DECLARATION STATEMENT - RECORD OF DECISION

Dover Electronics Inactive Hazardous Waste Site
Kirkwood (T), Broome County, New York
Site No. 7-04-026

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Dover Electronics class 2 inactive hazardous waste disposal site which was chosen in accordance with the New York State Environmental Conservation Law. The remedial program selected is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300).

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Dover Electronics inactive hazardous waste site and upon public input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened release of hazardous waste constituents from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and the environment.

Description of Selected Remedy

Based on the results of the Remedial Investigation/Feasibility Study (RI/FS) for the Dover Electronics site and the criteria identified for evaluation of alternatives, the NYSDEC has selected groundwater extraction and treatment, soil vapor extraction (SVE) for contaminated inaccessible soil under the building, and excavation/off-site disposal for contaminated accessible soil. The components of the remedy are as follows:

- Installation of a soil vapor extraction (SVE) system, to address the contaminated inaccessible subsurface soils under the rear of the building.

- The storm water piping system that originates in the building's front roof drains (eventually discharging from the CB-1537 outfall located west of the west corner of the building) would be re-routed so that it would not travel through currently contaminated underground piping; the abandoned piping would then be used as a part of the SVE system.

- Installation of a ground water extraction/treatment system to address the on-site and off-site contaminated ground water.

- Excavation and off-site disposal (landfill and/or incineration) of the limited amount of contaminated, accessible subsurface and surface soil.

- During the early stages of the implementation of the remedy, supplemental in-situ groundwater treatment (in the area(s) where the highest concentrations are present) will be evaluated to determine if it will be a cost effective way to shorten the duration for the operation of the groundwater extraction/treatment system.

- The Department would seek to have property restrictions placed upon the site as long as residual contamination remains at the site that could create a significant threat to public health or the environment.

- Since the remedy results in hazardous waste remaining at the site, for at least the term of the implementation of the remedy, an operation & maintenance (for the active components of the remedy) and a long-term monitoring program would be instituted.

New York State Department of Health Acceptance

The New York State Department of Health concurs with the remedy selected for this site as being protective of human health.

Declaration

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

3/30/2000
Date

Michael J. O'Toole, Jr., Director
Division of Environmental Remediation

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RECORD OF DECISION

Dover Electronics Site
Kirkwood (T), Broome County
Site No.7-04-026

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) has selected this remedy to address the significant threat to human health and/or the environment created by the presence of hazardous waste at the Dover Electronics class 2 inactive hazardous waste site. As more fully described in Sections 3 and 4 of this document, past handling practices have resulted in the disposal of hazardous wastes, including tetrachloroethene (also known as perchloroethylene or PCE). Over time, some of the PCE has undergone natural degradation which has resulted in the presence of trichloroethene (TCE) and dichloroethene (DCE) in the environment. Some of the contamination present at the site has migrated in the ground water from the site to a limited area located immediately southwest of the site (the surface of this area is currently covered by a parking lot). These disposal activities have resulted in the following significant threats to the public health and/or the environment:

- A significant threat to human health associated with disturbance/regrading/ excavation in areas where contamination is present which would create the potential for exposure to contaminated soil, ground water, and/or vapors.

- A significant environmental threat exists since the site is acting as a continuing source of contamination to the off-site ground water due to the presence of soil contamination.

In order to eliminate or mitigate the significant threats to the public health and/or the environment that the hazardous waste at the Dover Electronics site has caused, the following remedy was selected:

- Soil vapor extraction (SVE) to address the contaminated inaccessible subsurface soils located below the on-site building;

- Abandonment and re-routing of the roof drain system located in the front of the building;

- Ground water extraction and treatment (current treatment proposal is via an air stripper, but this treatment option may be modified in design) to address contaminated ground water plume, both on site and off site; this would include an evaluation, early in the design phase of the program, of more aggressive actions in the secondary source area west of the west corner of the on-site building (i.e., SVE or a ground water extraction point or dual phase extraction);

- Excavation and off-site disposal of the limited amount of contaminated soils that are located outside of the footprint of the on-site building and thus, are accessible for excavation;

- During the early stages of the implementation of the remedy, supplemental in-situ groundwater treatment (in the area(s) where the highest concentrations are present) will be evaluated to determine if it will be a cost effective way to shorten the duration for the operation of the groundwater extraction/treatment system;

- The Department would seek to have deed restrictions placed upon the property as long as residual contamination remains at the site; and

- Since the remedy results in hazardous waste remaining at the site, for at least the term of the implementation of the remedy, an operation & maintenance (for the active components of the remedy) and a long-term monitoring program would be instituted.

The selected remedy, discussed in detail in Section 8 of this document, is intended to attain the remediation goals selected for this site in Section 6 of this Record of Decision (ROD), in conformity with applicable standards, criteria, and guidance (SCGs).

SECTION 2: SITE LOCATION AND DESCRIPTION

The Dover Electronics site (Site No. 7-04-026) is located just south of exit 3 of Interstate Route 81, across Colesville Road, at 29 Industrial Park Road in the Town of Kirkwood, Broome County (see Figure 1). The site property is approximately 9 ½ acres in size and is located in an industrial/commercial area at the western end of the Kirkwood Industrial Park.

The property consists of an industrial building and historically had areas outside and inside that stored drums and chemicals. The original building was constructed in 1973, and subsequent additions were built in 1978, 1982, and 1983.

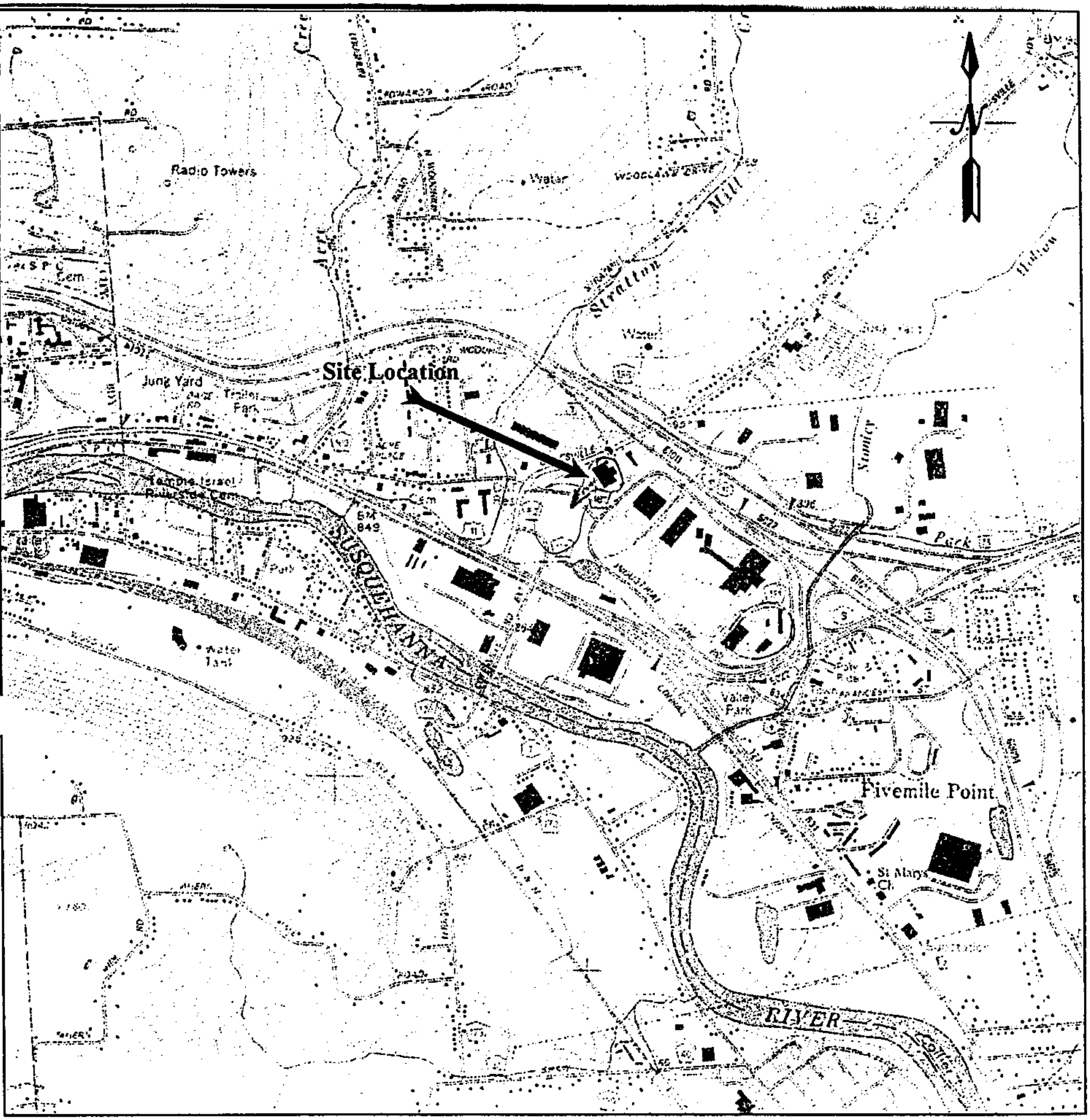
The property is rectangular in shape and is oriented in a southwest-to-northeast direction. The site elevation ranges from approximately 860 to 926 feet above Mean Sea Level. The on-site building is located on a relatively flat area on the northeast side of the property. From the building to the southwest edge of the property (at Industrial Park Drive) the topography dips steeply; from Industrial Park Drive to the Susquehanna River, located approximately 2/3 of a mile southwest of the site, the topography is relatively flat.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The site has been occupied by Universal Plastics and Dover Electronics (Division of Dover). In 1993, Dover Electronics separated from Dover as a stand-alone corporation and was renamed Dovatron, Inc. In 1995, Dovatron, Inc. transferred its title to the facility to Universal Instruments. In 1996, Dovatron, Inc. changed its name to the DII Group. The site currently serves as the corporate headquarters for Universal Instruments. The facility has been used as an electronic circuit board manufacturing company and has reportedly been in operation since its construction in 1973.

The property consists of an industrial building and historically had areas outside and inside that stored drums and chemicals. The original building was constructed in 1973, and subsequent additions were built in 1978, 1982, and 1983.



SOURCE: USGS Topographic Quadrangle Map
Binghamton East, New York
1994 Digital Edition

0 1,000' 2,000'
scale

DATE: 8/25/99	FIGURE 1	SHIELD
DRAWN BY: SCT	SITE LOCATION MAP	ENVIRONMENTAL ASSOCIATES, INC
APPROVED BY: KD	DOVER ELECTRONICS SITE	
CLIENT NO.: 395-0430	KIRKWOOD, NEW YORK	LEXINGTON, KENTUCKY

50430 SCT / KD

Previous on-site circuit board manufacturing processes used tetrachloroethene (PCE) as a cleaning solvent. Originally, the virgin PCE was stored in 55-gallon drums at an outer drum storage area. During the initial facility expansion, a ramp to the east side overhead door served as the entry point for PCE drums. As production increased and the facility was again expanded, virgin PCE was stored in a 3,000-gallon aboveground storage tank. A 5,000-gallon "used PCE" aboveground flux storage tank was also on site. A 10,000-gallon fuel oil tank (see Figure 2 for locations of the former tanks) was reportedly removed from the site in March 1992, and the aboveground PCE system was dismantled in March 1993. Reportedly, two 480-gallon PCE tanks were dismantled and removed from the building interior at that time. As the result of the historical handling and use of PCE, the presence of soil, storm water, and ground water contamination has been documented at this site.

3.2: Remedial History

Throughout the 1990s, several environmental consultants have conducted environmental investigations at the Kirkwood facility (prior to the PRP entering into Consent Order with NYSDEC). These investigations have been conducted by Hagopian Engineering Associates (Hagopian), Stetson-Harza, and Harza Northeast from 1990 to 1995. The current environmental consultant to the PRP (Shield Environmental Associates) has been involved at this site since 1996.

Phase I Investigation (Hagopian-10/90)

This investigation is documented in the report entitled *Environmental site Investigation for Dover Electronics Company*. Soil samples collected near the former PCE tanks and drum storage shed contained elevated chemical concentrations. A subsurface soil sample, collected near the fuel oil tank, showed no detectable concentrations of petroleum products using a flame ionization detector (FID).

Phase II Investigation (Hagopian-1991)

This investigation consisted of soil gas sampling, ground water monitoring well installation and sampling (MW1), storm water sampling (catch basin), and subsurface soil borings.

1992-1995 Investigation (Stetson-Harza)

This investigation consisted of advancing additional borings, converting two of these borings into monitoring wells (MW-2 and MW-3), and the collection of soil and ground water samples.

Based upon the previous site investigations, a ground water treatment system was recommended.

