RECORD OF DECISION AMENDMENT

Hollingsworth Solderless Terminal Company Superfund Site
EPA ID: FLD 004119681
Fort Lauderdale, Florida

PREPARED BY:

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

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LIST OF ACRONYMS and ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
AROD	Amended Record of Decision
bls	below land surface
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	Contaminant (or Chemical) of Concern
COPC	Contaminant of Potential Concern
COPEC	Contaminant of Potential Ecological Concern
CTLs	Cleanup Target Levels
DCE	Dichloroethene
DHE	Dehalococcoides ethenenogens
DO	Dissolved oxygen
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FDEP	Florida Department of Environmental Protection
gpm	Gallons per minute
GTCL	Groundwater target cleanup level
HSTC	Hollingsworth Solderless Terminal Company
ISEB	In-situ enhanced bioremediation
kg	Kilogram
L	Liter
µg	Microgram
mg	Milligram
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram or parts per million (ppm)
ORP	Oxidative-reduction potential
NPL	National Priority List
MNA	Monitored natural attenuation
NADC	Natural Attenuation Default Criteria
ppb	parts per billion
ppm	parts per million
PVC	Polyvinyl chloride
RAO	Remedial action objectives
RD/RA	Remedial design/remedial action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe drinking water act
SVE	Soil vacuum extraction
TCE	Trichloroethene
TCLP	Toxicity characteristic leachability procedure
ug/kg	micrograms per kilogram
ug/L	micrograms per Liter
VC	Vinyl chloride
VOCs	Volatile Organic Compounds

Part 1 THE DECLARATION

1.1 Site Name and Location

Hollingsworth Solderless Terminal Company Superfund Site, 700 57th Place, Fort Lauderdale, Broward County, Florida.

1.2 Statement of Basis and Purpose

This decision document presents the amendment to the groundwater component of the selected remedial action for the Hollingsworth Solderless Terminal Company (HSTC) Superfund Site, Fort Lauderdale, Broward County, Florida, chosen in accordance with Section Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, Section 300.430(f)(2)of the National Contingency Plan (NCP). This decision is based on the Administrative Record for the Site.

1.3 Assessment of Site

The EPA and the Florida Department of Environmental Protection (FDEP) believe the response action selected in this amended record of Decision (AROD), in-situ enhanced bioremediation (ISEB), would be an appropriate alternative to reduce the remaining volatile organic compounds (VOCs) concentrations in groundwater to levels that are protective of human health and the environment within a reasonable timeframe. The decision to use ISEB at the HSTC Site is based on data from a ISEB pilot-scale treatability study performed from April 2005 to September 2007. Aside from the obvious degradation of contaminants observed during the pilot study, other chemical factors, such as oxidative-reduction potential (ORP) and dissolved oxygen (DO) indicate an anaerobic aquifer with highly reducing conditions. In addition, the presence of the vinyl chloride reductase gene detected in bacteria from groundwater samples collected during the pilot study is promising for further anaerobic reduction of VOCs. The presence of the ultimate non-toxic end product ethene also suggests reductive dechlorination is progressing to completion, thus justifying this amendment to the 1986 remedy.

The soil remediation objective, as stated in the 1986 ROD, was to remove the sources of contamination present in the Site's multiple drainfields. Of the multiple source areas, the East Drainfield, was initially considered as being the most highly contaminated. In 1991, a soil vapor extraction (SVE) system was installed and operated in the East Drainfield. A remediation goal of less than one part per million of total VOCs was achieved within six months of operation of the SVE system. Results of a June 1999 soil investigation provided conclusive evidence of additional soil contamination in the West and South Drainfields. In addition, during a June 1999 investigation, a soil boring installed near the East Drainfield revealed contamination levels in excess of cleanup goals, suggesting that the former East Drainfield area had become re-contaminated by contaminated groundwater.

In 1992, a groundwater extraction and treatment system was installed and operated in the Biscayne aquifer. A considerable mass of VOCs was removed during the initial operation of the groundwater extraction and treatment system. In 1994, once the system reached the point of diminishing returns and further reduction in groundwater concentrations of trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC) were not occurring, as a result of the continuing groundwater pumping and treatment effort, EPA directed its contractors to dismantle the treatment system in the summer/fall of 1994.

After 1994, several rounds of groundwater monitoring documented residual VOCs in the shallow and intermediate wells. Subsequent groundwater monitoring showed a rebound of contaminant concentrations after the treatment system was removed, suggesting residual contaminant sources in two specific areas of the Site. Additional subsurface soil sampling identified the former West and South Drainfield areas as the probable causes of this rebound. Neither of these source areas were identified in the 1986 ROD as containing source material that required remediation, and thus were not treated during the early 1990s. In hindsight, they should have been recognized as source areas and treated.

After issuing an Explanation of Significant Differences (ESD), in early 2002, source removal of contaminated soils proceeded in the former South Drainfield and the septic tank associated with the West Drainfield. The excavation was performed as deep as possible, but the full extent of impacted soil could not be removed due to the shallow water table, presence of flowing sands, and the threat of causing serious structural damage to an adjacent building.

Results from sampling groundwater from monitoring wells in August 2002, five and a half months after the removal of the contents of the West Septic Tank and South Drainfield, indicated that, although contaminant concentrations in the shallow monitoring wells had declined significantly, contaminant concentrations in the intermediate wells in the vicinity of the South Drainfield did not show a similar decline.

Subsequent to 2002, Site monitoring has documented the presence of residual breakdown products of TCE in groundwater, in the vicinity of the West Septic Tank and South Drainfield. As a consequence, a Work Plan was developed to conduct an ISEB pilot test in these areas. The test was performed from April 2005 to September 2007 and included two potassium lactate injections in the West Septic Tank and South Drainfield areas followed by groundwater monitoring.

1.4 Description of Amended Selected Remedy

This remedy addresses the principal threat of contaminated groundwater associated with the HSTC Site. The purpose of this amendment is to document a specific change that is being made to a component of the remedy selected by the Region 4 Office of the United States Environmental Protection Agency (EPA) in the 1986 ROD for the HSTC Site. The original remedy for the HSTC Site included abandonment of the old injection well and all other PVC wells, treatment of VOC contaminated groundwater and injection of

treated groundwater near the Site; and treatment of contaminated soils in the vadose zone in the East Drainfield. An ESD was later issued and implemented to remove additional contaminated soils in the vadose zone in the West and South Drainfields, not treated during the original remediation.

The result of previous remedial activities and the ISEB pilot study have indicated that an amended remedy should be implemented to address the remaining groundwater contamination. Therefore, EPA in consultation with FDEP, has determined to amend the remedy as follows:

- Amend the April 10, 1986 Record of Decision (ROD) as follows: Perform ISEB in the affected groundwater zone.

1.5 Statutory Determinations

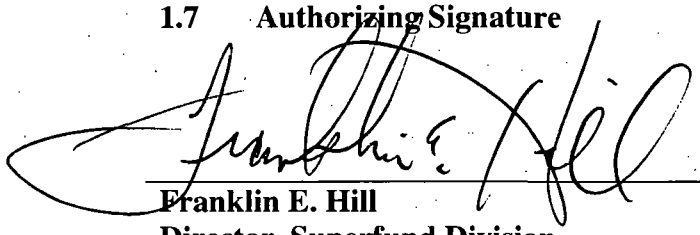
The selected remedy is protective of human health and the environment, complies with federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technology to the maximum extent practicable. Upon completion of the remedial action, hazardous substances, pollutants, or contaminants will no longer remain at this site above health based levels.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this ROD Amendment. Additional information can be found in the Administrative Record file for this site.

- Contaminants of Concern (COCs) and their respective cleanup levels;
- How source materials constituting principal threats have been addressed;
- Potential land and groundwater use that will be available at the Site as a result of the ISEB remedy;
- Total present worth costs for the ISEB remedy, and the number of years over which the remedy cost estimates are projected; and
- Key factors that led to selecting the ISEB remedy.

1.7 Authorizing Signature



11/24/08

Franklin E. Hill **Date**
Director, Superfund Division
U.S. EPA, Region 4

Part 2 INTRODUCTION TO SITE, SITE HISTORY, AND CONTAMINATION

2.1 Site Name and Location

The HSTC Site is located at 700 57th Place in Fort Lauderdale, Broward County, Florida. Most of the three and a half acre property consists of a relatively large one-story cinder block building approximately 250 by 200-feet, referred to as Plant #1/Building B in the early documents (**Figure 2-1**). The lead agency for this Site is the EPA.

The facility was purchased in a tax sale and subsequently remodeled approximately four years ago. The owner occupies office space in the northern portion of the building, and has leased most of the inside space to five tenants. Current tenants include a sign company, a company that stocks and sells U.S. postal uniforms and supplies, a warehouse that stores cabinets and other items for remodeling baths and kitchens, and one-room with a wrestling rink, where wrestlers work-out and practice. In addition, a pallet refurbishing and sales company uses both indoor and outdoor storage, with the western parking lot filled with tall stacks of pallets. Based on field observations, none of the tenants use chlorinated solvents in their operations.

2.2 Site History

From 1968 to 1982, HSTC manufactured solderless electrical terminals, consisting of a conductive metal portion and a plastic sleeve. The operations consisted of heat treatment of the terminals in molten salt baths, electroplating, and degreasing, and the process wastes consisted of spent liquid dye, electroplating wastes, and maintenance wastes. The day-to-day cleaning and maintenance wastes consisted of TCE solution to clean floors and degrease machinery parts. The primary contaminants of concern are TCE and its degradation products cis 1,2-dichloroethene (cis 1,2-DCE), trans 1,2-dichloroethene (trans 1,2-DCE), and VC.

The waste disposal practices at the HSTC consisted of allowing the waste liquids to infiltrate into the ground through numerous industrial drainfields, and through a surface discharge. Wastes were also pumped into an onsite injection well (**Figure 2-1**). The industrial drainfields are referred to as the East, South and West drainfields, as well as the West Septic Tank. In November 1982, HTSC filed for Chapter 11 bankruptcy status under the Federal Bankruptcy Code.

The 1986 ROD provides further detail on the early Site history.

2.3 Administrative History and Administrative Record

The Administrative Record is available at the Ft. Lauderdale Public Library located at 100 S. Andrews Avenue, Ft. Lauderdale, FL 33301. The lead agency is the EPA, with the FDEP providing technical support (CERCLA §117 and NCP §300.435 (c) (2) (11)). This ROD Amendment will be incorporated into the Administrative Record file in accordance with NCP §300.825 (a) (2).

The HSTC Site was listed as final on the National Priorities list in 1983. On April0, 1986, a ROD was issued by EPA, which selected remedies for the Site. The principal elements of the 1986 ROD were treatment of VOCs in unsaturated soil underlying the East Drainfield, and recovery and treatment of VOC-impacted groundwater from the Biscayne aquifer, a federally-designated sole-source aquifer.

In 2001, an Explanation of Significant Differences (ESD) was issued by EPA that supported the removal of source VOCs by the excavation of the South Drainfield and the removal of the East Septic Tank, located near West Drainfield.

2.4 Contaminants of Concern, 1986 ROD

The groundwater COCs associated with potential health risks which were identified in the 1986 ROD include VC, TCE, and trans 1,2-DCE. The cleanup goals for groundwater were based on the 10^{-6} cancer risk, the State of Florida Primary Drinking Water Standards, and the proposed EPA MCLs. **Table 2.1** presents the 1986 ROD's cleanup goals for both soil and groundwater. Soil cleanup goals were established on the basis of protection of groundwater.

Table 2.1
1986 ROD Clean Up Goals for Health Risk COCs

Groundwater COC	**Cleanup Goal (ug/L)**
Vinyl Chloride	1.0
Trans 1,2-dichloroethene	70.0
Trichloroethene	3.2
Soil COC	**Cleanup Goal (mg/kg)**
Total VOCs	1.0
	Cleanup Goal (mg/L)
Copper	10.0
Nickel	1.0
Lead	0.5

Based on results of the Public Health Evaluation referred to in the 1986 ROD, there are no complete pathways for exposure by direct contact, ingestion, or inhalation of contaminants from the HSTC Site, because public water is available and the asphalt and buildings present a barrier to the contaminated soil. However, there was a possible pathway associated with direct contact with soil, were any future excavation to take place. There was also a potential for future exposure via installation of private irrigation or supply wells with the area of contaminated groundwater. No known irrigation or supply wells located within the known extent of the groundwater plume.

