwater alternative that also includes air stripping, would effectively mitigate the risks associated with the groundwater contamination. However, the estimated cost of the selected groundwater alternative is about 30 percent lower than the estimated cost of the alternative involving only chemical precipitation and carbon adsorption. Although the estimated total present worth cost of the alternative involving biological treatment/carbon adsorption is about 40 percent lower than that of the selected groundwater alternative, treatability studies would need to be performed during remedial design to provide design information and verification of the effectiveness of this alternative in achieving removal efficiencies required to comply with all federal MCLs and state groundwater standards.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA and New York State have determined that the selected remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be utilized in a cost-effective manner for the Solvent Savers Site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA and NYSDEC have determined that the selected remedy best balances the goals of long-term effectiveness and permanence, reduction in toxicity, mobility, or volume achieved through treatment, short-term effectiveness, implementability, and cost, also considering the statutory preference for treatment as a principal element and considering state and community acceptance. With regard to the most mobile soil wastes that pose the major risks at the Site, the selected remedy will offer a higher degree of long-term effectiveness and permanence than the other treatment alternatives, involving in-situ soil flushing and vapor extraction, by permanently removing the source of groundwater contamination and reducing the risk to human health and the environment. The selected remedy will result in significant reductions in the toxicity of the contaminated material through thermal destruction of the organic contaminants. The selected remedy is as effective as the off-site incineration alternative. However, in the short-term, it offers the additional advantage of on-site treatment, thereby reducing the potential risks to residents along transportation routes. Implementation of the selected source control alternative is a cost-effective treatment option that is protective of public health and the environment.

The decision to treat the contaminated soil is consistent with program requirements that state that highly toxic and mobile wastes should be treated to ensure the long-term effectiveness of a remedy. Long-term effectiveness, reduction of toxicity, mobility, or volume, and implementability are the major factors that provide the basis for the selection of the soil portion of the remedy. The selected remedy can be implemented with less risk to area residents and, therefore, is determined to be the most appropriate solution for the contaminated soil at the Solvent Savers site.

The selected alternative for the groundwater offers as high a degree of long-term effectiveness and permanence, and reduction of toxicity, mobility, and volume as the other treatment options. The selected alternative is also as effective in the short-term as the other treatment options. With regard to implementability, the components of the selected groundwater alternative and of the chemical precipitation/carbon adsorption alternative are easily implemented, proven technologies and are readily available. In contrast, the treatment technologies for UV oxidation, although successful in pilot runs, has had limited use to date. In addition, UV oxidation units are currently available from only two sources nationwide, and the sludge units of the biological

treatment alternative are available from only one vendor. Implementation of the selected groundwater alternative is the most cost-effective treatment option that is protective of public health and environment.

Since all treatment options for the groundwater are reasonably comparable with respect to long-term effectiveness, reduction of toxicity, mobility, and volume, and short-term effectiveness, the major factors that provide the basis for the selection of the chemical precipitation/air stripping/carbon adsorption alternative as the remedy for the groundwater are implementability when compared to the UV oxidation and biological treatment options, and cost when compared to the chemical precipitation/carbon adsorption alternative. The technology for the selected alternative is proven and readily available, and the carbon adsorption system when added to the air stripping option ensures complete removal of contaminants.

Preference for Treatment as a Principal Element

The selected remedy addresses the principal threat posed by the Site through the use of treatment technologies by removing the buried drums off-site for treatment/disposal, by removing the PCB-contaminated soil for off-site treatment in an incinerator, by treating the VOC-contaminated soil on-site in a low-temperature thermal treatment unit, and by treating the contaminated groundwater via chemical precipitation, air stripping, and carbon adsorption. Therefore, the statutory preference for remedies that employ treatment as a principal element is satisfied.

APPENDIX 1

TABLES

TABLE 1

COST ESTIMATE SUMMARY OF ALTERNATIVES

		Capital	Annual O&M	Total Present Worth (30-yr, 5% discount rate)
SOIL ALTERNATIVES				
SC-1:	No Action	$ 0	$ 15,000	$ 231,000
SC-2:	Limited Action	$ 54,000	$ 23,800	$ 462,000
SC-3:	Site Capping	$ 562,500	$ 16,800	$ 862,000
SC-4:	In-Situ Vapor Extraction	$ 7,887,000	$ 0	$ 7,887,000
SC-5:	Excavation/Low Temperature Thermal Extraction/On-site Redeposition	$19,416,000	$ 0	$19,416,000
SC-6:	Off-Site Incineration	$96,800,000	$ 0	$96,800,000
SC-7:	In-Situ Soil Flushing	$ 981,000	$ 6,200	$ 1,076,000
GROUNDWATER ALTERNATIVES				
GW-1:	No Action	$ 0	$ 15,000	$ 231,000
GW-2:	Limited Action	$ 48,000	$ 58,000	$ 985,000
GW-3:	Groundwater Extraction/ Chemical Precipitation/ Carbon Adsorption	$ 1,618,000	$821,000	$14,279,000
GW-4:	Groundwater Extraction/ Chemical Precipitation/ Air Stripping/Carbon Adsorption	$ 1,855,000	$523,000	$ 9,934,000
GW-5:	Groundwater Extraction/ Chemical Precipitation/ UV Oxidation	$ 3,138,000	$775,000	$15,094,000
GW-6:	Groundwater Extraction/ Chemical Precipitation/ Biological Treatment	$ 2,300,000	$220,000	$ 5,739,000

TABLE 2

SOLVENT SAVERS RI REPORT
BACKGROUND SOIL CONCENTRATIONS FOR INORGANIC CHEMICALS

Chemical	Concentration in Chenango Co. east of Sherburne (a) (mg/kg)	Concentration in Chenango Co. south of Bainbridge (a) (mg/kg)	Concentration in Onondaga Co. I-90 at exit 35 (a) (mg/kg)
Aluminum	100,000	70,000	20,000
Arsenic	8.4	8.2	2.0
Barium	500	200	200
Beryllium	2.0	1.0	ND
Cadmium	NA	NA	NA
Calcium	1,900	2,000	3,600
Chromium	100	30	15
Cobalt	10	10	3.0
Copper	20	15	30
Iron	50,000	15,000	15,000
Lead	20	30	15
Magnesium	5,000	3,000	3,000
Manganese	300	700	300
Mercury	0.13	0.08	0.6
Nickel	20	20	7.0
Potassium	17,300	10,000	10,800
Selenium	0.2	0.6	0.6
Sodium	7,000	7,000	7,000
Vanadium	150	50	30
Zinc	101	80	41

(a) As reported in Shacklette and Boerngen (1984).

ND = Not detected.
NA = Not available.

TABLE 3

BACKGROUND SOIL CONCENTRATIONS OF TARGET COMPOUND LIST
POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)

	Concentration (ug/kg)		
	Rural Soil	Agricultural Soil	Urban Soil
Carcinogenic PAH			
Benzo(a)anthracene	5 - 20	56 - 110	169 - 59,000
Benzo(b)fluoranthene	20 - 30	58 - 220	15,000 - 62,000
Benzo(j)fluoranthene			6,000 - 97,000
Benzo(b+j)fluoranthene	25 - 110		
Benzo(k)fluoranthene	10 - 110	58 - 250	300 - 26,000
Benzo(a)pyrene	2 - 1,300	4.6 - 900	165 - 22,000
Chrysene	38.3	78 - 120	251 - 64,000
Dibenz(a,h)anthracene			
Indenol(1,2,3-cd pyrene)	10 - 15	63 - 100	8,000 - 61,000
Non-Carcinogenic PAH			
Acenaphthene	1.7	6	
Acenaphthylene		5	
Anthracene		11 - 13	
Benzo(g,h,i)perylene	10 - 70	66	900 - 47,000
Benzo(e)pyrene		53 - 130	60 - 14,000
Biphenyl	14.8		
Fluoranthene	0.3 - 75	120 - 210	200 - 166,000
Fluorene		9.7	
Naphthalene	46.2		
Perylene		14 - 18	100 - 4,800
Phenanthrene	30.0	48 - 140	
Pyrene	0.1 - 64	99 - 150	3,000 - 147,000

Sources:
IARC (1973)
Blumer (1977)
White and Vanderslice (1980)
Windsor and Hites (1979)
Pucknat (1981)
Edwards (1983)
Butler et al. (1984)
Vogt et al. (1986)
Jones et al. (1989)

TABLE 4

SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN SURFACE SOIL

Chemical	Frequency of Detection (a)	Range of Detected Concentrations	Range of Background Concentrations (b)
Organics (ug/kg):			
* Acetone	1/7	26	NA
* Benzoic acid	3/7	240-650	NA
* 2-Butanone	1/7	13	NA
* Butylbenzylphthalate	1/7	400	NA
* di-n-Butylphthalate	1/7	380	NA
* Chlorobenzene	1/7	3.0	NA
* Chloroform	1/7	5.0	NA
* 1,1-Dichloroethane	1/7	4.0	NA
* 1,2-Dichloroethane	1/7	7.0	NA
* 1,1-Dichloroethene	1/7	3.0	NA
* bis(2-Ethylhexyl)phthalate	2/7	100-22,500	NA
* Hexachlorobenzene	1/7	610	NA
* Methylene chloride	2/7	18.0-23.0	NA
* carcinogenic PAHs			
Benzo(b and k)fluoranthene	2/7	410-1,030	58-250
Benzo(a)pyrene	1/7	160	5-900
Chrysene	1/7	480	78-120
Total carcinogenic PAHs (c)	2/7	410-1,670	318-1700
* noncarcinogenic PAHs			
Fluoranthene	1/7	280	120-210
Phenanthrene	1/7	100	48-140
Pyrene	1/7	1350	99-150
Total noncarcinogenic PAHs (c)	1/7	1730	431-747
* PCBs			
PCB-1242	3/46	740-14,000,000	NA
PCB-1254	10/46	260-870,000	NA
PCB-1260	1/46	420,000	NA
PCB-1248	18/46	580-470,000	NA
Total PCBs (c)	29/46	260-15,300,000	NA
* Tetrachloroethene	2/7	2.0-735	NA
* Toluene	1/7	170	NA
* 1,1,1-Trichloroethane	2/7	8.0-3150	NA
* 1,1,2-Trichloroethene	1/7	825	NA
* Trichloroethene	5/7	2.5-26,500	NA
Inorganics (mg/kg):			
Aluminum	7/7	12,300-18,800	20,000-100,000
* Arsenic	4/4	8.70-12.2	7.6-8.4
Barium	7/7	39.5-87.6	200-500
Beryllium	7/7	0.67-1.05	ND-2.0
* Cadmium	1/7	10.6	NA
Calcium	7/7	417-3,110	1,900-3,600
* Chromium	7/7	18.9-289	15-100
* Cobalt	7/7	8.95-19.0	3-10
* Copper	7/7	16.8-106	15-30
Iron	7/7	33,750-40,600	15,000-50,000
* Lead	7/7	22.2-83.6	15-30
* Magnesium	7/7	2,780-5,840	3,000-5,000
* Manganese	7/7	316-905	300-700
* Mercury	2/7	0.30-15.0	0.08-0.6
* Nickel	7/7	24.1-49.9	7-20
Potassium	7/7	488-1,260	10,000-17,300
Selenium	2/7	0.31-0.38	0.2-0.6
Vanadium	7/7	23.7-32.7	30-150
* Zinc	7/7	85.3-411	41-101
* Cyanide	1/7	7.0	NA

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 7 indicate that some samples were rejected for QA/QC reasons.
(b) Background concentrations for soil as presented in Tables 2 and 3
(c) Total carcinogenic PAHs, total noncarcinogenic PAHs, and total PCBs found in each sample were determined for each sample location. The range of these totals was then determined.

* = Selected as chemical of potential concern.
NA = Not available.
ND = Not detected.

TABLE 5

SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN SUBSURFACE SOIL

Chemical	Frequency of Detection (a)	Range of Detected Concentrations
Organics (ug/kg):		
* Acetone	5/60	410-3,700
* Benzene	2/60	0.60-7,400
* Benzoic acid	3/59	190-380
* Bromomethane	1/60	1,400
* 2-Butanone	9/21	1.0-72,000
* Butylbenzylphthalate	1/59	170
* di-n-Butylphthalate	6/59	39-2,700
* Chlorobenzene	2/60	1.0-260
* Chloroform	24/60	1.0-7,500
* 1,2-Dichlorobenzene	4/59	50-13,000
* 1,3-Dichlorobenzene	1/59	730
* 1,4-Dichlorobenzene	1/59	2,600
* 1,1-Dichloroethane	1/60	110
* 1,1-Dichloroethene	7/60	110-2,700
* total 1,2-Dichloroethene	10/60	0.90-6,500
* bis(2-Ethylhexyl)phthalate	29/59	38-21,000
* Ethylbenzene	7/60	1.0-29,000
* Isophorone	2/59	73-530
* Methylene chloride	4/60	540-890
* 4-Methylphenol	1/59	170
* di-n-Octylphthalate	2/59	24-57
* carcinogenic PAHs		
Benzo(a)anthracene	1/59	57
Benzo(b and k)fluoranthene	1/59	88
Chrysene	1/59	61
Total carcinogenic PAHs (b)	1/59	206
* noncarcinogenic PAHs		
Acenaphthene	1/59	92
Anthracene	1/59	580
Dibenzofuran	1/59	210
Fluoranthene	1/59	74
Fluorene	1/59	220
2-Methylnaphthalene	5/59	79-52,000
Naphthalene	4/59	56-53,000
Phenanthrene	6/59	43-620
Pyrene	2/59	89-140
Total noncarcinogenic PAHs (b)	9/59	840
* PCBs		
PCB-1016	5/58	620-29,500
PCB-1242	3/58	500-41,000
PCB-1248	3/58	470-22,000
PCB-1254	7/58	290-44,500
Total PCBs (b)	13/58	661-75,700
* Pentachlorophenol	1/59	370-370
* Phenol	1/59	120
* 1,1,2,2-Tetrachloroethane	2/60	3.0-5.0
* Tetrachloroethene	47/60	3.0-67,000
* Toluene	24/60	1.0-400,000
* 1,2,4-Trichlorobenzene	3/59	220-1,200,000
* 1,1,1-Trichloroethane	48/60	2.0-170,000
* 1,1,2-Trichloroethane	8/60	6.0-1,200
* Trichloroethene	54/60	6.0-750,000
* total Xylenes	12/60	5.0-229,500

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 60 indicate that some samples were rejected for QA/QC reasons.

(b) Total carcinogenic PAHs, total noncarcinogenic PAHs, and total PCBs found in each sample were determined for each sample location. The range of these totals was then determined. The carcinogenic PAHs were detected in the same sample.

* = Selected as chemical of potential concern.

TABLE 5 (Continued)
SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS DETECTED IN SUBSURFACE SOIL

Chemical	Frequency of Detection (a)	Range of Detected Concentration	Range of Background Concentration (b)
Inorganics (mg/kg):			
Aluminum	60/60	8,620-24,600	20,000-100,000
* Antimony	12/56	2.3-9.8	NA
* Arsenic	59/59	6.4-46.8	7.6-8.4
Barium	60/60	26.3-158	200-500
Beryllium	30/41	0.32-1.3	ND-2.0
* Cadmium	34/60	0.69-8.6	NA
* Calcium	60/60	416-53,900	1,900-3,600
Chromium	56/57	11.5-34.8	15-100
* Cobalt	60/60	8.7-19.9	3-10
* Copper	49/49	17.9-74.6	15-30
Iron	60/60	22,900-39,200	15,000-50,000
* Lead	45/45	9.8-177	15-30
* Magnesium	60/60	3,340-7,600	3,000-5,000
* Manganese	60/60	254-1,830	300-700
* Nickel	55/55	20.3-40.9	7-20
Potassium	60/60	616-1,810	10,000-17,300
* Selenium	11/52	0.43-2.3	0.2-0.6
* Silver	1/57	1.0	NA
Sodium	20/26	52.6-116	7,000
Vanadium	60/60	8.2-42.1	30-150
* Zinc	60/60	58.4-331	41-101

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 60 indicate that some samples were rejected for QA/QC reasons.
(b) Background concentrations for soil as presented in Table 2.

* = Selected as chemical of potential concern.
NA = Not available.
ND = Not detected.

TABLE 6

SOLVENT SAVERS RI REPORT
DIOXIN ISOMERS
FREQUENCY OF DETECTION ANALYSIS
SUBSURFACE SOIL SAMPLES

COMPOUND	NUMBER OF DETECTIONS/SAMPLES	RANGE OF VALUES (UG/KG)
TOTAL TCDD= TETRACHLORODIBENZODIOXIN	0/17	-
TOTAL PCDD= PENTACHLORODIBENZODIOXIN	1/17	0.199
TOTAL HxCDD= HEXACHLORODIBENZODIOXIN	2/17	0.271-1.270
TOTAL HpCDD= HEPTACHLORODIBENZODIOXIN	2/15	1.425-2.591
TOTAL OCDD= OCTACHLORODIBENZODIOXIN	2/11	5.035-7.835

TABLE 7

SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN GROUNDWATER

Chemical	Frequency of Detection (a)	Range of Detected Concentrations	Maximum Concentration in Background Wells (b)
Organics (ug/l):			
* Acetone	1/64	7,700	ND
* Benzene	19/64	7.6-610	ND
* Benzoic acid	2/64	40.0-75.0	ND
* sec-Butylbenzene	7/61	0.54-2.0	ND
* Carbon tetrachloride	1/64	63.0	ND
* Chlorobenzene	4/64	9.0-17.0	ND
* Chloroethane	5/64	13.0-38.0	ND
* Chloroform	16/64	130-2,500	ND
* 2-Chlorotoluene	1/61	0.96	ND
* 4-Chlorotoluene	1/61	1.1	ND
* 1,2-Dichlorobenzene	4/64	34.5-150	ND
* 1,3-Dichlorobenzene	5/63	0.54-2.4	ND
* 1,4-Dichlorobenzene	7/63	0.52-9.4	ND
* Dichlorodifluoromethane	8/10	1.7-85.0	ND
* 1,1-Dichloroethane	16/64	67.0-1,900	ND
* 1,2-Dichloroethane	6/64	14.0-45.0	ND
* 1,1-Dichloroethene	18/64	30.0-430	ND
* cis-1,2-Dichloroethene	22/61	5.9-27,000	ND
* trans-1,2-Dichloroethene	9/64	5.1-18.0	ND
* 2,4-Dichlorophenol	3/56	11.0-45.0	ND
* Ethylbenzene	10/64	12.0-170	ND
* bis(2-Ethylhexyl)phthalate	3/63	3.0-12.0	ND
* Isophorone	2/63	6.0-8.0	ND
* Isopropylbenzene	9/61	0.73-3.5	ND
* p-Isopropyltoluene	12/61	0.51-7.5	ND
* Methylene chloride	5/64	770-15,000	ND
* 4-Methyl-2-pentanone	8/64	47.0-670	ND
* 2-Methylphenol	4/56	15.0-75.0	ND
* 4-Methylphenol	2/55	8.0-10.0	ND
* noncarcinogenic PAHs			
2-Methylnaphthalene	3/63	3.0-28.0	ND
Naphthalene	4/64	16.0-91.0	ND
Total noncarcinogenic PAHs (d)	4/64	21.0	ND
* PCBs			
PCB-1232	3/62	2.3-72.0	ND
PCB-1242	1/62	12.0	ND
Total PCBs (d)	4/62	2.6-73.2	ND
* Phenol	5/57	8.0-25.0	ND
* n-Propylbenzene	7/61	0.77-4.7	ND
* Styrene	2/64	25.8-330	ND
* 1,1,1,2-Tetrachloroethane	7/61	0.67-4.8	ND
* 1,1,2,2-Tetrachloroethane	2/64	19.0-21.1	ND
* Tetrachloroethene	17/64	8.7-1,950	ND
* Toluene	10/64	330-3,500	ND
* 1,1,1-Trichloroethane	20/64	330-16,000	ND
* 1,1,2-Trichloroethane	10/64	27.0-170	ND
* Trichloroethene	20/64	2,600-57,000	ND
* Trichlorofluoromethane	22/61	0.55-240	ND
* 1,3,5-Trimethylbenzene	10/61	0.57-23.0	ND
* Vinyl chloride	9/64	7.4-32.0	ND
* total Xylenes	12/64	30.0-1,300	ND

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 52 indicate that some samples were rejected for QA/QC reasons.
(b) A statistical test of significance was performed using data from both background wells. Complete background data and t-test results are presented in Appendix C.
(c) If either total or dissolved concentrations exceeded background (see Appendix C) both total and dissolved chemicals were "'ed.
(d) Total carcinogenic PAHs, total noncarcinogenic PAHs, and total PCBs found in each sample were determined for each sample location. The range of these totals was then determined.

* = Selected as chemical of potential concern.
ND = Not detected.

TABLE 7 (Continued)
SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN GROUNDWATER

Chemical	Frequency of Detection (a)	Range of Detected Concentrations	Maximum Concentration in Background Wells (b)
Inorganics (ug/l) (c):			
* Aluminum (dissolved)	4/64	1,420-89,100	ND
* Aluminum (total)	52/64	609-141,000	13,900
** Arsenic (dissolved)	25/62	2.6-35.9	4.1
** Arsenic (total)	47/63	1.2-73.1	5.8
Barium (dissolved)	59/64	11.7-491	152
Barium (total)	61/64	12.7-1,100	278
* Beryllium (dissolved)	1/64	4.2	ND
* Beryllium (total)	19/64	0.75-6.2	ND
* Calcium (dissolved)	63/63	7,870-182,000	29,600
* Calcium (total)	63/63	7,640-261,000	40,900
* Chromium (dissolved)	5/64	6.0-150	ND
* Chromium (total)	46/64	5.0-254	22.5
* Cobalt (dissolved)	5/64	4.2-94.6	ND
* Cobalt (total)	34/64	4.1-151	11.9
** Iron (dissolved)	15/64	1,000-166,000	ND
** Iron (total)	60/64	808-254,000	25,000
* Lead (dissolved)	2/64	2,140-3,210	ND
* Lead (total)	2/64	736-1,140	ND
* Magnesium (dissolved)	62/64	948-39,700	3,580
* Magnesium (total)	64/64	809-82,400	7,720
* Manganese (dissolved)	49/64	58.0-11,800	71.7
* Manganese (total)	63/64	58.4-15,500	791
* Mercury (dissolved)	1/64	0.80	ND
* Mercury (total)	8/64	0.20-1.0	ND
* Nickel (dissolved)	1/63	240	ND
* Nickel (total)	13/64	99.0-406	ND
* Potassium (dissolved)	35/64	807-13,200	ND
* Potassium (total)	47/64	836-13,200	2,620
* Selenium (dissolved)	3/64	1.2-1.6	ND
Sodium (dissolved)	61/63	1,750-42,500	7,370
Sodium (total)	59/63	2,040-40,800	7,470
* Thallium (dissolved)	1/64	2.1	ND
* Vanadium (dissolved)	6/64	3.1-132	ND
* Vanadium (total)	45/64	3.2-219	20.8
* Zinc (dissolved)	9/64	3,230-31,000	ND
* Zinc (total)	12/64	2,970-17,400	ND

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 52 indicate that some samples were rejected for QA/QC reasons.
(b) A statistical test of significance was performed using data from both background wells. Complete background data and t-test results are presented in Appendix C.
(c) If either total or dissolved concentrations exceeded background (see Appendix C) both total and dissolved chemicals were "ed.

* = Selected as chemical of potential concern.
** = Present within background concentrations but above New York State drinking water standards therefore retained for evaluation (see Appendix C).
ND = Not detected.

TABLE 8

SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN RESIDENTIAL GROUNDWATER

Chemical	Frequency of Detection (a)	Range of Detected Concentrations	Maximum Concentration in Background Wells
LINDSEY			
Organics (ug/l):			
* Carbon disulfide	2/2	0.82-1.8	ND
* Chloroform	1/2	0.93	ND
* Chloromethane	2/2	1.4-1.9	ND
* 1,1-Dichloroethane	2/2	0.83-0.97	ND
Inorganics (ug/l):			
Barium (dissolved)	2/2	170-171	182
Barium (total)	2/2	210-216	278
Calcium (dissolved)	2/2	19,600	29,600
Calcium (total)	2/2	18,100-18,300	40,800
** Iron (total)	2/2	31,000-35,700	26,000
Magnesium (dissolved)	2/2	4,570-4,600	3,580
Magnesium (total)	2/2	4,230-4,290	7,720
Manganese (total)	2/2	104-113	791
* Potassium (dissolved)	2/2	1,370-1,390	ND
* Potassium (total)	2/2	1,350-1,420	2,620
* Sodium (dissolved)	2/2	31,500-31,800	7,370
* Sodium (total)	2/2	28,400-28,600	7,470
* Zinc (dissolved)	2/2	278	ND
* Zinc (total)	2/2	1,720-1,940	ND
PARKIN:			
Organics (ug/l):			
* cis-1,2-Dichloroethene	1/2	42.5	ND
Inorganics (ug/l):			
* Barium (dissolved)	2/2	407-421	182
* Barium (total)	2/2	407-414	278
Calcium (dissolved)	2/2	25,900-26,600	29,600
Calcium (total)	2/2	24,600-26,600	40,800
Magnesium (dissolved)	2/2	5,000-5,030	3,580
Magnesium (total)	2/2	4,860-5,030	7,720
Manganese (total)	1/2	29.4	791
* Potassium (dissolved)	2/2	674	ND
* Sodium (dissolved)	2/2	24,500-25,100	7,370
* Sodium (total)	2/2	23,400-24,800	7,470
SPRINGER:			
Inorganics (ug/l):			
Arsenic (dissolved)	2/2	4.0-4.9	4.10
Arsenic (total)	2/2	3.5-5.2	5.80
Barium (dissolved)	2/2	46.0-48.7	182
Barium (total)	2/2	46.7-46.9	278
Calcium (dissolved)	2/2	35,500-35,800	29,600
Calcium (total)	2/2	33,800-35,200	40,800
** Iron (total)	2/2	91.6-104	26,000
Magnesium (dissolved)	2/2	3,930-4,080	3,580
Magnesium (total)	2/2	3,910-3,950	7,720
Manganese (dissolved)	2/2	118-119	71.7
Manganese (total)	2/2	117-121	791
Sodium (dissolved)	1/2	2,600	7,370
Sodium (total)	2/2	2,370-3,090	7,470

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed.

* = Selected as chemical of potential concern.
** = Present at within background concentrations (see Appendix C) but at above New York State drinking water standards therefore retained for evaluation.
ND = Not detected.

TABLE 9

SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN MUD CREEK SEDIMENT AND SURFACE WATER

Chemical	Frequency of Detection (a)	Range of Concentrations Detected Downsteam of Site	Upstream Concentration
SEDIMENT			
Organics (ug/kg):			
* 4-Chloro-3-methylphenol	1/4	1,760	ND
* 2-Chlorophenol	1/4	1,560	ND
* 1,2-Dichlorobenzene	1/4	58.0	ND
* 1,4-Dichlorobenzene	1/4	712	ND
* total 1,2-Dichloroethene	3/4	1.0-7.5	ND
* 2,4-Dinitrotoluene	1/4	812	ND
* 4,4'-DDD	1/4	36.0	ND
* bis(2-Ethylhexyl)phthalate	1/4	1,160	ND
* Methylene chloride	1/4	140	ND
* 4-Nitrophenol	1/3	1,900	ND
* N-Nitroso-di-n-propylamine	1/4	875	ND
* carcinogenic PAHs			
Benzo(a)anthracene	1/4	200	ND
Benzo(b and k)fluoranthene	1/4	387	ND
Benzo(a)pyrene	1/4	210	ND
Chrysene	1/4	268	ND
Total carcinogenic PAHs (b)	1/4	1,063	ND
* noncarcinogenic PAHs			
Acenaphthene	1/4	712	ND
Fluoranthene	1/4	150	ND
2-Methylnaphthalene	1/4	86.0	ND
Naphthalene	1/4	110	ND
Phenanthrene	1/4	110	ND
Pyrene	1/4	912	ND
Total noncarcinogenic PAHs (b)	1/4	2,080	ND
* Pentachlorophenol	1/4	2,500	ND
* Phenol	1/4	1,460	ND
* 1,2,4-Trichlorobenzene	1/4	762	ND
* Trichloroethene	1/4	1.0-4.0	ND
Inorganics (mg/kg):			
Aluminum	4/4	12,300-14,400	13,800
* Arsenic	4/4	2.5-11.5	NA
Barium	4/4	54.1-89.8	62.8
Beryllium	4/4	0.90	0.79
Calcium	4/4	1,380-2,560	2,100
Chromium	4/4	18.8-20.9	21.0
Cobalt	4/4	10.6-12.6	12.0
Copper	4/4	11.0-18.0	19.3
Iron	4/4	24,500-35,600	36,100
Lead	4/4	9.5-11.7	11.5
Magnesium	4/4	3,540-4,980	5,170
Manganese	4/4	316-420	511
Nickel	4/4	23.6-32.0	36.1
Potassium	4/4	744-1,040	992
Vanadium	4/4	17.9-21.2	21.1
Zinc	4/4	74.3-87.7	89.7

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 4 indicate that some samples were rejected for QA/QC reasons.
(b) Total carcinogenic PAHs, total noncarcinogenic PAHs, and total PCBs found in each sample were determined for each sample location. The range of these totals was then determined.

* = Selected as chemical of potential concern.
NA = Not available.
ND = Not detected.

TABLE 9 (Continued)
SOLVENT SAVERS RI REPORT
CONCENTRATION OF CHEMICALS IN MUD CREEK
SEDIMENT AND SURFACE WATER

CHEMICAL	FREQUENCY OF DETECTION (a)	RANGE OF CONCENTRATIONS DETECTED DOWNSTREAM OF SITE	UPSTREAM CONCENTRATION
SURFACE WATER			
Organics (ug/L):			
* Benzene	2/4	0.60-0.65	ND
* 1,1-Dichloroethene	3/4	1.7-4.4	ND
* Tetrachloroethene	2/4	0.40-0.50	ND
* Trichloroethene	4/4	0.40-18.5	ND
Methylene Chloride	1/4	1.25	ND
Acetone	3/4	8.2-23	ND
Chloroform	1/4	3.5	ND
1,1,1-Trichloroethane	4/4	4.6-10.5	ND
Toluene	3/4	1.4-4.6	ND
1,2-Dichloroethene	4/4	11-39.5	ND
Xylene	2/4	0.4-0.7	ND
Inorganics (ug/L):			
* Aluminum	2/4	5,320	75.3
* Barium	4/4	18.0-60.4	18.7
Calcium	4/4	30,000-31,100	30,200
* Chromium	1/4	9.0	ND
* Cobalt	1/4	4.3	ND
* Iron	4/4	238-10,700	227
* Lead	1/4	6.1	ND
* Manganese	4/4	42.6-456	36.7
* Nickel	1/4	8.8	ND
Potassium	4/4	876-1,460	884
* Vanadium	1/4	8.2	ND
* Zinc	2/2	3.6-43.3	ND

(a) The number of samples in which the contaminant was detected divided by the total number of samples analyzed. Total number of samples less than 4 indicate that some samples were rejected for QA/QC reasons.

* Selected as chemical of potential concern.

ND Not Detected.

TABLE 10

SOLVENT SAVERS RI REPORT
CONCENTRATIONS OF CHEMICALS IN INTERMITTENT STREAM SEDIMENT AND SURFACE WATER

Chemical	Detected Concentration	Upstream Concentration (a)
SEDIMENT		
Inorganics (mg/kg):		
Barium	92.7	68.7
Beryllium	1.1	0.81
Calcium	1,490	1,600
Chromium	22.9	18.5
* Cobalt	28.3	11.7
Copper	14.9	15.6
Iron	52,400	30,000
* Lead	34.3	19.9
Magnesium	4,760	3,800
* Manganese	2,490	622
Nickel	32.0	25.8
Potassium	921	722
Vanadium	30.4	20.9
Zinc	116	85.4
SURFACE WATER		
Inorganics (ug/L):		
* Aluminum	2,550	75.3
Barium	34.4	18.7
Calcium	12,300	30,200
* Chromium	5.8	ND
* Iron	4,750	227
* Lead	3.3	ND
Magnesium	2,090	3,530
* Manganese	216	36.7
Potassium	909	884
* Vanadium	5.4	ND
* Zinc	19.3	3.1

(a) The upstream background concentration for surface water was taken upstream in Mud Creek.

* = Selected as chemical of potential concern.
ND = Not detected.

TABLE 11

SOLVENT SAVERS RI REPORT
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN

Chemical	Surface Soil	Subsurface Soil	Sediment	Surface Water	Groundwater
ORGANICS:					
Acetone	X	X			X
Benzene		X		X	X
Benzoic acid	X	X			X
Bromomethane		X			
2-Butanone	X	X			
sec-Butylbenzene					X
Butylbenzylphthalate	X	X			
di-n-Butylphthalate	X	X			
Carbon disulfide					X
Carbon tetrachloride					X
Chlorobenzene	X	X			X
Chloroethane					X
Chloromethane					X
Chloroform	X	X			X
4-Chloro-3-methylphenol			X		
2-Chlorophenol			X		
2-Chlorotoluene					X
4-Chlorotoluene					X
4,4'-DDD			X		
1,2-Dichlorobenzene		X	X		X
1,3-Dichlorobenzene		X			X
1,4-Dichlorobenzene		X	X		X
Dichlorodifluoromethane					X
1,1-Dichloroethane	X	X		X	X
1,2-Dichloroethane	X				X
1,1-Dichloroethene	X	X			X
cis-1,2-dichloroethene					X
trans-1,2-Dichloroethene					X
Total 1,2-Dichloroethene		X	X		
2,4-Dichlorophenol					X
2,4-Dinitrotoluene			X		
Ethylbenzene		X			X
bis(2-Ethylhexyl)phthalate	X	X	X		X
Hexachlorobenzene	X				
Isophorone		X			X
Isopropylbenzene					X
p-Isopropyltoluene					X
Methylene chloride	X	X	X		X
4-Methyl-2-pentanone					X
2-Methylphenol					X
4-Methylphenol		X			
4-Nitrophenol			X		
N-Nitroso-di-n-propylamine			X		
di-n-Octylphthalate		X			
Carcinogenic PAHs	X	X	X		
Noncarcinogenic PAHs	X	X	X		X
Total PCBs	X	X			X
Pentachlorophenol		X	X		
Phenol		X	X		X
n-Propylbenzene					X
Styrene					X
1,1,1,2-Tetrachloroethane					X
1,1,2,2-Tetrachloroethane		X			X
Tetrachloroethene	X	X		X	X
Toluene	X	X			X
1,2,4-Trichlorobenzene		X	X		
1,1,1-Trichloroethane	X	X		X	X
1,1,2-Trichloroethane	X	X			X
Trichloroethene	X	X	X	X	X
Trichlorofluoromethane					X
1,3,5-Trimethylbenzene					X
Vinyl chloride					X
Total Xylenes		X			

TABLE 11 (Continued)
SOLVENT SAVERS R1 REPORT
SUMMARY OF CHEMICALS OF POTENTIAL CONCERN

Chemical	Surface Soil	Subsurface Soil	Sediment	Surface Water	Groundwater
INORGANICS:					
Aluminum				X	X
Antimony		X			
Arsenic	X	X	X		X
Barium				X	X
Beryllium					X
Cadmium	X	X			
Calcium		X			X
Chromium	X			X	X
Cobalt	X	X	X	X	X
Copper	X	X			
Cyanide	X				
Iron				X	X
Lead	X	X	X	X	X
Magnesium	X	X			X
Manganese	X	X	X	X	X
Mercury	X				X
Nickel	X	X		X	X
Potassium					X
Selenium		X			
Silver		X			X
Sodium					X
Thallium				X	X
Vanadium				X	X
Zinc	X	X			

TABLE 12

SOLVENT SAVERS RI REPORT
SUMMARY OF MONITORING WELL CONSTRUCTION
(PAGE 1 OF 2)

Well I.D.	Depth of Well (Ft. Below Grade)	Depth of Screened Interval (Ft. Below Grade)	Elevation of Screened Interval (Ft. MSL)
301S	16	6-16	1191.7-1181.7
301B	42.6	32.6-42.6	1165.3-1155.3
302S	17	7-17	1183.1-1173.1
302I	40	30-40	1160.0-1150.0
303S	15.7	5.7-15.7	1167.0-1157.0
304S	37	27-37	1184.8-1154.8
304D	108	98-108	1093.5-1083.5
305D	110	100-110	1104.5-1094.5
306S	14.8	4.8-14.8	1163.9-1153.9
307S	17.1	7.1-17.1	1158.7-1148.7
307D	88.5	78.5-88.5	1087.2-1077.2
308S	15.6	5.6-15.6	1158.7-1148.7
308D	54	44-54	1120.3-1110.3
308B	128	118-128	1046.3-1036.3
309S	17	7-17	1157.1-1147.1
309D	119.5	109.5-119.5	1055.4-1045.4
310S	45	35-45	1169.1-1159.1
310I	72.7	62.7-72.7	1141.4-1131.4
311	103	62-103	1158.0-1099.0

TABLE 12

SOLVENT SAVERS RI REPORT
SUMMARY OF MONITORING WELL CONSTRUCTION
(PAGE 2 OF 2)

Well I.D.	Depth of Well (Ft. Below Grade)	Depth of Screened Interval (Ft. Below Grade)	Elevation of Screened Interval (Ft. MSL)
101	42	37-42	1164.8-1159.8
102	11	6-11	1170.0-1165.0
103	28	23-28	1162.5-1157.5
104A	67	62-67	1143.4-1138.4
104B	50	47-50	1158.3-1155.3
105	47	42-47	1157.3-1152.3
106	35	30-35	1159.2-1154.2
201	58	43-58	1160.5-1145.5
202	27	7-27	1172.3-1152.3
203A	73	53-73	1114.7-1094.7
203B	25	15-25	1152.6-1142.6
204	34	24-34	1162.2-1152.2
205A	73	61-73	1105.6-1093.6
205B	15	7-15	1159.3-1151.3
206A	74	59-74	1107.1-1092.1
206B	25	15-25	1151.2-1141.2

TABLE 13

SOLVENT SAVERS RI REPORT
ASSUMPTIONS USED TO ESTIMATE EXPOSURE FOR DIRECT CONTACT WITH SURFACE SOILS BY CHILDREN PLAYING ON THE SITE

Parameter	Exposure Assumption
Exposure Frequency (a)	120 days/year
Exposure Duration (b)	10 years
Soil Ingestion Rate (c)	110 mg/day
Skin Surface Area (d)	5,870 cm2/day
Soil to Skin Adherence Factor (e)	1.45 mg/cm2
Soil contact rate	8,510 mg/day
Body weight (f)	38 kg
Lifetime (g)	70 years
Relative oral absorption fraction for soil matrix:	
Arsenic (h)	0.8
PCBs, PAHs, bis(2-Ethylhexyl)phthalate (i)	0.5
Other chemicals of concern (j)	1.0
Dermal absorption fraction:	
Carcinogenic PAHs (k)	0.02
Noncarcinogenic PAHs (k)	0.05
PCBs (k)	0.07
bis(2-Ethylhexyl)phthalate (k)	0.03
Other phthalates (l)	0.05
Benzoic acid (m)	0.36
Other organics (l)	0.1
Inorganics (l)	0

(a) Based on five times per week during summer (13 weeks) and three times per week during spring and fall when the minimum temperature is greater than 32 degrees F (18.3 weeks).
(b) Based on age range 6-15.
(c) Weighted average lifetime ingestion rates based on EPA (1989a).
(d) Based on surface area of the hands, arms and legs. Calculated from data in EPA (1989b).
(e) Based on EPA (1989a).
(f) Calculated from EPA (1989b).
(g) Based on EPA (1989a) standard assumption for a lifetime.
(h) An oral absorption factor of 0.8 is used for arsenic because its oral cancer potency factor is based on an absorbed dose.
(i) Based on data on 2,3,7,8-TCDD (Poiger and Schlatter 1980, Wendling et al. 1989, McConnell et al. 1984).
(j) Default value.
(k) Based on data from Yang et al. (1986a,b), Wester et al. (1987), and Poiger and Schlatter (1980).
(l) Assumed value.
(m) Based on Feldman and Maibach (1970).

TABLE 14

SOLVENT SAVERS RI REPORT
ASSUMPTIONS USED TO ESTIMATE RESIDENTIAL
GROUNDWATER INGESTION EXPOSURES

Parameter	Exposure Assumption
Ingestion Rate (a)	2 L/day
Exposure Frequency	365 days/year
Exposure Duration (b)	30 years
Body Weight (c)	70 kg
Lifetime (d)	70 years

(a) Based on EPA (1989a) values for adult ingestion.
(b) Based on EPA (1989a) values for maximum duration for residents in the same place.
(c) Based on EPA (1989a) standard assumption for adult body weight.
(d) Based on EPA (1989a) standard assumption for a lifetime.

TABLE 15

SOLVENT SAVERS RI REPORT
ASSUMPTIONS USED TO ESTIMATE EXPOSURE FOR
DIRECT CONTACT WITH SEDIMENTS BY CHILDREN

Parameter	Exposure Assumption
Frequency of Exposure (a)	88 days/year
Period of Exposure (b)	10 years
Soil Ingestion Rate (c)	110 mg/day
Area of skin exposed (d)	6,780 cm2/day
Soil accumulation rate (e)	1.45 mg/cm2
Soil contact rate	9,830 mg/day
Body weight (f)	38 kg
Lifetime (g)	70 year
Relative oral absorption fraction for soil matrix:	
Arsenic (h)	0.8
PAHs, bis(2-Ethylhexyl)phthalate (i)	0.5
Inorganics, other organics (j)	1.0
Dermal absorption fraction:	
Carcinogenic PAHs (k)	0.02
Noncarcinogenic PAHs (k)	0.05
bis(2-Ethylhexyl)phthalate (k)	0.03
Phenol (l)	0.03
Phenolic compounds (m)	0.03
DDT (k)	0.02
Other organics (n)	0.1
Inorganics (n)	0

(a) Based on four times per week during May through September
(b) Based on age range 6-15.
(c) Weighted average lifetime ingestion rates based on EPA (1989a).
(d) Based on surface area of the arms, hands, legs, and feet. Calculated from data in EPA (1989b).
(e) Based on EPA (1989a).
(f) Calculated from EPA (1989b).
(g) Based on EPA (1989a) standard assumption for lifetime.
(h) An oral absorption factor of 0.8 is used for arsenic because its oral cancer potency factor is based on an absorbed dose.
(i) Based on data on 2,3,7,8-TCDD (Poiger and Schlatter 1980, Wendling et al. 1989, McConnell et al. 1984).
(j) Default value.
(k) Based on data from Yang et al. (1986a,b), Wester et al. (1987), and Poiger and Schlatter (1980).
(l) Based on Feldman and Maibach (1970).
(m) Based on Roberts et al. (1977).
(n) Assumed value.

TABLE 16

SOLVENT SAVERS RI REPORT
ASSUMPTIONS USED TO ESTIMATE EXPOSURE
DIRECT CONTACT WITH SURFACE WATER BY CHILDREN

Parameter	Exposure Assumption
Exposure Frequency (a)	88 days/year
Exposure Duration (b)	10 years
Area of Skin Exposed (c)	6,780 cm2
Permeability Constant (d)	8E-04 cm/hour
Exposure Length (e)	2.6 hours/day
Body weight (f)	38 kg
Lifetime (g)	70 years

(a) Based on four times per week from May through September.
(b) Based on age range 6-15.
(c) Based on surface area of the arms, hands, legs, and feet. Calculated from data in EPA (1989b).
(d) Value for water (Blank et al. 1984 as cited in EPA 1989a). Assumes chemicals in water are absorbed at the same rate as water itself.
(e) Based on EPA (1989a).
(f) Calculated from EPA (1989b).
(g) Based on EPA (1989a) standard assumption for lifetime.

