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EPA Superfund
Record of Decision:

SOUTHERN SOLVENTS, INC.
EPA ID: FL0001209840
OU 01
TAMPA, FL
09/30/1999

RECORD OF DECISION

Summary of Remedial
Alternative Selection

for the

Soil and Surficial Aquifer
Operable Unit 1
(OU1)

at the

Southern Solvents Site
Tampa, Hillsborough County, Florida

Prepared by the
United States
Environmental
Protection Agency

RECORD OF DECISION

Declaration

Site Name and Location

Southern Solvents, Inc. Site
Tampa, Hillsborough County, Florida

Statement of Basis and Purpose

This decision document presents the selected remedial action for the soil and surficial aquifer (OU1) at the Southern Solvents, Inc. Site, in Tampa, Hillsborough County, Florida, which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the administrative record for the Southern Solvents Inc. site. The State of Florida, as represented by the Florida Department of Environmental Protection (FDEP), has reviewed the reports which are included in the administrative record for the Site. In accordance with 40 CFR 300.430, as the support agency, FDEP has provided EPA with input on those reports. The State of Florida concurs with the selected remedy.

Assessment of the Site

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

Description of the Selected Remedy

This remedy addresses threats to the soil and surficial groundwater posed by the environmental conditions at this Site (operable unit 1). Cleanup of the contaminated soil and surficial aquifer to health based levels will reduce further leaching of contaminants to the Floridan aquifer. This cleanup will be further evaluated after its initial phase to ensure consistency with later actions for cleanup of the Floridan aquifer (operable unit 2).

The major components of the remedy include:

- Excavation of contaminated, unsaturated soils around the existing building;
- Initial treatment of the highly contaminated saturated soil and surficial groundwater using chemical oxidation in areas that exceed the Florida Natural Attenuation Default Concentration for PCE;

- Evaluation of continued use of chemical oxidation in areas with lower concentrations of PCE;

- Final treatment of the surficial groundwater to the cleanup goal using chemical oxidation (unless determined otherwise); and

- Groundwater use restrictions by naming the area a delineated area under the Southwest Florida Management District.

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 uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy. EPA will conduct a policy five year review of the Site beginning five years after the construction completion date until no hazardous substances remain on-site above concentration or contamination levels that allow for unlimited use and unrestricted exposure.

ROD Data Certification Checklist

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

- The chemicals of concern at the Site are perchloroethylene (PCE), trichloroethylene (TCE), and cis- 1,2-dichloroethene (DCE). In the 81 soil samples taken at the Site, PCE was detected 50 times at a maximum concentration of 50,000,000 ppb, TCE was detected 2 times at a maximum concentration of 200 ppb, and DCE was detected 2 times at a maximum concentration of 81 ppb. In the 44 groundwater samples taken at and around the Site, PCE was detected 24 times at a maximum concentration of 170,000 ppb, TCE was detected 8 times at a maximum concentration of 1,500 ppb, and DCE was detected 6 times at a maximum concentration of 510 ppb.

- The risk assessment results indicated that current site-related contaminant concentrations in onsite surface soil, onsite subsurface soil, and offsite groundwater at the Site, do not pose significant carcinogenic or noncarcinogenic hazards to human health under current use conditions.

- The risk assessment assumed future land use to be industrial and residential. If onsite groundwater were to be used for drinking water or other purposes under future land use conditions, then the risks to future workers and/or residents would be unacceptable, due primarily to exposures to PCE.

- The cleanup goals developed for the unsaturated soil at the Site are 50 ppb for PCE, 30 ppb for TCE, and 400 ppb for DCE. These cleanup goals are based on levels that have been determined by EPA to be necessary to curtail further contamination of the groundwater. The cleanup goals for groundwater at the Site are 3 ppb for PCE and TCE and 70 ppb for DCE. These cleanup goals are based on Florida primary drinking water standards for these chemicals and will be used to measure the effectiveness of the treatment of the surficial groundwater and the saturated soil.

- After successful implementation of the selected remedy, the soil and surficial groundwater will be remediated to levels that do not pose current or future risks to human health or the environment. The future land use of the Site will be determined after a remedy for the deep (Floridan) aquifer has been developed.

- The total estimated cost for the remedy will be $4,636,306. This estimate includes minimal O&M costs associated with the remedy.

- The selected remedy was chosen because it represents the most effective remedial strategy taking into consideration effectiveness versus cost. The selected remedy uses the same remedial technology (chemical oxidation) to treat both the saturated soil and groundwater, which is anticipated to result in a savings of approximately 30% in combined costs.

Richard D. Green, Director
Waste Management Division

30 SEP 99
Date

TABLE OF CONTENTS

1.0 SITE LOCATION AND DESCRIPTION 1-1

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES 2-1
- 2.1 History of Site Operations 2-1
- 2.2 History of Federal and State Site Investigations 2-1
- 2.3 History of CERCLA Enforcement Activities 2-5

3.0 HISTORY OF COMMUNITY RELATIONS 3-1

4.0 SCOPE AND ROLE OF ACTION 4-1

5.0 SUMMARY OF SITE CHARACTERISTICS 5-1
- 5.1 Geology 5-1
- 5.2 Hydrogeology 5-1
- 5.3 Soil Contamination 5-1
- 5.4 Groundwater Contamination 5-3

6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES 6-1

7.0 SUMMARY OF SITE RISKS 7-1
- 7.1 Human Health Risk Assessment 7-1
  - 7.1.1 Identification of Chemicals of Concern 7-1
  - 7.1.2 Exposure Assessment 7-2
  - 7.1.3 Toxicity Assessment 7-3
  - 7.1.4 Risk Characterization 7-3
- 7.2 Environmental Risks 7-5

8.0 REMEDIATION OBJECTIVES 8-1

9.0 DESCRIPTION OF ALTERNATIVES 9-1
- 9.1 Description of Remedy Components 9-1
- 9.2 Common Elements and Distinguishing Features of Each Alternative 9-6
- 9.3 Expected Outcomes of Each Alternative 9-10

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES 10-1

11.0 SELECTED REMEDY 11-1
- 11.1 Description of the Selected Remedy 11-1
- 11.2 Summary of the Estimated Remedy Costs 11-3
- 11.3 Expected Outcome of Selected Remedy 11-3

12.0 STATUTORY DETERMINATIONS 12-1
12.1 Protection of Human Health and the Environment 12-1
12.2 Compliance with Applicable or Relevant and Appropriate Requirements 12-1
12.3 Cost Effectiveness 12-2
12.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable 12-2
12.5 Preference for Treatment as a Principal Element 12-3
12.6 Five-Year Review Requirements 12-3

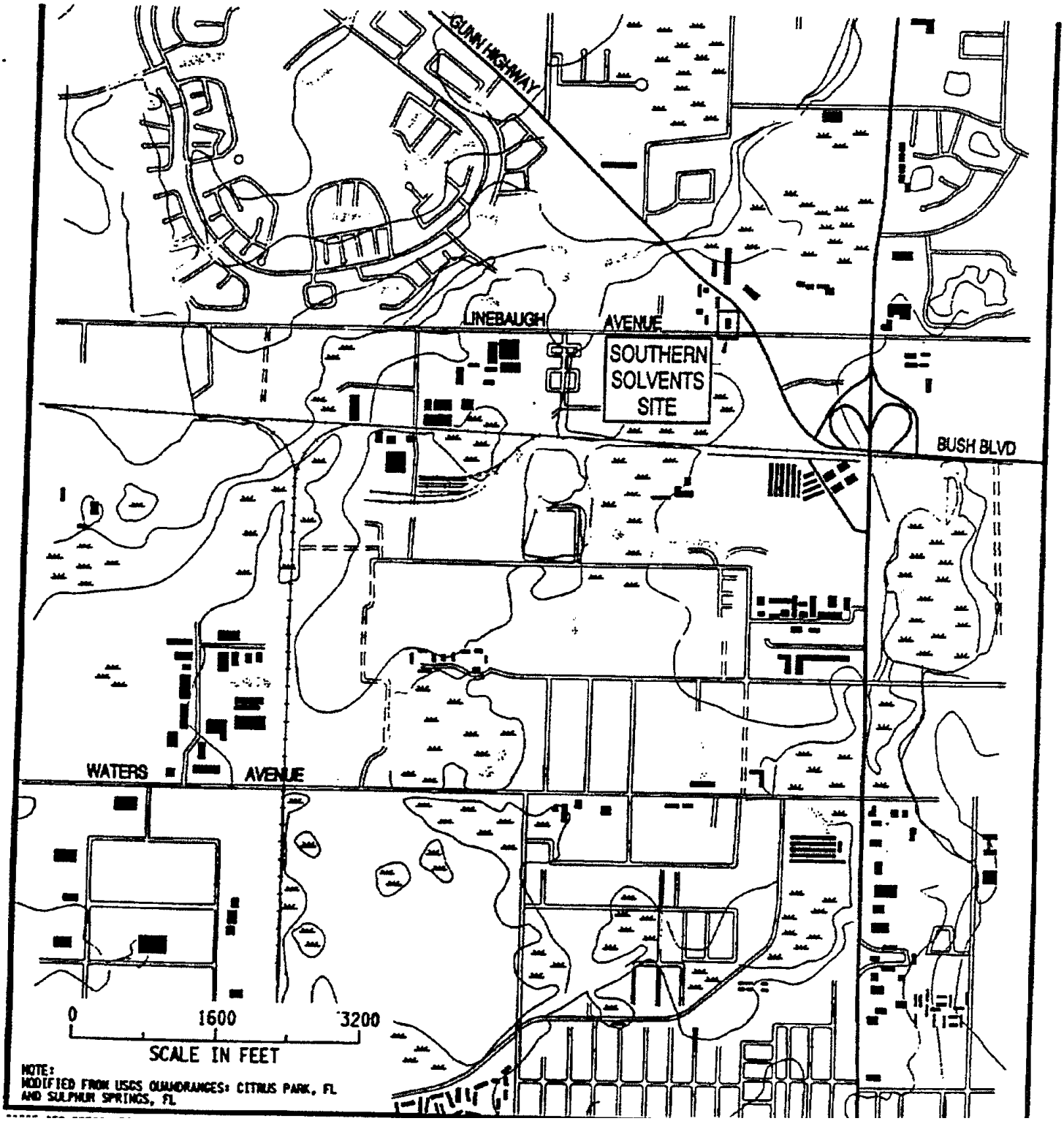
1.0 SITE LOCATION AND DESCRIPTION

The Southern Solvents Site (CERCLIS # FL0001209840) is located at 4109 West Linebaugh Avenue, approximately 500 ft. west of the intersection of Gunn Highway and Linebaugh Avenue in Hillsborough County, Florida (Figure 1-1). The Site is located in a predominately commercial area and is presently bordered on the north by Gold Cup Coffee, Inc., on the west by Express Printing, on the south by West Linebaugh Avenue, and on the east by a closed Amoco gasoline station.

The Southern Solvents Site consists of a parcel of land that is approximately 100 ft wide by 185 ft deep. The only structures on the property are a one-story metal building and an exterior concrete slab along the north end of the building (See Figure 1-2). The remainder of the Site is unpaved and is used for parking and equipment storage by the current Site tenant.

Perchloroethylene (PCE) was stored in aboveground storage tanks and small tanker trucks on the slab and the northern portion of the property, Based on historical photographs of the Site, the last of the aboveground tanks were removed at some point between 1987 and 1991. A 6-ft chain link fence encloses the property.

Figure 1-1
Site Location Map
Southern Solvents Site



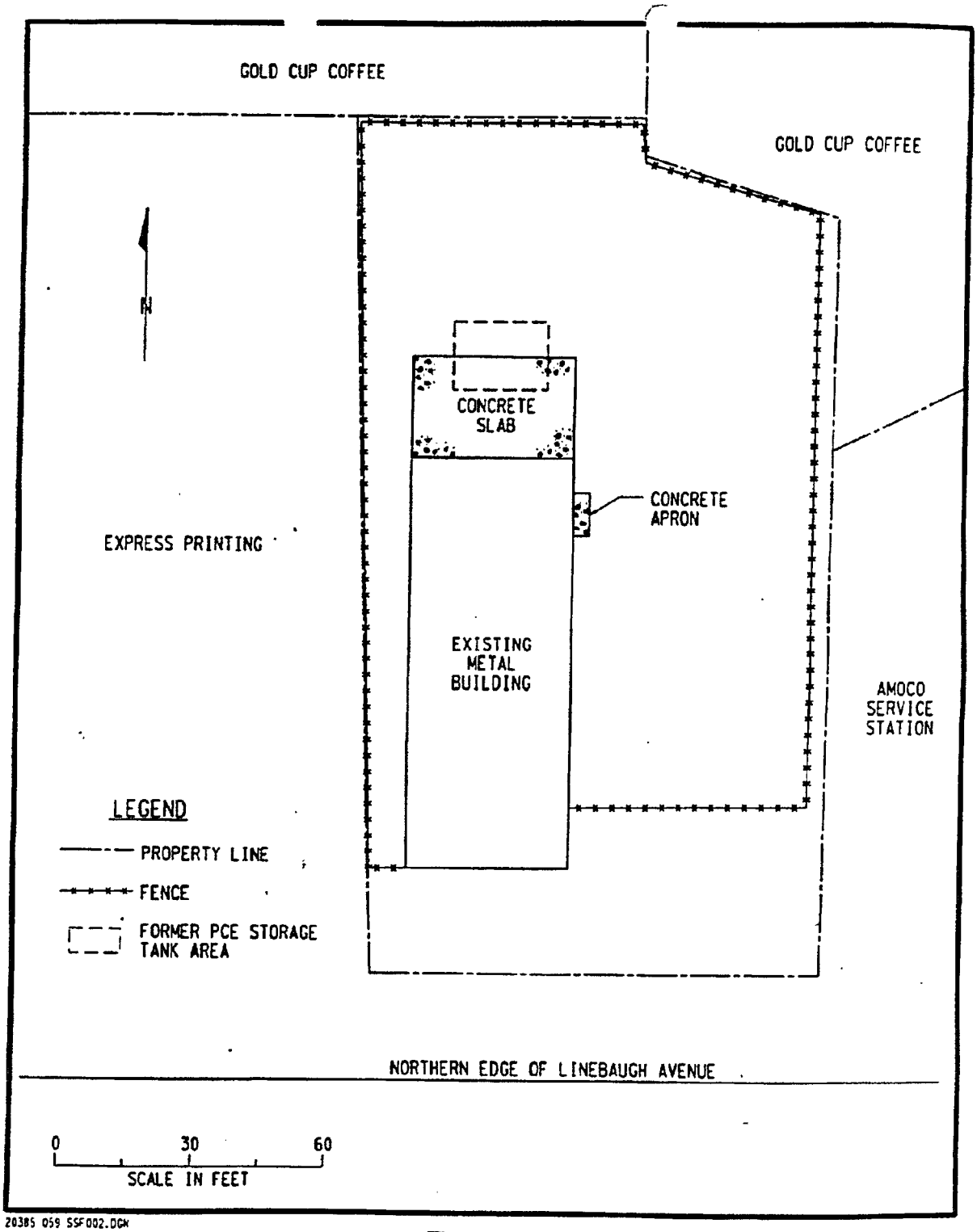


Figure 1-2
Site Layout
Southern Solvents

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 History of Site Operations

Interpretation of historical aerial photographs revealed that the Site was part of an orchard in 1965 (EPA 1998). The land use and land cover around the Site then changed from predominately agricultural to primarily commercial usage as reflected in the most recent (1991) photograph analyzed. In a 1972 photograph, the metal warehouse building is present, and in 1980, vertical and horizontal storage tanks are visible. In 1987, only one storage tank remained, and by 1991, the remaining storage tank was no longer present.

Records show that Southern Solvents, Inc. stored, transferred, and distributed PCE to the local dry cleaning industry from circa 1977 until 1985. The facility was then leased to PJ's Spas who operated a business that sold and maintained spas at the Site until August of 1989. The Site is currently leased by AAA Diversified Services, a small business that specializes in commercial painting.

During Southern Solvent' operation at the Site, PCE was stored in aboveground storage tanks at the north end of the facility on or near a concrete slab. PCE was also stored in small tanker trucks in the north central and northeast parts of the Site. Reportedly, several accidental spills of small quantities of PCE from the storage tanks and trucks occurred in the mid-1980s. It is believed that these accidents are the cause of the soil and groundwater contamination at the Site. No known landfill practices occurred at the Site

2.2 History of Federal and State Site Investigations

Many investigations have occurred at the Southern Solvents Site since it was first discovered in 1988. These investigations are discussed in detail below and are summarized in Table 1. As a result of the investigations that took place prior to EPA's involvement at the Site, EPA had extensive information on the Site condition prior to conducting the Remedial Investigation and Feasibility Study (RI/FS) at the Site which began in 1997 and was completed in 1999. This information was used in developing EPA's approach for conducting the RI/FS.

Due to the levels of contamination at the Site and the impact on private drinking water wells, EPA expedited cleanup in accordance with the Superfund Accelerated Cleanup Model (SACM) guidance. The data received from the Remedial Investigation will be used to develop the Hazard Ranking System (HRS) package for the Site. The HRS package is the document that is used to place a site on the National Priorities List (NPL).

Table 1
Summary of Site Investigations

Investigator/Date	Type	Scope	Significance
State of Florida Department of Health and Rehabilitative Services/1988-1989	Drinking water analysis	Sampling of the onsite deep well and several neighboring deep wells (all potable water supply wells).	Sampling results indicated the presence of PCE, TCE, and 1,2 DCA.The affected wells were closed and bottled water was provided to the well users.
Mortensen Engineering for Southern Solvents, Inc./1989	Preliminary site contamination assessment	Installed 5 shallow onsite wells and completed 2 deep auger borings to assess the source of groundwater contamination.	Based on the locations and test results of the wells, it was determined that the probable source was the former storage tank area north of the concrete pad.
Mortensen Engineering for Southern Solvents, Inc./1991	Shallow aquifer system contamination assessment	Installed 9 deep soil borings, 33 shallow hand auger borings, and 14 shallow monitoring wells.	Analytical results confirmed concentrations of PCE and derivative constituents in excess of 200,000 µg/L.
Mortensen Engineering for Southern Solvents, Inc./1992-1993	Additional assessment of the shallow aquifer system	Installed 7 deep soil borings, 14 shallow hand auger borings, and 7 shallow monitoring wells.	Resulting analytical data supported the previous evidence that PCE shallow groundwater contamination was present on the site and property to the west of the site.
Mortensen Engineering for Southern Solvents, Inc./1994	Upper Floridan Aquifer contamination assessment	Installed 5 deep soil borings and 6 deep monitoring wells.	Results indicated that PCE concentrations, greater than the MCL, existed in the deep groundwater system.
Bechtel Environmental, Inc. for EPA/1997	Preliminary remedial investigation	Sampled 20 shallow, intermediate, and deep monitoring wells.	Contaminant and hydrogeological information collected was used to develop the approach to the 1998 remedial investigation.
Bechtel Environmental Inc. for EPA/1998	Remedial Investigation	Extensive soil and groundwater sampling	Data collected was used to delineate the nature and extent of soil and groundwater contamination

Department of Health and Rehabilitative Services (1988-1989)

Investigation activities at the Site began in August 1988, when Florida's Department of Health and Rehabilitative Services (DHRS) discovered that the onsite deep well and three neighboring deep wells (all once were potable water supply wells) were contaminated with PCE and its derivatives. PCE and trichloroethene (TCE) each were detected at greater than 100 µg/L; 1,2-dichloroethane (DCA) was detected at 37µg/L. The concentrations of PCE detected exceeded the acceptable State drinking water standard maximum concentration level (MCL) of 3 µg/L as specified in Chapter 17-550 F.A.C. for Class G-II groundwater (FDEP 1996). Due to the discovery of contamination above the MCL by DHRS, the wells were immediately closed and property owners and tenants were provided bottled water. In April 1989, following further investigations at the Site (see below), DHRS collected additional samples from two other wells in the area. Again the results indicated the presence of PCE and TCE.