2.5 Summary of Post ROD Investigation Activities and Remedial Actions

Soil

In 1991, a SVE system was installed and operated in the East Drainfield. The soil cleanup goal of less than one part per million total VOCs was achieved within six months of start-up of the SVE system. Additional soil samples collected in March 1993 (to a depth of five feet below the ground surface) verified that the SVE system had also remediated total VOC concentrations below the cleanup goal in the unsaturated zone.

The June 2001 Final Supplemental Remedial Investigation Report concluded that, while EPA had remediated the East Drainfield (at the time recognized as the most highly contaminated area), soil and groundwater data indicated the presence of additional residual soil sources. The sources identified were the South and West Drainfields. It was concluded that the groundwater remediation goals of the 1986 ROD would not be achieved unless these area were more thoroughly addressed. In addition, the Report concluded that redox conditions existed in the groundwater which was conducive to biodegradation of the chlorinated VOCs.

In October 2001, an ESD was issued by EPA, supporting the removal of source VOCs in the South and West Drainfields; FDEP concurred with the ESD. The residual sources had been identified by a June 2001 soil sampling event. Consequently, source removal was proposed through the excavation and removal of the South Drainfield and the septic tank associated with the West Drainfield.

In early 2002, source removal proceeded in the South Drainfields and West Septic Tank areas. Confirmatory soil samples were analyzed for the target compounds TCE, cis-DCE, and VC by EPA Method 8260B. The excavation was performed as deep as possible, but the full extent of impacted soil could not be removed due to the shallow water table, the presence of flowing sands, and the potential threat of causing severe structural damage to an adjacent building. The water table was found at approximately five feet below the land surface (bls). With the use of sheet piling, excavation of the South Drainfield proceeded to depths ranging from six-to-nine feet bls, with the deepest excavation in the center of the remediation area, where the highest VOCs were detected. This central area corresponded to the location of the former industrial septic tank/drainfield area.

Within the West Drainfield, a stainless steel industrial septic tank, containing TCE sludge was uncovered and removed. Upon opening the tank and examining the interior of the tank, the contents were described as a saturated bright green sludge with a chemical odor. The contents of the tank were removed and, based on sampling results, disposed of at hazardous waste landfill.

Groundwater

In 1992, a three well groundwater extraction and treatment system was installed and put into operation. Groundwater was recovered, treated by air stripping and injected back

into the Biscayne aquifer through a two well injection system. As many as 55 pounds of VOCs per day were removed during the initial operation of the system. In 1994, once the system reached the point of diminishing returns and further reduction in groundwater concentrations of TCE, DCE (both cis- and trans- isomers) and VC was not occurring, EPA directed its contractors to dismantle the treatment system in the summer/fall of 1994.

After 1994, several rounds of groundwater monitoring were conducted and revealed residual VOC groundwater concentrations (primarily cis-DCE) in shallow and intermediate well depths.

Results from sampling monitoring wells in August 2002, five and a half months after the removal of the contents of the South Drainfield and West Septic Tank, indicated that, although contaminant concentrations in the shallow (20 ft) monitoring wells had declined significantly, contaminant concentrations in the intermediate wells (50 ft bls) in the vicinity of both overlooked source areas did not show a similar decline.

2.6 Summary of ISEB Pilot Test Activities

Subsequent to 2002, groundwater monitoring documented the presence of residual breakdown products of TCE remaining in groundwater, in the vicinity of the South Drainfield and West Septic Tank. As a consequence, a Work Plan was developed to conduct a pilot-scale treatability study in these areas. The test was performed from April 2005 to September 2007 and included two potassium lactate injections in the areas of the South Drainfield and the West Septic Tank (**Figure 2-2**). Each location consisted of one central recovery well (RW-1 and RW-2) surrounded radially by eight injection wells (IW-1 to IW-16). In addition, four new performance monitor wells were installed within each area (PMW-1 to PMW-8) to monitor groundwater conditions between the injection points and the central recovery well. All eight performance monitoring wells and all 16 injection wells were screened from 10-to-30-feet bls, and the two recovery wells were screened from six-to-36 feet bls. A steel shed was installed to enclose the remedial controls and piping and is positioned along the southern wall of the HSTC building.

The system was configured into closed-loop recirculation cells whereby groundwater was pumped into a tank from RW-1 and RW-2, and was mixed with a lactate solution which was returned to the subsurface via the 16 injection wells. This resulted in the injections producing a mounded water table at the injection well locations, with a low point in the middle of the circle, at the recovery well location. The closed-loop system did not include any aboveground treatment.

Potassium lactate was used for injection. As an aqueous solution, the lactate functioned as an electron donor in a complex series of biochemical reactions to break down the Site contaminants into innocuous end products (ethene, chloride, and ultimately carbon dioxide [CO_2]). The indigenous chloro-respiring bacteria ferment the lactate (organic substrate) to fatty acids (e.g., acetate and propionate). These are subsequently metabolized releasing hydrogen (H_2). Hydrogen is used by the reductive dechlorinating microorganisms as the ultimate electron donor for dechlorinating TCE and its daughter

products cis 1,2-DCE and VC. The overall success of this technology depended on: (1) an adequate supply, distribution, and residence time of the lactate solution, (2) the absence of excessive quantities of competing electron acceptors (e.g., ferric iron, sulfate), and (3) the absence of an ongoing source in the vadose zone.

Appendix A and, **Figure 2-3 and 2-4** presents the VOC analytical results from the groundwater samples collected in February and August 2007. The data are compared to State of Florida regulatory closure guidelines which use established FDEP Cleanup Target Levels (CTLs), with active remediation indicated when there exist exceedences of Natural Attenuation Default Concentrations (NADCs). For chlorinated ethene compounds, the NADC is 100 times the CTL. The data are summarized below and indicates the following:

- For the 20 wells sampled in August 2007 (**Figure 2-4**), there were only two wells that contained VC above the FDEP NADC of 100 ug/L. Specifically, PMW-1 contained VC at 160 ug/L and PMW-5 contained VC at 720 ug/L. These two wells correspond to the hotspots near the West Drainfield and within the former South Drainfields, respectively;

- Only one well contained cis 1,2-DCE above the FDEP CTL of 70 ug/L. Specifically, PMW-1 contained cis 1,2-DCE at 430 ug/L;

- Two other wells contained VC slightly above the CTL in the West Drainfield. Specifically, RW-1 contained VC at 13 ug/L and MW-B contained VC at 1.7 ug/L;

- One well contained TCE above the FDEP CTL of 3.0 ug/L. Specifically, RW-1 contained TCE at 4.7 ug/L;

- The VOCs concentrations decreased in August 2007 compared to the previous sampling event in February 2007. At PMW-1, total VOCs decreased from 1,071 to 599 ug/L, consisting primarily of cis 1,2-DCE and VC. At PMW-5, total VOCs decreased from 7,824 to 730 ug/L, consisting primarily of VC; and

- The groundwater contaminant plume appears to be stable and has not migrated offsite, to a significant extent

Part 3 BASIS FOR DOCUMENT

3.1 Purpose for Issuing the Proposed Amendment

The purpose of this amendment is to modify the groundwater component of the 1986 ROD to include treatment of the Site's groundwater with ISEB. A groundwater extraction and treatment system was employed successfully from 1992 through 1994. The system removed a substantial mass of contaminants from the groundwater. However, once the system reached the point of diminishing returns and further reduction in groundwater concentrations of TCE, DCE and VC were not occurring as a result of the groundwater pumping and treatment effort, EPA directed its contractors to dismantle the treatment system in the summer/fall of 1994. Subsequent groundwater monitoring showed a rebound of contaminant concentrations after the treatment system was removed, suggesting residual contaminant sources in two specific areas of the Site. Additional subsurface soil sampling identified the former South Drainfield and West Septic Tank areas as the probable causes of this rebound. Neither of these source areas were identified in the 1986 ROD as containing source material that required remediation, and thus were not treated during the early 1990s.

Subsequent to 2002, Site monitoring indicated residual breakdown products of TCE remaining in groundwater in the vicinity of the South Drainfield and West Septic Tank areas, above the 1986 ROD's groundwater remediation goals. As a consequence, a Work Plan was developed to conduct an ISEB pilot-scale treatability study. The study was performed from April 2005 to September 2007 and included two potassium lactate injections, the first of which was augmented with *Dehalococcoides ethenogenes* (DHE) bacteria in the groundwater. DHE is a genus of eubacteria within the class *Dehalococcoides* that obtains energy via the oxidation of hydrogen gas and subsequent reductive dechlorination of halogenated organic compounds.

3.2 Rationale for In-Situ Enhanced Bioremediation (ISEB)

The pilot-scale treatability study has suggested that ISEB would be an appropriate alternative to reduce the remaining VOC concentrations in groundwater to levels that are protective of human health and the environment within a reasonable timeframe. EPA's decision to use ISEB at the HSTC Site to address the remaining VOC contamination is based on data from the ISEB pilot study performed April 2005 to September 2007.

Results of the pilot-scale treatabity study indicate the following:

- Addition of lactate and augmentation with the DHE culture during the ISEB Pilot Study promoted enhanced reductive dechlorination, via biotic mechanisms, of the target compounds. Both in February 20007 and August 2007, the extent of significant groundwater contamination appears to be limited to well PMW-1 near the West Septic Tank and well PMW-5 in vicinity of the South Drainfield. At PMW-1, the total VOC concentrations have been reduced from as high as 3,067 ug/L down to the August 2007 level of 599 ug/L. At PMW-5, the total VOC concentrations have been reduced from as high as 60,171 ug/L down to the

August 2007 level of 733 ug/L. Aside from the obvious degradation of contaminants, measured geochemical parameters such as oxidative reduction potential (ORP) and dissolved oxygen (DO) indicate that the aquifer was driven further anaerobically, with highly reducing conditions, following the lactate injections.

- During the course of the entire ISEB study, the contaminant found were almost exclusively cis 1,2-DCE and VC, with the infrequent occurrence of the parent product TCE, found at trace concentrations. Currently, the regulatory FDEP CTL for cis 1,2-DCE of 70 ug/L is exceeded in PMW-1, and the NADC for VC of 100 ug/L is exceeded in PMW-1 and PMW-5. In addition, there are very minor CTL exceedances for TCE and VC in RW-1, and for VC in MW-B. Although not ubiquitous, the presence of the vinyl chloride reductase gene, found in samples of DHE recovered from the Site, is promising for further anaerobic reduction of both cis 1,2-DCE and VC. In addition, the presence of the ultimate non-toxic end product ethene suggests reductive dechlorination is progressing to completion.

Documentation supporting the need for this amendment to the 1986 ROD may be found in a number of Vital Signs Report and the ISEB Progress Report, dated February 5, 2008. These documents are available in the Site's Administrative Record.

3.3 Site Hydrogeology

The residual contamination at this Site is present in the unconsolidated sands, which are present from the surface to about 50-feet bls. These sands have high transmissivities, making them ideal setting for application of ISEB. No confining units are present to complicate delivery of the lactate, or other electron donor. The water table at the HSTC Site is very shallow, historically ranging between approximately three-to-five feet bls.

The geology underlying the Site consists of fine-grained quartz sand to approximately 30-feet or so, overlying a fine-to-medium-grained quartz sand to approximately 50-feet, in turn overlying a partially-cemented sand and gravel (shell-sand gravel) to 65-feet. From approximately 65 to 150-feet bls, a gray limestone with traces of shell and sand is present that grades into a fossiliferous, micritic (microcrystalline) limestone to a depth of 190-feet bls. Appendix A shows that since May 2005, only low-to-trace contaminant concentrations have been detected at depth of 50 feet bls, or greater.

Part 4 DESCRIPTION OF PROPOSED GROUNDWATER REMEDY

4.1 1986 ROD Groundwater Remedy

The groundwater treatment system constructed pursuant to the groundwater remedy selected in the 1986 ROD consisted of three extraction wells, two air stripping towers, and two re-injection wells. The system was designed to extract and treat groundwater at a rate of 450 gallons per minute (gpm) for nine months, however, the constructed system operated at a rate of between 280-to-400 gpm. The system operated continuously from July 1992 through October 1993 and was operated in pulse cycles for 21 days of pumping and seven days without pumping from October 1993 to August 1994. Once the system reached the point of diminishing returns and further reductions in groundwater concentrations of TCE, VC and trans 1,2-DCE were not occurring as a result of the groundwater pumping and treatment effort, EPA directed contractors to dismantle the treatment system in summer/fall 1994. During the treatment period, a total of over 201 million gallons of water was extracted, treated and re-injected. During the initial weeks of operation of the groundwater recovery treatment system, as many as 55 pounds of VOCs were removed daily from the Biscayne aquifer by the three recovery wells.