TABLE 17

SOLVENT SAVERS RI REPORT
ASSUMPTIONS USED TO ESTIMATE EXPOSURE FOR
DIRECT CONTACT WITH SOILS BY RESIDENTS

Parameter	Exposure Assumption
Exposure Frequency (a)	94 days/year
Exposure Duration (b)	30 years
Soil Ingestion Rate (c)	120 mg/day
Skin Surface Area (d)	4,790 cm2/day
Soil to Skin Adherence Factor (c)	1.45 mg/cm2
Soil contact rate	6,950 mg/day
Body weight (c)	48 kg
Lifetime (e)	70 years
Relative oral absorption fraction for soil matrix:	
PCBs, PAHs, bis(2-Ethylhexyl)phthalate (f)	0.5
Other chemicals of concern (g)	1.0
Dermal absorption fraction:	
Carcinogenic PAHs (h)	0.02
Noncarcinogenic PAHs (h)	0.05
PCBs (h)	0.07
bis(? Ethylhexyl)phthalate (h)	0.03
Other phthalates (i)	0.05
Benzoic acid (j)	0.36
Phenol (j)	0.03
Phenolic compounds (k)	0.03
Other organics (i)	0.1
Inorganics (i)	0

(a) Based on three times per week when the minimum temperature is greater than 32 degrees F (e.g., 219 days * 3/7).
(b) Based on EPA (1989a) values for maximum duration for residents in the same place.
(c) Based on EPA (1989a).
(d) Based on surface area of the hands, arms, and legs for children (1 to 18 years) and surface area of the hands, forearms, and lower legs for adults. Calculated from data in EPA (1989b).
(e) Based on EPA (1989a) standard assumption for a lifetime.
(f) Based on data on 2,3,7,8-TCDD (Poiger and Schlatter 1980, Wendling et al. 1989, McConnell et al. 1984).
(g) Default value.
(h) Based on data from Yang et al. (1986a,b), Wester et al. (1987), and Poiger and Schlatter (1980).
(i) Assumed value.
(j) Based on Feldman and Maibach (1970).
(k) Based on Roberts et al. (1977).

TABLE 18

SOLVENT SAVERS RI REPORT
ASSUMPTIONS USED TO ESTIMATE EXPOSURE
FOR ON-SITE INHALATION BY RESIDENTS

Parameter	Exposure Assumption
Inhalation Rate (a)	30 m3/day
Exposure Frequency	365 days/year
Exposure Duration (b)	30 years
Body Weight (c)	70 kg
Lifetime (d)	70 years

(a) Suggested upper bound value (EPA 1989a).

(b) Based on EPA (1989a) values for maximum duration for residents in the same place.

(c) Based on EPA (1989a) standard assumption for adult body weight.

(d) Based on EPA (1989a) standard assumption for a lifetime.

TABLE 19

SOLVENT SAVERS RI REPORT
HEALTH EFFECTS CRITERIA FOR ORAL EXPOSURE TO CHEMICALS OF POTENTIAL CONCERN

Chemical	Reference Dose (RfD) (mg/kg-day)	Safety Factor (a)	Source (b)	Slope Factor (mg/kg-day)-1	Source (b)	Weight of Evidence (c)
Organic:						
Acetone	0.1	1,000	IRIS	--	--	--
Benzene	-- *	--	--	0.029	IRIS	A
Benzoic acid	4	1	IRIS	--	--	--
Bromomethane	0.0014	1,000	IRIS	--	--	--
2-Butanone	0.05	1,000	IRIS	--	--	--
sec-Butylbenzene	--	--	--	--	--	--
Butylbenzylphthalate	0.2	1,000	IRIS	--	IRIS	C
di-n-Butylphthalate	0.1	1,000	IRIS	--	--	--
Carbon disulfide	0.1	100	IRIS	--	--	--
Carbon tetrachloride	0.0007	1,000	IRIS	0.13	IRIS	B2
Chlorobenzene	0.02	1,000	IRIS	--	--	--
Chloroethane	--	--	--	--	--	--
Chloromethane	--	--	--	0.013	HEA (d)	C
Chloroform	0.01	1,000	IRIS	0.0061	IRIS	B2
4-Chloro-3-methylphenol	--	--	--	--	--	--
2-Chlorophenol	0.005	1,000	IRIS	--	--	--
2-Chlorotoluene	--	--	--	--	--	--
4-Chlorotoluene	--	--	--	--	--	--
	0.0005	100	IRIS	0.34	IRIS	B2
1,2-Dichlorobenzene	0.09	1,000	IRIS	--	--	--
1,3-Dichlorobenzene	--	--	--	--	--	--
1,4-Dichlorobenzene	--	--	--	0.024	HEA	B2
Dichlorodifluoromethane	0.2	100	IRIS	--	--	--
1,1-Dichloroethane	0.1	1,000	HEA	0.091	HEA	B2
1,2-Dichloroethane	--	--	--	0.091	IRIS	B2
1,1-Dichloroethene	0.009	1,000	IRIS	0.6	IRIS	C
1,2-Dichloroethene (total):	--	--	--	--	--	--
cis-						
trans-	0.02	1,000	IRIS	--	--	--
2,4-Dichlorophenol	0.003	100	IRIS	--	--	--
2,4-Dinitrotoluene	--	--	--	0.68	HEA	B2
Ethylbenzene	0.1	1,000	IRIS	--	--	--
bis(2-Ethylhexyl)phthalate	0.02	1,000	IRIS	0.014	IRIS	B2
Hexachlorobenzene	0.0008	100	IRIS	1.7	HEA	B2
Isophorone	0.2	1,000	IRIS	0.0041 *	HEA	C
Isopropylbenzene	--	--	--	--	--	--
p-Isopropyltoluene	--	--	--	--	--	--
Methylene chloride	0.06	100	IRIS	0.0075	IRIS	B2
4-Methyl-2-pentanone	0.05	1,000	IRIS	--	--	--
2-Methylphenol	0.05	1,000	IRIS	--	--	--
4-Methylphenol	0.05	1,000	IRIS	--	--	--
4-Nitrophenol	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	--	--	--	7	IRIS	B2
di-n-Octylphthalate	--	--	--	--	--	--
Carcinogenic PAHs (e) (as Benzo[a]pyrene)	--	--	--	11.5 *	HEA (f)	B2
Noncarcinogenic PAHs (e) (as Naphthalene)	0.4 *	100	HEA	--	--	--
PCBs (total)	0.0001	100	(g)	7.7	IRIS	B2
Pentachlorophenol	0.03	100	IRIS	-- *	--	--
Phenol	0.6	100	IRIS	--	--	--
n-Propylbenzene	--	--	--	--	--	--
Styrene	0.2	1,000	IRIS	--	--	--
1,1,1,2-Tetrachloroethane	0.003	3,000	IRIS	0.026	IRIS	C
1,1,2,2-Tetrachloroethane	--	--	--	0.2	IRIS	C
Tetrachloroethene	0.01	1,000	IRIS	0.051 *	HEA	B2
Toluene	0.3	100	IRIS	--	--	--
1,2,4-Trichlorobenzene	0.02	1,000	HEA	--	--	--
1,1,1-Trichloroethane	0.09	1,000	IRIS	--	--	--
1,1,2-Trichloroethane	0.004	1,000	IRIS	0.057	IRIS	C
Trichloroethene	--	--	--	0.011	HEA	B2
Trichlorofluoromethane	0.3	1,000	IRIS	--	--	--
1,2,4-Trimethylbenzene	--	--	--	--	--	--
1,3,5-Trimethylbenzene	--	--	--	--	--	--
Vinyl chloride	--	--	--	2.3	HEA	A
Xylenes (total)	2	100	IRIS	--	--	--

TABLE 19 (Continued)
SOLVENT SAVERS RI REPORT
HEALTH EFFECTS CRITERIA FOR ORAL EXPOSURE TO CHEMICALS OF POTENTIAL CONCERN

Chemical	Reference Dose (RfD) (mg/kg-day)	Safety Factor (a)	Source (b)	Slope Factor (mg/kg-day)$^{-1}$	Source (b)	Weight of Evidence (c)
Inorganics:						
Aluminum	--	--	--	--	--	--
Antimony	0.0004	1,000	IRIS	--	--	--
Arsenic (h)	0.001 *	1	HEA	2	(i)	A
Barium	0.05	100	IRIS	--	--	--
Beryllium	0.005	100	IRIS	--	IRIS	B2
Cadmium	0.001 (j) 0.0005 (water)	10	HEA	-- (k)	--	--
Calcium	--	--	--	--	--	--
Chromium (e):						
Chromium (III)	1	1,000	IRIS	--	--	--
Chromium (VI)	0.005	500	IRIS	-- (k)	--	--
Cobalt	--	--	--	--	--	--
Copper	--	--	--	--	--	--
Cyanide	0.02	500	HEA	--	--	--
Iron	--	--	--	--	--	--
Lead	--	--	--	--	IRIS	B2
Magnesium	--	--	--	--	--	--
Manganese	0.2	100	HEA	--	--	--
Mercury (e):						
Inorganic & alkyl	0.0003	10	IRIS	--	--	--
[illegible] (organic)	0.0003	10	IRIS	--	--	--
[illegible]	0.0003 *	1,000	HEA	--	--	--
Nickel	0.02	300	IRIS	--	--	--
Potassium	--	--	--	--	--	--
Selenium	0.003 *	15	HEA	--	--	--
Silver	0.003	2	IRIS	--	--	--
Sodium	--	--	--	--	--	--
Thallium	0.00007	3,000	HEA	--	--	--
Vanadium	0.007	100	HEA	--	--	--
Zinc	0.2	10	HEA	--	--	--

* = Pending/under review.
-- = Criterion has not been developed for this chemical.

(a) Safety factors are the products of uncertainty factors and modifying factors. Uncertainty factors used to develop reference doses generally consist of multiples of 10, with each factor representing a specific area of uncertainty in the data available. The standard uncertainty factors include the following:
- a 10-fold factor to account for the variation in sensitivity among the members of the human population;
- a 10-fold factor to account for the uncertainty in extrapolating animal data to the case of humans;
- a 10-fold factor to account for uncertainty in extrapolating from less-than-chronic NOAELs to chronic NOAELs; and
- a 10-fold factor to account for the uncertainty in extrapolating from LOAELs to NOAELs.

Modifying factors are applied at the discretion of the reviewer to cover other uncertainties in the data.

(b) IRIS = the chemical files of EPA's Integrated Risk Information System (as of 12/01/89); and HEA = Health Effects Assessment Summary Tables (04/01/89).

(c) EPA weight of evidence classification scheme for carcinogens: A--Human Carcinogen, sufficient evidence from human epidemiological studies; B1--Probable Human Carcinogen, limited evidence from epidemiological studies and adequate evidence from animal studies; B2--Probable Human Carcinogen, inadequate evidence from epidemiological studies and adequate evidence from animal studes; C--Possible Human Carcinogen, limited evidence in animals in the absence of human data; D--Not Classified as to human carcinogenicity; and E--Evidence of Noncarcinogenicity.

(d) Based on route-to-route extrapolation.

(e) For these chemical mixtures, toxicity data for one of the most toxic compounds in the mixture is used to represent the entire mixture, e.g., benzo(a)pyrene for carcinogenic PAHs, naphthalene for noncarcinogenic PAHs, trans-1,2-dichloroethene for 1,2-dichloroethene (total), and chromium VI for total chromium. For mercury, all three forms for which toxicity criteria are available have the same reference dose.

(f) Health Effects Assessment for Benzo(a)pyrene, Environmental Criteria and Assessment Office, Cincinnati, Ohio. EPA 540/1-86-046.

(g) Calculated by Clement Associates based on data in Barsotti, A., and Van Miller, J. P. 1984. Accumulation of commercial polychlorinated biphenyl mixture (Aroclor 1016) in adult rhesus monkeys and their nursing infants. Pathology, 30(1984) 31-44. Received conditional site-specific approval from EPA Environmental Criteria and Assessment Office by Dr. Choudhury January 1989.

(h) The chronic daily intake for arsenic is based on an absorbed dose, because the toxicity criteria are based on absorbed doses. Eighty% absorption from ingested soil was assumed based on EPA (1984).

(i) EPA. 1988. Special Report on Ingested Inorganic Arsenic. Skin Cancer; Nutritional Essentiality. Risk Assessment Forum, U.S. Environmental Protection Agency, Washington, D.C.

(j) In accordance with EPA guidance, the listed cadmium RfD is used for exposures to food and other nonaqueous materials (i.e., soil).

(k) There is inadequate evidence for carcinogenicity of this compound by the oral route.

TABLE 20

SOLVENT SAVERS RI REPORT

HEALTH EFFECTS CRITERIA FOR INHALATION EXPOSURE TO CHEMICALS OF POTENTIAL CONCERN

Chemical	Reference Dose — (RfD) (mg/kg-day)	Safety Factor (a)	Source (b)	Slope Factor (mg/kg-day)-1	Source (b)	Weight of Evidence (c)
Organic:						
Acetone	--	--	--	--	--	--
Benzene	--	--	--	0.029	IRIS	A
Benzoic acid	--	--	--	--	--	--
Bromomethane	0.008	1,000	HEA	--	--	--
2-Butanone	0.09	1,000	HEA	--	--	--
sec-Butylbenzene	--	--	--	--	--	--
Butylbenzylphthalate	--	--	--	--	IRIS	C
di-n-Butylphthalate	--	--	--	--	--	--
Carbon disulfide	--	--	--	--	--	--
Carbon tetrachloride	--	--	--	0.13	IRIS	B2
Chlorobenzene	0.005	1,000	HEA	--	--	--
Chloroethane	--	--	--	--	--	--
Chloromethane	--	--	--	--	--	--
Chloroform	--	--	--	0.081	IRIS	B2
4-Chloro-3-methylphenol	--	--	--	--	--	--
2-Chlorophenol	--	--	--	--	--	--
2-Chlorotoluene	--	--	--	--	--	--
4-Chlorotoluene	--	--	--	--	--	--
DDT	--	--	--	0.34	IRIS	B2
1,2-Dichlorobenzene	0.04	1,000	HEA	--	--	--
1,3-Dichlorobenzene	--	--	--	--	--	--
1,4-Dichlorobenzene	0.2 * (d)	100	HEA	--	HEA	B2
Dichlorodifluoromethane	0.05	10,000	HEA	--	--	--
1,1-Dichloroethane	0.1	1,000	HEA	--	--	--
1,2-Dichloroethane	--	--	--	0.091	IRIS	B2
1,1-Dichloroethene	--	--	--	1.2	IRIS	C
1,2-Dichloroethene (total):						
cis-	--	--	--	--	--	--
trans-	--	--	--	--	--	--
2,4-Dichlorophenol	--	--	--	--	--	--
2,4-Dinitrotoluene	--	--	--	--	HEA	B2
Ethylbenzene	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	--	--	--	--	IRIS	B2
Hexachlorobenzene	--	--	--	--	--	--
Isophorone	--	--	--	--	HEA	C
Isopropylbenzene	--	--	--	--	--	--
p-Isopropyltoluene	--	--	--	--	--	--
Methylene chloride	0.86 (d)	100	HEA	0.014	IRIS	B2
4-Methyl-2-pentanone	0.02	1,000	IRIS	--	--	--
2-Methylphenol	--	--	--	--	--	--
4-Methylphenol	--	--	--	--	--	--
4-Nitrophenol	--	--	--	--	--	--
N-Nitroso-di-n-propylamine	--	--	--	--	--	--
di-n-Octylphthalate	--	--	--	--	--	--
Carcinogenic PAHs (e) (as Benzo[a]pyrene)	--	--	--	6.1 *	HEA (f)	B2
Noncarcinogenic PAHs (as Naphthalene)	--	--	--	--	--	--
PCBs	--	--	--	--	--	--
Pentachlorophenol	--	--	--	-- *	--	--
Phenol	--	--	--	--	--	--
n-Propylbenzene	--	--	--	--	--	--
Styrene	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	--	--	--	0.026	IRIS	C
1,1,2,2-Tetrachloroethane	--	--	--	0.2	IRIS	C
Tetrachloroethene	--	--	--	0.0033 *	HEA	B2
Toluene	0.57 (d)	100	HEA	--	--	--
1,2,4-Trichlorobenzene	0.003	1,000	HEA	--	HEA	B2
1,1,1-Trichloroethane	0.3	1,000	HEA	--	--	--
1,1,2-Trichloroethane	--	--	--	0.057	IRIS	C
Trichloroethene	--	--	--	0.0046	HEA (g)	B2
Trichlorofluoromethane	0.2	10,000	HEA	--	--	--
1,2,4-Trimethylbenzene	--	--	--	--	--	--
1,3,5-Trimethylbenzene	--	--	--	--	--	--
Vinyl chloride	--	--	--	0.295 (h)	IRIS	A
Xylenes (total)	--	--	--	--	--	--

TABLE 20 (Continued)
SOLVENT SAVERS RI REPORT
HEALTH EFFECTS CRITERIA FOR INHALATION EXPOSURE TO CHEMICALS OF POTENTIAL CONCERN

Chemical	Reference Dose (RfD) (mg/kg-day)	Safety Factor (a)	Source (b)	Slope Factor (mg/kg-day)-1	Source (b)	Weight of Evidence (c)
Inorganic:						
Aluminum	--	--	--	--	--	--
Antimony	--	--	--	--	--	--
Arsenic	--	--	--	50	IRIS	A
Barium	0.0001	1,000	HEA	--	--	--
Beryllium	--	--	--	8.4	IRIS	B2
Cadmium	--	--	--	6.1	IRIS	B1
Calcium	--	--	--	--	--	--
Chromium (e):						
Chromium (III)	--	--	--	--	--	--
Chromium (VI)	--	--	--	41	IRIS	A
Cobalt	--	--	--	--	--	--
Copper	--	--	--	--	--	--
Cyanide	--	--	--	--	--	--
Iron	--	--	--	--	--	--
Lead	--	--	--	--	IRIS	B2
Magnesium	--	--	--	--	--	--
Manganese	0.0003	100	HEA	--	--	--
Mercury:						
Inorganic & alkyl	--	--	--	--	--	--
Methyl (organic)	--	--	--	--	--	--
Inorganic mercurial	--	--	--	--	--	--
Nickel	--	--	--	--	--	--
Potassium	--	--	--	--	--	--
Selenium	0.001	10	HEA	--	--	--
Silver	--	--	--	--	--	--
Sodium	--	--	--	--	--	--
Thallium	--	--	--	--	--	--
Vanadium	--	--	--	--	--	--
Zinc	--	--	--	--	--	--

* = Pending/under review.
-- = Criterion has not been developed for this chemical.

(a) Safety factors are the products of uncertainty factors and modifying factors. Uncertainty factors used to develop reference doses generally consist of multiples of 10, with each factor representing a specific area of uncertainty in the data available. The standard uncertainty factors include the following:
- a 10-fold factor to account for the variation in sensitivity among the members of the human population;
- a 10-fold factor to account for the uncertainty in extrapolating animal data to the case of humans;
- a 10-fold factor to account for uncertainty in extrapolating from less-than-chronic NOAELs to chronic NOAELs; and
- a 10-fold factor to account for the uncertainty in extrapolating from LOAELs to NOAELs.

Modifying factors are applied at the discretion of the reviewer to cover other uncertainties in the data.

(b) IRIS = the chemical files of EPA's Integrated Risk Information System (as of 12/01/89); and HEA = Health Effects Assessment Summary Tables (04/01/89).

(c) EPA weight of evidence classification scheme for carcinogens: A--Human Carcinogen, sufficient evidence from human epidemiological studies; B1--Probable Human Carcinogen, limited evidence from epidemiological studies and adequate evidence from animal studies; B2--Probable Human Carcinogen, inadequate evidence from epidemiological studies and adequate evidence from animal studies; C--Possible Human Carcinogen, limited evidence in animals in the absence of human data; D--Not Classified as to human carcinogenicity; and E--Evidence of Noncarcinogenicity.

(d) Inhalation RfD's in mg/m3 were converted to units of mg/kg-day by assuming a 70-kg adult inhales 20 m3 of air each day.

(e) For these chemical mixtures, toxicity data for one of the most toxic compounds in the mixture is used to represent the entire mixture, e.g., benzo(a)pyrene for carcinogenic PAHs and chromium VI for total chromium.

(f) Health Effects Assessment for Benzo(a)pyrene, Environmental Criteria and Assessment Office, Cincinnati, Ohio. EPA 540/1-86-046.

(g) Belliles, R. 1988. Personal communication with Dr. Robert Belliles, Carcinogen Assessment Group, EPA. Also in the EPA 1984 Health Effects Assessment for Trichloroethylene, Environmental Criteria and Assessment Office, Cincinnati, Ohio. EPA/540/1-86-046.

(h) Based on metabolized dose.

TABLE 21

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT WITH SURFACE SOILS BY CHILDREN

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		SLOPE FACTOR (mg/kg-day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
Chloroform	5.44E-10	4.21E-09	6.10E-03	2.9E-11
1,1-Dichloroethane	4.89E-10	3.79E-09	9.10E-02	3.9E-10
1,2-Dichloroethane	6.53E-10	5.05E-09	9.10E-02	5.2E-10
1,1-Dichloroethene	4.08E-10	3.16E-09	6.00E-01	2.1E-09
bis(2-Ethylhexyl)phthalate	6.56E-07	3.04E-06	1.40E-02	5.2E-08
Hexachlorobenzene	4.89E-08	3.79E-07	1.70E+00	7.3E-07
Methylene chloride	2.43E-09	1.88E-08	7.50E-03	1.6E-10
Carcinogenic PAHs	7.33E-08	2.22E-07	1.15E+01	3.4E-06
Total PCBs	4.38E-04	4.74E-03	7.70E+00	3.9E-02
Tetrachloroethene	4.23E-08	3.27E-07	5.10E-02	1.9E-08
1,1,2-Trichloroethane	4.74E-08	3.67E-07	5.70E-02	2.4E-08
Trichloroethene	1.51E-06	1.17E-05	1.10E-02	1.5E-07
Arsenic	1.27E-06	NC	2.00E+00	2.5E-06
Total Excess Cancer Risk				4E-02

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
Acetone	1.91E-08	1.48E-07	1.00E-01	1.7E-06
Benzoic acid	6.19E-07	1.72E-05	4.00E+00	4.5E-06
2-Butanone	1.24E-08	9.57E-08	5.00E-02	2.2E-06
Butylbenzylphthalate	3.27E-07	1.27E-06	2.00E-01	8.0E-06
di-n-Butylphthalate	3.03E-07	1.17E-06	1.00E-01	1.5E-05
Chlorobenzene	2.86E-09	2.21E-08	2.00E-02	1.2E-06
Chloroform	3.81E-09	2.95E-08	1.00E-02	3.3E-06
1,1-Dichloroethane	3.43E-09	2.65E-08	1.00E-01	3.0E-07
1,1-Dichloroethene	2.86E-09	2.21E-08	9.00E-03	2.8E-06
bis(2-Ethylhexyl)phthalate	4.59E-06	2.13E-05	2.00E-02	1.3E-03
Hexachlorobenzene	3.43E-07	2.65E-06	8.00E-04	3.7E-03
Methylene chloride	1.70E-08	1.32E-07	6.00E-02	2.5E-06
Noncarcinogenic PAHs	4.90E-07	3.79E-06	4.00E-01	1.1E-05
Total PCBs	3.06E-03	3.32E-02	1.00E-04	3.6E-02
Tetrachloroethene	2.96E-07	2.29E-06	1.00E-02	2.6E-04
Toluene	6.99E-08	5.41E-07	3.00E-01	2.0E-06
1,1,1-Trichloroethane	1.27E-06	9.79E-06	9.00E-02	1.2E-04
1,1,2-Trichloroethane	3.32E-07	2.57E-06	4.00E-03	7.3E-04
Arsenic	8.91E-06	NC	1.00E-03	8.9E-03
Cadmium	4.47E-06	NC	1.00E-03	4.5E-03
Chromium	1.28E-04	NC	5.00E-03	2.6E-02
Cyanide	2.95E-06	NC	2.00E-02	1.5E-04
Manganese	8.19E-04	NC	2.00E-01	4.1E-03
Mercury	6.09E-06	NC	3.00E-04	2.0E-02
Nickel	4.35E-05	NC	2.00E-02	2.2E-03
Zinc	2.24E-04	NC	2.00E-01	1.1E-03
Total Hazard Index				4E+02

NC = Not calculated.

TABLE 22

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
INGESTION OF GROUNDWATER IN RESIDENTIAL WELLS

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) USING THE MAXIMUM (a) (mg/kg-day)	SLOPE FACTOR (mg/kg/day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
LINDSEY:			
Chloroform	6.49E-06	6.10E-03	4.0E-08
Chloromethane	2.33E-05	1.30E-02	3.0E-07
1,1-Dichloroethane	1.19E-05	9.10E-02	1.1E-06
Total Excess Cancer Risk			1E-06
PARKIN:			
Tetrachloroethene	2.36E-05	5.10E-02	1.2E-06
1,1,2-Trichloroethane	3.94E-05	5.70E-02	2.2E-06
Trichloroethene	4.62E-04	1.10E-02	5.1E-06
Total Excess Cancer Risk			8E-06

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) USING THE MAXIMUM (a) (mg/kg-day)	REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
LINDSEY:			
Carbon disulfide	5.14E-05	1.00E-01	5.1E-04
Chloroform	1.51E-05	1.00E-02	1.5E-03
1,1-Dichloroethane	2.77E-05	1.00E-01	2.8E-04
Zinc	5.54E-02	2.00E-01	2.8E-01
Total Hazard Index			3E-01
PARKIN:			
Barium	1.20E-02	5.00E-02	2E-01
1,2-Dichlorobenzene	1.68E-04	9.00E-02	2E-03
Tetrachloroethene	5.12E-05	1.00E-02	5E-03
1,1,1-Trichloroethane	2.53E-04	9.00E-02	3E-03
1,1,2-Trichloroethane	8.54E-05	4.00E-03	2E-02
Xylenes (total)	7.97E-05	2.00E+00	4E-05
Total Hazard Index			3E-01

(a) The upper 95th confidence limit could not be calculated since only two samples were collected.

TABLE 23

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
DIRECT CONTACT WITH SEDIMENTS BY CHILDREN

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		SLOPE FACTOR (mg/kg-day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
MUD CREEK:				
DDT (total)	3.16E-09	5.65E-09	3.40E-01	3.0E-09
1,4-Dichlorobenzene	6.41E-08	5.73E-07	2.40E-02	1.5E-08
2,4-Dinitrotoluene	7.24E-08	6.47E-07	6.80E-01	4.9E-07
bis(2-Ethylhexyl)phthalate	5.08E-08	2.73E-07	1.40E-02	4.5E-09
Methylene chloride	1.19E-08	1.06E-07	7.50E-03	8.8E-10
N-Nitroso-di-n-propylamine	8.41E-08	7.52E-07	7.00E+00	5.9E-06
Carcinogenic PAHs	5.33E-08	1.91E-07	1.15E+01	2.8E-06
Trichloroethene	3.99E-10	3.56E-09	1.10E-02	4.4E-11
Arsenic	8.85E-07	NC	2.00E+00	1.8E-06
Total Excess Cancer Risk				1E-05

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
MUD CREEK:				
2-Chlorophenol	9.42E-07	2.53E-06	5.00E-03	6.9E-04
DDT (total)	2.21E-08	3.95E-08	5.00E-04	1.2E-04
1,2-Dichlorobenzene	4.05E-08	3.62E-07	9.00E-02	4.5E-06
1,2-Dichloroethene	5.23E-09	4.68E-08	2.00E-02	2.6E-06
bis(2-Ethylhexyl)phthalate	3.56E-07	1.91E-06	2.00E-02	1.1E-04
Methylene chloride	8.31E-08	7.42E-07	6.00E-02	1.4E-05
Noncarcinogenic PAHs	6.39E-07	5.71E-06	4.00E-01	1.6E-05
Pentachlorophenol	1.64E-06	4.40E-06	3.00E-02	2.0E-04
Phenol	8.86E-07	2.38E-06	6.00E-01	5.4E-06
1,2,4-Trichlorobenzene	4.77E-07	4.27E-06	2.00E-02	2.4E-04
Arsenic	6.20E-06	NC	1.00E-03	6.2E-03
Total Hazard Index				8E-03
STREAM:				
Manganese	1.74E-03	NC	2.00E-01	9E-03

NC = Not calculated.

TABLE 24

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT WITH SURFACE WATER AND SUBSEQUENT DERMAL ABSORPTION BY CHILDREN

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	SLOPE FACTOR (mg/kg/day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
MUD CREEK:			
Benzene	8.95E-09	2.90E-02	2.6E-10
1,1-Dichloroethane	5.88E-08	9.10E-02	5.4E-09
Tetrachloroethene	6.39E-09	5.10E-02	3.3E-10
Trichloroethene	2.43E-07	1.10E-02	2.7E-09
Total Excess Cancer Risk			9E-09

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
MUD CREEK:			
1,1-Dichloroethane	3.40E-07	1.00E-01	3.4E-06
Tetrachloroethene	4.47E-08	1.00E-02	4.5E-06
Barium	4.81E-06	5.00E-02	9.6E-05
Chromium	7.07E-07	5.00E-03	1.4E-04
Manganese	3.49E-05	2.00E-01	1.7E-04
Nickel	7.16E-07	2.00E-02	3.6E-05
Vanadium	6.44E-07	7.00E-03	9.2E-05
Zinc	3.39E-06	2.00E-01	1.7E-05
Total Hazard Index			6E-04
INTERMITTENT STREAM:			
Chromium	5.19E-07	5.00E-03	1.0E-04
Manganese	1.93E-05	2.00E-01	9.7E-05
Vanadium	4.83E-07	7.00E-03	6.9E-05
Zinc	1.73E-06	2.00E-01	8.6E-06
Total Hazard Index			3E-04

TABLE 25

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
ON-SITE INHALATION BY CHILDREN

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	SLOPE FACTOR (mg/kg/day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
Trichloroethene	2.11E-04	1.70E-02	3.59E-06
Tetrachloroethene	3.11E-05	3.30E-03	1.03E-07
PCBs (Total)	1.48E-09	-- (a)	--
Total:			4E-06

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	REFERENCE DOSE (RfD) (mg/kg/day)	CDI:RfD
1,1,1-Trichloroethane	9.24E-04	3.00E-01	3.08E-03
Toluene	1.79E-04	2.00E+00	8.96E-05
Total:			<1 (3E-03)

(a) No toxicity value is available for the inhalation of PCBs (personal communication with EPA's Environmental Assessment and Criteria Office; April 11, 1990).

TABLE 26

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH DIRECT CONTACT WITH SURFACE SOILS BY RESIDENTS

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		SLOPE FACTOR (mg/kg-day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
Chloroform	1.10E-09	6.39E-09	6.10E-03	4.6E-11
1,1-Dichloroethane	9.93E-10	5.75E-09	9.10E-02	6.1E-10
1,2-Dichloroethane	1.32E-09	7.67E-09	9.10E-02	8.2E-10
1,1-Dichloroethene	8.28E-10	4.79E-09	6.00E-01	3.4E-09
bis(2-Ethylhexyl)phthalate	1.33E-06	4.63E-06	1.40E-02	8.3E-08
Hexachlorobenzene	9.93E-08	5.75E-07	1.70E+00	1.1E-06
Methylene chloride	4.94E-09	2.86E-08	7.50E-03	2.5E-10
Carcinogenic PAHs	1.49E-07	3.45E-07	1.15E+01	5.7E-06
Total PCBs	8.88E-04	7.20E-03	7.70E+00	6.0E-03
Tetrachloroethene	8.58E-08	4.97E-07	5.10E-02	3.0E-08
1,1,2-Trichloroethane	9.63E-08	5.58E-07	5.70E-02	3.7E-08
Trichloroethene	3.06E-06	1.77E-05	1.10E-02	2.3E-07
Arsenic	2.58E-06	NC	2.00E+00	5.2E-06
Total Excess Cancer Risk				6E-03

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
Acetone	1.29E-08	7.50E-08	1.00E-01	8.8E-07
Benzoic acid	4.18E-07	8.73E-06	4.00E+00	2.3E-06
2-Butanone	8.37E-09	4.85E-08	5.00E-02	1.1E-06
Butylbenzylphthalate	2.21E-07	6.41E-07	2.00E-01	4.3E-06
di-n-Butylphthalate	2.05E-07	5.93E-07	1.00E-01	8.0E-06
Chlorobenzene	1.93E-09	1.12E-08	2.00E-02	6.6E-07
Chloroform	2.58E-09	1.49E-08	1.00E-02	1.7E-06
1,1-Dichloroethane	2.32E-09	1.34E-08	1.00E-01	1.6E-07
1,1-Dichloroethene	1.93E-09	1.12E-08	9.00E-03	1.5E-06
bis(2-Ethylhexyl)phthalate	3.11E-06	1.08E-05	2.00E-02	7.0E-04
Hexachlorobenzene	2.32E-07	1.34E-06	8.00E-04	2.0E-03
Methylene chloride	1.15E-08	6.67E-08	6.00E-02	1.3E-06
Noncarcinogenic PAHs	3.32E-07	1.92E-06	4.00E-01	5.6E-06
Total PCBs	2.07E-03	1.68E-02	1.00E-04	1.9E+02
Tetrachloroethene	2.00E-07	1.16E-06	1.00E-02	1.4E-04
Toluene	4.73E-08	2.74E-07	3.00E-01	1.1E-06
1,1,1-Trichloroethane	8.56E-07	4.96E-06	9.00E-02	6.5E-05
1,1,2-Trichloroethane	2.25E-07	1.30E-06	4.00E-03	3.8E-04
Arsenic	6.03E-06	NC	1.00E-03	6.0E-03
Cadmium	3.03E-06	NC	1.00E-03	3.0E-03
Chromium	8.69E-05	NC	5.00E-03	1.7E-02
Cyanide	2.00E-06	NC	2.00E-02	1.0E-04
Manganese	5.54E-04	NC	2.00E-01	2.8E-03
Mercury	4.12E-06	NC	3.00E-04	1.4E-02
Nickel	2.94E-05	NC	2.00E-02	1.5E-03
Zinc	1.51E-04	NC	2.00E-01	7.6E-04
Total Hazard Index				2E+02

NC = Not calculated.

TABLE 27

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
DIRECT CONTACT WITH SUBSURFACE SOILS BY RESIDENTS

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)		SLOPE FACTOR (mg/kg-day)-1	EXCESS LIFETIME CANCER RISK
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
Chloroform	4.14E-08	2.40E-07	6.10E-03	1.7E-09
1,1-Dichloroethane	1.68E-09	9.75E-09	9.10E-02	1.0E-09
1,2-Dichloroethane	1.32E-09	7.67E-09	9.10E-02	8.2E-10
1,1-Dichloroethene	7.37E-08	4.27E-07	6.00E-01	3.0E-07
bis(2-Ethylhexyl)phthalate	7.02E-07	2.44E-06	1.40E-02	4.4E-08
Hexachlorobenzene	9.93E-08	5.75E-07	1.70E+00	1.1E-06
Methylene chloride	5.13E-08	2.97E-07	7.50E-03	2.6E-09
Carcinogenic PAHs	1.49E-07	3.45E-07	1.15E+01	5.7E-06
Total PCBs	2.90E-04	2.35E-03	7.70E+00	2.0E-02
1,1,2,2-Tetrachloroethane	1.08E-09	6.23E-09	2.00E-01	1.5E-09
Tetrachloroethene	1.90E-06	1.10E-05	5.10E-02	6.6E-07
1,1,2-Trichloroethane	8.17E-08	4.73E-07	5.70E-02	3.2E-08
Trichloroethene	3.01E-05	1.74E-04	1.10E-02	2.2E-06
Arsenic	2.32E-06	NC	2.00E+00	4.6E-06
Total Excess Cancer Risk				2E-02

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) USING THE UPPER 95th CONFIDENCE LIMIT (mg/kg-day)		REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
	INCIDENTAL INGESTION	DERMAL ABSORPTION		
Acetone	7.08E-07	4.10E-06	1.00E-01	4.8E-05
Benzoic acid	3.01E-07	6.28E-06	4.00E+00	1.6E-06
Bromomethane	3.68E-07	2.13E-06	1.40E-03	1.8E-03
2-Butanone	1.46E-08	8.46E-08	5.00E-02	2.0E-06
Butylbenzylphthalate	2.04E-07	5.91E-07	2.00E-01	4.0E-06
di-n-Butylphthalate	5.92E-07	1.72E-06	1.00E-01	2.3E-05
Chlorobenzene	4.51E-08	2.61E-07	2.00E-02	1.5E-05
Chloroform	9.66E-08	5.59E-07	1.00E-02	6.6E-05
1,2-Dichlorobenzene	1.64E-06	9.51E-06	9.00E-02	1.2E-04
1,1-Dichloroethane	3.93E-09	2.27E-08	1.00E-01	2.7E-07
1,1-Dichloroethene	1.72E-07	9.96E-07	9.00E-03	1.3E-04
1,2-Dichloroethene (total)	7.28E-07	4.21E-06	2.00E-02	2.5E-04
Ethylbenzene	2.29E-06	1.32E-05	1.00E-01	1.6E-04
bis(2-Ethylhexyl)phthalate	1.64E-06	5.69E-06	2.00E-02	3.7E-04
Hexachlorobenzene	2.32E-07	1.34E-06	8.00E-04	2.0E-03
Methylene chloride	1.20E-07	6.94E-07	6.00E-02	1.4E-05
4-Methylphenol	1.09E-07	1.90E-07	5.00E-02	6.0E-06
Noncarcinogenic PAHs	1.12E-06	6.47E-06	4.00E-01	1.9E-05
Total PCBs	6.76E-04	5.48E-03	1.00E-04	6.2E+01
Phenol	7.73E-08	1.34E-07	6.00E-01	3.5E-07
Tetrachloroethene	4.42E-06	2.56E-05	1.00E-02	3.0E-03
Toluene	1.55E-06	8.95E-06	3.00E-01	3.5E-05
1,2,4-Trichlorobenzene	1.65E-06	9.55E-06	2.00E-02	5.6E-04
1,1,1-Trichloroethane	9.85E-06	5.71E-05	9.00E-02	7.4E-04
1,1,2-Trichloroethane	1.91E-07	1.10E-06	4.00E-03	3.2E-04
Xylenes	3.09E-05	1.79E-04	2.00E+00	1.0E-04
Antimony	3.41E-06	NC	4.00E-04	8.5E-03
Arsenic	5.41E-06	NC	1.00E-03	5.4E-03
Cadmium	1.22E-06	NC	1.00E-03	1.2E-03
Chromium	3.55E-05	NC	5.00E-03	7.1E-03
Cyanide	2.00E-06	NC	2.00E-02	1.0E-04
Manganese	4.85E-04	NC	2.00E-01	2.4E-03
Mercury	4.12E-06	NC	3.00E-04	1.4E-02
Nickel	2.41E-05	NC	2.00E-02	1.2E-03
Selenium	1.93E-07	NC	3.00E-03	6.4E-05
Silver	5.79E-07	NC	3.00E-03	1.9E-04
Zinc	8.95E-05	NC	2.00E-01	4.5E-04
Total Hazard Index				6E+01

NC = Not calculated, dermal absorption of inorganics from contacted soil is negligible.

TABLE 28

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
INGESTION OF GROUNDWATER IN ON-SITE WELLS

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	SLOPE FACTOR (mg/kg/day)-1	EXCESS UPPER BOUND LIFETIME CANCER RISK
Benzene	9.06E-04	2.90E-02	2.6E-05
Carbon tetrachloride	3.92E-05	1.30E-01	5.1E-06
Chloroform	3.60E-03	6.10E-03	2.2E-05
1,4-Dichlorobenzene	6.61E-05	2.40E-02	1.6E-06
1,1-Dichloroethane	2.84E-03	9.10E-02	2.6E-04
1,2-Dichloroethane	6.61E-05	9.10E-02	6.0E-06
1,1-Dichloroethene	6.99E-04	6.00E-01	4.2E-04
bis(2-Ethylhexyl)phthalate	6.49E-05	1.40E-02	9.1E-07
Isophorone	6.37E-05	4.10E-03	2.6E-07
Methylene chloride	1.15E-02	7.50E-03	8.6E-05
Total PCBs	5.63E-05	7.70E+00	4.3E-04
1,1,1,2-Tetrachloroethane	1.10E-05	2.60E-02	2.9E-07
1,1,2,2-Tetrachloroethane	2.57E-05	2.00E-01	5.1E-06
Tetrachloroethene	2.14E-03	5.10E-02	1.1E-04
1,1,2-Trichloroethane	2.39E-04	5.70E-02	1.4E-05
Trichloroethene	8.68E-02	1.10E-02	9.5E-04
Vinyl chloride	5.51E-05	2.30E+00	1.3E-04
Arsenic	2.19E-04	2.00E+00	4.4E-04
Total Excess Cancer Risk			3E-03

TABLE 28 (Continued)
SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
INGESTION OF GROUNDWATER IN ON-SITE WELLS

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
Acetone	9.34E-03	1.00E-01	9.3E-02
Benzoic acid	8.06E-04	4.00E+00	2.0E-04
Carbon tetrachloride	9.14E-05	7.00E-04	1.3E-01
Chlorobenzene	7.43E-05	2.00E-02	3.7E-03
Chloroform	8.40E-03	1.00E-02	8.4E-01
1,2-Dichlorobenzene	4.54E-04	9.00E-02	5.0E-03
Dichlorodifluoromethane	1.56E-03	2.00E-01	7.8E-03
1,1-Dichloroethane	6.63E-03	1.00E-01	6.6E-02
1,1-Dichloroethene	1.63E-03	9.00E-03	1.8E-01
trans-1,2-Dichloroethene	8.00E-05	2.00E-02	4.0E-03
2,4-Dichlorophenol	2.37E-04	3.00E-03	7.9E-02
Ethylbenzene	5.51E-04	1.00E-01	5.5E-03
bis(2-Ethylhexyl)phthalate	1.51E-04	2.00E-02	7.6E-03
Isophorone	1.49E-04	2.00E-01	7.4E-04
Methylene chloride	2.67E-02	6.00E-02	4.5E-01
4-Methyl-2-pentanone	1.53E-03	5.00E-02	3.1E-02
2-Methylphenol	3.09E-04	5.00E-02	6.2E-03
4-Methylphenol	1.54E-04	5.00E-02	3.1E-03
Noncarcinogenic PAHs	5.00E-04	4.00E-01	1.3E-03
Total PCBs	1.31E-04	1.00E-04	1.3E+00
Phenol	1.97E-04	6.00E-01	3.3E-04
Styrene	4.23E-04	2.00E-01	2.1E-03
1,1,1,2-Tetrachloroethane	2.57E-05	3.00E-03	8.6E-03
Tetrachloroethene	5.00E-03	1.00E-02	5.0E-01
Toluene	9.86E-03	3.00E-01	3.3E-02
1,1,1-Trichloroethane	6.80E-02	9.00E-02	7.6E-01
1,1,2-Trichloroethane	5.57E-04	4.00E-03	1.4E-01
Trichlorofluoromethane	8.20E-04	3.00E-01	2.7E-03
Total xylenes	2.97E-03	2.00E+00	1.5E-03
Arsenic	5.11E-04	1.00E-03	5.1E-01
Beryllium	5.14E-05	5.00E-03	1.0E-02
Chromium	1.84E-03	5.00E-03	3.7E-01
Manganese	7.83E-02	2.00E-01	3.9E-01
Mercury	5.71E-06	3.00E-04	1.9E-02
Nickel	2.62E-03	2.00E-02	1.3E-01
Selenium	2.29E-05	3.00E-03	7.6E-03
Thallium	2.86E-05	7.00E-05	4.1E-01
Vanadium	1.46E-03	7.00E-03	2.1E-01
Zinc	8.03E-02	2.00E-01	4.0E-01
Total Hazard Index			7E+00

TABLE 29

SOLVENT SAVERS RI REPORT
CHRONIC DAILY INTAKES AND RISKS ASSOCIATED WITH
ON-SITE INHALATION BY RESIDENTS

CHEMICAL WITH POTENTIAL CARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	SLOPE FACTOR (mg/kg-day)-1	EXCESS LIFETIME CANCER RISK
Trichloroethene	1.06E-03	1.70E-02	1.80E-05
Tetrachloroethene	1.56E-04	3.30E-03	5.15E-07
PCBs (Total)	7.42E-09	-- (a)	--
Total:			2E-05

CHEMICAL WITH NONCARCINOGENIC EFFECTS	ESTIMATED CHRONIC DAILY INTAKE (CDI) (mg/kg-day)	REFERENCE DOSE (RfD) (mg/kg-day)	CDI:RfD
1,1,1-Trichloroethane	1.55E-03	3.00E-01	5.1[illegible]E-03
Toluene	3.00E-04	2.00E+00	1.5[illegible]E-04
Total:			<1 (5E-03)

(a) No toxicity value is available for the inhalation of PCBs (personal communication with EPA's Environmental Criteria and Assessment Office; April 11, 1990).