Preliminary Contamination Assessment (1989)

Following the initial discovery of contamination at the Site, Southern Solvents, Inc. retained the services of Mortensen Engineering, Inc. in October 1988 to conduct a preliminary contamination assessment (PCA). The objectives of the PCA were to assess the probable source of the groundwater contamination in the deep potable wells and ascertain, if possible, whether or not the contamination was associated with any site-related operations. The PCA Report was forwarded to the Florida Department of Environmental Protection, then known as the Florida Department of Environmental Regulation (FDER), in early 1989.

The literature review conducted during the PCA did not reveal any probable offsite sources of groundwater contamination of the magnitude found by DHRS. PCE and other contaminants (PCE degradation products) were detected at some well locations. Based on the locations and test results of the onsite wells, it was determined during the PCA that the probable source of the contamination was the former storage tank area north of the concrete pad (Figure 12). These findings and conclusions were summarized in the Preliminary Contamination Report submitted to FDER in early 1989. The conclusions outlined in the report, in conjunction with the DHRS findings in 1988, led to the negotiation of a Consent Order between FDER and Southern Solvents to conduct further investigations.

Shallow Aquifer System Contamination Assessment Report (CAR) (1991)

In accordance with the requirements outlined in the Consent Order, a subsequent contamination assessment of the shallow aquifer system was performed by Southern Solvents. The primary objective of this investigation was to determine the suspected source of the

groundwater contamination, and to sufficiently delineate the magnitude of and both the lateral and vertical extent of soil and groundwater contamination onsite and offsite within the shallow aquifer system. The scope of the shallow aquifer assessment included deep and shallow soil sampling and the installation and sampling of fourteen shallow monitoring wells.

The analytical results confirmed that significant PCE contamination and its derivative constituents were present within the onsite/offsite shallow aquifer system at maximum concentrations greater than 200,000 µg/L. Soil contamination was detected at the water table interface; however, significant soil contamination did not appear to exist in the shallow vadose zone because PCE is heavier than water and tends to sink. The CAR was completed and submitted to FDER in February 1991.

Shallow Aquifer System CAR Addenda (1992-1993)

In response to FDER's comments to the CAR, Southern Solvents conducted further work and analyses of the shallow aquifer system and reported in Addendum I, submitted in July 1992, and Addendum II, submitted in November 1993. The scope for the follow-up investigation included collection and analysis of seven deep soil borings, 14 shallow hand auger borings, and the installation and sampling of eight additional monitoring wells. The resulting analytical data supported the previous evidence that significant PCE shallow groundwater contamination was present on the Site and on property to the west (Express Printing) of the Site with the higher levels reported at locations in and around the former storage tank area.

Upper Floridan Aquifer System CAR (1994)

Satisfied that the PCE contaminant plume in the shallow aquifer system had been adequately identified and delineated, Southern Solvents conducted a separate site investigation focused on the upper Floridan aquifer. The field activities paralleled those performed for the shallow aquifer, e.g., installation of soil borings and monitoring wells. Results of the sampling indicated concentrations of PCE existed in the deep groundwater system. As in the shallow aquifer, the levels of PCE detected exceeded the MCL of 3 ppb. The CAR for the upper aquifer system was prepared and submitted to FDEP in February 1994.

Preliminary Assessment (1996)

In 1996, EPA first became involved at the Site when a Preliminary Assessment (PA) was conducted by the Florida Department of Environmental Protection. After review of the extensive past data collected and high contaminant concentrations present, EPA was confident this Site would qualify to be placed on the National Priorities List (NPL). EPA therefore, proceeded

directly to the Remedial Investigation (RI) in accordance with the Superfund Accelerated Cleanup Model (SACM) guidance which was developed to accelerate the cleanup of Superfund sites.

.Preliminary Remedial Investigation (1997)

Because no investigation had been conducted at the Site since the 1994 assessment of the upper aquifer, EPA, conducted a preliminary Remedial Investigation (RI) in November 1997. The objective of this interim field activity was to collect current contaminant data to identify and develop the approach to be taken during the RI, including identification of data quality objectives, source characterization activities, and contaminant migration assessment. Water level measurements were collected to identify groundwater flow paths and 20 shallow, intermediate, and deep monitoring wells were sampled. The results of this investigation can be found in the Remedial Investigation Report for the Site.

Remedial Investigation (1998)

In April 1998, EPA began field activities for the Remedial Investigation (RI) at the Site. Additional groundwater monitoring wells were installed and extensive soil and groundwater sampling was conducted to fully delineate the nature and extent of contamination at the Site. The three main objectives of the April 1999 soil investigation were to: (1) determine the presence and define the distribution of any Dense Non-Aqueous Phase Liquid (DNAPL) and Volatile Organic Compound (VOC) contamination in Site soils; (2) to evaluate geologic, stratigraphic, and other physical controls affecting the downward migration and retention of contamination; and (3) to support the development of a comprehensive Baseline Risk Assessment (BRA) and Hazard Ranking System (HRS) package for the Site. The five main objectives of the groundwater investigation were to: (1) determine the extent of contamination beneath the Site and in offsite areas affected by the VOC plume; (2) to identify and evaluate release and transport mechanisms; (3) to predict future migration trends; (4) to provide data for the numerical groundwater modeling effort; and (5) to support the development of the BRA and HRS package for the Site. The results of this investigation can be found in the March 1999 Remedial Investigation Report for the Site.

2.3 History of CERCLA Enforcement Activities

In October 1997, EPA issued to Southern Solvents a General Notice and information request letter which notified Southern Solvents of their potential liability at the Site and requested answers to questions related to the Site. In their response, Southern Solvents indicated they were no longer in operation and had no meaningful monetary assets. EPA conducted the RI/FS activities with federal funds from the Superfund. However, EPA is in the process of completing a search for additional responsible parties.

3.0 HISTORY OF COMMUNITY RELATIONS

Meeting (March 1998):

On March 2, 1998, the EPA Remedial Project Manager (RPM) and EPA Attorney met with local business owners from the area around the Site. Representatives from Bechtel and the Hillsborough County Health Department were also in attendance. The purpose of the meeting was to discuss with the business owners the upcoming RI activities and to answer any questions or address any concerns they might have about any potential liability. The November 1995 EPA fact sheet titled "*Policy Towards Owners of Property Containing Contaminated Aquifers*" had been mailed to them previously and was discussed at the meeting. A representative from the Hillsborough County Health Department was present and distributed the ATSDR fact sheet on tetrachloroethylene. She also discussed the sampling of drinking water wells that had taken place in the past. Requests for property access were distributed at the meeting and explained.

Meeting (April 1998):

On April 2, 1998, the EPA RPM held an information session for the residents of the St. Andrew Square Townhomes located just southwest of the Site. The purpose of the meeting was to inform the residents in the area about upcoming Site activities and to answer questions about the Site and about Superfund. Flyers were taped to the door of each of the residents' townhomes to notify them of the meeting.

Community Interviews (November 1998):

Community interviews were conducted with local officials and residents in November 1998. Using information collected during these interviews, EPA developed a Community Relations Plan to address the concerns and information needs of the community. The Community Relations Plan identifies opportunities for the community to provide input concerning the cleanup decisions related to the Site.

RI Results Fact Sheet (April 1999):

In April 1999, EPA mailed out a fact sheet to the community which discussed the findings of the RI and the upcoming activities at the Site. The public was asked to contact the RPM if they wanted EPA to hold a public meeting to discuss the proposed plan. No calls were received requesting a public meeting and therefore, no meeting was held.

Proposed Plan Fact Sheet (August 1999):

The proposed plan for the Southern Solvents Site in Tampa, Florida, was mailed out to the 140 people who were on the Site mailing list. The proposed plan was made available to the public for comment from August 1, 1999 to September 1, 1999. The proposed plan along with other Site related documents can be found in the Administrative Record file and the information repository maintained at the EPA Docket Room in the Region 4 office in Atlanta, Georgia, and at the North Tampa Branch Library located at 8916 North Boulevard in Tampa, Florida. The opportunity for a public meeting was made, but no one requested EPA to hold a public meeting. EPA's response to the comments received on the proposed plan during the public comment period is included in the Responsiveness Summary, which is contained in Appendix B and is part of this Record of Decision.

4.0 SCOPE AND ROLE OF ACTION

As with many Superfund sites, the problems at the Southern Solvents Site are complex. As a result, EPA has organized the work into two operable units (OUs). This ROD describes the planned actions for contamination in the soil and surficial groundwater (OU 1). A second ROD to address the contamination in the deeper, Floridan aquifer (OU 2) is subsequently anticipated for this Site. The overall Site cleanup plan for OU 1 is discussed below.

- Excavate shallow soils above the water table (approximately 0-4 feet) around the building, including and send offsite for treatment/disposal. This will include the removal of the concrete slab and underlying contaminated soil behind the building.

- In the initial phase, use chemical oxidation to treat the saturated soils and groundwater in the areas where levels of PCE exceed 300 ppb in the groundwater. This level was chosen because 300 ppb is the Natural Attenuation Default Concentration for PCE in Florida. Chemical oxidation will also be used to treat the unsaturated, shallow soil contamination underneath the building, since the concrete slab will act as a lid, containing the oxidant.

- After successful implementation of the initial phase, an evaluation of the effectiveness of chemical oxidation and its continued use to treat the remaining contamination will be conducted. It is anticipated that chemical oxidation will be used as the final treatment technology to treat the contamination to meet the Site cleanup goals. However, this break in the implementation of the cleanup will provide an opportunity to determine the effectiveness of chemical oxidation, still an innovative technology, and to determine how effective chemical oxidation will be in treating the lower level contamination. Additionally, by this time, it is anticipated that the investigation of the Floridan aquifer will be complete and a remedial strategy will have been developed. This break will also allow EPA to determine if chemical oxidation will complement the treatment technology ultimately chosen as the remedial strategy for remediating the Floridan aquifer.

5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 Geology

The regional geology in the Site area generally consists of an upper or surficial zone, a low permeability confining clay layer below the surficial zone, and a karst limestone zone below the clay layer. The saturated portion of the surficial zone is referred to as the surficial aquifer, which for the purposes of the remedial investigation, was separated into the shallow zone (water table to 15 feet deep) and intermediate zone (15 feet to 35 feet). The saturated karst limestone zone below the surficial aquifer is referred to as the Floridan aquifer, which is the drinking water source for much of this area of Florida. The clay layer between the two zones can range from being non-existent to several feet thick. Where the clay layer is thick enough, it can limit the connection between the surficial and Floridan aquifers. Where the clay layer is either too thin or non-existent, groundwater in the two aquifers can mix freely and any contaminants in the surficial aquifer can be released into the Floridan aquifer. Variations in the thickness of the clay layer can occur over small areas and can be affected by features such as sinkholes or channel scours, which can provide a direct conduit into the Floridan aquifer.

The Site geology is discussed in greater detail in the March 1999 Remedial Investigation (RI) report. During the RI, EPA collected data to specifically characterize the geology in the area around the Site. This data shows that semi-confining conditions exist at Site. Therefore, even though a clay layer may exist at the Site, it is not an effective barrier to groundwater flow and contaminant transport. This explains why PCE contamination has been detected in the Floridan aquifer below the Site.

5.2 Hydrogeology

In the Site area, the regional direction of groundwater flow is to the south-southwest, towards Tampa Bay. During the RI, data confirmed that the surficial aquifer groundwater in the Site area flows to the southwest as expected. However, it was found that water in the Floridan aquifer below the Site flows to the northeast, opposite the expected direction of flow. EPA conducted a numerical groundwater flow model to predict groundwater flow at the Site. The results from this model were used to evaluate potential remedial alternatives.

5.3 Soil Contamination

Historical operations conducted at the north end of the building and in the northeast corner of the Site resulted in releases of PCE, a chlorinated solvent used in the dry cleaning industry. Upon its release to the surface soils, the PCE migrated downward under the influence

of gravity as an immiscible-phase liquid. As expected, the highest concentrations of contaminants were encountered in the soil and groundwater below where the spills occurred. RI soil sampling results indicated no significant inorganic contamination associated with the Site. None of the onsite soil samples contained metal concentrations exceeding FDEP residential cleanup goals or risk-based concentrations (RBCs) used for screening purposes. The presence of organic. contamination above levels of concern in soil and groundwater was determined through comparison of sampling results with ambient media concentrations and RBCs. Upon review of sampling results, it was determined that PCE and its degradation products were the primary contaminants detected in soil and groundwater.

Soil Contamination in the Vadose Zone

The lateral and vertical extent of contamination within onsite vadose zone soils (above the water table) was determined prior to EPA's RI from organic vapor analyzer (OVA) readings performed on a series of 33 shallow hand borings. Based on that delineation and further investigations, EPA concentrated on further characterization of the spill area at the north end of the building. The results confirm PCE is the predominant contaminant from spills that occurred north of the building. While the area of vadose zone soil initially contaminated was relatively small, analytical results show that the PCE has migrated downward through the vadose zone and into the saturated soil.

In general, PCE concentrations are relatively low within the vadose zone when compared to those measured in saturated soils. This is expected given PCE's high volatility and a density greater than water. At exposed sampling locations (not covered with concrete), concentrations in shallow soil samples ranged from nondetectable to 5,400 ug/kg. Except for the maximum concentration measured in surface soil located within the former tank storage area, all results were below 1000 ug/kg. Twelve out of the fourteen shallow samples collected contained PCE concentrations less than 500 ug/kg.

Soil Contamination in Saturated Soils

Generally increasing with depth, PCE concentrations were highest in samples collected just above the clay layer in the immediate vicinity of the former solvent storage tanks. The maximum concentration estimated at 50,000,000 ug/kg was detected in a sample collected from a depth of 32 to 34 feet directly below the tank area. Concentrations from 10,000 to 100,000 ug/kg were commonly measured in shallower saturated soils.

An exception to the increasing concentration/depth trend is found in the sampling results located beneath the building slab. At this location, concentrations are elevated (15,000 ug/kg) in the 0-2 ft interval and decrease with depth. It is probable that PCE volatilized from the water

table and migrated upward as an organic vapor becoming trapped between the pore spaces in the soils and the concrete.

The soil sampling results indicate that the approximate lateral extent of contamination migration within the saturated soil (above the clay) is limited to the north and east as shown in Figure 5-1. Further movement in these directions would be limited due to the relatively flat clay layer and the southwest surficial groundwater flow. Correspondingly, it can be assumed that the southwest flow of a dissolved phase PCE plume has resulted in contamination of most of the saturated soil beneath the building. This contamination of the soil/groundwater matrix likely continues (at somewhat reduced concentrations) to areas south and southwest of the Site as outlined by contamination seen in the groundwater monitoring wells. Based on the magnitude of some of the soil concentrations of PCE, the vadose and saturated soils within the footprint of the tank storage area still represent a definable source area.

Dense Non-Aqueous Phase Liquid (DNAPL)

Although field screening of soil samples for DNAPL was inconclusive, there are data from this site which indicate the presence of some DNAPL in the subsurface. The presence of DNAPL is inferred from the magnitude of soil PCE concentrations, the variability of soil PCE concentrations within short lateral and vertical distances, and the association of high soil PCE concentrations with a low point in the surface of the clay underlying the surficial aquifer. Such an association is suggestive of DNAPL pooling on the clay.

5.4 Groundwater Contamination

During the 1998 remedial investigation, 27 existing wells and 17 new groundwater monitoring wells were sampled. All PCE concentrations detected above the method detection limit in groundwater samples were present at levels in excess of the risk based concentration (1.1 ug/l) and the MCL (3 ug/1). The highest concentrations were found in samples collected from the shallow and intermediate wells installed in the surficial aquifer. The onsite and offsite PCE concentrations are shown on Figures 5-2 and 5-3.