Harza Northeast - Ground Water IRM

The aboveground PCE tank system was dismantled in March 1993, and two ground water recovery wells (RW-1 and RW-2) were installed near the former PCE tanks in April 1993 (approximately 58 feet below the ground surface) as an interim remedial measure (IRM); it became operational on August 17, 1994. Due to various operational problems the system was not operational from 11/94 to 5/95, and again from 7/95 to 10/95. The maximum amount of ground water treated in one day was 90 gallons, with an average of approximately 30 gallons per day.

Shield Investigations

Shield Environmental Associates (Shield) has undertaken a series of site investigations since 1996. These investigations were summarized in the report, submitted to NYSDEC, entitled *Baseline Summary Report and Baseline Summary Report Addendum*.

The following is a summary of field work/sampling performed by Shield at the site prior to the initiation of the RI/FS:

2/96 Soil Gas Survey - A soil gas survey was conducted around the building perimeter and inside the rear addition to the building. The rear addition is reportedly where PCE processes were located.

4/96 Geoprobe® Soil Sampling Event - Soil samples were collected, using a Geoprobe® system, in the rear addition (north side) and in the area of the former aboveground tank.

6/96 Split Spoon Soil Sampling Event - Five borings were advanced/sampled to depths between 27 and 44 feet. A sixth soil boring was advanced to a depth of 82 feet and completed as a ground water monitoring well (MW-4).

10/96 Soil Sampling & Monitoring Well Installation - Six ground water monitoring wells (MW-5 through MW-10) were installed.

10/97 Soil Sampling & Monitoring Well Installation - During the installation of monitoring wells MW-11, MW-12, and RW-4 subsurface soil samples were collected and sent for laboratory analysis.

8/96 Geoprobe® Water Sampling Event - To define the lateral extent of ground water contamination downgradient of the suspected source area, water samples were collected from Geoprobe® borings along the southern edge of the facility's property line.

8/97 Installation of RW-3 - Recovery well RW-3 (screened from 15-35 feet) was installed adjacent to MW-7 as part of an IRM ground water treatment system (PCE concentration levels in MW-7 have consistently been elevated).

1/98 MW-14 Installation - This well was constructed to monitor source area ground water in the sorted sediments below the glacial till (relatively deep with the monitored zone at approximately 60-70 feet below ground surface).

Storm Drains/Catch Basins

Water and soil samples from the North Catch Basin (NCB) CB-2044 and the Northeast Catch Basin (NECB) CB-1846 have historically had elevated PCE concentrations.

6/96 Storm Water Sampling Event

In June 1996 storm water samples were collected from the NCB (CB-2044) and its outfall. The analytical results from the samples indicated elevated PCE concentrations at the catch basin and the outfall.

7/96 Storm water and Catch Basin Sampling

Sediment samples were collected from the NCB (CB-2044) and from the NECB (CB-1846) outfall. The analytical results indicated elevated PCE concentrations in the NCB (CB-2044) sediments.

7/96 Storm Basin Water & Sediment Removal

Based upon the July 1996 analytical results for sediment samples from the NCB (CB-2044), the NCB (CB-2044) was cleaned and the material disposed of off site as hazardous waste.

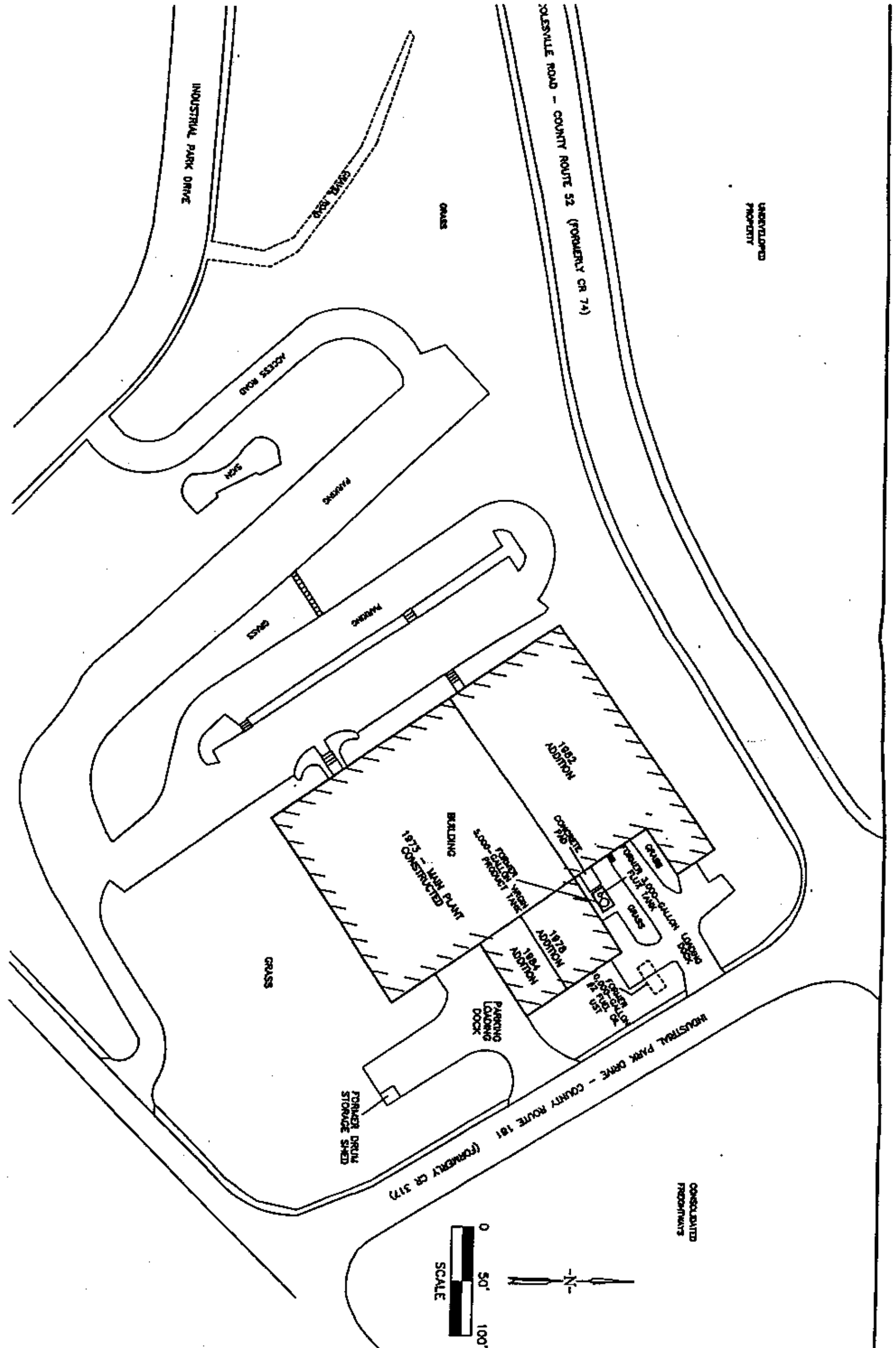


FIGURE 2

SURROUNDING PROPERTIES, BUILDING ADDITIONS, AND HISTORICAL SITE FEATURES
DOVER ELECTRONICS SITE
KIRKWOOD, NEW YORK

SHIELD
ENVIRONMENTAL ASSOCIATES, INC.
LEXINGTON, KENTUCKY

11/96 Basin Water/Sediment Removal and Sampling

Based on a sediment sample, collected from the NECB in October 1996, the NECB was cleaned and the sediment was transported to an off-site facility for incineration.

8/97 Storm water Basin Water/Sediment Removal

Post-cleaning samples were collected from NCB and NECB. Based upon these results a second cleaning of the NCB (CB-2044) was conducted during the week of August 11, 1997. The sediments were profiled as hazardous waste and transported to an off-site facility for incineration.

8/97 Storm water Catch Basin Repair

During the NCB (CB-2044) and NECB (CB-1846) sediments removal, water was observed entering the basins from below the influent pipes.

On August 13, 1997, the area around the basins was excavated and a 2-foot-thick concrete seal was poured around each pipe to keep ground water from entering the basins from around the pipes. At this time it was discovered that the NCB influent pipe was encased in concrete under the pavement area. The section of the pipe encased in concrete was removed and replaced. The sand bedding and visually affected soil were removed from the piping trench. A 20-foot section of the existing pipe was also replaced.

9/97 Storm Water Basin Sampling

After the concrete seals were installed additional water samples were collected from the NCB (CB-2044) and NECB (CB-1846) on 9/25/97; elevated PCE levels were detected in the NCB, and low PCE levels were detected in the NECB.

The annular space around the influent and effluent piping to the NCB and NECB was sealed, and both basins were cleaned. Water samples were collected and detectable PCE levels remained in water samples from both catch basins.

12/97 Storm water Basin Replacement

During the week of 12/15/97, a new catch basin and piping were installed in the NCB (CB-2044). The new catch basin was equipped with rubber gaskets at the piping/catch basin junction to prevent infiltration.

During replacement activities, personnel noted the old connection between the piping under the building slab and the new piping starting at building wall (leading to the NCB) was not sealed. A new coupling was installed to prevent infiltration.

During the old storm water piping excavation (from the Universal building to the NCB), elevated PID readings were reported at the building perimeter excavation.

After the old catch basin was removed, the material in the excavation was noted to be affected by VOC contamination (visual evidence). A sample of the material indicated the presence of PCE at a concentration of 58,000 ppm. The material was excavated and disposed of at an off-site facility, along with the material excavated next to the footer and piping excavation. The excavation activities continued until all of the visible contamination was removed. The excavation was backfilled with gravel, and the new catch basin was installed.

A water sample from the open excavation (present in the excavation as the result of ground water infiltration) indicated a concentration of 1,200 ppm of PCE. The liquid in the excavation was pumped out and transferred to the on-site water treatment system.

SECTION 4: SITE CONTAMINATION

To evaluate the contamination present at the site and to identify alternatives to address the significant threat to human health and the environment posed by the presence of hazardous waste, the PRP has recently conducted a Remedial Investigation/Feasibility Study (RI/FS).

4.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site.

The RI field work was initiated in October 1998. Based on the results of ground water samples collected from newly installed monitoring wells, additional monitoring wells were installed and sampled until the vertical and horizontal extent of the ground water contamination was defined (the last monitoring well installations were completed in April 1999). The February 2000 Remedial Investigation Report has been prepared which describes the field activities and findings of the RI in detail.

The RI included the following activities:

- Test pits were excavated around the site to evaluate the possibility for man-made conduits (i.e., storm drains, water lines) to be acting as preferential pathways for the migration of contamination.
- Soil borings were advanced in order to collect subsurface soil samples in potential source areas which had not yet been characterized prior to the RI.
- Monitoring wells were installed to define the extent of the ground water contamination.
- Storm water and ditch soil samples were collected from the storm water drainage system around the site.
- Indoor samples were taken in the rear of the building, adjacent to the source areas that exist in the subsurface.

To determine which media (soil, ground water, etc.) contain contamination at levels of concern, the RI analytical data was compared to environmental Standards, Criteria, and Guidance values (SCGs). Ground water SCGs identified for the Dover Electronics site are based on NYSDEC Ambient Water Quality Standards and Guidance Values. Water quality data from storm water ditches and catch basins are also compared with the ground water standards. For soils, NYSDEC TAGM 4046 provides soil cleanup guidelines for the protection of ground water, background conditions, and health-based exposure scenarios. Since the contaminated solids in the drainage ditches and catch basins are not true sediments (i.e., they are not associated with streams, ponds, lakes or other water bodies with ecological significance), the concentration of contaminants in these solids are compared with the soil guidelines in TAGM 4046.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain areas and media of the site require remediation. These are summarized below. More complete information can be found in the RI Report.

Chemical concentrations are reported in parts per billion (ppb) and parts per million (ppm). For comparison purposes, where applicable, SCGs are provided for each medium.

4.1.1: Site Geology and Hydrogeology

Geology

The shallowest soils at the site consist of a brown, poorly sorted (contains various particle sizes), weathered, glacial till unit that ranges in thickness from approximately 10 to 25 feet. The weathered till layer contains a mixture of clays, silts, sands, gravels and cobbles. The weathered till is brown in color and is fractured/cracked. These fractures are poorly to moderately connected and act as pathways and/or pockets for water and contaminants.

Below the weathered brown glacial till lies the unweathered till that ranges in thickness from less than 20 feet (south of the site) to greater than 80 (north of the site). This unit is similar to the weathered till and consists of a mix of clay, silt, sand, gravel and cobbles. However, the unweathered till differs from the weathered till in color and fracturing. Specifically, its color grades from light brown to olive-gray, and it is generally less fractured than the weathered till. The contact between the weathered and unweathered tills is not a distinct line between the units, but rather a gradual transition.

During drilling operations, lenses of silty clay and clayey silt were identified in the unweathered till. The unweathered till contained a small percentage of gravels (5 to 15 percent). The discrete lenses of fine silt and clay may be zones that inhibit the flow of ground water.