TABLE 30

SUMMARY OF POTENTIAL FEDERAL ARARs AND TBCS
Solvent Savers Site

Contaminant-Specific	Rationale
Safe Drinking Water Act (SDWA) Maximum Contaminants Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs) - 40 CFR 411.11 - 411.18.	Sets acceptable concentration of chemicals in current or potential drinking water based on leaching of contaminants from soil
Toxic Substances Control Act (TSCA) standards for PCBs - 40 CFR 761	Regulates cleanup of chlorinated solvent concentrations in soil
Clean Water Act (CWA) Water Quality	Regulates ambient concentration of Criteria contaminants in surface water for human and aquatic exposure scenarios. Also establishes NPDES permit system, under which discharges to surface water are regulated based on use of water, and POTW pretreatment standards.
Clean Air Act	Regulates ambient and release concentrations of chemicals to air.

Location-Specific	Rationale
Rivers and Harbors Act (33 CFR Parts 329)	Corps of Engineer regulations for 320-wetlands and navigable waters of U.S.
Executive Order 11990 - Protection of Wetlands	Requires consideration during remedial actions that may affect known wetlands
Executive Order 11988 - Floodplain Management	Requires consideration if remedial actions affect floodplains
RCRA Location Standards - 40 CFR 264.18	Requires that units located in a 100-year floodplain be designed and operated to avoid a washout.
Fish and Wildlife Coordination Act (16 USC 661): -- 1978 Improvement Act (16 USC 742) -- 1980 Coordination Act (16 USC 2901)	Regulates remedial actions that affect bodies of water or pose potential harm to fish or wildlife.

Action-Specific	Rationale
DOT Rules for Hazardous Materials Transport (49 CFR 107, 171.1-171.500)	Regulates remedial measures involving transportation or hazardous materials.
OSHA - Health and Safety Standards (29 CFR 1910)	Provides safety standards for onsite workers

Table 30

SUMMARY OF POTENTIAL FEDERAL ARARs AND TBCS
Solvent Savers Site
(Page 2 of 2)

Action-Specific	Rationale
OSHA - Recordkeeping, Reporting, and Related Regulations (29 CFR 1904)	OSHA regulations for recordkeeping and reporting of compliance with safety conditions during management of hazardous waste.
Resource Conservation and Recovery Act (RCRA), Subtitle C (40 CFR 260 -270)	RCRA standards for management of hazardous waste.
RCRA - Subpart F Standards for Owner Operators of Permitted Hazardous Waste Facilities (40 CFR 264.90 - 264.101)	General requirements for ground water monitoring.
RCRA - Closure and Post-Closure for hazardous waste facilities (40 CFR 264.110-264.120)	Specific requirements for capping waste facilities.
RCRA - Manifesting, Recordkeeping Reporting (40 CFR 264.70-264.77)	Requirements for hazardous waste management.
RCRA - Landfills (40 CFR 264, Subpart N)	Regulates the design and construction of landfills.
RCRA Land Ban (40 CFR 268, Subpart D)	Regulates land disposal of RCRA hazardous wastes or wastes that are sufficiently similar to RCRA hazardous wastes.
RCRA - Incinerators (40 CFR 264, Subpart O)	Regulates design and operation of incinerators.
RCRA (40 CFR 761.70)	Establishes performance standards for incinerators.
RCRA Standards Applicable to Generators Transporters of Hazardous Waste - RCRA Section 3003 (40 CFR 262 and 263, 40 CFR 170 to 179)	Regulates offsite transport and management of hazardous waste.
RCRA Hazardous Waste Permit Program RCRA Section 30-35 (40 CFR 270, 124)	Specifies permit requirements for RCRA hazardous waste management activities.
TSCA - PCB Management and Landfills (40 CFR 761)	Regulates soil cleanup requirements and establishes regulations for chemical waste landfills into which PCB wastes may be land disposed.
Clean Air Act - Prevention of Significant Deterioration (PSD) and New Source Performance Standards (NSPS) (40 CFR 60.52)	Establishes particulate emission limits for incinerators.

TABLE 31

SUMMARY OF POTENTIAL STATE ARARs AND TBCs
Solvent Savers Site

Contaminant-Specific	Rationale
New York State Water Quality Regulation; NYCRR Title 6, Part 700-703	Pertains to surface water and ground water, quality classification, and usage.
New York State Air Guide-1 Guidelines for the Control of Toxic Ambient Air contaminants	Sets ambient concentration for toxic air pollutants used as a possible screening mechanism to determine whether permits should be issued.
New York Air Pollution Control Regulations; NYCRR Title 6, III; Parts 202, 212, and 219	Regulates emissions from treatment processes such as land farming, vacuum extraction, and air stripping
New York Ambient Air Quality Standards; NYCRR, Title 6 III; Part 375farming, vacuum extraction, air stripping, etc.	Establishes treatment process emission standards for treatments such as land
New York Effluent Standards and Limitations for Class GA Aquifers	Regulates direct or indirect injection of treatment effluents into the ground water aquifer.

Location-Specific	Rationale
New York Wetlands Laws, New York Environmental Conservation Law, Title 7, Freshwater Wetland Regulations (Article 24)	Regulates impacts of remedial actions adjacent to wetlands.
6 NYCRR Part 361 - Citing of Hazardous Waste Facilities	Regulates siting of certain industrial hazardous waste facilities.
New York Rules for Inactive Hazardous Waste Disposal Sites; NYCRR Title 6, Chapter 375	Dictates involvement of federal, state, local governments, etc.

Action-Specific	Rationale
New York General Hazardous Waste Management Systems Regulations; NYCRR Title 6, Chapter 370	General regulations for hazardous waste management.
New York Hazardous Waste Manifest System Requirements; 6 NYCRR Chapter 372	Regulates transportation of hazardous waste.
New York Hazardous Waste Treatment, Storage, and Disposal Facility Permitting Requirements; NYCRR Title 6, Chapter 373	Regulates permitting for hazardous waste storage, and disposal.
New York Final Status Standards for Owners & Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; 6 NYCRR Chapter 373-2	Regulates hazardous waste treatment, storage, and disposal.

Table 32

SUMMARY OF POTENTIAL LOCATION-SPECIFIC ARARs
(By Location)

Location	Requirement	Description	Action To Be Taken To Comply
Floodplain:	Executive Order (EO) 11988	The potential effects of any action taken in a 500-year floodplain must be evaluated to ensure that planning and decision-making reflect consideration of flood hazards and floodplain management.	Potential effects of remedial will be considered before any remedial action is taken.
	RCRA Location Standards (40 CFR 264.18)	Units in 100-year floodplains must be designed, operated, and maintained to prevent washout of any hazardous wastes.	Alternatives involving retention of hazardous wastes on sites will be implemented and operated to prevent washout.
Wetlands:	Executive Order (EO) 11990	Actions must be managed to avoid adverse effects, minimize harm, and, to extent practicable, enhance wetlands.	Actions will be evaluated for potential effects on nearby wetlands.
	NY Wetlands Law (7 NYCRR 24)	Requires permit and consideration of potential adverse effects for any action affecting freshwater wetlands (wetlands are Designated Class II under NY State Law).	Consideration of effects in Class II wetlands will be made before remedial actions are taken.
River:	Fish and Wildlife Coordination Act (16 USC 661)	Proposals affect a body of water must be referred to the U.S. Fish and Wildlife Service for consultation.	If any actions have an effect on the activities of the River, the substantive provisions of these requirements will be met. Superfund sites do not have to meet the administrative components of an ARAR for an on-site action.
	Rivers and Harbors Act	Actions that require diversion, channelling, or other activities affecting regulated bodies of water may require consultation with Corps of Engineers.	(See Fish and Wildlife Coordination Act)

TABLE 33 (page 1 of 3)

SOLVENT SAVERS SITE
PROPOSED GROUND WATER ACTION LEVELS
CARCINOGENS AND NON-CARCINOGENS

	Concentrations			Potential ARARs		Other Guidance		
Carcinogenic Parameter	Arithmetic Mean (ug/l)	Maximum (ug/l)	10^{-6} Risk Clean-Up Level (ug/l)	Maximum Contaminant Level (ug/l)	New York Ground Water (ug/l)	Lifetime Health Advisories (ug/l)	Maximum Contaminant Level Goals (ug/l)	CLP Contract Required Quantitation Limits (ug/l)
Arsenic	1.44E+01	7.31E+01	0.041	50	25	----	50	10
Benzene	4.86E+01	6.10E+02	40.984	5	ND	----	0	5
Carbon Tetrachloride	1.60E+00	6.30E+01	0.631	5	5	----	0	5
Chloroform	1.94E+02	2.50E+03	13.44	----	100	----	----	5
1,4-Dichlorobenzene	5.10E+00	1.90E+01	3.415	75	4.7	75	75	10
1,1-Dichloroethane	1.53E+02	1.90E+03	0.901	----	----	----	----	5
1,2-Dichloroethane	3.40E+00	4.30E+01	0.901	5	----	----	0	5
1,1-Dichloroethene	3.93E+01	4.30E+02	0.137	7	----	7	7	5
Bis(2-Ethylhexyl) Phthalate	5.10E+00	1.20E+01	5.855	----	----	----	----	10
Isophorone	5.10E+00	8.00E+01	19.992	----	----	----	----	10
Methylene Chloride	4.66E+02	1.50E+04	1.093	----	----	----	----	5
Total PCBs	2.50E+00	7.45E+01	0.011	.5	0.1	----	0	.5
1,1,1,2-Tetrachloroethane	7.00E-01	5.10E+00	3.153	5	----	----	----	5
1,1,2,2-Tetrachloroethane	1.40E+00	2.13E+01	4.098	5	----	----	----	5
Trichloroethene	4.79E+03	5.70E+04	7.452	5	10	----	0	5
Vinyl Chloride	3.30E+00	3.20E+01	0.036	2	5	----	0	10
Tetrachloroethene	1.08E+02	2.10E+03	1.6072	5	----	10	0	5
1,1,2-Trichloroethane	1.27E+01	1.70E+02	1.438	3	----	----	----	5

TABLE 33 (page 2 of 3)

SOLVENT SAVERS SITE
PROPOSED GROUND WATER ACTION LEVELS
NON-CARCINOGENS

Non-Carcinogenic Parameter	Concentrations		Potential ARARs			Other Guidance		
	Arithmetic Mean (ug/l)	Maximum (ug/l)	Health-Based Clean-Up Level (ug/l)	Maximum Contaminant Level (ug/l)	New York Ground Water (ug/l)	Lifetime Health Advisories (ug/l)	Maximum Contaminant Level Goals (ug/l)	CLP Contract Required Quantitation Limits (ug/l)
Acetone	1.26E+02	7.70E+03	8,085	----	----	----	----	10
Benzoic Acid	2.66E+01	7.60E+01	3,230	----	----	----	----	50
Carbon Tetrachloride	1.60E+00	6.30E+01	----	----	----	----	----	5
Chlorobenzene	1.90E+00	1.70E+01	1,615	100	20	3,150	100	5
Chloroform	1.94E+02	2.50E+03	----	----	----	----	----	5
1,2-Dichlorobenzene	1.06E+01	1.50E+02	7,275	600	4.7	3,750	600	10
Dichlorodifluoromethane	3.47E+01	4.47E+03	16,170	----	50	----	----	5
1,1-Dichloroethane	1.53E+02	1.90E+03	----	----	----	----	----	5
1,1-Dichloroethene	3.93E+01	4.30E+02	----	----	----	----	----	5
Trans-1,2-Dichloroethene	2.10E+00	1.80E+01	1,615	100	50	350	100	5
2,4-Dichlorophenol	6.70E+00	3.70E+01	240	----	0.3	----	----	10
Ethylbenzene	1.16E+01	1.70E+02	8,085	700	50	3,400	700	5
Bis(2-Ethylhexyl) Phthalate	5.10E+00	1.20E+01	----	----	----	----	----	10
Isophorone	5.10E+00	8.00E+00	----	----	----	----	----	10
Methylene Chloride	4.66E+02	1.50E+04	----	----	----	----	----	5
4-Methyl-2-Pentanone	3.28E+01	6.70E+02	4,040	----	----	----	----	10
2-Methylphenol	8.00E+00	6.30E+01	4,040	----	----	----	----	10
4-Methylphenol	5.20E+00	8.00E+00	4,040	----	----	----	----	10
Noncarcinogenic PAHs	1.39E+01	3.60E+01	32,340	----	----	----	----	10
Total PCBs	2.50E+00	7.45E+01	----	----	----	----	----	0.5
Phenol	6.10E+00	2.50E+01	48,500	----	----	----	----	10
Styrene	6.10E+00	3.30E+02	16,170	5	931	7,000	0	5
1,1,1,2-Tetrachloroethane	7.00E-01	5.10E+00	----	----	----	----	----	5
Tetrachloroethene	1.08E+02	2.10E+03	----	----	----	----	----	5
Toluene	2.15E+02	3.50E+03	24,250	2,000	50	10,800	2,000	5
1,1,1-Trichloroethane	1.63E+03	2.20E+04	7,275	200	50	1,000	200	5
1,1,2-Trichloroethane	1.27E+01	1.90E+02	----	----	----	----	----	5
Trichlorofluoromethane	1.81E+01	2.40E+02	24,250	----	50	----	----	10
Total Xylenes	6.00E+01	1.30E+03	16,700	10,000	50	440	10,000	5
Arsenic	1.44E+01	7.31E+01	----	50	25	----	50	10
Beryllium	1.40E+00	6.20E+00	400	1	3	----	----	5
Chromium	4.94E+01	2.54E+02	400	50	50	170	100	10
Manganese	2.19E+03	1.55E+04	16,170	----	300	----	----	15

TABLE 33 (page 3 of 3)

SOLVENT SAVERS SITE
PROPOSED GROUND WATER ACTION LEVELS
NON-CARCINOGENS

Non-Carcinogenic Parameter	Concentrations		Health-Based Clean-Up Level (ug/l)	Potential ARARs		Other Guidance		
	Arithmetic Mean (ug/l)	Maximum (ug/l)		Maximum Contaminant Level (ug/l)	New York Ground Water (ug/l)	Lifetime Health Advisories (ug/l)	Maximum Contaminant Level Goals (ug/l)	CLP Contract Required Quantitation Limits (ug/l)
Mercury	1.00E+01	1.00E+00	24	2	2	5.5	2	0.2
Nickel	6.96E+01	4.06E+02	1,615	100	----	350	----	40
Selenium	8.00E-01	1.60E+00	240	10	20	----	50	5
Thallium	1.00E+00	2.10E+00	5	2	4	----	----	10
Vanadium	3.87E+01	2.19E+02	565	----	----	----	----	50
Zinc	1.72E+03	3.10E+04	16,170	----	5,000	----	----	20

APPENDIX 2

FIGURES

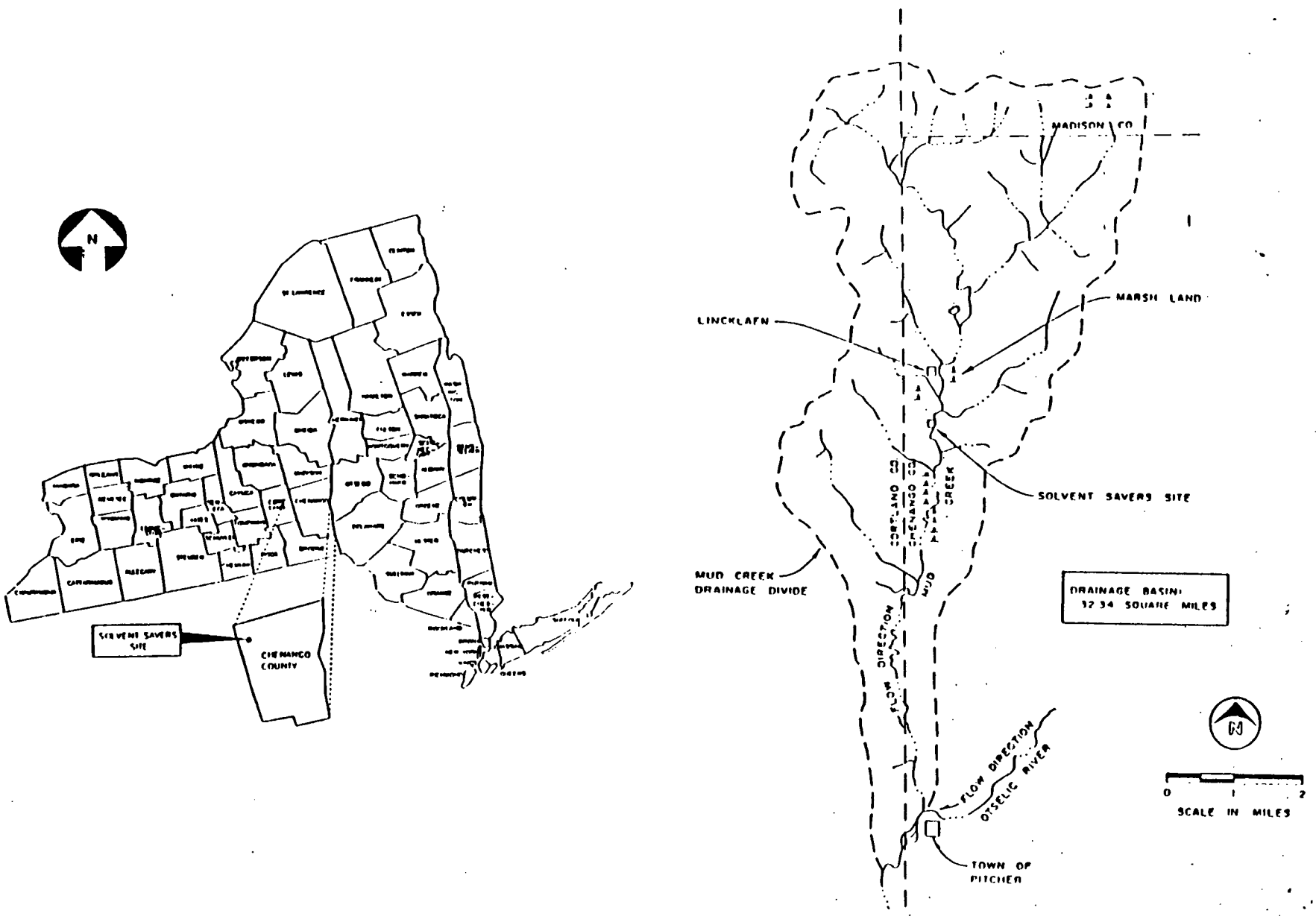
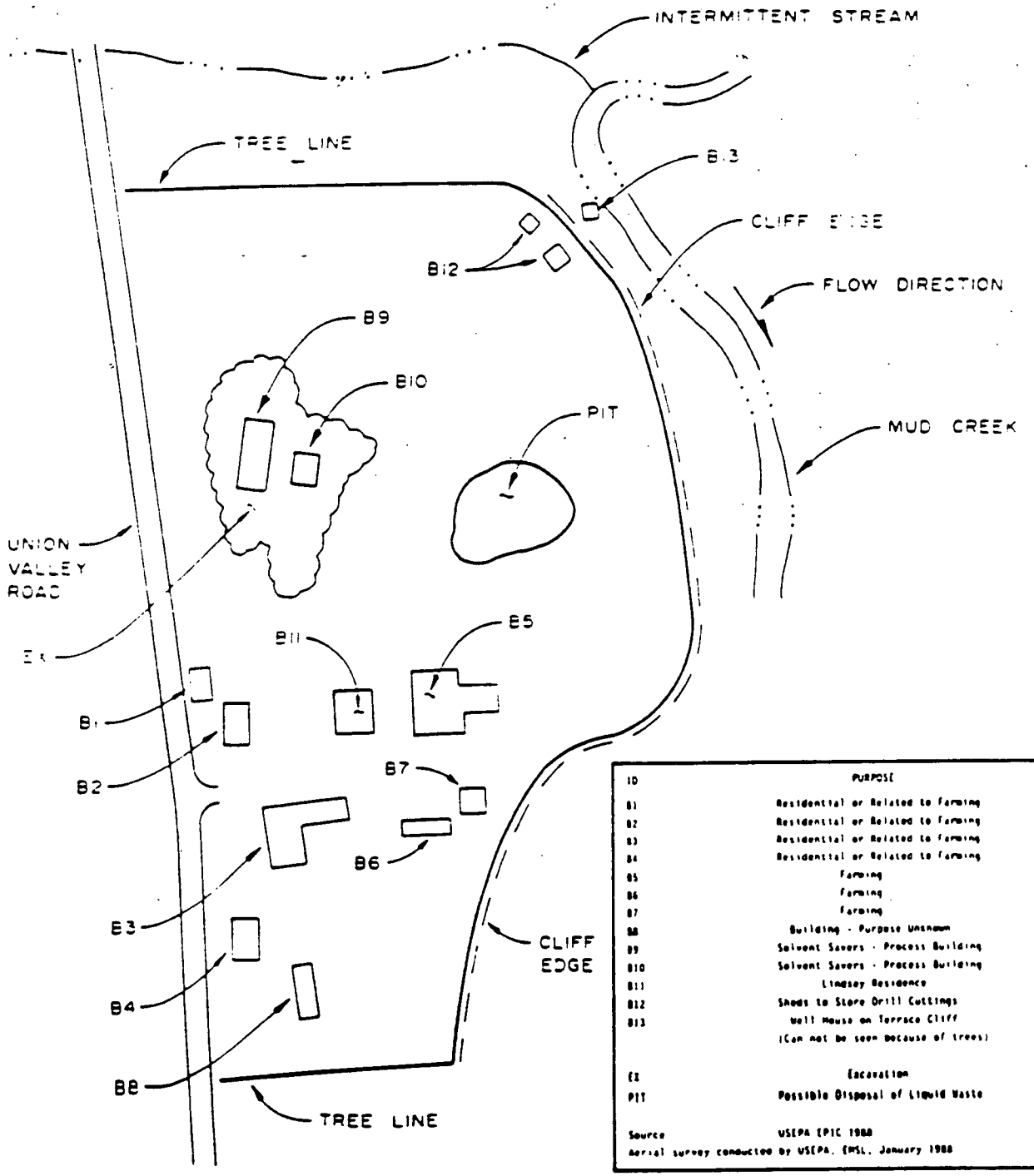


Figure 1

LOCATION MAP
SOLVENT SAVERS SITE
CHENANGO COUNTY, NEW YORK



ID	PURPOSE	PHOTOGRAPHED	
B1	Residential or Related to Farming	1955	
B2	Residential or Related to Farming	1955	1971
B3	Residential or Related to Farming	1955	1988
B4	Residential or Related to Farming	1955	1971
B5	Farming	1955 -	1968
B6	Farming	1955	
B7	Farming	1955	1971
B8	Building - Purpose Unknown	1966	1968
B9	Solvent Savers - Process Building	1955	Present
B10	Solvent Savers - Process Building	1968	1988
B11	Lindsey Residence	1983	Present
B12	Sheds to Store Drill Cuttings	1981	Present
B13	Well House on Terrace Cliff (Can not be seen because of trees)		Unknown
EX	Excavation	1966	
PIT	Possible Disposal of Liquid Waste	1966	1968