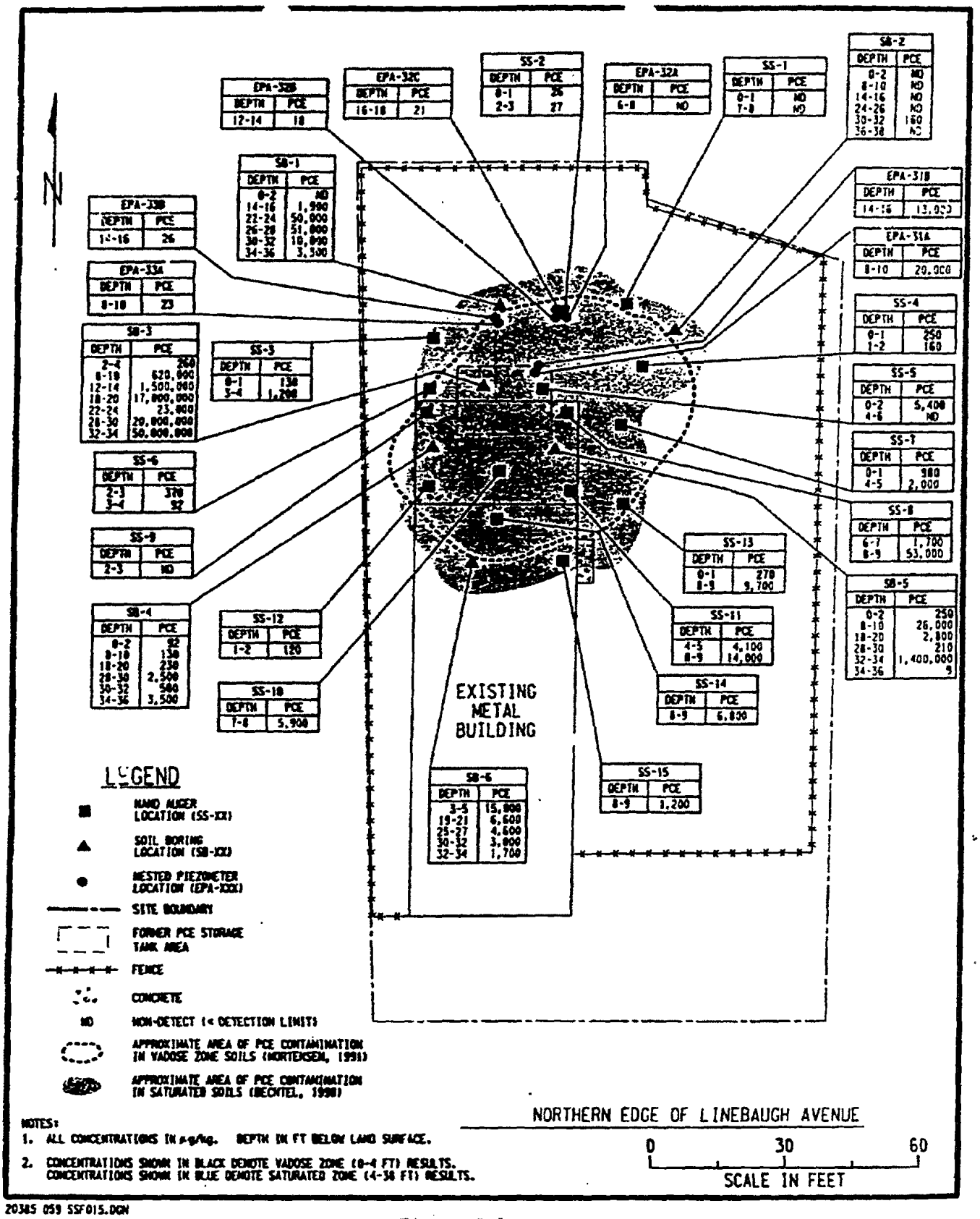


Figure 5-1

Approximate Location of PCE Source Area
Southern Solvents

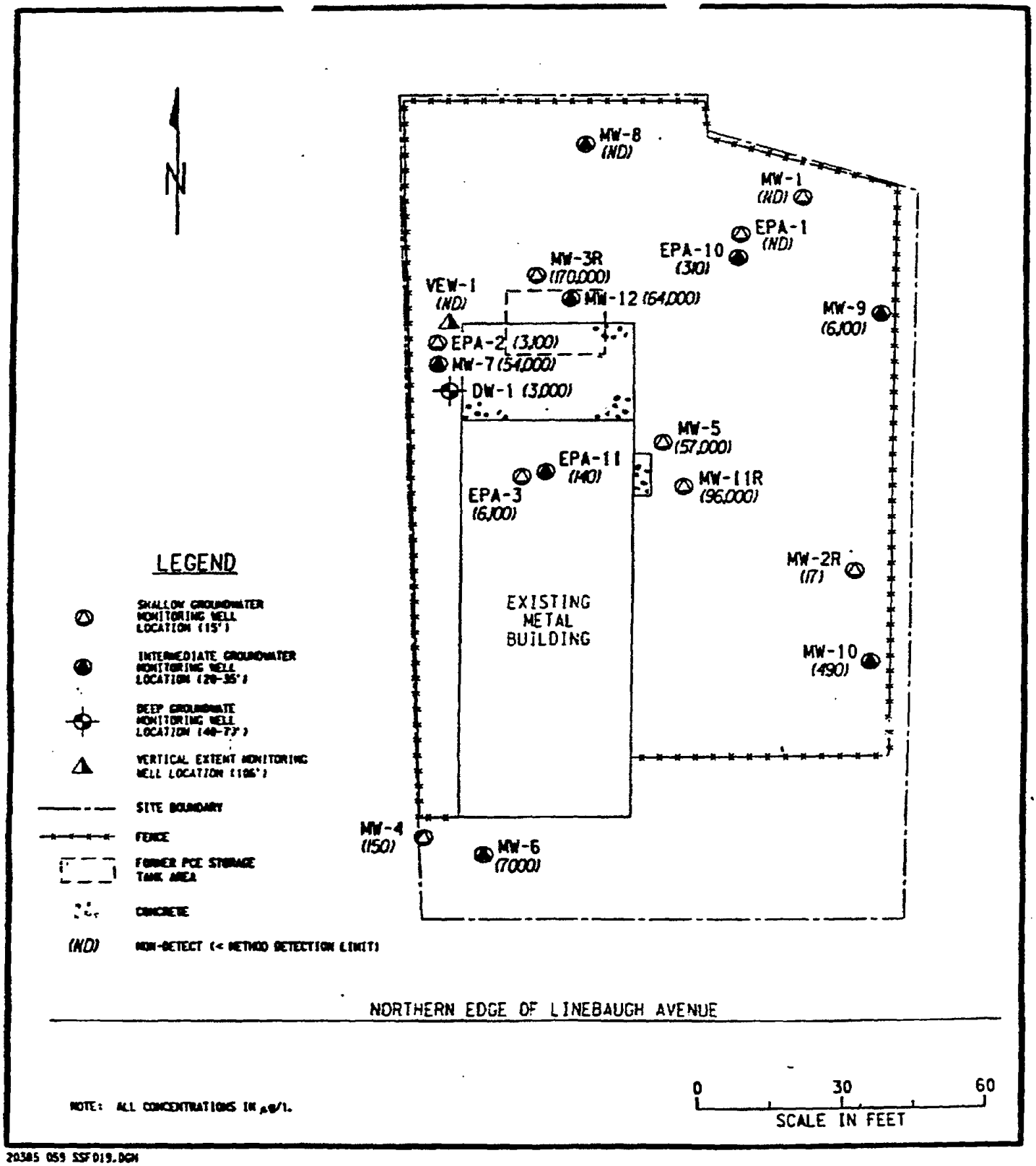


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Figure 5-2
Onsite Groundwater PCE Concentrations
Southern Solvents

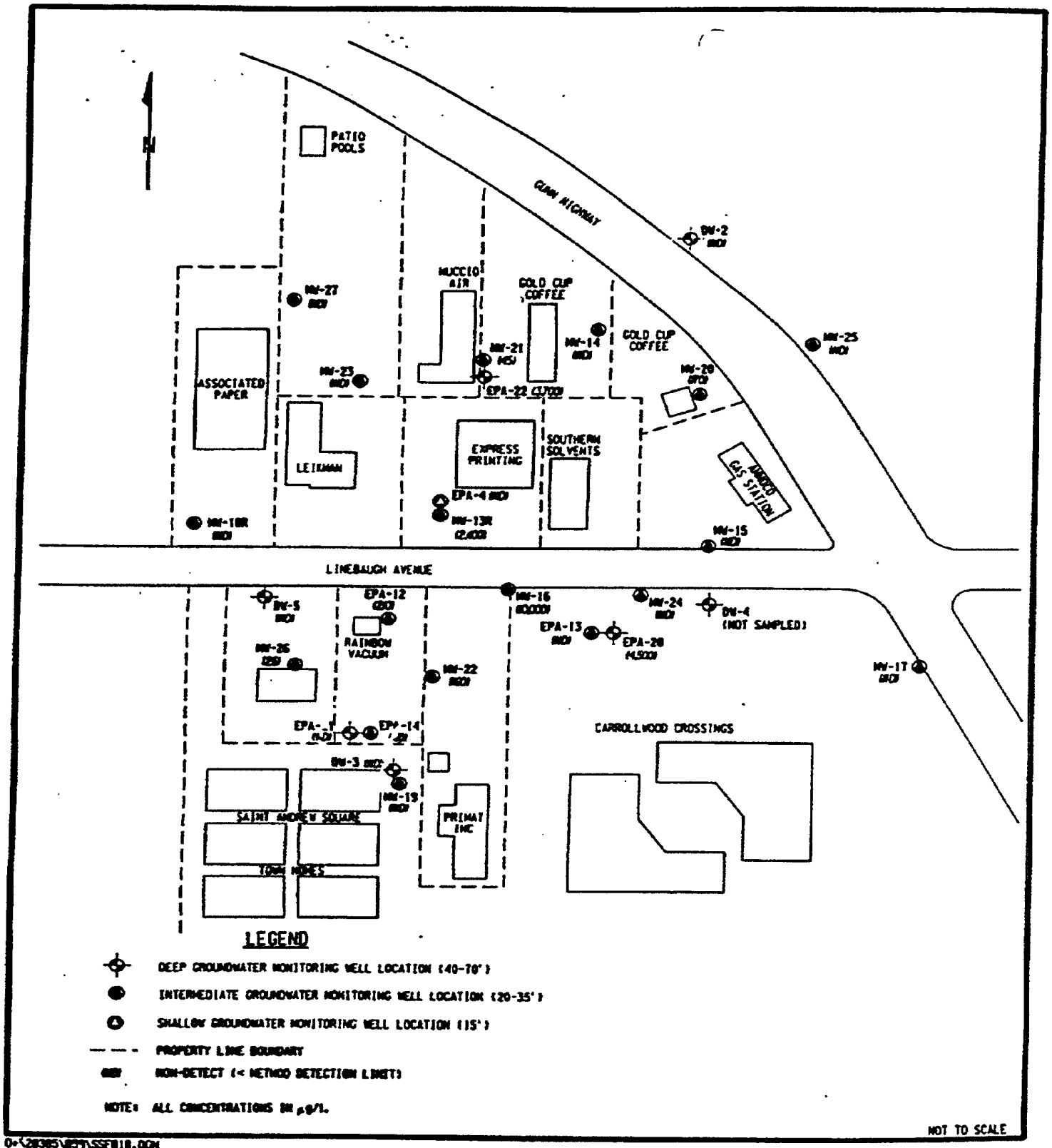

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Figure 5-3
Offsite Groundwater PCE Concentrations
Southern Solvents

6.0 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

Land Uses

Current land use is light commercial. The existing building is used as the headquarters for a small painting business which specializes in commercial painting. The building is used to store equipment and as an office. Due to the location of the property, future land use would most likely continue to be commercial.

Groundwater Uses

Locally, groundwater is being used in a limited number of private wells. The wells in the immediate vicinity were initially tested by the Hillsborough County Health Department. A filter was installed on one well, just north of the Site, which exceeded the drinking water standard for PCE. The Hillsborough County Health Department continues to test all wells in the vicinity annually, that continue to have detectable levels of Site contaminants. Municipal water supply is available in this area. Therefore, future use of groundwater in the immediate area of the Site is anticipated to decrease.

The Floridan aquifer, which is first encountered approximately 35 feet below the ground surface at the Site, is a significant source of drinking water for this area of Florida. Potential releases of Site contaminants to the Floridan aquifer are the main concern at this Site. Potential exposures to contaminants in the Floridan aquifer will be further evaluated in operable unit 2 (OU2).

7.0 SUMMARY OF SITE RISKS

The risk assessment results indicate that site-related contaminant concentrations in onsite surface soil, onsite subsurface soil, and offsite groundwater at the Southern Solvents Site do not pose significant carcinogenic or noncarcinogenic risks to human health. However, if onsite groundwater were to be used for drinking water or for other purposes under the future land use conditions that were assumed in the risk assessment, then the carcinogenic and noncarcinogenic risks to future workers and/or residents would be high, due primarily to PCE. Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present a current or potential threat to public health, welfare, or the environment.

7.1 Human Health Risk Assessment

The baseline risk assessment estimates what risks the Site poses if no action is taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addresses by the remedial action. This section of the ROD summarizes the results of the baseline risk assessment for this Site.

7.1.1 Identification of Chemicals of Concern

To evaluate the risk to human health associated with contamination from the Southern Solvents Site, analytical data for onsite and offsite groundwater and onsite surface soil and subsurface soil collected during the RI was evaluated to develop a list of Chemicals Of Potential Concern (COPCs) (see tables 6-2.1 through 6-2.16 - Appendix A). Maximum detected chemical concentrations of these COPCs, were then compared to the appropriate health based screening criteria. All organic compounds detected at concentrations above screening criteria were selected as COPCs. Inorganic chemicals detected at concentrations above screening criteria were further compared to background data in order to determine whether these chemicals were present above naturally occurring levels. Inorganic chemicals detected above both health based screening criteria and background levels were selected as COPCs.

Based on results from the RI, as well as previous investigations, the baseline risk assessment, confirmed PCE is the predominant Chemical of Concern (COC) (see tables 6-10.1 through 6-10.4 - Appendix A). PCE was detected in 5 of 18 onsite surface soil samples with concentrations as high as 5,400 ug/kg. Generally increasing with depth, PCE was detected in 45 of 63 onsite subsurface samples with the highest detected concentration of 50,000,000 ug/kg detected just above the clay layer below the former tank location. The maximum groundwater

contamination detected was PCE, with a concentration of 170,000 ug/l, found in the groundwater just below the former tank location. TCE and cis-1,2-DCE were also determined to be contaminants of concern. TCE was detected in 2 of 81 soil samples at a maximum concentration of 200 ppb and in 8 of 44 groundwater samples at a maximum concentration of 1,500 ppb. Cis-1,2-DCE was detected in 2 of 81 soil samples at a maximum concentration of 81 ppb and in 6 of 44 groundwater samples at a maximum concentration of 510 ppb.

Pentachlorophenol (PCP) was detected in one groundwater sample taken from a deep onsite well that is screened in the Floridan aquifer. Chloroform was detected in two offsite, upgradient, deep monitoring wells which are also screened in the Floridan aquifer. This ROD is being prepared to determine the remedy for soil and the surficial aquifer only. Neither PCP nor chloroform are thought to be Site related and were only detected a minimum number of times in the Floridan aquifer. The extent of contamination in the Floridan aquifer will be further evaluated in operable unit 2 and a subsequent ROD will contain the remedial strategy for the Floridan aquifer.

7.1.2 Exposure Assessment

The human health exposure assessment was performed to determine which human exposure pathways could potentially be complete at the Southern Solvents Site under current and future land use conditions. Under current land use conditions, offsite worker exposures to groundwater from the area wells were evaluated. Under future land-use conditions, onsite worker and hypothetical future resident exposures to groundwater from the site-wide surficial aquifer, site-wide Floridan aquifer, surficial aquifer- PCE plume, and Floridan Aquifer - PCE plume were evaluated. The results of this assessment in addition to examples of exposure assumptions and formulas can be found in tables 6-1, 6-2, 6-4 & 6-10 in Appendix A.

For each complete pathway, the chemical concentrations assumed to be contacted (i.e., the exposure point concentrations) were derived. For all data groupings, with the exception of (1) the surficial aquifer - PCE plume and (2) Floridan aquifer - PCE plume data groupings, exposure point concentrations were either the 95 percent upper confidence limit on the arithmetic mean concentration or the maximum detected concentration, whichever was lower. In accordance with EPA Region 4 guidance, exposure point concentrations for COPCs in the PCE plume data groupings were based on the arithmetic average of the wells in the highly concentrated area of the plumes. The exposure point concentrations were combined with reasonable maximum estimates of the extent, frequency, and duration of exposure in order to calculate chemical doses.

7.1.3 Toxicity Assessment

The human toxicity assessment was performed in order to identify numerical toxicity criteria with which to assess human health exposures. Quantitative dose-response data were compiled from EPA's Integrated Risk Information System, Health Effects Assessment Summary Tables, and National Center for Environmental Assessment. Toxicity criteria were available for all COPCs. The non-cancer and cancer toxicity data can be found in tables 6-5 & 6-6 in Appendix A.

7.1.4 Risk Characterization

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

$$\textbf{Risk} = \textbf{CDI} \times \textbf{SF}$$

where:

Risk	=	a unitless probability (e.g., 2×10^{-5}) of an individual's developing cancer
CDI	=	chronic daily intake averaged over 70 years (mg/kgday)
SF	=	slope factor, expressed as (mg/kgday).

These risks are probabilities that usually are expressed in scientific notation (e.g., 10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site related exposures is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). An HQ<1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g., liver) within a medium or across all media to which a given individual may reasonably

be exposed. An HI< 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. An HI > 1 indicates that site related exposures may present a risk to human health.

The HQ is calculated as follows:

Noncancer HQ = CDI/RfD

where:
CDI = chronic daily intake
RfD = reference dose.

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short- term).

The Site risk characterization results showed unacceptable risks (i.e., upper-bound excess lifetime cancer risks exceeding the upper limit of EPA's target risk range and/or non-cancer hazard indices greater than one) were associated with future worker and hypothetical resident exposures to onsite groundwater in each of the four onsite groundwater data groupings evaluated (i.e., site-wide surficial aquifer, site-wide Floridan aquifer, surficial aquifer - PCE plume, and Floridan aquifer - PCE plume). In each data grouping, high cancer risks were due primarily to PCE. In the site-wide Floridan aquifer and Floridan aquifer - PCE plume data groupings, high cancer risks were also due to pentachlorophenol and TCE.

In each of the onsite groundwater groupings, noncancer hazard indices above 1 were calculated for both future workers and hypothetical residents, indicating that noncarcinogenic adverse health effects could occur if these receptors were exposed to onsite groundwater under the conditions assumed in the human health risk assessment. In the surficial aquifer groundwater data groupings, high hazard indices were due primarily to PCE. In the Floridan aquifer groundwater data groupings, high hazard indices were due primarily to PCE and TCE.

7.2 Environmental Risks

A qualitative ecological risk assessment conducted for this site indicated very little potential for adverse effects to terrestrial and aquatic life. The Site and surrounding areas are urbanized and contain very little habitat and food resources for potential ecological receptors. Surface soil is the only medium that terrestrial receptors could possibly contact. However, this exposure pathway is incomplete because few, if any, receptors would forage at the Site. Structures on the 100 feet by 185 feet site include one building and concrete slab. The remainder of the sandy site is used for parking and equipment storage by the current tenant. There are no sources of surface water and sediment at the Site, and groundwater does not discharge at the Site. VOCs are present in the groundwater of the surficial aquifer, which eventually discharges to a wetland located to the southwest of the Site. Groundwater data upgradient of the wetlands indicated that VOCs detected in the onsite groundwater are not currently discharging to adjacent wetlands. Moreover, based on the distance of the onsite groundwater from the wetlands and retardation factors affecting the groundwater, it is unlikely that the VOC contaminated groundwater will discharge to the wetlands in the future. Therefore, there are no complete exposure pathways at the Site and no risks to ecological receptors.

8.0 REMEDIATION OBJECTIVES

As stated in section 7, the site-related contaminant concentrations in onsite surface soil, onsite subsurface soil, and offsite groundwater at the Southern Solvents Site do not pose significant carcinogenic or noncarcinogenic risks to human health. The primary risk associated with this Site is onsite groundwater if it were to be used for drinking water or other purposes in the future.

The remediation objectives were developed to restore the groundwater to drinking water standards, therefore eliminating the unacceptable risk at the Site which is due primarily to high concentrations of PCE in the groundwater. The cleanup goals for soil were determined by EPA to be necessary to curtail further contamination of groundwater. The cleanup goals for groundwater were determined based on Florida's primary drinking water standards. The cleanup goals for the Southern Solvents Site are found below in Table 8-1.

TABLE 8-1
SOUTHERN SOLVENTS CLEANUP GOALS

Contaminant	Groundwater (ppb)	Soil (ppb)
perchloroethylene (PCE)	3	50
trichloroethylene (TCE)	3	30
cis- 1,2-dichloroethene (DCE)	70	400

9.0 DESCRIPTION OF ALTERNATIVES

In developing remedial alternatives for this Site, separate alternatives were developed for soil and groundwater remediation. In addition, remedial options were developed after the initial internal review. The selected remedy is a combination of alternatives and options. The remedial alternatives and options are listed below.

Soil (S) Remediation Alternatives:

Alternative S1: No Action
Alternative S2: Source Isolation
Alternative S3: In-Situ Treatment (chemical oxidation)
Alternative S4: Source Restoration (excavation)

Groundwater (GW) Remediation Alternatives:

Alternative GW1: No Action
Alternative GW2: Monitored Natural Attenuation
Alternative GW3: In-Situ Treatment (reactive barrier wall)
Alternative GW4: Aquifer Restoration (pump-and-treat)

Additional Options Considered:

Option A: Soil Vapor Extraction (shallow soil)
Option B: Shallow Excavation
Option C: In-Situ Groundwater Treatment (chemical oxidation)

9.1 Description of Remedy Components

<u>Alternatives S1 & GW1: No Action</u>
(Estimated total cost: $0)

The No Action alternatives S1 and GW1 are required to be evaluated as a baseline for comparison of other alternatives. Under these alternatives, no further cleanup would occur at the Site. These remedial alternatives would not include any measures to remove, treat, or contain source materials; restrict further releases of contamination to the Floridan aquifer; or limit the migration of the source area groundwater plume within the aquifer. If implemented, these alternatives would be considered the final remedy and would not involve any periodic reviews to verify their protectiveness.