Institutional controls, designed to restrict groundwater use while contaminant concentrations remain above State or federal standards, were not contemplated in the 1986 ROD.

4.2 Amended Groundwater Remedy

EPA assessed the residual cis 1,2-DCE and VC concentrations remaining in the groundwater, considered available alternatives for remediating this residual contamination, and conducted a pilot-scale treatability study to assess whether ISEB would be a potentially effective remedy. Upon reviewing the results of the pilot-scale study, EPA determined that ISEB would be a potentially effective remedy that would be expected to treat the remaining VOCs in the Site's groundwater to levels below the recommended revised groundwater cleanup goals for this Site. ISEB has been determined to be a potentially effective remedy for the remaining VOCs in the Site's groundwater. ISEB is an enhancement of the naturally occurring biodegradation of contaminants in various media, including groundwater. Additives such as nutrients, biodegradable carbon substrates and/or bulking agents are added to the groundwater and/or soil to enhance the activity of indigenous microbial populations.

The proposed groundwater remedy would include addition of a carbon substrate in all or part of the two areas requiring treatment. This alternative may also include additional bioaugmentation. Bioaugmentation is the introduction of a group of natural microbial strains or a genetically engineered variant to treat contaminated soil or groundwater. The substrate injections would be targeted to address the remaining unacceptable concentrations in the vicinity of monitoring wells PMW-1 and PMW-5. These injections could be more limited than previous injections, perhaps by injecting into just a portion of the area encompassed by the injection wells, such as the areas centered on PMW-1 and PMW-5. A more limited, targeted approach appears appropriate given the current

distribution of unacceptable VOC concentrations. Bioaugmentation with additional *Dehalococcoides ethenogenes* could increase the potential for successful reductive dechlorination. Additional design would be undertaken to determine appropriate substrate type (perhaps a less rapidly fermented formulation), substrate concentration, total mass required, injection and extraction flow rates, injection locations, quantity of bioaugmentation culture, and potential assessment of other requirements for the successful construction of the ISEB bioaugmentation remedy. It is anticipated that ISBE would reduce groundwater contaminant concentrations to levels below the State of Florida Natural Attenuation Default Concentrations. Once the following Site conditions have been met, Monitored Natural Attenuation would be implemented: contaminant concentrations are below the Natural Attenuation Default Concentrations, contaminants are not migrating vertically or horizontally, and achievement of the groundwater cleanup target levels is anticipated in five years or less. These criteria will be evaluated by groundwater monitoring.

The remedial strategy would include a monitoring plan, which would designate the location of a temporary assessment point, and would confirm the effectiveness of natural attenuation in reducing contaminant levels and preventing contaminant migration. The groundwater data would be evaluated annually to determine the remedy effectiveness. A contingency plan would be implemented as a modification to the remedial strategy if the data indicate plume migration, or if contaminant concentrations do not continue to decline in a satisfactory manner.

The remedial action provided in the 1986 ROD did not include institutional controls for groundwater. Institutional controls are needed at the Site, however, to prohibit groundwater use where groundwater contamination exists or is anticipated to exist above the amended cleanup goals indicated in Table 4-1, until such time as the cleanup goals have been achieved. The Site is located within a delineated area pursuant to Florida's Groundwater Delineation Program. See Chapter 62-524 of the Florida Administrative Code (FAC). Rule 62-524.700(2), FAC, prohibits permitting and construction of new potable wells in a delineated area if a potable water supply is available within 500 feet of the property boundary except under limited circumstances. Because the conditions of the rule have been met and none of the exceptions apply, and because there are no existing wells at the Site, Rule 62-524.700(2), FAC, will serve to prohibit groundwater use at the Site. The remedial action provided in the 1986 ROD is therefore amended to include Rule 62-54.700(2), FAC, as an institutional control for the groundwater remedy at the Site.

A review of the amended remedial action will be conducted no less often than every five years, until the amended remedial action results in hazardous substances, pollutants, or contaminants remaining at the Site below levels that allow for unlimited and unrestricted exposure. The report generated from this review is called the Five-Year Review Report. This five-year review process would continue for all selected remedial components at this Site until there is unlimited use and unrestricted exposures associated with the site (e.g., when all cleanup goals listed on **Table 4-1** have been achieved). Three five year reviews

have been completed for the Site. The next five year review is scheduled for December 2011.

Table 4.1: Comparison of 1986 ROD and Revised GCTLs and State of Florida Natural Attenuation Default Criteria

Contaminant of Concern	1986 ROD GCTL, ug/L	Revised GCTL, ug/L	State of Florida NADC, ug/L
TCE	3.2	3	300
cis 1,2-DCE	none	70	700
trans 1,2-DCE	70	100	1,000
VC	1	1	100

Part 5 EVALUATION OF ALTERNATIVES

The NCP Section 300.430 (f) (I), requires that the alternative considered for the final remedy be evaluated on the basis of nine evaluation criteria. This also applies when fundamental changes are proposed to an existing ROD. Table 5.1 presents a description of the nine evaluation criteria and how the alternatives are evaluated.

Table 5.1: Criteria For Evaluating Remedial Alternative

In selecting the preferred cleanup alternative, EPA uses the following criteria to evaluate each alternative developed in the Feasibility Study.

Threshold Criteria: the first two criteria are essential and if not met, an alternative is not considered further.

1. Overall protection of human health and the environment – Degree to which an alternative eliminates, reduces, or controls health and environmental threats.
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) – Assesses compliance with Federal and State requirements.

Balancing Criteria: The next five are balancing criteria used to further evaluate all options that meet the first two criteria.

3. Long-term effectiveness and permanence – Expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment, once clean-up levels have been met.
4. Reduction of contaminant toxicity, mobility, or volume through treatment – Expected performance of the treatment technology to lessen the harmful nature, migration, or amount of contaminants.
5. Implementability – Technical feasibility and administrative ease of a remedy.
6. Short-term effectiveness – The period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.
7. Cost – Weighing of benefits of a remedy against the cost of implementation.

Modifying Criteria: The final two criteria are used to modify EPA's proposed plan after public comment period has ended and comments from the community and the State have been received.

8. State Acceptance – Consideration of the State's opinion of EPA's proposed plan. EPA seeks state concurrence.
9. Community Acceptance – Consideration of public comments on proposed plan.

5.1 Threshold Criteria

The threshold criteria relate to statutory requirements that each alternative must satisfy in order to be eligible for selection. An evaluation of the 1986 ROD selected groundwater remedy and the proposed amended groundwater remedy follows.

Overall Protection of Human Health and the Environment

The 1986 ROD selected groundwater remedy (pump-and-treat) has not been effective at reaching the groundwater cleanup goals specified by the 1986 ROD, which remain above the State and federal standards at two locations.

The proposed amended remedy is expected to reduce the cis 1,2-DCE and VC concentrations to below the recommended revisions to the 1986 ROD's groundwater cleanup goals or the State of Florida Natural Attenuation Default Criteria, with active treatment. This conclusion is supported by results of the ISEB pilot study, which show both substantial contaminant reductions and the development of a reducing environment favorable for reductive dechlorination. In addition, the presence of the vinyl chloride reductase gene detected in samples of DHE collected during the pilot study is promising for further anaerobic reduction of both cis 1,2-DCE and VC. The presence of the ultimate non-toxic end product ethene also suggests reductive dechlorination is progressing to completion.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

The 1986 ROD's selected remedy is not anticipated to attain the ARARs associated with cleanup goals for groundwater that are listed in the 1986 ROD because the levels of cis 1,2-DCE and VC in the groundwater are anticipated to remain above the State and federal primary drinking water standards.

The proposed amended remedy is expected attain the amended ARARs associated with cleanup goals for groundwater at the HSTC Site, by stimulating the growth of anaerobic microbes capable of further degrading remaining contaminants present in the groundwater. The amended chemical-specific ARARs to be met in the Site's groundwater, to permit delisting the site from the National Priorities List (NPL), are listed on **Table 4-1** and are based on the following requirements:

- Federal – SDWA - Maximum Contaminant Levels Goals (MCLGs, 40 CFR 141); and
- FDEP Drinking Water Standards (F.A.C. 62-520 and 62-550).

5.2 Balancing Criteria

The balancing criteria are the technical criteria that are considered during the analysis. An evaluation of the 1986 ROD selected remedy and the proposed amended groundwater remedy against these criteria follows.

Long-term Effectiveness and Permanence

The proposed amended remedy would be designed to optimize the reduction of contaminant concentrations, thereby minimizing the risk of exposure. Further migration of the remaining VOCs, present above regulatory standards would be eliminated through active treatment. *This will also result in a permanent reduction in groundwater contaminant concentrations below the regulatory standards.* The viability of this remedy is supported by results of the ISEB pilot study. While ISBE as a remedial technology was not available when the 1986 ROD was prepared, it is currently being refined and optimized.

Reduction of Contaminant Toxicity, Mobility, or Volume through Treatment

The 1986 ROD's selected groundwater remedy has been shown to be only capable of reducing the Site's groundwater contaminant concentrations to levels considerably above the groundwater cleanup goals specified in the 1986 ROD. As shown on **Figures 2-3 and 2-4**, recent groundwater monitoring has shown the presence of cis 1,2-DCE and VC above the recommended cleanup goals listed on **Table 4-1**.

The proposed amended groundwater remedy would provide a substantial reduction in toxicity, mobility, and volume of VOC contaminants remaining in the Site's groundwater through active treatment over the 1986 ROD's selected groundwater remedy. This proposed amended groundwater remedy is supported by results of the ISEB pilot study.

Also, the NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. As described earlier, there are no anticipated principal threat wastes at this site which require treatment.

Implementability

The 1986 ROD's selected groundwater remedy was implemented and operated for a number of years before EPA concluded that it had reached the point of diminishing returns and was discontinued and dismantled.

Site hydrogeologic conditions are ideal for implementing the proposed amended ISBE groundwater remedy. It would require EPA, in consultation with FDEP, to design the additional lactate substrate injections, and monitor progress of the ISBE remedy over time. Much of the subsurface and above-ground equipment used during the pilot test and which currently remains at the Site may be used for additional substrate injections. Contractors are readily available for construction of the recommended amended remedy.

Short-Term Effectiveness

The 1986 ROD's selected groundwater remedy was constructed over a short period of time. Contaminant concentrations were reduced considerably while the pump-and-treat system operated, but spiked intermittently above groundwater cleanup levels specified in

the 1986 ROD, after the pump and treat system was discontinued and dismantled. Subsequent groundwater monitoring showed the compounds to be consistently above the 1986 ROD's groundwater cleanup goals. No significant problems occurred or were observed during construction and operation of the system.

The proposed amended remedy would be designed to achieve short term protection and can be implemented without significant risks to the community or on-site workers and without adverse environmental impacts. Substrate injected into the contaminant plume can be present in the aquifer for up to three-to-five years. However, results of the ISEB pilot study indicate the short term effectiveness of the proposed amended remedy (in terms of achieving the amended groundwater cleanup goals noted in Table 4-1) to be several years. Following an initial set of injections the effectiveness will be determined by groundwater monitoring. Additional injections will be considered, as needed. The monitoring and injection/extraction network already exists. Minimal construction will be required, posing no disruption to the community.

Cost

The estimated cost of the proposed amended groundwater remedy is:

Total Capital Cost: $0
Total Present Worth Costs: ***$281,000*** (assumes 7% Discount Rate)

Below is the total cost broken down.

Table 5.2: Cost Estimate

Task No.	Description	Estimated Cost, $
1	Design and Work Plans	19,500
2	Mobilization and Demobilization	22,750
3	Baseline Groundwater Sampling	13,750
4	Purchase Substrate Oil and DHE	17,250
5	ISEB Focused Injections	120,000
6	Post-Injection Groundwater Sampling	68,750
7	Final Site Teardown	4,000
8	Final Report	6,000
9	Project Support (22 months)	50,000
TOTAL ESTIMATED COST		322,000

5.3 Modifying Criteria

The following criteria are used to assess State and community acceptance.

State Acceptance

State acceptance is the criterion used to consider whether the State agrees with the lead agency's analyses and recommendations of the amended remedy. EPA and FDEP have agreed that the proposed amended remedy (ISEB) with continued groundwater monitoring is the appropriate amended remedy for the contaminated groundwater at the Site.

Community Acceptance

On May 18, 2008, EPA published a Notice of Proposed Plan Public Comment Period and offered a public meeting. No comments were received during the comments period. No requests for a Public Meeting or extension of the comment period were received.