Source: USEPA EPIC 1988
Aerial survey conducted by USEPA, EMSL, January 1988

N

0 100 200
SCALE IN FEET

Figure 2
SOLVENT SAVERS SITE
COMPOSITE MAP OF BUILDINGS & STRUCTURES

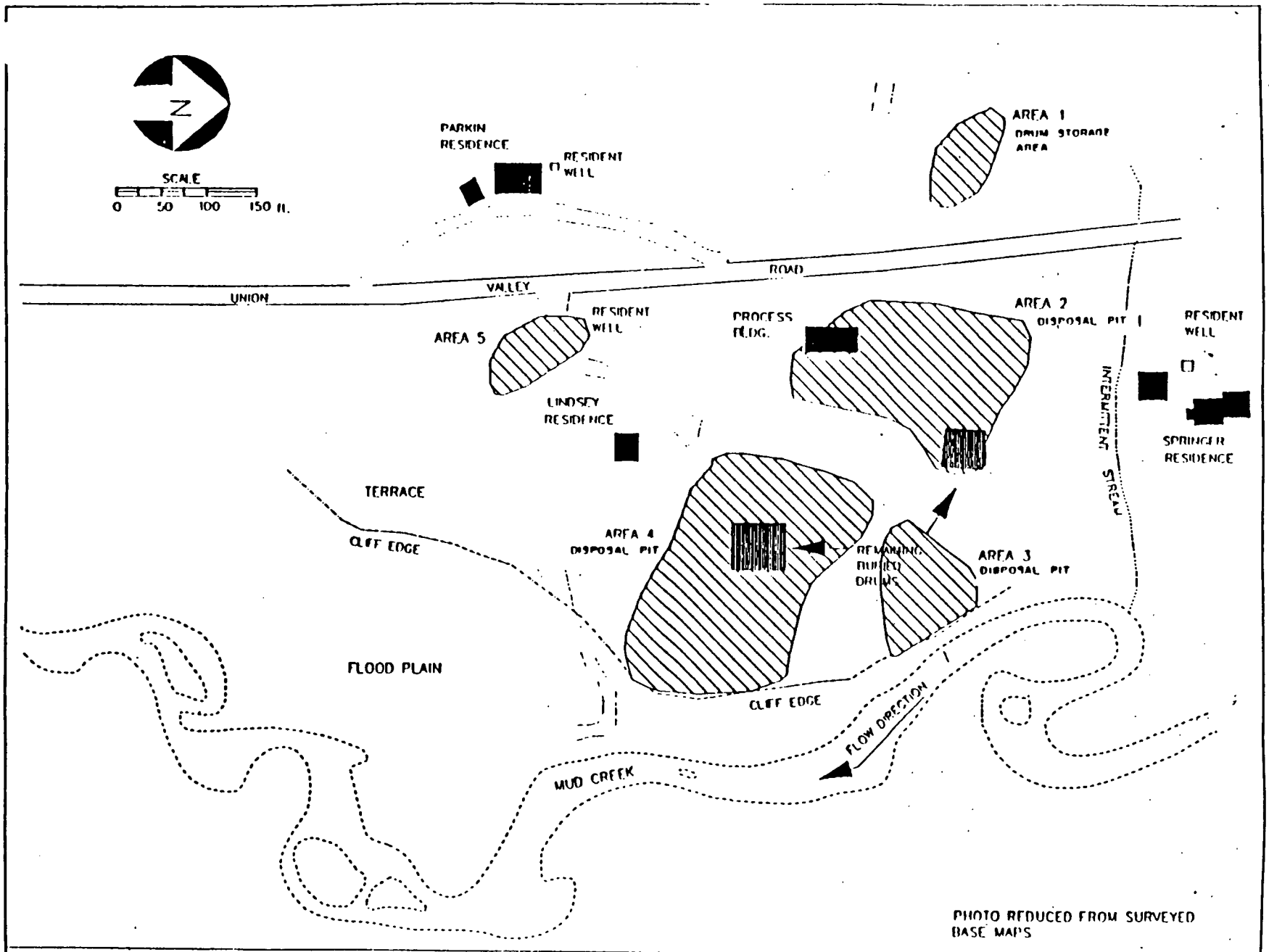


Figure 3
SOLVENT SAVERS SITE MAP
BOUNDARIES OF SOURCE AREAS

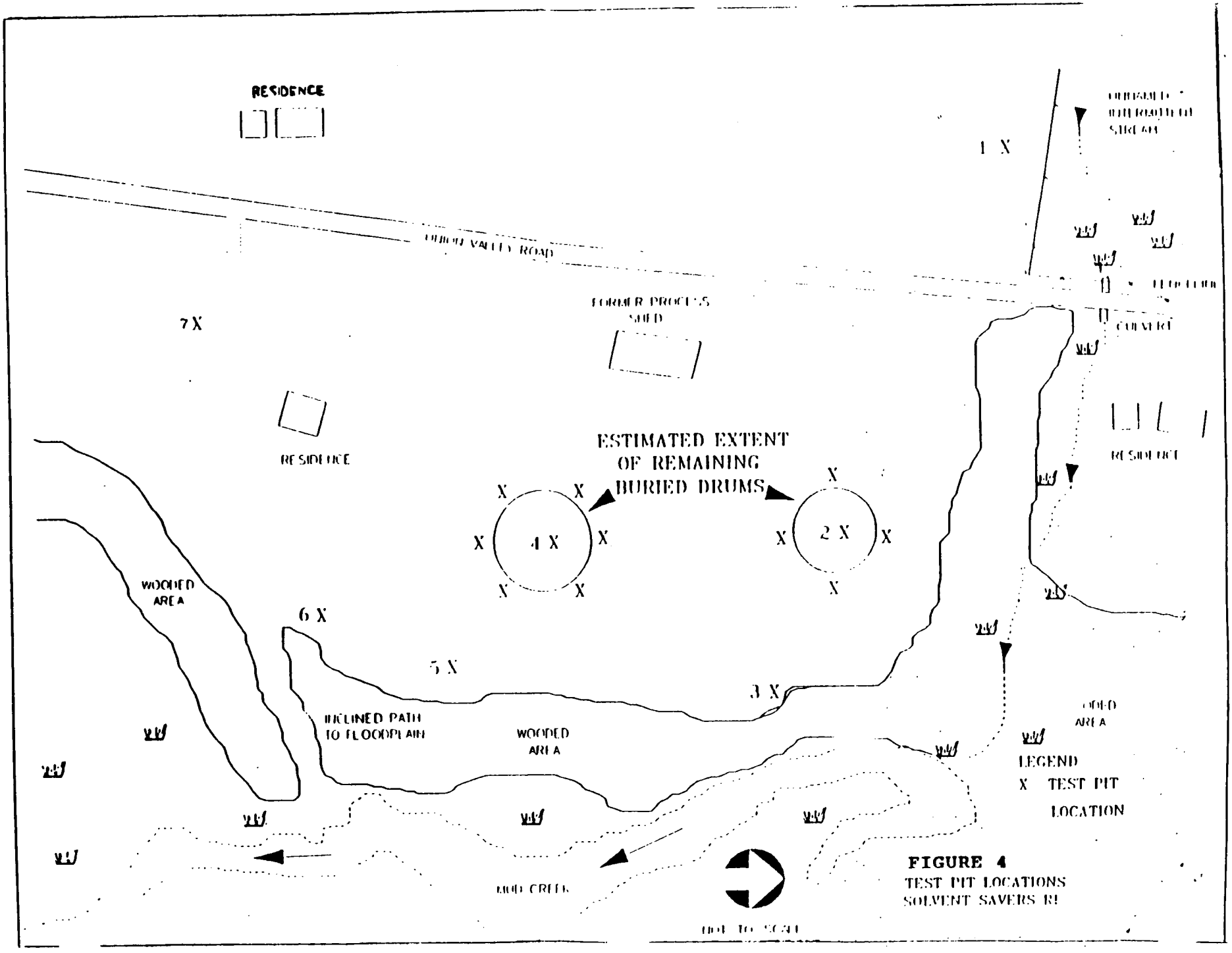


FIGURE 4
TEST PIT LOCATIONS
SOLVENT SAVERS RI

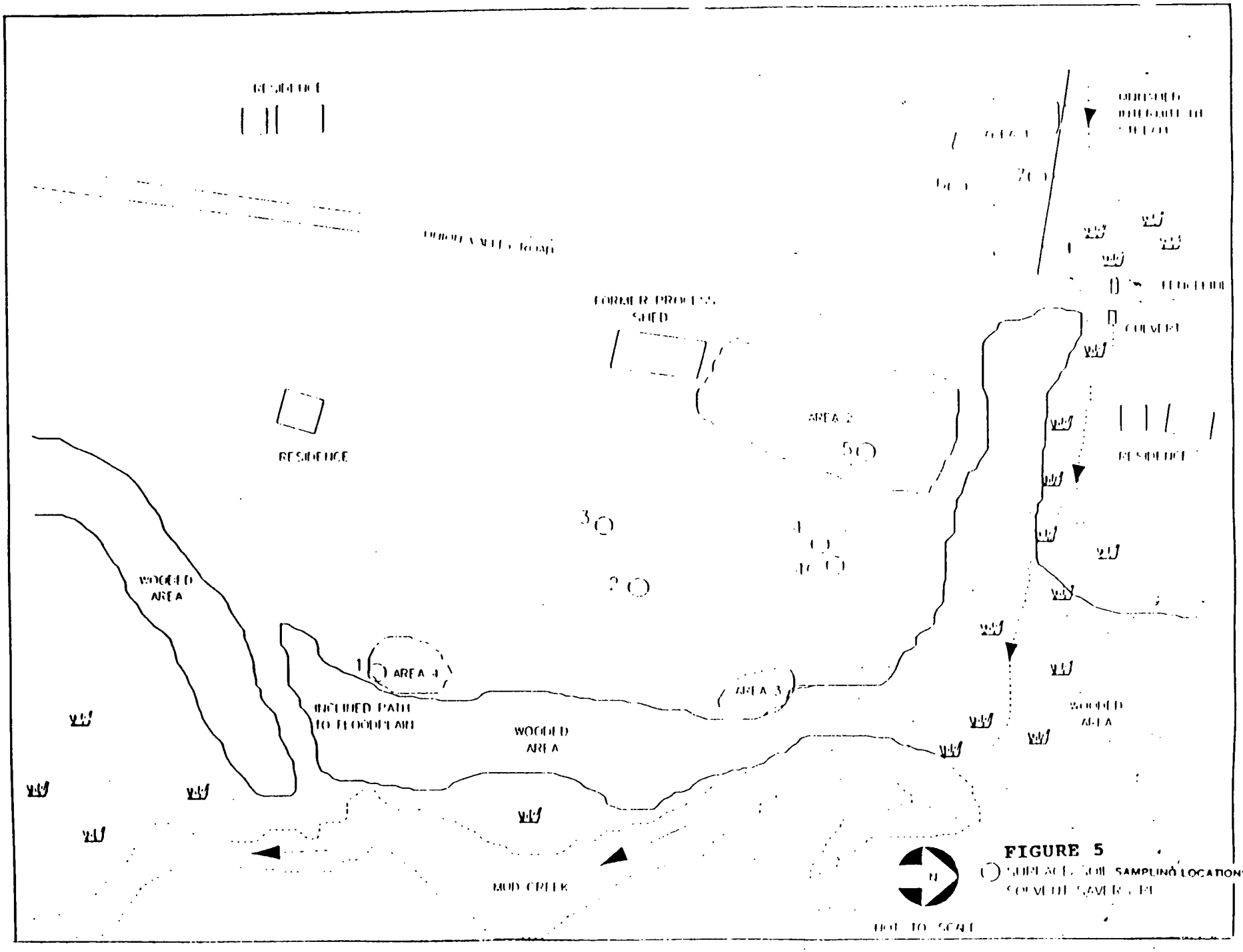


FIGURE 5

○ SURFACE SOIL SAMPLING LOCATIONS
CULVERT SAMPLE

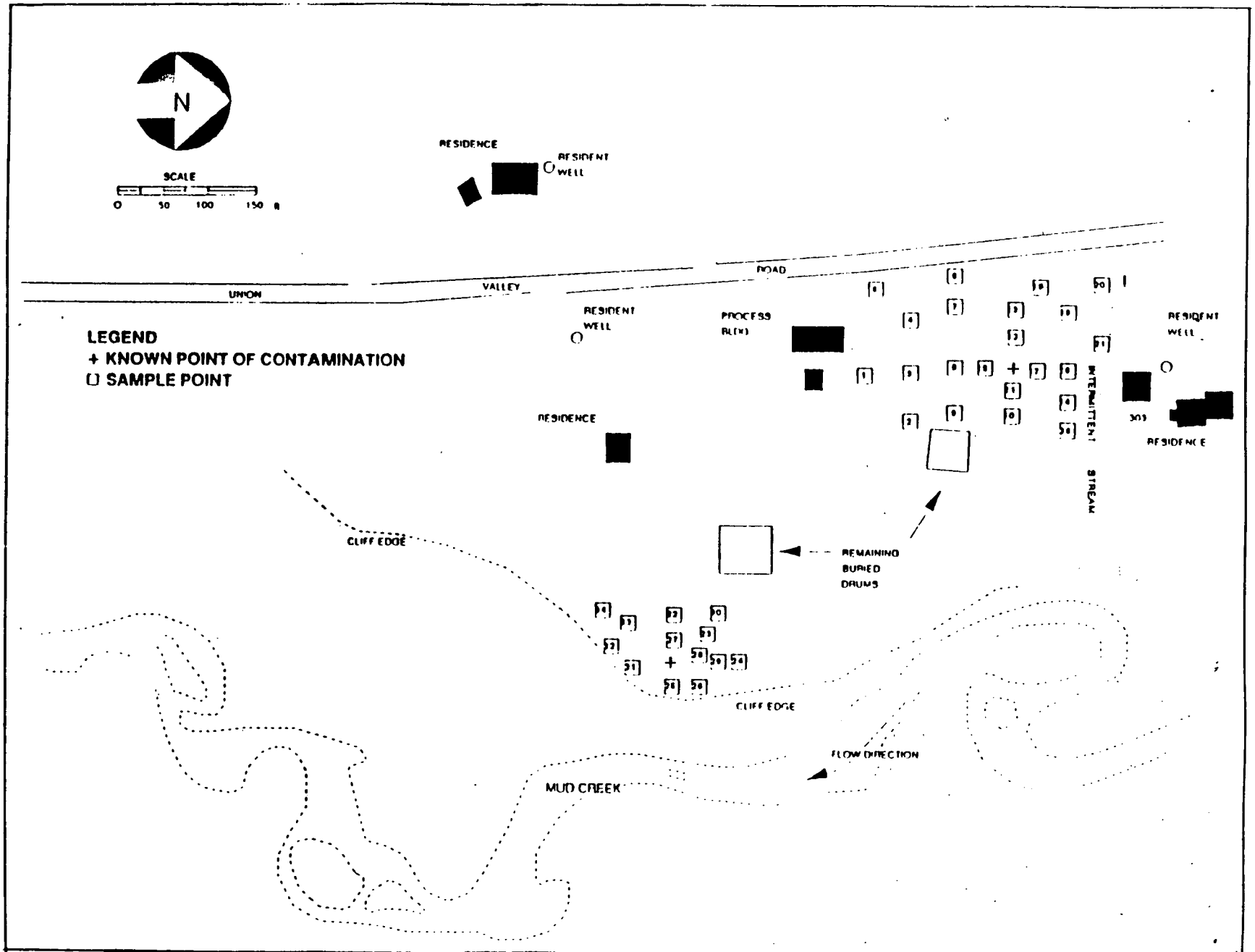


FIGURE 6

SOLVENT SAVERS RI REPORT

PCB SAMPLING LOCATIONS - SECOND ROUND SURFACE SOILS

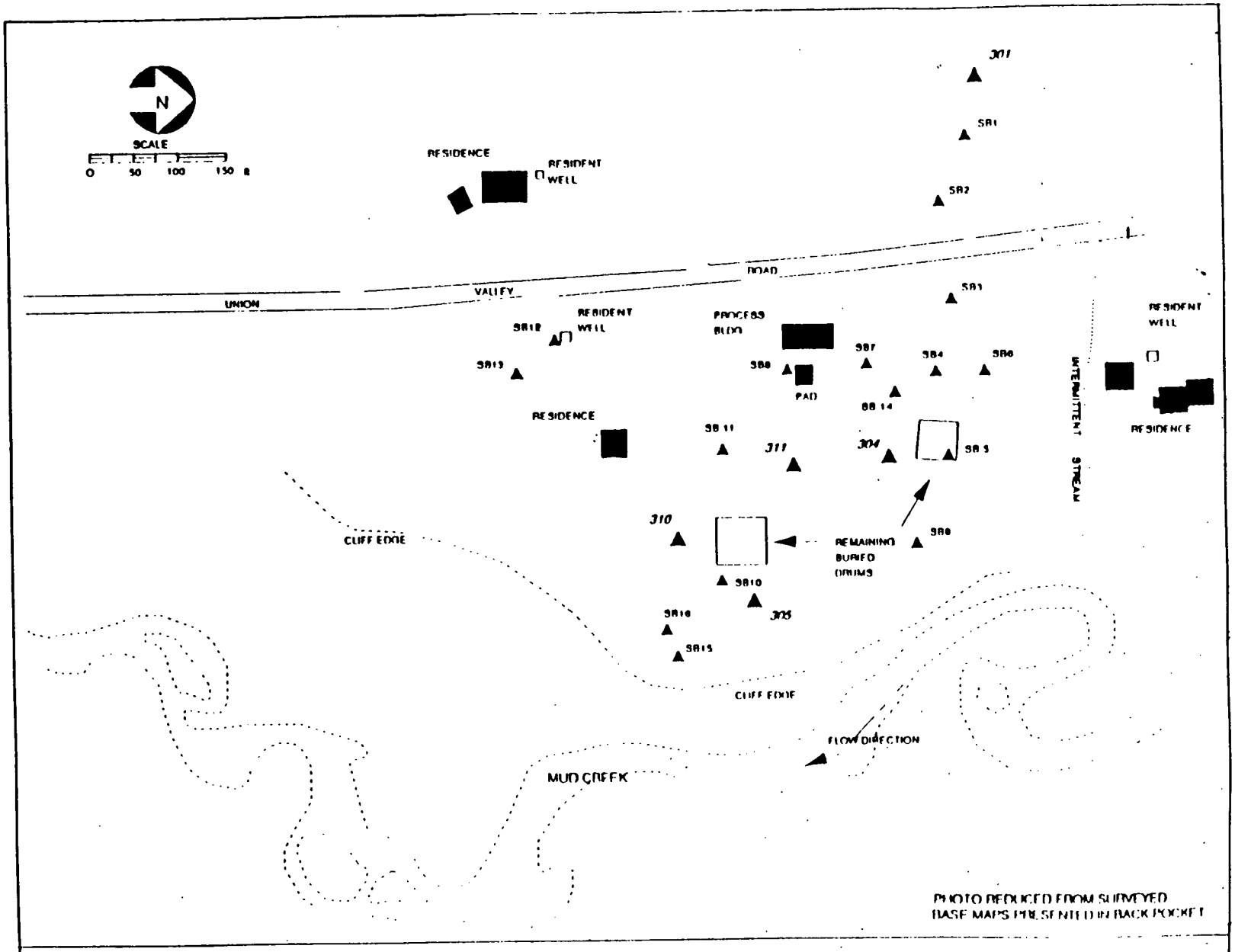


FIGURE 7
SOLVENT SAVERS RI REPORT
SOIL BORING LOCATIONS

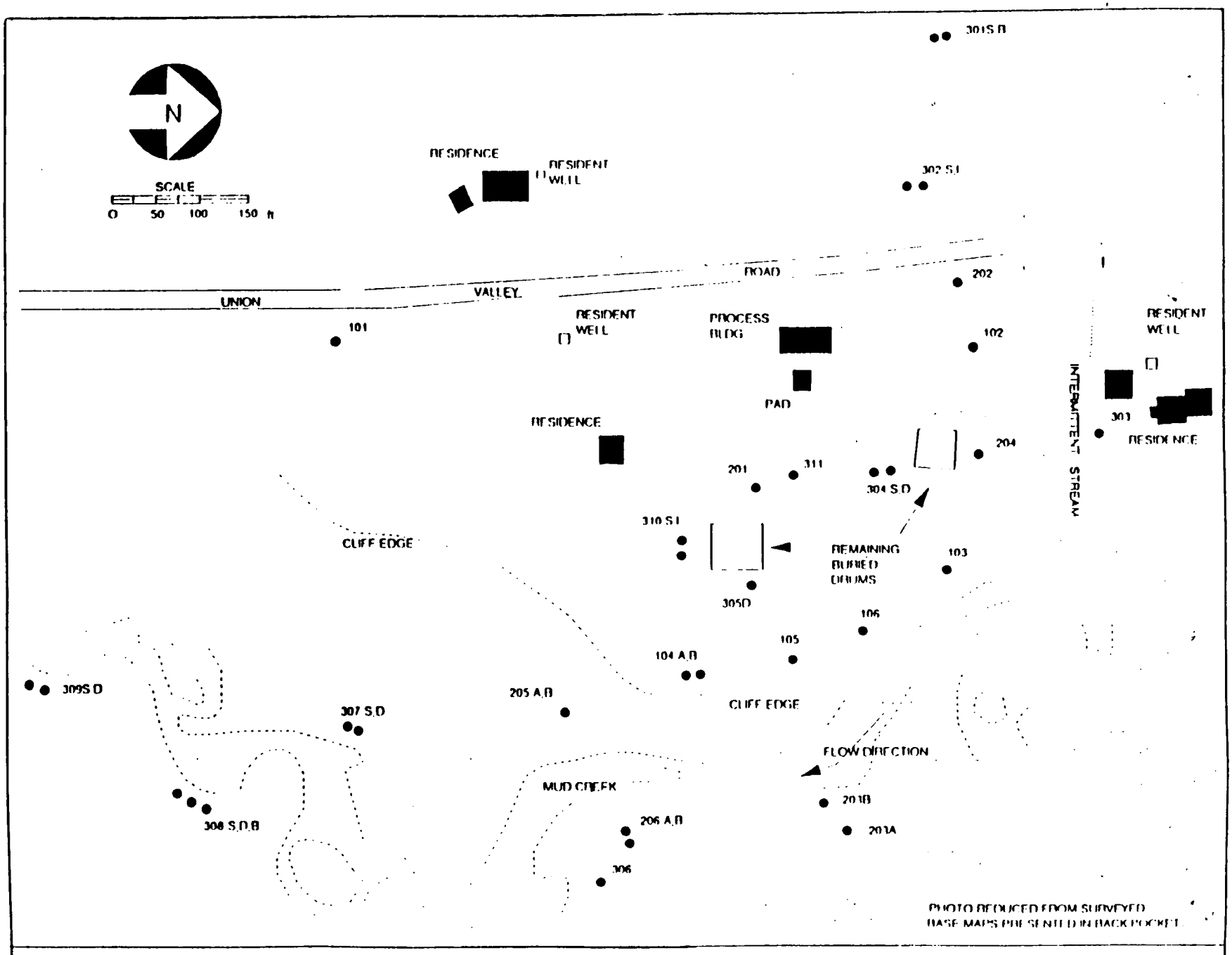


FIGURE 8

SOLVENT SAVERS RI REPORT

MONITORING WELL LOCATIONS

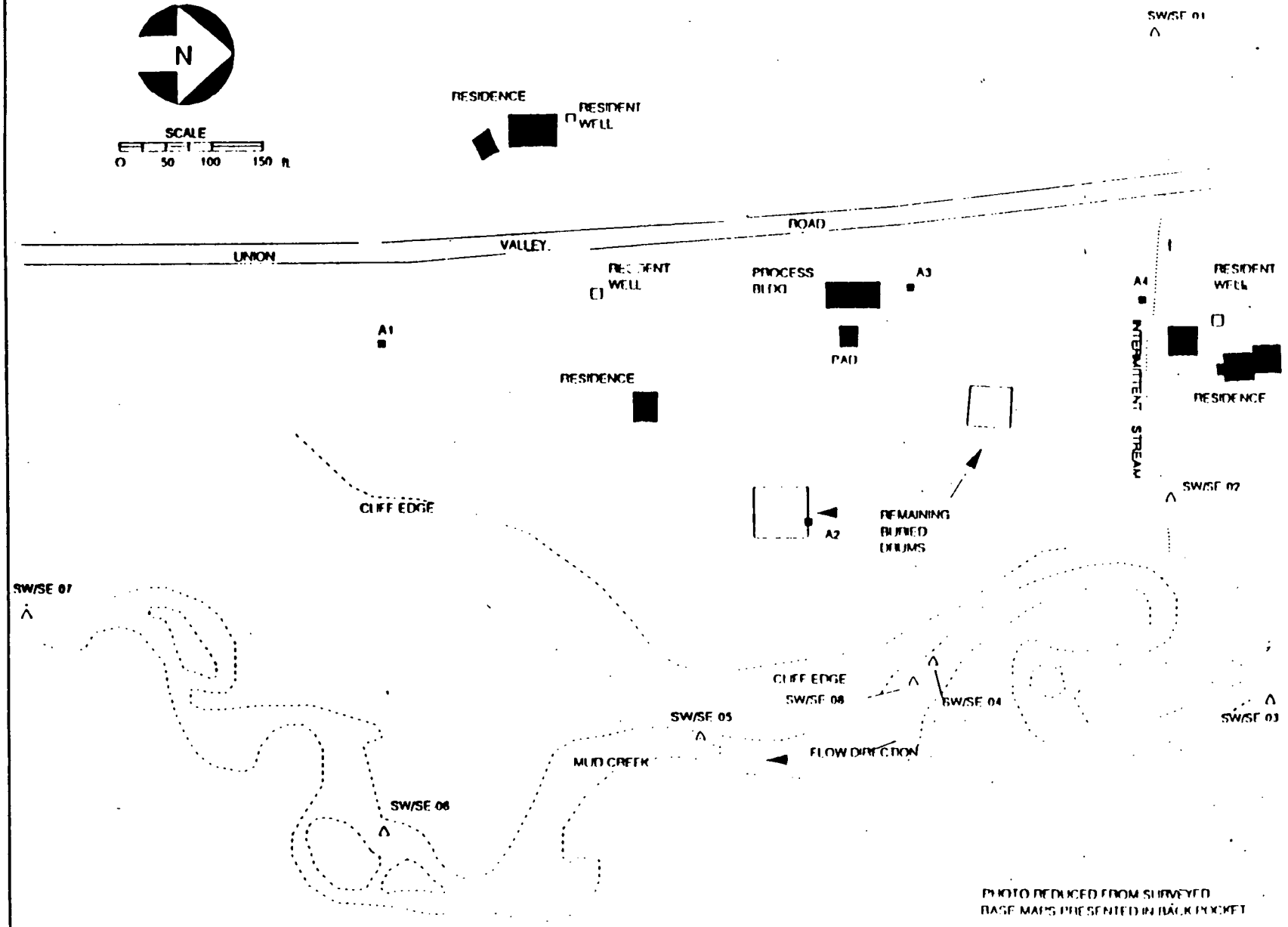


FIGURE 9

SOLVENT SAVERS RI REPORT

SEDIMENT, SURFACE WATER AND AIR SAMPLING LOCATIONS

APPENDIX 3 - ADMINISTRATIVE RECORD INDEX

SOLVENT SAVERS SITE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

SITE IDENTIFICATION

Notification / Site Inspection Reports

p. 1-16 — Potential Hazardous Waste Site Inspection Report. February 11, 1982.

p. 17-47 — Report: Final Report: Technical Review of Documents, prepared by Camp, Dresser & McKee. May 6, 1987.

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

Master Plan, Work Plans, Field Operations Plan

p. 48-223 — Report: Remedial Action Master Plan, prepared by NUS Corporation. December, 1983.

p. 224-245 — Report: Work Plan - Supplemental Data Collection, prepared by Conestoga-Rovers & Associates. March 27, 1987.

p. 246-362 — Report: Remedial Investigation/Feasibility Study Work Plan, Supplemental Data Collection, prepared by Conestoga-Rovers & Associates. June, 1988.

p. 363-370 — Report: Comparison of EPA's Final Work Plan (March 1988) to CRA's Work Plan (June 1988), prepared by Conestoga-Rovers & Associates. June, 1988.

p. 371-504 — Report: Final Work Plan Remedial Investigation/ Feasibility Study at the Solvent Savers Site, prepared by EBASCO Services, Inc. November 24, 1988.

p. 505-524 — Report: Final Field Operation Plan for the Remedial Investigation and Feasibility Study at the Solvent Savers Site, prepared by EBASCO, Inc. November, 1988.

Remedial Investigation Reports

p. 525-609 — Report: Final Report, Solvent Savers Site Remedial Investigation/Feasibility Study, Vol. I., prepared by E.C. Jordan Co. August, 1985.

p. 610-775 Report: Final Report, Solvent Savers Site Remedial Investigation/Feasibility Study, Vol. II, prepared by E.C. Jordan Co. August, 1985.

p. 776-1214 Report: Final Remedial Investigation Report, Solvent Savers Site, Lincaklaen, Chenango County, New York, prepared by EBASCO, Services, Inc. July 23, 1990.

p. 1215-1541 Report: Final Remedial Investigation Report Appendices, Solvent Savers Site, Lincklaen, Chenango County, New York, prepared by EBASCO, Services, Inc. July 23, 1990.

Correspondence

p. 1542-1545 Letter to David Weinberg of Porter, Wright, Morris & Arthur Law Firm, from David Munro and Dean Sommer, NYS Department of Law, re: State's comments on RI/FS. November 8, 1985.

p. 1546-1588 Response to April 29, 1987 State Request for Supplemental Investigation, prepared by Conestoga-Rovers & Associates. May, 1987.

p. 1589-1599 Letter from Mr. John V. Czapor, re: U.S. EPA responses to Conestoga-Rovers & Associates Supplemental Data Collection Work Plan. June 9, 1987. Responses are attached.

p. 1600-1606 Letter to Joel Singerman, U.S. EPA, from William Gill, U.S. Department of the Interior, re: Review of 1987 Draft Work Plan and Draft Field Operations Plan. January 28, 1988.

p. 1607-1608 Letter to Reed Newman of Fox, Weinberg & Bennett, from Paul Simon, U.S. EPA, re: Conestoga-Rovers & Associates Remedial Investigation/Feasibility Study Work Plan. August 9, 1988.

p. 1609-1610 Letter to Ms. A. Ross from William M. Moran. July 23, 1990.

p. 1611-1612 Letter to Addresses from Joel Sigerman. August 7, 1990.

Feasibility Study Report

p. 1613-1882 Report: Feasibility Study Report , Solvent Savers Site, Lincklaen, Chenago County, New York, prepared by EBASCO Services, Inc. July 23, 1990.

STATE COORDINATION

State Certification of Applicable or Relevant and Appropriate Requirements

p. 1883-1903 Letter from Dean S. Sommer, State of New York Department of Law, re: State of New York v. Allied Corporation, et al. April, 1987. The following are attached:

a) NY/EPA responses to Conestoga-Rovers Work Plan;
b) Overburden Well Figure 1;
c) Bedrock Well Figure 2;
d) Proposed Soil Gas Survey Locations Fig 3;
e) Attachment "B".

Correspondence

p. 1904 Letter to Gary Bowitch, NYSDEC, from Caroline Kwan, U.S. EPA, re: Additional information on Solvent Savers and Pompey Sites. June 10, 1988.

ENFORCEMENT

Notice Letters and Responses

p. 1905-1912 General RI/FS Notice Letter from Stephen D. Luftig to PRP's listed on attachment. June 5, 1987.

p. 1913-1914 Letter to Caroline Kwan, U.S. EPA, from Scott Slaughter, U.S. Department of Justice, re: Air Force's response to June 5, 1987 notice letter. June 10, 1987.

p. 1915-1918 Letter to Elena Kissel, U.S. EPA, from Peter Paden of Teitelbaum & Hiller, P.C., re: To confirm the response of G.E., Bristol-Myers and Stauffer Chemical Companies to the EPA's request to committing to a work plan and supplemental RI/FS. July 9, 1987.

p. 1919-1920 Letter to Caroline Kwan, U.S. EPA, from Karl Bordeaux of Beveridge & Diamond, P.C., re: UNISYS response to June 5, 1987 notice letter. June 11, 1987.

p. 1921-1947 Special RI/FS notice letter from Steve Luftig to PRP's listed on attachment. April 25, 1988.

p. 1928-1930 Letter to Caroline Kwan, U.S. EPA, from David Weinberg of Fox, Weinberg & Bennett, re: Response on behalf of client, Bristol-Myers Company, to EPA notice letter received April 26, 1988. May 9, 1988.

p. 1931 Letter to Caroline Kwan, U.S. EPA, from Mr. Francis Esposito, USAF, re: Air Force response to EPA letter of April 26, 1988.

p. 1932 Letter to Caroline Kwan, U.S. EPA, from Guy Hoadley, UNISYS Corporation, re: UNISYS Corp. response to April 25, 1988 notice letter. May 10, 1988.

p. 1933-1935 Letter to Elena Kissel, U.S. EPA, from Melinda Kemp, Champion International Corporation, re: Response to special notice letter received April 26, 1988. May 10, 1988.

p. 1936-1937 Letter to Caroline Kwan, U.S. EPA, from Russel Randle of Patton, Boggs & Blow, re: Carrier Corp. response to April 25, 1988 notice letter. May 18, 1988.

p. 1939-1940 Letter to Caroline Kwan, U.S. EPA, from Russel Randle of Patton, Boggs & Blow, re: Norwich-Eaton's response to April 25, 1988 notice letter. May 18, 1988.

p. 1941 Letter to Caroline Kwan, U.S. EPA, from Allan Topol of Covington & Burling, re: Extension of time for IBM to respond to April 25, 1988 notice letter until May 25, 1988. May 10, 1988.

p. 1942-1944 Letter to Caroline Kwan, U.S. EPA from, Mr. E.M. Wonderli, IBM, re: IBM response to April 25, 1988 notice letter. May 10, 1988.

p. 1945-1946 Letter to Caroline Kwan, U.S. EPA, J. Richard Lauver of Kirkpatrick & Lockhart, re: Response of American Locker Group to April 25, 1988 notice letter. June 27, 1988.

p. 1947-1953 Special RI/FS Notice Letter to General Motors Corporation from Stephen D. Luftig, U.S. EPA. June 23, 1988.

p. 1954-1956 Letter to Caroline Kwan, U.S. EPA, from William Stephens of Raichle, Banning, Weiss & Stephens, re: Denial of General Motors Corp. as a PRP. June 27, 1988.

p. 1957-1960 Letter to Carolyn [sic] Kwan, U.S. EPA, from Peter Paden of Teitelbaum & Hiller, P.C., re: Response to April 25, 1988 notice letter from G.E., Bristol-Myers and Stauffer Chemical Companies. June 28, 1988.

PUBLIC PARTICIPATION

Comments and Responses

p. 1961 Letter to Ms. Alondarae DelRossi, Town Clerk of Lincklaen, from Jill Hacker, U.S. EPA, re: Making RI/FS available to the public. December 28, 1988.

p. 1962-1964 Letter to Glen Angell, Lincklaen Town Board, from Jill Hacker, U.S. EPA, re: Radiation at the Solvent Savers Site. March 31, 1989.

p. 1965-1966 Letter to Ms. Alondarae DelRossi, Town Clerk of Lincklaen, from Jill Hacker, U.S. EPA, re: Advising the Town of Lincklaen community of the EPA's work since March, 1989. July 14, 1989.

Community Relations

p. 1967-1993 Report: Final Community Relations Plan for the Solvent Savers Site, prepared by EBASCO Services Incorporated. January, 1988.

Documentation of Other Public Meetings

p. 1994-2014 Report: Final Public Information Meeting Summary for the Solvent Savers Site, prepared by EBASCO. July, 1989.

Proposed Remedial Action Plan

p. 2015-2018 Proposed Plan concerning the Solvent Savers Site, prepared by U.S. EPA. October, 1989.

p. 2019 Letter to Marsden Chen, NYSDEC, from Joel Singerman, U.S. EPA, re: Draft Proposed Plan. June 29, 1990.

p. 2020-2021 Letter to Glen Angell, Lincklaen Town Board, from Lisa Wong, U.S. EPA, re: Status of RI/FS. July 23, 1990.

p. 2022-2023 Letter to the PRPs from Joel Singerman, U.S. EPA, re: Proposed Plan for the Solvent Savers Site. July 23, 1990.

p. 2024-2051 Letter to Marsden Chen, NYSDEC, from Lisa Wong, U.S. EPA, re: Final Proposed Plan. July 23, 1990. Proposed Plan is attached.

p. 2052 Letter to Richard L. Caspe, U.S. EPA, from Michael J. O'Toole, Jr., New York State Department of Environmental Conservation, re: Draft Proposed Remedial Action Plan. July 23, 1990.

APPENDIX 4 - NYSDEC LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233 -7010

Thomas C. Jorling
Commissioner

Mr. Richard L. Caspe, P.E.
Director
Emergency and Remedial Response
Division
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278

SEP 2 6 1990

Dear Mr. Caspe:

Re: Draft Record of Decision
Solvent Savers Site
DEC I.D. No. 709002

I am pleased to advise you that the New York State Department of Environmental Conservation (NYSDEC) concurs with the provisions of the referenced document. Specifically, the major components of the selected remedies will be:

1) Excavation and removal of the buried drums for off-site treatment and disposal at an approved Resource Conservation and Recovery Act ("RCRA") hazardous waste facility;

2) Excavation of approximately 60,000 cubic yards of contaminated soil (including 1,000 cubic yards of PCB-contaminated soil);

3) On-site treatment using low temperature thermal extraction ("LTTE") for volatile organic compounds ("VOCs") from highly contaminated soil;

4) Backfill of the excavated areas with the treated soil and approximately 1,000 cubic yards of clean fill (if removal of the PCB-contaminated soil for off-site incineration is deemed necessary);

5) Extraction and on-site treatment, using chemical precipitation, air stripping, and carbon adsorption of the contaminated groundwater in the underlying aquifer;

6) Reinjection of the treated water into the ground, and/or discharge of the treated water to surface water;

7) Disposal of the residuals from the treated groundwater at an off-site approved RCRA hazardous waste facility;

8) Treatability studies will be conducted during the remedial design phase to determine whether the on-site LTTE process is an appropriate treatment method for the PCB-contaminated soil. If the treatability study results indicate that LTTE is an appropriate treatment method, then this technology will be utilized to treat the excavated soil contaminated with PCBs. Should the findings of the treatability studies indicate that the on-site LTTE process would not provide the desired degree of treatment, then the PCB-contaminated soil excavated will be removed for off-site incineration; and

9) Treatability studies will be conducted during the remedial design phase to determine whether the soil flushing and/or vapor extraction processes are appropriate treatment methods for the excavated soil contaminated with low level VOCs. If the treatability study results indicate that one or both of these technologies are appropriate treatment methods, then one or both of these technologies will be utilized to treat the excavated soil contaminated with VOCs. Should the findings of the treatability studies indicate that these on-site treatment processes would not provide the desired degree of treatment, then the contaminated soil will be treated on-site using LTTE.

Items 8 and 9, (additions to the initial draft ROD), are acceptable, since as proposed by the General Electric Co., the treatability studies could result in significant monetary savings.

We also accept the results of your model, but this acceptance is contingent on the NYSDEC staff receiving a copy of and confirming the efficacy of your model and data generated for the Solvent Savers site. Based on this, NYSDEC accepts the USEPA's statement:

> "Areas 1, 3 and 5, which contain lesser concentrations of VOCs below health-based levels, do not require remediation. The vast majority of contaminated soil, amounting to approximately 59,000 cubic yards, is located in Areas 2 and 4.
>
> The initial soil cleanup levels, which are based on an average of the model-derived cleanup levels for Areas 2 and 4, are as follows:
>
> Tetrachloroethene - 2.2 ppm
> Trichloroethene - 0.8 ppm
> 1,1,1-Trichloroethane - 0.9 ppm
> 1,1,2-Trichloroethane - 0.4 ppm
> Toluene - 1.5 ppm
> 1,2-Dichloroethene - 0.8 ppm (Area 2 only)
> Xylenes (total) - 3.1 ppm (Area 2 only)

These levels represent average contaminant concentrations of indicator chemicals in the soil which will theoretically produce contaminant concentrations in the groundwater at the nearest receptor which meet potable water standards. The nearest receptor is considered to be Mud Creek."

Should NYSDEC disagree with your findings, a reopening of the ROD will be in order. Please contact Marsden Chen at (518) 457-4349 if there are further points for discussion.

Sincerely,

E. O. Sullivan

Edward O. Sullivan
Deputy Commissioner

cc: D. Munro, AG's office

that the alternative remedy would not achieve the established remediation goals.

Please note that the enclosed comments also recommend, to address a matter not considered in the FS Report, that PCBs in soils be disposed of in an off-site landfill, provided the soils meet applicable treatment standards under the RCRA land disposal restrictions. Those PCB soils not capable of meeting applicable treatment standards would be thermally treated on-site. The thermal treatment of these soils would result in the condensation and collection of PCBs in the off-gas handling system, and the resulting condensate would be destroyed by off-site incineration. This approach avoids the off-site transport of unnecessarily large volumes of PCB-contaminated soils, and avoids the ultimate land disposal of large volumes following incineration.

Conestoga-Rovers is prepared to meet with you at your earliest convenience to discuss issues raised by our comments. Please do not hesitate to contact the undersigned or Mr. Frank Rovers should you desire further information or wish to discuss these issues.

Sincerely,

Reed Neuman

Reed W. Neuman
Counsel for Bristol-Myers
Squibb Company

John Hanna

John Hanna, Jr.
Counsel for General Electric
Company

cc: Joel Singerman
Frank Rovers

CRA
Consulting Engineers

CONESTOGA-ROVERS & ASSOCIATES LIMITED
651 Colby Drive.
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510

September 7, 1990

Reference No. 2077

Mr. Joel Singerman; Chief
Western New York Remedial Action Section
United States Environmental
Protection Agency
Region II
26 Federal Plaza
New York, New York
10278

Dear Mr. Singerman:

Re: Comments on RI/FS and Proposed Plan for the Solvent Savers Site

On behalf of General Electric Co. and Bristol-Myers Squibb Co., find attached comments on the RI/FS and Proposed Plan for the Solvent Savers Site.

A separate cover letter is being forwarded to you from John Hanna, Jr. (Whiteman Osterman & Hanna).

Should you have any questions, please do not hesitate to contact us.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

for Frank A. Rovers, P.Eng.
FAR/cdd/1

c.c. John Hanna, Jr., Esq. (w/encl.)
Reed Neuman, Esq. (w/encl.)
James Doyle (w/encl.)
Mike Ianniello (w/encl.)
Ken Burns (w/encl.)
William Bulsiewicz, Esq. (w/encl.)

APPENDIX 5-RESPONSIVENESS SUMMARY

SOLVENT SAVERS SITE
LINCKLAEN, NEW YORK
RESPONSIVENESS SUMMARY

COMMENTS RECEIVED

CHENANGO NORTH

Citizens Against Radioactive Dumping

August 3, 1990

Ms. Lisa Wong
U.S. E.P.A.
N.Y.-Carribean Remedial Action Branch
26 Federal Plaza, Room 29102
New York City, New York 10278

Dear Ms. Wong:

I am requesting a copy of the RI/SS and the Proposed Plan for the Solvent Savers, Linklean, Chenango County site. #709002

This request is made under the Federal Freedom of Information Act and will come to Chenango North, Citizens Against Radioactive Dumping, a not-for-profit organization, less than five miles from the Solvent Savers site.

It is essential that we get these documents as quickly as possible so that we have time to review them before the public meeting in Linklean, on August 13, 1990, so that we can formulate our questions appropriately.

Very truly yours,

Susan B Griffin

Susan B. Griffin,
Coordinator,
Chenango North Citizens
Against Radioactive Dumping

Post Office Box 126 South Otselic, New York 13155

Cortland County

Low-Level Radioactive Waste Office

County Office Building 60 Central Avenue
P.O. Box 5590
Cortland, New York 13045
Telephone (607) 756-3444

Cindy M. Monaco
LLRW Coordinator

Denise Cote-Hopkins
Assistant LLRW Coordinator

August 3, 1990

Ms. Lisa Wong
Remedial Project Manager
US Environmental Protection Agency
Room 29-102
26 Federal Plaza
New York, NY 10278

Dear Ms. Wong:

Pursuant to the Freedom of Information Act, I would like to request the following documents on behalf of the Cortland County government. The documents concern the Solvent Savers Site (site code # 709002) at Lincklaen, New York.

The site rests approximately 1 mile from the Cortland County border. Mud Creek, which flows past the site, also flows through the town of Taylor, Cortland County. The town of Taylor has had two sites selected as potential repositories for low-level radioactive waste.

The documents which we request include:

The Work Plan and Report for:

Phase I
Phase II
Remedial Investigation
Supplemental Investigation (if any)
Feasibility Study

The Selection Process for Remedial Alternatives

The Record of Decision

It is our understanding that written comments must be submitted to you before August 23, 1990. Having just received public notice in the Cortland Standard newspaper on August 1, 1990, we, consequently, ask that this request be acted upon expediently.

Thank you.

Sincerely,

Denise Cote-Hopkins

Denise Cote-Hopkins
Assistant LLRW Coordinator

cc: Thom Heckard, Congressman Boehlert's Office

SHERWOOD BOEHLERT
25TH DISTRICT, NEW YORK

COMMITTEES:
SCIENCE, SPACE, AND TECHNOLOGY
PUBLIC WORKS AND TRANSPORTATION
SELECT COMMITTEE ON AGING

NORTHEAST-MIDWEST CONGRESSIONAL COALITION
U.S. DELEGATION INTERPARLIAMENTARY UNION

Congress of the United States
House of Representatives
Washington, DC 20515

WASHINGTON OFFICE
1127 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-3665

CENTRAL OFFICE
ALEXANDER PIRNIE FEDERAL BUILDING
10 BROAD STREET
UTICA, NY 13501
(315) 793-8146

TOLL FREE 1-800-235-2525

August 10, 1990

Ms. Lisa Wong
Remedial Project Manager
U.S. Environmental Protection Agency
Room 29-102, 26 Federal Plaza
New York, New York 10278

Dear Ms. Wong:

I am following up on a preliminary inquiry by my staff to endorse the Cortland County government's request for a copy of the following documents regarding the Solvent Savers Site (site code #709002) at Lincklaen, New York (copy enclosed).

The documents requested by the county include:

- Phase I
- Phase II
- Remedial Investigation
- Supplemental Investigation
- Feasibility Study
- Selection Process for Remedial Alternatives
- Record of Decision

I appreciate your offer to provide access for Cortland to this information in your New York City office. But given the August 23 deadline for written comments, county officials will require uninterrupted access to these documents if they are to provide an accurate, quality presentation of the county's views.

The final decisions on this matter should be based upon the best information available. Providing Cortland county with a copy of these documents will allow them to do their part in providing that information.

Thank you for your assistance. Should you have any questions, please don't hesitate to call my Washington office at (202) 225-3665.

Sincerely,

Sherwood Boehlert
Member of Congress

SB:th
Enclosure

Low-Level Radioactive Waste Office

County Office Building 60 Central Avenue
P.O. Box 5590
Cortland, New York 13045
Telephone (607) 756-3444

Cindy M. Monaco
LLRW Coordinator

Denise Cote-Hopkins
Assistant LLRW Coordinator

August 1, 1990

Ms. Lisa Wong
Remedial Project Manager
US Environmental Protection Agency
Room 29-100
26 Federal Plaza
New York, NY 10278

Dear Ms. Wong:

Pursuant to the Freedom of Information Act, I would like to request the following documents on behalf of the Cortland County government. The documents concern the Solvent Savers Site (site code # 709001 at Limeklaen, New York.

The site rests approximately 1 mile from the Cortland County border. Mud Creek, which flows past the site, also flows through the town of Taylor, Cortland County. The town of Taylor has had two sites selected as potential repositories for low-level radioactive waste.

The documents which we request include:

The Work Plan and Report for:

Phase I
Phase II
Remedial Investigation
Supplemental Investigation (if any)
Feasibility Study

The Selection Process for Remedial Alternatives

The Record of Decision

It is our understanding that written comments must be submitted to you before August 23, 1990. Having just received public notice in the Cortland Standard newspaper on August 1, 1990, we, consequently, ask that this request be acted upon expediently.

Thank you.

August 13, 1990

Questions on the Solvent Savers Site, Lincklaen, NY
Submitted by: Denise Cote-Hopkins, RD 2 Box 4555 - Taylor, Cincinnatus, NY 13045

1) Why is there only a ten day comment period from the time of the public information meeting?

Do you ever extend deadlines?

Will there be a "public hearing?"

Are there any other occasions for public comment? During remediation?

2) Why did this site make the National Priorities List? What rank is it: nationwide, statewide?

3) Exclusive of community comment, would there be any change in the preferred method selected?

4) Would you draw a schematic of the proposed plans?

5) What is your "emission treatment" as stated on page 19 for soil, and "air emission controls" for ground water as stated on page 20? How are they deemed necessary? Can the community affect this?

6) Emissions (may have been answered in #5)

a) Ground Water method 4

Will a carbon filter be utilized to trap the air which leaves the air-stripper? If not, what percentage of the contaminant is being trapped in the planned carbon filtration for the water which leaves the air-stripper? And, what percentage of the contaminant is leaving via the air? In utilizing preferred method GW-4, are the materials essentially being transferred from the ground to the air?

b) Soil alternative method 5

While the scrubber will remove particulate and acidic gas, are other volative organic compound vapors released to the atmosphere, or would they be allowed to remain in the soil; thus, accounting for the TCLP (Toxicity Characteristic Leaching Procedure)?

7) Who will do the clean-up? US, DEC, and sub-contractors? May the community comment on proposed contractors?

8) Has an on-scene coordinator been selected? How will we obtain notice of such, and how may we communicate with the coordinator?

9) Were air samples taken? Were soil, air, ground and surface water samples taken off site? Where? Were samples handled timely to prevent deterioration (cite Weston lawsuit)?

10) As the site effects both Chenango and Cortland counties, could the public libraries of both county seats: Norwich, Cortland, and also at Cincinnatus -- locally most available be repositories? Do you have available the EPA's Community Relations Plan? May it be sent to the repositories?
The Fenders are to remote, hours unrealistic for working people

11) Will remediation reports (monitoring, etc.) be available as the work proceeds? Will they be made available at the repositories?

12) Have any health studies been conducted in the community? If so, what were the geographical parameters for study, and is this information available? Is there any need for a baseline study prior to remediation?

13) Who are the prp's? Any rp's?

TOWN OF LINCKLAEN
County of Chenango

Alondarae Del Rossi, *Town Clerk*
DeRuyter, N. Y. 13052
315 852-9601

August 17, 1990

United States Environmental
Protection Agency Region II
Jacob J. Javits Federal Building
New York, New York 10278

Attention: Lisa K. Wong
Project Manager

The Town Board of the Town of Lincklaen wishes to thank you for the meeting held last week at the Town Hall.

The Board is in support of the Proposed Plan of clean-up for the Solvent Savers Site in the Town of Lincklaen, especially Alternative SC-5 and GW-4.

Very truly yours,

Alondarae Del Rossi
Town Clerk
Town of Lincklaen

Citizens Against Radioactive Dumping

....AND ALL OTHER POLLUTION

August 30, 1990

Ms. Lisa Wong, Project Manager
Solvent Savers Site
EPA, N.Y./Carribian Remedial Action Branch
26 Federal Plaza, Room 10278
New York, New York 10278

Dear Ms. Wong:

The citizens in Chenango North, who all live between 3 and five miles down wind of the Lincklean 'Solvent Savers' site, are not convinced that SC-5, Excavation/low temperature thermal extraction/on-site redeposition, is the best alternative for our well being.

It is clear that the excavation and the emissions possible from thermal treatment, are risks which could represent health hazards to our families.

The in-site vapor extraction, by contrast, is far better in its short term effectiveness, and results in the same outcome, as far as long term resolution of the problem.

Chenango North asks that the decision ot implement this method is delayed until we have the opportunity to review the detailed site review, which just arrived yesterday, and that we have another opportunity to meet with someone form your staff to review the in-site process in more detail.

With that in mind we invite your representative, and will provide a meeting place, if the Lincklean Town Hall is not available.

We ask that no media be present, and that the meeting be more informal in nature than our previous meeting.

I would like to take this opportunity to remind you that the documents we requested through the Freedom of Information Act, were promised without charge. Indeed, the risk to our community, and the impossibility of our community to access the Pond Store documents, make it imperative that these documents be available for detailed examination. To charge a low income community under the circumstances, would be at the very least, inappropriate.

Very truly yours,

Susan B. Griffin

Contact #'s:

607-863-3872 home
607-753-0106 work
or by address below

Susan B. Griffin,
Coordinator, Chenango North C.A.R.D.
... and all other pollution

Post Office Box 126, South Otselic, New York 13155

Pass & Seymour
Legrand

August 31, 1990

To: Ms. Lisa K. Wong
Project Manager
Western New York Remedial Action Section
U.S. Environmental Protection Agency
26 Federal Plaza, Room 29-102
New York, N.Y. 10278

From: Edward F. Baumgras
Plant Engineering Manager
Pass & Seymour
50 Boyd Avenue
Syracuse, N.Y. 13209

Ms. Wong.

Having reviewed your Final Feasibility Study Report of July 23, 1990, as well as attending your meeting of August 13, 1990 at the Lincklaen Town Hall, the following questions / comments are submitted for review.

1. During the course of the meeting, I believe it was stated by a member of your party that no TCE vapors are being emitted from the Site, and that there was no detectable TCE contamination present in Mud Creek 200' downgradient from the Site. It was also stated by a representative of the New York State Fish and Game Agency, that species of fish such as the environmentally sensitive Dace are thriving within the Creek.

   My question is: Does a definable TCE plume exist at this Site, and if so how does it compare in size to earlier test data ?

2. It would appear from the data on pages 18, 19, and 56 of the Final Feasibility Study that all health risks would be completely satisfied by Alternative SC-3. What realistically is gained by spending an additional $18,554,000 ?

3. Please explain the practical need that requires any further efforts, than those that are defined in Alternatives SC-3 and GW-2 ? (862K & 985K)

4. What are the incremental costs associated with the removal of TCE, PCB's, and METALS by area, for Alternatives SC-4 and SC-5 ? (7,887K vs 19,416K)

Sincerely yours,

Edward F. Baumgras

Pass & Seymour, Inc. P.O. Box 4822 Syracuse, New York 13221 315-468-6211 Fax 315-468-6296

September 5, 1990

Ms. Lisa K. Wong
Project Manager
U.S. EPA, Region 2
26 Federal Plaza
Room 29-102
New York, New York 10278

Dear Ms. Wong:

A group of Lincklaen's Citizens concerned about the cleanup of the Solvent Savers Site met on August 27th. The purpose of this meeting was to explore various possibilities of how to help with a successful completion of the proposed EPA Cleanup.

The unanimous feeling of the Lincklaen residents is they want to work in a positive, constructive way with the E.P.A. Many of our group were dismayed that several of the people from various groups involved with fighting the siting of a Low Level Radioactive Waste Facility perceived the E.P.A. as their enemy.

We want to assure you that we believe you are sincere in your desire to see this problem resolved.

We look forward to future meetings and early complete cleanup of the Solvent Savers Site.

Yours truly,

Glenn Angell

Lincklaen Concerned Citizens
Glenn Angell, Town Supervisor

GA/eba

copy - Glenn Malson
Mary Jo Brown

International Business Machines Corporation

208-262 Harbor Drive
P O Box 1050
Stamford CT 06904-2501
203/352-7000

September 5, 1990

Ms. Lisa Wong, Project Manager
Western New York Remedial Action Section
USEPA - Room 29-102
26 Federal Plaza
New York, NY 10278

Re: Comments on the Proposed Plan and the Remedial Investigation/ Feasibility Study for the Solvent Savers Site, Lincklaen, New York

Dear Ms. Wong:

The following comments are submitted on behalf of IBM in response to the USEPA's Proposed Plan and Remedial Investigation/Feasibility Study (RI/FS) for the Solvent Savers site in Lincklaen, N.Y. The Proposed Plan was received in this office on August 1, 1990, and the RI/FS on August 8, 1990. Subsequent to our receipt of the plan, you granted Mr. Guerin of this office an extension until September 7, 1990, for IBM to submit written comments.

For the record, IBM has maintained for many years that none of its waste went to the Solvent Savers site. New York State, the USEPA and IBM, after extensive search, have been unable to produce a single document that indicates IBM waste went to the Solvent Savers site. In spite of this and as a result of the USEPA's persistent belief that IBM is a "potentially responsible party" (PRP) at this site, IBM submits these comments for the public record in order to preserve any future rights for possible challenge to the selected remedy.

In general, concerning the RI/FS, there are a number of serious flaws which have resulted in the USEPA's selection of a recommended remedial program that is not cost-effective, considering the degree of risk reduction and clean-up afforded. Of significant concern is the manner in which the USEPA characterizes the potential, future use of the site and associated risks. By assuming the site may some day be developed and inhabited, USEPA is grossly overstating the risk posed by the site. This is especially true concerning the location of the site in the 100-year flood plain because in New York State, under prevailing policies, it is extremely unlikely that the site will ever be developed.

The RI/FS data base is limited in many respects. Although data collection has continued for several years, the RI relies mainly on data collected over a two-to-three-month period in 1989. As a result, seasonal fluctuations and long-term trends are not presently understood. Also, much of the data in the RI is suspect as evidenced by significant contamination of quality control field blanks.

IBM believes that much of the evaluation concerning feasible remedial alternatives is premature and needs to be supported with additional investigations into the nature and extent of the source. For example, the limits of soil and groundwater potentially requiring remedial action have not been adequately established.

Detailed comments are as follows:

1. Risks posed by the site are overstated due to the overly conservative assumptions about the anticipated future use of the site. The risk calculations are based on a hypothetical individual living on-site and drinking on-site groundwater for his entire life. Risks should be recalculated using current EPA methods and modifying assumptions to present a realistic potential exposure scenario.

2. The FS did not consider a proper or complete range of remedial alternatives. The FS should have presented a series of alternatives with increasing benefits and risk reduction corresponding to increased cost. Of particular concern is the lack of intermediate alternatives between capping ($862,000), in-situ vapor extraction ($7,877,000), and low-temperature thermal ($19,416,000). It is particularly confusing that the Proposed Plan stated that the highest cost alternative was Alternative SC-6 at $96,800,000 and involved off-site incineration, where the Feasibility Study did not present any costs associated with this alternative. Also, the proposed soil alternative in the Proposed Plan is stated as costing $19,416,000, whereas the Feasibility Study states this alternative will cost $22,900,000.

   There are other cases of inconsistencies of this nature, which seem to indicate that some additional studies or documentation was generated that is not made available in the Feasibility Study.

3. The FS was structured such that the complementary effects of source control and groundwater remediation were not considered in any technical detail. For example, allowing natural attenuation of the groundwater plume may be appropriate if the VOC source is controlled or removed. Similarly, hydraulic containment of the site might eliminate the need for removing VOC sources altogether.

4. The risks to workers and off-site residents posed by excavating soils to a depth of 40 feet are dismissed by the FS. In fact, the risk to workers posed by air emissions of VOCs may outweigh the existing risks posed by the site.

5. The FS did not consider a range of objectives, clean up levels, or timeframes for groundwater remediation as required by EPA guidance. Instead, the FS selected drinking water MCLs and considered only one scenario for groundwater extraction.

6. The "Blank" samples collected in May 1989 were contaminated by 20 volatile compounds, suggesting field and/or laboratory quality control problems. Two of these blanks contained TCE at levels of 200 ppb and 140 ppb. The RI did not account for this contamination in interpreting the data. As a result, as many as seven of the wells which the RI concluded contained low-level chemistry may in fact be clean. Additional sampling is appropriate to resolve the status of these wells.

7. In-situ soil vacuum extraction (SVE) was considered in the FS and presented as similar in performance and reliability to low temperature thermal (LTT). Yet the proposed plan selected LTT over SVE at an added cost of $11.5 million.

   Also, this rationale is extremely confusing since the "vitrification" remedy was eliminated from further consideration because, as the feasibility study states, "in-situ vapor extraction can achieve the remedial objectives using a treatment process for less cost."

8. A 10 ppm PCB cleanup level was selected based on TSCA Spill Cleanup policy, which is inapplicable to remedial sites. Recent EPA comments tend to suggest that PCB cleanup levels in soils could range from 1 to 100 ppm and still be protective of human health.

9. It is not clear in the report why the May 1990 PCB samples were taken and presented but not used in the risk assessment. Duplicates #27 and #37 show a >10-fold error, which is unexplained. It is not explained in the report why no Arclor 1260 was found in this sampling round but detected in the others. Also, the bulk of the PCBs contained in the soils is Arclor 1242 and 1248 with Arclor 1260 constituting three percent of the surface-bound PCB. Although it is EPA policy to base total PCB cleanup levels on one commercial mixture's toxicity, there is little correlation at this site between the cancer risk level calculated and the substance-specific risk present.

10. Exposure assumptions for direct contact with on-site soils and sediments as well as dermal exposures are overestimated by a factor of ≃ ten. The number of days exposed/year was calculated using 24 hours per day exposure. This is incorrect. The proper exposure durations were accounted for in the calculations concerning surface and groundwater contact.

11. All risks were assumed to be additive. Only cancer risk and systemic toxicants with similar target organ effects are additive.

If you have any questions concerning the above comments, please contact me at (203) 357-7944.

Sincerely,

for T. D. Morris
Environmental Engineer

TDM:gdn

September 6, 1990

Ms. Lisa Wong
Remedial Project Manager
US Environmental Protection Agency
Room 29-102
26 Federal Plaza
New York, NY 10278

Dear Ms. Wong:

I write to comment on the United States Environmental Protection Agency's cleanup for the Solvent Savers Site in Lincklaen, New York. It is my understanding that the deadline of August 23, 1990 has been extended to September 7, 1990.

These comments are in addition to the written questions which I submitted at the August 13, 1990 public meeting.

I have met with members of our local organization, Taylor Against Low-level radioactive waste, many of whom are immediate downstream neighbors to the site. Some of their comments are contained within.

HEALTH RELATED ISSUES

The most obvious problem is that health risks have not been explained to the public in plain English. Neighbors to the site haven't technical expertise. While certainly it is important that the EPA report in a technical manner, additional translation into commonly accepted terms would have been beneficial. The section on health of the "Proposed Plan for Solvent Savers Lincklaen, NY" is just beyond everyday comprehension. The public has gained little or no knowledge of the risk to which they've been exposed. Thus, I would ask that health problems be restated in language which a layperson may comprehend.

More specifically:

Explain what the carcinogenic and adverse non-carcinogenic effects are exactly.

Explain your risk assessment results. Who conducted the health risk assessment and when?

Explain excess lifetime cancer risk with EPA's range.

Explain hazard index.

Explain reference doses.

Please clarify "assumed exposure scenarios." To what time period does "current" and "future" exposure refer; that is, does current mean one exposure, one year, sixteen years (current lifetime of site)? Why hasn't "future" exposure been applied to pathways to the neighboring residents, but only to on-site residents? Does the term "future" reflect prolonged exposure?

Are similar risk analyses calculated on remediation activities?

As stated on page 6, "Actual or threatened releases of hazardous substances from this site ... "may present a current or potential threat to public health, welfare, or the environment." If it may present a current threat to the public, etc., why hasn't a health survey been done for people and bovine herds to determine if there has been damage done? If there is regulatory policy regarding this issue, please include references in answer.

Are there any plans for current or future health monitoring? Is there any mechanism through which this may be pursued?

REMEDIATION ISSUES

Soil

The preferred method chosen, SC-5 is acceptable as a remediation alternative. It is imperative, however, that all precautions are taken to prevent community and worker exposure to low-level emissions. As was described at the public meeting, it is my understanding that the after burner would destroy the VOCs, and that the scrubber would filter particulates. These should not be designed out under any circumstances. Even if the EPA should find through "treatability study results" that the extra measures are unneccesary, the emission controls must be instituted for the following reasons: 1) at present the materials which are in the remaining barrels has not been identified; 2) there exists the possibility of treating more densely contaminated soils -- a surge, which would render treatability results inconsequential; 3) a deserved "peace of mind" for the community. 4) to remove the contaminants from the soil to air is not acceptable. Even though there may be a potential for photodecay, etc. in the air, it is particularly important that the extra measures are taken because the site is situated in a

food production area. The possibility for bioaccumulation exists in this agricultural setting.

Explain the residual contamination level of treated soil which has passed the TCLP toxicity test. That is, what are the concentrations of contaminants in the soil when what is remaining is an "acceptable level?"

It is not clear from what is stated on page 16 of the "Proposed Plan," to what degree metal compounds will remain in the soil. Will they be removed at all? If not, why not? What process could be utilized to remove these metals? What risk do they pose if left in place? Consider the consequences if they were to remain in place and were dislodged into the creek from the cliff edge through natural erosion, or worse, a severe storm.