Also in the unweathered till are layers or lenses of sedimentary deposits (i.e., sand). The thicknesses of these deposits vary, but most are thin. The soils in these lenses are unconsolidated and typically consist of sorted clay, silt, and fine- to medium-grained sand. The frequency of the lenses is generally greater with deeper elevations. Consolidated bedrock was not encountered in any of the borings drilled at the site (wells were installed to depths of 70-75 feet).

Hydrogeology

The main regional aquifer in the area is the Five-Mile Point aquifer. The aquifer is in the general area of the site and is used as a potable water supply. However, the limit of the ground water contamination on site and off site has been defined, and is not currently impacting the Five-Mile Point aquifer.

The shallow ground water underlying the site is flowing through two water-bearing units: a glacial till ground water unit and a ground water unit in the glaciolacustrine (glacial lake deposits) or glaciofluvial (glacial stream deposited) sediments, located below the till. The non-till deposits generally consist of layers of similar sized particles and can transmit more water.

Ground water is recharged from percolating storm water. The water filters through the weathered brown till and is bound in the unweathered, olive-gray till or uses a sorted lens deposit to migrate horizontally.

Also, the weathered till in the southern portion of the site that is in the zone of saturation is more conductive than the unweathered till.

The static water level in the till varies from approximately 40 feet below the ground surface at the northern portion of the site to 1 to 3 feet below the ground surface at the southeastern corner of the site (the ground surface elevation is significantly higher in the northern area of the site). The wells installed in the till water-bearing zone are generally slow to recharge. Based on data collected to date, seasonal water level fluctuations are up to 4 feet. However, water level fluctuations are not consistent across the site from well to well.

Currently, the unweathered glacial till unit is believed to be a semiconfining aquitard (ground water does not move through it very easily). The ground water in the glaciolacustrine or glaciofluvial deposits has different characteristics from the ground water in the glacial till and does not appear to have a direct hydraulic connection with the overlying till.

During the RI, aquifer pumping tests were performed to determine characteristics such as approximate hydraulic conductivity, transmissivity, and the degree of "connectedness" between the aquifers. Generally, the results indicate that the on-site aquifer has relatively low conductivity (e.g., 10^{-5} to 10^{-6} cm/sec) while the off-site (downgradient) areas transmit water more easily (e.g., 10^{-3} to 10^{-5} cm/sec). The implication of these results is that collecting ground water on site would be more effective using a long collection trench whereas off-site ground water could be collected efficiently using recovery wells.

No test data are currently available regarding the ability of the unsaturated soil under the building to transmit soil vapor. This is relevant to the evaluation of soil vapor extraction as a possible remedial technology for contaminated soils as discussed below. It is likely, however, that the construction of the building resulted in the reworking of these soils such that they would be amenable to soil vapor extraction. This assumption needs to be tested in an actual vapor recovery test.

<u>Surface Water Hydrology</u>

No surface water features (e.g., ponds, streams and springs) are on the subject site. The surface water runoff is collected through a series of catch basins, pipes, and open ditches. The catch basins consist of below ground concrete boxes with grates and curb inlets on the surface that allow water to enter the boxes. The water is transported from the catch basins below ground to outfalls where the water is discharged to the surface. Catch basins and pipes are used to collect storm water runoff from paved areas and the roof of the building at the site.

The water discharged from the outfalls and the runoff from the grassy areas are collected in an open ditch around the site perimeter. The water collected in the perimeter ditch is discharged off the site through two culverts. The water collected from the northwest side of the site is discharged through a culvert pipe under Industrial Park Drive at the west end of the site. The water is then transported 0.7 miles in a ditch along Route 52 (Colesville Road) and discharged to the Susquehanna River. The water collected from the southwest portion of the site is discharged through a culvert pipe under Industrial Park Drive at the southern end of the site. The water is then transported to the south approximately 300 to 500 feet along Industrial Park Drive to a wetland. No impacts to off-site surface water have been found.

4.1.2: Nature of Contamination

As described in the RI report, many soil, ground water, storm water, and ditch/catch basin soil samples were collected at the site (storm water and ditch/catch basin soil samples were taken from the storm drains/perimeter drainage system on and around the site) to characterize the nature and extent of contamination. The main categories of contaminants which exceed their SCGs are volatile organic compounds (VOCs).

Nickel and zinc were found in soils at slightly elevated concentrations, relative to the guidelines established in Technical and Administrative Guidance Memorandum (TAGM) 4046 (see Table 1). TAGM 4046 recommends soil cleanup objectives for metals based on average background concentrations for this area of the country OR indicating site background as the objective. VOCs were the primary contaminant class of concern at this site, so metals background concentrations were not established. The metals concentrations detected were slightly and consistently elevated, indicating that the local background may be somewhat higher than the average regional background. Since the data indicates that metals do not present a significant threat to human health or the environment at this site, the remedial alternatives described below do not address metals.

4.1.3: Extent of Contamination

Table 1 summarizes the extent of contamination for the contaminants of concern in the soil, ground water, storm water, and ditch/catch basin soil (storm water and ditch soil samples were taken from the storm drains/perimeter drainage system on and around the site) and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil

Samples were taken from subsurface soils across the site during the test trench installations (see Figure 3), as well as from the surface down to the depth of the boring/well using a drill rig during the installation of monitoring wells. Contaminant concentrations in the subsurface soil exceeded SCG levels in the following areas:

- in the rear, near the north corner of the building, adjacent to the north catch basin (CB-2044), as well as below the grassy area next to the loading dock; tetrachloroethene (PCE) was detected at a concentration of 400 ppm at MW-23 at a depth of 5-7 feet, 2300 ppm at SB-12 at a depth of 0-2 feet, and 50 ppm at SB-15 at a depth of 6-8 feet [compared to the SCG of 1.4 ppm].

- next to the building near the northeast catch basin (CB-1846); two samples were taken from trench 11, with PCE concentrations of 17,000 and 38,000 ppm.

- under the pavement, approximately 75 feet east of the east corner of the building; PCE was detected at a concentration of 3800 ppm at a depth of 0-2 feet below the pavement.

- adjacent to the water line lateral to the building, approximately 75 feet northeast of the northeast catch basin; PCE was detected at a concentration of 140 ppm in trench 8.

- in the perimeter ditch at the outfall of the northeast catch basin, approximately 75 feet east of the northeast catch basin; PCE was detected at a concentration of 350 ppm and trichloroethene (TCE) was detected at a concentration of 1.4 ppm in trench 18 [compared to the SCGs of 1.4 ppm and 0.7 ppm, respectively].

- in the front area of the building, near the stairs for the employee entrance, adjacent to what appears to be an old footer drain for the building; PCE was detected at a concentration of 4000 ppm in trench 1.

- NOTE: Soil samples were taken below the floor of the rear addition of the building (between the north and the east corners of the building) by Shield Environmental in April 1996, prior to the initiation of the "formal" RI/FS (that is, prior to the execution of the Consent Order to perform the RI/FS). Those samples indicated significant soil contamination present in this area; eight samples were collected with a range of concentrations from ND (5 ppb) - 2,700,000 ppb [three of the samples had concentrations greater than 50,000 ppb]. The areas outside of the building with soils known to contain significant contamination are "accessible," that is, the soils could be removed without excessive difficulty.

Drainage System Soils

[See Figure 4 for soil/water sample locations]

Many of the "sediment" samples that were taken were from catch basins that are present in the on-site storm water drainage system.

PCE was detected in the northeast catch basin (CB-1846) at a concentration of 4.7 ppm. PCE, TCE, and 1,2-dichloroethene (1,2-DCE) were detected in CB-2077 (immediately north of the north corner of the building) at concentrations of 100 ppm, 4 ppm, and 13 ppm, respectively.

The on-site storm drainage system flows into a perimeter ditch with flow exiting the site at two points, at the west property line outfall (WPLO) and at the south property line outfall (SPLO). Ditch soil samples at these two locations did not indicate the presence of elevated concentrations of contamination.

Drainage System Water

Water found in site storm water drainage ditches and catch basins were sampled to determine if it is contaminated.

Elevated PCE concentrations were found in all of the samples collected from the on-site catch basins, with concentrations detected ranging from 3.2 ppb to 5900 ppb (compared to the SCG of 0.7 ppb). Elevated concentrations of TCE and 1,2-DCE were found in some of the samples collected from the on-site catch basins, with detected concentrations ranging from 7.1 ppb to 48 ppb (compared to the SCG of 5 ppb) and 9.3 ppb to 130 ppb (compared to the SCG of 5 ppb), respectively.

The on-site storm drainage system flows into a perimeter ditch with flow exiting the site at two points, at the west property line outfall (WPLO) and at the south property line outfall (SPLO). Storm water samples at these two locations did not indicate the presence of elevated concentrations of contamination. This is most likely due to the nature of VOCs to volatilize, or separate from the aqueous phase (in water) to the vapor phase (in the air) and/or from dilution due to the additional flow of clean storm water in the perimeter ditch.

Table 1
Nature and Extent of Contamination

MEDIUM	CATEGORY	CONTAMINANT OF CONCERN	CONCENTRATION RANGE (ppb)*	FREQUENCY of Detected Exceedances	SCG/ Bkgd. (ppb)
Ground Water	Volatile Organic Compounds (VOCs)	1,2-dichloroethene	ND(5) - 24	14/64	5
		trichloroethene	ND(5) - 18	13/64	5
		tetrachloroethene	ND(5) - 2700	33/64	5
		vinyl chloride	ND(10) - 2.2	1/64	2
	Metals	Manganese	1000 - 1200	3/3	300
Subsurface Soil	VOCs	trichloroethene	ND(5) - 1600	2/77	7700
		tetrachloroethene	ND(5) - 44,000,000	11/77	1400
	Metals*	Nickel	18.3-30.6	10/10	13 or SB**
		Zinc	56.6-128	10/10	20 or SB**
Storm Water	Volatile Organic Compounds (VOCs)	1,2-dichloroethene	ND(5) - 130	11/18	5
		trichloroethene	ND(5) - 48	9/18	5
		tetrachloroethene	ND(5) - 5,900	15/18	5
On-site Storm Drain-Catch Basin Soils	Volatile Organic Compounds (VOCs)	1,2-dichloroethene	ND(5) - 18,000	1/7	300***
		trichloroethene	ND(5) - 5,500	1/7	700***
		tetrachloroethene	1 - 140,000	2/7	1,400***

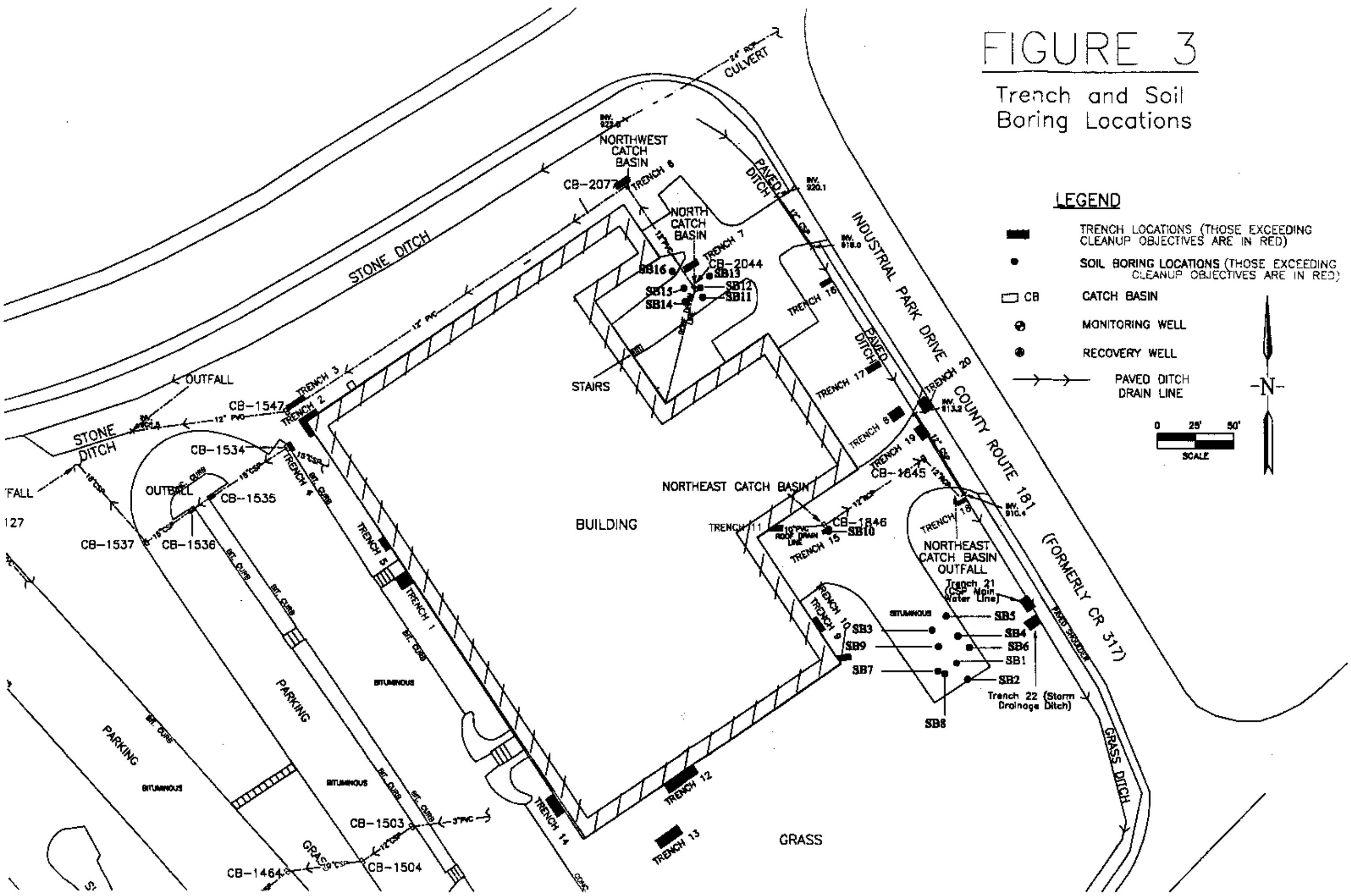
* Metals concentrations in soil are expressed in ppm