Part 6 THE AMENDED REMEDY

6.1 Amended Remedy

Based on consideration of the requirements of CERCLA, the NCP, and the detailed analysis of alternatives and public and State comments, EPA has selected ISEB as the remedy for the residual groundwater contamination at the HSTC Site. The overall remedial action objectives for the ISEB remedy is the same as for the original 1986 ROD which are to prevent further migration of contaminated groundwater into the Biscayne aquifer by cleaning up the existing contamination in the aquifer and to remove the sources of contamination in the overlying soils. Currently, groundwater concentration levels are above the State and federal MCLs for cis 1,2-DCE and VC.

Results of the pilot-scale treatability study indicate that the addition of lactate and augmentation with the DHE culture promoted enhanced reductive dechlorination of the target compounds at the HSTC Site. The contaminant load, although reduced by as much as 99 percent, appears restricted to monitoring wells PMW-1 near the former West Drainfield and PMW-5 in the former South Drainfield area. In addition to reduction of contaminants, other chemical factors such as ORP and DO indicate an anaerobic aquifer, with highly reducing conditions following the lactate injections, justifying use of this technology. In an effort to keep the DHE production high while decreasing the ORP and DO to promote further reductive dechlorination of cis 1,2-DCE and VC at the HSTC Site, additional injection of a carbon substrate is recommended. However, as opposed to lactate, a slow-release/slow-fermentation compound is proposed that yields an appropriate production of hydrogen over time.

Rather than using a groundwater recirculation system that may impact groundwater geochemistry, the slow-release carbon application should be injected and allowed residence time in the aquifer. Only the region surrounding PMW-1 near the former West Drainfield and PMW-5 within the former South Drainfield would require treatment. The recommended process and methods are:

- Injection should be performed using existing wells where feasible and supplemented with temporary direct push drilling technology (DPT) locations closer to the source wells (e.g., lance permeation), which would focus on the target areas;
- Augmentation of the substrate with another DHE application to assist the existing microbes in anaerobic reduction of CAHs;
- Analytical testing of the proposed substrate in accordance with FDEP requirements prior to injection; and
- Implementation of a performance sampling schedule to track the success of the slow-release substrate over time, as well as progress of VOC concentrations.

6.2 Final Cleanup Goals

Table 6.1 presents the cleanup goals for the amended ROD. The cleanup goals have been amended from the 1986 ROD because of post-ROD modifications to the Federal regulations and because an additional COC has been identified during past site investigation and remedial activities.

Table 6.1
Clean Up Goals for the Amended ROD

Groundwater COC	Cleanup Goal (ug/L)
Vinyl Chloride	1.0
Trans 1,2-dichloroethene	100.0
Trichloroethene	3.0
cis-1,2-dichloroethene	70

The primary groundwater COCs associated with potential health risks, which were identified in the 1986 ROD include VC, TCE, and trans 1,2-DCE. The compound cis1,2-DCE was added to the list of cleanup goals because it has been consistently detected above the Federal MCLs and the FDEP Drinking Water Standards in samples collected during past investigation and remedial activities (Appendix A).

The 1986 ROD cleanup goals are more protective than current EPA's MCL's and Florida's Groundwater CTL with the exception of TCE which was based on the 10-6 cancer risk. This is because some of the original cleanup goals were based on proposed EPA MCLs, which cited a lower concentration. Since the original remedy was implemented, the MCLs have been made final and, because Florida's GCTLs are based on the EPA's MCL's, the current EPA MCLs will be the basis for the following compounds: VC, trans1,2-DCE, and cis1,2-DCE.

The cleanup goal for TCE was based on the 10-6 cancer risk and will not change from the 1986 ROD. The exposure assumptions used to develop the Human Health Assessment included both current exposures and potential future exposures. There have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk based cleanup levels.

6.3 Expected Outcomes of the Remedy

The overall RAO for this amendment to the remedy is the following:

- to prevent further migration of contaminated groundwater into the Biscayne aquifer by cleaning up existing contamination in the aquifer; and
- to degrade the remaining sources of contamination identified by previous investigations as present in the immediate vicinity of the former South Drainfield and the former West Drainfield.

The amended remedy, ISEB, is expected to reduce COCs in the groundwater to below cleanup goals in approximately two years. For contaminated soils and drainfields, source removal has been performed successfully at depths above the shallow groundwater table. When the ISEB remedy is complete, further migration of COCs to the Biscayne aquifer will not be a concern.

6.4 Available Land Use after Cleanup

As a result of the HSTC Site being designated a delineated area, pursuant to Chapter 62-524 of the Florida Administrative Code, an institutional control in the form of restrictions on the installation of potable water wells is currently in place. In addition, other restrictions have been imposed at the Site and include well construction, water quality testing, and permitting of groundwater wells located in the delineated area. Once the COC remediation levels and RAO's (**Table 6.1**) in this ROD Amendment have been achieved, EPA in consultation with FDEP will make a determination on whether groundwater will be available for unrestricted uses within the bounds of the local ordinances.

Soil data, collected since the year 2000, indicate that there are no exceedences of State of Florida residential or industrial direct exposure SCTLs, potentially restricting future land use. One exception to this is the contaminant vinyl chloride. This compound was found above the residential target concentration of 200 µg/kg in three soil borings, however, these samples were collected at depths of 10 feet bls, or greater. Appendix B presents the acquired 2000 and 2006 soil VOC data.

Part 7 SUPPORT AGENCY AND PUBLIC PARTICIPATION

7.1 State Opinion on the Remedy (NCP §300.435 (c)(2))

The State of Florida, as represented by the FDEP, has been the support agency throughout the initial and supplemental RI/FS and the RD/RA process leading up to this ROD amendment. In accordance with 40 CFR §300.435, as the support agency, FDEP has provided input during the ROD Amendment process.

EPA has provided FDEP a draft copy of this ROD Amendment. The FDEP agrees with the proposed remedy change, and will provided EPA with a concurrence letter.

7.2 Public Notice (NCP §300.435(c)(2)(ii)(A)), Public Comment (NCP §300.435(c)(2)(ii)(B) and (C)), Public Meeting (NCP §300.435(c)(2)(ii)(D) and (E))

EPA Region 4 published notice of the Public Comment Period for the ROD Amendment at the HSTC Site on May 18, 2008, in the Sun-Sentinel Newspaper. In this announcement, EPA provided information regarding the proposed ROD amendment. Prior to publishing notice, fact sheets were mailed out to the community and placed in the Site Information Repository, located at the Ft. Lauderdale Public Library located at 100 S.Andrews Avenue, Ft. Lauderdale, FL 33301. EPA established a 30-day Comment Period for community members to express their views about the proposed amendment and accepted comments from June 18 through July 17, 2008.

7.3 Responsiveness Summary (NCP §300.435(c)(2)(ii)(F))

No comments were received by EPA of the published Proposed Plan.

7.4 Availability of Amended ROD (NCP §300.435(c)(2)(ii)(G) and (H))

The supporting information for the ROD Amendment is already in the Administrative Record which also resides at the local repository. The ROD Amendment will be included in the Administrative Record and at the local repository within 30 calendar days of signature of the ROD Amendment.

7.5 Issuance of Fact Sheet Prior to Initiation of Remedial Action (NCP §300.435(c)(3))

After completing the remedial work plans and monitoring plans, and before implementing the remedy, EPA will issue a fact sheet and provide the public with the opportunity for a public briefing to discuss the amended remedy.

Part 8 STATUTORY DETERMINATION (NCP §300.430 (f)(5)(ii) and (iii))

Considering the new information that has been developed and the changes that have been made to the selected remedy, EPA and FDEP believe that the remedy will remain protective of human health and the environment, will comply with Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and be cost effective. In addition, the revised remedy uses permanent solutions to the maximum extent practicable for this site.

EPA consulted with the FDEP on the change and FDEP concurs with the modifications.

8.1 Protection of Human Health and Environment (NCP §300.430 (f)(5)(ii)(A))

The ISEB remedy will adequately protect human health and the environment through reduction and/or elimination of the VOC contamination in the groundwater.

8.2 Compliance with ARARs (NCP §300.430 (O(5)(ii)(B))

CERCLA Section 121(d) specifies in part that remedial actions for cleanup of hazardous substances must comply with requirement and standards under federal or more stringent state environmental laws and regulations that are applicable or relevant and appropriate (i.e., ARARs) to the hazardous substances or particular circumstances at a site or obtain a waiver (see also 40 CFR 300.430(f)(1)(ii)(B)). ARARs include only federal and state environmental or facility siting laws/regulations and do not include occupational safety or worker protection requirements. In addition, per 40 CFR 300.405(g)(3), other advisories, criteria, or guidance may be considered in determining remedies [so called To-Be-Considered(TBC) criteria].

Applicable requirements are those cleanup standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and are more stringent than federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, although not applicable to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is wells suited to the particular site. Only those state standards that are identified in a timely manner and are more stringent than federal requirements may be relevant and appropriate.

In accordance with 40 CFR 300.400(g) EPA has identified the specific ARARs for the selected amended remedy. The amended remedy is expected to comply with all ARARs

related to implementing the selected action. Tables 8-1 and 8-2 (Appendix C) list the chemical-specific and action-specific ARARs that will be considered in the implementation of the amended remedy.

8.3 ARAR Waivers (NCP §300.430 (f)(5)(ii)(C))

No ARAR waivers are needed for this ISEB remedy.

8.4 Cost Effectiveness (NCP §300.430 (f)(5)(ii)(D))

This section explains how the ISEB remedy meets the statutory requirements that all Superfund remedies be cost-effective. A cost-effective remedy in the Superfund program is one whose "costs are proportional to its overall effectiveness" (NCP §300.430(0(1)(ii)(D)). The "overall effectiveness" is determined by evaluating three of the five balancing criteria used in the detailed analysis of alternatives, including:

- Long term effectiveness and permanence,
- Reduction in toxicity, mobility and volume (TMV) through treatment; and
- Short term effectiveness

"Overall effectiveness" is then compared to cost to determine whether a remedy is cost effective (NCP §300.430(0(1)(ii)(D)). The ISEB remedy is considered cost effective because it offers a permanent solution that reduces human health risks to acceptable levels at less expense than the previous remedy.

8.5 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable (NCP §300.430 (f)(5)(ii)(E))

The ISEB remedy provides for permanent reduction of toxicity, mobility and volume of the remaining VOCs in the groundwater at the site. The ISEB remedy includes monitoring of the groundwater to ensure that cleanup objectives are being met.

8.6 Preference for Treatment as Principal Element (NCP §300.430 (f)(5)(ii)(F))

The ISEB remedy includes active treatment through enhancement of the naturally occurring biodegradation of contaminants in various media, including groundwater.

8.7 Indication of Remediation Levels (NCP §300.430 (f)(5)(iii)(A))

The VOC groundwater remediation levels are presented in **Table 6.1**. Groundwater monitoring plans will be developed to track the success of the ISEB remedy.