Alternative S2: Source Isolation
(Estimated total cost: $1,203,993)

This remedial alternative uses a groundwater extraction system to hydraulically contain any contaminant migration out of the source area, by pumping groundwater from the center of the source area plume to the surface, treating the water in an on-site air stripping system, and then reinjecting the treated water back into injection wells located along the outer edges of the plume, This would create a hydraulic gradient from the outer edge of the source plume toward the center.

Alternative S2 is designed only to contain the source plume and would require institutional controls in the form of deed restrictions to restrict future use of the Site groundwater.

Extensive Operation and Maintenance (O&M) activities would be necessary for this alternative during the projected 30 years of operation. This would include routine maintenance of system components, power usage for the pumps and the air stripper, carbon usage, and injection pump maintenance and repair. Periodic monitoring (every 5 years) would be required to determine if the system was effectively containing the contaminated groundwater.

Alternative S3: In-Situ Treatment (chemical oxidation)
(Estimated total cost: $ 1,325,552)

This remedial alternative uses in-situ chemical oxidation, an innovative technology, to remediate the source materials and source area plume. Alternative S3 would treat the soil within the saturated zone and the groundwater contaminated with chlorinated organic chemicals by injecting an oxidant directly into the contaminated aquifer. A strong oxidant, such as hydrogen peroxide, would be injected under pressure into groundwater contaminated with PCE. The chemical reactions that follow cause a degradation of PCE, TCE, and other chlorinated organic compounds that result in the formation of nontoxic by-products such as carbon dioxide, water, and salts.

The installation of wells and usage of groundwater are regulated by the Southwest Florida Water Management District through the issuance of individual and general water use permits. The district also regulates water well construction and requires permits for all new water wells. Therefore, exposure to contaminated groundwater during the implementation of this remedy is unlikely and institutional controls would not be necessary.

O&M activities associated with this remedy are minimal and would include sampling and the preparation of a remedial action effectiveness review report. Performance monitoring during the implementation of this alternative would evaluate the effectiveness of this in situ treatment, in terms of verifying the destruction of the source material and the contaminant source plume.

Alternative S4: Source Restoration
(Estimated total cost: $ 3,131,597)

This remedial alternative would remove the contaminated soil from the surface and subsurface and replace it with clean soil. The contaminated soil would be sent off site for treatment and disposal. The estimated area to be removed would be 70 ft by 70 ft and 35-40 ft deep. This would relieve a significant input of contamination from the source into the aquifer contamination plume. This remedy would require a large area for stockpiling and dewatering soil prior to being sent off site. Additionally, engineering controls would be needed to control air emissions resulting from volatilizing PCE.

There would be no institutional controls or O&M associated with this remedy. Monitoring requirements would include sampling of excavated soil, exposed groundwater, and air concentrations of PCE.

Alternative GW2: Monitored Natural Attenuation
(Estimated total cost: $ 942,372)

The natural attenuation alternative relies on natural processes to achieve the cleanup objectives for the offsite contaminant plume. This alternative would involve long term monitoring and periodic reviews to assess the progress of natural attenuation processes and evaluate whether the groundwater outside the area of the contaminant plume continues to be protected. It does not include measures designed to collect, treat, or contain the offsite contaminant plume.

The installation of wells and usage of groundwater are regulated by the Southwest Florida Water Management District through the issuance of individual and general water use permits. The district also regulates water well construction and requires permits for all new water wells. Therefore, exposure to contaminated groundwater during implementation of this remedy would be unlikely and institutional controls would not be necessary.

The O&M associated with this remedy would include the installation of wells, yearly sampling and analysis, and periodic reviews. Performance monitoring and a remedial action effectiveness review would occur every five years.

Alternative GW3: In-Situ Treatment (reactive barrier wall)
(Estimated total cost: $ 1,389,966)

This alternative involves the installation of a permeable reactive barrier wall which is an innovative, alternative groundwater remediation technology. The concept involves the construction of a permeable wall or barrier, containing appropriate reactive materials across the

path of the contaminant plume. As the contaminated water passes through the wall, the contaminants are removed through chemical or physical processes.

The installation of wells and usage of groundwater are regulated by the Southwest Florida Water Management District through the issuance of individual and general water use permits. The district also regulates water well construction and requires permits for all new water wells. Therefore, exposure to contaminated groundwater is unlikely and institutional controls would not be necessary.

The O&M associated with this remedy would involve sampling and a remedial action effectiveness review every five years. Performance monitoring would be needed to optimize operation of the treatment system, verify containment of the off site contaminant plumes, and demonstrate successful treatment of the groundwater by the permeable reactive wall.

Alternative GW4: Aquifer Restoration (pump-and-treat)
(Estimated total cost: $ 7,849,048)

The pump-and-treat alternative, a proven technology, would be designed to remediate contamination associated with the Southern Solvents plume in order to return the affected groundwater to beneficial uses. Extracted groundwater would be treated aboveground and discharged via injection wells located between the plume and the Florida Cities wellfield, located 4,000 feet northeast of the Site. Injecting the treated groundwater in this location would create an additional hydraulic barrier to minimize the potential for any additional impacts to the wellfield.

The installation of wells and usage of groundwater are regulated by the Southwest Florida Water Management District through the issuance of individual and general water use permits. The district also regulates water well construction and requires permits for all new water wells. Therefore, exposure to contaminated groundwater is unlikely and institutional controls would not be necessary.

Extensive O&M would be associated with this remedy. It would need to be operated and maintained for 30 years. O&M would include power usage by the extraction pump, air stripper, carbon adsorption unit, and injection pump; regular reconditioning of the air stripping packing; annual injection pump maintenance and repair; and groundwater sampling and analysis. Performance monitoring would occur to optimize operation of the extraction and treatment systems, track cleanup of the plume, verify containment of the plume during the remediation, and demonstrate the successful treatment of the extracted groundwater before discharge back into the aquifer.

Additional Remediation Options:

Three supplemental remediation options were evaluated based on the Florida Department of Environmental Protection's (FDEP) review of the June 1999 Feasibility Study. The first two additional options were evaluated to complement existing soil remediation alternatives. The third additional option was evaluated at the request of FDEP as a result of their experience at dry cleaning sites in using chemical oxidation for groundwater as well as source treatment.

Option A (OpA): Soil Vapor Extraction
(Estimated total cost: $ 247,562)

The first remedial option evaluated, OpA, uses an in-situ treatment method for remediation of soil via soil vapor extraction (SVE). SVE works by creating air movement through the shallow soil. As this air moves upward through the soil, the contaminants would volatilize into the air, removing them from the soil. The air would then be captured and treated prior to discharge. OpA was evaluated to complement the preferred alternative, S3, which would remediate the saturated (wet) soil via chemical oxidation. OpA provides an option for remediation of the shallow, vadose (above the water table) soils.

This option was developed to complement a remediation alternative. There are no institutional controls or O&M associated with this option. Performance monitoring would be required initially to optimize the system and evaluate its effectiveness.

Option B (OpB): Shallow Excavation
(Estimated total cost: $ 228,300)

Like OpA, OpB provides an additional option for the remediation of the shallow, vadose soils to complement the preferred alternative, S3. Unlike OpA, which is an in-situ option, OpB would involve the excavation of shallow soils in the source treatment area around the existing building (estimated at 70 x 70 feet to a depth of approximately 4 feet). The soil would then be shipped off site for treatment/disposal and clean soil would be backfilled prior to the installation of the injection wells associated with the preferred alternative, S3. The shallow soils underneath the building would be treated via the chemical oxidation alternative, S3. It is anticipated that S3 would be effective in treating the shallow soils underneath the building since the building's concrete floor would act as a lid helping to contain the oxidant.

This option was developed to complement a remediation alternative. There are no institutional controls or O&M associated with this option. Sampling would be required to determine the lateral extent of excavation necessary to complete the vadose soil remediation.

Option C (OpC: In-Situ Groundwater Treatment (Oxidation)
(Estimated total cost: $ 2,041,114)

OpC uses the same technology to treat the groundwater as the preferred alternative S3 uses to treat the soil. This option involves the injection of a strong oxidant such as hydrogen peroxide into the soil and groundwater to reduce the levels of PCE. This option would initially be implemented in the areas where groundwater concentrations of PCE are above the Florida Natural Attenuation Default concentration for PCE of 300 ppb. After the initial implementation of this option, the effectiveness would be evaluated to see if it should be used over the entire plume to remediate the groundwater down to the MCL of 3 ppb or if another alternative would be more effective for the lower level concentrations.

The installation of wells and usage of groundwater are regulated by the Southwest Florida Water Management District through the issuance of individual and general water use permits. The district also regulates water well construction and requires permits for all new water wells. Therefore, exposure to contaminated groundwater during the implementation of this remedy is unlikely and institutional controls would not be necessary.

O&M activities associated with this remedy are minimal and would include sampling and the preparation of a remedial action effectiveness review report. Performance monitoring during implementation of this alternative would evaluate the effectiveness of the in situ treatment, such as verifying the destruction of the source material and contaminant source plume.

9.2 Common Elements and Distinguishing Features of Each Alternative

S1, GW1: Under the No Action alternatives S1 and GW1, no future action would be taken at the Site. Therefore, they have no common elements and will not be discussed further in this section.

<u>Key ARARs Associated With Each Alternative:</u>

S2: The source isolation alternative (S2) would involve treatment of groundwater prior to reinjection into the groundwater. The ARAR's associated with Alternative S2 include:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141);
(2) Resource, Conservation, and Recovery Act (RCRA) groundwater protection standards (40 CFR 22);
(3) Florida MCLs (FAC 62-550);
(4) Florida groundwater classification (FAC 62-520);

(5) Florida hazardous waste regulations (FAC 62-730);
(6) RCRA requirements for generators of waste (22 CFR 66262);
(7) record-keeping and waste accumulation (22 CFR 22262);
(8) container storage, closure, corrective action, disposal and discharges from regulated units (22 CFR 66264);
(9) Department of Transportation (DOT) requirements for transport of hazardous materials (49 CFR 171 and 172);
(10) Florida requirements for water well construction (FAC 62-528), and
(11) Florida requirements for underground injection of treated discharge (FAC 62-532).

S3: The in-situ alternative (S3) would trigger a minimum number of ARAR's since no waste or contaminated groundwater would be brought to the surface. The ARAR's associated with Alternative S3 include:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141);
(2) Florida MCLs (FAC 62-550);
(3) Florida requirements for water well construction (FAC 62-528); and
(4) Florida groundwater classification (FAC 62-520).

S4: The soil excavation alternative (S4) would trigger a maximum number of ARAR's including treatment of exposed contaminated groundwater, control of fugitive air emissions, and compliance with storage, shipping, treatment, and disposal of contaminated soil regulations. The ARAR's associated with Alternative S4 include:

(1) Florida petroleum criteria (FAC 62-770);
(2) RCRA Hazardous Waste Regulations (40 CFR 268);
(3) Florida Hazardous Waste Regulations (FAC 62-730);
(4) Clean Water Act treatment standards for discharge to a surface water body (33 USC 125 et seq.);
(5) Florida treatment standards for discharge to a surface water body (FAC 62-302);
(6) Clean Air Act air emission standards for stationary sources (40 USC 7401 et seq);
(7) Florida air emission standards for stationary sources (FAC 62-302);
(8) Florida Surface Water Quality Standards (FAC 62-302),
(9) Florida point source discharge regulations (FAC 62-620); and

(10) DOT regulations for transporting hazardous waste (49 CFR 107 and 171-179).

GW2: The Natural Attenuation (GW2) alternative would trigger a minimum number of ARAR's since no waste or contaminated groundwater would be brought to the surface. The ARAR's associated with GW2 include:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141) and
(2) Florida MCLs (FAC 62-550).

GW3: The in-situ barrier wall (GW3) alternative would not trigger many ARAR's since it is an in-situ treatment. ARAR's associated with GW3 would include:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141) and
(2) Florida MCLs (FAC 62-550).

GW4: The pump-and-treat (GW4) alternative would trigger a maximum number of ARAR's including those associated with treatment of groundwater prior to reinjection into the Floridan aquifer. ARAR's associated with GW4 would include:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141);
(2) Resource, Conservation, and Recovery Act (RCRA) groundwater protection standards (40 CFR 22);
(3) Florida MCLs (FAC 62-550);
(4) Florida groundwater classification (FAC 62-520);
(5) Florida hazardous waste regulations (FAC 62-730);
(6) RCRA requirements for generators of waste (22 CFR 66262);
(7) record-keeping and waste accumulation (22 CFR 22262);
(8) container storage, closure, corrective action, disposal and discharges from regulated units (22 CFR 66264);
(9) DOT requirements for transport of hazardous materials (49 CFR 171 and 172);
(10) Florida requirements for water well construction (FAC 62-528), and
(11) Florida requirements for underground injection of treated discharge (FAC 62-532).

OpA: OpA (SVE) would involve treatment of captured air emissions. ARAR's associated with OpA include:

(1) Florida VOC criteria (FAC 62-770);
(2) Clean Air Act standards for stationary sources (40 USC 125 et seq.); and
(3) Florida air standards for stationary sources (FAC 62-302).

OpB: OpB (shallow excavation) would trigger ARAR's associated with storing, shipping, treating, and disposing of contaminated soil. ARAR's associated with OpB include:

(1) RCRA Hazardous Waste Regulations (40 CFR 268);
(2) Florida Hazardous Waste Regulations (FAC 62-730);
(3) DOT regulations for transport of hazardous waste (49 CFR 107 and 171-179);

OpC: OpC would trigger the same ARAR's as S3 and include:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141);
(2) Florida MCLs (FAC 62-550);
(3) Florida requirements for water well construction (FAC 62-528); and
(4) Florida groundwater classification (FAC 62-520).

Long Term Reliability of Remedy:

The remedial alternatives and options were evaluated for soil and groundwater separately. The selected remedy is a combination of these alternatives and options which EPA believes best balances effectiveness and cost. Alternatives S2, GW4 and OpA involve active remedial measures and even though it is expected they would be reliable technologies over time, periodic maintenance would be required. Alternatives GW2 and GW3 do not involve active remedial measures and would be considered very reliable over a long period of time. Alternatives S3, S4, OpB and OpC would not be implemented over a long period of time and therefore, would be considered very reliable over the long term.

Quanti1y of Untreated Waste to be Disposed Offsite:

Alternatives S2, S3, GW2, GW3, GW4, OpA, and OpC do not result in any untreated wasted being disposed of offsite. Alternatives S4 and OpB would involve the excavation of soil which would be sent offsite for treatment and/or disposal. Alternative S4 would involve the excavation of an area approximately 70 ft by 70 ft by 35 ft deep. Option B would be used on a much smaller scale in conjunction with another alternative and would result in the excavation of an area approximately 70 ft by 70 ft by 3-4 ft deep.

Uses of Innovative Technologies:

The innovative technologies considered for use at this Site include in-situ chemical oxidation (S3 for soil and OpC for groundwater) and a permeable reactive barrier wall (GW3). Chemical oxidation has been successfully used to remediate sites with similar conditions and similar contaminants. A treatability study showed that the chemistry at the Southern Solvents Site was favorable to implementing the permeable reactive barrier wall. However, due to low groundwater velocity, it was determined that alternative GW3 would not be completely effective in removing PCE mass from the surficial aquifer. Additionally, this alternative would not address vertical migration of contaminants into the Floridan aquifer.

9.3 Expected Outcomes of Each Alternative

S2: Alternative S2 would be designed only to effectively contain the source of contamination. Even though some of the contamination would be treated prior to reinjection into the Floridan aquifer, it is not expected to reach the cleanup goals within a 30 year time frame.

S3: It has been demonstrated that chemical oxidation can be effectively used to destroy PCE and its degradation products in saturated soil and groundwater. It is expected that this alternative would successfully achieve its goal of treating the source area at the Site within a 30 year time frame, possibly within 5 years.

S4: Excavation is a tried and proven technology that could be successfully used to remove the source material in the source area. However, this alternative would require the construction of an enclosure around the excavated area large enough to stage contaminated soil and capture fugitive air emissions. It is expected this alternative would result in a significant impact on the surrounding businesses and community.

GW2: The results of the Remedial Investigation showed that even though natural degradation of PCE may be occurring at the Site, it is not occurring in a robust manner or at an expedient pace. It is not expected that this alternative would reach the cleanup goals within a 30 year time frame.

GW3: A treatability study showed that the chemistry at the Southern Solvents Site was favorable to implementing a permeable reactive barrier wall. However, due to low groundwater velocity, it was determined that this alternative would not be completely effective in removing PCE mass from the surficial aquifer. Also, this alternative would not address vertical migration of PCE into the Floridan aquifer.

GW4: It is expected that a pump-and-treat system would eventually attain the Site cleanup goals. This system, however, would involve significant costs and a lengthy period of time to implement.

OpA: It is expected that OpA could be successfidly used to treat the unsaturated soil above the water table to the cleanup goal for soil.

OpB: It is expected that OpB could be successfully used to treat the unsaturated soil above the water table to the cleanup goal for soil.

OpC: It is expected that chemical oxidation (OpC) could be successfully used to treat the Site groundwater to the cleanup goals. It is estimated that using option OpC will result in a 30% cost savings if used in conjunction with the chemical oxidation soil remedial alternative S3.

10.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Soil Remediation Alternatives

The soil remediation alternatives, which would provide the highest level of protection of human health and the environment, would be In-situ Treatment (S3) and Source Restoration (S4). The Source Restoration alternative would remove the maximum amount of contamination from the source area soil and groundwater in the shortest time.

The Source Isolation alternative (S2) would prevent all further migration of the source area plume by extracting contaminated groundwater. Over time, this alternative could also accomplish a potentially significant reduction in contaminant mass and concentrations within the surficial aquifer. S2, however, is not considered to be as protective of human health as S3 or S4 because it does not have as its objective the complete restoration of the source area.

Alternative S1 would provide the least protection of human health or the environment. The no action alternative does not provide the engineering and/or institutional controls to mitigate the significant, ongoing degradation of the surficial and upper Floridan aquifers resulting from continued migration of contamination from the Southern Solvents source area. For this reason, it is not considered to be protective.

Groundwater Remediation Alternatives

The Aquifer Restoration alternative (GW4) would be the most aggressive alternative to restore the contaminated portions of the shallow and Floridan aquifers. This alternative would be protective of human health and the environment. The In-situ Treatment alternative (GW3) would not be as protective as GW4. However, GW3 would prevent further degradation of the shallow aquifer beyond the existing plume boundaries. Groundwater use restrictions under alternatives GW3 and GW4 should be effective in preventing any additional exposures to contaminated groundwater during the long-term operations associated with each alternative.

The Monitored Natural Attenuation alternative (GW2) would be protective to some degree, but is considered less protective than GW3 or GW4, primarily due to its reliance on natural attenuation processes to fully degrade the Southern Solvents plume before it impacts any downgradient receptors. The existing data show that natural attenuation processes are not robust in the surficial aquifer. The No Action alternative (GW1) would not be protective. It entails none of the monitoring or evaluation activities needed to verify the progress of natural attenuation processes, to assess the continued protectiveness of the action, or to determine the need for contingent actions or other measures.

Remediation Options

All three options would be protective of human health and the environment. OpA and OpB would result in the permanent removal of VOCs in the shallow soils and provide significant progress toward restoring the groundwater quality. OpC would result in the treatment of groundwater that is highly contaminated with PCE, thus reducing the potential for further migration of the existing plume.

Compliance With ARARs

Section 121(d) of CERCLA requires that remedial actions at CERCLA sites attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARAR's" unless such ARAR's are waived under CERCLA section 121(d)(4).