For obvious reasons, the excavation should not be undertaken in dry seasons or in windy conditions where dust may carry the contaminants away from the site. I recognize that some individuals believe that a "bubble" should be utilized. Could we receive more information on this? What are the pros and cons regarding community and worker exposure?

Will all PCB contaminated soils be excavated, if not what concentration will remain?

Groundwater

I find the preferred treatment of GW-4 acceptable. The additional carbon adsorption unit to filter the air from the air stripper must be kept in place and not designed out under any circumstances. All of the arguments raised regarding air emission controls in SC-5 above apply here similarly.

TESTING FOR CONTAMINANTS

Bioassessment

How far downstream were samples taken in Mud Creek? Were samples taken from natural deposition areas further along the creek where materials may have come to rest after being awash in the stream?

How far downstream were VOCs and metals detected? What evidence do you have to support the position that the VOC's and metals detected "do not pose a significant threat to aquatic organisms?"

It is stated that "VOCs are rapidly biodegraded and exhibit a low potential for bioaccumulation." This may be so; however, I have learned that a significant anomaly was found in testing the fish tissues: that VOCs were present. This, I am told, was

unusual and perplexing. Could you please explain why, if the VOCs are rapidly biodegradable, that they appeared at all in the fish? What is the toxicity of VOCs found in the fish samples? If this is really so unusual why, was it not presented to the public?

For the above question on VOCs in fish, as well as the statement, "number of lesions in fish tissues were found," please described what evidence you have to support the position that "none can be attributed to the contamination at the site or are indicative of serious health problems." Additionally, who made this determination.

QUALITY ASSURANCE

The observation was made that the Roy F. Weston company performed work for the bioassessment. The community is familiar with the company and feels suspect of any of their actions. Simply put, they do not have any credibility in the eyes of our community. An EPA settlement of $730,000 is evidence which questions the integrity of work performed by Roy F. Weston. A consent judgment was signed as a resolution to the EPA's inquiry into alledged practices by the Lyonsville, PA unit of the company. I note for the public record statements made in the February 14, 1990 "Superfund Report" page 6 - 7:

> "The contract laboratory, a division of Roy F. Weston, Inc., falsified the dates on which time-sensitive Superfund contaminant samples were studied, negating the accuracy of the analyses.... Because the samples were volatile organic contaminants that dissipate over a short period of time they must be studied within six to ten days of their collection if an accurate assessment is to be made, EPA officials say....
>
> Millions of dollars and human health risks are at stake when each contaminant is studied as almost all the remaining decisions about cleanup, including whether or not the site should be remediated, are based on the results of the analyses. First, whether or not a hazardous substance exists is determined. If so millions may be spent on site cleanup. If not the site could be allowed to stay as is. If the study's conclusions are inaccurate, money spent on cleanup could be wasted on a non-existent threat, or a site posing a significant health risk may be left unaddressed.
>
> The results of a sample analysis are also used in the remedy selection process. Not only is the type of remedy determined by the study, but how long the treatment will last also depends on the laboratory...."
>
> Additionally, refer to the February 28, 1990 "Superfund

Report" page 7 DOE Site Investigations - Cost overruns, flawed studies faulted. In this report on RI/FS studies, it is stated that: "Roy F. Weston ... failed to give special consideration to wetlands on the site and provided no procedures for handling radioactive waste that might be dredged up by drilling crews.... Although Weston tried to downplay the seriousness of the charges, a DOE official acknowledged that the (future) work was being split to encourage "improved quality assurance."

In light of these grievous offenses, the community, here, really has doubts about the credibility of tests conducted by Weston. What assurances can you give that such is not the case for the Solvent Savers Site? Which lab performed the tests? Who from the EPA oversaw quality assurance in sub-contractors? Is there any review process in EPA to determine whether fraudulent activities have taken place elsewhere? Can this review be applied to the Solvent Savers Site?

SAFETY

A fence and signs at the site are ashamedly long overdue. These measures should be undertaken immediately.

To reiterate, it is my understanding that the cliff edge stability along the creek is questionable should a severe storm or other erosive action take place. What can be done about this -- before and after excavation?

PUBLIC PARTICIPATION

I believe that it is the EPAs duty to fully inform the public about the problems of the site as it is, or upon remediation. The community has been exposed to the risk. Unlike probably exposure, it is a fait accompli. The people have a right to know and understand what this bad place means to their lives. Thus, the EPA should be as forthright as possible in informing the public, particularly, with regard to health related issues. Again in reiteration, information should be provided in common layperson terms to the greatest degree possible.

Public notification should be made of that which is found in the residual drums. Additionally, notification should be made regarding the results of the model being implemented by EPA to determine target clean-up levels in areas 1, 3, and 5 of the site (page 3).

I formally wish to address the inadequacy of the established repository for information. The libraries in Cincinnatus and DeRuyter would best serve the public. It is simply ludicrous that research should be undertaken at the Pond Store in between customers' purchases of beer, cigarettes and candy. There isn't

even a chair in which to sit. The store is remote and is open only a few hours beyond normal working persons' hours. It is quite simply unacceptable.

The comment period of twenty-five days after the public meeting really isn't sufficient time to adequately review materials and produce comments.

Public participation and review should be particularly encouraged and allowed during the design phase which I understand is prior to the Record of Decision. Furthermore, with or without the aid of the Technical Assistance Grant, the public should be allowed to participate in all phases of the project. Indeed, it is obvious that the TAG liaison is advantageous to the EPA in that they must deal with one community liaison, rather than hundreds of local technically illiterate people. If the TAG funding were not obtained, it should not forfeit the community's ability to receive information or participate in commenting on the project.

Finally, I wish to comment on two speakers' statements made at the public meeting. Their sentiments were that contaminated material should not be transported, nor disposed of in other communities. This ideology parallels arguments for on-site point-of-generation storage of noxious wastes -- you make it, you keep it. What is seriously wrong in the conclusions which they have drawn is that this site is in essence an accident. They are concerned with how a transportation accident spill be handled. However, their argument for retaining the wastes at the site is pathetic in that they fail to see that this site is in fact an accident. Because of the sites proximity to Mud Creek, it's an accident which has occurred on a moving highway no less. They are trying to suggest that we should not clean-up this spill. This is not a fair assessment of the situation. It is particularly unfair to the local community, particularly, the gentleman who watches the barrels go "snap, crackle and pop" (reference to comment made by immediate neighbor to the site at the public hearing).

Respectfully submitted,

Denise Cote-Hopkins

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Cincinnatus, N.Y. 13040

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September 7, 1990

Via Telecopy and Federal Express

Ms. Lisa K. Wong
Project Manager
Western New York Remedial Action Section
U.S. Environmental Protection Agency
Region II
26 Federal Plaza, Room 29-102
New York, New York 10278

Re: Solvent Savers Site

Dear Ms. Wong:

Under separate cover we are transmitting to you today the joint comments of General Electric Company and Bristol-Myers Squibb Company to EPA's recent "Final Remedial Investigation Report," "Final Feasibility Study Report," and "Proposed Plan for the Solvent Savers Site," all issued on July 23, 1990.[1/] The detailed comments were prepared on the Companies' behalf by Conestoga-Rovers Associates Limited.

We believe that the materials noted above, and other information we understand to be considered part of the administrative record for this site, do not support the issuance of a Record of Decision at this time. In particular, as more fully detailed in the accompanying comments, insufficient data have been collected and reviewed in support of the selected source control remedy alternatives, and the reports do not adequately develop and evaluate pertinent alternative treatment technologies. As a result, the FS Report presently does not satisfy the requirements for the development, screening and evaluation of remedial alternatives as specified in the National Contingency Plan, 40 C.R.F. § 300.430(f), and thus in our view

---

1/ We understand that, pursuant to recent communications with representatives of Conestoga-Rovers, EPA has extended to today the deadline for filing these comments.

precludes EPA from finalizing a remedy decision set out in the Proposed Plan.

The accompanying joint comments both address the deficiencies noted in the RI/FS summary documents, and provide support for a more thorough evaluation of available alternatives and provide a basis for a ROD to be issued. In particular, the comments encourage EPA to develop further information regarding, and then to evaluate implementation of, a combination of on-site treatment technologies in furtherance of its stated source control remedial objectives. We understand that in recent discussions EPA staff have acknowledged that, with the collection of additional pertinent data and requisite field demonstrations, alternative treatment technologies may, at least in part, allow equally-effective achievement of EPA's remediation goals.

Accordingly, should EPA choose to proceed at this time to issue a ROD for this site, EPA should incorporate the recommendations expressed in our comments to provide an adequate administrative record supporting development and consideration of a combination of complementary treatment alternatives to its preferred source control remedy. The ensuing ROD would sanction development of data and technical demonstrations to evaluate application of the in-situ treatment technologies (vacuum extraction, soil flushing and land application), to address at least a portion of the soil volumes at the site exhibiting contaminant concentrations of concern. Should that evaluation determine that an alternative treatment technology is not appropriate or, should an alternative be provisionally authorized but ultimately not completely achieve clean-up goals, the ROD presumably would require implementation of the pre-selected alternative (Alternative SC-5: Excavation/Low Temperature Thermal Extraction/On-Site Redeposition). The particulars of this approach are explained in greater detail in the accompanying comments.

We understand that the EPA regional offices have been encouraged to evaluate, in appropriate circumstances, the use of such contingent remedial alternative selections in RODs, and that formal guidance on this subject is expected to be issued in the near future. We also believe precedent exists for EPA to structure a ROD in this manner, and for particular example direct your attention to the ROD for the York Oil site in Region II, in which treatability studies were authorized to evaluate the effectiveness of an alternative remedy, with the understanding that further study and implementation of a prescribed treatment approach would be required if these treatability studies indicate

JOINT COMMENTS OF GE AND BRISTOL ON RI/FS AND PROPOSED PLAN FOR THE SOLVENT SAVERS SITE

SEPTEMBER 1990
REF. NO. 2077

CONESTOGA-ROVERS & ASSOCIATES

JOINT COMMENTS OF GE AND BRISTOL ON RI/FS AND PROPOSED PLAN FOR THE SOLVENT SAVERS SITE

INTRODUCTION

The following reports were reviewed and are commented on below:

1. "Final Remedial Investigation Report, Solvent Savers Site, Lincklaen, Chenango County, New York, July 23, 1990", Ebasco Services Incorporated, EPA Contract 68-01-7250, (RI Report).

2. "Final Feasibility Study Report, Solvent Savers Site, Lincklaen, Chenango County, New York, July 23, 1990", Ebasco Services Incorporated, EPA Contract No. 68-01-7250, (FS Report).

3. "Proposed Plan for the Solvent Savers Site, Lincklaen, New York", U.S. Environmental Protection Agency, July 23, 1990.

RI Report

The RI Report does not present a sufficient data base, particularly as to subsurface soils, for a full determination of the aerial and vertical extent of soils with concentrations above the target soil cleanup levels established in the FS Report. From the RI Report itself and other historic site data of which we are aware, it appears there exist discrete site subareas exhibiting a fairly wide distribution of contaminant concentrations. However, the data presented does not allow for identification of such subareas nor delineation of contaminant ranges. As discussed below, confirming these areas and ranges could facilitate application of a combination of treatment technologies to meet EPA's cleanup objectives.

The analysis and comparison of remedial subsurface soil source control alternatives presented in the FS Report was based on the analytical data from a total of 21 sample locations (16 soil borings and five monitoring well locations) from which a total of 61 investigative samples (excluding QA/QC samples) were collected and analyzed for TCL parameters. This data base unfortunately does not allow conclusions to be drawn with an

acceptable degree of confidence as to contaminated soil volumes and the delineation of contaminant ranges.

Given a less-than-adequate data base, the FS Report indicates the following assumptions were applied to calculate the volume of soil with concentrations exceeding the target soil cleanup levels:

1. Boreholes with samples which exceeded soil target cleanup levels (contamination) were included in the source areas requiring remediation.

2. The boundary of contamination was roughly defined as the midpoint between clean boreholes and contaminated boreholes or 50 feet beyond the contaminated boreholes if no adjacent samples were available, which may result in underestimating/overestimating the aerial extent of soil contamination. For example, in areas where no adjacent samples were available, contamination may extend beyond the arbitrary distance of 50 feet which was utilized, or be significantly less.

3. Although the depth of contamination varied in each borehole, the depth of contamination for the source control area was defined as all soils within the boundaries for the two areas, from ground surface to the top of the water table, which will result in overestimating the volume of soil contamination. For example, if the depth to the water table is 30 feet, and soil exceeds the target cleanup level in only the lower 15 feet, the volume of soil estimated utilizing the entire depth would be twice as high as the actual volume of soil requiring treatment.

Therefore, an additional soil boring and analytical program, as part of a pilot study, would facilitate evaluation of the efficacy of a combination of treatment technologies. We understand EPA recognizes that additional data would need to be collected, during the remedial design phase, to address the uncertainties and data deficiencies noted above.

To address those issues, a soil sampling and analytical program along the lines of that summarized in Attachment 1 should be implemented. The program will provide extensive geologic and analytical data on the soils above the water table. This additional data will allow for a more complete evaluation of the soil characteristics, and mainly, a more accurate determination of soil volume above target clean-up levels and identification of subareas and soil volumes potentially amenable to alternative treatment technologies.

FS REPORT

1) Remedial Technology Screening

The FS Report identified and initially screened potential remedial technologies for treatment of contaminated soil. Under the category of biological treatment alternatives, the FS Report included liquid solids contact, in-situ treatment and land application, all of which were eliminated (without substantial discussion) as ineffective, unproven and possibly resulting in creation of more toxic contaminants (i.e. TCE to vinyl chloride). We concur that liquid solids contact and in-situ bioremediation are unproven and should be eliminated. However, particularly as to soils with low levels of contamination, we believe land application (also sometimes referred to as landfarming) may be highly effective as a complement to other treatment technologies designed to address high-level material. Accordingly, landfarming should be considered for further evaluation as a support technology.

The technology of landfarming uses biodegradation to degrade the contaminants in the soil. The basic concept involves providing a favorable environment to enhance microbial metabolism of organic contaminants resulting in the breakdown and detoxification of those contaminants. It has amply been demonstrated that landfarming is effective for treating low level VOCs.

A local State experience with landfarming which was effective was at Union Fork & Hoe, New York State. New York State has approved in the past and continues to do so landfarming as an effective technology.

Particularly when applied to soils with relatively low contamination, techniques exist to substantially mitigate any short-term environmental impacts associated with landfarming. For example, landfarming operations could be conducted with the benefit of nutrient enriched surfactants that would assist in minimizing the generation of fugitive emissions of VOCs and odors. Excavation and landfarming activities would be accompanied by an ambient air monitoring program and potentially an emission control system.

The concern, noted without discussion in the FS Report, that biodegradation of VOCs at this site may result in more toxic byproducts (i.e., TCE-vinyl chloride) in our view is unwarranted. In particular, the aerobic environment typically found in soils likely would inhibit rapid formation of vinyl chloride. Moreover, any vinyl chloride that does form likely would evaporate rapidly, given its short half-life in soil (0.5 to 2 days). In addition, any vinyl chloride escaping to the air would degrade rapidly due to reaction with hydroxyl radicals. Under these circumstances, vinyl chloride likely would not accumulate in quantities posing a significant risk to human health and the environment.* It should be noted that any landfarming implemented will be monitored with an approved program. This includes air monitoring to insure no off-site VOC emissions in excess of appropriate standards.

The principal merits of landfarming as a treatment technology for low level contaminated soils are as follows:

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* Handbook of Environmental Fate and Exposure Data, Vols. I & II, Philip H. Howard, Ed. Lewis Publishers, Chelsea, Michigan 1989.

Effectiveness:

Landfarming low level contaminated soils would significantly reduce the toxicity, mobility, and volume of organic contamination and provide a permanent solution for low level VOC contaminated soils. Potential releases of VOCs and odors to the air would be controlled by one or a variety of techniques if required.

Implementability:

This technology is technically feasible and implementable. This technology would require site controls to manage the soils being excavated and landfarmed and the implementation of an air monitoring program. A treatability study would be required to evaluate treatment time for soils.

Cost:

The costs associated with this alternative include manpower and excavation equipment, construction of landfarming treatment unit, air monitoring costs, and confirmation analysis of soils prior to backfilling. No long-term operation and monitoring is required. All costs are capital cost and are expected to range from $50 to $75 per cubic yard of soil treated.

Conclusions:

Landfarming is a proven technology for treating low level VOC contaminated soils, and should be considered in conjunction with other treatment technologies (i.e. low temperature thermal extraction for PCB contaminated materials).

The FS Report analyzes source control remedial technologies based on the RI data. As discussed in the comments on the RI Report, the subsurface soil data base is insufficient for a complete determination of the aerial and vertical extent of contaminated soils above the target soil

cleanup levels, and a determination of the location and extent of subareas with high and low-level VOC concentrations.

2) Preferred Technology Selection (Non-PCB Materials)

As noted above, the uncertainty of the volume of subsurface soils above target levels, and the location and range of contaminated levels, precludes on adequate evaluation of the merits and optimal utilization of a mix of treatment technologies.

Incorporated here are the previous comments that landfarming should be considered as an appropriate source control remedy at least as to soils exhibiting relatively low-level VOC contamination.

The FS Report analyzes six source control remedial action alternatives. Alternatives SC-4 (In-Situ Vapor Extraction), SC-5 (Low Temperature Thermal Extraction) and SC-6 (In-Situ Flushing) were all considered to be in compliance with ARARs and provide protection of human health and the environment. EPA found the three alternatives to performed equivalently under long-term effectiveness, reduction of toxicity, mobility, or volume, implementability and availability of services and materials. The three alternatives varied somewhat as to short-term effectiveness.

The FS Report states that Alternative SC-5 (Low-Temperature Thermal Extraction) resulted in an increased short-term environmental impact due to the excavation activities (e.g. track traffic, noise, dust, potential organic air emissions), compared to Alternatives SC-4 and SC-6. Alternatives SC-4 and SC-5 could be completed within one year after start of construction and Alternative SC-6 would require 20 years to achieve ARARs. However, the FS Report fails to acknowledge that the 20-year period to achieve ARARs for Alternative SC-6 may be inconsequential since the candidate groundwater remediation alternatives all include (with exception of 'No Action' and 'Limited Action' alternatives), a long term groundwater pump and treat system which would all require a 20-year period to achieve ARARs.

3) Target Soil Cleanup Calculations

The estimated volume of soil utilized in the FS, requiring remediation was based on several calculations presented in Appendix A of the FS. The calculations are based on the mass balance equation:

$Q_d = Q_a + Q_r$

where:

Q_d = flow out of mixing zone
Q_a = flow into mixing zone
Q_r = volumetric recharge

One of the factors used to establish the target cleanup levels is the dilution that naturally occurs in the subsoil. An important component of the dilution factor is volumetric recharge. The volumetric recharge was calculated based on an assumed infiltration rate, applied over the entire site of 2.45 ft/yr (refer to Appendix A of the FS Report). The source of this infiltration rate was not referenced and its derivation is unknown.

An appropriate methodology to calculate a realistic infiltration rate is the following water balance equation:

$I = P - Ro - ET \pm Sw$

where

I = infiltration (in)
P = total precipitation (in)
Ro = runoff (in)
ET = evapotranspiration (in)
ΔSW = change in soil moisture

On page 1-7 of the RI Report, the total precipitation was stated to be 40 inches/year, while on page 1-10 the runoff was estimated to be 21 inches/year. Therefore, using EPA's reported numbers, approximately 19 inches per year is available for infiltration. In

addition, it is noted that evapotranspiration at the site will serve to reduce further the actual amount of precipitation available for infiltration. Evapotranspiration at the site is dependent upon climate, vegetative cover and soil moisture conditions. Typical values of potential evapotranspiration in humid climates range from 18 to 21 inches per year (Fenn et al, 1975)*. Therefore, the infiltration rate used in the FS Report likely has been overestimated by a factor of 3 or more.

A more realistic, but still highly conservative infiltration rate for the site would be 6 inches/year (0.5 ft/year). As a result, the EPA's calculated Qr values, used in calculating soil cleanup levels, may be approximately five or more times that which would reasonably be expected. Therefore, the reported dilution factors would be much higher. This significantly affects the calculated target soil cleanup levels and therefore, the volume of soil requiring remediation.

It is understood that EPA currently is reviewing the use of a new model to calculate target soil cleanup levels. Comments on the FS cannot be finalized until the target soil cleanup levels have been recalculated and the method of calculation reviewed.

4) Treatment Technologies for PCB Materials

Although the FS Report does not address the issue, the process description presented for Alternative SC-5 may also be appropriate as an initial treatment technology for PCB contaminated soils. Based on discussions with a vendor, the dryer would drive off PCB contaminants at the specified temperatures. The volatilized PCBs would be condensed and collected in the off-gas handling system. The volume of PCB contaminated material for off-site incineration could be greatly reduced if the process equipment as specified in the FS Report is ultimately the preferred remedial alternative for at least a portion of the contaminated soils.

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* Fenn, D.G. et al. (1975): Use of the Water Balance Method for Predicting Leachate Generation; USEPA SW-168, 40pp.

Dependent upon the final volume of PCB contaminated soils, it may also be appropriate to dispose of the soils at a secure TSCA/RCRA permitted landfill. Based on the analytical data for existing drums sampled at the site, all drummed material satisfy the treatability standards specified in 40 CFR Part 268. Therefore should the technology of low thermal extraction not be required for other soils on site and the PCB contaminated soils satisfy all applicable landfilling restrictions, the technology of off-site disposal may be appropriate.

5) Remedial Alternatives Screening

The FS Report does not evaluate the merits of combining selected alternatives for non-PCB soils. At this site, for example, it may be equally effective to address heavily contaminated soils by thermal extraction and the remaining contaminated soils by in-situ vacuum extraction, soil flushing or landfarming.

We believe EPA frequently has authorized the implementation of a combination of complementary treatment and other approaches to achieve cleanup objectives, and we understand the NCP strongly to encourage EPA to do so in appropriate circumstances. [See 40 CFR §300.430 (a)(1)(iii)(c)].

PROPOSED PLAN FOR THE SOLVENT SAVERS SITE (PRAP)

1) Source Control Alternatives

The FS Report presents a detailed analysis of six source control alternatives. These alternatives did not include off-site incineration for all soils. The PRAP should not include off-site incineration for all soils as a selected alternative when this was eliminated in the FS.

2) Selected Remedial Plan

The PRAP recommends Alternative SC-5, Excavation/Low Temperature Thermal Extraction/On-Site Redeposition for source control (of non-PCB soils), and Alternative GW-4, Groundwater Extraction/Chemical Precipitation/Air Stripping/Carbon Adsorption, for migration control (groundwater). Alternative SC-5 also recommends the excavation and off-site incineration of PCB contaminated soils.

The FS Report evaluated source control Alternatives SC-4 (In-Situ Vapor Extraction); SC-5 (Low Temperature Thermal Extraction); SC-6 (In-Situ Soil Flushing) as all being in compliance with ARARs and protective of human health and the environment and all being equivalent in regards to reduction of toxicity, mobility or volume, implementability and long-term effectiveness. According to EPA, Alternative SC-5 resulted in greater short-term environmental impacts than Alternatives SC-4 and SC-6.

The PRAP acknowledges that alternatives SC-4, SC-5, and SC-6, all satisfy the ARARs and are protective of human health and the environment. The PRAP, however, indicates that Alternative SC-5 would result in a greater reduction of toxicity, mobility or volume than Alternatives SC-4 and SC-6 due to the possibility of preferential flow in the vadose zone. The PRAP also indicates that Alternative SC-5 would be easier to implement due to the complex and heterogeneous nature of soils at the site. Alternative SC-5 is also indicated to have better long- and short-term effectiveness than Alternatives SC-4 and SC-6. This rationale is not consistent with the evaluation presented in the FS Report, where each of the alternatives are determined to be applicable, implementable and effective.

We understand that concerns regarding geologic heterogeneity, may underlie EPA's decision not to consider vacuum extraction and soil flushing for selection as preferred alternatives. However, review of the existing geologic data base does not identify a condition which would

make vacuum extraction and soil flushing ineffective, at least as to soils exhibiting relatively low VOC concentrations. It should be noted that In-Situ Vacuum Extraction does not appear to be affected by the permeability of the soil, as documented by EPA in the report entitled, "Technology Demonstration Summary - Terra Vac In-Situ Vacuum Extraction System, Graveland, Massachusetts, EPA/540/S5-89/003 May 1989" (see Attachment 2).

Like the FS Report, the PRAP does not address the viability of a combination of source control measures. Concerns regarding the vadose zone and complexity of the geology may be reduced substantially if the in-situ technologies of vacuum extraction or soil flushing were limited to soils with low levels of contamination, thus allowing for the selection of a combination of cost-effective remedial alternatives.

Like the FS Report, the PRAP also does not address the viability of treating PCB contaminated soils by low temperature thermal extraction or off-site landfill disposal. As discussed previously, the low temperature thermal extraction technology described in the FS is appropriate for treating PCB contaminants and would significantly reduce the volume required for off-site incineration. Also, the technology of off-site disposal of PCB contaminated soils would be appropriate if the soils satisfy all applicable landfill restrictions.

RECOMMENDATIONS

We recommend that the foregoing comments be incorporated into the Record of Decision ("ROD") as follows:

1) Recalculate soil target cleanup levels using a more realistic -- yet still conservative -- infiltration rate (i.e., 0.5 feet per year).

2) Collect additional data to: (a) more fully define the volume of soil with concentrations of volatile organic compounds ("VOCs") above revised

soil target cleanup levels; (b) comprehensively identify the aerial and vertical extent of contamination; and (c) identify/specify the concentrations of contaminants in soil throughout the site.

3) Following the data collection activities outlined above, select one or a combination of the following technologies as to volumes of soil containing VOCs:
   (a) in-situ vacuum extraction (Alternative SC-4);
   (b) in-situ soil flushing (Alternative SC-6);
   (c) excavation, landfarming, and redeposition.

4) Should appropriate field tests or pilot demonstrations indicate that none of the above technologies is effective, Alternative SC-5 (excavation, low temperature thermal extraction, and redeposition) would be implemented as to those soils for which the above remedies are deemed ineffective. The efficacy of a given technology would be determined based upon the results of approved representative sampling techniques and statistical procedures.

5) Excavate and dispose of in an off-site landfill soils containing PCBs, assuming such soils meet applicable treatment standards under the RCRA land disposal restrictions. All off-site shipments would be to a facility with appropriate RCRA/TSCA permits and/or authorizations and would be conducted in accordance with the CERCLA off-site policy.

6) Utilize low temperature thermal extraction as to PCB soils not meeting appropriate treatment standards under the land disposal restrictions. Treated soils would be redeposited on site. PCB condensate would be sent off-site for incineration at a TSCA-permitted facility. All shipments of the condensate would be in accordance with the CERCLA off-site policy.

Figure 1 illustrates the overall approach outlined above.

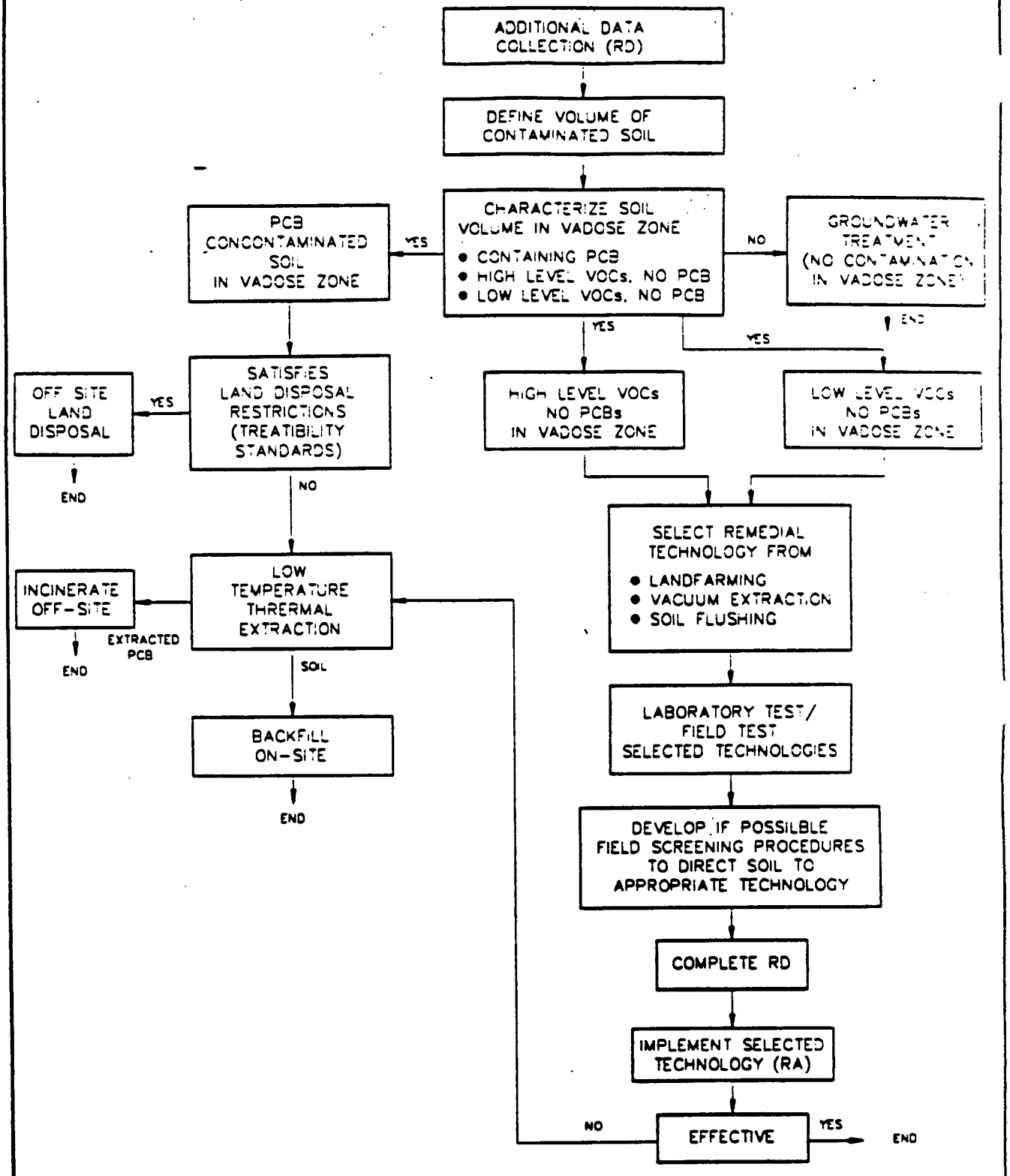


figure 1

ALTERNATIVES SELECTION AND IMPLEMENTATION FLOW CHART
Solvent Savers Site

CRA

2077-7/09/90-L-0 (C-04)

ATTACHMENT I

SOIL SAMPLING

AND

ANALYTICAL PROGRAM SUMMARY

SOIL SAMPLING
AND
ANALYTICAL PROGRAM SUMMARY

A subsurface soil sampling grid will be established on site. The sampling grid will be centered around Areas 2 and 4. Figure 1 presents a site Plan and presents a sampling grid. The grid interval is based on 50-foot centers.

A total of approximately 75 locations will be sampled. Split-spoon soil samples would be collected at 5-foot intervals from ground surface to the top of the water table at each location for a total of approximately 450 investigatory samples. Each sample would be analyzed discretely for Target Compound List (TCL), Volatile Organic Compounds (VOCs).

Based upon the analytical results for the soil analyses, an accurate calculation for the volume of soil requiring remediation can be undertaken. This program will also provide extensive geologic data for the site to further evaluate source control remedial alternatives.

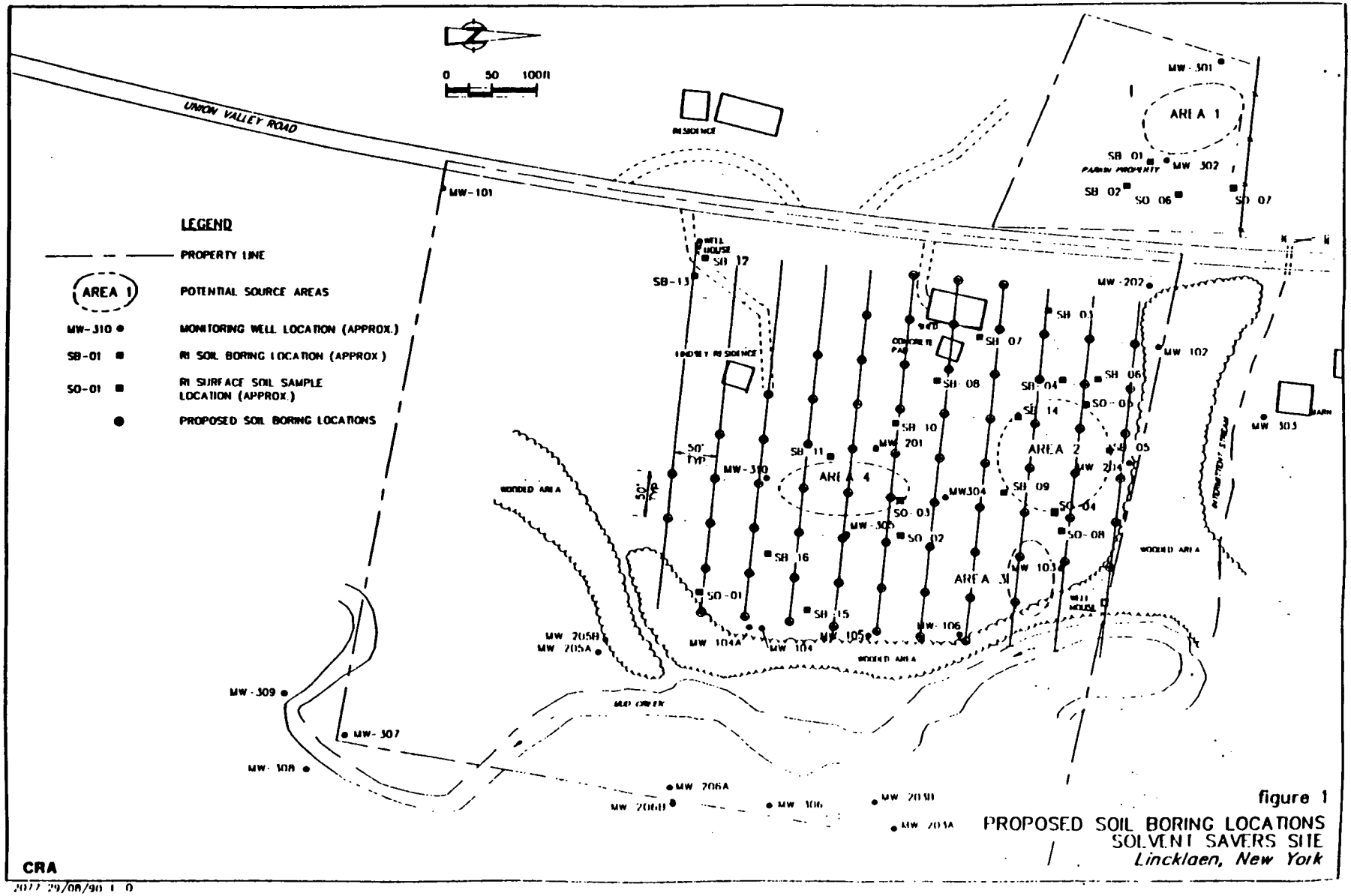


figure 1

PROPOSED SOIL BORING LOCATIONS
SOLVENT SAVERS SITE
Lincklaen, New York

CRA

2077 29/08/90 1 0

ATTACHMENT 2

TECHNOLOGY DEMONSTRATION
SUMMARY - IN-SITU VACUUM EXTRACTION

United States
Environmental Protection
Agency

EPA/540/S5-89/003
May 1989

EPA

SITE
SUPERFUND INNOVATIVE
TECHNOLOGY EVALUATION

Technology Demonstration Summary

Terra Vac In Situ Vacuum Extraction System Groveland, Massachusetts

Terra Vac Inc's vacuum extraction system was demonstrated at the Valley Manufactured Products Company, Inc., site in Groveland, Massachusetts. The property is part of the Groveland Wells Superfund site and is contaminated mainly by trichloroethylene (TCE). Vacuum extraction entails removal and venting of volatile organic constituents (VOCs) such as TCE from the vadose or unsaturated zone in the ground by use of extraction wells and vacuum pumps. The process of removing VOCs from the vadose zone using vacuum is a patented process.

The eight-week test run produced the following results:

- **extraction of 1,300 lb of VOCs**
- **a steady decline in the VOC recovery rate with time**
- **a marked reduction in soil VOC concentration in the test area**
- **an indication that the process can remove VOCs from clay strata**

This Summary was developed by EPA's Risk Reduction Engineering Laboratory, Cincinnati, OH, to announce key findings of the SITE program demonstration that is fully documented in two separate reports of the same title (see ordering information at back).

Introduction

Environmental regulations enacted in 1984 (and recent amendments to the Superfund program) discourage the continued use of landfilling of wastes in favor of remedial methods that will treat or destroy the wastes. The Superfund program now requires that, to the maximum extent practicable, cleanups at Superfund sites must employ permanent solutions to the waste problem.

The Superfund Innovative Technology Evaluation (SITE) program is one major response to the challenge of finding safe ways to deal with waste sites. Part of the program includes carefully planned demonstration projects at certain Superfund sites to test new waste treatment technologies. These new alternative technologies will destroy, stabilize, or treat hazardous wastes by changing their chemical, biological, or physical characteristics.

Under the SITE program, which is sponsored jointly by the USEPA Office of Research and Development (ORD) and the Office of Solid Waste and Emergency

Response (OSWER), the USEPA selects 10 or 12 Superfund sites each year at which pilot studies of promising technologies can be conducted. Sites are chosen to match the effectiveness and applicability of a particular technology with specific waste types and local conditions. The pilot studies are carefully monitored by the USEPA. Monitoring and data collection determines how effectively the technology treats the waste, how cost-effectively the technology compares with more traditional approaches, and that the operation can be conducted within all public health and environmental guidelines.

The Groveland Wells site was selected for such a demonstration project for 1987. The site is the location of a machine shop, the Valley Manufactured Products Company, Inc., which employs approximately 25 people and manufactures, among other things, parts for valves. The company has been in business at the site since 1964. As an integral part of its building-wide operation of screw machines, the company has used different types of cutting oils and degreasing solvents, mainly trichloroethylene, tetrachloroethylene, trans-1,2-dichloroethylene, and methylene chloride.

The contamination beneath the shop apparently is caused by a leaking storage tank and by former improper practices in the storage and handling of waste oils and solvents. The contamination plume is moving in a northeasterly direction towards and into the Mill Pond.

The USEPA has been involved since 1983, when the Groveland Wells site was finalized on the National Priorities List. The initial Remedial Investigation (RI) of the Valley property was carried out by the responsible party (RP), Valley Manufactured Products Company, Inc. A supplemental RI was conducted by Valley in the fall/winter of 1987 to determine more completely the full nature of contamination at the Valley site. A source control Feasibility Study was performed by USEPA to evaluate various methods for cleaning up or controlling the remaining contaminants. A Record of Decision (ROD) for the site was signed in October 1988 calling for vacuum extraction and groundwater stripping.

The Terra Vac system is being utilized in many locations across the nation. This report is based on monitoring the Terra Vac patented vacuum extraction process (U.S. Patent Nos. 4593760 and 4660639) at the Groveland Wells site during a four-and-one-half-month field operation period, with emphasis on a 56-day demonstration test active treatment period. The report interprets results of analyses performed on samples and establishes reliable cost and performance data in order to evaluate the technology's applicability to other sites.

The main objectives of this project were:

- The quantification of the contaminants removed by the process.
- The correlation of the recovery rate of contaminants with time.
- The prediction of operating time required before achieving site remediation.
- The effectiveness of the process in removing contamination from different soil strata.

Approach

The objectives of the project were achieved by following a demonstration test plan, which included a sampling and analytical plan. The sampling and analytical plan contained a quality assurance project plan. This QAPP assured that the data collected during the course of this project would be of adequate quality to support the objectives.

The sampling and analytical program for the test was split up into a pretest period, which has been called a pretreatment period, an active period, midtreatment, and a posttreatment period.

The pretreatment period sampling program consisted of:

- soil boring samples taken with split spoons
- soil boring samples taken with Shelby tubes
- soil gas samples taken with punch bar probes

Soil borings taken by split spoon sampling were analyzed for volatile organic compounds (VOCs) using headspace screening techniques, purge and trap, GC/MS procedures, and the EPA-TCLP procedure. Additional properties of the soil were determined by sampling using a Shelby tube, which was pressed hydraulically into the soil by a drill rig to a total depth of 24 feet. These Shelby tube samples were analyzed to determine physical characteristics of the subsurface stratigraphy such as bu density, particle density, porosity, ph, grain size, and moisture. These parameters were used to define the basic soil characteristics.

Shallow soil gas concentrations were collected during pre-, mid-, and post-treatment activities. Four shallow vacuum monitoring wells and twelve shallow punch bar tubes were used at sample locations. The punch bar samples were collected from hollow stainless steel probes that had been driven to a depth of 3 to 5 feet. Soil gas was drawn up the punch bar probes with a low-volume personal pump and tygon tubing. Gas-tight 50-ml syringes were used to collect the sample out of the tygon tubing.

The active treatment period consisted of collecting samples of:

- wellhead gas
- separator outlet gas
- primary carbon outlet gas
- secondary carbon outlet gas
- separator drain water

All samples with the exception of the separator drain water were analyzed on site. On-site gas analysis consisted of gas chromatography with a flame ionization detector (FID) or an electron capture detector (ECD). The FID was used generally to quantify the trichloroethylene (TCE) and trans 1,2-dichloroethylene (DCE) values, while the ECD was used to quantify the 1,1,1-trichloroethane (TRI) and the tetrachloroethylene (PCE) values.

The separator drain water was analyzed for VOC content using SW846 8010. Moisture content of the separator inlet gas from the wells was analyzed using EPA Modified Method 4. This method is good for the two-phase flow regime that existed in the gas emanating from the wellhead. See Table 1 for a listing of analytical methods applied.

The posttreatment sampling essentially consisted of repeating pretreatment sampling procedures at locations as close as possible to the pretreatment sampling locations.

The activated carbon canisters were sampled, as close to the center of the canister as possible, and these samples were analyzed for VOC content as a check on the material balance for the process. The method used was P&CAM 127, which consisted of desorption of the carbon with CS_2 and subsequent gas chromatographic analysis.

ble 1. Analytical Methods

Parameter	Analytical Method	Sample Source
Grain size	ASTM D422-63	Soil borings
pH	SW846* 9040	Soil borings
Moisture (110°C)	ASTM D2216-80	Soil borings
Particle density	ASTM D698-78	Soil borings
Oil and grease	SW846* 9071	Soil borings
EPA-TCLP	F. R. 11/7/86, Vol. 51, No. 216, SW846* 8240	Soil borings
TOC	SW846* 9060	Soil borings
Headspace VOC	SW846* 3810	Soil borings
VOC	GC/FID or ECD	Soil gas
VOC	GC/FID or ECD	Process gas
VOC	SW846* 8010	Separator liquid
VOC	SW846* 8010	Groundwater
VOC	Modified P&CAM 127	Activated carbon
VOC	SW846* 8240	Soil borings

*Third Edition, November 1986.

Process Description

The vacuum extraction process is a technique for the removal and venting of volatile organic constituents (VOCs) from the vadose or unsaturated zone of soils. Once a contaminated area is completely defined, an extraction well or wells, depending upon the extent of contamination, will be installed. A vacuum system induces air flow through the soil, stripping and volatilizing the VOCs from the soil matrix into the air stream. Liquid water is generally extracted as well along with the contamination. The two-phase flow of contaminated air and water flows to a vapor liquid separator where contaminated water is removed. The contaminated air stream then flows through activated carbon canisters arranged in a parallel-series fashion. Primary or main adsorbing canisters are followed by a secondary or backup adsorber in order to ensure that no contamination reaches the atmosphere.