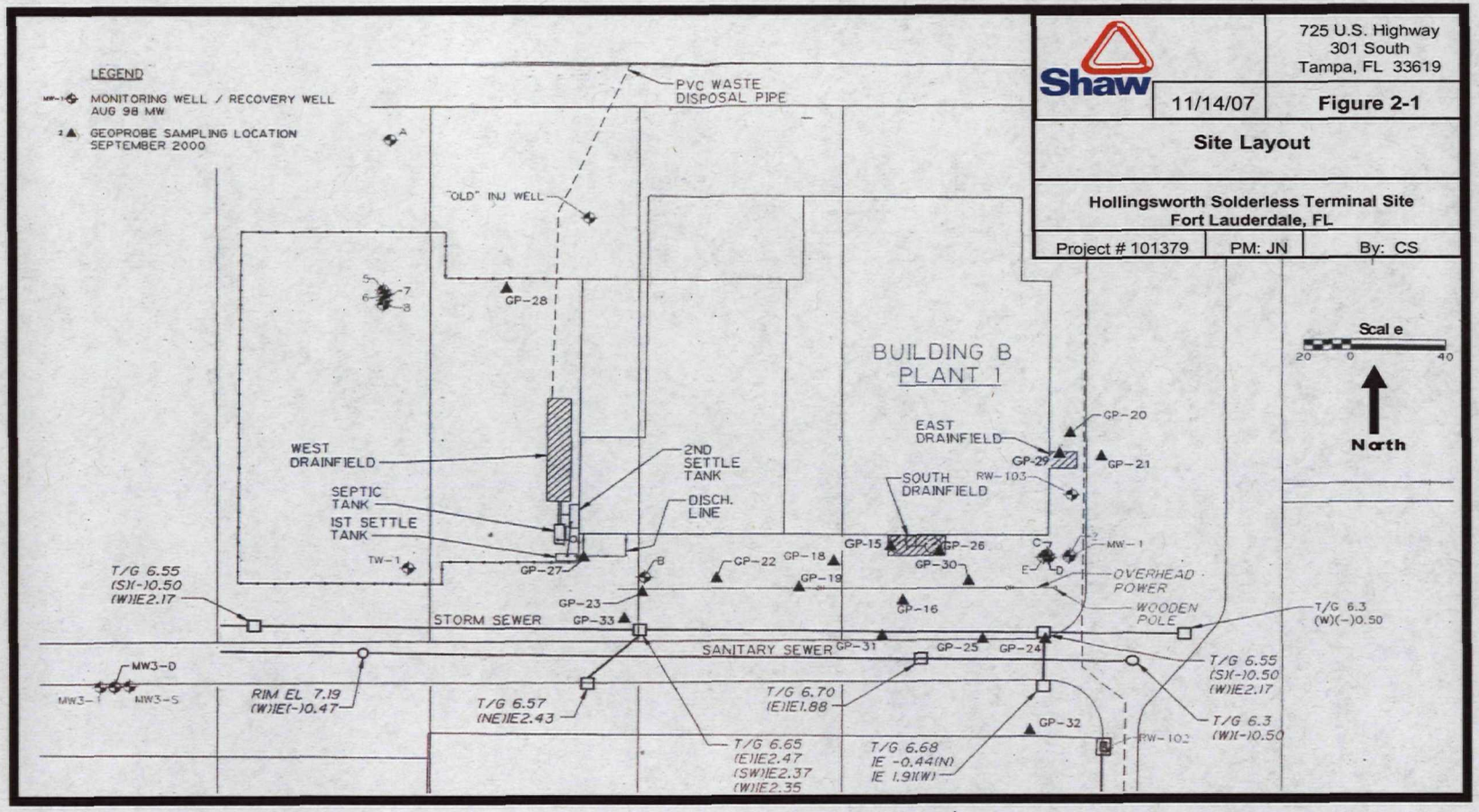
8.8 Documentation of Significant Changes (NCP §300.430 (f)(5)(iii)(B))

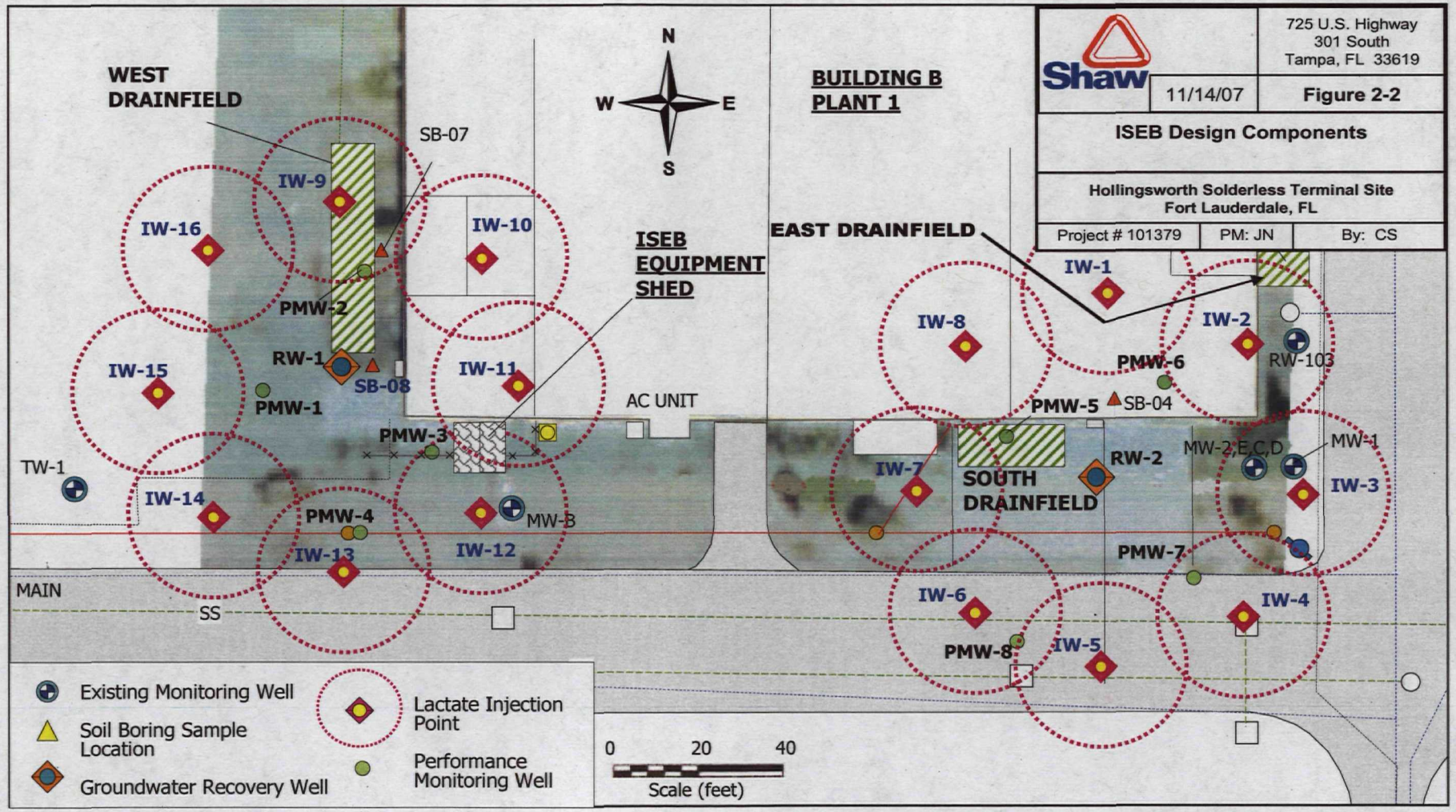
No significant changes to the proposed remedy amendment.

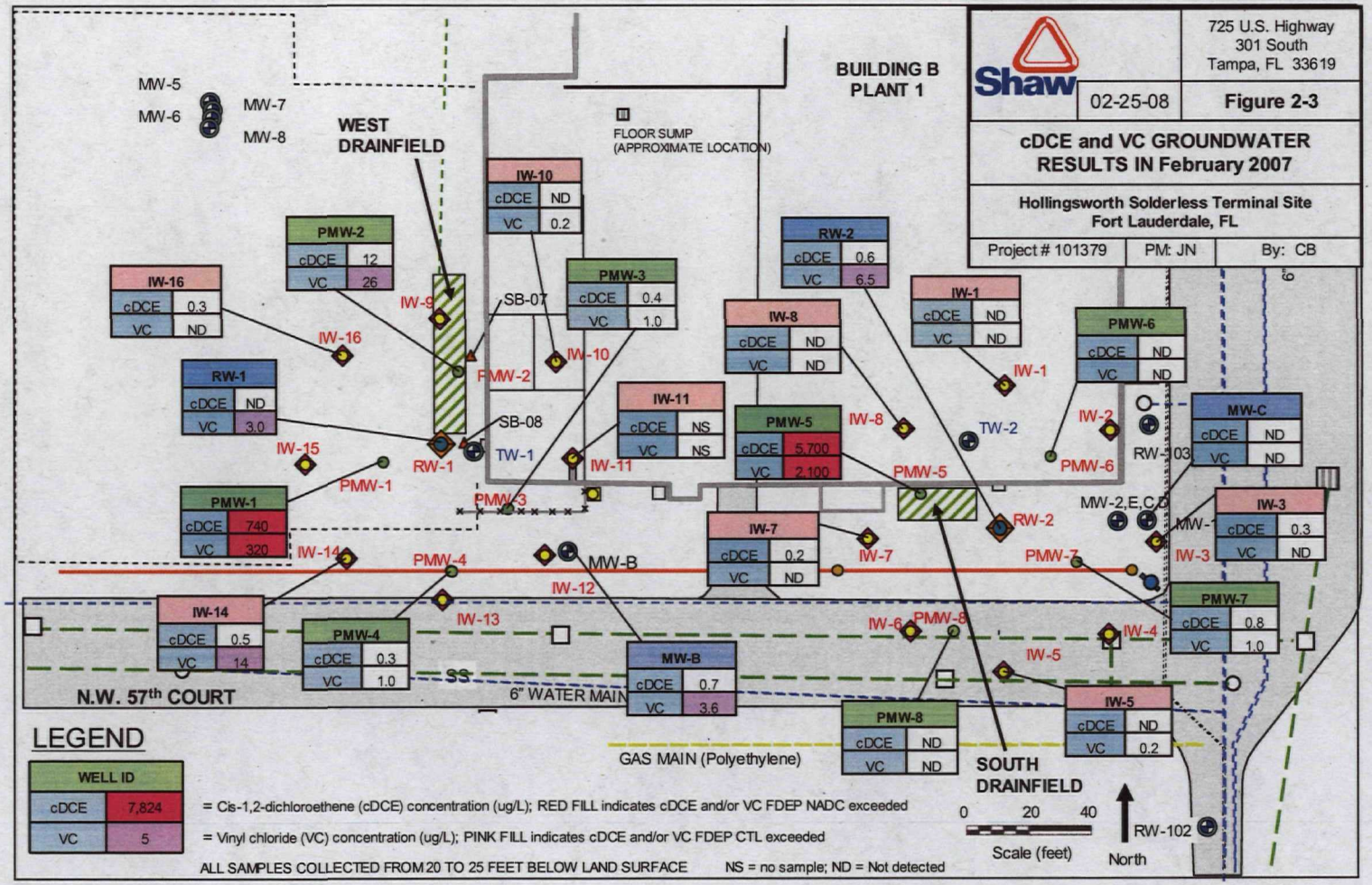
8.9 Five Year Requirement (NCP §300.430 (f)(5)(iii)(C))

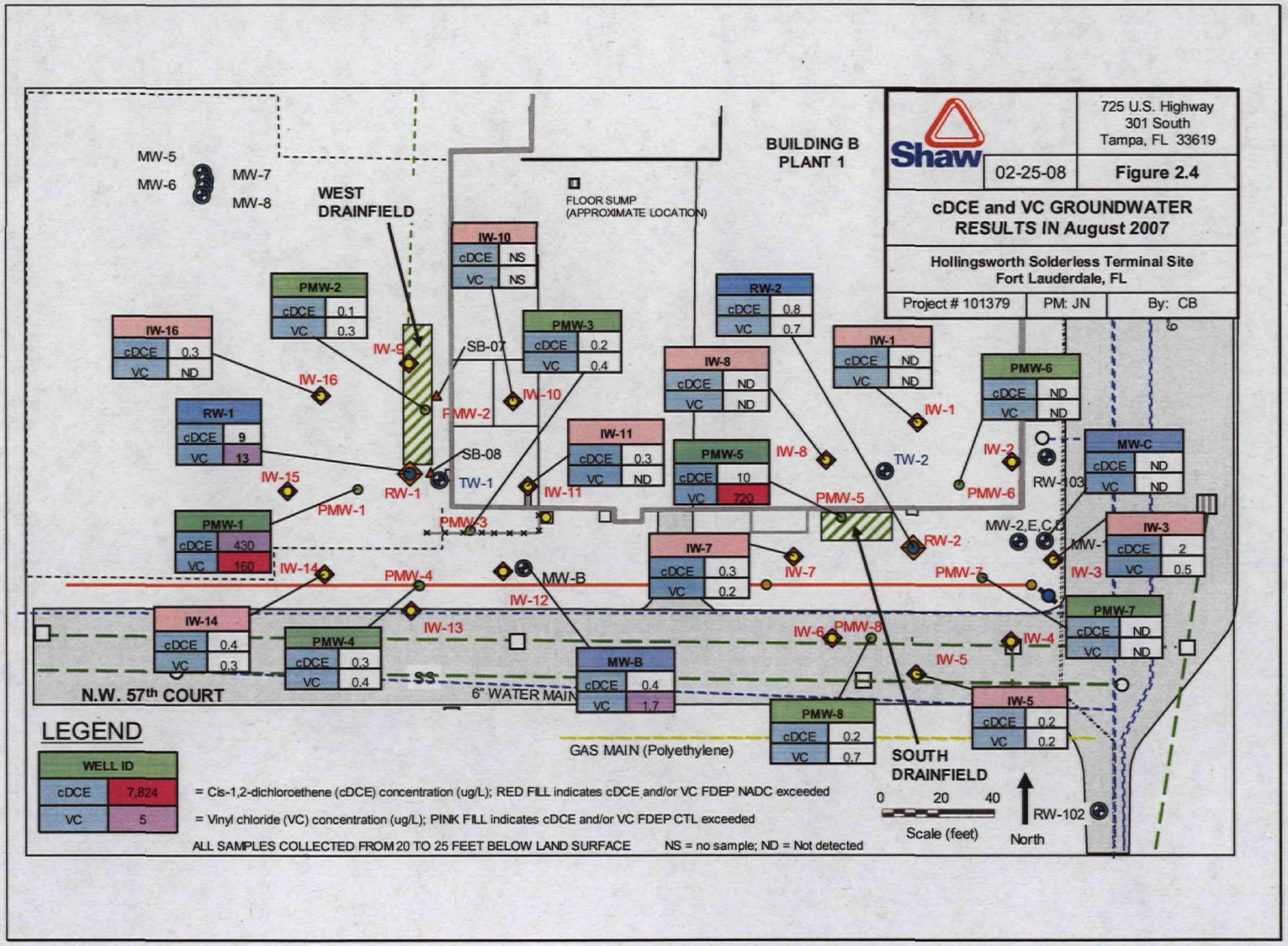
Because the remedy results in the potential for hazardous substances, pollutants, or contaminants to remain on-site until the remedial goals are achieved, a statutory Five-Year review will be completed by the year 2011 to ensure that the ISEB remedy is, or will be, protective of human health and the environment. Each Five-Year review required for the ISEB remedy will include an evaluation of the protectiveness of the remedy.