Soil Remediation Alternatives

While all of the alternatives involving soil remediation could be designed and implemented so as to be in compliance with ARARs, the In-situ alternative (S3) would be purposely designed to minimize the number of ARARs that are triggered. The treatment of the soil and groundwater using S3 would be performed without pumping the groundwater to the surface. The Source Isolation (S2) and Source Restoration (S4) alternatives would use similar extraction and treatment technologies and, therefore, would have comparable ARAR requirements associated with the extraction and treatment of contaminated water and the reinjection of treated water back into the aquifer.

The No Action alternative (S1) would not trigger any action specific ARARs, because no actions would be taken at the Site.

Groundwater Remediation Alternatives

The Aquifer Restoration alternative (GW4) would potentially meet contaminant specific ARARs through the removal of groundwater contaminants below drinking water standards. The In-situ Treatment alternative (GW3) may not meet the remediation goals within a 30 year time frame. Both of these alternatives would trigger numerous action specific ARARS that would need to be considered during the design and implementation of either alternative.

Neither the No Action (GW1) nor the Natural Attenuation alternatives (GW2) are believed to be able to attain the remediation goals within a 30 year timeframe. The implementation of either or these alternatives would not involve remedial actions that would trigger any action or location specific ARARs.

Remediation Options

All options would be designed to comply with all ARARs. OpA would involve the collection and treatment of VOC laden air as part of the remediation. This option would be designed to meet the Federal Clean Air Act and State of Florida regulations. OpB would involve the excavation and offsite shipment of contaminated soils and would be designed to meet Federal and State hazardous waste regulations. Just as with alternative S3, OpC would involve treatment of contaminated groundwater via chemical oxidation and would be purposely designed to minimize the number of ARARs that are triggered. It is expected that OpC would potentially meet contaminant specific ARARs within a 30 year timeframe.

Long-term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk and the adequacy and reliability of controls.

Soil Remediation Alternatives

The In-situ Treatment (S3) and Source Restoration (S4) alternatives would be the most effective long-term soil remedies, as they would provide a high degree of permanence through the removal of contaminant mass from the source. Aboveground storage and treatment requirements are simplified under Alternative S3, and there is essentially no chance for a spill or inadvertent release, thereby increasing the long-term effectiveness of the action.

While S2 would not be designed to remediate the PCE source, it would effectively isolate the source, preventing further degradation of groundwater quality. The No Action alternative (S1) would provide no long-term effectiveness and permanence.

Groundwater Remediation Alternatives

Long-term effectiveness and permanence is highest for alternatives that actively extract and treat the contaminants. While the In-situ Treatment alternative (GW3) uses a passive chemical oxidative process, Aquifer Restoration alternative (GW4) uses pump and treat methods to restore the aquifer. GW4 is projected to restore the aquifer to drinking water standards after about 20 years. While plume containment is the objective of Alternative GW3, this alternative is not projected to restore the aquifer after 30 years (assuming the source is not dense nonaqueous phase liquids, or DNAPL).

The No Action (GW1) and Monitored Natural Attenuation (GW2) alternatives do not employ active remediation to affect the long term nature of the plume, GW2 would be much more effective than GW1 because it uses an extensive monitoring program to verify its continued effectiveness and includes a provision for a contingent remedy if the natural attenuation processes do not work as expected. Neither GW1 nor GW2 would be expected to restore the aquifer within 30 years,

Remediation Options

Both OpA and OpB would result in the permanent removal of contaminant mass from the vadose source area. Removal of source material represents a highly effective response measure for the Site and is expected to greatly enhance the effectiveness of the groundwater response actions. OpC would result in the permanent removal of PCE, including DNAPL in the surficial aquifer, and would greatly reduce the amount of PCE that would otherwise penetrate into the Floridan aquifer.

Reduction of Toxicity, Mobility, or Volume

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Soil Remediation Alternatives

As in the case of long term effectiveness and permanence, the In-situ treatment (S3) and Source Restoration (S4) alternatives would be the most effective in reducing contaminant mobility and volume. Both of these alternatives would capture or intercept the plume, eliminating any further mobility. Both alternatives also would be designed and operated to provide an optimal

removal of contamination from the Site, reducing both the volume and mass of contamination associated with the Southern Solvents source area.

The Source Isolation alternative (S2) would control the mobility of the plume through pumping to achieve hydraulic containment, but this alternative would not be designed to remove large amounts of contaminants like S4. Of the alternatives involving active remediation (i.e., S2, S3, or S4), only S3 would reduce the toxicity of the contaminants on site. In each of the other cases, contamination is either separated from the groundwater, transferred to another media (activated carbon), or shipped off site for treatment and/or disposal.

The No Action alternative (S1) would not include any controls to reduce either the toxicity, mobility, or volume of the contaminant source.

Groundwater Remediation Alternatives

The greatest reduction in contaminant mobility and volume would occur through the active pumping of the contaminant plume in Aquifer Restoration alternative (GW4). The In-situ alternative (GW3) would involve passive treatment of the surficial aquifer to control the further migration of the plume and reduce the mobility of the contaminants. This alternative would also reduce the volume of contaminants, but at a slower rate than for Alternative GW4.

The No Action (GW1) and Monitored Natural Attenuation (GW2) alternatives would not use any remediation methods other than naturally occurring processes. Although these processes may ultimately result in the eventual degradation of the offsite plume, the response measures would not be considered effective in the overall reduction.

Remediation Options

Both OpA and OpB would result in the removal of contaminant mass from the source area, thereby addressing contaminants that are continuing to release contamination into the Floridan aquifer. However, OpB would accomplish a more rapid reduction in the toxicity, mobility, and volume of the source area in comparison to OpA. OpB is also expected to accomplish a more effective removal of contaminant mass than OpA. OpC would also result in the rapid degradation of the contaminants accomplishing a significant reduction in toxicity, mobility, and volume of the groundwater plume.

Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers and the community during construction and operation of the remedy until cleanup goals are met.

Soil Remediation Alternatives

The No Action alternative (S1) would involve no onsite actions and, therefore, no construction or operation related impacts, including potential exposure to contamination, for Site workers or the community. The In-situ alternative (S3) would have the least short-term effectiveness, as it would involve the most complicated implementation. The increased level of onsite construction activities that would occur under the Source Restoration alternative (S4) has greater potential for exposures to or inadvertent releases of contamination than either S2 or S3. The Source Isolation alternative (S2) would also involve drilling in the source area, but only on a very limited scale. S4 would have the greatest potential for short-term impacts to workers and the surrounding community resulting from excavation and handling of highly contaminated soils and water. Additional impacts may occur as a result of noise, dust and vehicular traffic that would accompany excavation. The relative short-term effectiveness of S3 and S4 is equivalent.

Groundwater Remediation Alternatives

The Monitored Natural Attenuation alternative (GW2) would require continued monitoring of contaminants. These activities would have only a minimal short-term risk associated with them based on exposure potential and duration. The No Action (GW1) and GW2 alternatives are virtually equivalent in their short-term effectiveness as neither alternative would require any active remediation, nor would reduce and/or eliminate the possibility of exposures to workers and the community,

The in-situ Treatment (GW3) and Aquifer Restoration (GW4) alternatives would be equivalent in terms of being the least effective from a short-term perspective. Although these alternatives would use different technologies, both would require installation and/or continued operation and maintenance on offsite property. The risks to workers and the local community associated with activities for GW3 and GW4 would be greater than for either GW1 or GW2. Short-term risks would be greatest with GW3 during the installation of the slurry walls, while the activities associated with GW4 are commonplace for pump and treat remediation and would not be considered to have excessive risks associated with them.

Remediation Options

Both OpA and OpB entail significant onsite construction activities. Pairing one of the options with one of the alternatives has the potential for greater short-term impacts to onsite workers and the surrounding community than would be expected if just the alternative were implemented. The potential short-term risks from implementation of OpC to the onsite workers and the community include limited exposure to contaminated groundwater during installation and operation of the injector system and monitoring wells. Provisions for minimizing these impacts will be taken.

Implementabilily

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Soil Remediation Alternatives

The No Action altemative (S1) would be the easiest to implement, as it would not involve any active remediation or any further response actions. The Source Isolation (S2) and in-situ Treatment (S3) alternatives would be considered comparable in levels of Implementability, although each would involve different technologies. S2 would entail the long-term operation and maintenance of a familiar technology for groundwater treatment, while S3 utilizes a technology which will require a treatability study to establish dosage criteria. One significant implementation concern for S2 involves the placement of the effluent line from the water treatment system to the injection well. This line would have to cross Linebaugh Avenue.

The Source Restoration alternative (S4) is considered the most complicated alternative to implement, as it requires an innovative application of foundation technology, and additional complications due to handling of wet, highly contaminated materials. This alternative would use somewhat larger equipment for the excavation of soil and to handle the higher volume of water requiring treatment.

Groundwater Remediation Alternatives

Because neither the No Action (GW1) nor the Monitored Natural Attenuation (GW2) alternatives would require any extensive onsite activities, the implementation of these alternatives would be relatively easy. GW2 would require the installation of a few new monitoring wells but the majority of the wells in the proposed network are currently in place. The implementation of the In-situ Treatment (GW3) and Aquifer Restoration (GW4) alternatives would be extensive and require arrangements with property owners for offsite installation and/or maintenance of equipment. GW3 would require the installation of approximately 680 feet of slurry wall and associated monitoring wells. The use of pump-and-treat technologies for GW4 would require the installation of extraction wells and several individual treatment plants. Coordination with the Water Management District would be required since the pump-and-treat technology would involve large withdrawals of water from the Floridan Aquifer. While the construction systems are readily implementable for both these alternatives, installation of the slurry wall may be more problematic than the pump-and-treat systems due to the fact that it would be constructed very near West Linebaugh Avenue and may significantly disrupt traffic and businesses in the area.

Remediation Options

Both OpA and OpB are readily implementable. The selection of either OpA or OpB to complement a soil remediation alternative complicates, but does not prevent, implementation of the soil alternative. Chemical oxidation (OpC) is readily implementable with no anticipated difficulties regarding technical feasibility, reliability, or scheduling. Although chemical oxidation is considered an innovative technology, it has become widely used to treat PCE and TCE contamination.

Cost

The estimated present worth costs for the alternatives, not including the No Action alternative range for groundwater, from $942,372 for alternative GW2 to $7.8 million for alternative GW4 and for soil, from $1.2 million for alternative S2 to $3.1 million for S4. Generally, the costs are highest for the ex-situ active treatment alternatives, and lowest for the containment and natural attenuation alternatives.

State Acceptance

The State of Florida has provided input during the Remedial Investigation and Feasibility Study process and supports the selected remedy.

Community Acceptance

Based on the responses received during the public comment period, the community also supports the selected remedy. The public comments and EPA responses are contained in the Responsiveness Surrimary, found in Appendix B.

11.0 SELECTED REMEDY

11.1 Description of the Selected Remedy

Based on consideration of the requirements of CERCLA, the NCP, the detailed analysis of alternatives, and public and State comments, EPA has selected a remedy to address the contaminated soil and surficial groundwater at this Site. The purpose of this response action is to control risks posed by potential future exposure to groundwater contaminated with PCE and to minimize future migration of contaminants into the Floridan aquifer. The baseline risk assessment results indicate that site-related contaminant concentrations in onsite surface soil, onsite subsurface soil, and offsite groundwater at the Southern Solvents Site do not pose significant carcinogenic or noncarcinogenic risks to human health. However, if onsite groundwater were to be used for drinking water or for other purposes under the future land use conditions that were assumed in the risk assessment, then the carcinogenic and noncarcinogenic risks to future workers and/or residents would be high, due primarily to PCE. At the conclusion of this remedy, the groundwater in the surficial aquifer will be remediated to the State of Florida's drinking water standards for Site contaminants which is 3 ppb for PCE, 3 ppb to TCE, and 70 ppb for cis-1,2-DCE. Additionally, shallow, unsaturated soil with contaminant levels at or above 50 ppb for PCE, 30 ppb for TCE, and 400 ppb for cis-1,2-DCE will be removed to curtail further contamination of the groundwater.

The selected remedy is a combination of the evaluated alternatives and options for remediating the Site. This combination is believed to be the most effective remedial strategy taking into consideration effectiveness versus cost and which attempts to minimize the impact on the surrounding community. At this time, EPA's preferred alternative does not address contamination in the deeper Floridan aquifer. The Floridan aquifer will be investigated further prior to selecting a remedial strategy for the deep aquifer. While the Floridan aquifer investigation is being conducted, the OU1 remedial action will begin treating the shallow soil and shallow groundwater contamination, which at this time continues to be a source for further contamination of the Floridan aquifer.

Description of Remedy for Soil Contamination

The selected remedy for addressing soil contamination at the Site is a combination of Option B (OpB) and the In-situ Treatment alternative (S3). This option and alternative are being combined because S3 alone may not successfully treat the shallow, unsaturated soils. OpB will involve the excavation of contaminated shallow soils (above the water table) that are not underneath the existing building. These shallow, unsaturated soils will be removed around the building until the soil remediation goals are reached. This excavation will involve an estimated 725 cubic yards of soil. EPA has determined that the unsaturated soil remedial goals of 50 ppb for PCE, 30 ppb for TCE, and 70 ppb for cis-1,2-DCE are appropriate for groundwater protection in

light of the Site conditions and the overall Site remedial strategy. It is anticipated that since the building has a concrete slab that will act as a lid, alternative S3 will be effective for treating the contaminated shallow, unsaturated soil underneath the building. Therefore, the implementation of OpB will not be necessary underneath the building and the rear of the building will not have to be demolished. Chemical oxidation, the selected remedy to address groundwater contamination, will destroy the contaminants in the groundwater and saturated soil concurrently. Therefore, the contamination in the saturated soil will be treated along with the contamination in the groundwater. The specific oxidation process will be determined prior to implementation of the remedy. The effectiveness of chemical oxidation will be determined by measuring contaminant concentrations in the groundwater as discussed in the following description of the remedy for surficial groundwater contamination.

Description of Remedy for Surficial Groundwater Contamination

The selected remedy for the surficial groundwater contamination at the Site is the chemical oxidation option (OpC). This option will complement the preferred soil remediation alternative (S3) and will address contamination in the groundwater and saturated soil (soil below the water table) at the same time. Additionally, by using this option in conjunction with the soil remediation alternative S3, an estimated reduction of approximately 30 percent in overall costs will be achieved. The Site specific oxidation process will be determined prior to implementation of the remedy. The first phase of the cleanup will be conducted until the groundwater is remediated to PCE concentrations above the Florida Natural Attenuation Default Concentration of 300 ppb. The final cleanup goals for treatment of surficial groundwater contamination are 3 ppb for PCE, 3 ppb for TCE, and 70 ppb for cis-1,2-DCE. However, the effectiveness of continued chemical oxidation for groundwater treatment will be reevaluated after the first phase of the remediation is complete. By then, the investigation of the Floridan Aquifer will have been completed and a remedial strategy will be developed for the Floridan aquifer. If chemical oxidation in the shallow aquifer, as the final remedy to meet the cleanup goals, would not complement the selected remedy for the Floridan aquifer or if chemical oxidation is shown to not be effective for treatment of low level contaminated groundwater at the Site, additional remedial alternatives may be evaluated for treatment of the shallow aquifer to meet the groundwater cleanup goals. By approaching the remediation of groundwater in this way, EPA will be able to quickly and aggressively treat the areas containing the highest contaminant concentrations and then reevaluate the overall remedial strategy for the Site to develop a plan which is most effective at addressing the remaining contamination.

As part of the surficial aquifer remediation, groundwater use restrictions will be implemented by naming the area a delineated area under the Southwest Florida Management District.

11.2 Summary of the Estimated Remedy Costs

The summary of the estimated costs of the selected remedy can be found in table 11-1.

TABLE 11-1 COST SUMMARY OF SELECTED REMEDY			
	Alternative S3	**Option B**	**Option C**
Capital Cost	$1,208,842	$228,300	4,971,610
O&M Cost	$116,710		
30% Reduction	($397,666)	N/A	($1,491,483)
Subtotal	927,886	228,300	3,480,120
Total Cost of Remedy			**$4,636,306**

11.3 Expected Outcome of Selected Remedy

The selected remedy allows EPA to aggressively treat the highest levels of contamination at the Site that continue to be a source of further contamination of the surficial and Floridan aquifers. EPA expects the initial phase of the remedy to eliminate a significant amount of source material, while further investigation of the Floridan aquifer occurs. Upon completion of the initial phase of the remedy, more information will be known about the characteristics of the Floridan aquifer. Moreover, the continued use of chemical oxidation to treat the lower levels of contamination can be evaluated. This evaluation will take into account how effective chemical oxidation has been in treating the higher levels of contamination, the future effectiveness of chemical oxidation in treating the lower levels of contamination, and the compatibility of chemical oxidation with the selected remedy for the Floridan aquifer. Although not a cleanup goal, implementation of the selected remedy should not leave any daughter products of existing contaminants that exceed any federal or state drinking water standards.

Upon achieving the cleanup goals, the contaminants in the soil and surficial aquifer will be below levels that would prevent unlimited land or groundwater use. However, the contamination in the Floridan aquifer will have to be addressed prior to the potential land use for the Site being designated as unlimited. It is anticipated that the initial phase of the remedy will be completed within two years of the completion of the remedial design. If chemical oxidation is deemed appropriate at that time to treat contaminants to the Site cleanup goals, it is anticipated that the remedial action would be completed within five years of the completion of the remedial design.

12.0 STATUTORY DETERMINATIONS

12.1 Protection of Human Health and the Environment

The selected remedy will be protective of human health and the environment by treating, via chemical oxidation, the contaminated saturated soil and groundwater in the surficial aquifer until drinking water standards are met. Prior to this treatment, shallow soil will be excavated to levels that have been determined by EPA to curtail further groundwater contamination. The selected remedy will not pose unacceptable short-term risks or cross-media impacts.

12.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with all Federal and State ARARs. The ARARs associated with the selected remedy are:

(1) Safe Drinking Water Act (SDWA) Maximum Concentration Limits (MCLs) (40 CFR 141) and Florida MCLs (FAC 62-550). The SDWA and Florida law provides groundwater MCLs that have been determined to be acceptable for the consumption of drinking water. If different, the more stringent MCL was selected. The MCLs are applicable and are the basis for determination of the cleanup standards for groundwater.

(2) RCRA Hazardous Waste Regulations (40 CFR 268) and Florida Hazardous Waste Regulations (FAC 62-730). These regulations provide requirements for the handling and disposal of hazardous wastes. These regulations are applicable and will apply to the excavation of shallow soil portion of the remedy.

(3) DOT regulations for transport of hazardous waste (49 CFR 107 and 171-179). This regulation provides requirements for the transport of hazardous waste and will be applicable to the offsite transport of excavated soil.

12.3 Cost Effectiveness

In EPA's judgement, the selected remedy is cost effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used *"A remedy shall be cost effective if its costs are proportional to its overall effectiveness."* (40 CFR 300.430(f)(1)(ii)(D). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then comparted to costs to determine cost effectiveness. The relationship of overall effectiveness of this remedial alternative was determined to be proportional to its costs and hence represent a reasonable value for the money to be spent.