Equipment Layout and Specifications

The equipment layout is shown in Figure 1, and specifications are given in Table 2 for the equipment used in the initial phase of the demonstration. This equipment was later modified when unforeseen circumstances required a shutdown of the system. The vapor-liquid separator, activated carbon canisters, and vacuum pump skid were inside the building, with the stack discharge outside the building. The equipment was in an area of the machine shop where used cutting oils and metal shavings had been stored.

Four extraction wells (EW1 - EW4) and four monitoring wells (MW1 - MW4) were drilled south of the shop. Each well was installed in two sections, one section to just above the clay lens and one section to just below the clay lens. The extraction wells were screened above the clay and below the clay. As shown in Figure 2, the well section below the clay lens was isolated from the section above by a bentonite portland cement grout seal. Each section operated independently of the other. The wells were arranged in a triangular configuration, with three wells on the base of the triangle (EW2, EW3, EW4) and one well at the apex (EW1). The three wells on the base were called barrier wells. Their purpose was to intercept contamination, from underneath the building and to the side of the demonstration area, before this contamination reached the main extraction well (EW1). The area enclosed by the four extraction wells defined the area to be cleaned.

Installation of Equipment

Well drilling and equipment setup were begun on December 1, 1987. A mobile drill rig was brought in and equipped with hollow-stem augers, split spoons, and Shelby tubes. The locations of the extraction wells and monitoring wells had been staked out based on contaminant concentration profiles from a previously conducted remedial investigation and from bar punch probe soil gas monitoring.

Each well drilled was sampled at 2-foot intervals with a split spoon pounded into the subsurface by the drill rig in advance of the hollow stem auger. The hollow stem auger would then clear out the soil down to the depth of the split spoon, and the cycle would continue in that manner to a depth of 24 feet. The drilling tailings were shoveled into 55-gallon drums for eventual disposal. After the holes were sampled, the wells were installed using 2-inch PVC pipes screened at various depths depending upon the characteristics of the soil in the particular hole. The deep well was installed first, screened from the bottom to various depths. A layer of sand followed by a layer of bentonite and finally a thick layer of grout were required to seal off the section below the clay lens from the section above the clay lens. The grout was allowed to set overnight before the shallow well pipe was installed at the top of the grout. A layer of sand bentonite and grout finished the installation.

VOC Removal From the Vadose Zone

The permeable vadose zone at the Groveland site is divided into two layers by a horizontal clay lens, which is relatively impermeable. As explained previously, each extraction well had a separate shallow and deep section to enable VOCs to be extracted from that

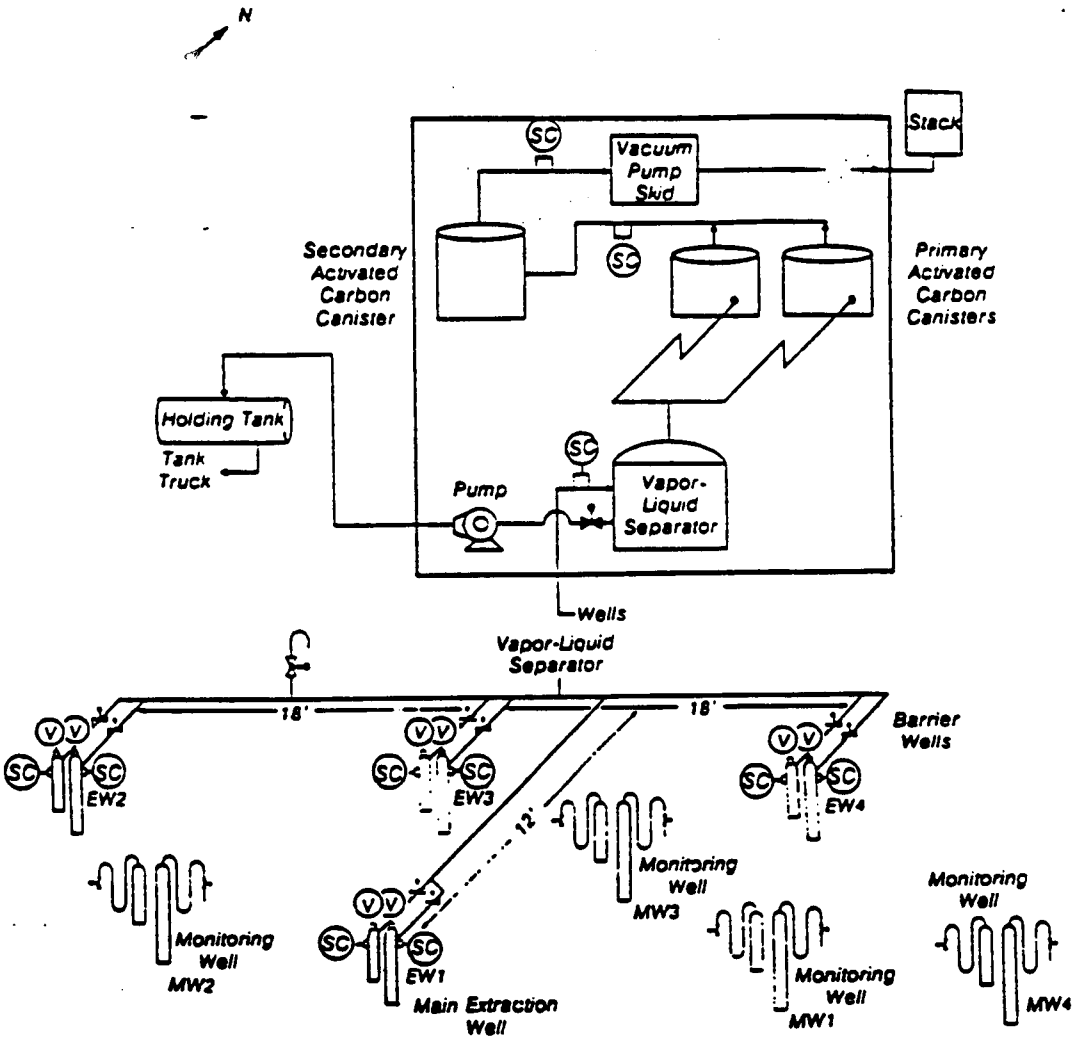


Figure 1. Schematic diagram of equipment layout.

Table 2. Equipment List

Equipment	Number Required	Description
Extraction wells	4 (2 sections each)	2" SCH 40 PVC 24' total depth
Monitoring wells	4 (2 sections each)	2" SCH 40 PVC 24' total depth
Vapor-liquid separator	1	1000-gal capacity, steel
Activated carbon canisters	Primary: 2 units in parallel Secondary: 1 unit	Canisters with 1200 lb of carbon in each canister - 304 SS 4" inlet and outlet nozzles
Vacuum unit	1	Terra Vac Recovery Unit - Model PR17 (25 HP Motor)
Holding tank	1	2000-gal capacity - steel
Pump	1	1 HP motor - centrifugal

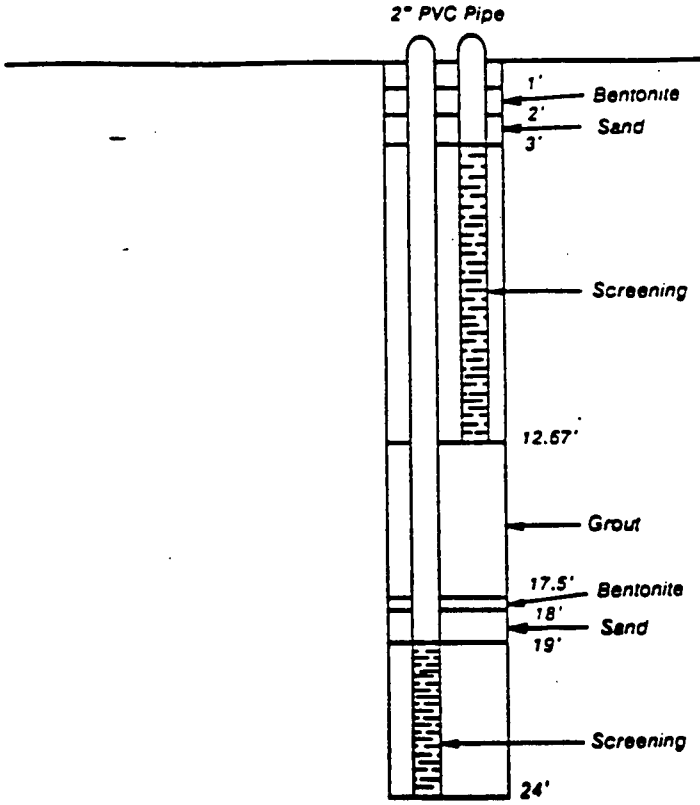


Figure 2. Schematic diagram of an extraction well.

area of the vadose zone above and below the clay lens. The quantification of VOCs removed was achieved by measuring

- gas volumetric flow rate by rotameter and wellhead gas VOC concentration by gas chromatography
- the amount of VOCs adsorbed by the activated carbon canisters by desorption into CS_2 followed by gas chromatography.

VOC flow rates were measured and tabulated for each well section separately. The results of gas sampling by syringe and gas chromatographic analysis indicate a total of 1.297 lb of VOCs were extracted over a 56-day period, 95% of which was trichloroethylene. A very good check on this total was made by the activated carbon VOC analysis, the results of which indicated a VOC recovery of 1353 lb; virtually the same result was obtained by two very different methods.

The soil gas results show a considerable reduction in concentration over the course of the 56-day demonstration period as can be seen from Figures 3 and 4. This is to be expected since soil gas is the vapor halo existing around the contamination and should be relatively easy to remove by vacuum methods.

A more modest reduction can be seen in the results obtained for soil VOC concentrations by GC/MS purge-and-trap analytical techniques. Soil concentrations include not only the vapor halo but also interstitial liquid contamination that is either dissolved in the moisture in the soil or exists as a two-phase liquid with the moisture.

Table 3 shows the reduction of the weighted average TCE levels in the soil during the course of the 56-day demonstration test. The weighted average TCE level was obtained by averaging soil concentrations obtained every two feet by split spoon sampling methods over the entire 24-foot depth of the wells. The largest reduction in soil TCE concentration occurred in extraction well 4, which had the highest initial level of contamination. Extraction well 1, which was expected to have the greatest concentration reduction potential, exhibited only a minor decrease over the course of the test. Undoubtedly this was because of the greater-than-expected level of contamination that existed in the area around monitoring well 3 that was drawn into the soil around extraction well 1. The decrease in the TCE level around monitoring well 3 tends to bear this out.

Effectiveness of the Technology in Various Soil Types

The soil strata at the Groveland site can be characterized generally as consisting of the following types in order of increasing depth to groundwater:

- medium to very fine silty sands
- stiff and wet clays
- sand and gravel

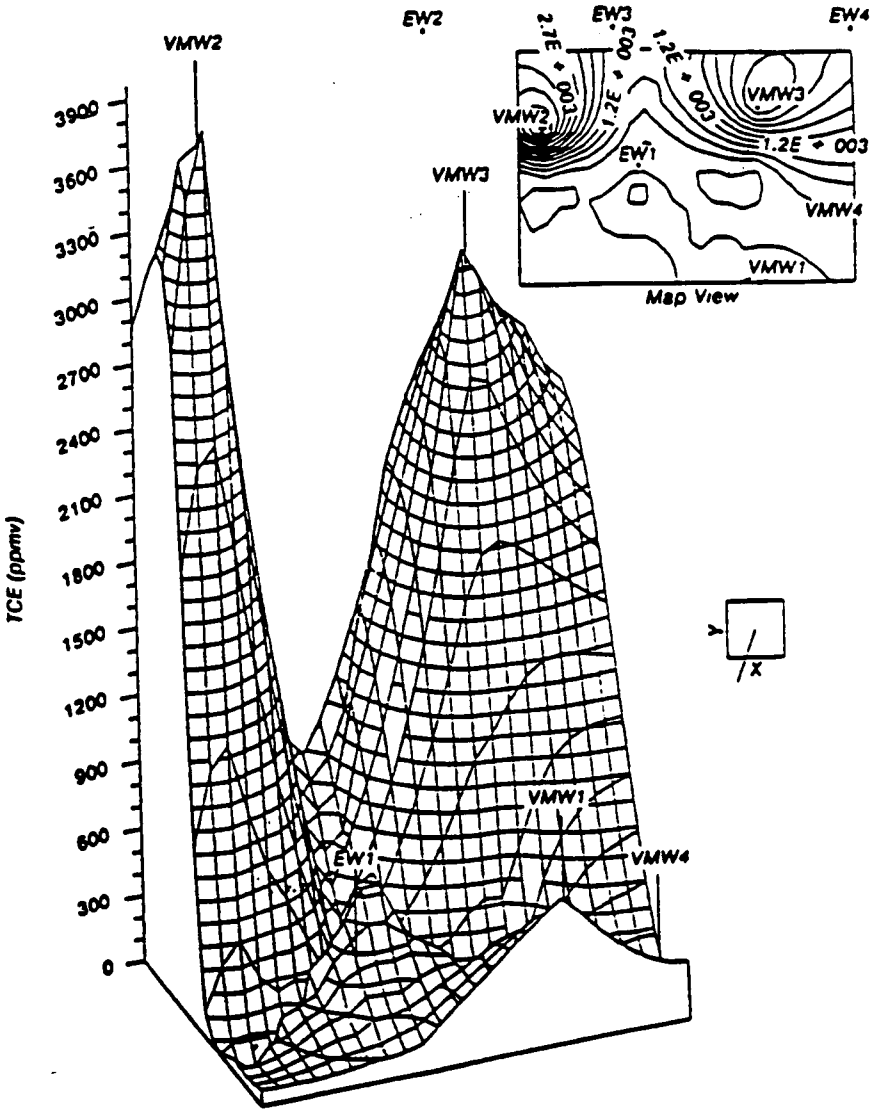


Figure 3. Pretreatment shallow soil gas concentration.

Soil porosity, which is the percentage of total soil volume occupied by pores, was relatively the same for both the clays and the sands. Typically porosity, over the 24-foot depth of the wells, would range between 40% and 50%. Permeabilities, or more accurately hydraulic conductivities, ranged from 10^{-4} cm/sec for the sands to 10^{-6} cm/sec for the clays with corresponding grain sizes equal to 10^{-1} mm to 10^{-3} mm.

Pretest soil boring analyses indicated in general that most of the contamination was in the strata above the clay lens, with a considerable quantity perched on top of the clay lens. This was the case for extraction well 4, which showed an excellent reduction of TCE concentration in the medium to fine sandy soils existing above the clay layer, with no TCE detected in the clay in either the pretest or posttest borings (see Table 4). One of the wells, however, was an exception. This was monitoring well 3, which contained the highest contamination levels of any of the wells, and was exceptional in that most of the contamination was in a wet clay stratum. The levels of contamination were in the 200 to 1600 ppm range before the test. After the test, analyses of the soil boring adjacent to monitoring well 3 showed levels in the range of ND-60 ppm in the same clay stratum. The data suggest that the technology can desorb or otherwise mobilize VOCs out of certain clays (see Table 5).

From the results of this demonstration it appears that the permeability of a soil need not be a consideration in applying the vacuum extraction technology. This may be explained by the fact that the porosities were approximately the same for all soil strata, so that the total flow area for stripping air was the same in all soil strata. It will take a long time for a liquid contaminant to percolate through clay with its small pore size and

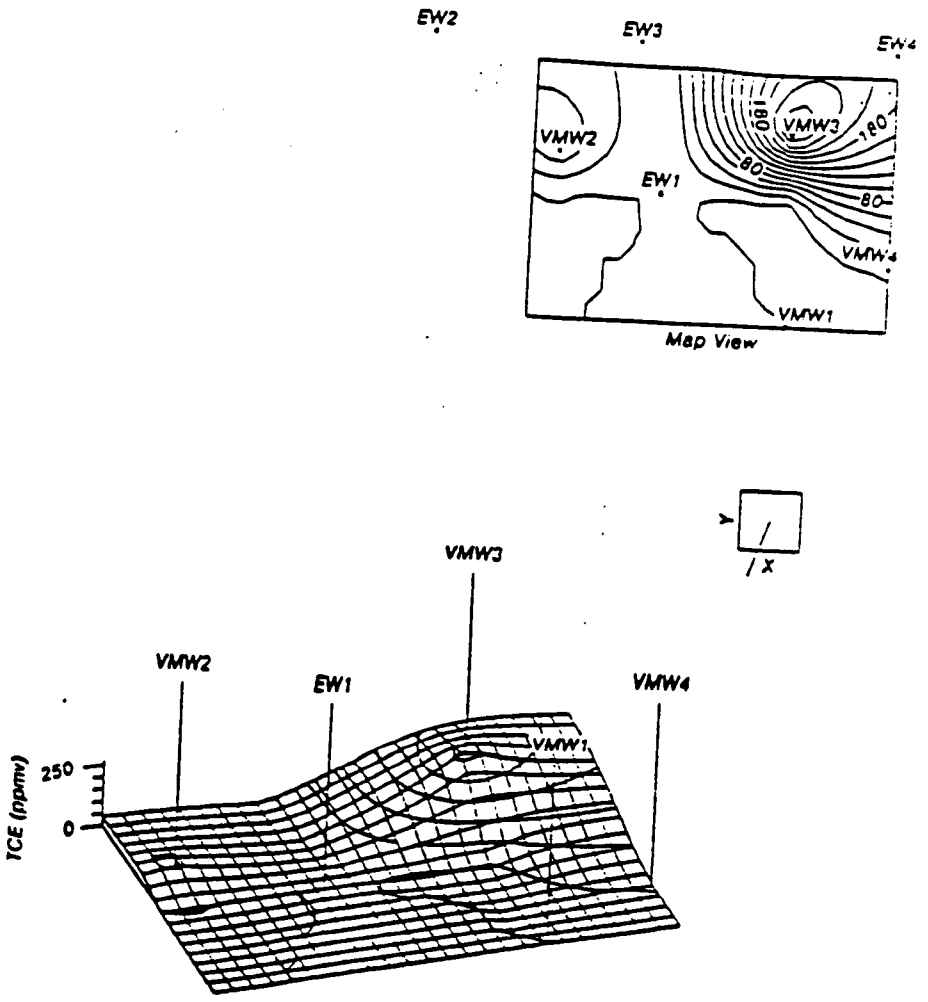


Figure 4. Postreatment shallow soil gas concentration.

consequent low permeability. However, the much smaller air molecules have a lower resistance in passing through the same pores. This may explain why contamination was generally not present in the clay strata but when it was, it was not difficult to remove. Further testing should be done in order to confirm this finding.

Correlation of Declining VOC Recovery Rates

The vacuum extraction of volatile organic constituents from the soil may be viewed as an unsteady state process taking place in a nonhomogeneous environment acted upon by the combined convective forces of induced stripping air and by the vacuum induced volatilization and diffusion of volatiles from a dissolved or sorbed state. As such it is a very complicated process, even though the equipment required to operate the process is very simple.

Unsteady state diffusion processes in general correlate well by plotting the logarithm of the rate of diffusion versus time. Although the vacuum extraction here might be som correlation obtain· logarithm of the contaminant in the time and obtaining a line was reasonably plot, shown in Figu data very well and is a linear graph concentration versus best fit curve would concentrations of ze:

Table 3. Reduction of Weighted Average TCE Levels in Soil (TCE Conc. in mg/kg)

Extraction Well	Pretreatment	Posttreatment	% Reduction
1	33.98	29.31	13.74
2	3.38	2.36	30.18
3	6.89	6.30	8.56
4	96.10	4.19	95.64
Monitoring Well			
1	1.10	0.34	69.09
2	14.75	8.98	39.12
3	227.31	84.50	62.83
4	0.87	1.05	--

Table 4. Extraction Well 4—TCE Reduction in Soil Strata

Depth ft	Description of Strata	Permeability cm/sec	TCE Conc. ppm	
			pre	post
0-2	Med. sand w/gravel	10^{-4}	2.94	ND
2-4	Lt. brown fine sand	10^{-4}	29.90	ND
4-6	Med. stiff lt. brown fine sand	10^{-5}	260.0	39
6-8	Soft dk. brown fine sand	10^{-5}	303.0	9
8-10	Med. stiff brown sand	10^{-4}	351.0	ND
10-12	V stiff lt. brown med. sand	10^{-4}	195.0	ND
12-14	V stiff brown fine sand w/silt	10^{-4}	3.14	2.3
14-16	M stiff grn-brn clay w/silt	10^{-8}	ND	ND
16-18	Soft wet clay	10^{-8}	ND	ND
18-20	Soft wet clay	10^{-8}	ND	ND
20-22	V stiff brn med-coarse sand	10^{-4}	ND	ND
22-24	V stiff brn med-coarse w/gravel	10^{-3}	6.71	ND

Table 5. Monitoring Well 3—TCE Reduction in Soil Strata

Depth ft	Description of Strata	Permeability cm/sec	TCE Conc. ppm	
			pre	post
0-2	M. stiff brn. fine sand	10^{-5}	10.30	ND
2-4	M. stiff grey fine sand	10^{-5}	8.33	800
4-6	Soft lt. brn. fine sand	10^{-4}	80.0	84
6-8	Lt. brn. fine sand	10^{-4}	160.0	ND
8-10	Stiff V. fine brn. silty sand	10^{-4}	ND	63
10-12			NR	2.3
12-14	Soft brown silt	10^{-4}	316.0	ND
14-16	Wet green-brown silty clay	10^{-8}	195.0	ND
16-18	Wet green-brown silty clay	10^{-8}	218.0	62
18-20	Wet green-brown silty clay	10^{-8}	1570.0	2.4
20-22	Silt, gravel, and rock frag.	10^{-4}	106.0	ND
22-24	M. stiff lt. brn. med. sand	10^{-4}	64.1	ND

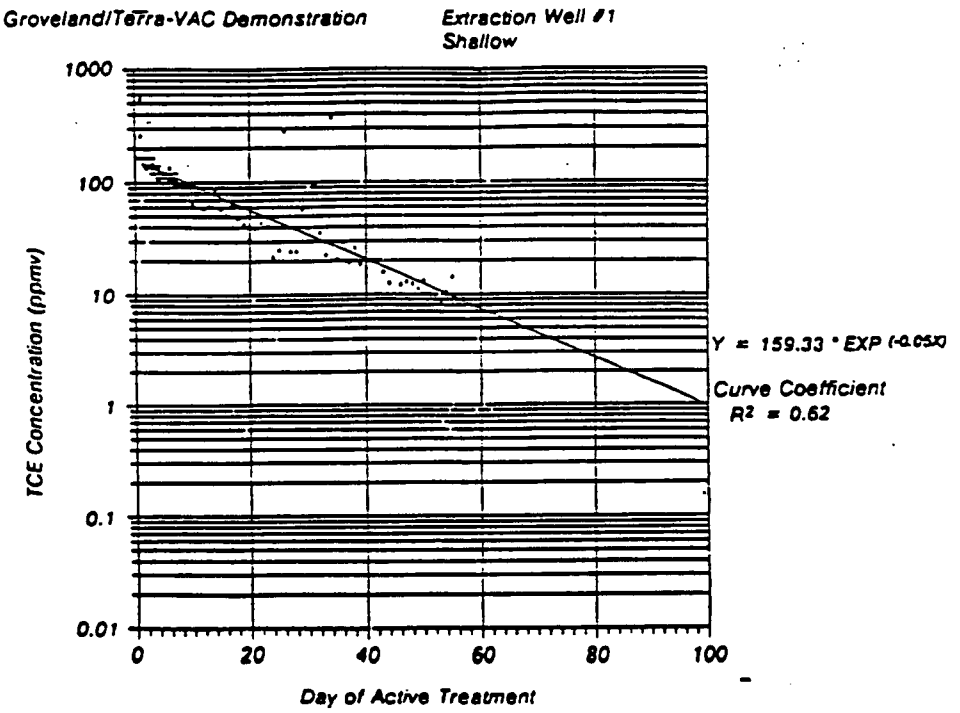


Figure 5. Wellhead TCE concentration vs time.

Looking at the plots for extraction well 1, shallow and deep, equations are given for the least squares best fit line for the data points. If the vacuum extraction process is run long enough to achieve the detection limit for TCE on the ECD, which is 1 ppbv, the length of time required to reach that concentration would be approximately 250 days on the shallow well and approximately 300 days on the deep well.

Prediction of Time Required for Site Remediation

The soil concentration that would be calculated from the wellhead gas concentration using Henry's Law is included in the last column of Table 6. Calculations for the predicted soil concentrations were made assuming a bulk density of the soil of 1761 kg/m^3, a total porosity of 50%, and a moisture content of 20%. The calculated air filled porosity of the soil is approximately 15%. Henry's constant was taken to be 0.492 KPa/m^3-gmol at 40°F.

Table 6. Comparison of Wellhead Gas VOC Concentration and Soil VOC Concentration

Extraction Well	TCE Concentration in Wellhead Gas ppmv	TCE Concentration in Soil ppmw	Predicted by Henry's Law ppmw
1S	9.7	54.5	0.11
1D	5.6	7.2	0.07
2S	16.4	ND	0.20
2D	14.4	20.4	0.17
3S	125.0	20.9	1.53
3D	58.7	18.0	0.74
4S	1095.6	9.1	12.49

CHENANGO NO...

Citizens Against Radioactive Dumping

AND ALL OTHER POLLUTION

September 10, 1990

Mr. Joel Singerman
Solvent Savers Project
U.S. Environmental Protection
Agency - Region II
26 Federal Plaza, Room 29-102
New York, New York 10278
Fax # 212-264-6607

Dear Mr. Singerman:

In regards to our telephone conversation of Friday afternoon, September 7th, 1990, I am faxing you this reply.

Chenango North's decision is to pursue the further explication of In-situ Vapor Extraction, (SC-4), and to further examine for ourselves the record/results of other cases in which (SC-5), Low Temperature Thermal Treatment, have been used.

Contrary to the information you conveyed in our phone conversation, the RI/FS report confirms that "... the SC-4 alternative requires minimal excavation (well installation), for implementation.

Therefore, the 'short term effectiveness' is more favorable because it limits the "fugitive dust emissions" and "wind dispersed soil particles", produced during wholesale excavation.

Nowhere does the RI/FS report mention that the Lincklean soil types prevents the in-situ method from being successful. Indeed, in our conversation, you led me to believe that both the effectiveness and the long term resolution of SC-4, was less than desirable.

Again, the RI/FS says, ..."the extraction efficiciency for volatile organics is expected to be moderately high... as much as 80% - 90% of the VOCs could be removed ...and that no further treatment of the soils would be required".

Further, the total implementation cost is stated as $7,572,000 for SC-4, and $21,525,000 for SC-5. Why should we bare more risk and the taxpayers more cost, than is absolutely necessary?

Post Office Box 126, South Otselic, New York 13155

CHENANGO NORTH, C.A.R.D.
SOLVENT SAVERS, LINCKLEAN, N.Y.
JOEL SINGERMAN - P2

We feel that we cannot wait for the TAG Grant. For now, we have found our own independent expert who will review the RI/FS alternative of SC-5, and advise us.

This will take approximately two weeks. For this reason we are asking for an extention of the comment period and delay in the signing of the ROD, until we have confirmed that your alternative is in our best interest.

Since the excavation of the PCBs and other buried barrels of toxic waste are scheduled this fall, we are anxious to work with the other citizen groups effected by the site, to obtain a TAG Grant as soon as possible, so our monitoring can begin when the excavation begins.

Very truly yours,
Susan B Griffin

Susan B. Griffin,
Coordinator
Chenango North C.A.R.D.
and All Other Pollution

cc: Glen Angell
Denise Cote-Hopkins

9/9/95

Lisa Wong,

Why were the residents Not informed of any testing on site?

How much Fallout in our air within 1 mile of site are we to expect?

Will the lands to the east (as wind blows) be periodically tested?

Why are the lands surrounding site Not posted?

Is it Cheaper to Not buy a sign and put it up?

What about air Contaimnets for children passing the sight in buses 4 times a day?

Will all the Cleanup money be spent on paper work of actual Cleanup?

What are the 63 organic and 24 inorganic Chemicals present on site?

K.C. Crandall III
P.O. Box 223
De Ruyter, NY 13052

Who are the Potentially responsible parties? By ~~name~~ name?

Who did their "RI/FS" 1985? 5 years ago?

Where is their report findings?

Where is a copy of Ebasco Remedial Investigation and Feasability Study

How deep in streams did they test-sediment?

Why was only 600 yards of Mud Creek Stream tested?

DEC can go on anyone's property they want can't they?

Who were all Contracters to date and their findings? 4-9-90

Why wasn't something done in 1974 when Dale Hough was denied a permit by DEC?

Who are owner's of waste dumped?

: 2

9/4/96

K. Cranda II
PO Box 223
Dr Ryder NY 13525

How are the Children on passing buses to be kept safe from breathing the fumes from unknown barrels when excavated?

How will we (residents) know when they are being dug?

What about the call to DEC when the barrel from site was down stream on shore; why was Nothing done? Where were you people then? Why wasn't call answered?

Why was barrel found in Whitney Point? What was in it?

How spread out are the poly-nuclear dromatic hydrocarbons?

Why were minnows used, not older fish who live longer?

Why is there no Sign around Mud Creek to let fisherman decide if they want to be exposed to fish in there?

Why is the site Not fenced or Posted? How much is a sign?

How come it has been studied since 1981 and never posted or fenced?

How come it was shut off as a dumping grounds in 1974 by DEC, but never made public until sold to people wanting a dream turned to night mare? Why was site not taken over by DEC or State to protect innocent people?

Where does funding for cleanup come from? fines? taxpayers? fishing and/or hunting licences?

Is there a more upto date EPA test method for Evaluating Solid Wastes, (SW84 than November 1986?

Is there a more uptodate method for Chemical analysis of water and wastes? EPA 600 4-79-020 than March 19

Where will PCB material be sent?

K. Crandall
PO Box 223
Dexter NY
13634

Where will materials (barrels) be sent?

Who were contractors hired for testing? by whom? where's all the reports?

Were enough fish caught to do adequate testing or were fish samples to small to really test enough?

How long after clean up will site be monitered? for how many years

Is Roy F. Weston the only contractor around or cheapest?

Once site is cleaned will there be any new dumping by State?

What test have be done onsite to date 8/90?

Will a bubble be used during Cleanup

I really want one used to keep my children safe.

Who is ICF Technology Inc? full name please, and wat the specialize in?

Will a Carbon filter be used for cleanup? (soil) and water?

Will we be notified of cleanup beginning?

When will it start?

by Whom?

Is the waste dumped owned by State or taxpayers or private companies in its present form?

The detailed information is at very bad locations and should be put at the local library for better convenience, readability, zeroxing machine, etc please see that it gets there, please.

DeRuyter Library in Madison Country is the local libr

Please hurry the clean up so some of the world will be a little cleaner and safer for the future generations.

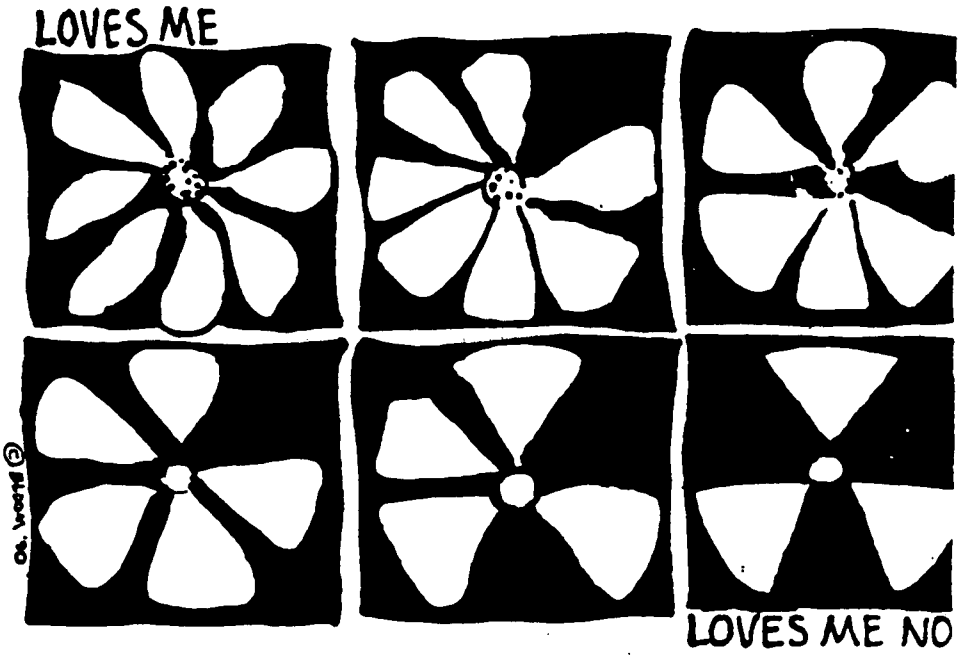
LincKlaen Resident — to close for comfort-

Karen Crandall
PO Box 223
DeRuyter NY 13052

Karen Crandall
P.O Box 223
De Ruyter, NY
13052

Is the site 13 acres as in Proposed Plan or 6.5 acres as in Bio Assessment? What are the different figures list for acreage?

Lisa V. Wang
Project Manager
U.S. EPA
Environmental Protection Agency - Region II
FEDERAL FACILITIES
26 Federal Plaza
Room 29-102
N.Y., N.Y. 10278



De Ruyter,N.Y.
Sept.7,1990 I3052

Lisa Wong,Project Manager
26,Federal Plaza,Room 29-I02
Albany,N.Y.

Dear MZ.Wong:

I attended the meeting at the town hall in Lincklaen in regards to the Solvent Savers Site.I have lived all my life in close proximity of Mud Creek I am now nearly sixty nine years old.In your pamplet you state there is only minute traces of chemicals in the water and sediment in this creek.I am asking why in the last twelve to fifteen years there has been such a drastic reduction in the muskrat and mink population in this valley below this dump site? They are now nearly non-existent.The only places where they will live are in the privatly owned farm ponds and spring runs.The grassy vegetation will not thrive on the banks of this stream;neither will the willows and these are the sources of food for the muskrats.Where there are no muskrats,there willbe very few mink as they are a natural food source for mink.

A sample was taken only 200 yards from this site.I would like to see the results from some samples taken further downstream.I was told by the wild-life services that it was hard for them to obtain permission from the landowners to go on their land.I do not believe this to be true.My land borders Mud Creek and I am wlling to have samples taken.Fact is,I would encourage to having it done.I also believe the landowners in the whole valley would like to have it done so they could see the results.I live about one and one half miles due south of this site.

Yours truly,

Paul Loomis

Lisa K. Wong
U.S. EPA, Region II
26 Federal Plaza, Room 29-102
New York, N.Y. 10278

To Mrs. Wong,

I am writing today to state a few of my concerns with the Solvent Savers Superfund site in Lisbon N.Y.

First of all, I think at the very least, that there should be a fence put up encircling the entire site. Many days I drive by the site and there are wood chuck, rabbits, and deer walking within the site. I think their protection is important, and a fence seems like a fairly simple project, I think this should be done right away.

When clean up does begin I would expect that there would be an inflatable put over the entire site to stop chemicals from escaping and dispersing into the air. My feelings are that an inflatable is a must considering the type of clean up that E.P.A. is suggesting.

From past record I know that EPA gets caught up in bureaucracy sometimes, and citizens have been known to be toward end of list of concerns.

I expect from EPA though, concerning this site, that public & wildlife health & safety, the environments health and safety be of major concern and come first.

Thank-You for your time!

Connie Angell
Union Valley Road
DeRuyter N.Y. 13052
Sept. 1, 1990

RESPONSES TO COMMENTS RECEIVED

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERN

A. History of Community Involvement

Community concern and involvement associated with the Solvent Savers Site is considerable. In 1987, when EPA began its supplemental remedial investigation and feasibility study (RI/FS), community relations activities and the development of the community relations plan for the Site were implemented. During most of the RI/FS, local involvement in the Site activities has focused around the residents living directly next to, or on, the Site. These residents utilize private wells for their domestic water supply.

Typically, public interest in site activities increases when EPA presents its Proposed Plan for comment. This is the case at the Solvent Savers site as well. This interest has been spurred even more by several local environmental organizations that organized to protest the siting of a low level radioactive waste dump in the area.

In fact, residents and officials within Chenango County have been involved and concerned with many hazardous waste issues in the area. There are seven hazardous waste sites in the County, including this Site and the Novak Farm site, where Mr. Dale Hough often disposed of toxic waste from Solvent Savers. Local county officials are well informed about these sites and media coverage of hazardous waste issues has been thorough. This concern has resulted in the formation of an Environmental Management Committee by chenango County to oversee environmental issues.

B. Key Community Concerns

Community interviews, discussions with local officials and comments received at the public meeting and during public comment periods have identified the following major concerns.

Health and Safety

Health and safety has consistently been a concern of local officials and residents. Residents living near the Site have in the past expressed concern about the possibility that their wells may be contaminated. EPA has determined that those residential wells being used by the public do not present a health risk. Additionally, residents are concerned that the Site does not have a sign that indicates the presence of contaminated materials. Residents are concerned about exposure to contaminated dust and vapors during remediation and have requested that dust suppression, air emission controls and discharge monitoring be implemented throughout the life of the remediation.

Information on Site Activity

Residents, local officials, and representatives from local

environmental groups have stressed the importance of frequent, accurate and comprehensive information from EPA on the site and the Superfund program in general. They anticipate close coordination and communication between EPA and interested parties during remediation.

II. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS.

Comments raised during the public comment period for the site and the EPA responses are summarized in the following section. Comments received during the public comment period are organized into six categories: Remedial Alternatives/Proposed Plan, Remedial Investigation/Feasibility Study, Cost and Schedule, Remedial Design, Public Participation, and Other.

REMEDIAL ALTERNATIVES/PROPOSED PLAN

Comment:

Representatives of a local environmental group asked about the location of the disposal facilities and the amount of waste materials to be carried off-site during the remedial efforts. Specifically, they asked where the off-site incineration facility was located, the amount of PCB contaminated soil that would be incinerated, and where and how much carbon and sludges from Alternative GW-4, Groundwater Extraction/Chemical Precipitation/Air Stripping/Carbon Adsorption would be disposed of.

Response:

EPA's Proposed Plan is conceptual. Approximately 1000 cubic yards of PCB contaminated soil requires treatment. Treatability tests are required to estimate the volume of carbon and sludges that will be generated. These tests will be performed during the remedial design. Additional sampling during the remedial design will better assess the extent of PCB-contaminated soil requiring remediation. If the PCBs are treated off-site by incineration, the construction contractor will be responsible for selecting an appropriate vendor for off-site incineration and carbon and sludge disposal.

Comment:

A resident felt that the Alternative GW-4 was an acceptable alternative for remediation. However, she expressed concern regarding potential air emissions from the treatment unit.

Response:

EPA is aware of the concerns of the community that all air released by the processes of Alternative GW-4 meet discharge requirements. At this point, EPA feels that this will be accomplished by

Alternative GW-4 which includes a carbon adsorption unit which will filter air from the air stripper.

Comment:

A resident asked if surges of contaminants in the groundwater could be handled by Alternative GW-4. She asked if the proposed system would be designed to handle surges in the levels of contaminants and would the system shut down if it could not.

Response:

The system described by Alternative GW-4 would be designed for the worst case scenarios to remediate those areas where the greatest concentrations of contaminants are present. Environmental monitoring would be conducted during the life of the treatment system and the system could be should down if discharges did not meet standards.

Comment:

A resident asked about the types of contaminants that the community would be exposed to when excavation and remediation took place.

Response:

During the remedial design, the design contractor will incorporate methods into the engineering design that will minimize off-site migration of the contamination to protect public health. Contaminants of concern include PCBs and volatile organic compounds. For example, during excavation, dust suppression measures would be taken to keep potentially contaminated dust to a minimum. Also, during remediation, an on-site health and safety officer will monitor all activities to ensure that dust control measures are effective and that any air emissions or discharges as a result of the operations are below federal and state action levels.

Comment:

Several individuals asked about the inorganics present in the soil after treatment through the low temperature thermal destruction process. Specifically, why weren't the inorganic contaminants being treated.

Response:

EPA has determined that the levels of inorganics in the soils do not present a health risk to the public or the environment. That is, that they are below health risk levels and federal and state standards of cleanup. After treatment of the soil, toxicity characteristic leaching procedure testing will be performed. If the treated soils pass the toxicity tests the soils will be

replaced. If the soils do not pass the toxicity tests, further treatment might be necessary, before the soil can be replaced.

Comment:

A resident asked about the discharge of water to Mud Creek and the groundwater during the implementation of Alternative GW-4. She asked how acceptable levels of contaminants would be determined and how this would affect the contaminant levels in Mud Creek and the groundwater.

Response:

The acceptable level of contaminants, or the level to which they must be treated is determined by the nature of the body of water which is discharged to. Mud Creek is classified as a trout stream by NYSDEC. As such, any discharge to the stream must meet NYSDEC-established Ambient Water Quality Standards for trout streams. Any discharges to groundwater must meet EPA and NYSDEC drinking water standards. Discharges to the groundwater and Mud Creek will not increase the contaminant levels present nor will they pose a threat to either human health or the environment. The actual treated discharge is expected to be cleaner than the water in Mud Creek.

Comment:

A resident asked why Alternative GW-4 was significantly less expensive than Alternative GW-3, Groundwater Extraction/Chemical Precipitation/Carbon Adsorption, when there seems to be additional processes in Alternative GW-4.

Response:

The air stripper used in Alternative GW-4 will significantly reduce the carbon usage and has different operation and maintenance requirements which over a twenty year period accounts for the difference in cost estimates.

Comment:

A local official asked if recording monitors would be installed on any exhaust gases from the processes of Alternative SC-5, Excavation/Low Temperature Thermal Extraction/On-Site Redeposition, and on discharges from the processes of Alternative GW-4.

Response:

Typically, recording monitors are installed on any discharge of air. Discharges from Alternative GW-4 would be sampled on a regular basis to assure that all federal and state regulatory requirements are met. The implementation of the remedy must comply with all federal and state requirements.

Comment:

A resident asked about the scrubber process utilized in Alternative SC-5.

Response:

A scrubber system uses water and a neutralizing agent such as lime to remove particulates and acid gases from an air stream.

Comment:

A resident asked about the fire protection methods utilized in Alternative SC-5.

Response:

National Fire Protection Association-approved fire extinguishers will be used for fire protection. In addition, local emergency planning officials will be advised regarding ongoing remedial activities at the site and may comment on them.

Comment:

A representative of a local environmental group asked at what temperature the thermal treatment unit and afterburner would operate at, and whether this was sufficient to oxidize all of the different organic compounds that have been found in the soil.

Response:

While there are different types of thermal extraction units, the thermal treatment system would operate at approximately 400 to 800 degrees fahrenheit. This temperature is sufficient to oxidize all organics. The after burner will operate at approximately 1200 to 1400 degrees fahrenheit.

Comment:

Several residents have suggested that an inflatable cover be utilized during the remediation efforts to safeguard the community from fugitive dust and vapors containing volatile organic compounds.

Response:

An inflatable cover and other mitigative measures will be considered during the remedial design.

Comment:

A commentor stated that all health risks would be adequately

reduced utilizing Alternative SC-3, Site Capping, and questioned why additional funds should be spent on EPA's preferred alternatives, when Alternative SC-3 and GW-2, Limited Action, are protective of human health and the environment.

Response:

Alternative SC-3 would not meet contaminant-specific applicable or relevant and appropriate requirements (ARARs) for PCBs. Alternative GW-2 would not meet ARARs for contaminants in ground water. Neither alternative meets the preference in the Superfund law to significantly reduce the toxicity, mobility, or volume of contamination through treatment of contaminated materials, or the Superfund mandate to use treatment to the maximum extent practicable.

Comment:

A commentor asked for an explanation of the incremental costs associated with the removal of TCE, PCBs, and metals by contaminated areas for Alternatives SC-4, and SC-5.

Response:

The cost for remediation of PCBs is essentially the same for both Alternatives SC-4 and SC-5. The major difference the cost between Alternatives SC-4 and SC-5 is due to the respective costs for the different treatment technologies; vapor extraction for Alternative SC-4, and thermal extraction for Alternative SC-5. Thermal extraction is approximately three times as costly.

Comment:

Several residents commented that Alternative SC-5 for remediation of soils is an acceptable alternative. One resident asked what level of contaminants EPA will allow in residual soils that will be backfilled.