FIGURES


LEGEND
MONITORING WELL / RECOVERY WELL AUG 98 MW
GEOPROBE SAMPLING LOCATION SEPTEMBER 2000
PVC WASTE DISPOSAL PIPE
"OLD" INJ WELL
GP-28
BUILDING B PLANT 1
WEST DRAINFIELD
2ND SETTLE TANK
SEPTIC TANK
1ST SETTLE TANK
DISCH. LINE
TW-1
GP-27
EAST DRAINFIELD
GP-29
GP-20
GP-21
SOUTH DRAINFIELD
RW-103
GP-15
GP-26
GP-30
GP-22
GP-18
GP-19
GP-23
GP-33
GP-16
MW-1
OVERHEAD POWER
WOODEN POLE
STORM SEWER
SANITARY SEWER
GP-31
GP-25
GP-24
GP-32
RW-102
MW3-D
MW3-I
MW3-S
T/G 6.55 (S)(-)10.50 (W)IE2.17
RIM EL 7.19 (W)IE(-)0.47
T/G 6.57 (NE)IE2.43
T/G 6.65 (E)IE2.47 (SW)IE2.37 (W)IE2.35
T/G 6.70 (E)IE1.88
T/G 6.68 IE -0.44(N) IE 1.91(W)
T/G 6.3 (W)(-)0.50
T/G 6.55 (S)(-)10.50 (W)IE2.17
T/G 6.3 (W)(-)10.50
Shaw
725 U.S. Highway 301 South Tampa, FL 33619
11/14/07
Figure 2-1
Site Layout
Hollingsworth Solderless Terminal Site
Fort Lauderdale, FL
Project # 101379
PM: JN
By: CS
Scale
20 0 40
North


WEST DRAINFIELD
SB-07
IW-9
IW-16
IW-10
PMW-2
RW-1
SB-08
IW-15
PMW-1
IW-11
ISEB EQUIPMENT SHED
AC UNIT
PMW-3
TW-1
IW-14
PMW-4
MW-B
IW-13
IW-12
MAIN
SS
N
W
E
S
BUILDING B PLANT 1
EAST DRAINFIELD
IW-1
IW-8
IW-2
RW-103
PMW-6
PMW-5
SB-04
MW-2,E,C,D
MW-1
IW-7
RW-2
SOUTH DRAINFIELD
IW-3
PMW-7
IW-6
IW-4
PMW-8
IW-5
Existing Monitoring Well
Soil Boring Sample Location
Groundwater Recovery Well
Lactate Injection Point
Performance Monitoring Well
0
20
40
Scale (feet)
Shaw
725 U.S. Highway 301 South Tampa, FL 33619
11/14/07
Figure 2-2
ISEB Design Components
Hollingsworth Solderless Terminal Site
Fort Lauderdale, FL
Project # 101379
PM: JN
By: CS


Shaw
725 U.S. Highway
301 South
Tampa, FL 33619
02-25-08
Figure 2-3
cDCE and VC GROUNDWATER
RESULTS IN February 2007
Hollingsworth Solderless Terminal Site
Fort Lauderdale, FL
Project # 101379
PM: JN
By: CB
BUILDING B
PLANT 1
FLOOR SUMP
(APPROXIMATE LOCATION)
WEST
DRAINFIELD
SOUTH
DRAINFIELD
MW-5
MW-6
MW-7
MW-8
IW-10 cDCE ND VC 0.2
PMW-2 cDCE 12 VC 26
PMW-3 cDCE 0.4 VC 1.0
RW-2 cDCE 0.6 VC 6.5
IW-16 cDCE 0.3 VC ND
IW-1 cDCE ND VC ND
IW-8 cDCE ND VC ND
PMW-6 cDCE ND VC ND
RW-1 cDCE ND VC 3.0
IW-11 cDCE NS VC NS
PMW-5 cDCE 5,700 VC 2,100
MW-C cDCE ND VC ND
PMW-1 cDCE 740 VC 320
IW-7 cDCE 0.2 VC ND
IW-3 cDCE 0.3 VC ND
IW-14 cDCE 0.5 VC 14
PMW-4 cDCE 0.3 VC 1.0
MW-B cDCE 0.7 VC 3.6
PMW-7 cDCE 0.8 VC 1.0
IW-5 cDCE ND VC 0.2
PMW-8 cDCE ND VC ND
SB-07
SB-08
TW-1
TW-2
RW-1
RW-2
RW-102
RW-103
IW-9
IW-10
IW-16
IW-15
IW-11
IW-8
IW-1
IW-2
PMW-2
PMW-3
PMW-5
PMW-6
PMW-1
IW-14
PMW-4
MW-B
IW-12
IW-13
IW-7
PMW-7
IW-6
PMW-8
IW-4
IW-5
IW-3
MW-2,E,C,D
N.W. 57th COURT
6" WATER MAIN
SS
GAS MAIN (Polyethylene)
LEGEND
WELL ID
cDCE 7,824
VC 5
= Cis-1,2-dichloroethene (cDCE) concentration (ug/L); RED FILL indicates cDCE and/or VC FDEP NADC exceeded
= Vinyl chloride (VC) concentration (ug/L); PINK FILL indicates cDCE and/or VC FDEP CTL exceeded
ALL SAMPLES COLLECTED FROM 20 TO 25 FEET BELOW LAND SURFACE
NS = no sample; ND = Not detected
0 20 40
Scale (feet)
North


Shaw
725 U.S. Highway
301 South
Tampa, FL 33619
02-25-08
Figure 2.4
cDCE and VC GROUNDWATER
RESULTS IN August 2007
Hollingsworth Solderless Terminal Site
Fort Lauderdale, FL
Project # 101379
PM: JN
By: CB
BUILDING B
PLANT 1
FLOOR SUMP
(APPROXIMATE LOCATION)
WEST
DRAINFIELD
SOUTH
DRAINFIELD
N.W. 57th COURT
6" WATER MAIN
GAS MAIN (Polyethylene)
MW-5
MW-6
MW-7
MW-8
IW-10 cDCE NS VC NS
PMW-2 cDCE 0.1 VC 0.3
IW-16 cDCE 0.3 VC ND
PMW-3 cDCE 0.2 VC 0.4
RW-2 cDCE 0.8 VC 0.7
IW-1 cDCE ND VC ND
IW-8 cDCE ND VC ND
PMW-6 cDCE ND VC ND
RW-1 cDCE 9 VC 13
IW-11 cDCE 0.3 VC ND
PMW-5 cDCE 10 VC 720
MW-C cDCE ND VC ND
PMW-1 cDCE 430 VC 160
IW-7 cDCE 0.3 VC 0.2
IW-3 cDCE 2 VC 0.5
IW-14 cDCE 0.4 VC 0.3
PMW-4 cDCE 0.3 VC 0.4
MW-B cDCE 0.4 VC 1.7
PMW-7 cDCE ND VC ND
PMW-8 cDCE 0.2 VC 0.7
IW-5 cDCE 0.2 VC 0.2
SB-07
SB-08
TW-1
TW-2
RW-102
RW-103
MW-2,E,C,D
MW-1
IW-9
IW-10
IW-16
IW-15
IW-11
IW-8
IW-1
IW-2
PMW-6
PMW-5
RW-2
PMW-1
PMW-3
IW-14
PMW-4
MW-B
IW-12
IW-7
PMW-7
IW-3
IW-13
IW-6
PMW-8
IW-4
IW-5
LEGEND
WELL ID
cDCE 7,824
VC 5
= Cis-1,2-dichloroethene (cDCE) concentration (ug/L); RED FILL indicates cDCE and/or VC FDEP NADC exceeded
= Vinyl chloride (VC) concentration (ug/L); PINK FILL indicates cDCE and/or VC FDEP CTL exceeded
ALL SAMPLES COLLECTED FROM 20 TO 25 FEET BELOW LAND SURFACE
NS = no sample; ND = Not detected
0 20 40
Scale (feet)
North

APPENDIX A

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample			PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
Location	Depth (ft bls)	Date							
FDEP GCTL:			3	3	70	100	7	1	
FDEP NADC:			300	300	700	1,000	700	100	
2006 - 2007 Lab Detection Limit:			0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
(A) SCREENED UP TO 31.5 FT (UPPER SURFICIAL AQUIFER)									
RW-1	5.0	02/08/06	ND	ND	ND	ND	ND	ND	ND
	20.0	02/08/06	ND	ND	4	ND	ND	6.9	11
		09/27/06	ND	ND	92	2	ND	190	284
		02/06/07	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	3.0 j	3
		02/06/07 DUP	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	3.5 j	4
		08/28/07	ND	4.7	9	0.5 j	ND	13 j	27
RW-2	20.0	02/08/06	ND	ND	44	1	ND	57	102
		09/27/06	ND	7.5	420	5	ND	150	583
		02/06/07	ND (5)	ND (5)	0.6 j	0.7 j	ND (5)	6.5 j	8
		08/28/07	ND	0.3 j	0.8 j	ND	ND	0.7 j	2
PMW-1	20.0	04/05/05	ND	ND	ND	ND	ND	3.8	4
		08/09/05	ND	ND	2,600	27	ND	440	3,067
		09/26/06	ND	ND	570	8	1	170 j	749
		02/06/07	ND (5)	ND (5)	740 j	11 j	ND (5)	320 j	1,071
		08/28/07	ND (5)	ND (5)	430	9	ND (5)	160	599
PMW-2	20.0	04/05/05	ND	3.6	ND	ND	ND	ND	4
		08/09/05	ND	ND	1,100	27	ND	620	1,747
		02/08/06	ND	ND	ND	ND	ND	ND	ND
		02/08/06 DUP	ND	ND	15	ND	ND	72	87
		09/26/06	ND	ND	14	ND	ND	25 j	39
		09/26/06 DUP	ND	ND	15	ND	ND	33	48
		02/06/07	ND	ND	12 j	0.3 j	ND	26 j	38
		02/06/07 DUP	ND	ND	8.5 j	0.3 j	ND	24 j	33
		08/29/07	ND	ND	0.1 j	ND	ND	0.3 j	0
		08/29/07 DUP	ND	ND	ND	ND	ND	0.2 j	0
PMW-3	20.0	03/30/05	ND	ND	120	10	ND	ND	130
		02/08/06	ND	ND	1,800	36	ND	520	2,356
		09/26/06	ND	ND	1	1	ND	1.0 j	3
		02/05/07	ND	ND	0.4 j	0.6 j	ND	1.0 j	2
		08/28/07	ND	ND	0.2 j	0.3 j	ND	0.4 j	1
PMW-4	20.0	03/30/05	ND	ND	150	7	ND	ND	157
		08/09/05	ND	ND	3,000	29	ND	710	3,739
		09/26/06	ND	ND	ND	1	ND	ND	1
		02/05/07	ND	ND	0.3 j	ND	ND	1.0 j	1
		08/29/07	ND	ND	0.3 j	ND	ND	0.4 j	1