** SB=site background

*** TAGM 4046 soil cleanup objectives were used for on-site catch basin ditch/catch basin soil samples

FIGURE 3

Trench and Soil Boring Locations



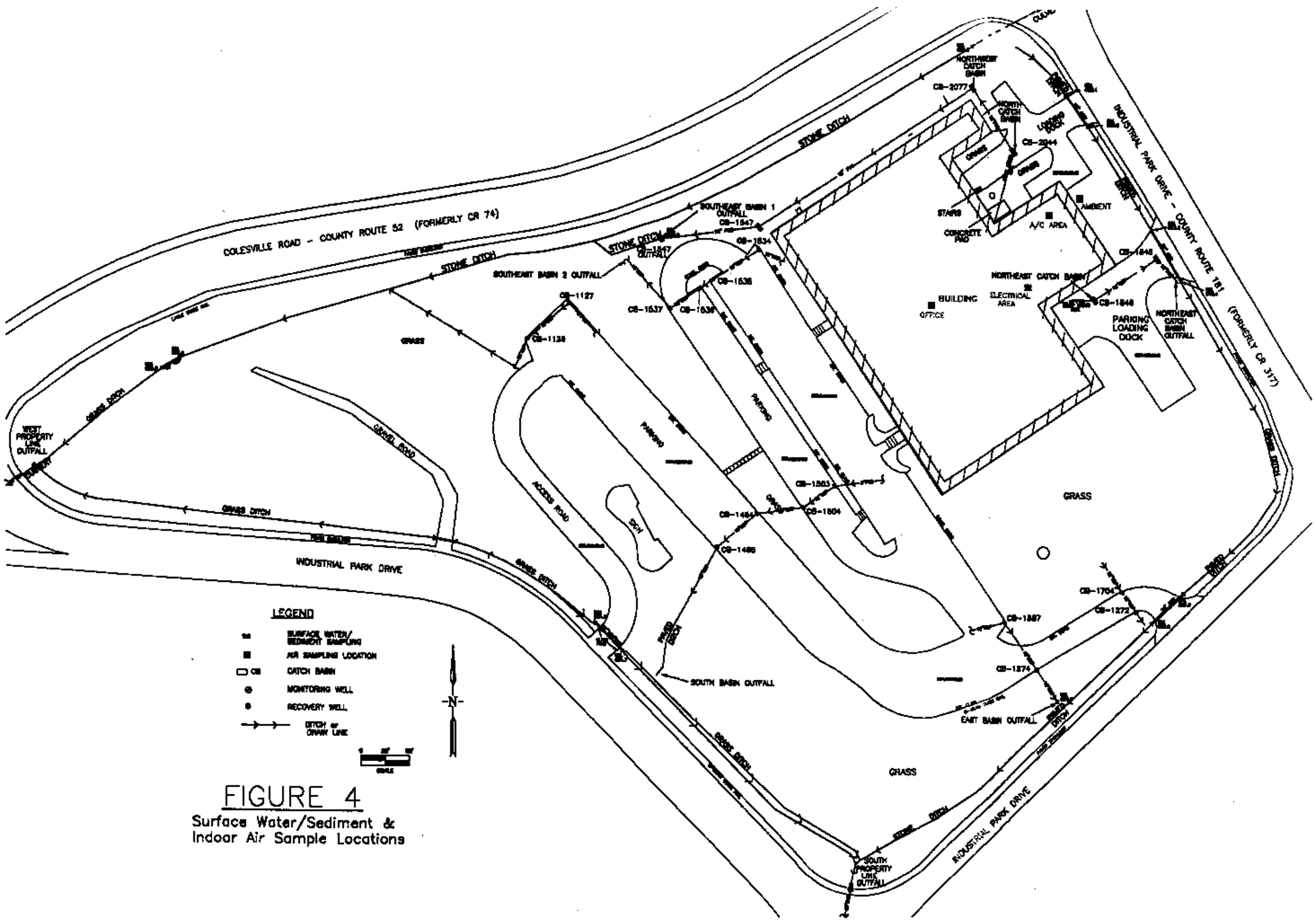


FIGURE 4

Surface Water/Sediment & Indoor Air Sample Locations

Ground Water

[See Figure 5 A/B] for monitoring well locations]

The concentrations of PCE in the ground water will be discussed below since PCE is the most significant contaminant found in the ground water at the site. However, in addition to PCE, elevated concentrations of TCE and 1,2-DCE were also found in ground water samples. In each well where contamination above standards was found, PCE was the predominant contaminant.

A large part of the ground water plume originates from the two outfalls: Catch Basin 1537 Outfall and Catch Basin 1547 Outfall (located near Colesville Road, just west of the west corner of the building). This assumption is supported by analysis of water samples collected from MW24. The latest analytical results from MW24 reported a PCE concentration of 2700 ppb (compared to an SCG of 5 ppb). This is one of the most concentrated PCE levels reported in any ground water well sample analyzed from the site.

The lateral extent of ground water contamination has been defined, as shown on Figure 6.

The vertical extent of contamination has been defined by three wells: MW22 (located at the downgradient edge of the property and screened from 17 to 22 feet below the ground surface), MW34 (located off-site and screened from 53 to 58 feet), and MW-35 (located downgradient of MW-34 and screened from 32 to 37 feet).

The ground water gradient mimics the topography at the site. There is a steep gradient at the point of the catch basin outfall discharge points. The gradient then decreases and becomes relatively low to the south-southwest, across Industrial Park Drive. The VOC concentrations in the ground water are relatively high near the storm water outfalls and decrease to the south-southwest and spreads laterally.

Off site, across Industrial Park Drive (in the area of MW25, MW28, and MW34), the PCE concentrations in the "shallow" ground water are in excess of 1,000 ppb. PCE concentrations in water from this area are over 5 times higher than the concentrations in samples collected from MW19 and MW26. These two wells are between the source area outfalls and MW25.
There are many possible explanations for the relatively high PCE ground water concentrations in this area. They could be the result of a large PCE slug that was released during one or several discharge events from the storm water system. The PCE slug would have migrated down the steep ground water gradient and then pooled in the area of lower ground water gradient.

These concentrations could also be from a secondary source area, the result of a PCE-contaminated waste dump. However this does not seem likely; during the installation of MW28, soil samples were field screened and a sample from 4 to 6 feet below the ground surface was analyzed. No VOCs were detected in the soil and there were no elevated field screening results.

In addition, there could be preferential pathways through the weathered glacial till and other sorted deposits. MW19, and MW26, may have missed the most concentrated pathway and only penetrated a secondary pathway with lower concentrations.

Air

Air samples were collected in three areas inside the building, two in the rear, storage/utility area of the building, and one in the front office area (see Figure 4). Elevated concentrations of PCE were found in the rear of the building with relatively low levels found in the office area. Steps were taken to address this situation on an interim basis, as summarized below in Section 4.2.

4.2: Interim Remedial Measures

An Interim Remedial Measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

IRM to Address Roof Drains/Indoor Air

Available information indicates that there is significant contamination present under the rear of the building, in the area of the building between the north catch basin (CB-2044) and the northeast catch basin (CB-1846). It was apparent that the contamination under the building was [1] using the underground piping conduit/backfill (which connects building roof drains with the north catch basin) as a pathway for migration, and [2] causing the elevated concentrations of PCE to be present in the indoor air samples taken from the storage/utility area in the rear of the building, as discussed above. In February 1999 an IRM was implemented to address these two situations.

On February 10, 1999 the drainpipe, leading from the roof through the concrete slab and under the rear of the building on its way to the north catch basin, was abandoned. New pipe was installed which does not travel through the contamination present in the soil beneath the rear portion of the building.

During the week of February 1, 1999 all visible openings (i.e., cracks, floor drains, floor seams) were sealed with a silicone-based caulk. Following the completion of this process, on March 4, 1999, additional indoor air samples were collected. The results indicated that the concentrations of PCE had decreased by a factor of about three. Both before and after the IRM, the concentrations of VOCs in indoor air were many times below occupational guidelines.

4.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the health risks can be found in Section 6 of the RI report.

An exposure pathway is the manner by which an individual may come in contact with a contaminant. The five elements of an exposure pathway are 1) the source of contamination; 2) the environmental media and transport mechanisms; 3) the point of exposure; 4) the route of exposure; and 5) the receptor population. These elements of an exposure pathway may be based on past, present, or future events.

Pathways which are known to or may exist at the site include:

- Direct contact with ground water could occur if wells within the contaminant plume are used for irrigation or other non-potable purposes.

- On-site workers could be exposed during soil excavation or subsurface maintenance activities via dermal contact with contaminated soil, inhalation of vapors and airborne particulates, or incidental ingestion. There also is the potential for exposure via inhalation due to vapors from below the slab moving into the building (Section 4.1.3 discusses the results of indoor air samples collected during the RI).