Alternatives S1 & GW1 (No Action); S2 (Source Isolation); and GW2 (Natural Attenuation) were not considered to be cost effective as they would not result in any reduction of the toxicity, mobility, or volume of wastes at the Site, nor would they be effective in the long-term at reducing Site risks in a permanent manner. Alternatives S3 (Chemical Oxidation in Soil), S4 (Soil Excavation), GW3 (Reactive Barrier Wall), GW4 (Pump-and-Treat), OpA (Shallow Soil Vapor Extraction), OpB (Shallow Soil Excavation), and OpC (Chemical Oxidation in Groundwater) were all determined to be cost effective. In evaluating the incremental cost effectiveness of these alternatives, the decisive factors considered were the time frame required to construct the remedy, the time frame to achieve the remedial goals, and the preference for using alternative technologies for treatment. EPA believes that the combination of S3 and OpB for treatment of soil and OpC as the treatment for groundwater represents the best value for the money to be spent.

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

The selected remedy represents the best balance of tradeoffs as compared to the other alternatives. For soil treatment, shallow soil excavation will accomplish the removal of soil with contaminant levels above those which have been determined by EPA to curtail further contamination of groundwater. This portion of the remedy is permanent, reduces the toxicity, mobility, and volume of contaminants, is easily implementable, cost effective, and is accepted by the State and community. For groundwater treatment, chemical oxidation satisfies the preference for usage of alternative treatment technologies. Chemical oxidation will provide long term effectiveness and permanence, will reduce the toxicity, mobility and volume of contaminants, is implementable, cost effective and is accepted by the State and the community.

12.5 Preference for Treatment as a Principal Element

By treating the contaminated saturated soil and surficial groundwater through chemical oxidation, the selected remedy addresses the principal threat posed by the surficial aquifer through the use of treatment technologies. By utilizing treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

12.6 Five-Year Review Requirements

Section 121 (c) of CERCLA and the NCP provide the statutory and legal bases for conducting five year reviews. If there are any hazardous substances, pollutants, or contaminants remaining at the Site above levels that would allow for unlimited use and unrestricted exposure, EPA shall conduct a review of such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

EPA will conduct a policy five year review of the Southern Solvents Site beginning five years after the construction completion date. EPA conducts policy five year reviews at sites where no hazardous substances will remain above levels that allow unlimited use and unrestricted exposure after completion of the remedial action, but the cleanup levels specified in the ROD will require five or more years to attain.

EPA may discontinue the policy five year reviews when no hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

APPENDIX A

Baseline Risk Assessment Tables

TABLE 6-1.1
SELECTION OF EXPOSURE PATHWAYS
SOUTHERN SOLVENTS SITE

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater	Groundwater	Groundwater: Site-wide Surficial Aquifer; Site-wide Floridan Aquifer; Surficial Aquifer PCE Plume Floridan Aquifer PCE Plume.	None	None	None	On-site	None	No. On-site groundwater is not used as a drinking water source (potable water is provided to the surrounding area by city wells). In addition, no useable groundwater wells exist on site.
			Groundwater: Seven Off-site Area Wells	Off-Site Worker	Adult	Ingestion	Off-site	Quant	Off-site workers could be exposed to chemicals in groundwater obtained from area wells. Although ingestion of groundwater is unlikely to occur, ingestion exposures were conservatively evaluated in the HHRA for the four area wells in which COPCs were selected.
						Dermal	Off-site	None	Although off-site worker dermal exposures to groundwater could occur, the exposed body surface area of a worker (i.e., hands and arms) would be small and exposures would be infrequent.
	Surface Soil	Surface Soil	Site-wide Surface Soil	Trespasser/Visitor	Adolescent	Ingestion	On-site	None	Trespassers could be exposed to chemicals in surface soil via incidental ingestion; however, no COPCs were selected in this medium.
						Dermal	On-site	None	Trespassers could be exposed to chemicals in surface soil via dermal contact; however, no COPCs were selected in this medium.
				On-site Worker	Adult	Ingestion	On-site	None	Workers could be exposed to chemicals in surface soil via incidental ingestion; however, no COPCs were selected in this medium.
						Dermal	On-site	None	Workers could be exposed to chemicals in surface soil via dermal contact; however, no COPCs were selected in this medium.
		Air	Particulates released from Site-wide Surface Soil	Trespasser/Visitor	Adolescent	Inhalation	On-site	None	Trespassers could be exposed to chemicals released from soil in particulate matter; however, no COPCs were selected in this medium.
				On-site Worker	Adult	Inhalation	On-site	None	Workers could be exposed to chemicals released from soil in particulate matter; however, no COPCs were selected in this medium.
	Subsurface Soil	Subsurface Soil	Site-wide Subsurface Soil	None	None	Ingestion	On-site	None	No ground-intrusive activities are occurring at the Southern Solvents Site that would result in contact with subsurface soil.
						Dermal	On-site	None	No ground-intrusive activities are occurring at the Southern Solvents Site that would result in contact with subsurface soil.
Future	Groundwater	Groundwater	Groundwater: Site-wide Surficial Aquifer; Site-wide Floridan Aquifer; Surficial Aquifer PCE Plume; Floridan Aquifer PCE Plume.	On-site Worker	Adult	Ingestion	On-site	Quant	If the Southern Solvents Site is further developed for industrial purposes, a well could be installed at the site, and workers could be exposed to COPCs in groundwater via ingestion.
						Dermal	On-site	None	Although worker dermal exposures to groundwater could occur, the exposed body surface area of a worker (i.e., hands and arms) would be small and exposures would be infrequent.
				Resident	Adult	Ingestion	On-site	Quant	If the Southern Solvents Site is developed for residential purposes, a well could be installed at the site, and adult residents could be exposed to COPCs in groundwater via ingestion.

TABLE 6-1.1
SELECTION OF EXPOSURE PATHWAYS
SOUTHERN SOLVENTS SITE

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future (Continued)	Groundwater (Continued)	Groundwater (Continued)	Groundwater: Site-wide Surficial Aquifer; Site-wide Floridian Aquifer; Surficial Aquifer PCE Plume; Floridian Aquifer PCE Plume (continued)	Resident (Continued)	Adult (Continued)	Dermal	On-site	Quant	If the Southern Solvents Site is developed for residential purposes, a well could be installed at the site, and adult residents could be exposed to COPCs in groundwater via dermal contact while bathing.
					Child	Ingestion	On-site	Quant	If the Southern Solvents Site is developed for residential purposes, a well could be installed at the site, and child residents could be exposed to COPCs in groundwater via Ingestion.
						Dermal	On-site	Quant	If the Southern Solvents Site is developed for residential purposes, a well could be installed at the site, and child residents could be exposed to COPCs in groundwater via dermal contact while bathing.
		Air	Groundwater-VOCs at Showerhead: Site-wide Surficial Aquifer; Site-wide Floridian Aquifer; Surficial Aquifer PCE Plume; Floridian Aquifer PCE Plume (continued)	Resident	Adult	Inhalation	On-site	Quant	If the Southern Solvents Site is developed for residential purposes, a well could be installed at the site, and adult residents could be exposed to VOCs released from groundwater while showering.
				Resident	Child	Inhalation	On-site	None	Although child residents could be exposed to VOCs released from groundwater while bathing, such exposures would be much less than those for adults since the amount of volatilization from water in a tub would be less than from water In small droplest from a shower.
	Surface Soil	Surface Soil	Site-wide Surface Soil	Resident	Adult	Ingestion	On-site	None	If the Southern Solvents Site is developed for residential purposes, adult residents could be exposed to chemicals in surface soil via Incidental Ingestion; however, no COPCs were selected in the medium.
						Dermal	On-site	None	If the Southern Solvents Site is developed for residential purposes, adult residents could be exposed to chemicals in surface soil via dermal contact; however, no COPCs were selected in the medium.
				Resident	Child	Ingestion	On-site	None	If the Southern Solvents Site is developed for residential purposes, child residents could be exposed to chemicals in surface soil via Incidental Ingestion; however, no COPCs were selected in the medium.
						Dermal	On-site	None	If the Southern Solvents Site is developed for residential purposes, child residents could be exposed to chemicals in surface soil via dermal contact; however, no COPCs were selected in the medium.
		Air	Particulates and VOCs released from Site-Wide Surface Soil	Resident	Adult	Inhalation	On-site	None	Adults residents could be exposed to chemicals released from soil in particulate matter; however, no COPCs were selected in the medium.
					Child	Inhalation	On-site	None	Child residents could be exposed to chemicals released from soil in particulate matter; however, no COPCs were selected in the medium.
	Subsurface Soil	Subsurface Soil	Site-Wide Surface Soil 2-6 ft bgs	Construction Worker	Adult	Ingestion	On-site	None	If the Southern Solvents Site is developed in the future, construction/excavation workers could be exposed to chemicals in subsurface soil via incidental ingestion; however, no COPCs were selected in the 2-6 ft bgs subsurface soil data grouping (the depth at which excavation/construction would occur)
						Dermal	On-site	None	If the Southern Solvents is developed in the future, construction/excavation workers could be exposed to chemicals in subsurface soil via dermal contact; however, no COPCs were selected in the 2-6 ft bgs subsurface soil data grouping (the depth at which excavation/construction would occur)

TABLE 6-1.1
SELECTION OF EXPOSURE PATHWAYS
SOUTHERN SOLVENTS SITE

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Future (Continued)	Subsurface Soil (Continued)	Subsurface Soil (Continued)	Site-wide Subsurface Soil below 6 ft bgs.	Construction Worker	Adult	Ingestion	On-site	None	Although COPCs were selected in subsurface soils collected bellow 6 ft bgs, exposures to deep subsurface soil are not likely to occur at the Southern Solvents Site due to the shallow depth of surficial groundwater. Thus, the exposure pathway is incomplete.
						Dermal	On-site	None	Although COPCs were selected in subsurface soils collected bellow 6 ft bgs, exposures to deep subsurface soil are not likely to occur at the Southern Solvents Site due to the shallow depth of surficial groundwater. Thus, the exposure pathway is incomplete.
		Air	Particulates and VOCs released from Site-Wide Subsurface Soil 2-6 ft bgs	Construction Worker	Adult	Inhalation	On-site	None	Construction workers could be exposed to chemicals released from soil in particulate matter; however, no COPCs were selected in this medium.
			Particulates and VOCs released from Site-Wide Subsurface Soil below 6 ft bgs	Construction Worker	Adult	Inhalation	On-site	None	No COPCs were selected for the inhalation route of exposures in subsurface soil collected below 6 ft bgs. In addition, exposures to deep subsurface soil are not likely to occur at the Southern Solvents Sites. Thus, the exposure pathway is incomplete.

TABLE 6-2 1

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site-wide Surficial Aquifer - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationale for Contaminant Deletion or Selection
	Organics:															
67-64-1	Acetone	—		460	J	µg/L	MW-4	1/31	10.0-710	460	ND	370 N	N/A	N/A	Yes	ASL
71-43-2	Benzene	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	0.38 C	5.0	MCL	Yes	ASL
75-27-4	Bromodichloromethane	2.0	J	3.0	J	µg/L	EPA-4	2/2	—	3.0	ND	0.17 C	100	MCL	Yes	ASL
75-25-2	Bromoform	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	2.3 C	100	MCL	No	BSL
56-23-5	Carbon tetrachloride	—		1.0	J	µg/L	EPA-13	1/1	—	1.0	ND	0.16 C	5.0	MCL	Yes	ASL
108-90-7	Chlorobenzene	2.0	J	6.0	J	µg/L	MW-11R	2/20	10.0	6.0	ND	3.5 N	N/A	N/A	Yes	ASL
67-66-3	Chloroform	1.0	J	20.0		µg/L	EPA-4	9/24	10.0-33.0	20.0	ND	0.083 N	100	MCL	Yes	ASL
124-48-1	Dibromochloromethane	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	0.13 C	N/A	N/A	Yes	ASL
75-34-3	1,1-Dichloroethane	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	80 N	N/A	N/A	No	BSL
75-35-4	1,1-Dichloroethene	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	0.044 C	7.0	MCL	Yes	ASL
540-59-0	1,2-Dichloroethene (total)	1.0		160	J	µg/L	EPA-2	6/23	10.0-200	160	ND	8.5 N	70.0	MCL (c)	Yes	ASL
10061-01-5	cis-1,3-Dichloropropene	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	0.077 C	N/A	N/A	Yes	ASL
10061-02-6	trans-1,3-Dichloropropene	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	0.077 C	N/A	N/A	Yes	ASL
100-41-4	Ethyl benzene	2.0	J	5.0	J	µg/L	EPA-10	2/21	10.0	5.0	ND	130 N	700	MCL	No	BSL
75-09-2	Methylene chloride	—		30.0	J N	µg/L	MW-11R	1/20	10.0-71.0	30.0	ND	4.1 C	N/A	N/A	Yes	ASL
100-42-5	Styrene	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	160 N	100	MCL	No	BSL
79-34-5	1,1,2,2-Tetrachloroethane	—		3.0	J	µg/L	EPA-13	1/1	—	3.0	ND	0.083 C	N/A	N/A	Yes	ASL
127-18-4	Tetrachloroethene	1.0	J	170,000		µg/L	MW-3R	24/24	10.0-40.0	170,000	ND	1.1 C	5.0	MCL	Yes	ASL
108-88-3	Toluene	2.0	J	40.0	J	µg/L	MW-4	3/26	10.0-71.0	40.0	ND	75 N	1000	MCL	No	BSL
71-55-6	1,1,1-Trichloroethane	—		2.0	J, J	µg/L	EPA-13, MW-26	2/2	—	2.0	ND	54 N	200	MCL	No	BSL
79-00-5	1,1,2-Trichloroethane	—		2.0	J	µg/L	EPA-13	1/1	—	2.0	ND	0.16 C	[illegible]	MCL	Yes	ASL
79-01-6	Trichloroethene	1.0	J	24.0	J	µg/L	EPA-3	12/24	10.0-71.0	24.0	ND	1.6 C	[illegible]	MCL	Yes	ASL
1330-20-7	Xylenes (total)	5.0	J	6.0	J	µg/L	EPA-10	2/21	10.0	6.0	ND	1,200 N	10,000	MCL	No	BSL

TABLE 6-2.1
OCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Ground Water
Exposure Point: Site-Wide Surficial Aquifer - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximun Concentration	Maximun Qualifier	Units	Location of Maximun Concentration	(2) Detection Frecuency	Range of Detention Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationals for Contaminant Deletion or Selection
	Inorganics:															
7440-70-2	Calcium	3,000	J	79,000	J	mg/l	MW-1	17/17	–	79,000	101,000	N/A	400	ADI	No	NUT
7439-95-4	Magnesium	1,000	J	74,000	J	mg/l	MW-8	16/17	630	74,000	3,800	N/A	80.5	ADI	No	NUT
7440-09-7	Potassium	1,300	J	35,000	J	mg/l	MW-8	15/17	760-1,200	35,000	2,500	N/A	100	ADI	No	NUT
7440-23-5	Sodium	4,700		560,000		mg/l	MW-8	15/17	1,300	560,000	5,900	N/A	100	ADI	No	NUT

(1) Minimum/maximum detected concentration.
(2) Frecuency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding date rejected as a result of validation and non-detect samples where the detection limit was greater than two lines the maximum detected concentration.
(3) Maximun concentration used when screening for COPCs.
(4) The background value is two times the background mean concentration (USEPA, 1995a).
(5) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1996b).
(6) Groundwater ARARs are MCLs unless otherwise noted (USEPA, 1996c).
(7) Rationale Codes
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:
J = Value is estimated.
N = Tentative Identification. Considered present.

Definition: ADI = Allowable Daily Intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
MCL = Maximum Contaminant Level
N = Noncarcinoganic
N/A = Not Available
ND = Not Detected

TABLE6-2.2

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site-wide Floridan Aquifer - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationale for Contaminant Deletion or Selection
	Organics:															
67-64-1	Acetone	—		13.0	NJ	ug/L	EPA-21	1/5	10.0	13.0	ND	370 N	N/A	N/A	No	BSL
67-66-3	Chloroform	1.0	J	2.0	J	ug/L	EPA-21	[illegible]	[illegible]	2.0	ND	0.063 N	100	MCL	Yes	ASL
540-59-0	1,2-Dichloroethene (total)	1.0	J	510	[illegible]	ug/L	DW-1	[illegible]	10-500	510	ND	[illegible]	70.0	MCL (cis-)	Yes	ASL
87-86-5	Pentachlorophenol	[illegible]	[illegible]	12.0	[illegible]	ug/L	DW-1	[illegible]	[illegible]	12.0	ND	[illegible]	[illegible]	MCL	Yes	ASL
127-18-4	Tetrachloroethene	2.0	J	4,800	[illegible]	ug/L	EPA-20	[illegible]	[illegible]	4,800	ND	[illegible]	[illegible]	MCL	Yes	ASL
79-01-6	Trichloroethene	1.0	J	1,900	[illegible]	ug/L	EPA-21	[illegible]	[illegible]	1,900	ND	[illegible]	[illegible]	MCL	Yes	ASL
	Inorganics:															
7440-70-2	Calcium	52,000	J	130,000	J	mg/L	DW-1	4/4	—	130,000	101,000	N/A	400	ADI	No	NUT
7439-95-4	Magnesium	2,100	J	5,100		mg/L	EPA-20	3/4	790	5,100	3,800	N/A	80.5	ADI	No	NUT
7440-09-7	Potassium	2,100		2,300	J	mg/L	DW-1	2/4	1,100-1,200	2,300	2,500	N/A	100	ADI	No	NUT
7440-23-5	Sodium	4,800		18,000		mg/L	EPA-20	4/4	—	18,000	5,900	N/A	100	ADI	No	NUT

(1) Minimum/maximum detected concentration.

(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.

(3) Maximum concentration used when screening for COPCs.

(4) The background value is two times the background mean concentration (USEPA, 1995a).

(5) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1996b).

(6) Groundwater ARARs are MCLs unless otherwise noted (USEPA, 1996c).

(7) Rationale Codes

Selection Reason: Above Screening Level (ASL)

Deletion Reason: Below Screening Level (BSL)

Essential Nutrient (NUT)

Data Qualifiers:

J = Value is estimated.

N = Tentative identification. Considered present.

Definitions: ADI = Allowable Daily Intake

ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered

C = Carcinogenic

MCL = Maximum Contaminant Level

N = Noncarcinogenic

N/A = Not Available

ND = Not Detected.