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample Location	Depth (ft bls)	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
FDEP GCTL:			3	3	70	100	7	1	
FDEP NADC:			300	300	700	1,000	700	100	
2006 - 2007 Lab Detection Limit:			0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
			(A) SCREENED UP TO 31.5 FT (UPPER SURFICIAL AQUIFER) *continued*						
PMW-5	20.0	04/05/05	ND	ND	ND	ND	ND	1.2	1
		08/09/05	ND	1	39,000	170	ND	21,000	60,171
		02/08/06	ND	ND	570	14	ND	2,600	3,184
		02/8/06 DUP	ND	ND	960	10	ND	3,100	4,070
		09/26/06	ND	ND	28	2	ND	160 j	190
		02/06/07	ND (25)	2.1 j	5,700 j	22 j	ND (25)	2,100 j	7,824
	10.0	08/28/07	ND (5)	ND (5)	14	3.4 j	ND (5)	690	707
	20.0	08/28/07	ND (5)	ND (5)	10	3.3 j	ND (5)	720	733
		08/29/07 DUP	ND (5)	ND (5)	12	2.3 j	ND (5)	520	534
	29.0	08/28/07	ND (5)	ND (5)	10	3.6 j	ND (5)	780	774
PMW-6	20.0	03/30/05	ND	ND	ND	ND	ND	ND	ND
		09/26/06	ND	ND	ND	1	ND	ND	1
		02/06/07	ND	ND	ND	ND	ND	ND	ND
		08/29/07	ND	ND	ND	ND	ND	ND	ND
PMW-7	20.0	03/30/05	ND	ND	ND	ND	ND	ND	ND
		08/09/05	ND	ND	4	ND	ND	7.6	12
		02/08/06	ND	ND	0.6	ND	ND	ND	1
		09/25/06	ND	ND	11	1	ND	13 j	25
		02/06/07	ND	ND	0.8 j	ND	ND	1.0 j	2
		08/29/07	ND	ND	ND	ND	ND	ND	ND
PMW-8	20.0	04/05/05	ND	13	1,700	13	ND	780	2,506
		08/09/05	ND	ND	280	3	ND	270	553
		02/08/06	ND	ND	110	ND	ND	120	230
		09/25/06	ND	2.8	10	4	ND	87	103
		02/06/07	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		08/29/07	ND	ND	0.2 j	ND	ND	0.7	1
IW-1	20.0	03/30/05	ND	ND	ND	10	ND	ND	10
		02/08/06	ND	ND	0.6	ND	ND	ND	1
		09/26/06	ND	1.3	65	4	ND	95	165
		02/06/07	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		08/29/07	ND	ND	ND	ND	ND	ND	ND
IW-3	20.0	03/30/05	ND	ND	1.6	ND	ND	3.1	5
		09/27/06	ND	ND	ND	ND	ND	ND	ND
		02/07/07	ND	ND	0.3 j	ND	ND	ND	0
		08/27/07	ND	ND	2	ND	ND	0.5 j	3
IW-4	20.0	03/30/05	ND	ND	ND	ND	ND	ND	ND
IW-5		02/08/06	ND	ND	ND	ND	ND	ND	ND
		09/27/06	ND	ND	2	1	ND	2.0	5
		02/06/07	ND	ND	ND	ND	ND	0.2 j	0
		08/29/07	ND	ND	0.2 j	ND	ND	0.2 j	0

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample Location	Depth (ft bls)	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
FDEP GCTL:			3	3	70	100	7	1	
FDEP NADC:			300	300	700	1,000	700	100	
2006 - 2007 Lab Detection Limit:			0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
(A) SCREENED UP TO 31.5 FT (UPPER SURFICIAL AQUIFER) *continued*									
IW-7	20.0	03/30/05	ND	ND	ND	ND	ND	ND	ND
		09/27/06	ND	ND	ND	2	ND	1.2	3
		02/05/07	ND	ND	0.2 j	ND	ND	ND	0
		08/28/07	ND	ND	0.3 j	ND	ND	0.2 j	1
		08/29/07 DUP	ND	ND	0.3 j	ND	ND	0.2 j	1
IW-8	20.0	02/08/06	ND	ND	ND	ND	ND	ND	ND
		09/26/06	ND	ND	24	3	ND	23	50
		02/05/07	ND	ND	ND	ND	ND	ND	ND
		08/28/07	ND	ND	ND	ND	ND	ND	ND
IW-9	20.0	03/30/05	ND	ND	ND	ND	ND	ND	ND
		09/26/06	ND	ND	ND	ND	ND	ND	ND
		02/07/07	ND	ND	ND	ND	ND	0.2 j	0
IW-11	20.0	03/30/05	ND	ND	1.1	ND	ND	ND	1
		08/30/07	ND	ND	0.3 j	ND	ND	ND	0
IW-12	20.0	02/08/06	ND	ND	ND	ND	ND	ND	ND
IW-16	20.0	02/08/06	ND	ND	ND	ND	ND	ND	ND
		09/27/06	ND	ND	1	1	ND	22	24
		02/07/07	ND	ND	0.5 j	ND	ND	14 j	15
		08/29/07	ND	ND	0.4 j	ND	ND	0.3 j	1
IW-15	20.0	03/30/05	ND	ND	ND	ND	ND	ND	ND
		03/30/05 DUP	ND	ND	ND	ND	ND	ND	ND
		03/30/05	ND	ND	ND	ND	ND	ND	ND
		08/09/05	ND	ND	240	27	ND	1,600	1,867
		09/27/06	ND	ND	ND	ND	ND	ND	ND
		09/27/06 DUP	ND	ND	ND	ND	ND	ND	ND
		02/06/07	ND	ND	0.3 j	ND	ND	ND	0
		08/28/07	ND	ND	0.3 j	ND	ND	ND	0
IW-17	20.0	03/30/05	ND	ND	2,600	ND	ND	ND	2,600
TW-1		02/08/06	ND	ND	840	25	ND	340	1,205
TW-2		02/08/06	ND	ND	ND	ND	ND	ND	ND
MW-2A	12.6	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
MW-3S	26.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		05/01/96	ND	ND	ND	ND	ND	ND	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-7S	26.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample			PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
Location	Depth (ft bls)	Date							
FDEP GCTL:			3	3	70	100	7	1	
FDEP NADC:			300	300	700	1,000	700	100	
2006 - 2007 Lab Detection Limit:			0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
(A) SCREENED UP TO 31.5 FT (UPPER SURFICIAL AQUIFER) *continued*									
MW-8	25.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-A	25.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	0.5 j	1
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98		ND	ND	ND	ND	ND	ND
MW-B	25.0	06/01/95	ND (100)	ND (100)	510	15 j	ND (100)	770	1,295
		01/01/97	ND	ND	77	ND	ND	66	143
		05/01/97	ND	ND	1,000	ND	ND	1,500	2,500
		08/01/98	ND	ND	1,100	ND	ND	1,700	2,800
		06/01/99	ND	ND	726	ND	ND	> 2,500	> 3,226
		09/01/00	ND	ND	ND	ND	ND	ND	ND
		08/01/02	ND	ND	ND	ND	ND	ND	ND
		04/05/05	ND	ND	ND	ND	ND	1.1	1
		08/10/05	ND	0.2	12	ND	ND	12	24
		09/27/06	ND	ND	ND	1	ND	1.1	2
		02/05/07	ND	ND	0.7 j	0.6 j	ND	3.6 j	5
		08/29/07	ND	ND	0.4 j	ND	ND	1.7	2
MW-D	25.0	06/01/95	ND (5)	ND (5)	9,700	19	4 j	2,000 j	9,719
		06/01/95	ND (5)	ND (5)	10,000	17	4 j	2,000 j	10,017
		05/01/96	ND	ND	15	ND	ND	1.7	17
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	17	ND	ND	ND	17
		06/01/99	ND	ND	ND	ND	ND	ND	ND
		09/01/00	ND	ND	3	ND	ND	ND	3
		08/01/02	ND	ND	ND	ND	ND	ND	ND
		04/05/05	ND	ND	ND	ND	ND	ND	ND
		04/05/05 DUP	ND	ND	ND	ND	ND	ND	ND
		08/10/05	ND	ND	ND	ND	ND	ND	ND
MW-XS	30.1	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
MW-YS	30.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
MW-ZS	30.2	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample			PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
Location	Depth (ft bls)	Date							
		FDEP GCTL:	3	3	70	100	7	1	
		FDEP NADC:	300	300	700	1,000	700	100	
		2006 - 2007 Lab Detection Limit:	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
			(B) SCREENED UP TO 75 FT (LOWER SURFICIAL AQUIFER)						
MW-2	75.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	1.9 j	2
		08/01/02	ND	ND	530	48	ND	200	778
MW-3I	61.5	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
MW-6	75.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
MW-7	50.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-7I	61.5	06/01/95	ND (5)	ND (5)	1 j	ND (5)	ND (5)	ND (5)	1
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	1	ND	ND	ND	1
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-8I	72.0	06/01/95	ND	ND	ND	ND	ND	1.9 j	2
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-C	50.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	0.5	1
		05/01/96	ND	ND	ND	ND	ND	ND	ND
		01/01/97	ND	ND	66	ND	ND	3	69
		05/01/97	ND	ND	2,300	ND	ND	200	2,500
		08/01/98	ND	ND	5,100	ND	ND	230	5,330
		06/01/99	ND	ND	10	ND	ND	ND	10
		09/01/00	ND	ND	59	22	ND	130 e	211
		08/01/02	ND	260	9,400	310	ND	3,400	13,370
		05/23/05	ND	11	3,000	140	ND	1,800	4,951
		09/27/06	ND	ND	ND	ND	ND	ND	ND
		02/07/07	ND	ND	ND	ND	ND	0.7 j	1
		08/27/07	ND	ND	ND	ND	ND	ND	ND
MW-XI	60.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		05/01/96	ND	ND	ND	ND	ND	2.3	2
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-YI	60.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	0.7 j	ND	ND	ND	ND	1
MW-ZI	54.7	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample Location	Depth (ft bls)	Date	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
FDEP GCTL:			3	3	70	100	7	1	
FDEP NADC:			300	300	700	1,000	700	100	
2006 - 2007 Lab Detection Limit:			0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
(B) SCREENED UP TO 75 FT (LOWER SURFICIAL AQUIFER) *continued*									
PN-5	50.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	1	1
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
PS-5	50.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	2	ND	ND	ND	2
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	1 J	ND	ND	ND	1
(C) SCREENED UP TO 120 FT (TOP BISCAYNE AQUIFER)									
MW-3D	97.5	06/01/95	ND (5)	0.8 J	3 J	ND (5)	ND (5)	8.4	10
		01/01/97	ND	ND	1 J	ND	ND	ND	1
		05/01/97	ND	ND	ND	ND	ND	1.5	2
		08/01/98	ND	ND	2	ND	ND	ND	2
		09/01/00	ND	ND	ND	ND	2	3	5
		08/01/02	ND	ND	2	ND	6	14	22
MW-5	100.0	06/01/95	ND (5)	0.5	2 J	ND (5)	5	3.3 J	6
		05/01/96	ND	ND	2	ND	ND	12	14
		01/01/97	ND	ND	1 J	ND	ND	ND	1
		05/01/97	ND	ND	1 J	ND	ND	2	3
		08/01/98	ND	ND	ND	ND	ND	0.2 J	0.2
MW-7D	103.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-E	100.0	06/01/95	ND (5)	ND (5)	2 J	ND (5)	ND (5)	ND (5)	2
		05/01/96	ND	0.8	4	ND	ND	2.3	7
		01/01/97	ND	ND	1	ND	ND	ND	1
		05/01/97	ND	ND	1	ND	ND	4.2	5
		08/01/98	ND	ND	0.2 J	ND	ND	0.6 J	1
		06/01/99	ND	ND	ND	ND	ND	ND	ND
(C) SCREENED UP TO 120 FT (TOP BISCAYNE AQUIFER) *continued*									
MW-XD	95.2	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		05/01/96	ND	ND	1	ND	ND	6.9	8
MW-YD	95.0	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND
MW-ZD	100.0	06/01/95	ND (5)	ND (5)	1 J	ND (5)	0.9 J	0.8 J	3
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	ND	ND	ND	ND	ND

APPENIX A MONITOR WELL, INJECTION WELL, and RECOVERY WELL GROUNDWATER ANALYTICAL SUMMARY in ug/L VOLATILE ORGANIC COMPOUNDS (VOCs)

Sample			PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	Total VOCs (µg/L)
Location	Depth (ft bls)	Date							
FDEP GCTL:			3	3	70	100	7	1	
FDEP NADC:			300	300	700	1,000	700	100	
2006 - 2007 Lab Detection Limit:			0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	0.5 to 1.0	
PN-9	90	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
		01/01/97	ND	ND	ND	ND	ND	ND	ND
		05/01/97	ND	ND	ND	ND	ND	ND	ND
		08/01/98	ND	ND	**0.3 j**	ND	ND	ND	**0.3**
PS-9	90	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
			(D) SCREENED TO 263 FT (BOTTOM BISCAYNE AQUIFER)						
MW-1	263	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND
TW-1	262	06/01/95	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND

Notes: DCE = dichloroethene
TCE = trichloroethene
PCE = tetrachloroethene
VOCs = volatile organic compounds

blank cell = no datum
TIC = tentatively identified compound
µg/L = micrograms per liter
ft bls = feet below land surface
j = data qualifier denoting estimated value
e = estimated result, which exceeded the calibration range
ND = not detected above the method detection limit; alternate detection limits given in parentheses
nj = presumptive evidence that analyte is present; reproted as tentative identification with an estimated value

Traces of BTEX, MTBE, chloroethane, and carbon disulfide were present in many wells sampled in 2006 and 2007. Aside from the sulfur dioxide TIC in 2006, tetrahydrofuran TIC was also reported in IW-10 at 40 µg/L nj.