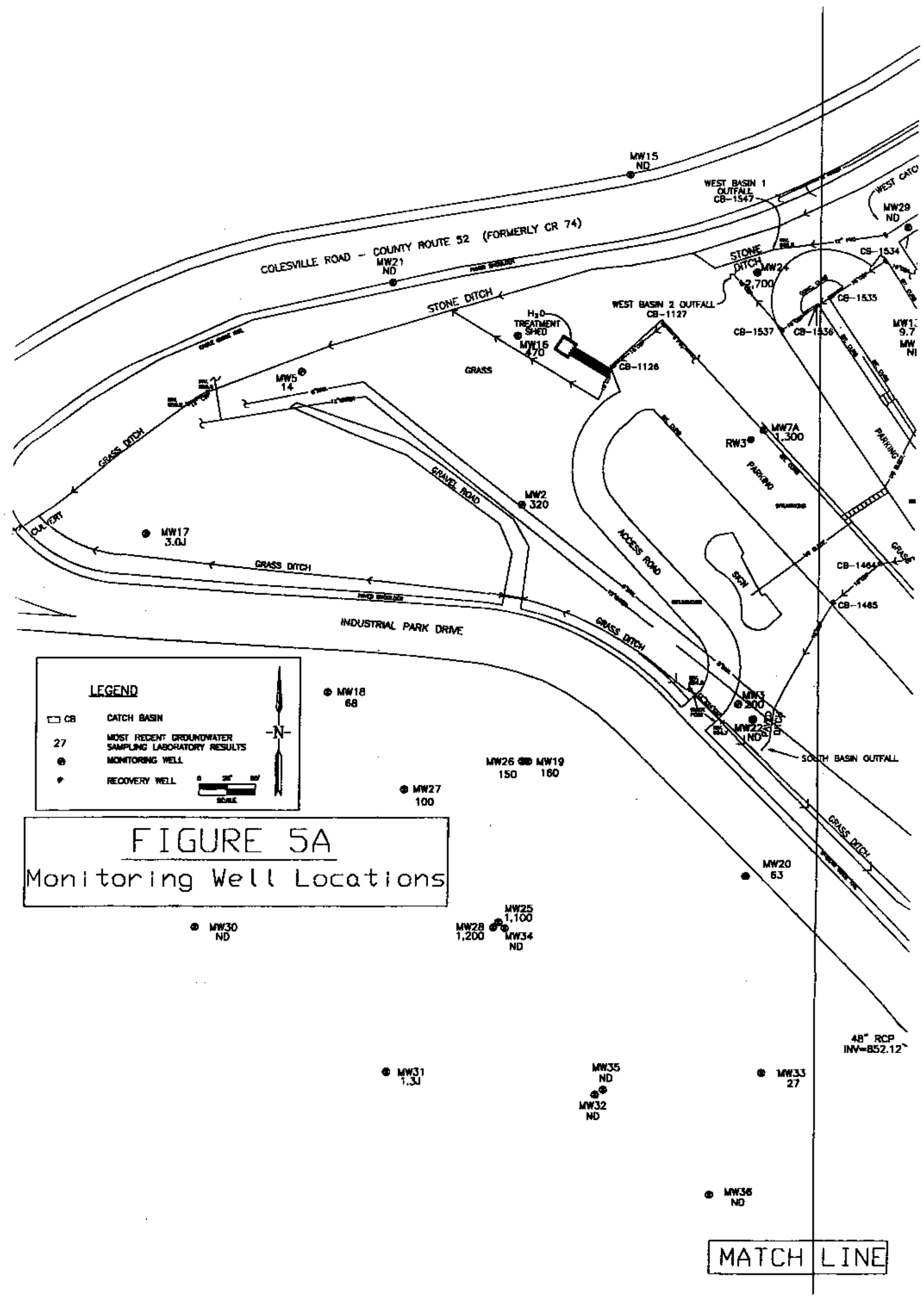


FIGURE 5A
Monitoring Well Locations

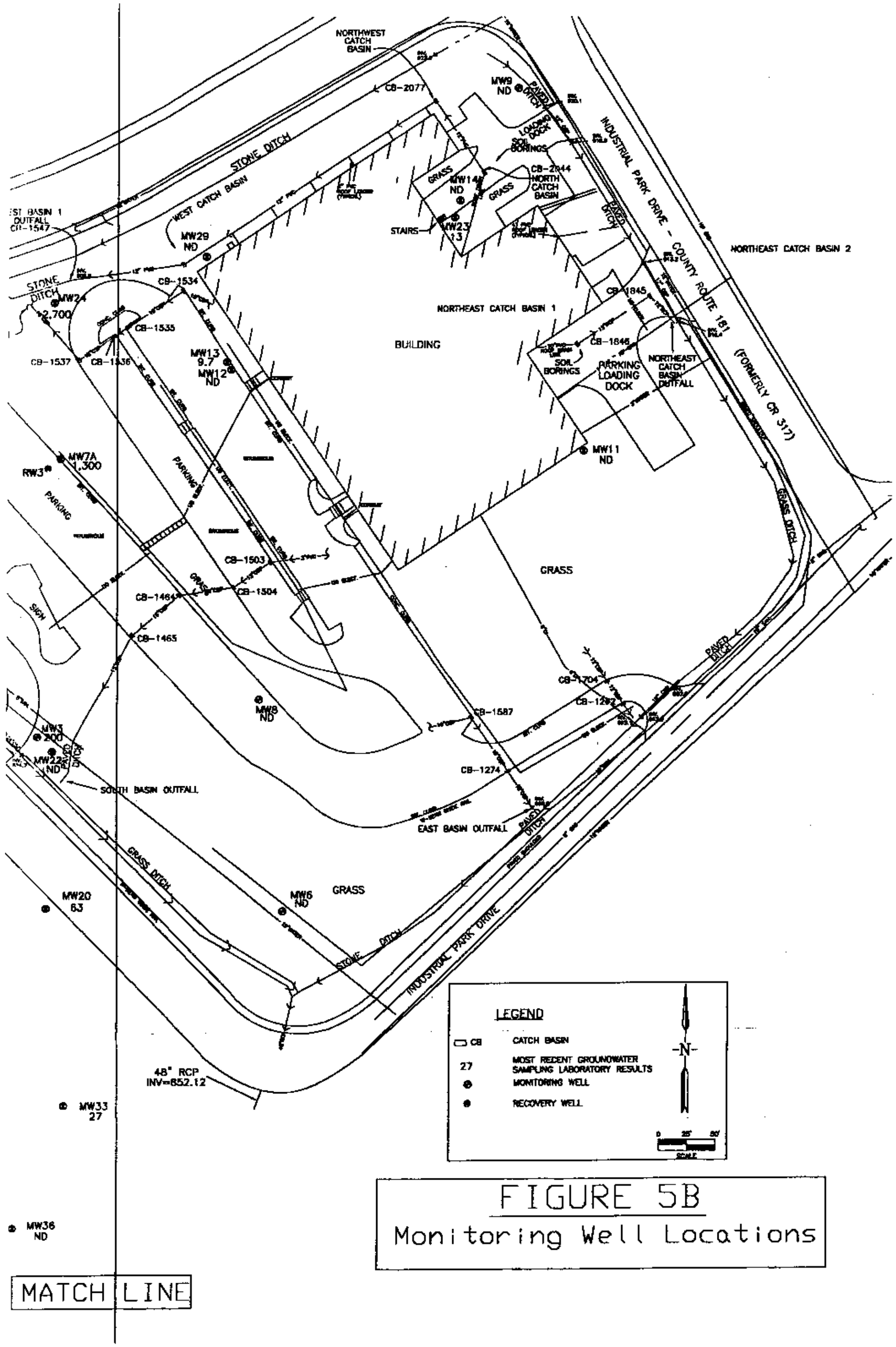


FIGURE 5B

Monitoring Well Locations

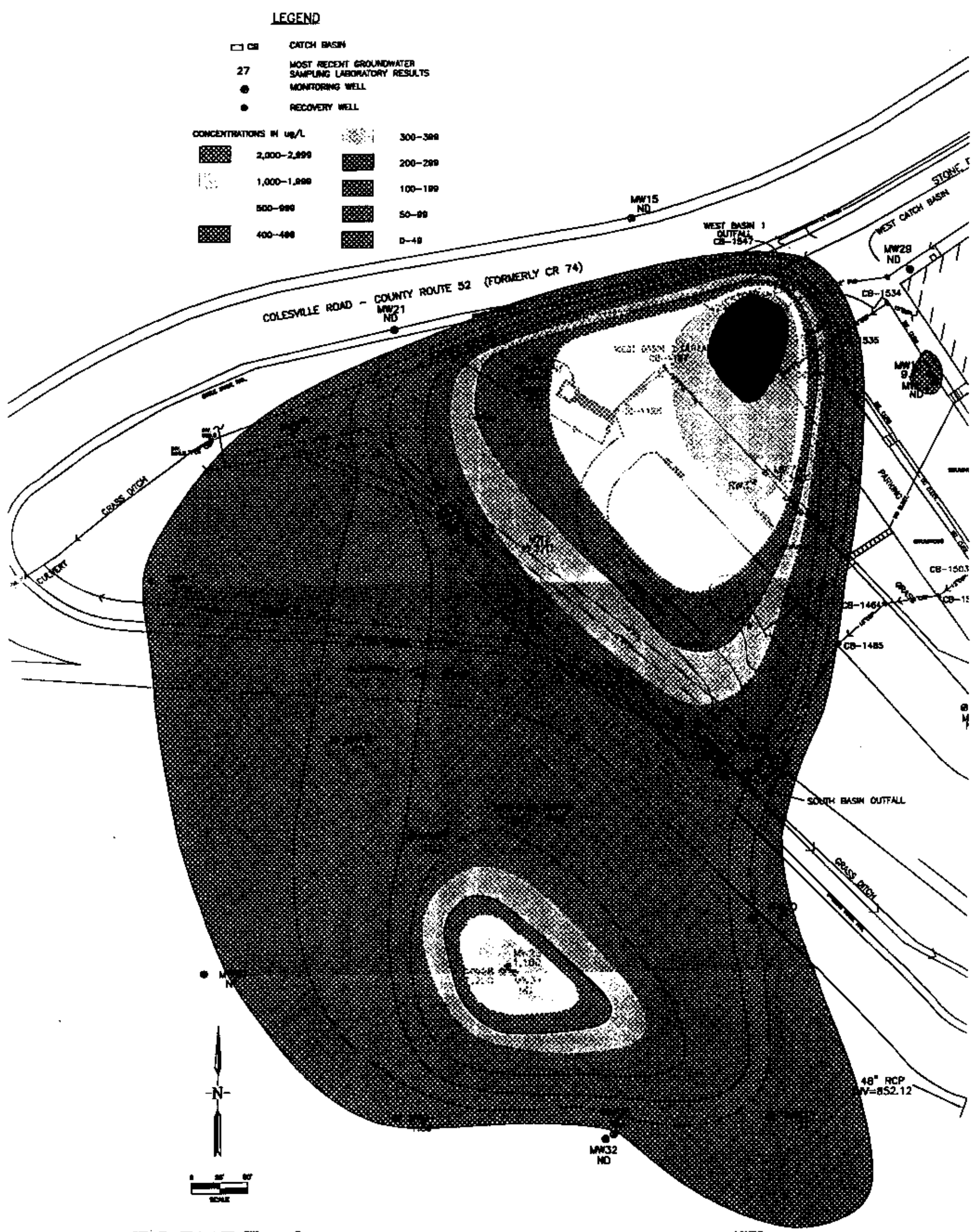


FIGURE 6
Groundwater Plume

- A change in the current conditions or future development on site presents the potential for exposure via the migration of contaminated ground water and/or vapors into buildings.

4.4: Summary of Environmental Exposure Pathways

This section summarizes the types of environmental exposures and ecological risks which may be presented by the site. The Fish and Wildlife Impact Assessment included in the RI presents a more detailed discussion of the potential impacts from the site to fish and wildlife resources. The following potential pathways for environmental exposure and/or ecological risks have been identified:

- Uptake of contaminants by plant life on or near the site.

- Consumption of contaminated plants by animals in the area.

- Direct contact with contaminants at the surface by animal life on or near the site.

Although the potential environmental exposures are listed above, they are not likely. The on-site contamination is predominantly subsurface soil and ground water. Storm water and ditch/catch basin soil samples collected at the site boundaries do not indicate the presence of elevated levels of contamination.

SECTION 5: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and the DII Group, Inc. entered into a Consent Order on May 12, 1998. The Order obligates the responsible parties to implement the RI/FS at the site. Upon issuance of the Record of Decision the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. The overall remedial goal is to meet all Standards, Criteria and Guidance (SCGs) and be protective of human health and the environment. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The goals selected for this operable unit are:

- Reduce, control, or eliminate, to the extent practicable, the contamination present in the subsurface soils at the site; this includes the reduction, control, or elimination, to the extent practicable, of releases from the subsurface soil to ground water and to the storm water drainage system.

- Reduce, control, or eliminate, to the extent practicable, the continued migration of contaminated ground water from the site.

- Eliminate, to the extent practicable, exceedances of applicable environmental quality standards related to ground water and storm water.

- Reduce, control, or eliminate, to the extent practicable, the source of the contamination that has been detected in the indoor air samples (i.e., air samples taken in the storage/utility area in the rear of the building).

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost effective, comply with other statutory laws and utilize permanent solutions, alternative technologies or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the Dover Electronics site were identified, screened and evaluated in February 2000 Feasibility Study Report.

The EPA has developed policy and procedures for presumptive remedies at sites where commonly encountered characteristics are present. Presumptive remedies are preferred technologies for common categories of sites, based on historical patterns of remedy selection and EPA's scientific and engineering evaluation of performance data on technology implementation. The objective of the presumptive remedies initiative is to use past experience to speed up the evaluation and selection of remedial options, to ensure consistency in remedy selection, and to reduce the time and cost required to clean up similar types of sites. The presumptive remedies directive eliminates the need for the initial step of identifying and screening a variety of alternatives during the Feasibility Study (FS).

The FS for this site used the following presumptive remedy guidance directives: *Presumptive Remedies: Policies and Procedures*; *Presumptive Remedies: Site Characterization and Technology Selection for CERCLA Sites with Volatile Organic Compounds in Soils*; and *Presumptive Response Strategy and Ex-situ Treatment Technologies for Contaminated Ground Water at CERCLA Sites.*

A summary of the detailed analysis follows. As presented below, the time to implement reflects only the time required to implement the remedy, and does not include the time required to design the remedy, procure contracts for design and construction or to negotiate with responsible parties for implementation of the remedy.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils, ground water, drainage ditch soils and water in the on-site storm water system, as well as address the source of contamination detected in indoor air samples.

ALTERNATIVES TO ADDRESS SOIL

The presumptive remedies strategy was used for the VOC-contaminated soil at this site. The alternatives originally identified included Excavation & Off-site Disposal and Thermal Desorption. Both alternatives are ex-situ technologies, which would involve the excavation of all contaminated soil. However, most of the contamination is present under the on-site building, which is an active commercial facility. In order to excavate the soil, a large part of this active facility would have to be torn down, causing a significant increase in both direct (construction costs) and indirect (loss of business/jobs) costs associated with implementing these alternatives.