Response:

The treated soils will meet the cleanup levels specified in the ROD, which will ensure that the soils are at health-based levels.

Comment:

Alternative SC-5 may also be appropriate as an initial treatment technology for PCB-contaminated soils.

Response:

EPA has incorporated this suggestion into the ROD. Treatability

studies will be performed during the remedial design to determine whether the low temperature thermal extraction process is an appropriate treatment method for the PCB-contaminated soil. If the treatability study results indicate that low temperature thermal extraction is an appropriate treatment method, then this technology will be utilized to treat the excavated soil contaminated with PCBs on-site. Should the findings of the treatability studies indicate that the on-site low temperature thermal extraction process will not provide the desired degree of treatment, then the excavated PCB-contaminated soil will be removed for off-site incineration.

Comment:

The merits of combining selected alternatives for treatment of non-PCB-contaminated soils should be evaluated.

Response:

In the ROD, EPA has incorporated the option of implementing different treatment technologies for the less contaminated soils if the treatment is demonstrated to be effective in meeting cleanup levels during treatability studies.

Comment:

The Proposed Plan should not include off-site incineration since it was not included in the Feasibility Study (FS) Report.

Response:

The off-site incineration alternative for both the VOC- and PCB-contaminated soils was screened out in the FS Report due to costs of an order-of-magnitude higher than other alternatives. It was included in the Proposed Plan to show the higher range of remedial costs. Off-site incineration of the VOC- contaminated soils, however, is a viable alternative for this site.

Comment:

A PRP and representatives from local environmental groups questioned in the Proposed Plan the assertion that Alternative SC-5 is easier to implement, has a better short- and long-term effectiveness and would achieve a greater reduction in toxicity, mobility, and volume of contamination than Alternatives SC-4 and SC-7.

Response:

In-situ soil flushing and in-situ vapor extraction are effective in treating highly permeable, homogeneous soils. The soil matrix at the Solvent Savers site, however, is complex and heterogeneous in nature. Accordingly, we believe that employing in-situ soil flushing and in-situ vapor extraction at the Solvent Savers site

would result in the preferential flow of the volatile organics through the soil. As a result, the complete extraction of the volatile organics from the soil might not be achievable utilizing Alternatives SC-4 or SC-7.

Comment:

A representative of a local environmental group and a PRP asked if EPA would consider utilizing bioremediation (e.g., land application) as a support technology. Additionally, a commentor asked if EPA had considered photo-oxidation.

Response:

Due to the very limited successful laboratory scale and pilot scale testing of the bioremediation technologies for treatment of mixtures of organic contaminants, the potential generation of more toxic contaminants as by-products of the biodegradation process, the possibility of seasonal variations seriously impairing the function of these technologies, and the uncertainties associated with the time required for remediation, the biological treatment technologies were eliminated during the initial screening of remedial technologies for the contaminated soil. Oxidation technologies were considered in the FS. Photo-oxidation was not included because it is not feasible for the large volume of water to be treated and the size constraints of the site.

Comment:

The difference between the 20-year implementation period for Alternative SC-6 and the 1-year period for Alternatives SC-4, and Alternative SC-5 may be inconsequential considering that the groundwater remediation will take 20 years.

Response

This difference in not inconsequential. The time difference between 1-year and 20-years will have a significant effect because the source will be remediated more quickly, thereby making the groundwater remediation process proceed more quickly and efficiently. It also allows for the potential development or usage of the site on an expedited basis.

Comment:

A commentor asked for details of the proposed long-term monitoring program for Alternative SC-5 and Alternative GW-4. The commentor was particularly concerned about the long-term monitoring of the surface water discharge of treated groundwater.

Response:

During implementation of Alternative SC-5, soil samples would be analyzed to ensure that all contaminated soils are excavated for treatment. After treatment the soils will be analyzed to ensure that they are clean.

Alternative GW-4 will be designed to meet the New York State Water Quality Standards. The flow is expected to be 56 gallons per minute. Long-term sampling of treated effluent is included in the implementation of this alternative. The specifics of sampling frequency and analytical parameters will be established during the preparation of a New York State Pollution Discharge Elimination System permit.

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Comment:

A resident noted that some work during the RI/FS was conducted at night and wanted to know why.

Response:

EPA conducted a 24-hour measurement of groundwater levels during a pump test, which provided information about the ability and effectiveness of extracting groundwater during remediation.

Comment:

A representative of a local environmental group asked if the raw data from EPA's studies of the Solvent Savers site was available to citizens groups.

Response:

All validated analytical data from EPA's studies is available to the public. Upon receipt of the data from the laboratory, EPA first evaluates and validates the data to assure that the laboratory has properly analyzed it and the samples have been properly collected. The validated analytical data is available in the RI/FS report.

Comment:

A local official asked if a hydrogeologic study has been conducted to determine if the groundwater flows from north to south.

Response:

As a part of the RI/FS, a hydrogeologic study was conducted. The Solvent Savers site sits on a terrace. Above the site is a very

steep rise. The groundwater flow is controlled by this topography. Groundwater flows, initially, west to east, but as the flow reaches the center of the valley the groundwater arcs southward. Further hydrogeologic characteristics are presented in the RI/FS report.

Comment:

Several residents asked about the downstream sampling of Mud Creek. These residents feel that the downstream sampling conducted to date is insufficient, and request further sampling.

Response:

EPA's furthest sample, approximately 200 yards south of the site, revealed no detectable contamination. During remedial design, EPA may determine that additional downstream testing is necessary.

Comment:

A resident asked if EPA was confident that it had ascertained the extent of the pollution problem and its boundaries.

Response:

EPA is confident that it has determined the nature and extent of the contamination problem. During the remedial design, EPA will conduct some sampling activities to further refine the extent of the contamination. This sampling is necessary so as to conduct the remedial action in a cost-effective manner.

Comment:

A resident asked about the bioassessment, performed by the U.S. Fish and Wildlife Service, that had been conducted at the Site.

Response:

During the bioassessment, samples (sediment, water, fish, and benthic invertebrates) were collected up to 1500 feet down stream of the Site. The Fish and Wildlife study concluded that there were no levels of metals or cyanide above background levels, but did note low levels of volatile organic compounds. However, it was determined that these low levels of volatile organics do not pose a significant threat to aquatic organisms based on the following:

- toxic levels of contaminants were not detected in surface water;
- no significant health problems were noted in white suckers evaluated by a histopathologist;
- fish species diversity was acceptable at all sampling

locations; and,

- there were no dramatic differences in benthic invertebrate diversity that might indicate chemical or other stress.

Also, though there were low levels of volatile organics detected in fish tissue, it was concluded that these organisms are not adversely affected by the low level chronic exposure. It was also concluded, based on information provided by Dr. Roger Herman of the National Fish Health Research Center in Kearneysville, West Virginia, that the lesions detected in some fish cannot be attributed to Site contaminants or any serious health problems.

Comment:

A resident asked if the contamination found in the monitoring wells on the eastern side of Mud Creek would be cleaned up by the proposed remediation efforts.

Response:

The proposed groundwater extraction system would capture water from both sides of Mud Creek.

Comment:

A commentor questioned the infiltration rate used in the calculation of soil cleanup levels presented in the FS report.

Response:

Upon consideration of the infiltration rate presented in the RI/FS report (34 inches per year), EPA determined that this rate was not accurate and recalculated it (6 inches per year). The recalculated infiltration rate was used by EPA in its groundwater modeling to calculate soil cleanup levels. These calculations will be refined during the remedial design.

Comment:

Several commentors, including a PRP, raised questions about the Risk Assessment, stating that the risks are overstated due to overly conservative assumptions, asking for clarification of some specific technical terms.

Response:

The Risk Assessment was prepared utilizing current guidelines as detailed in "Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, September 29, 1989". A conservative approach is used to safeguard human health.

Comment:

A commentor asked if a definable trichloroethylene plume exists at the site and asked how it compares to earlier data.

Response:

A definable plume of trichloroethylene is present in the ground water. This plume was illustrated in Figure 3-13 of the RI Report. Comparison to previous data show that the levels of contamination in downgradient wells have remained the same order of magnitude.

Comment:

The FS did not consider a range of remedial objectives showing increased benefits corresponding to increased costs and range of clean-up levels, or time frames.

Response:

The objective to protect human health and the environment is a threshold requirement that all remedies must meet. Clean-up levels are set by groundwater ARARs. These are health-based standards that EPA is required to meet. The FS developed different alternatives to meet these minimum requirements with a range of costs and remediation time frames.

Comment:

The FS Report did not consider the complementary effect of source control on ground water quality. Groundwater treatment may not be necessary if the source is removed. Source control may not be necessary if the site is hydraulically contained.

Response:

The groundwater extraction and treatment system presented in the FS was developed under the assumption that source control is implemented. Groundwater remediation is required because contaminants are above health-based standards. Hydraulic containment of the site was determined to be not feasible due to hydrogeologic constraints.

Comment:

Since some of the blank samples showed the presence of volatile compounds, specifically TCE, some of the wells which show similar levels of TCE may in fact be clean. Additional sampling is necessary.

Response:

The presence of volatile organic compounds in blank samples is apparently due to the presence of very high levels of TCE in the samples analyzed immediately before the blanks. This was only noted in two of the blank samples. Two rounds of groundwater samples were collected and the concentrations of contaminants in the wells questioned by the commentor were similar in both rounds of sampling. However, even discounting the presence of TCE in some wells, the levels of other contaminants are such as to require groundwater remediation. EPA intends to conduct additional sampling during the remedial design.

Comment:

One commentor questioned why the results of the May, 1990 PCB sample results were not included in the risks assessment, and raised questions about the inconsistencies between the May 1990 sampling and the December 1988 sampling, specifically the Aroclor 1248 was detected in May 1990 but not in December 1988.

Response:

The May 1990 PCB sampling was conducted after the risk assessment was completed. It was intended to further define the extent of the surface soil PCB contamination. Aroclor 1248, although not detected in December 1988, had been detected in previous studies at the site.

Comment:

One commentor stated that exposure assumptions for direct contact with on-site soils and sediments as well as dermal exposures are overestimated by a factor of ten. The number of days exposed/year was incorrectly calculated using 24 hours per day exposure.

Response:

Exposure assumptions were calculated correctly. The exposure scenarios for direct contact and dermal exposure are based on exposure to an assumed mass of soil per day, and in these cases do not specify the number of hours per day.

Comment:

One commentor stated that the risks due to contaminants were incorrectly assumed to be additive and that only toxic substances which affect similar target organs are additive.

Response:

For calculations of the cancer risk, EPA procedures are to add the

risks due to individual contaminants. The risks associated with PCBs alone account for the significant portion of the risk. The risk due to all other compounds is so low in comparison to PCBs that adding their effect would have little effect on the overall potential adverse effect to human health.

COST AND SCHEDULE

Comment:

A resident asked if EPA encountered much more contaminated material than identified in the RI/FS, and this resulted in the remediation effort becoming much larger than anticipated, would funds be available to finish the remediation.

Response:

Although EPA is confident that it has properly characterized the nature and extent of contamination, during the remedial design, additional sampling will be conducted to revise the estimates and then revised cost estimates will be developed. Although EPA cannot absolutely guarantee that Superfund monies will be available, as Superfund is up for reauthorization by Congress in 1991, EPA is committed to the completion of the remediation effort spelled out by the ROD.

EPA also recognizes that it is current cost estimates have an expected level of accuracy of plus 50 percent and minus 30 percent. Though the actual cost may vary significantly from these estimates due to the environmental uncertainties, EPA must evaluate alterna tive and use these "best guess" cost estimates.

Comment:

A resident asked if EPA would be negotiating with PRPs to take responsibility for the cost of the clean-up, and would those negotiations delay the whole process.

Response:

EPA will first request that the PRPs undertake the cleanup efforts. EPA has already issued a unilateral administrative order to some of the PRPs to perform some of the work called for in the ROD. Following the issuance of the ROD, EPA will give the PRPs an opportunity to agree to conduct those portions of the selected remedy that they are not already performing under the 1989 Administrator Order. If the PRPs are willing to undertake this work, EPA would negotiate the terms of a judicial consent decree with the PRPs which would provide for their performance of the work. If the PRPs do not volunteer to implement the remedy, EPA may unilaterally require them to do so, and/or EPA will implement the remedy itself. It is consistent with EPA's policy to attempt

to have the PRPs either undertake or assume the costs of the remedial action. We do not expect that negotiations with PRPs will delay the remediation process significantly.

Comment:

A local official and several residents asked EPA to estimate the length of time necessary to complete the remedial design and remedial action.

Response:

EPA's current time estimate for the remedial design is approximately a year to 18 months. This includes the additional sampling that may be required. The remediation of the soil will take approximately one year from the initiation of soil cleanup. It is estimated that it will take approximately 18 months to construct the groundwater systems, but approximately 20 years to fully remediate the groundwater.

REMEDIAL DESIGN

Comment:

A local official asked if monitoring wells would be installed in the substrata downstream from the Site toward the Town of Pitcher line.

Response:

Additional wells may be installed if they are determined to be necessary to monitor the progress of the remedial action.

Comment:

Because of the limited numbers of samples taken during the RI, the actual soil volume requiring remediation may be overestimated. The PRP has included a proposed scope of work for additional sampling.

Response:

EPA recognizes that additional data is need to refine the estimates of the volume of soil requiring remediation. This data will be collected in the remedial design phase.

PUBLIC PARTICIPATION

Comment:

Several individuals asked whether an opportunity existed for citizen input during the remedial design.

Response:

EPA encourages citizen participation throughout the remediation process. In fact, many of the comments on the Proposed Plan and ROD provided by the public and the PRPs will be factored into the remedial design. The design documents will be available for public comment.

Comment:

Several individuals have asked that EPA notify residents, local officials and emergency responders when hazardous materials will be taken off-site.

Response:

As a part of its remedial design, EPA will strengthen communication channels with local officials, emergency responders and community groups. This will include informing local officials, emergency responders and concerned citizens of the schedule for removal of hazardous materials from the site.

Comment:

A resident expressed dissatisfaction with EPA's communication about site activities to date.

Response:

EPA is committed to providing timely information about site activities to local officials and concerned citizens. EPA is required by law to provide opportunities for the public to comment on the process and site activities. To date, EPA has held an RI/FS workplan scoping meeting with the public, distributed Superfund Updates for the Site at strategic points in the remediation process, distributed the Proposed Plan to the mailing list maintained for the site, held a public meeting to discuss the proposed plan and the RI/FS report, and provided the opportunity for the public to comment on the Work Plan, RI/FS report and Proposed Plan for the site. During the remedial design, EPA will continue to provide information to the public and encourages the public to participate fully. One available mechanism is the Technical Assistance Grant (TAG) program.

The TAG program offers funds to an incorporated citizen group which is affected by the site for the purpose of providing independent technical expertise to evaluate EPA's activities. This program requires the citizen group to provide some in-kind services to be eligible for the grant. EPA encourages the citizens affected by the Solvent Savers site to apply for a Technical Assistance Grant. Anyone interested should contact:

Ms. Ann Rychlenski
Office of External Programs
U.S. Environmental Protection Agency
26 Federal Plaza
New York, New York 10278
Phone: (212) 264-7214

Comment:

A resident requested that EPA visit with some of the people in the area so that they know how the people in the immediate area feel.

Response:

EPA is willing to meet with interested citizens during remedial design to discuss any concerns that they have about the site. Additionally, at many Superfund sites EPA has worked along with citizens' groups that have formed.

Comment:

Several representatives of local environmental groups and residents have expressed dissatisfaction with the availability of site documents. They have indicated that the Pond Store is very inconvenient and have suggested that EPA maintain information repositories in the libraries of Cincinnatus and DeRuyter.

Response:

EPA will explore the viability of additional site repositories. Site documents will be made available, including the ROD and Responsiveness Summary, in the information repositories.

Comment:

A resident of Lincklaen asked if there was any assurance that if and when a TAG is granted it would be to representatives of the people of Lincklaen.

Response:

TAGs are available only to those groups that can demonstrate that they are affected by the site. Where more than one group applies for a TAG, the group that can better demonstrate its qualifications, including its relative proximity to the site and the degree to which it is affected, will have a better chance of qualifying for the TAG.

Comment:

A local official asked if the Town of Lincklaen Town Board could get involved in the TAG process.

Response:

The TAG grants are not distributed to local governments, political subdivisions, academic institutions or PRPs. Existing citizens' associations that are incorporated or working towards incorporation and environmental and health advocacy groups are encouraged to apply. Only non-profit groups are eligible for TAGs.

OTHER

Comment:

A resident asked for the names of EPA's contractors that had performed work at the site to date.

Response:

The following firms have been involved in work related to the Solvent Savers site:

Ebasco Services, Inc.
ICF Technology, Inc.
NUS Corporation
Roy F. Weston, Inc.

Comment:

Several residents have asked why no sign has been posted to denote it as a hazardous waste site, and no fence has been put up to limit access to the site. They request that this matter be resolved immediately.

Response:

The PRPs are currently in the process of installing fencing and warning signs along Union Valley Road.

Comment:

A resident asked when the drums stored at the site would be removed.

Response:

The work plan submitted by the PRPs will also deal with the removal of some of the drums on the site. EPA has reviewed and approved the work plan for the removal of the excavated drums. Before removing the drums, the PRPs must receive approval from a licensed disposal facility. It is anticipated that this approval will be received shortly.

Comment:

A resident asked if there is a ranking system for hazardous waste sites and what is the rank for the Solvent Savers site.

Response:

The National Priorities List (NPL) is a list of the nations worst uncontrolled hazardous waste sites. Superfund monies are available to investigate those sites. The list is based on the Hazardous Ranking Score for each site. This score is a reflection of the potential for human and environmental harm due to the migration of contaminants by surface water, groundwater or air; potential for harm due to fire or explosion; or, potential for harm due to direct contact with hazardous substances. The NPL ranking of the Solvent Savers site was 582 out of the 849 sites in the March 1989 listing.

Comment:

A resident was concerned that the potential existed for the Solvent Savers site to become a dumping ground for hazardous wastes from other sites.

Response:

This fear is unfounded. EPA is currently remediating this site and has no intention of utilizing the Solvent Savers site as a disposal facility.

Comment:

A resident expressed concern for the removal of waste and the shipping of it through the community. She wanted to know who was responsible for accidents that might occur along the shipping route. She also wanted to know if EPA uses private haulers and if they can backhaul.

Response:

Responsibility for accidents that might occur during the shipment of waste is that of the contractors, PRPs and EPA. Private haulers would be used to remove the waste from the site. The haulers must decontaminate the exterior of their trucks before they leave the site and the interior and exterior after shipment of the waste.

Comment:

A resident asked what could happen if mixed waste was found during remedial design or action.

Response:

A radiation survey at the site did not indicate the presence of mixed waste. However, in the unlikely event that mixed waste was discovered, EPA would evaluate options for its disposal at that time.

Comment:

A resident stated that the presence of the Solvent Savers site has caused property values in the area to decrease and wanted to know what assurances EPA could give that property values would increase when the site had been remediated.

Response:

Although EPA has not conducted any studies of the area property value trends, it is not unlikely that proximity to the site may cause a decline in property values. When the site is remediated, property values should return to within ranges of similar homes in comparable communities. However, EPA cannot guarantee or forecast future property values.

Comment:

A resident asked what the motivation for PRPs is to cleanup a site if the federal government is willing to do it.

Response:

Superfund has built-in cost recovery provisions. EPA will attempt to recover from the PRPs all costs incurred from the cleanup of the Solvent Savers site. EPA may also, at its discretion, order the PRPs to conduct the design and construction of the selected remedy. Such an order would include penalties for non-compliance.

Comment:

A resident has asked that a health survey be performed for residents in the area.

Response:

EPA does not normally conduct health surveys as a part of its remediation process. They are more appropriately conducted by local and county health departments who have access to area records. EPA recommends that requests for a health survey be directed to the local and county health departments.

Comment:

A resident questioned the cleanup standards for metals in soils.

Response:

Because of the fact that most samples were within background ranges, and the inorganics detected above background ranges were not found at levels which were a health risk, inorganic cleanup levels were not set for soil.

Comment:

A commentor asked for the cleanup standards for PCBs.

Response:

All soils containing PCBs above 1 ppm will be remediated. This level has been set jointly by EPA and NYSDEC.

Comment:

A resident requested assurance that all analytical work was performed correctly.

Response:

The EPA's Environmental Services Division continually audits subcontractors and laboratories in the Contract Laboratory Program. These subcontractors and laboratories also must have an independent, internal quality assurance program that meets EPA approval. Several audits were performed of field procedures at the Solvent Savers site. All audits reported that field activities were being performed satisfactorily.

Comment:

A resident requested a list of the 63 organic and 24 inorganic chemicals present on the site.

Response:

<u>Organic Compounds</u>

Acetone
Benzene
Benzoic Acid
Bromomethane
2-Butanone
sec-Butylbenzene
Butylbenzylphthalate
di-n-Butylphthalate
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane

Chloromethane
Chloroform
4-Chloro-3-methylphenol
2-Chlorophenol
2-Chlorotoluene
4-Chlorotoluene
4,4'-DDD
1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Dichlorodifluoromethane
1,1-Dichloroethane
1,2-Dichloroethane
1,1-Dichloroethene
cis-1,2-Dichloroethene
trans-1,2-Dichloroethene
Total 1,2-Dichloroethene
2,4-Dichlorophenol
2,4-Dinitrotoluene
Ethylbenzene
bis-(2-Ethylhexyl)phthalate
Hexachlorobenzene
Isophorone
Isopropylbenzene
p-Isopropyltoluene
Methylene Chloride
4-Methyl-2-pentanone
2-Methylphenol
4-Methylphenol
4-Nitrophenol
4-Nitro-di-n-propylamine
di-n-Octylphthalate
Carcinogenic PAHs
Noncarcinogenic PAHs
Total PCBs
Pentachlorophenol
Phenol
n-Propylbenzene
Styrene
1,1,1,2,-Tetrachloroethane
1,1,2,2,-Tetrachloroethane
Tetrachloroethane
Toluene
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Tricloroethane
Trichloroethene
Trichlorofluoromethane
1,3,5-Trimethylbenzene
Vinyl Chloride
Total Xylenes

Inorganics

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Cyanide
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

Comment:

A resident asked if children on school buses that rode by the site are at risk from air contaminants now or during remediation.

Response:

Air sampling at the perimeters of the site indicated that contaminants were not migrating from the site. During remediation dust suppression technologies will be utilized to prevent air-borne contaminants from leaving the site.

Comment:

A resident requested a list of the PRPs.

Response:

The following entities have been identified as potentially responsible parties:

Allied Corporation
American Locker Group
Bristol Laboratories, Inc.
Carrier Corporation

General Electric Company
International Business Machines Corp.
Norwich Eaton Pharmaceuticals
Pass and Seymour, Inc.
St. Regis Corporation
Solvents and Petroleum Services, Inc.
Stauffer Chemical Company
UNISYS Corporation
U.S. Air Force

Comment:

A resident requested the name of the consultant who conducted the PRP RI/FS in 1985.

Response:

EC Jordan, Inc. conducted the RI/FS undertaken by the PRPs in 1985.

Comment:

A resident asked where the funds used in Superfund investigations come from.

Response:

Superfund is funded via taxes levied against the petrochemical industry and/or the general treasury.

Comment:

A resident asked is there an update to the November 1986, EPA **Test Method for Evaluating Solid Wastes, (SW-846).**

Response:

The EPA guidance document, **Test Method for Evaluating Solid Wastes**, (SW-846), was last revised in November 1986. However, a supplement was produced in 1987.

Comment:

A resident asked if there is an update to the March 1983, EPA guidance document, **Chemical Analysis of Water and Wastes** (EPA 600/4-79-020).

Response:

The March 1983 revision to the EPA guidance document, **Chemical Analysis of Water and Wastes** (EPA 600/4-79-020), represents the latest revision to that document.

III. REMAINING CONCERNS

The primary areas of concern which should be considered during remedial design and remedial action are health and safety issues and communication of information about site activities to interested parties.

Residents and members of local environmental organizations have strong convictions with regard to the necessary health and safety precautions that should be taken during remedial implementation. They also are concerned that the site be secured. This should be a top priority.

Also of concern is the communication of information about site activities to interested parties. This includes schedules for site activities and off-site disposal. The community is concerned about the transportation of hazardous waste through their public streets.

AUG 27 1990

CERTIFIED MAIL -
RETURN RECEIPT REQUESTED

Ms. Susan B. Griffin
Coordinator
Chenango North Citizens
Against Radioactive Dumping
P.O. Box 126
South Otselic, New York 13155

Re: Freedom of Information Act Request (2) RIN-1760-90

Dear Ms. Griffin:

In response to your August 3, 1990 Freedom of Information Act request, enclosed please find copies of the proposed plan, and remedial investigation and feasibility study reports for the Solvent Savers Superfund Site located in the Town of Lincklaen, Chenango County, New York.

The cost for providing this information is $184.05. An itemized invoice is enclosed. Please forward your check or money order, made payable to the U.S. Environmental Protection Agency, within 30 days of the date of this response. Your check should refer to the RIN number above and should be accompanied by the top portion of the enclosed Bill for Collection. Your prompt payment of the amount indicated will be appreciated.

Should you have any questions, please contact me at (212) 264-9348.

Sincerely yours,

/s/

Lisa K. Wong, Project Manager
Western New York Remedial Action Section

Enclosures

bcc: OEP
FIN

AUG 27 1990

CERTIFIED MAIL-
RETURN RECEIPT REQUESTED

Ms. Denise Cote-Hopkins
Assistant LLRW Coordinator
Cortland County Low-Level
Radioactive Waste Office
County Office Building
P.O. Box 5590
60 Central Avenue
Cortland, NY 13045

Re: Freedom of Information Act Request (2) RIN-1758-90

Dear Ms. Hopkins:

This is in response to your letter dated August 3, 1990, requesting information under the Freedom of Information Act with regard to the Solvent Savers Superfund Site ("the Site") located in the Town of Lincklaen, Chenango County, New York. The following documents were requested in your letter:

i) Phase I work plan
ii) Phase II work plan
iii) Remedial investigation report
iv) Feasibility study report
v) Selection process for remedial alternatives
vi) Record of Decision

Enclosed please find copies of the remedial investigation and feasibility study (RI/FS) reports, and the phase I removal action work plan entitled, "Existing Drum Characterization and Disposal Program" for the Site. In addition, a copy of the fact sheet providing information on the Superfund program's remedial action selection process is also enclosed for your reference.

The phase II removal action work plan, which addresses the buried drums and contaminated soils at the Site, is currently under review by the United States Environmental Protection Agency (EPA). After EPA's approval of the phase II removal action work plan, a copy of this document will be prepared and sent to your office.

Subsequent to consideration of all comments received during the public comment period for the RI/FS reports and the proposed plan, the EPA will select a final remedy, and document this decision in a Record of Decision ("ROD"). After the ROD is signed, a copy of the ROD document will also be prepared and sent to your office.

The cost for providing the RI/FS reports and Phase I removal action workplan is $199.80. An itemized invoice is enclosed. Please forward your check or money order, made payable to the U. S. Environmental Protection Agency, within 30 days of the date of this response. Your check should refer to the RIN number above and should be accompanied by the top portion of the enclosed Bill for Collection. Your prompt payment of the amount indicated will be appreciated.

Should you have any questions, please contact me at (212) 264-9348.

Sincerely yours,

/s/

Lisa K. Wong, Project Manager
Western New York Remedial Action Section

Enclosures

bcc: OEP
FIN

AUG 21 1990

Honorable Sherwood Boehlert
House of Representatives
Washington, D.C. 20515

Dear Mr. Boehlert:

This is in response to your letter of August 10, 1990 concerning Cortland County's Freedom of Information Act request pertaining to the Solvent Savers Superfund site.

A copy of each of the following Solvent Savers site documents were requested by the County:

i) Phase I removal action workplan

ii) Phase II removal action workplan

iii) Remedial investigation report

iv) Supplemental investigation reports (if any)

v) Feasibility study report

vi) Selection Process for Remedial Alternatives

vii) Record of Decision

In response to the County's request, the Solvent Savers site remedial investigation and feasibility study reports, the phase I removal action workplan (removal of the on-site surficial drums), and a fact sheet on the Superfund program's remedial action selection process will be sent to Denise Cote-Hopkins, Assistant Coordinator of the Cortland County Low-Level Radioactive Waste Office. There are no supplemental investigation reports. A copy of the phase II removal action workplan (excavation of the on-site buried drums and associated contaminated soil) will be sent to Ms. Cote-Hopkins once ongoing revisions to the document are completed.

It is anticipated that a Record of Decision, the document which will select a remedy for the site, will be signed by the end of September 1990. At that time a copy will be sent to the County.

In regard to the concern that the County will not have sufficient time to provide written comments, it should be noted that the remedial investigation and feasibility study reports, as well as the Proposed Plan, which describes the Environmental Protection Agency's (EPA's) preferred remedy for the site, were placed in Pond Store, a local repository situated on Star Route, DeRuyter, New York, in late July 1990. Also, a public meeting was held on August 13, 1990 to discuss the results of the investigations, to present EPA's preferred remedy, and to solicit public comments. Please note that so as to allow the public more time to review the available documents, the public comment period has been extended to September 7, 1990.

If you have any questions concerning this response, please let me know or have your staff contact Jeane Rosianski of the Office of External Programs at (212) 264-7834.

Sincerely,

/S/

Constantine Sidamon-Eristoff
Regional Administrator

cc: Thomas C. Jorling, Commissioner
New York State Department of
Environmental Conservation

bcc: Alice Greene, A-101

United States Department of the Interior

FISH AND WILDLIFE SERVICE
100 Grange Place
Room 202
Cortland, New York 13045

September 17, 1990

Mr. Bill Moran
ICF Kaiser Engineers, Inc.
379 Thornall Street, 5th Floor
Edison, NJ 08837-0001

Dear Mr. Moran:

This responds to public comments you provided to us on the "Bioassessment at the Solvent Savers Superfund Site." Each question identified in your communication of September 13, 1990 is answered below:

1. Samples (sediment, water, fish, benthic invertebrates) were collected up to 1500 feet downstream of the Solvent Savers Site (site). Sediment samples were taken from natural deposition areas. If significant levels of contaminants were detected at this location, the Fish and Wildlife Service (Service) would have recommended chemical analysis at locations further downstream.

2. Low levels of volatile organic contaminants (VOCs) were detected at the sample site noted above (see pp. 19-21 of the Bioassessment prepared by the Service). As discussed on page 22 of the Bioassessment, concentrations of metals and cyanide in sediment were all within background limits for soils of New York State. Since sediment is where inorganic substances are mostly likely to accumulate, we do not consider there to be problems with the levels of metals/cyanide in Mud Creek.

3. Our conclusion that the VOCs and metals do not pose a significant threat to aquatic organisms is based on the following:

   - toxic levels of contaminants were not detected in surface water,
   - no significant health problems were noted in white suckers evaluated by a histopathologist,
   - fish species diversity was acceptable at all sampling locations, and
   - there were no dramatic differences in benthic invertebrate diversity that might indicate chemical or other stress.

4. There is very little scientific documentation of VOCs in fish tissue. However, it is not necessarily unusual or perplexing that they were detected in fish from Mud Creek. Many laboratories find it difficult to analyze for VOCs because of their ephemeral nature. Also, since VOCs are not regarded as highly toxic to aquatic organisms, many scientists may perform a chemical analysis for these substances.

Our theory on why VOCs were detected in fish tissue is that the fish are being exposed to chronic, low levels of these substances. We concluded that the level of exposure is not posing a significant threat to aquatic organisms. This information was publicized in our Bioassessment report and is part of the public record maintained at the site repository.

5. Our conclusion that none of the histological lesions detected in fish tissue can be attributed to contamination at the site or are indicative of serious health problems is based on information provided by Dr. Roger Herman. Dr. Herman is a histopathologist with the National Fish Health Research Center in Kearneysville, West Virginia.

We hope this adequately responds to the questions posed. If you would like additional information, please contact Anne Secord of this office at 607-753-9334.

Sincerely,

Leonard P. Corin
Field Supervisor

cc: EPA, New York, NY (L. Wong, RPM)
EPA, Edison, NJ (M. Sprenger, ERT)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

SEP 27 1990

Ms. Susan B. Griffin, Coordinator
Chenango North Citizens Against Radioactive
Dumping and All Other Pollution
P.O. Box 126
South Otselic, New York 13155

Dear Ms. Griffin:

This letter will serve to memorialize our September 7, 1990 and September 10, 1990 telephone conversations which addressed the issues concerning the Solvent Savers Superfund site that were raised in your August 30, 1990 and September 10, 1990 letters, respectively.

In regard to your request that the Environmental Protection Agency waive the duplication costs associated with our response to your Freedom of Information Act request, I suggested that you submit a written request for a fee waiver or fee reduction to our Freedom of Information Act Officer, Ms. Wanda Vasquez, at the following address:

Office of External Programs
U.S. Environmental protection Agency
Region II
26 Federal Plaza, Room 905
New York, NY 10278

In regard to your concerns associated with the excavation of the contaminated soil and on-site thermal treatment (the preferred soil remedy), I noted that, to limit the amount of volatile emissions and dust generated during the soil excavation and handling activities, vapor suppressive foams and dust suppression mechanisms, such as water spraying, could be employed if necessary. The levels of contaminants present in the ambient air during all on-site soil excavation and handling activities would be monitored. If unacceptable levels of contaminants are detected in the ambient air, the on-site Health and Safety Officer would shut down the operation until the situation could be rectified. During treatment, emissions from the thermal treatment unit would be monitored to make sure that the discharge to the atmosphere complies with all federal and state air discharge requirements. If unacceptable levels of contamination are detected, the treatment unit would be shut down until the situation could be rectified.

In your letter, you expressed a preference for in-situ vapor extraction for treatment of the volatile organic-contaminated soils, since this alternative would reduce the potential for volatile emissions and the generation of dust. As I noted during our September 7, 1990 conversation, in-situ vapor extraction is effective in treating highly permeable, homogeneous soils. The soil matrix at the Solvent Savers site, however, is complex and heterogeneous in nature. Accordingly, we believe that employing in-situ vapor extraction at the Solvent Savers site would result in the preferential flow of the volatile organics through the soil. As a result, the complete extraction of the volatile organics from the soil might not be achievable utilizing in-situ vapor extraction.

You indicated during our September 7, 1990 conversation that, based upon our discussion, you did not believe that it would be necessary to have a meeting to discuss in-situ vapor extraction and low temperature thermal extraction further, as you requested in your August 30, 1990 letter. You noted further, that your group would [illegible] meeting on September 8, 1990 and that you would telefax any comments derived from your meeting.

As I noted to you during our September 10, 1990 telephone conversation in regard to your request that we extend the comment period so that your "independent expert" could review the remedial investigation and feasibility study report, while we do not intend to extend the comment period, which ended on September 7, 1990, we will take into consideration comments that are received before a remedy is selected for the site.

The remaining questions and concerns raised in your September 10, 1990 letter will be addressed in the Responsiveness Summary, which will be attached to the Record of Decision, the document which will formally select a remedy for the site.

Should you have any questions, please contact me at (212) 264-1132.

Sincerely yours,

Joel Singerman, Chief
Western New York Remedial Action Section

PROPOSED PLAN

PROPOSED PLAN

FOR THE

SOLVENT SAVERS SITE

LINCKLAEN, NEW YORK

PREPARED BY THE

U.S. ENVIRONMENTAL PROTECTION AGENCY

JULY 23, 1990

INTRODUCTION

This Proposed Plan describes the remedial alternatives considered for the Solvent Savers Superfund site and identifies the U.S. Environmental Protection Agency's (EPA's) and the New York State Department of Environmental Conservation's (NYSDEC's) preferred remedy and the rationale for this preference.

This document is issued pursuant to Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act as amended, 42 U.S.C. Section 9601 et seq. ("CERCLA"), commonly known as Superfund.

SITE LOCATION

The Solvent Savers site (hereinafter, "the Site") covers about 13 acres in a rural, sparsely populated area, and is located in the Town of Lincklaen, Chenango County, New York (See Figure 1). The Site is bounded by Union Valley Road to the west, Mud Creek to the east, an unnamed intermittent stream to the north, and shrubs and trees to the south (see Figure 2). Mud Creek is classified as a trout stream by NYSDEC and is used for recreational activities and livestock watering. Three residences, which are located within 300 feet of the Site, utilize private wells as the source of drinking water.

SITE HISTORY

Solvent Savers, Inc. was a chemical waste recovery facility operated by Mr. Dale Hough between approximately 1967 and 1974. Waste industrial solvents were hauled from clients in the Syracuse and Binghamton areas to the facility. A distillation process was used to recover solvents for reuse. It is suspected that a wide variety of wastes from the distillation process, including liquids, solids, and sludges, were disposed of on the Site. In addition, Mr. Hough owned and operated a drum reconditioning business (Cash Barrel, Inc.) at the same location, which reconditioned and sold many of the drums brought to the Site containing waste solvents.

Solvent Savers, Inc. ceased operations in 1974. In October 1978, Mr. Robert Lindsey purchased the property and regraded it, moving some exposed drums and a large tank, and covering them with soil. He also removed some exposed drums from the Site.

In 1981, NYSDEC conducted an initial site characterization, which included sampling of the on-site surface soils, water in Mud Creek, and groundwater from three private wells in the immediate vicinity of the Site. Sample analyses indicated the presence of contaminants that included volatile organics (primarily trichloroethylene and 1,1,1-trichloroethane), polychlorinated biphenyls ("PCBs"), and various inorganic substances (arsenic, cyanide, cadmium, and lead).

In 1982, the EPA Field Investigation Team ("FIT") performed a hazardous waste site inspection at the Site. During the FIT investigation, metals and organic compounds were detected in the surface soils, and organic chemicals were detected in the groundwater beneath the Site and in the surface water in Mud Creek. As a result of the FIT investigation, the Site was listed on the National Priorities List of uncontrolled hazardous waste sites in 1983.

EPA and NYSDEC identified a number of potentially responsible parties ("PRPs") that had arranged for the disposal of wastes at the Site. The State of New York initiated negotiations with the PRPs to begin the site cleanup.

In 1984, a consent agreement between the PRPs and the New York State Department of Law ("NYSDOL") was signed, requiring the PRPs to perform a remedial investigation and feasibility study ("RI/FS") at the Site. In August 1985, a consultant for the PRPs prepared an RI/FS report that recommended the following:

i) Excavate the buried drums for treatment and/or disposal off-site;

ii) Cover portions of the Site with a less permeable soil cover and revegetate;

iii) Restrict future use of contaminated groundwater using institutional controls; and

iv) Allow natural flushing to reduce the levels of contaminants in the groundwater to acceptable levels. (The estimated time to naturally flush the contaminants from the soil was 85 years).

On the basis of a review the PRPs' RI/FS report, it was determined that additional RI/FS work was necessary to obtain the data and information needed to characterize the nature and extent of contamination at the Site, and to formulate the optimum cleanup strategy.

In 1988, notification was sent by the EPA to the PRPs, stating EPA's intent to perform a supplemental RI/FS, and offering the PRPs an opportunity to conduct the supplemental RI/FS. The failure of the PRPs to agree to undertake the supplemental RI/FS in an acceptable manner prompted EPA to initiate a supplemental RI/FS independently.

ICF Technology, Inc. ("ICF"), EPA's consultant, commenced field investigations under the supplemental RI/FS in November 1988. Field work was completed in May 1990. The field investigations included surface and subsurface soil sampling, a magnetometer survey, test pit excavations, soil gas sampling, monitoring well

installation, depth-to-water measurements, surface water, sediment, groundwater, and air sampling, a pump test, a study of the biota in Mud Creek, a delineation of the wetlands and floodplains, and cultural and biological resources studies.

During the performance of the field work associated with the supplemental RI, over 100 drums were excavated and overpacked by ICF. An unknown number of drums remain buried.

In September 1989, EPA issued an Administrative Order to the PRPs, requiring the PRPs to undertake the following removal activities:

- Remove and properly dispose of the overpacked drums;
- Excavate, overpack, remove, and properly dispose of the buried drums;
- Implement a soil sampling program to define the nature and extent of contamination resulting from releases of hazardous constituents from the buried drums; and
- Excavate, treat and/or dispose of the contaminated soil associated with the drums.

In October 1989, the PRPs' consultant submitted to EPA a phase I removal action work plan, which detailed the tasks that would be involved in the removal and disposal of the overpacked drums. The PRPs' consultant sampled the contents of the drums and is currently in the process of obtaining disposal facility approvals for disposal of the overpacked drums. A phase II removal action work plan, which outlines the activities to be implemented to address the drums that remain buried and the contaminated soils at the Site, is presently under review by EPA.

During the RI conducted by ICF, five source areas were identified (see Figure 2). Samples collected from surface and subsurface soils in these areas show that the soils are contaminated with volatile organic compounds ("VOCs"), extractable organic compounds, metals, and PCBs. Areas 2 and 4 are identified in the FS as requiring remediation. Areas 1, 3, and 5 may require remediation depending upon the results of a model currently being implemented by EPA to determine target clean-up levels.

Area 1 was previously used as a drum storage area. Volatile and extractable organic contaminants were found at a depth of about 12 feet. Chromium and lead were found in surface soils.

Area 2 was previously used as a discharge area for spent solvents and wastewaters and as a drum disposal area. Area 2 has the highest levels of surface and subsurface soil contamination on-site. The primary contaminants detected were tetrachloroethene ("PCE"), trichloroethene ("TCE"), and 1, 1, 1-trichloroethane. In

addition, a PCB hot-spot was detected in this area. Barium was detected above the background level.

Area 3 was the location of an excavation that was backfilled with a 500-gallon tank, a drum, and miscellaneous debris. VOC contamination was detected in this area.

Area 4 is located in the central portion of the Site and includes a large drum burial area. VOC contamination was found consistently in all borings down to the water table (approximately 40 feet). TCE was the chemical found most frequently. Low levels of PAHs and phthalates were detected. PCB contamination was detected in surface soils in this area. The highest level of surface PCB contamination detected was 18,600 ppm.

Area 5 is located near the former Lindsey residence. VOC contamination was detected at depths down to 32 feet. TCE was the chemical detected most frequently. Barium was detected above the background level.

Groundwater samples collected on-site and downgradient show the presence of contamination by VOCs and metals. The VOC contamination is primarily TCE, PCE, and degradation products of these compounds. The metals include lead, chromium, arsenic, beryllium, and cadmium.

As part of the supplemental RI, EPA, in cooperation with the U.S. Fish and Wildlife Service, completed the field work for a bioassessment at the Site in May 1989. The objective of this study was to determine whether contaminants from the Site are causing adverse ecological impacts to the fish and wildlife resources in the Mud Creek. Samples of surface water, sediment, and fish tissues were collected, and analyses were performed for VOCs, PCBs, pesticides, base neutral/acid extractables (BNAs), metals and cyanide. No BNAs were detected in fish tissues. The levels of BNAs detected in surface water and sediment were below detection limits. No pesticides or PCBs were detected in surface water, sediment or fish samples. The levels of VOCs and metals detected in surface water, sediment, and fish tissues do not pose a significant threat to aquatic organisms. VOCs are rapidly biodegraded and exhibit a low potential for bioaccumulation. A number of lesions in fish tissues were found, but none can be attributed to the contamination at the site or are indicative of serious health problems.

SUMMARY OF SITE RISKS

A baseline health risk assessment was performed as part of the supplemental RI to describe the carcinogenic risks and non-carcinogenic chronic lifetime effects associated with the Solvent Savers site, assuming that no remedial action occurs. The risk

assessment was based on the analysis of the impact of 63 organic and 24 inorganic chemicals present at the Site.

Potential human health risks were evaluated for the following exposure pathways:

- Current exposure of neighboring children and teenagers to surface soil contaminants through direct contact, with subsequent incidental ingestion and dermal absorption during play activities;

- Current exposure of nearby residents to groundwater contaminants through ingestion of drinking water from residential wells;

- Current exposure of neighboring children and teenagers to sediment and surface water contaminants in Mud Creek and the intermittent stream through direct contact, with subsequent incidental ingestion and/or dermal absorption during play activities;

- Future exposure of on-site residents to surface soil contaminants through direct contact, with subsequent incidental ingestion and dermal absorption;

- Future exposure of on-site residents to subsurface soil contaminants through direct contact, with subsequent incidental ingestion and dermal absorption during play activities; and

- Future exposure of on-site residents to groundwater contaminants through ingestion of drinking water from on-site wells.