Cells shaded blue represent most recent sampling event.
Cells shaded yellow with **bold** numbers are above the CTL.
Cells shaded green with **bold** numbers are above the NADC.
GCTL = Groundwater Cleanup Target Level per Chapter 62-777, Florida Administrative Code
NADC = Natural Attenuation Default Concentration per Chapter 62-777, Florida Administrative Code

APPENDIX B

APPENDIX B: DIRECT PUSH SOIL ANALYTICAL SUMMARY, SEPTEMBER 2000 AND FEBRUARY 2006 VOLATILE ORGANIC COMPOUNDS

Facility Name: Hollingsworth Solderless Terminal Site

Sample			PCE (µg/kg)	TCE (µg/kg)	cis-1,2-DCE (µg/kg)	trans-1,2-DCE (µg/kg)	1,1-DCE (µg/kg)	Vinyl Chloride (µg/kg)	Total VOCs (µg/kg)	TOC (mg/kg)
Location	Depth (ft bls)	Date								
FDEP Leachability Standard:			**30**	**30**	**400**	**700**	**60**	**7**		
GP-15	5	Sep-00	ND	**150**	**170**	ND		**20**	**340**	
	5 CLP		ND	**250**	**200**	**4**		**60**	**514**	
	20		ND	ND	ND	ND		ND	ND	
GP-16	5	Sep-00	ND	ND	ND	ND		ND	ND	
	5 CLP		ND	ND	ND	ND		ND	ND	
	10		ND	**390 e**	**820 e**	10		**170**	**1,390**	
	10 DUP		ND	**350 e**	**710 e**	ND		**110**	**1,170**	
	10 CLP		**3**	**1,400**	**960**	**11**		**280**	**2,654**	
	20		ND	ND	ND	ND		ND	ND	
GP-17	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
GP-18	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	10 CLP		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
GP-19	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	10 CLP		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
GP-20	5	Sep-00	ND	ND	ND	ND		ND	ND	
	5 CLP		ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	ND
	10 CLP		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
GP-21	5	Sep-00	All ND, although high detection limit							
	10		ND	ND	ND	ND		ND	ND	
	10 CLP		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
	20 CLP		ND	ND	ND	ND		ND	ND	
GP-22	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
	20 CLP		ND	ND	ND	ND		ND	ND	
GP-23	5	Sep-00	ND	ND	ND	ND		ND	ND	**2,100**
	5 CLP		ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
GP-24	5	Sep-00	ND	ND	ND	ND		ND	ND	
	5 CLP		ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	10 CLP		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	

APPENDIX B: DIRECT PUSH SOIL ANALYTICAL SUMMARY, SEPTEMBER 2000 AND FEBRUARY 2006 VOLATILE ORGANIC COMPOUNDS

Facility Name: Hollingsworth Solderless Terminal Site

Sample			PCE (µg/kg)	TCE (µg/kg)	cis-1,2-DCE (µg/kg)	trans-1,2-DCE (µg/kg)	1,1-DCE (µg/kg)	Vinyl Chloride (µg/kg)	Total VOCs (µg/kg)	TOC (mg/kg)
Location	Depth (ft bls)	Date								
FDEP Leachability Standard:			**30**	**30**	**400**	**700**	**60**	**7**		
GP-25	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	ND
	20		ND	ND	ND	ND		ND	ND	420
GP-26	5	Sep-00	ND	ND	320	ND		170	490	ND
	5 CLP		ND	2	210	2		110	324	
	10		ND	ND	200	ND		360	560	440
	10 CLP		ND	3	200	3		380	586	
	20		ND	ND	12	ND		7	19	
GP-27	5	Sep-00	ND	ND	11	ND		ND	11	
	10		ND	ND	14	ND		ND	14	
	20		ND	ND	730	64		13	807	
	30		ND	ND	ND	ND		ND	ND	
	30 DUP		ND	ND	ND	ND		ND	ND	
	40		ND	ND	ND	ND		ND	ND	
GP-28	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
	20 CLP		ND	ND	ND	ND		ND	ND	
GP-29	5	Sep-00	ND	ND	ND	ND		ND	ND	
	5 CLP		ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
	20		ND	ND	ND	ND		ND	ND	
GP-30	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	540	7		260	807	
	20		ND	ND	710	8		260	978	
GP-31	5	Sep-00	ND	ND	ND	ND		ND	ND	
	10		ND	ND	ND	ND		ND	ND	
SB-1	24		ND	ND	45	ND	ND	ND	45	
	25		ND	ND	14	ND	ND	54	68	
	26		ND	ND	230	ND	ND	8.5	239	
	37		ND	ND	ND	ND	ND	ND	ND	
SB-2	7	Feb-06	ND	ND	ND	ND	ND	ND	ND	
	19		ND	ND	ND	ND	ND	ND	ND	
	23		ND	ND	ND	ND	ND	ND	ND	
	27		ND	ND	ND	ND	ND	9.2	9	
	30		ND	ND	ND	ND	ND	ND	ND	
SB-4	13	Feb-06	ND	ND	ND	ND	ND	12	12	
SB-7	23	Feb-06	ND	ND	330	6.0	ND	93	429	
	31		ND	ND	490	6.9	ND	79	576	
	34		ND	ND	550	12.0	ND	71	633	
	44		ND	ND	9	ND	ND	ND	9	

APPENDIX B: DIRECT PUSH SOIL ANALYTICAL SUMMARY, SEPTEMBER 2000 AND FEBRUARY 2006 VOLATILE ORGANIC COMPOUNDS

Facility Name: Hollingsworth Solderless Terminal Site

Sample			PCE (µg/kg)	TCE (µg/kg)	cis-1,2-DCE (µg/kg)	trans-1,2-DCE (µg/kg)	1,1-DCE (µg/kg)	Vinyl Chloride (µg/kg)	Total VOCs (µg/kg)	TOC (mg/kg)
Location	Depth (ft bls)	Date								
FDEP Leachability Standard:			30	30	400	700	60	7		
SB-8	23	Feb-06	ND	ND	ND	ND	ND	ND	ND	
	31		ND	ND	ND	ND	ND	ND	ND	
	37		ND	ND	ND	ND	ND	ND	ND	
	41		ND	ND	ND	ND	ND	ND	ND	

Notes:
blank cell = no datum
ft bls = feet below land surface
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
CLP = Contract Laboratory Program
ND = not detected above the method detection limit
Samples collected via direct push technology (DPT)
e = estimated result, which exceeded the calibration range

DCE = dichloroethene
TCE = trichloroethene
PCE = tetrachloroethene
VOCs = volatile organic compounds
DUP = duplicate sample
TOC = total organic carbon

Cells shaded yellow with **bold** numbers are above the FDEP Leachability Standard per Chapter 62-777, FAC

APPENDIX C

Table 8-1
CHEMICAL-SPECIFIC ARARS
HOLLINGSWORTH SOLDERLESS TERMINAL SITE
FT. LAUDERDALE, FLORIDA
PAGE 1 OF 1

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Florida Groundwater Classes, Standards and Exemptions	Chapter 62-520, Florida Administrative Code (F.A.C.)	Applicable	This rule designates the groundwater of the State into five classes and establishes minimum "free from" criteria. This rule also specifies that Classes I and II must meet the primary and secondary drinking water standards listed in Chapter 62-550.	This rule was used to classify groundwater and establish cleanup goals fro groundwater. Groundwater at this site is considered a sole source aquifer (Class I).
Florida Groundwater Permitting and Monitoring Requirements	Chapter 62-550.310, F.A.C.	Relevant and appropriate	This rule provides primary drinking water quality standards and maximum contaminant levels (MCLs) for public water supply systems.	Cleanup goals for volatile organic compounds in groundwater are based on Florida MCLs listed on Table 4 of this rule.
Florida Contaminant Cleanup Target Levels Rule	Chapter 62-770.170(1)(a), F.A.C	Relevant and appropriate	This rule provides default criteria in tables and the process for deriving site-specific Cleanup Target Levels (CTLs) for groundwater and surface water cleanup.	CTLs for groundwater provided in Table 1 of this rule were used to establish clean-up goals.

TABLE 8-2

ACTION-SPECIFIC ARARs
HOLLINGSWORTH SOLDERLESS TERMINAL SITE
FT. LAUDERDALE, FLORIDA
PAGE 46 OF 51

Requirement	Citation	Status	Synopsis	Evaluation/Action To Be Taken
Florida Underground Injection Control Regulations	Chapter 62-528.600 through 528.645, Florida Administrative Code (F.A.C.)	Applicable	Establishes standards and criteria for construction, operation, monitoring, plugging, and abandonment for Class V wells.	Regulations pertaining to Class V Group 4 injection wells associated with aquifer remediation projects will be followed.
Florida Groundwater Permitting and Monitoring Requirements	Chapter 62-522.300 and 522.300(2)(e), F.A.C.	Applicable	Establishes permitting and monitoring requirements for installations discharging to groundwater to prevent contaminants from causing a violation of water quality standards and criteria of the receiving groundwater.	A zone of discharge is allowed for primary standards for groundwater for closed-loop re-injection systems and for the prime constituents of the reagents used to remediate the contaminants.
Florida Water Well Permitting and Construction Requirements	Chapter 62-532.500, F.A.C.	Applicable	Establishes minimum standards for the location, construction, repair, and abandonment of water wells.	The requirements for the construction, repair, and abandonment of monitoring, extraction, and injection wells will be met.
Florida Natural Attenuation with Monitoring Regulation	Chapter 62-780.690 (8)(a) thru (c), F.A.C	Relevant and Appropriate	Specifies minimum number of wells and sampling frequency for conducting groundwater monitoring as part of a natural attenuation remedy.	The requirements associated with implementation of groundwater monitoring as part of the MNA remedy will be met.(1)

TABLE 8-2

ACTION-SPECIFIC ARARs
HOLLINGSWORTH SOLDERLESS TERMINAL SITE
FT. LAUDERDALE, FLORIDA
PAGE 2 OF 51

Florida Active Remediation Regulation for Groundwater In-situ System(s)	Chapter 62-780.700(12)(g), F.A.C	Relevant and Appropriate	Specifies that operational parameters for in-situ system(s) should include measurements of biological, chemical, or physical indicators that will verify the radius of influence at representative monitoring locations, weekly for the first month, monthly for the next 2 months, quarterly for the first 2 years, and semi-annually thereafter.	In-situ groundwater remediation will consider the relevant requirements of this rule.(1)
Florida Active Remediation Regulation for Groundwater Bioremediation System(s)	Chapter 62-780.700(12)(h), F.A.C	Relevant and Appropriate	Specifies that operational parameters for bioremediation system(s) should include measurements of dissolved oxygen at representative monitoring locations; rates of biological, chemical, or nutrient enhancement additions; weekly for the first month, monthly for the next 2 months, quarterly for the first 2 years, and semi-annually thereafter.	Bioremediation groundwater remediation will consider relevant requirements of this rule.(1)
Florida Post Active Remediation Monitoring Regulation	Chapter 62-780.750(4)(a) thru (c), F.A.C	Relevant and Appropriate	Specifies minimum number of wells and sampling frequency for conducting groundwater monitoring as part of post active remediation monitoring.	Post active remediation monitoring will consider the relevant requirements of this rule.(1)

1 The designated number of wells, sampling time frames/frequency, and specific parameters for analyses will be provided in a Monitoring Plan that is included in a post-ROD document (e.g. Remedial Design or Remedial Action Work Plan) that is approved by the EPA and FDEP.