For these reasons Excavation & Off-site Disposal and Thermal Desorption, of the soil under the building, were considered "un-implementable" and eliminated from further consideration.

1. No Further Action

Present Worth	$ 10,000
Capital Cost	$10,000
Annual O&M	$0
Time to Implement	N/A
Estimated Time to Completion	N/A

This alternative is listed as No *Further* Action to acknowledge the work that has been previously done to address contaminated soils, as summarized above in *Section 3.2 - Remedial History*. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. Legal restrictions regarding land usage/deed restrictions would be placed on the property.

2. Soil Vapor Extraction + Limited Excavation and Off-Site Disposal/Incineration

Present Worth	$520,286
Capital Cost	$374,900
Annual O&M	$41,000
Time to Implement	approx. 3-6 months
Estimated Time to Completion	4 years

Soil vapor extraction (SVE) is an in-situ unsaturated (vadose) zone soil remediation technology in which a vacuum is applied to the soil to induce the controlled flow of air and remove volatile contaminants from the soil. The gas leaving the soil may be treated to recover or destroy the contaminants, depending on the concentrations that are present.

The SVE component of this alternative would involve, a) the installation of vapor extraction wells under the building in areas where contamination is present; b) the storm water piping system that originates in the building's front roof drains (eventually discharging from the CB-1537 outfall located west of the west corner of the building) would be re-routed so that it would not travel through currently contaminated underground piping; c) the abandoned piping would then be used as a part of the SVE system; and d) placement of an asphalt cover, to minimize drawing in clean air from the surface (approximate area of 6400 ft^2). The SVE treatment unit would be installed, along with all of the associated piping and an air treatment unit (some form of air treatment would be installed to prevent unacceptable air emissions).

Excavation of impacted soils under the building is not currently a feasible option. However, it would be possible to excavate contaminated soils present around catch basins, at outfalls, along utility lines, and in the area of the former oil shed (just east of the east corner of the building). This alternative would include the removal of approximately 600 tons of soil in the former oil shed area as well as approximately 70 tons from around catch basin CB-2044. This would address all of the accessible soils of concern. Land Disposal Restrictions (LDRs) prevent the landfilling of contaminated material that exceeds certain concentrations, listed by contaminant. These concentrations are called Universal Treatment Standards (UTSs). All soils that exceed UTSs cannot be placed in a landfill and would be incinerated.

This alternative would also include the replacement of three catch basins and the replacement of approximately 360 feet of storm water drainline/piping.

ALTERNATIVES TO ADDRESS GROUND WATER

During the Feasibility Study a number of alternatives were evaluated to address the contamination present in the ground water. As a result of the preliminary screening of alternatives in the FS, the Ground Water Extraction & Treatment and the Passive/Reactive Treatment Wall alternatives were the only "active" alternatives that passed through to the detailed analysis of alternatives phase. The reason for this is that the specific conditions/permeability of the soils would not be conducive to the implementation of the other alternatives initially developed in the FS (i.e., Air Sparging, In-well Stripping).

1. No Further Action/ Ground Water Monitoring

Present Worth	$ 101,285
Capital Cost	$10,000
Annual O&M	$10,000
Time to Implement	NA

This alternative would include the placement of restrictions on future ground water usage on the property, as well as the annual sampling of approximately 35 ground water monitoring wells with the samples analyzed for VOCs.

This alternative is listed as No ***Further*** Action to acknowledge the work that has been previously done to address contaminated ground water, as summarized above in *Section 3.2 - Remedial History*. It requires continued monitoring only, allowing the ground water to remain in an unremediated state. It would not provide any additional protection to human health or the environment.

2. Ground Water Extraction and Treatment (via Air Stripping)

Pump & treat (On-site)

Present Worth	$ 898,672
Capital Cost	$ 499,000
Annual O&M	$ 26,000
Time to Implement	approximately 6 months
Estimated Time to Completion	30 years

Pump & Treat (Off site)

Present Worth	$515,672
Capital Cost	$116,000
Annual O&M	$ 26,000
Time to Implement	approx. 3-6 months

Estimated Time to Completion	30 years

This alternative would involve the installation of an on-site ground water collection trench, approximately 600 feet in length and 20 feet deep, as well as the installation of approximately six ground water extraction wells (to address the portion of the plume that has migrated off site). This combination of an on-site trench and off-site wells is needed because of the differences in the ability to collect water on site and off site. The low conductivities on site make the trench a more appropriate approach than recovery wells. Off site, conditions make recovery wells appropriate. It would also include the installation of all necessary conveyance piping and the air stripper unit. The treatment system would be installed to address both on-site and off-site ground water, and thus the costs presented above have applied 50% of the "shared" costs to each estimate (on site and off site). It is estimated that the system would operate at a capacity of up to 50 gallons per minute. For cost estimate purposes, an operation period of 30 years has been assumed, although the system may not need to operated for that full period (i.e., addressing source areas in soils would accelerate ground water remediation). Once removed, the ground water would be treated on site and discharged to either storm water or the sanitary sewers, as necessary and appropriate.

3. Passive/Reactive Treatment Wall

Present Worth	$1,522,976
Capital Cost	$1,400,000
Annual O&M	$8,000
Time to Implement	approx. 6 months
Estimated Time to Completion	30 years

A permeable reaction wall would be installed across the flow path of the contaminant plume, allowing the water portion of the plume to passively move through the wall. This alternative relies on the ground water gradient to "push" the ground water through the wall for in-situ treatment. This barrier would be excavated and then backfilled with a reactive material (i.e., zero-valent metals) that would allow the passage of water while prohibiting the movement of contaminants by treating the water as it passes through. The contaminants would be either degraded (organic contaminants) or retained (metals) in a concentrated form by the barrier material.

For cost estimate purposes, an operation period of 30 years has been assumed, although the system may not need to operated for that full period (i.e., addressing source areas in soils would accelerate ground water remediation).

7.2 Evaluation of Remedial Alternatives

The criteria used to compare the potential remedial alternatives are defined in the regulation that directs the remediation of inactive hazardous waste sites in New York State (6 NYCRR Part 375). For each of the criteria, a brief description is provided, followed by an evaluation of the alternatives against that criterion. Additional discussion of the evaluation criteria and comparative analysis is included in the Feasibility Study.

The first two evaluation criteria are termed threshold criteria and must be satisfied in order for an alternative to be considered for selection.

1. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance.

- 6 NYCRR Part 375, Inactive Hazardous Waste Disposal Site Remedial Program
- NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) 4046, Determination of Soil Cleanup Objectives and Cleanup Levels
- 6 NYCRR Part 376 - Land Disposal Restrictions including the Universal Treatment Standards (UTS)
- NYSDEC Division of Hazardous Substance Regulation TAGM 3028, "Contained in Criteria for Environmental Media" (11/92)
- 6NYCRR Part 700-705, Water Quality Regulations for Ground Water
- NYSDEC Division of Water TOGS 1.1.1
- Air Guide 1 - Guidelines for the Control of Toxic Ambient Air Contaminants

2. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, etc.

7. Cost. Capital and operation and maintenance costs are estimated for each alternative and compared on a present worth basis. Although cost is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the remaining criteria, cost effectiveness can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

Detailed Analysis for Soils

Overall Protection of Human Health and the Environment: The no further action alternative would not be protective of human health or the environment within an acceptable time frame. The remaining alternative would actively address the on-site contamination and would be protective of human health and the environment. Excavation and off-site disposal would provide protection since the contamination (in the accessible soils) would be removed from the site. SVE would also address the contamination in the soil under the building over the period of operation needed to achieve the remedial objectives.

Compliance with SCGs: The no further action alternative would not meet SCGs since it would leave elevated contaminant concentrations in on-site soils. SVE would meet most, if not all of the SCGs for soil under the building, depending on the ability for the extraction points to influence all contaminated areas. The excavation and off-site disposal component would meet SCGs for accessible soils. Both SVE and off-site disposal would also result in the reduction of contaminant concentrations in the ground water by addressing the source areas.

Short-Term Impacts and Effectiveness: The No Further Action alternative would cause no increased short-term impacts since no intrusive work would take place. It would, however, take many years to achieve remedial objectives by natural attenuation.

SVE would result in air emissions that would require treatment, posing a short-term risk should the air emissions control device be breached. This risk would be reduced through the proper use and monitoring of air treatment devices. Excavation and off-site disposal (for the accessible soils) would involve more extensive soil handling, with an increased risk of exposure to dust and vapors. There is the potential for greater exposure, although for a shorter period of time. However, the use of engineering controls, including air monitoring and dust suppression measures, would minimize and/or eliminate any possible impact during excavation.

All the alternatives except the No Further Action alternative would involve the handling of contaminated media. These actions could potentially impact worker health and safety, the environment, and the local community. SVE would have limited potential for worker exposure, since the only intrusive activity would be the installation of the extraction points. Excavation and off-site disposal (for the accessible soils) would involve more extensive soil handling, since contaminated soil would be excavated and hauled off site. However, the use of engineering controls would minimize and/or eliminate any possible impact during excavation. These controls would include air monitoring, personal protective equipment, and dust suppression measures. Offsite hauling would pose a short-term risk due to possible spilling of contaminated media offsite. This could be mitigated by properly covering contaminated media and by establishing proper emergency spill response measures.

The length of time needed to complete the soil removal component would be approximately three months. The SVE component would take up to approximately four years to achieve remedial objectives for soil under the building.

Long-Term Effectiveness and Permanence: The no further action alternative would allow the continued migration of contaminants from the soil to the ground water and would not achieve remedial objectives in a reasonable amount of time. Soil excavation and SVE would provide a permanent remedy. SVE may not achieve soil SCGs for all of the contaminated soil mass (e.g., some soil under the on-site building not fully treated due to potential difficulty in accessing the entire volume with the SVE system), resulting in some minor residual concentrations remaining in the soils. The excavation and off-site disposal component would effectively eliminate all contamination exceeding the remedial goals for the accessible soils.

Reduction of Toxicity, Mobility, and Volume: With the no further action alternative, reduction in the toxicity, mobility, or volume of waste would occur very slowly through natural attenuation, but would not occur in an acceptable time frame. The SVE component of the active soil alternative would remove/treat most, if not all of the site related contamination under the building. This would have the effect of greatly reducing contaminant mobility in the environment and volume. The excavation and off-site disposal component removes all of the accessible soil exceeding the cleanup objectives, thereby reducing contaminant mobility and volume. Addressing contaminated soil would result in a decrease in the movement of soil contaminants to the ground water.

Implementability: The no further action alternative would be the easiest to implement, since no construction would be necessary. Excavation of contaminated soils under the building is not an implementable option at this time. There is a significant volume of contamination under the building and the building is an active commercial facility. Excavation and disposal of the accessible soil outside of the footprint of the building (around catch basins/utility lines, at outfalls, and in the former oil shed area) and off-site disposal would be easy to implement, since this alternative is easily engineered, treatment/disposal facilities are readily available, and regulatory requirements are easily met. Due to building constraints, the SVE system would have to be installed from outside the structure using horizontal collection wells. The technology is available and reliable but would be difficult to install because of the building foundation/footings.

Cost: A summary of the costs are presented in Table 2. The costs are the present worth based on a 5% discount rate over the estimated life of the project.

Detailed Analysis for Ground Water

Overall Protection of Human Health and the Environment: The no action/ground water monitoring alternative would not be protective of human health or the environment. The ground water extraction/treatment alternative (on site and off site) would actively address the ground water contamination and would be protective of human health and the environment by reducing the volume and the mobility of the contamination for their targeted areas (i.e., on site and off site). Because of the relatively low conductivity of the on-site shallow aquifer, Alternative 2 includes the use of a ground water collection trench on site rather than only recovery wells. Properly designed, this trench should be able to effectively capture the on-site plume. Off site, the conductivity of the aquifer is high enough to use recovery wells, which are more straightforward to install.

The passive treatment wall would actively address the ground water contamination for the on-site area, but due to the aquifer properties off site (relatively flat ground water gradient; not enough "driving force" to move ground water through the wall for in-situ treatment), would not be as likely to

Table 2
Remedial Alternative Costs

Remedial Alternative		Capital Cost	Annual O&M	Total Present Worth
SOIL ALTERNATIVES				
1. No Further Action		$10,000[1]	$0	**$10,000**
2. Soil Vapor Extraction[2] + Excavation & Off-site Disposal (estimate is for accessible soils)		$374,900	$41,000	**$520,286**
Ground Water ALTERNATIVES				
1. No Further Action/Ground Water Monitoring		$10,000[1]	$10,000	**$101,285**
2. Ground Water Extraction/Treatment via Air Stripper[3]	On site[4]	$499,000	$26,000	$898,672
	Off site[4]	$116,000	$26,000	$515,672
	Alt. #2 Totals	$615,000	$52,000	**$1,414,344**
3. Passive/Reactive Treatment Wall[3]		$1,400,000	$8,000	**$1,522,976**

Notes:
(1) capital cost is for legal fees to implement deed restrictions
(2) Estimate assumes four years of operation/ costs include re-routing of front roof drains
(3) 30 years of O&M is assumed for cost estimate
(4) Costs assume both on-site & off-site would implement this alternative - fixed costs are split between them

successfully address the off-site plume. As a result, the passive/reactive treatment wall alternative would not be as protective of human health and the environment for the off-site area.