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Surficial Aquifer - PCE Plume - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationale for Contaminant Deletion or Selection
	Organics:															
67-64-1	Acetone	—		460	J	µg/L	MW-4	1/16	10.0-710	460	ND	370 N	N/A	N/A	Yes	ASL
108-90-7	Chlorobenzene	—		6.0	J	µg/L	MW-11R	1/13	10.0-10.0	6.0	ND	3.5 N	N/A	N/A	Yes	ASL
67-66-3	Chloroform	1.0	J	4.0	J, J	µg/L	EPA-12, MW-11R	3/3	—	4.0	ND	0.083 N	100	MCL	Yes	ASL
540-59-0	1,2-Dichloroethene (total)	2.0	J	190	J	µg/L	EPA-2	2/16	10.0-200	190	ND	3.5 N	70.0	MCL (cis-)	Yes	ASL
100-41-4	Ethyl benzene	—		5.0	J	µg/L	EPA-10	1/8	10.0-10.0	5.0	ND	130 N	700	MCL	No	BSL
75-09-2	Methylene chloride	—		36.0	N	µg/L	MW-11R	1/13	10.0-71.0	36.0	ND	4.1 C	N/A	N/A	Yes	ASL
127-18-4	Tetrachloroethene	17.0		170,000		µg/L	MW-3R	2/2	10.0-10.0	170,000	ND	1.1 C	5.0	MCL	Yes	ASL
108-88-3	Toluene	3.0	J	40.0	J	µg/L	MW-4	2/13	10.0-71.0	40.0	ND	75 N	1,000	MCL	No	BSL
71-55-6	1,1,1-Trichloroethane	—		2.0	J	µg/L	MW-26	1/1	—	2.0	ND	54 N	200	MCL	No	BSL
79-01-6	Trichloroethene	1.0	J	86.0	J	µg/L	EPA-2	9/15	10.0-71.0	86.0	ND	1.6 C	5.0	MCL	Yes	ASL
1330-20-7	Xylenes (total)	—		6.0	J	µg/L	EPA-10	1/8	10.0-10.0	6.0	ND	1,200 N	10,000	MCL	No	BSL
	Inorganics:															
7440-70-2	Calcium	3,000	J	71,000	J	mg/L	MW-4	13/13		71,000	101,000	N/A	400	ADI	No	NUT
7439-95-4	Magnesium	1,000	J	13,000	J	mg/L	MW-12	12/13	630	13,000	3,800	N/A	80.5	ADI	No	NUT
7440-09-7	Potassium	1,300	J	12,000	J	mg/L	MW-4	11/13	760-1,200	12,000	2,500	N/A	100	ADI	No	NUT
7440-23-5	Sodium	4,700		72,000		mg/L	MW-4	12/13	1,300	72,000	5,900	N/A	100	ADI	No	NUT

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) The background value is two times the background mean concentration (USEPA, 1995a).
(5) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1996b).
(6) Groundwater ARARs are MCLs unless otherwise noted (USEPA, 1996c).
(7) Rationale Codes
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:
J = Value is estimated.
N = Tentative identification. Considered present.

Definitions: ADI = Allowable Daily Intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
MCL = Maximum Contaminant Level
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected.

TABLE 6-2 4
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Concentrated Surficial Aquifer - PCE Plume (MW-3R, MW-5, MW-7, MW-11R, MW-12) (1) - Tap Water

CAS Number	Chemical	(2) Minimum Concentration	Minimum Qualifier	(2) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(3) Detection Frequency	Range of Detection Limits	(4) Concentration Used for Screening	(5) Background Value	(6) Screening Toxicity Value	(7) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(8) Rationale for Contaminant Deletion or Selection
	Organics:															
108-90-7	Chlorobenzene	—		6.0	J	µg/L	MW-11R	1/1	—	6.0	ND	3.6 N	N/A	N/A	Yes	ASL
67-66-3	Chloroform	—		4.0	J	µg/L	MW-11R	1/1	—	4.0	ND	0.003 N	100	MCL	Yes	ASL
540-59-0	1,2-Dichloroethene (total)	19.0	J	88.0		µg/L	MW-11R	1/1	—	88.0	ND	5.6 N	70.0	MCL (cis)	Yes	ASL
75-09-2	Methylene chloride	—		38.0	N	µg/L	MW-11R	1/1	—	38.0	ND	110 N	N/A	N/A	Yes	ASL
127-18-4	Tetrachloroethene	14,000		170,000		µg/L	MW-11R	1/1	—	170,000	ND	11.0	5.0	MCL	Yes	ASL
108-88-3	Toluene	—		3.0	J	µg/L	MW-11R	1/1	—	3.0	ND	75 N	1,000	MCL	No	BSL
79-01-6	Trichloroethene	26.0		46.0		µg/L	MW-11R	1/1	—	46.0	ND	1.6	5.0	MCL	Yes	ASL
	Inorganics:															
7440-70-2	Calcium	5,700	J	43,000	J	mg/L	MW-5	5/5	—	43,000	101,000	N/A	400	ADI	No	NUT
7439-95-4	Magnesium	1,600	J	13,000	J	mg/L	MW-12	4/5	630-630	13,000	3,800	N/A	80.5	ADI	No	NUT
7440-09-7	Potassium	2,800	J	8,800	J	mg/L	MW-12	3/5	760-1,200	8,800	2,500	N/A	100	ADI	No	NUT
7440-23-5	Sodium	6,900		46,000		mg/L	MW-12	4/5	1,300-1,300	46,000	5,900	N/A	100	ADI	No	NUT

(1) This data summary table presents data from samples MW-3R, MW-5, MW-7, MW-11R, and MW-12, which represent the more highly concentrated wells within the Surficial Aquifer PCE Plume.
(2) Minimum/maximum detected concentration.
(3) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(4) Maximum concentration used when screening for COPCs.
(5) The background value is two times the background mean concentration (USEPA, 1995a).
(6) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1996b).
(7) Groundwater ARARs are MCLs unless otherwise noted (USEPA, 1996c).
(8) Rationale Codes
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:
J = Value is estimated.
N = Tentative identification. Considered present.

ADI = Allowable Daily Intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
COPC = Chemical of Potential Concern
MCL = Maximum Contaminant Level
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected

TABLE 6-2.5
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Floridan Aquifer - PCE Plume - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationale for Contaminant Deletion or Selection
	Organics:															
540-59-0	1,2-Dichloroethene (total)	340	J	610		µg/L	DW-1	2/3	500	610	ND	5.6 N	N/A	N/A	Yes	ASL
87-86-5	Pentachlorophenol	—		42.0		µg/L	DW-1	1/2	24.0	42.0	ND	0.000 C	1.0	MCL	Yes	ASL
127-18-4	Tetrachloroethene	2,000		4,800		µg/L	EPA-20	1/2	—	4,800	ND	—	5.0	MCL	Yes	ASL
79-01-6	Trichloroethene	900		1,800		µg/L	EPA-20	1/2	—	1,800	ND	1.6 C	5.0	MCL	Yes	ASL
	Inorganics:															
7440-70-2	Calcium	99,000		130,000	J	mg/L	DW-1	2/2	—	130,000	101,000	N/A	400	ADI	No	NUT
7439-95-4	Magnesium	—		5,100		mg/L	EPA-20	1/2	790	5,100	3,800	N/A	80.5	ADI	No	NUT
7440-09-7	Potassium	2,100		2,300	J	mg/L	DW-1	2/2	—	2,300	2,500	N/A	100	ADI	No	NUT
7440-23-5	Sodium	7,300		18,000		mg/L	EPA-20	2/2	—	18,000	5,900	N/A	100	ADI	No	NUT

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) The background value is two times the background mean concentration (USEPA, 1995a).
(5) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1996b).
(6) Groundwater ARARs are MCLs unless otherwise noted (USEPA, 1996c).
(7) Rationale Codes
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Essential Nutrient (NUT)

Data Qualifiers:
J = Value is estimated.

Definitions: ADI = Allowable Daily Intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
MCL = Maximum Contaminant Level
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected.

TABLE 6-2.6
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Offices (3830 Gunn Hwy) - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
71-43-2	Benzene	[illegible]	[illegible]	0.390	[illegible]	µg/L	Office Well	1/1	N/A	0.390	ND	0.36 C	5	MCL	Yes	ASL
156-59-2	cis-1,2-Dichloroethene	—		0.210	I	µg/L	Office Well	1/1	N/A	0.210	ND	6.1 N	70	MCL	No	BSL

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1998b).
(5) Groundwater ARARs are MCLs (USEPA, 1996c).
(6) Rationale Codes
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL)

Data Qualifiers:
I = Approximate value between MDL and PQL; supporting evidence for identity.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
COPC = Chemical of Potential Concern
MCL = Maximum Contaminant Level
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected

TABLE 6-2.7
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Dibb's Plaza #1 (4123 Gunn Hwy) - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
75-27-4	Bromodichloromethane	—		0.590	Y	Fg/L	Dibb's Plaza #1	1/1	N/A	0.590	ND	0.17 C	100	MCL	Yes	ASL
67-66-3	Chloroform	—		0.850	Y	Fg/L	Dibb's Plaza #1	1/1	N/A	0.850	ND	0.063 N	100	MCL	Yes	ASL
124-48-1	Dibromochloromethane	—		0.280	I, Y	Fg/L	Dibb's Plaza #1	1/1	N/A	0.280	ND	0.13 C	100	MCL	Yes	ASL
156-59-2	cis-1,2-Dichloroethene	—		0.240	I	Fg/L	Dibb's Plaza #1	1/1	N/A	0.240	ND	6.1 N	70	MCL	No	BSL
127-18-4	Tetrachloroethene	—		0.360	I	Fg/L	Dibb's Plaza #1	1/1	N/A	0.360	ND	1.1 C	5	MCL	No	BSL
79-01-6	Trichloroethene	—		0.340	I	Fg/L	Dibb's Plaza #1	1/1	N/A	0.340	ND	1.6 C	5	MCL	No	BSL

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1998b).
(5) Groundwater ARARs are MCLs (USEPA), 1996c).
(6) Rationale Codes
Selection Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL)

Data Qualifiers:
I = Approximate value between MDL and PQL; supporting evidence for identity.
Y = Analysis from unpreserved or improperly preserved sample; result suspect.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
COPC = Chemical of Potential Concern
MCL = Maximum Contaminant Level
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected

TABLE 6-2.8
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Patio Pools (4118 Gunn Hwy) - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
156-59-2	cis-1,2-Dichloroethene	—		0.400	I	Fg/L	Patio Pools	1/1	N/A	0.400	ND	6.1 N	70	MCL	No	BSL
127-16-4	Tetrachloroethene	—		0.180	T	Fg/L	Patio Pools	1/1	N/A	0.180	ND	1.1 C	5	MCL	No	BSL
79-01-6	Trichloroethene	—		0.230	I	Fg/L	Patio Pools	1/1	N/A	0.230	ND	1.6 C	5	MCL	No	BSL

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1998b).
(5) Groundwater ARARs are MCLs (USEPA), 1996c).
(6) Rationale Codes
Deletion Reason: Below Screening Level (BSL)

Data Qualifiers:
I = Approximate value between MDL and PQL; supporting evidence for identity.
T = Approximate value less than the MDL; support evidence for identity.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
COPC = Chemical of Potential Concern
MCL = Maximum Contaminant Level
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected

TABLE 6-2.9

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Dibb's Plaza #2 (4113 Gunn Hwy) - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
67-66-3	Chloroform			1.20	Y	µg/L	Dibb's Plaza #2	1/15	N/A	1.20	ND	0.063 N	100	MCL	Yes	ASL

(1) Minimum/maximum detected concentration.

(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.

(3) Maximum concentration used when screening for COPCs.

(4) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1996b).

(5) Groundwater ARARs are MCLs (USEPA, 1996c).

(6) Rationale Code

Selection Reason: Above Screening Level (ASL)

Data Qualifiers:

Y = Analysis from unpreserved or improperly preserved sample; result suspect.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered

COPC = Chemical of Potential Concern

MCL = Maximum Contaminant Level

N = Noncarcinogenic

N/A = Not Available

ND = Not Detected

TABLE 6-2.10

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Gold Cup Coffee (Utility Line) (4108 Gunn Hwy) - Tap Water

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
75-27-4	Bromodichloromethane	—		6.70		µg/L	Line Sample	1/1	N/A	6.70	ND	0.17 C	100	MCL	Yes	ASL
67-66-3	Chloroform	—		56.0	LY	µg/L	Line Sample	1/1	N/A	56.0	ND	0.043 N	100	MCL	Yes	ASL
74-87-3	Chloromethane	—		2.0		µg/L	Line Sample	1/1	N/A	2.0	ND	2.6 C	N/A	N/A	Yes	ASL
124-48-1	Dibromochloromethane	—		0.790	LY	µg/L	Line Sample	1/1	N/A	0.790	ND	0.13 C	100	MCL	Yes	ASL

(1) Minimum/maximum detected concentration.

(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.

(3) Maximum concentration used when screening for COPCs.

(4) See Table A-1 for a list of all groundwater screening values. Screening values are Region III tap water RBCs (USEPA, 1998b).

(5) Groundwater ARARs are MCLs (USEPA, 1996c).

(6) Rationale Codes

Selection Reason: Above Screening Level (ASL)

Data Qualifiers:

L = Off-scale high; result value is approximate.

Y = Analysis from unpreserved or improperly preserved sample; result suspect.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered

C = Carcinogenic

COPC = Chemical of Potential Concern

MCL = Maximum Contaminant Level

N = Noncarcinogenic

N/A = Not Available

ND = Not Detected

TABLE 6-2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Surface Soil
Exposure Point: Site-wide Surface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organic:															
5103-71-9	alpha-Chlordane	—		12.0		Fg/L	SS1301	1/7	1.80-2.0	12.0	NT	1,800 C	N/A	N/A	No	BSL
5103-74-2	gamma-Chlordane	—		15.0		Fg/L	SS1301	1/7	1,80-2.0	15.0	NT	1,800 C	N/A	N/A	No	BSL
72-20-8	Endrin	1.30	J	3.90	J	Fg/L	SS0301	2/7	3.50-4.0	3.90	NT	2,300 N	N/A	N/A	No	BSL
76-44-8	Heptachlor	—		0.640	JN	Fg/L	SS1301	1/1	—	0.640	NT	140 C	N/A	N/A	No	BSL
127-18-4	Tetrachloroethene	26.0		5,400		Fg/L	SS0501	10/13	30.0-90.0	5,400	ND	12,000 C	N/A	N/A	No	BSL
108-88-3	Toluene	2.0	J	9.0	J	Fg/L	SS0401	8/11	11.0-12.0	9.0	ND	1,600,000 N	N/A	N/A	No	BSL
	Inorganics:															
7429-90-5	Aluminum	460	J	1,000	J	mg/L	SS0501	7/7	—	1,000	NT	7,800 N	N/A	N/A	No	BSL
7440-39-3	Barium	6.0		17.0		mg/L	SS0101	6/7	5.0	17.0	NT	550 N	N/A	N/A	No	BSL
7440-43-9	Cadmium	—		0.350		mg/L	SS0102	1/3	0.0600	0.350	NT	7.8 N	N/A	N/A	No	BSL
7440-70-2	Calcium	880	J	190,000	J	mg/L	SS1301	7/7	—	190,000	NT	N/A	4,000,000	ADI	No	NUT
7440-47-3	Chromium	3.0		4.20		mg/L	SS0101	5/7	2.0-3.0	4.20	NT	23 N	N/A	N/A	No	BSL
7440-50-8	Copper	7.0	J	40.0	J	mg/L	SS0102	7/7	—	40.0	NT	310 N	N/A	N/A	No	BSL
7439-89-6	Iron	130	J	900	J	mg/L	SS0401	7/7	—	900	NT	2,300 N	N/A	N/A	No	BSL
7439-92-1	Lead	9.70		50.0	J	mg/L	SS0101	5/7	5.30-6.90	50.0	NT	N/A	400	RSL	No	BSL
7439-95-4	Magnesium	—		1,500		mg/L	SS1301	1/7	50.0-390	1,500	NT	N/A	800,000	ADI	No	NUT
7439-96-5	Manganese	5.20	J	38.0		mg/L	SS0301, SS1301	7/7	—	38.0	NT	160 N	N/A	N/A	No	BSL
7440-02-0	Nickel	0.890		1.0	J	mg/L	SS0401	2/7	1.0-2.0	1.0	NT	160 N	N/A	N/A	No	BSL
7440-09-7	Potassium	—		96.0		mg/L	SS1301	1/7	50.0-100	96.0	NT	N/A	1,000,000	ADI	No	NUT
7440-23-5	Sodium	45.0		1,600		mg/L	SS1301	7/7	—	1,600	NT	N/A	1,000,000	ADI	No	NUT

TABLE 6-2.11
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Groundwater
Exposure Medium: Groundwater
Exposure Point: Site-wide Surface Soil

CAS Number	Chemical	Minimum Concentration (1)	Minimum Qualifier	Maximum Concentration (1)	Maximum Qualifier	Units	Location of Maximum Concentration	Detection Frequency (2)	Range of Detection Limits	Concentration Used for Screening (3)	Background Value	Screening Toxicity Value (4)	Potential ARAR/TBC Value (5)	Potential ARAR/TBC Source	COPC Flag	Rationale for Contaminant Deletion or Selection (6)
0-66-6	Zinc	16.0	J	200	J	mg/kg	SS0501	7/7	—	200	NT	2,300 N	N/A	N/A	No	BSL

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) The background value is two times the background mean concentration (USEPA, 1995a).
(5) See Table A-1 for a list of all surface soil screening values. Screening values are Region III residential soil RBCs (USEPA, 1998b).
(6) See Table A-1 for a list of all values presented.
(7) Rationale Codes
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:
J = Value is estimated.
N = Tentative identification. Considered present.

Definitions: ADI = Allowable Daily Intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected
NT = Not Tested (Chemical was not analyzed for.)
RSL = Residential Soil Screening Level (USEPA, 1994)

TABLE 6-2.12
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Medium: Surface Soil
Exposure Medium: Air
Exposure Point: Site-wide Surface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	Background Value	(4) Screening Toxicity Value	(5) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
5103-71-9	alpha-Chlordane	—		12.0		Fg/kg	SS-13-01	1/7	1.80-2.0	12.0	NT	66,000 C	N/A	N/A	No	BSL
5103-74-2	gamma-Chlordane	1.30		15.0		Fg/kg	SS-13-01	1/7	1.80-2.0	15.0	NT	66,000 C	N/A	N/A	No	BSL
72-20-8	Endrin	—	J	3.90	J	Fg/kg	SS-3-01	2/7	3.50-4.0	3.90	NT	110,000 N	N/A	N/A	No	BSL
76-44-8	Heptachlor	26.0		0.640	JN	Fg/kg	SS-13-01	1/1	–	0.640	NT	100 C	N/A	N/A	No	BSL
127-18-4	Tetrachloroethene	2.0		5,400		Fg/kg	SS-5-01	10/13	30.0-90.0	5,400	ND	9,800 C	N/A	N/A	No	BSL
106-88-3	Toluene	—	J	9.0	J	Fg/kg	SS-4-01	8/11	11.0-12.0	9.0	ND	64,000 N	N/A	N/A	No	BSL
	Inorganics:															
7429-90-5	Aluminum	480	J	1,000	J	mg/kg	SS-5-01	7/7	–	1,000	NT	1,600,000 N	N/A	N/A	No	BSL
7440-39-3	Barium	6.0		17.0		mg/kg	SS-1-01	6/7	5.0	17.0	NT	160,000 N	N/A	N/A	No	BSL
7440-43-9	Cadmium	—		0.350		mg/kg	SS-1-01	1/3	0.0600	0.350	NT	12,000 C	N/A	N/A	No	BSL
7440-70-2	Calcium	880	J	190,000	J	mg/kg	SS-13-01	7/7	–	190,000	NT	NSA	N/A	N/A	No	NUT
7440-47-3	Chromium	3.0		4.20		mg/kg	SS-1-01	5/7	2.0-3.0	4.20	NT	1,900 C	N/A	N/A	No	BSL
7440-50-8	Copper	7.0	J	40.0	J	mg/kg	SS-1-01	7/7	–	40.0	NT	65,000,000 N	N/A	N/A	No	BSL
743989-6	Iron	130	J	900	J	mg/kg	SS-4-01	7/7	–	900	NT	490,000,000 N	N/A	N/A	No	BSL
7439-92-1	Lead	530		50.0	J	mg/kg	SS-1-01	7/7	–	50.0	NT	NSA	400	RSL	No	BSL
7439-95-4	Magnesium	—		1,500		mg/kg	SS-13-01	1/7	50.0-390	1,500	NT	NSA	N/A	N/A	No	NUT
7439-96-5	Manganese	5.20		38.0		mg/kg	SS-3-01, SS-13-01	7/7	–	38.0	NT	16,000 N	N/A	N/A	No	BSL
7440-02-0	Nickel	0.890	J	1.0	J	mg/kg	SS-4-01	2/7	1.0-2.0	1.0	NT	32,000,000 N	N/A	N/A	No	BSL
7440-09-7	Potassium	—		96.0		mg/kg	SS-13-01	1/7	50.0-100	96.0	NT	NSA	N/A	N/A	No	BSL
7440-23-5	Sodium	45.0		1,600		mg/kg	SS-13-01	7/7	–	1,600	NT	NSA	N/A	N/A	No	BSL
0-66-6	Zinc	16.0	J	200	J	mg/kg	SS-5-01	7/7	–	200	NT	490,000,000 N	N/A	N/A	No	BSL