For each of the potential exposure pathways identified above, potential risks to human health were estimated. Exposure scenarios were developed for each pathway to represent a reasonable maximum exposure case. Quantitative risk estimates were developed by calculating intakes for the potentially exposed populations based on the assumed exposure scenarios and then combining these intakes with reference doses (for noncarcinogens) or cancer slope factors (for carcinogens).

Under current land use conditions, the excess estimated life-time cancer risk for the direct soil contact pathway (4×10^{-2}) exceeds

EPA's target cancer risk range (10^{-4} to 10^{-6})[1], primarily due to the presence of PCBs in the soil. The excess lifetime cancer risk is about one in a hundred thousand for the direct sediment contact pathway and about one in a million for the residential groundwater ingestion pathway. The excess lifetime cancer risks for these two pathways fall within EPA's target risk range. The hazard index values for noncarcinogenic effects exceed the threshold level of one[2] for the direct soil contact pathway, due to the presence of PCBs.

Under future land use conditions, the excess lifetime cancer risks exceed EPA's target cancer risk range for all the pathways examined (direct surface and subsurface soil contact, and ingestion of groundwater). These risks were primarily associated with exposure to PCBs for the soil pathway and to several volatile organics and

PCBs for the groundwater pathway. Additionally, the hazard index values exceed one for these pathways, indicating that adverse noncarcinogenic effects could occur. These potential noncarcinogenic risks are predominantly due to exposure to PCBs for the soil pathways and PCBs, chloroform, methylene chloride, PCE , and 1,1,1-trichloroethane, for the groundwater pathways.

Actual or threatened releases of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other remedial measures considered, may present a current or potential threat to public health, welfare, or the environment.

PURPOSE OF THE PROPOSED PLAN

The Proposed Plan outlines the remedial alternatives evaluated for the Site, and presents the rationale used in making the preliminary selection of the preferred remedy to protect human health and the environment from exposure to contamination at and emanating from the Site.

[1]Excess lifetime cancer risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a maximum upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

[2]For noncarcinogens, hazard index values were calculated. A hazard index greater than one indicates that adverse noncarcinogenic effects could occur, while a value below one indicates that such effects are unlikely to occur.

Changes to the preferred remedy or a change from the preferred remedy to another remedy may be made if public comments or additional data indicates that such a change will result in a more appropriate solution. The final decision regarding the selected remedy will be made after EPA has taken into consideration all comments the public. We are soliciting public comment on all of the alternatives considered in the detailed analysis phase of the RI/FS because EPA and NYSDEC may select a remedy other than the preferred remedy.

The detailed information and data used in determining the nature and extent of the contamination on-site and in the development of remedial alternatives is contained in the RI/FS report. The Proposed Plan highlights key information from the RI/FS report, but it is not a substitute for that report.

Copies of the RI/FS report, Proposed Plan, and supporting documentation are available at the following repositories:

- Pond's Store
  Star Route
  DeRuyter, New York 13052

- New York State Department of
  Environmental Conservation
  50 Wolf Road
  Albany, N.Y. 12233

- U.S. Environmental Protection Agency
  Emergency and Remedial Response Division
  26 Federal Plaza, Room 29-102
  New York, N.Y. 10278

SUMMARY OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

The findings of the RI are summarized as follows:

- Soils at the Site are contaminated with VOCs, extractable organic compounds, metals, and PCBs. The extent of VOC contamination is widespread and is concentrated in five areas. Metals contamination is less widespread (most contamination is around background levels), occurring in areas where VOC contamination

also exists. The PCB contamination is limited to two hot spots at the Site.

- Groundwater is contaminated with VOCs and metals underneath and downgradient of the Site. The VOC contamination is primarily TCE, PCE, and related compounds that could be TCE and PCE degradation products. The contamination decreases with distance from the source areas.

The remedial response objectives can be summarized as follows:

- Provide protection of human health and the environment from exposure to the PCB-contaminated soil;

- Provide protection of the groundwater, air, and surface water from the continued release of contaminants from the soils and buried leaking drums (to the extent that the removal work is not completed pursuant to the September 1989 Administrative Order); and

- Protect human health and the environment from current and potential future migration of contaminants in groundwater.

Accordingly, the FS evaluates, in detail, seven remedial alternatives for addressing the contaminated soils that contribute to groundwater contamination, as well as six remedial alternatives for addressing the groundwater contamination, at the Solvent Savers site.
These alternatives are:

SOIL ALTERNATIVES

Alternative SC-1: No Action

The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison of other alternatives. Under this alternative, EPA would take no further action to control the source of contamination. However, long-term monitoring of the Site (for a minimum period of 30 years) would be necessary to monitor contaminant migration. Monitoring would consist of annual soil, sediment, and surface water sampling and analyses for a variety of contaminants.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat wastes.

Alternative SC-2: Limited Action

The Limited Action alternative would limit public exposure to the contamination at the Site, but would not treat or remove the

contamination. This alternative would include the installation of a security fence and the posting of warning signs around the Site; annual soil and groundwater monitoring and site inspections; a public education program, institutional controls to limit site use and site access; and a review of site conditions every five years. If justified by the review, remedial actions may be implemented to remove or treat wastes.

Alternative SC-3: Site Capping

This alternative would include clearing the vegetation at the Site, grading and compacting the soil, and placing a 40-mil thick high density polyethylene (HDPE) liner and a compacted, 18-inch clay layer over the contaminated areas. Additionally, an 18-inch layer of topsoil would be placed on top of the clay, and vegetation would be planted to minimize the erosion of the topsoil. A fence would be constructed to surround the capped area, and land use restrictions would be implemented. This alternative would minimize the risks to the public of direct contact with the contaminated soil. Further, the HDPE liner and impermeable clay layer would limit rainfall infiltration into the subsurface, thereby limiting contaminant transport to the groundwater. The cap and fence would be inspected, and the soil and groundwater would be sampled, in a long-term monitoring program. Five-year reviews would be conducted to determine the effectiveness of the remedy.

Alternative SC-4: In-Situ Vapor Extraction

This alternative would employ in-situ vapor extraction to treat the contaminated soils.

Soil vapor extraction involves the collection of soil vapor from the unsaturated (vadose) zone by applying a vacuum at extraction points. The vacuum would draw vapor from the unsaturated zone, at the same time decreasing the pressure around the soil particles and releasing the VOCs. Because of the pressure difference, clean air from the atmosphere would enter the soil and replace the extracted air. The technology depends on factors such as soil permeability and depth to groundwater. Extraction wells, piping, and a positive displacement blower (vacuum pump) would be required to draw the vapor from the vadose zone. The collected air would be treated through an activated carbon unit. Spent carbon would be removed for off-site regeneration or incineration.

Under this alternative, the PCB-contaminated soils would be excavated and removed from the Site for off-site incineration. The buried drums would be excavated and removed from the Site for off-site treatment/disposal. On-site treatment was not considered due to the low volume of PCB-contaminated soils.

Under this alternative, long-term monitoring would not be required.

Alternative SC-5: Excavation/Low-Temperature Thermal Extraction/On-Site Redeposition

This alternative involves the excavation and on-site treatment of contaminated soils by low-temperature thermal extraction. The excavated soil would be fed to a thermal treatment unit, where hot air injected at a temperature above the boiling points of the organic contaminants of concern would allow the moisture and the organic contaminants to be volatilized into gases and escape from the soil. The organic vapors extracted from the soil would then be treated in a scrubber for particulate removal and acidic gas absorption.

Following treatment, the soils would be tested in accordance with the Toxicity Characteristic Leaching Procedure ("TCLP") to determine whether they constitute a Resource Conservation and Recovery Act ("RCRA") hazardous waste. Provided that they pass the test, they would be used as backfill material for the excavated area. Clean topsoil would be placed on the excavated areas, and the Site would be regraded and revegetated.

Under this alternative, the PCB-contaminated soils would be excavated and removed from the Site for off-site incineration. The buried drums would be excavated and removed from the Site for off-site treatment/disposal. On-site treatment was not considered due to the low volume of PCB-contaminated soils.

Under this alternative, long-term monitoring would not be required.

Alternative SC-6: Off-Site Incineration

This alternative would involve excavating the contaminated soil and transporting it to a permitted off-site incinerator for treatment and disposal.

The contaminated soil and buried drums would be excavated and staged. Contaminated materials would then be placed directly into 20-cubic yard trucks for shipment to the nearest available hazardous waste incinerator. Clean fill would be used to backfill the excavation area and the area would be revegetated.

Under this alternative, long-term monitoring would not be required.

Alternative SC-7: In-Situ Soil Flushing

This alternative would consist of the use of treated groundwater to flush the areas of soil contamination. A groundwater extraction and treatment system would be required. Because this is an in-situ contaminant removal process, this alternative would require minimal excavation (well installation, distribution system, and grading of the recharge basins) for implementation.

Since the total volume of groundwater extracted and treated could not be recharged (flushed), discharge of a portion of the treated water to Mud Creek would be required.

Under this alternative, the PCB-contaminated soils would be excavated and removed from the Site for off-site incineration. The buried drums would be excavated and removed from the Site for off-site treatment/disposal. On-site treatment was not considered due to the low volume of PCB-contaminated soils.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would continue for at least five years after the completion of the remediation to ensure that the goals of the remediation have been met.

GROUNDWATER ALTERNATIVES

Alternative GW-1: No Action

Under this alternative, no action would be taken to remedy the groundwater contamination at the Site or to control its spread. This alternative is used as a basis of comparison for other groundwater remediation alternatives. Under this alternative, the Site would be reviewed every five years.

Alternative GW-2: Limited Action

This alternative would include long-term groundwater monitoring and institutional restrictions on groundwater use. The monitoring would consist of annual groundwater sampling to track the movement of contaminated water and assess the need for future remediation. Institutional restrictions would prohibit the use or installation of water supply wells on-site. Under this alternative, the Site would be reviewed every five years.

Alternative GW-3: Groundwater Extraction/Chemical Precipitation/Carbon Adsorption

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be pumped to an equalization tank. Chemical precipitation would be employed to remove inorganic contaminants, followed by carbon adsorption to remove organic contaminants.

The chemical precipitation process would consist of the addition of lime to precipitate dissolved metals. A coagulant would be added to induce flocculation. The sludge generated would undergo dewatering and would be transported to an off-site treatment/disposal facility.

Carbon adsorption is the exposure of the contaminated groundwater to units filled with carbon. The contaminants come out of solution with the water and adhere to (are adsorbed onto) the carbon surface.

In order to prevent the loss of vapors to the atmosphere, the equalization tank, the chemical precipitation unit, and the filtration unit would be equipped with floating covers to prevent volatilization.

The treated water would be reinjected into the aquifer and/or discharged to Mud Creek.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

Alternative GW-4: Groundwater Extraction/Chemical Precipitation/ Air Stripping/Carbon Adsorption

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be pumped to a centrally located treatment plant on-site, where it would be treated by chemical precipitation to remove inorganic contaminants, and by air stripping and carbon adsorption to remove organic contaminants.

The groundwater extraction, chemical precipitation, and carbon adsorption processes would be the same as Alternative GW-3.

Air stripping is a mass transfer process in which volatile organics in water are transferred to the air blown in at the bottom of a packed tower.

The treated water would be reinjected and/or discharged to Mud Creek.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

Alternative GW-5: Groundwater Extraction/Chemical Precipitation/ UV Oxidation

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be pumped to an equalization tank, and then to a rapid mixing tank, where inorganic contaminants would be removed

by chemical precipitation. Next, the water would be treated by UV oxidation to remove organic contaminants.

The groundwater extraction and chemical precipitation processes would be the same as Alternative GW-3.

Following chemical precipitation, the groundwater would enter an oxidation tank. There, it would be mixed with a metered dose of an oxidant (e.g., hydrogen peroxide or ozone) and be exposed to high intensity ultraviolet ("UV") radiation. In the presence of UV light, the oxidant molecules would decompose to form hydroxyl radicals. Also, some organic contaminants would absorb UV light and become more reactive. The hydroxyl radicals would break down the organic molecules into smaller blocks and eventually to carbon dioxide, water, and non-hazardous salts. The treated water would be filtered for the removal of suspended particles and collected in a storage tank. To prevent the loss of vapors to the atmosphere, the equalization tank, the chemical precipitation unit, and the filtration process unit would be equipped with floating covers to prevent volatilization.

The treated water would be reinjected and/or discharged to Mud Creek.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

Alternative GW-6: Groundwater Extraction/Chemical Precipitation/ Biological Treatment

Under this alternative, contaminated groundwater would be pumped out of the ground through extraction wells. The extracted groundwater would be treated by chemical precipitation to remove inorganic contaminants, and by activated carbon biological treatment to remove organic contaminants.

The groundwater extraction and chemical precipitation processes would be the same as Alternative GW-3.

After chemical precipitation, the water would be pumped into the aeration tank, where it would be mixed with granular activated carbon and biological solids. The water-carbon-biological solids mixture would be aerated so that the biodegradable content of the groundwater could be biologically oxidized and assimilated. After aeration, the mixture would be sent to a clarifier, where the granular carbon and the biological solids would settle and be separated from the treated water. The clarifier overflow (treated water) would be filtered and collected in a storage tank. The clarifier underflow solids would be recycled to the aeration tank

to maintain the appropriate concentration of the granular activated carbon and biological solids. A portion of the clarifier underflow containing granular activated carbon and excess biological solids would be wasted daily, dewatered, and aerobically digested and disposed. Make-up granular activated carbon would be added to the aeration tank daily to account for the loss of that substance. The equalization tank, the chemical precipitation unit, and the filtration unit would be equipped with floating covers to prevent the loss of volatile chemicals prior to adsorption in the biological unit.

Environmental monitoring would be required during the life of the treatment process. In addition, monitoring of the groundwater at the Site would be conducted for a period of five years after completion of the remediation to ensure that the goals of the remedial action have been met.

All alternatives described above would include pre-construction, construction and post-construction air monitoring.

PREFERRED ALTERNATIVE

Based upon an evaluation of the various alternatives, EPA and NYSDEC recommend Alternative SC-5, Excavation/Low Temperature Thermal Extraction/On-Site Redeposition, for treatment of the contaminated soil and Alternative GW-4, Groundwater Extraction/ Chemical Precipitation/Air Stripping/Carbon Adsorption, for treatment of the contaminated groundwater, as the preliminary choice for the Site remedy.

RATIONALE FOR SELECTION

During the detailed evaluation of remedial alternatives, each alternative is assessed against nine evaluation criteria, namely short-term effectiveness, long-term effectiveness and permanence, reduction of toxicity, mobility or volume, implementability, cost, compliance with applicable or relevant and appropriate requirements ("ARARs"), overall protection of human health and the environment, and state and community acceptance.

Each criterion will be briefly addressed with respect to the preferred alternatives for both soil and groundwater.

GLOSSARY OF EVALUATION CRITERIA

- Overall protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment engineering controls or institutional controls.

- Compliance with ARARs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statues and/or provide grounds for invoking a waiver.

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk.

- Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies, with respect to these parameters.

- Short-term effectiveness involves the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period of the alternative.

- Implementability involves the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.

- Cost includes both capital and operation and maintenance ("O&M") costs. Cost comparisons are made on the basis of present worth values. Present worth values are equivalent to the amount of money which must be invested to implement a certain alternative at the start of construction to provide for both construction costs and O & M costs over a 30 year period.

- State acceptance indicates whether, based on its review of the RI/FS report and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

- Community acceptance will be assessed in the ROD following a review of the public comments received on the RI/FS report and the Proposed Plan.

SOIL ALTERNATIVES

A. Overall Protection of Human and the Environment

Alternative SC-1 provides no protection of human health and the environment from direct contact with contaminated soils. Alternative SC-2 provides a limited measure of protection through the installation of a site perimeter fence and the implementation of site use restrictions. Alternative SC-3 includes the installation of a site perimeter fence and construction of a cap, thereby providing additional protection due to reduction in direct contact risks. Over the long-term, the cap is anticipated to decrease leachate generation, mobility, and the volume of leachate reaching the aquifer.

Alternatives SC-4, SC-5, SC-6, and SC-7 provide even greater protection by direct treatment of contaminated soils and subsequent reduction of leachate within a relatively short timeframe. These alternatives, which also remove PCB-contaminated soils and drums, are far more protective of human health and the environment than Alternative SC-3.

The treatment of soils to remove the most mobile wastes would result in the elimination of a long-term source of groundwater contamination and it would mitigate the risks to public health and the environment associated with the migration of those contaminants off-site. Alternative SC-5, the preferred alternative, would effectively mitigate those risks by removing the most mobile wastes from the soil leaving only the less mobile organic and metal compounds in the soil (provided that the treated soil that is replaced has passed the TCLP toxicity test).[3]

Alternatives SC-3 through SC-7 would also mitigate the risks to public health and the environment associated with the leaching of contaminants into the groundwater and their migration off-site. Under Alternatives SC-1 and SC-2, contaminants would continue to leach from the soil into the groundwater and continued off-site migration of contaminants would occur. Monitoring would be implemented to observe contaminant migration, but an indeterminate amount of time would elapse between detection and the implementation of mitigating measures.

B. Compliance with ARARs

All technologies proposed for use in Alternatives SC-3 through SC-7 would be designed and implemented to satisfy all action-specific regulations, including all air emission standards. In addition,

[3] If the treated soil does not pass the TCLP test, further treatment may be necessary.

all disposal of buried drums, contaminated soils, and PCBs would be in accordance with the applicable RCRA/Toxic Substances Control Act regulations, including the land disposal regulations under RCRA.

No federal or New York State regulations specify cleanup levels for contaminants in soils. In terms of achieving target levels for soils for the purpose of removing potential sources of groundwater contamination, Alternatives SC-4 through SC-7 would be effective.

C. Reduction of Toxicity, Mobility, or Volume

Alternatives SC-1 and SC-2 would provide no reduction in toxicity, mobility, or volume. Alternative SC-3 would reduce the mobility of the contaminants but would not reduce the toxicity or volume. Alternatives SC-5 and SC-6 would result in comparable reductions in the toxicity, mobility, or volume through the use of treatment. Alternatives SC-4 and SC-7 would result in the reduction of toxicity, mobility, or volume but to a lesser degree than the thermal treatment alternatives due to the possibility of preferential flow in the vadose zone.

D. Implementability

All of the alternatives are technically feasible, but differ in the complexity of implementation. Alternatives SC-3, SC-4, SC-5, and SC-7 would utilize relatively common construction equipment and materials. Alternate SC-4, which requires soil gas extraction wells, piping, a vacuum system, and a mobile treatment system, would be relatively easy to implement. Alternative SC-7 may require extensive start-up testing to determine optimum recharge rates and to monitor changes in groundwater flow directions. Although the technologies employed in Alternatives SC-4 and SC-7 have been successfully pilot tested and have been utilized on a full scale basis for treatment of soils contaminated with VOCs, the complex and heterogeneous nature of the soils at the Site may render Alternatives SC-4 and SC-7 inappropriate for site remediation. Alternatives SC-5 and SC-6, which involve large scale excavation and backfilling operations, would be more difficult to implement than the in-situ remedies due to the volume of soil (about 60,000 cubic yards) required to be handled.

Alternative SC-5, excavation/low temperature thermal extraction/on-site redeposition, the preferred alternative, has been successfully pilot tested and has preformed on a full-scale basis with similar organic contaminants.

Alternatives SC-4, SC-5, SC-6, and SC-7 include the excavation and off-site treatment/disposal of PCB-contaminated soils and buried drums which would be relatively easy to implement.

E. Long-Term Effectiveness

Alternatives SC-1 and SC-2 do not include any removal, containment, or treatment of contaminated soils, and hence, the health risks present at the Site would remain. Alternative SC-2 would restrict site access and potential direct contact with contaminated soils. Installation of the cap under Alternative SC-3 would provide reduction of the residual risks of direct contact and of the leaching of contaminants to the groundwater. The preferred alternative, Alternative SC-5, as well as Alternatives SC-4, SC-6, and SC-7, include the treatment of contaminated soils. In Alternatives SC-5 and SC-6, no residual risks would remain, as the backfilled soils would be clean. In Alternative SC-4 and SC-7, some levels of contamination below action levels may remain in the soil. These calculated concentration levels are the levels whereby the leachate generated would be below MCLs. However, the effects of this residual contamination would be mitigated by the groundwater extraction and treatment alternative.

Alternatives SC-3, SC-4, SC-5, SC-6, and SC-7 incorporate proven engineering methods that are reliable for the control of leachate generation and protection of the groundwater.

The success of Alternatives SC-4 and SC-7 would be a function of the permeability of the vadose zone. Since the vadose zone is complex and heterogeneous in nature, these two alternatives may not result in the successful removal of the contaminants due to the possibility of preferential "flow" paths in some areas, and little or negligible flow in other areas.

All risks associated with the buried drums and PCB-contaminated soils in Alternatives SC-4, SC-5, SC-6, and SC-7 would be completely mitigated as these wastes would be properly treated and disposed of at approved Toxic Substances Control Act/RCRA facilities. The capping in Alternative SC-3 would only reduce the risks relating to the direct contact with PCB-contaminated soil and buried drums.

F. Short-Term Effectiveness

All alternatives, with the exception of Alternatives SC-1, SC-2, and SC-3, include activities such as excavation and off-site transport of contaminated soils for disposal that could result in potential exposure of residents to volatilized contaminants and contaminated dust. However, mitigative measures to reduce the probability of exposure would be implemented.

Alternatives SC-4 through SC-7 would result in worker exposure to volatilized contaminants and dermal contact with contaminated soils during waste excavation and handling. In addition, the preferred alternative, Alternative SC-5, might result in low-level emissions exposure from the on-site treatment unit. The threat to on-site workers and the community, however, would be mitigated through the

use of protective equipment by the on-site workers and control of emissions would be accomplished by emissions treatment. Additionally, scrubber wastewater would require removal and treatment prior to complete demobilization from the Site.

The groundwater and site use restrictions of Alternative SC-2 could be implemented within 6 months after start of construction. However, Alternative SC-2 would only reduce the potential risk associated with groundwater ingestion, and not directly address the continued leaching of contaminants. Alternative SC-3 could be completed within 6 months after start of construction, but would require more than 30 years for achieving remediation. Alternatives SC-4, SC-5, and SC-6 could be completed within 1 year after start of construction. Alternative SC-7 could be implemented within 3 months after start of construction, but would require 20 years to achieve remediation.

G. Cost

The total present worth cost for the preferred soil Alternative SC-5 is $19,416,000. The lowest cost alternative is Alternative SC-1 at $42,000. The highest cost alternative is Alternative SC-6 at $96,800,000. Alternatives SC-2, SC-3, SC-4, and SC-7 have total present worth costs of $462,000, $862,000, $7,887,000, and $1,076,000, respectively.

The total capital, annual operation and maintenance, and present worth costs in all soil alternatives are presented in Table 1 for comparison purposes.

GROUNDWATER

A. Overall Protection of Human Health and the Environment

Alternatives GW-1 and GW-2 would prevent exposure to groundwater contaminants by restricting its use as a potable water supply. Protection of the public would be dependent on the effectiveness of institutional controls on groundwater use.

In the long-term, the extraction and treatment options within Alternatives GW-3, GW-4, GW-5, and GW-6 would reduce contaminant levels in the groundwater to below MCLs, reduce non-carcinogenic risks to acceptable levels, and reduce cumulative carcinogenic risks to below 10^{-6}, thus protecting human health and the environment.

B. Compliance with ARARs

Alternatives GW-1 and GW-2 would not satisfy contaminant-specific ARARs, i.e., federal and state MCLS. The long-term monitoring and

groundwater use restrictions would meet location- and action-specific ARARs.

Groundwater treated through implementation of Alternatives GW-3, GW-4, or GW-6 is expected to meet surface water discharge requirements, achieve concentrations below MCLs, and meet risked-based action levels for chemicals of concern.

The ability of Alternative GW-5 to achieve the groundwater quality standards for organic contaminants is of a lower certainty as compared to those of Alternatives GW-3, GW-4 and GW-6 due to limited experience with the UV oxidation treatment process.

Alternative GW-4 would include air emission controls meeting the requirements of state and federal regulations should control be deemed necessary based on treatability study results.

C. Reduction of Toxicity, Mobility or Volume

Alternatives GW-1 and GW-2 would not reduce the toxicity, mobility, or volume of contaminants. Alternatives GW-3, GW-4, GW-5, and GW-6 would provide significant overall reduction in toxicity, mobility, and volume of the contaminants in the groundwater through the extraction and treatment of the groundwater.

D. Implementability

All of the alternatives are technically feasible, but differ in the complexity of implementation. All components of Alternatives GW-1 and GW-2 could be easily implemented.

The treatment technologies associated with Alternatives GW-3 and GW-4 employ reliable operations. All components (extraction, treatment and reinjection) of these two alternatives utilize relatively common construction equipment and materials and could be easily implemented. Additionally, the processes included in Alternatives GW-3 and GW-4 are proven and widely used methods of removing the contaminants of concern in the groundwater, and are readily available.

In contrast, the treatment technology in Alternative GW-5 (UV oxidation), although successful in pilot runs, has had limited full scale use to date. Therefore, site-specific pilot scale studies would be required to confirm its adequacy for the Site.

Furthermore, the UV oxidation units are currently available from two vendors nationwide, and the sludge units of Alternative GW-6 are available from one vendor who holds the patent.

E. Long-Term Effectiveness and Permanence

Alternatives GW-1 and GW-2 allow risks from the long-term migration of contaminants to continue. Alternative GW-2 includes monitoring to track the spread of contamination and instituting groundwater use restrictions to prevent potential exposure. Achievement of concentrations below MCLs and risk-based ARARs would be approached at a rate governed by natural attenuation.

Alternatives GW-3, GW-4, GW-5, and GW-6 would effectively reduce the potential risks associated with the contaminated groundwater by extracting and treating the contaminated groundwater, and returning the treated water to the aquifer.

F. Short-Term Effectiveness

Alternative GW-1 presents no additional short-term risks to workers or the community during implementation. Alternative GW-2 presents minimal short-term risks to workers during the sampling of the monitoring wells. The preferred alternative, Alternative GW-4, as well as Alternatives GW-3, GW-5, and GW-6 present short-term risks to workers and the community due to potential fugitive dust emissions during construction of the treatment plants, extraction systems, and associated piping. However, mitigative measures would be implemented to reduce the potential risk of exposure during remedial activities.

The annual sampling of monitoring wells and implementation of groundwater use restrictions that are contained in Alternative GW-2 could be implemented within 6 months. However, Alternative GW-2 would only reduce the potential for ingestion of groundwater and not directly address remediation of contaminated groundwater. The systems installed in Alternatives GW-3, GW-4, GW-5, and GW-6 would be operational within 18 months following the start of construction. The estimated time for aquifer restoration for all four alternatives is approximately 20 years.

G. Cost

The present worth cost for the preferred groundwater alternative, Alternative GW-4, is $9,934,000. The lowest cost alternative is Alternative GW-1 at $42,000. The highest cost alternative is Alternative GW-5 at $15,094,000. The present worth costs for Alternatives GW-2, GW-3, and GW-6 are $985,000, $14,279,000 and $5,739,000, respectively.

The total capital, annual operation and maintenance, and present worth costs for all groundwater alternatives are presented in Table 1 for comparison purposes.

State Acceptance

NYSDEC concurs with the preferred soil and groundwater alternatives.

Community Acceptance

Community acceptance of the preferred alternatives will be assessed in the ROD following a review of the pubic comments received on the RI/FS report and the Proposed Plan.

CONCLUSION

EPA believes that the preferred remedy described above is fully protective of human health and the environment, meets all the ARARs, offers the best balance among the evaluation criteria discussed above and satisfies the statutory preference for treatment as a principal element in remedy selection.

COMMUNITY ROLE IN SELECTION PROCESS

EPA and NYSDEC rely on public input to ensure that the concerns of the community are considered in selecting an effective remedy for each Superfund site.

To this end, the RI/FS report has been distributed to the public for a comment period which concludes on August 23, 1990. The Proposed Plan is being provided as a supplement to the RI/FS report and to inform the public of EPA's and NYSDEC's preferred remedy.

Pursuant to Section 117 (a) of CERCLA, a public meeting will be held during the comment period at the Lincklaen Town Hall, Chenango County, New York on August 13, 1990 at 7:30 p.m., to allow EPA to present the conclusions of the RI/FS, to further elaborate on the reasons for recommending the preferred remedy and to receive public comments. Written and oral comments will be documented in the Responsiveness Summary section of the subsequent ROD, the document which formalizes the selection of the remedy.

All written comments should be addressed to:

Lisa K. Wong, Project Manager
Western New York Remedial Action Section
U.S. Environmental Protection
Agency
26 Federal Plaza, Room 29-102
New York, N.Y. 10278

It is important to note that the remedy described above is the preferred remedy for the Site. The final selection will be documented in the ROD only after consideration of all comments on any of the remedial alternatives addressed in the Proposed Plan and the RI/FS report.

TABLE 1

COST ESTIMATE SUMMARY OF ALTERNATIVES

SOIL ALTERNATIVES		Capital	Annual O&M	Total Present Worth (30-yr, 5% discount rate)
SC-1:	No Action	$ 0	$ 15,000	$ 42,000
SC-2:	Limited Action	$ 54,000	$ 23,800	$ 462,000
SC-3:	Site Capping	$ 562,500	$ 16,800	$ 862,000
SC-4:	In-Situ Vapor Extraction	$ 7,887,000	$ 0	$ 7,887,000
SC-5:	Excavation/Low Temperature Thermal Extraction/On-site Redeposition	$19,416,000	$ 0	$19,416,000
SC-6:	Off-Site Incineration	$96,800,000	$ 0	$96,800,000
SC-7:	In-Situ Soil Flushing	$ 981,000	$ 6,200	$ 1,076,000
GROUNDWATER ALTERNATIVES				
GW-1:	No Action	$ 0	$ 15,000	$ 42,000
GW-2:	Limited Action	$ 48,000	$ 58,000	$ 985,000
GW-3:	Groundwater Extraction/ Chemical Precipitation/ Carbon Adsorption	$ 1,618,000	$821,000	$14,279,000
GW-4:	Groundwater Extraction/ Chemical Precipitation/ Air Stripping/Carbon Adsorption	$ 1,855,000	$523,000	$ 9,934,000
GW-5:	Groundwater Extraction/ Chemical Precipitation/ UV Oxidation	$ 3,138,000	$775,000	$15,094,000
GW-6:	Groundwater Extraction/ Chemical Precipitation/ Biological Treatment	$ 2,300,000	$220,000	$ 5,739,000

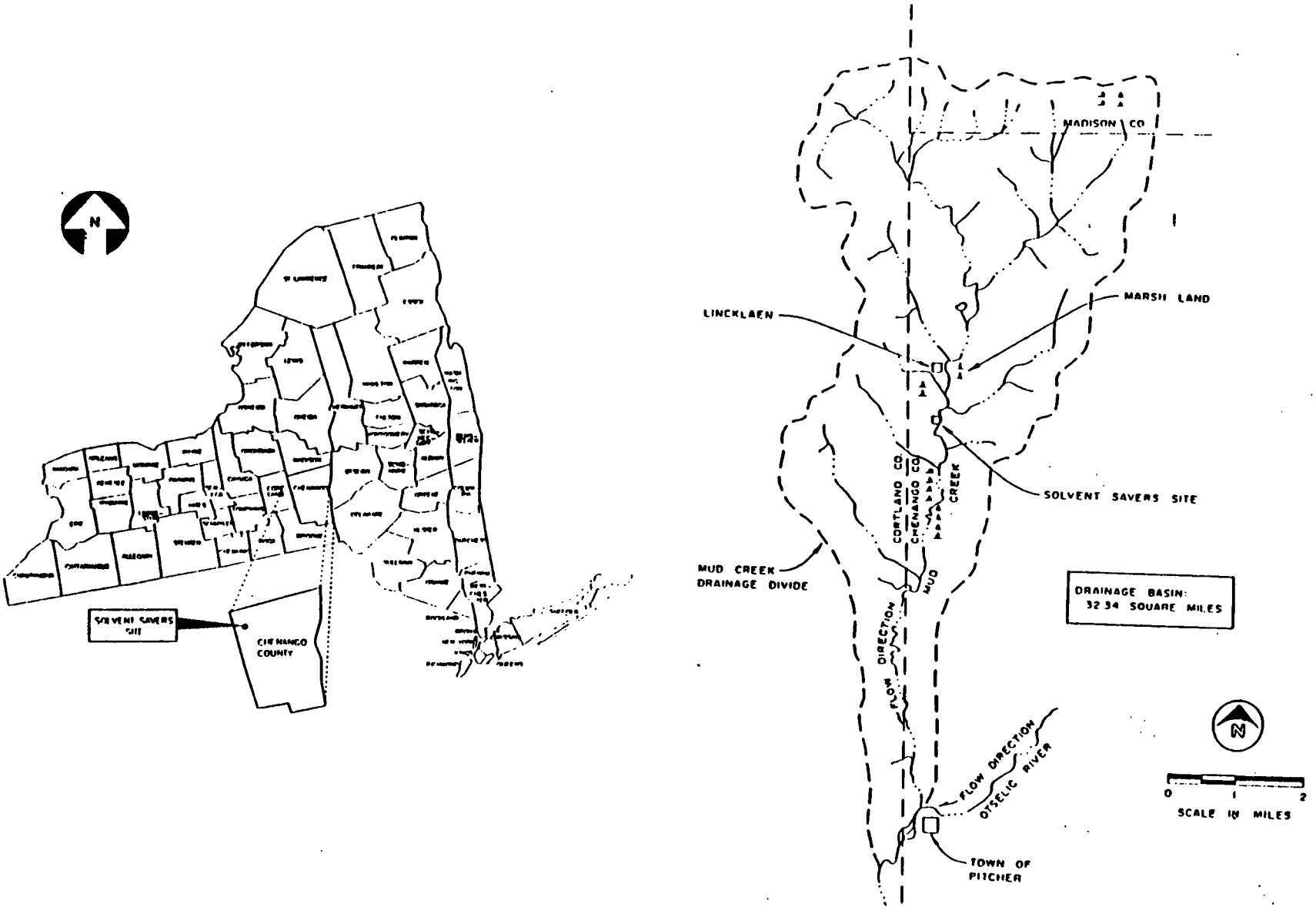


Figure 1

LOCATION MAP
SOLVENT SAVERS SITE
CHENANGO COUNTY, NEW YORK

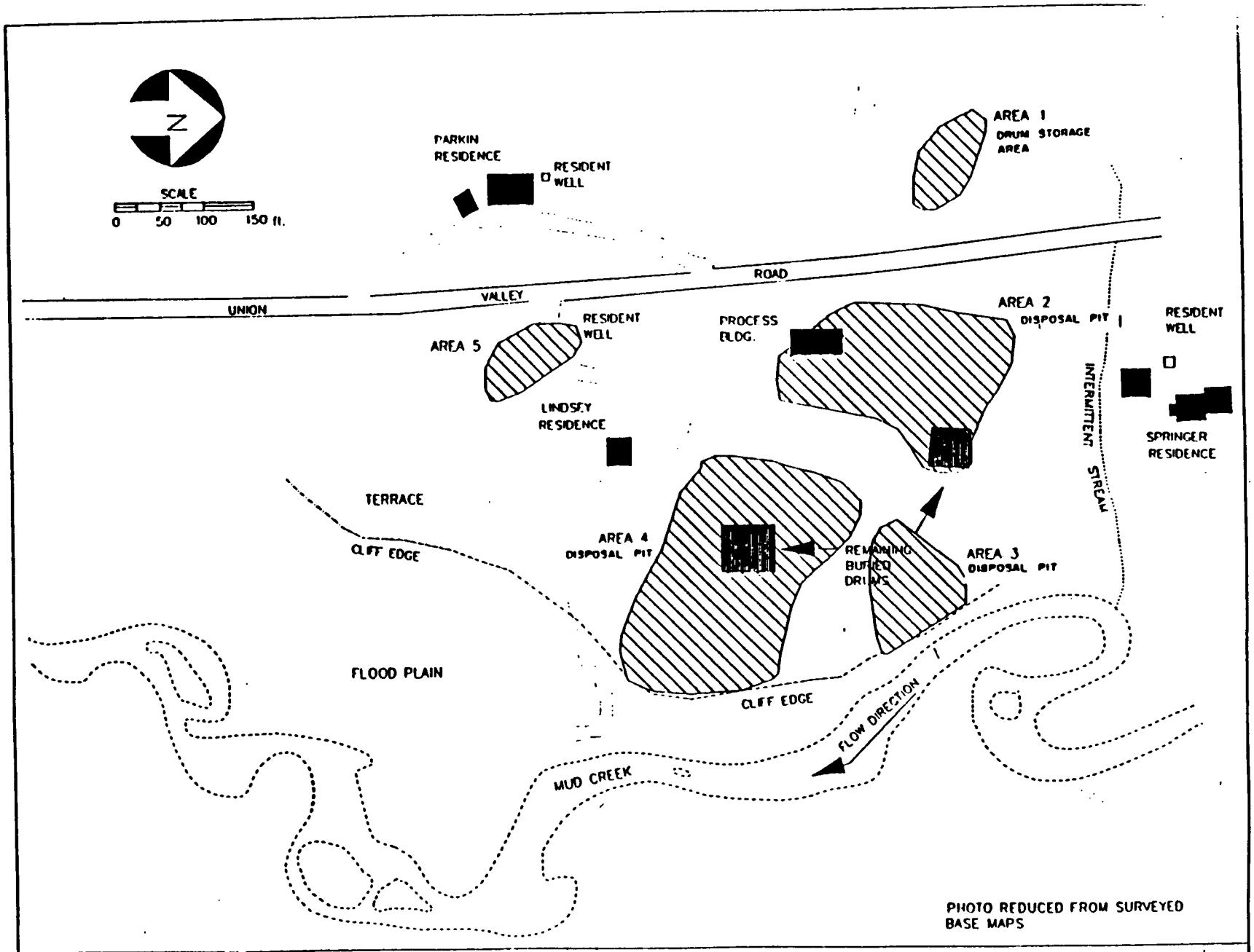


Figure 2
SOLVENT SAVERS SITE MAP
BOUNDARIES OF SOURCE AREAS

PUBLIC MEETING SIGN IN SHEET

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
PUBLIC MEETING
FOR
SOLVENT SAVERS SITE
LINCKLAEN, NEW YORK

AUGUST 13, 1980
ATTENDEES

(PLEASE PRINT)

NAME	STREET	CITY	ZIP	PHONE	REPRESENTING	MAILING LIST
Phyllis Marriol	Star Rt	DeRuyter, N.Y		852-9562		✓
[illegible]	[illegible]	[illegible]	13040	[illegible]	[illegible]	✓
Cortland Standard	110 Main St	Cortland NY		756 5665		✓ releases relating to contaminate movement of all pic
GENE SCHEPKER	RD 5 BOX 798	CORTLAND, N.Y	13045	607 756 5189		
A. Jones	24 East Main St	Norwich, N.Y.		(607) 334-[illegible]	[redacted]	✓ (also all releases relating to contaminate movement)
Robert J. Petty	HC-65 Box 572	DeRuyter, N.Y	13052	315-852-6249	Town of Lincklaen Councilmen	
Ronald Smith	7785 Co Rt 11	Pitcher NY	13136	607 863-3639		✓
James Foster	HC-65 Box 579	DeRuyter, N.Y.	13052	315-852-9950		
Richard A Rust	HC 65 Box 507	DeRuyter, N.Y.	13052	315-852-6411		

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
PUBLIC MEETING
FOR
SOLVENT SAVERS SITE
LINCKLAEN, NEW YORK

AUGUST 13, 1980
ATTENDEES

(PLEASE PRINT)

NAME	STREET	CITY	ZIP	PHONE	REPRESENTING	MAILING LIST
Lynott Jordan	Union Valley Rd	DeRuyter	13052	8537771	Self	yes

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NAME	STREET	CITY	ZIP	PHONE	REPRESENTING	MAILING LIST
Nan Leonard	Star Rt	Pitcher N.Y.	1332	8455760	my family	
Cee Dakin	Townline Rd	Cincinnatus		863-4250	-	
Sarah Elmendorf	Union Valley Rd.	Taylor, N.Y.		863-4573 (mp)	Cortland Co	
David E. Lee	P.O. Box -3	Norwich N.Y.		607 334-49		
Ken Sweet	Box 115	Plymouth N.Y.	13832	607-334-3036	CARD	yes
William Sweet	95 75	Union Vly. Rd Pitcher, N.Y.		852-95	yes	
TINA KIERNAN	HC65	Box 564	LINCKLAEN	-		YES
Patti Michael	RD 2	Cincinnatus NY	13040	607-863-4295	I want executive summaries	yes
Jed Michael						

Changed North
Linckland
DOWNY CARD

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NAME	STREET	CITY	ZIP	PHONE	REPRESENTING	MAILING LIST
Henri M Hamel	677 S. Salina St.	Syracuse	13202	315 426-7612	NYS DoH	
Tom Suozzo		Franklin NY	13775	607 773-7763	NYSDEC	
Earl Huntley		S. Otselic N.Y.	13155	315 653 7719		
GEORGE R. DUGAN		HOMER. NY.	13077	(607) 749 2162		
RICHARD A. RUGGIERO	43 HALE ST	NORWICH NY	13815	(607) 334 2218	WCHN/WKXZ RADIO	
A JONES						
[illegible] Brown		Lincklaen N.Y.		(315) 853-7773		
Susan B. Huffer	Star Rt, Box 5030	So. Plymouth, N.Y.	13844	607-[illegible]	Chenango NAAC CARD[illegible]	yes
[illegible]	RD1	McGraw	13101	–		NO
Robert & Linda Springer		Lincklaen				

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Tom Suozzo		Franklin NY	13775	607 773-7763	NYSDEC	
Earl Huntley		S. Otselic N.Y.	13155	315 653 7719		
GEORGE R. DUGAN		HOMER NY	13077	(607) 749-2[illegible]		
RICHARD A. RUGGIERO					WCHN/WKYZ RADIO	
A JONES	13 HALE ST	NORWICH NY	13815	(607) 334 2218		
[illegible] Brown		Lincklaen N.Y.		(315) 855-7773		
Susan B Huffer	Star Rt, Box 5030	So. Plymouth, NY	13844	607-[illegible]	Chenango North CACDI	yes
[illegible]	RD1	McGraw	13101			no
Robert & [illegible] Springer		Lincklaen				

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NAME	STREET	CITY	ZIP	PHONE	REPRESENTING	MAILING LIST
Carmelee Loomis		DeRuyter	13052	852-6227		
Lynn Olcott		Norwich	13815	336-9309	Health Dept	
Gene Skinner		Norwich			Chn Co EMC	
Dean Lord		Lincklaen	13052	852-6250		
Elizabeth Morris		Pitcher (Unadilla Valley)	13136	852-6141		
~~Harriet~~ Harriet L. Slamp		4713 Unadilla Valley/Linck Rd, Pitcher, NY	13156	852-6141		
Constance Staley		Lincklaen Ct Rd. DeRuyter NY	13052			
William J. Staley		Lincklaen Ctr Rd DeRuyter NY	13052			
Bill McCurry		Stage Road South Otselic	13155			
Stephen Wrightington		Stage Rd So Otselic NY	13155			

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Carmelita Lannis		DeRuyter	13052	852-6227		
Lynn Okolt		Norwich	13815	336-9309	Health Dept	
Doris Skinner		Norwich			Chen Co EMC	
Dean Ford		Lincklaen	13052	852-6250		
Elizabeth Morris		Pitcher (Union Valley)	13136	852-6141		
~~Harriet~~ Harriet L. Slamp		4715 Un Val/Linck Rd, Pitcher, NY	13156	852-6141		
Constance Staley	Lincklaen Ct. Rd.	DeRuyter NY	13052			
William J. Staley	Lincklaen Ct. Rd.	DeRuyter NY	13052			
Bill McCurry	Stage Road	South Otselic	13155			
Stephen Wrightington	Stage Rd	So Otselic	NY	13155		

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