Compliance with SCGs: The no action/ground water monitoring alternative would not achieve ground water standards in a reasonable amount of time. The passive/reactive treatment wall alternative would not reliably reduce contaminant concentrations in the off-site ground water due to the properties of the aquifer (relatively flat ground water gradient; not enough "driving force" to move ground water through the wall for in-situ treatment). The ground water extraction/treatment alternative would actively reduce contaminant concentrations in the ground water. If implemented on its own, this alternative would take a long period of time to significantly reduce contaminant concentrations. If source areas soils are addressed simultaneously, this time frame would be greatly reduced. However, although ground water concentrations would be greatly reduced, it may be impossible to achieve ground water standards.

Short-Term Impacts and Effectiveness: The no action/ground water monitoring alternative would result in the fewest short-term impacts, as the only action taken would be ground water monitoring. The ground water extraction/treatment alternative could create an air emission source and a water discharge. However, air emissions and the water discharge would be treated to prevent worker and resident exposure to contaminants. There would be potential short-term impacts during the installation of the passive/reactive treatment wall, but proper engineering controls would be in-place to mitigate/prevent any potential impacts.

Long-Term Effectiveness and Permanence: The no action/ground water monitoring alternative would not provide long-term effectiveness. The pump & treat (on site and off site) alternative should effectively remove contaminants, with the contaminants captured by the treatment component of these alternative. The relatively low yield of the shallow aquifer may make it difficult to fully capture all of the contaminated ground water on site and off site. It may be necessary to add additional recovery wells or enhance the collection trench to fully capture contaminated water. Although a greater level of effort may be needed to achieve effectiveness in ground water collection, it should ultimately be effective in preventing continued migration of the ground water plume and reduce concentrations to acceptable levels.

The passive/reactive treatment wall would not be as effective for the off-site area. The passive treatment wall depends on natural ground water flow patterns to "bring" ground water to it, and "push" it through the wall for treatment. The off-site ground water gradient is relatively flat and may be insufficient for this alternative to be effective, in the long-term, for the off-site area.

Reduction of Toxicity, Mobility, and Volume: The no action/ground water monitoring alternative would not actively reduce the volume of contaminants already in the ground water. The passive/reactive treatment wall alternative may not effectively remove contaminants from the subsurface for the off-site area; thus it would not effectively reduce the mobility and volume of contaminants in the ground water.

The ground water extraction/treatment alternative would remove contaminants from the subsurface and treat them, thereby reducing the mobility and volume of contaminants in the ground water.

Implementability: The no action/ground water monitoring alternative would be the easiest to implement. The ground water extraction/treatment and the passive/reactive treatment wall alternatives would both be implementable, as the systems are commercially available from several vendors; however, the ground water extraction/treatment would be easier to install than the passive/reactive treatment wall. There would be no anticipated administrative or legal barriers to the implementation of any of the alternatives .

Cost: A summary of the costs are presented in Table 2. The costs are the present worth based on a 5% discount rate over the estimated length of the remedial action.

This final criterion is considered a modifying criterion and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. **Community Acceptance** - Concerns of the community regarding the RI/FS reports and the Proposed Remedial Action Plan have been evaluated. The "Responsiveness Summary" included as Appendix A presents the public comments received and the Department's response to the concerns raised.

In general the public comments received were supportive of the selected remedy. There were some questions regarding the safety of the workers at the facility during the implementation of the remedy. In addition, a comment letter was received requesting additional consideration for in-situ groundwater treatment using a Hydrogen Release Compound (HRC). As indicated above, these questions and comments have been addressed in Appendix A.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the results of the RI/FS, and the evaluation presented in Section 7, the NYSDEC is selecting the following remedy for this site:

- Soil Vapor Extraction for the contaminated subsurface soils underneath the building.

- Excavation and off-site disposal (landfill and/or incineration) will be completed for the limited amount of contaminated, accessible subsurface and surface soils located in the former oil shed area, the area around CB-2044 (north catch basin), any contamination present at storm water outfalls, and any residual contamination present along utility lines extending from the building.

- The storm water piping system that originates at the roof drains in the front of the building and runs to CB-1537 outfall will be replaced and re-routed to prevent migration of contaminants along this line.

- Ground Water Extraction and Treatment (current treatment proposal is via an air stripper, but the treatment option may be modified in design) as the preferred remedy for the contaminated ground water (collection trench at the downgradient end of the on-site area and extraction wells for the area of the off-site plume.

- During the early stages of the implementation of the remedy, supplemental in-situ groundwater treatment (in the area(s) where the highest concentrations are present) will be evaluated to determine if it will be a cost effective way to shorten the duration for the operation of the groundwater extraction/treatment system.

- Long-term monitoring, and pursuit of deed restrictions if residual contamination remains after the remediation.

The basis for this selection is summarized below:

Soil

The No Action alternative was rejected because this alternative is not protective of human health or the environment, does not meet/satisfy SCGs, and does not satisfy the RAOs. It would leave in place a volume of contaminated soil which would act as a continuing source of contamination to the ground water.

The remaining alternative for contaminated soils includes SVE for under the building and off-site disposal for the remaining accessible soils. These technologies have both been successfully used at other sites to remediate soil contaminated with volatile organic compounds. Excavation and off-site disposal will be assured to achieve the goals of the program for the accessible soils. For the soils under the building, SVE may leave behind residuals after the remediation is complete. However, SVE is the preferred alternative for the inaccessible contaminated soils under the building because it is not feasible to excavate the soils under an active commercial facility. Therefore, given the site-specific conditions, excavation will be used for accessible soils and SVE will be used for the inaccessible soils.

Ground Water

The alternatives evaluated to address the contamination in the ground water are No Action/Ground Water Monitoring, Ground Water Extraction & Treatment, and Passive/Reactive Treatment Wall. Of these, the No Action/Ground Water Monitoring alternative was rejected it would do nothing to address the ground water contamination and thus would not be protective of human health or the environment.

The Ground Water Extraction & Treatment alternative will be effective at remediating the off-site area of contaminated ground water. The passive/reactive treatment wall would not be as effective for the off-site area. The passive treatment wall depends on natural ground water flow patterns to "bring" ground water to it for treatment. The off-site ground water gradient is relatively flat and would be insufficient for this alternative to be effective, in the long-term, for the off-site area.

Both Ground Water Extraction & Treatment and the Passive/Reactive Treatment Wall alternatives would be effective at remediating the on-site area of contaminated ground water, but the Ground Water Extraction & Treatment alternative will cost much less. Therefore, the Ground Water Extraction and Treatment alternative is the proposed remedy for the aqueous phase contamination in the ground water, both on site and off site.

The estimated present worth cost to implement the remedy is $1,934,630. The cost to construct the remedy is estimated to be $989,900 and the estimated overall present worth for the operation and maintenance of $944,730 (since different elements of the program will be operated for different durations, an average annual O&M cost has been replaced by the estimated present worth).

The elements of the proposed remedy are as follows:

- A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. This will include a pilot SVE test to provide the data needed to design a full-scale SVE system.

- Installation of a soil vapor extraction (SVE) system, to address the contaminated inaccessible subsurface soils, that will include approximately 10 horizontal vapor extraction wells, the use of abandoned sub-slab storm water piping for vapor extraction, as well as the associated piping and vapor treatment system.

- The storm water piping system that originates in the building's front roof drains (eventually discharging from the CB-1537 outfall located west of the west corner of the building) will be re-routed so that it will not travel through currently contaminated underground piping; the abandoned piping will then be used as a part of the SVE system, as described in the previous bullet. This is similar to the approach taken during the February 1999 IRM that addressed roof drains in the rear of the building.

- Installation of a ground water extraction system to address the on-site and off-site contaminated ground water. The on-site system will include a collection trench approximately 600 feet long and 20 feet deep. The trench will be located near the southwestern site boundary, along Industrial Park Drive. The off-site system will also include approximately six ground water extraction wells. This component of the remedy will include all associated piping and the water treatment system (current treatment proposal is via an air stripper, but the treatment option may be modified in design); this will also include an evaluation, early in the design phase of the program, of more aggressive actions in the secondary source area west of the west corner of the on-site building (i.e., SVE or a ground water extraction point or dual phase extraction).

- Excavation and off-site disposal (landfill and/or incineration) of the limited amount of contaminated, accessible subsurface and surface soils located the former oil shed area, the area around CB-2044 (north catch basin), any contamination present at storm water outfalls, and contamination present along utility lines extending from the building.

- During the early stages of the implementation of the remedy, supplemental in-situ groundwater treatment (in the area(s) where the highest concentrations are present) will be evaluated to determine if it will be a cost effective way to shorten the duration for the operation of the groundwater extraction/treatment system.

- The Department will seek to have property restrictions placed upon the site as long as residual contamination remains at the site that could create a significant threat to public health or the environment.

- Since the remedy results in hazardous waste remaining at the site, for at least the term of the implementation of the remedy, an operation & maintenance (for the active components of the remedy) and a long-term monitoring program will be instituted.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

As part of the remedial investigation process, a number of Citizen Participation activities were undertaken in an effort to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for the site:

- A repository for documents pertaining to the site was established.
- A site mailing list was established which included nearby property owners, local political officials, local media and other interested parties.
- In October 1998 a Fact Sheet was prepared, and sent to those people on the site mailing list, to announce the initiation of the Remedial Investigation/ Feasibility Study (RI/FS) at this site.
- In February 2000 a Meeting Announcement was prepared, and sent to those people on the site mailing list, to summarize the Proposed Remedial Action Plan (PRAP) for the site and to announce: 1) the public meeting scheduled to present the PRAP to the public, and 2) the public comment period (February 15 - March 16, 1999) during which people could provide their comments on the PRAP.
- A meeting was held on February 28, 2000 to present the Proposed Remedial Action Plan to the Public.
- In March 2000 a Responsiveness Summary was prepared and made available to the public, to address the comments received during the public comment period for the PRAP.

APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Dover Electronics
Proposed Remedial Action Plan
Kirkwood (T), Broome County
Site No. 7-04-026

The Proposed Remedial Action Plan (PRAP) for the Dover Electronics site was prepared by the New York State Department of Environmental Conservation (NYSDEC) and issued to the local document repository on February 10, 2000. This Plan outlined the preferred remedial measure proposed for the remediation of the contaminated soil and groundwater at the Dover Electronics site. The preferred remedy for this site is groundwater extraction and treatment, soil vapor extraction (SVE) for contaminated inaccessible soil under the building, and excavation/off-site disposal for contaminated accessible soil.

The release of the PRAP was announced via a notice to the mailing list, informing the public of the PRAP's availability.

A public meeting was held on February 28, 2000, at the Benjamin Franklin Elementary School, 262 Conklin Avenue, Binghamton, which included a presentation of the Remedial Investigation (RI) and the Feasibility Study (FS) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. Written comments were received from Mr. Leonard Eder of Gannett Fleming Engineers and Architects, P.C. The public comment period for the PRAP ended on March 16, 2000.

This Responsiveness Summary responds to all questions and comments raised at the February 28, 2000 public meeting and to the written comments received.

Section I. Comments Received at Public Meeting

The following are the comments received at the public meeting, with the NYSDEC's responses:

COMMENT 1:
The area where the groundwater contamination has migrated off-site, is that the area where the truck stop was recently built? If so, was anyone exposed to contamination during the construction of the truck stop?

RESPONSE 1:
Yes, the area of the off-site groundwater plume is where the truck stop was recently built; the plume is present below the rear portion of the truck stop where the tractor trailer parking area currently exists.

The only contamination present off-site is dissolved in the groundwater. The depth of the groundwater in this area is approximately 18 feet below the ground. As a result, there was no potential that workers were exposed to contamination from this site during the construction of the truck stop.

COMMENT 2:

On the site map there were groundwater monitoring wells located outside of the identified groundwater plume. Will these monitoring wells continue to be monitored?

RESPONSE 2:

Yes, the long-term monitoring program (part of the operation and maintenance plan (O&M plan) to be developed during the remedial design) will include sampling a network of groundwater monitoring wells. The purpose of monitoring these wells will be to evaluate the effectiveness of the groundwater remediation, determine if any adjustments need to be made, and to insure the groundwater plume is being contained/is not migrating further. This will be done by sampling groundwater monitoring wells both within the plume as well as wells outside of the contaminant plume.

COMMENT 3:

At what point do the potential health impacts to building employees at this facility factor into what is done and when?

RESPONSE 3:

Potential impacts to employees and the surrounding community are considered throughout the remedial program. The existence of current impacts and/or the potential for future impacts are evaluated as information is being collected, as well as during the current decision-making process for this project. If there are current potential impacts discovered at a site immediate action can be taken in the form of an Interim Remedial Measure, or IRM. In addition, when information is evaluated to determine what to do to address the site in the long-term, potential future impacts are a significant factor that is used to evaluate potential remedial alternatives; in order to be considered for selection as the final remedy at a site an alternative must provide Protection of Human Health and the Environment (one of the seven evaluation criteria discussed in the body of the Record of Decision).

COMMENT 4:

How are exposures which may have occurred in the past evaluated?

RESPONSE 4:

It would be extremely difficult, if not impossible, to speculate about potential exposures that may have occurred in the past and the data that would be needed to evaluate prior exposures usually does not exist. In our program we evaluate actual and potential exposures, based on current and future anticipated site conditions, and develop a remedial program to address these exposures.

COMMENT 5:

Are employees surveyed relative to the potential ill-effects they may be experiencing which may potentially be the result of environmental conditions at the site?

RESPONSE 5:

Volatile organic chemicals, more specifically chlorinated organic solvents, have been detected in the soils beneath the concrete slab floors at this site. The indoor air has been sampled by the responsible party.

Although there are no standards for indoor air quality other than the OSHA standards for workplaces, the NYSDOH has established a guideline for residential indoor air quality impacts for tetrachloroethene (which is significantly lower than the OSHA standards for workplaces). This was done in response to findings from a NYSDOH study of the impacts to residential indoor air quality in buildings with dry cleaners and residential occupants. Most dry cleaners today use primarily tetrachloroethene in their fabric cleaning business. The primary indoor air contaminant detected at this facility was also tetrachloroethene.

Using a conservative and occupant protective approach, NYSDOH has compared the indoor air sampling results from the Dover Electronics site to data from the sampling of indoor air in residences. The levels of tetrachloroethene detected in the office area were within the range expected for residential settings not impacted by dry cleaners and substantially below the range seen for residences that were impacted by dry cleaners. The indoor air volatile organic contaminant levels found in the office area were substantially lower than the levels found in the mechanical/electrical/storage area.

The NYSDOH residential indoor air quality guideline action level threshold is 1000 ug/m^3; the NYSDOH residential indoor air quality guideline is 100 ug/m^3. The highest level detected in the building at this facility was from a sample collected in the mechanical/ electrical/storage area of the building where the sub-floor soil contamination is likely to be the most concentrated. The level detected at that location did exceed the NYSDOH residential indoor air quality guideline action level threshold. Timely mitigative action is recommended at that action level. Mitigative action, consisting of the sealing of cracks and openings in the concrete slab floor in that area, was completed soon after the sample analysis results were available. The indoor air quality was evaluated after this mitigative action and substantial improvement was evident; the tetrachloroethene concentrations decreased by a factor of 2-3 (see Table 18 of the Remedial Investigation Report for a summary of the indoor air data). The tetrachloroethene concentrations detected in the mechanical/ electrical/storage area after the sealing of the floor cracks were still above the NYSDOH residential indoor air quality guideline (a factor of 2-4 times the guideline), however, the guideline applies to residential settings where people may be exposed 24 hours per day. Also, this area is not occupied on a regular basis. Further action designed to remove the sub-slab contamination using soil vapor extraction is being planned as part of the remedial efforts at this site. This action will further reduce the indoor air concentrations in the mechanical/ electrical/storage area of the building.

A tetrachloroethene inhalation exposure fact sheet has been produced by and is available from the NYSDOH. The Central New York Occupational Health Clinic is also available for persons who wish to have a medical evaluation due to concerns regarding exposures to chemicals in their environments.

COMMENT 6:

What would be the impact to the newly constructed truck stop during the construction of the chosen remedy for this site?

RESPONSE 6:

The groundwater plume has migrated off-site, to the area of the newly constructed truck stop. The work that will be done during construction will be the installation of some wells and the placement of the underground piping system needed to transmit the water back to the site for treatment. This area of the truck stop is the parking lot for the tractor trailers; all of the components of the remedy to be installed in this area can be installed below the surface of the ground. The only impacts to the truck stop will be associated with the time needed to install these components. These impacts will be relatively minor and relatively short in duration.

COMMENT 7:
Has the Responsible Party indicated if they will pay for the design and construction of the remedial plan?

RESPONSE 7:
Yes, the Responsible Party (PRP) has indicated they will pay for the implementation of the chosen remedy. The PRP is reviewing the draft Consent Order which, when finalized, will document their agreement to design and construct the remedy at this site.

It is anticipated that the Consent Order will be finalized some time this Spring. By then the Record of Decision will be in place, which will document the chosen remedy (anticipated by the end of March). Once the Consent Order is in place, the Remedial Design (RD) will be conducted. During the RD, the detailed plans and specifications will be prepared; these detailed plans and specifications will be used by the remedial contractor to construct the remedy. It is anticipated that the RD will be finished early in 2001 and that the remedy will be constructed during the 2001 construction season.

Section II. Written Comments Received

A letter dated March 14, 2000 was received from Mr. Leonard Eder of Gannett Fleming Engineers and Architects, P.C.; the substance of this letter is summarized below:

SUMMARY OF COMMENT LETTER
Gannett Fleming has reviewed the data collected at the Site during the RI/FS process and believes that the remediation of contaminated groundwater at this site may be achieved in far less time and at significantly lower cost by utilizing in-situ enhanced bioremediation as an alternative to the proposed "pump and treat" groundwater remedial systems. In-situ enhanced bioremediation involves the introduction of materials into the contaminated portion of the groundwater to speed up natural biological decomposition processes by creating conditions conducive to the growth of the appropriate bacteria. For the contaminants at the Site, chlorinated solvents, anaerobic conditions are preferred. In order to establish anaerobic conditions, a hydrogen release compound ("HRC") is introduced into the aquifer through temporary or permanent injection ports.

At the Dover Electronics Site Gannett Fleming proposes a nine month pilot study in the area of MW-25. The pilot study, including monitoring and report preparation, is estimated to cost approximately $60,000. If approximately 50% contaminant removal is achieved in the vicinity of MW-25 during the pilot study, enhanced in-situ bioremediation would proceed on a full-scale basis; otherwise, conventional "pump and treat" groundwater remediation would be re-evaluated. Gannett Fleming has estimated a total cost to treat the groundwater contaminant plume, using enhanced in-situ bioremediation via HRC, at $900,000. In addition, $668,000 of the Feasibility Study cost estimate for source removal, SVE installation and operation and outflow pipe relocation would also be performed. Based on Gannett Fleming's estimate, the total remediation cost would be approximately $1.6 million; compared to the $2.35 million estimate for the "pump and treat" alternative included in the PRAP.

Accordingly, on behalf of Dover Corporation, Gannett Fleming requests that the Department include enhanced in-situ bioremediation in the Record of Decision for the Site, allowing for pilot-scale testing at the Dover Electronics Site.

RESPONSE

In general, the use of a Hydrogen Release Compound (HRC) is promising as an in-situ treatment for VOC contaminated groundwater. However, the following is a summary of why the proposal to use HRC as the only component to address contaminated groundwater at the Dover Electronics site would not address the goals of the remedial program, relative to the evaluation criteria used to select the remedy for the site.

Protection of Human Health and the Environment

1. No containment is provided - the contaminant plume would remain in an "uncontrolled" state for the entire duration until the in-situ groundwater treatment achieved the SCGs.

2. The in-situ treatment works by "breaking down" or degrading the contaminants into other compounds that would not be harmful to human health or the environment. However, during this degradation process intermediate compounds are generated and remain until they are treated by the process. Some of these intermediate compounds are more soluble/mobile and more toxic than the original contaminant and would remain in this uncontrolled situation for a period of time until they are broken down by the process.

   Also, anaerobic degradation is promoted as a part of the enhanced biodegradation, but once the contaminants are broken down to vinyl chloride (more mobile and more toxic than the original contaminant), the degradation process progresses more slowly anaerobically (versus aerobically).

3. By itself, bioremediation is not well suited for soils with the physical characteristics of the aquifer present at this site. Specifically, fractured till is present at the site; groundwater has a preference to flow through the fractures that are present in the till. It is likely that the HRC would not come in contact with/would not treat all of the contaminated groundwater since the fractures, and thus the groundwater, are not totally interconnected.

Implementability

1. Using direct-push methods (e.g., Geoprobe™) to install the injection points is not realistic through the till found at this site. The till present at the site is "tight" and is very difficult to push through using this method (the method proposed for the installation of the injection points for the HRC).

2. At Dover Electronics, the installation of the necessary injection points, at/near the source area, on the sloped area near the stormwater outfalls near the west corner of the building would be extremely difficult, if not impossible.

Effectiveness

1. See #3 under Protection of Human Health and the Environment, above.

2. The EPA document titled "Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater" (EPA/600/R-98/128) includes a table (Table 2.3, page

29) presenting parameters of the aquifer to be evaluated as a screening tool to determine the expected effectiveness for anaerobic biodegradation for a system; the analysis of samples from these sites indicates many of these parameters are outside of the limits included in this table. Therefore, for bioremediation to be effective at this site, aquifer conditions would need to be modified. Although aquifer conditions could be improved to varying degrees across the site, the Department believes that bioremediation only, without active groundwater collection and treatment, would not achieve the remedial goals for the site in a reasonable amount of time and in a cost-effective manner.

Reduction of Toxicity, Mobility, or Volume

1. See #2 under Protection of Human Health and the Environment, above.

Cost

1. The cost estimate presented in the comment letter did not take into account the following factors:

   - costs associated with the use of drill rig to install the injection points
   - costs associated with the number of re-injections that would be required to attain the remedial goals
   - costs associated with the performance monitoring that would be necessary (consistent with Section 1.5 of the Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater, page 9).

Based on what is presented above, it is believed that a detailed breakdown of all of the relevant costs will indicate that the use of HRC, as the only component of the groundwater remedy at this site, is not as cost effective as the letter indicates.

For all of the reasons summarized above, the use of in-situ treatment of the contaminated groundwater (using HRC), as the only component to address the groundwater contamination, would not effectively address the remedial goals at this site. However, during the early stages of the implementation of the remedy, supplemental in-situ groundwater treatment (in the area(s) where the highest concentrations are present) will be evaluated to determine if it will be a cost effective way to shorten the duration for the operation of the groundwater extraction/treatment system.

APPENDIX B

Administrative Record

Administrative Record
Dover Electronics Site
Broome County
Site No. 7-04-026

1. Record of Decision, prepared by NYSDEC, dated March 2000.

2. Proposed Remedial Action Plan, prepared by NYSDEC, dated February 2000.

3. Environmental Site Investigation for Dover Electronics Company, DEM-East and Kirkwood North Locations; prepared by Hagopian Engineering Associates, prepared October 1990.

4. Phase II Environmental Site Investigation for Dover Electronics, prepared by Hagopian Engineering Associates, prepared August 1991.

5. Phase III Investigation - Kirkwood North, prepared by Stetson-Harza, dated December 1992.

6. Dovatron International - Kirkwood Facility, August 1994 to September 1995 Operation Report for On-Site Groundwater Recovery and Treatment System, prepared by Stetson-Harza, dated October 1995.

7. Site Investigation - Kirkwood Industrial Park, prepared by Shield Environmental Associates, Inc., dated July 23, 1997.

8. Baseline Summary Report for DII Kirkwood Industrial Park - Volume I, prepared by Shield Environmental Associates, Inc., dated February 20, 1999.

9. Baseline Summary Report for DII Kirkwood Industrial Park - Addendum, prepared by Shield Environmental Associates, Inc., dated February 20, 1999.

10. Remedial Investigation/Feasibility Study Work Plan for the Dover Electronics Site, prepared by Shield Environmental Associates, Inc., dated October 14, 1998.

11. Remedial Investigation(RI)/Feasibility Study(FS) Report, RI prepared by Shield Environmental Associates, Inc.,/FS prepared by Shield Engineering Associates, Inc., PC dated February 2000.

12. Remedial Investigation/Feasibility Study Report Appendices A-D, prepared by Shield Environmental Associates, Inc., dated August 1999.

13. Remedial Investigation/Feasibility Study Report Appendices E-H, prepared by Shield Environmental Associates, Inc., dated February 2000.

14. Citizen Participation Plan, prepared by NYSDEC, dated October 1998.

15. Fact Sheet, issued by NYSDEC, dated October 1998.

16. Public Meeting Announcement, prepared by NYSDEC, dated February 2000.

17. Comment Letter on the Proposed Remedial Action Plan, submitted by Mr. Leonard Eder - Gannett Fleming Engineers and Architects, P.C., dated March 14, 2000.