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) The background value is two times the background mean concentration (USEPA, 1995a).
(5) See Table A-2 for a list of all residential soil screening levels (SSLs).
(6) See Table A-2 for a list of all values presented.
(7) Rationale Codes
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:
J = Value is estimated.
N = Tentative identification. Considered present

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected
NSA = No SSL Available
NT = Not Tested (Chemical was not analyzed for.)
RSL = Residential Soil Screening Level (USEPA, 1994)

TABLE 6-2.13

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site-wide Shallow Subsurface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationale for Contaminant Deletion or Selection
	Organics:															
72-20-8	Endrin	---		3.90	J	µg/kg	SS0203	1/5	3.40-4.0	3.90	NT	61,000 N	N/A	N/A	No	BSL
127-18-4	Tetrachloroethene	4.0	J	15,000		µg/kg	SB0802	10/11	22[illegible]	15,000	ND	110,000 C	N/A	N/A	No	BSL
108-88-3	Toluene	---		2.0	J	µg/kg	SS0705	1/1	---	2.0	ND	41,000,000 N	N/A	N/A	No	BSL
	Inorganics:															
7429-90-5	Aluminum	490	J	1,300	J	mg/kg	SS0203	5/5	---	1,300	NT	200,000 N	N/A	N/A	No	BSL
7440-70-2	Calcium	370	J	550	J	mg/kg	SS0203	2/5	160-370	550	NT	N/A	4,000,000	ADI	No	NUT
7440-50-8	Copper	4.80	J	21.0	J	mg/kg	SS0603	2/5	2.0-6.0	21.0	NT	8,200 N	N/A	N/A	No	BSL
7439-89-6	Iron	130		180		mg/kg	SS0203	2/5	75.0-140	180	NT	61,000 N	N/A	N/A	No	BSL
7439-96-5	Manganese	---		4.70		mg/kg	SS0603	1/5	1.0-2.0	4.70	NT	4,100 N	N/A	N/A	No	BSL
7440-23-5	Sodium	48.0		68.0		mg/kg	SS0304	5/5	---	68.0	NT	N/A	1,000,000	ADI	No	NUT
7440-66-6	Zinc	--		13.0	J	mg/kg	SS0603	1/5	3.50-5.90	13.0	NT	61,000 N	N/A	N/A	No	BSL

(1) Minimum/maximum detected concentration.

(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.

(3) Maximum concentration used when screening for COPCs.

(4) The background value is two times the background mean concentration (USEPA, 1995a).

(5) See Table A-1 for a list of all subsurface soil screening values. Screening values are Region III industrial soil RBCs (USEPA, 1996b).

(6) See Table A-1 for a list of all values presented.

(7) Rationale Codes

Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:

J = Value is estimated.

Definitions: ADI = Allowable Daily Intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected
NT = Not Tested (Chemical was not analyzed for.)

TABLE 6-2.14
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Site-wide Shallow Subsurface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Qualifier	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Value	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
72-20-8	Endrin	þ		3.90	J	µg/kg	SS-2-03	1/5	3.40-4.0	3.90	NT	420,000 N	N/A	N/A	No	BSL
127-18-4	Tetrachloroethene	4.0	J	15,000		µg/kg	SB-6-02	10/11	220	15,000	ND	160,000 N	N/A	N/A	No	BSL
106-88-3	Toluene	þ		2.0	J	µg/kg	SS-7-05	1/1	þ	2.0	ND	250,000 N	N/A	N/A	No	BSL
	Inorganics:															
7429-90-5	Aluminum	490	J	1,300	J	mg/kg	SS-2-03	5/5	þ	1,300	NT	6,300,000 N	N/A	N/A	No	BSL
7440-70-2	Calcium	370	J	550	J	mg/kg	SS-2-03	2/5	160-370	550	NT	NSA	N/A	N/A	No	NUT
7440-50-8	Copper	4.80	J	21.0	J	mg/kg	SS-6-03	2/5	2.0-6.0	21.0	NT	250,000,000 N	N/A	N/A	No	BSL
7439-89-6	Iron	130		180		mg/kg	SS-2-03	2/5	75.0-140	180	NT	1,900,000,000 N	N/A	N/A	No	BSL
7439-92-1	Lead	1.20		8.40		mg/kg	SS-6-03	5/5	þ	8.40	NT	NSA	N/A	N/A	No	NTX
7439-96-5	Manganese	þ		4.70		mg/kg	SS-6-03	1/5	1.0-2.0	4.70	NT	63,000 N	N/A	N/A	No	BSL
7440-23-5	Sodium	46.0		68.0		mg/kg	SS-3-04	5/5	þ	68.0	NT	NSA	N/A	N/A	No	NUT
7440-66-6	Zinc	3.50	J	13.0	J	mg/kg	SS-6-03	5/5	þ	13.0	NT	1,900,000,000 N	N/A	N/A	No	BSL

(1) Minimum/maximum detected concentration.
(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.
(3) Maximum concentration used when screening for COPCs.
(4) The background value is two times the background mean concentration (USEPA, 1995a).
(5) See Table A-3 for a list of all industrial soil screening levels.
(6) Rationale Codes
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)
No Toxicity Information Available (NTX)

Data Qualifiers:
J = Value is estimated.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected
NSA = No SSL Available
NT = Not Tested (Chemical was not analyzed for.)

TABLE 6-2.15

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site-wide Deep Subsurface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	(6) Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(7) Rationale for Contaminant Deletion or Selection
	Organics:															
11097-69-1	Aroclor 1254	—		96.0		µg/kg	SB-5-19	1/14	38.0-80.0	96.0	NT	2,900 C	N/A	N/A	No	BSL
58-89-9	gamma-BHC (Lindane)	—		1.60	JN	µg/kg	SB-5-19	1/14	1.90-2.30	1.60	NT	4,400 C	N/A	N/A	No	BSL
74-87-3	Chloromethane	2,900		4,100		µg/kg	EPA-31B-16	2/36	11.0-4,700	4,100	ND	440,000 C	N/A	N/A	No	BSL
540-59-0	1,2-Dichloroethene (total)	3.0	J	81.0	J	µg/kg	SB-1-09	3/24	11.0-130	81.0	ND	1,800,000 N	N/A	N/A	No	BSL
100-41-4	Ethyl benzene	—		3.0	J	µg/kg	SS-1-07	1/1	—	3.0	ND	20,000,000 N	N/A	N/A	No	BSL
127-18-4	Tetrachloroethene	8.0	J	50,000,000		µg/kg	SB-5-19	3/14	5.60-[illegible]	50,000,000	ND	110,000 C	N/A	N/A	Yes	ASL
108-88-3	Toluene	2.0	J	160	J	µg/kg	SB-4-19	3/25	11.0-130	160	NT	41,000,000 N	N/A	N/A	No	BSL
79-01-6	Trichloroethene	2.0	J	200		µg/kg	SS-14-06	3/24	11.0-130	200	ND	520,000 C	N/A	N/A	No	BSL
	Inorganics:															
7429-90-5	Aluminum	740	J	13,000		mg/kg	SB0406	14/14	—	13,000	NT	200,000 N	N/A	N/A	No	BSL
7440-39-3	Barium	5.30		30.0		mg/kg	SB0516	9/14	1.0-4.0	30.0	NT	14,000 N	N/A	N/A	No	BSL
7440-41-7	Beryllium	—		0.300	J	mg/kg	SB0519	1/12	0.0200-0.250	0.300	NT	410 N	N/A	N/A	No	BSL
7440-43-9	Cadmium	—		1.0	J	mg/kg	SB0318	1/14	0.0700-0.250	1.0	NT	200 N	N/A	N/A	No	BSL
7440-70-2	Calcium	280		3,700	J	mg/kg	SB0311	14/14	—	3,700	NT	N/A	4,000,000	ADI	No	NUT
7440-47-3	Chromium	3.20		31.0		mg/kg	SB0519	12/14	3.0	31.0	NT	610 N	N/A	N/A	No	BSL
7440-48-4	Cobalt	1.40	J	3.20	J	mg/kg	SB0318	2/14	0.220-1.0	3.20	NT	12,000 N	N/A	N/A	No	BSL
7440-50-8	Copper	6.30	J	22.0	J	mg/kg	SS0107	5/14	2.0-9.50	22.0	NT	8,200 N	N/A	N/A	No	BSL
7439-89-6	Iron	110	J	2,100	J	mg/kg	SB0318	13/14	40.0	2,100	NT	61,000 N	N/A	N/A	No	BSL
7439-92-1	Lead	2.10		13.0	J	mg/kg	SS0107	9/14	0.770-7.40	13.0	NT	N/A	1,200	ISL	No	BSL
7439-95-4	Magnesium	180		1,100		mg/kg	SB0519	4/14	20.0-170	1,100	NT	N/A	800,000	ADI	No	NUT
7439-96-5	Manganese	0.740	J	8.30		mg/kg	SB0506	11/14	1.0-6.60	8.30	NT	4,100 N	N/A	N/A	No	BSL
7440-02-0	Nickel	0.70	J	9.80	J	mg/kg	SB0318	6/14	0.420-1.0	9.80	NT	4,100 N	N/A	N/A	No	BSL
7440-09-7	Potassium	29.0		950		mg/kg	SB0519	6/14	18.0-80.0	950	NT	N/A	1,000,000	ADI	No	NUT
7782-49-2	Selenium	2.80	J	5.40		mg/kg	SB0419	2/14	0.470-1.0	5.40	NT	1,000 N	N/A	N/A	No	BSL
7440-22-4	Silver	—		0.230	J	mg/kg	SB0318	1/9	0.190-0.460	0.230	NT	1,000 N	N/A	N/A	No	BSL
7440-23-5	Sodium	79.0		150		mg/kg	SB0411	14/14	99.0-150	150	NT	N/A	1,000,000	ADI	No	NUT

TABLE 6-2.15

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Subsurface Soil
Exposure Point: Site-wide Deep Subsurface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Qualifier	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Value	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
7440-62-2	Vanadium	0.370	J	100		mg/kg	SB0519	9/14	0.200-3.0	100	NT	1,400 N	N/A	N/A	No	BSL
7440-66-6	Zinc	2.10	J	9.90	J	mg/kg	SS0107	8/14	1.80-17.0	9.90	NT	61,000 N	N/A	N/A	No	BSL

(1) Minimum/maximum detected concentration.

(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.

(3) Maximum concentration used when screening for COPCs.

(4) The background value is two times the background mean concentration (USEPA, 1995a).

(5) See Table A-1 for a list of list of all subsurface soil screening values. Screening values are Benton III Industrial soil RBCs (USEPA, 1996b).

(6) See Table A-1 for a list of all values presented.

(7) Rationale Codes

Deletion Reason: Above Screening Level (ASL)
Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)

Data Qualifiers:

J = Value is estimated.
N = Tentative Identification. Considered present.

Definitions: ADI = Allowable Daily intake
ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
ISL = Industrial Soil Screening Level (USEPA, 1996a)
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected
NT = Not Tested (Chemical was not analyzed for.)

TABLE 6-2 16

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Site-wide Deep Subsurface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Concentration	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
	Organics:															
11097-69-1	Aroclor 1254	---		96.0		µg/kg	SB-5-19	1/14	38.0-80.0	96.0	NT	2,200,000,000 C	N/A	N/A	No	BSL
58-89-9	gamma-BHC (Lindane)	---		1.60	JN	µg/kg	SB-5-19	1/14	1.90-2.30	1.60	NT	88,000 N	N/A	N/A	No	BSL
74-87-3	Chloromethane	2,900		4,100		µg/kg	EPA-31B-16	2/36	11.0-4,700	4,100	ND	7.1E+11 C	N/A	N/A	No	BSL
540-59-0	1,2-Dichloroethane (total)	3.0	J	81.0	J	µg/kg	SB-1-09	3/24	11.0-130	81.0	ND	13,000 N	N/A	N/A	No	BSL
100-41-4	Ethyl benzene	---		3.0	J	µg/kg	SS-1-07	1/1	---	3.0	ND	1,000,000 N	N/A	N/A	No	BSL
127-18-4	Tetrachloroethene	2.0	J	80,000,000		µg/kg	[illegible]	[illegible]	[illegible]	80,000,000	ND	[illegible]	N/A	N/A	Yes	ASL
108-88-3	Toluene	2.0	J	160	J	µg/kg	SB-4-19	3/25	11.0-130	160	ND	250,000 N	N/A	N/A	No	BSL
79-01-6	Trichloroethene	2.0	J	200		µg/kg	SS-14-08	3/24	11.0-130	200	ND	240,000 C	N/A	N/A	No	BSL
	Inorganics:															
7429-90-5	Aluminum	740	J	13,000		mg/kg	SB-4-06	14/14	---	13,000	NT	6,300,000 N	N/A	N/A	No	BSL
7440-39-3	Barium	5.30		30.0		mg/kg	SB-5-16	9/14	1.0-4.0	30.0	NT	630,000 N	N/A	N/A	No	BSL
7440-41-7	Beryllium	---		0.300	J	mg/kg	SB-5-19	1/12	0.020[illegible]-250	0.300	NT	38,000 N	N/A	N/A	No	BSL
7440-43-9	Cadmium	---		1.0	J	mg/kg	SB-3-18	1/14	0.0200-0.250	1.0	NT	700,000 C	N/A	N/A	No	BSL
7440-70-2	Calcium	280		3,700	J	mg/kg	SB-3-11	14/14	---	3,700	NT	NSA	N/A	N/A	No	NUT
7440-47-3	Chromium	3.20		31.0		mg/kg	SB-5-19	12/14	3.0	31.0	NT	110,000 C	N/A	N/A	No	BSL
7440-48-4	Cobalt	1.40	J	3.20	J	mg/kg	SB-3-18	2/14	0.220-1.0	3.20	NT	380,000,000 N	N/A	N/A	No	BSL
7440-50-8	Copper	5.70	J	22.0	J	mg/kg	SS-1-07	13/14	2.0	22.0	NT	250,000,000 N	N/A	N/A	No	BSL
7439-89-6	Iron	110	J	2,100	J	mg/kg	SB-3-18	13/14	40.0	2,100	NT	1,900,000,000 N	N/A	N/A	No	BSL
7439-92-1	Lead	0.770	J	13.0	J	mg/kg	SS-1-07	14/14	---	13.0	NT	NSA	N/A	N/A	No	NTX
7439-95-4	Magnesium	180		1,100		mg/kg	SB-5-19	4/14	20.0-170	1,100	NT	NSA	N/A	N/A	No	NUT
7439-96-5	Manganese	0.740	J	8.30		mg/kg	SB-5-06	11/14	1.0-3.0	8.30	NT	63,000 N	N/A	N/A	No	BSL
7440-02-0	Nickel	0.650	J	9.80	J	mg/kg	SB-3-18	12/14	0.420-1.0	9.80	NT	130,000,000 N	N/A	N/A	No	BSL
7440-09-7	Potassium	18.0		950		mg/kg	SB-5-19	9/14	40.0-80.0	950	NT	NSA	N/A	N/A	No	NUT
7782-49-2	Selenium	2.80	J	5.40		mg/kg	SB-4-19	2/14	0.470-1.0	5.40	NT	32,000,000 N	N/A	N/A	No	BSL
7440-22-4	Silver	---		0.230	J	mg/kg	SB-3-18	1/9	0.190-0.460	0.230	NT	32,000,000 N	N/A	N/A	No	BSL
7440-23-5	Sodium	79.0		150		mg/kg	SB-4-11	14/14	---	150	NT	NSA	N/A	N/A	No	NUT
7440-62-2	Vanadium	0.370	J	100		mg/kg	SB-5-19	9/14	0.200-3.0	100	NT	44,000,000 N	N/A	N/A	No	BSL

TABLE 6-2.16

OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

SOUTHERN SOLVENTS

Scenario Timeframe: Future
Medium: Subsurface Soil
Exposure Medium: Air
Exposure Point: Site-wide Deep Subsurface Soil

CAS Number	Chemical	(1) Minimum Concentration	Minimum Qualifier	(1) Maximum Qualifier	Maximum Qualifier	Units	Location of Maximum Concentration	(2) Detection Frequency	Range of Detection Limits	(3) Concentration Used for Screening	(4) Background Value	(5) Screening Toxicity Value	Potential ARAR/TBC Value	Potential ARAR/TBC Value	COPC Flag	(6) Rationale for Contaminant Deletion or Selection
7440-66-6	Zinc	1.80	J	17.0	J	mg/kg	SB-3-18	14/14	—	17.0	NT	1,900,000,000 N	N/A	N/A	No	BSL

(1) Minimum/maximum detected concentration.

(2) Frequency of detection is the number of samples that the chemical was detected in over the total number of samples in which the chemical was analyzed for, excluding data rejected as a result of validation and non-detect samples where the detection limit was greater than two times the maximum detected concentration.

(3) Maximum concentration used when screening for COPCs.

(4) The background value is two times the background mean concentration (USEPA, 1995a).

(5) See Table A-3 for a list of list of all industrial soil screening levels.

(6) Rationale Codes

Selection Reason: Above Screening Level (ASL)

Deletion Reason: Below Screening Level (BSL)
Essential Nutrient (NUT)
No Toxicity Information Available (NTX)

Data Qualifiers:

J = Value is estimated.

N = Tentative Identification. Considered present.

Definitions: ARAR/TBC = Applicable or Relevant and Appropriate Requirement/To Be Considered
C = Carcinogenic
N = Noncarcinogenic
N/A = Not Available
ND = Not Detected
NSA = No SSL Available
NT = Not Tested (Chemical was not analyzed for.)

TABLE 6-4.10

VALUES USED FOR DAILY INTAKE CALCULATIONS

SOUTHERN SOLVENTS SITE

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Surficial Aquifer - PCE Plume Tap Water
Receptor Population:	Resident
Receptor Age:	Adult

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Groundwater	µg/l	See Table 6-3.6	See Table 6-3.6	þ	þ	
	IR-W	Ingestion Rate of Groundwater	liters/day	2	USEPA, 1995a	þ	þ	Potential (Lifetime) Average Daily Dose
	EF	Exposure Frequency	days/year	350	USEPA, 1995a	þ	þ	$[(L)ADD_{pot}]$ (mg/kg-day) =
	ED	Exposure Duration	years	24	USEPA, 1995a	þ	þ	
	CF	Conversion Factor	mg/µg	$1x10^{-3}$	þ	þ	þ	$\frac{CW \times IR\text{-}W \times EF \times ED \times CF}{BW \times AT}$
	BW	Body Weight	kg	70	USEPA, 1991a	þ	þ	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, 1991a	þ	þ	
	AT-N	Averaging Time (Non-Cancer)	days	8,760	USEPA, 1991a	þ	þ	
Dermal Absorption	DA	Dose Absorbed per Unit area per Event	mg/cm^2 - event	..	(1)	þ	þ	
	SA	Skin Surface Area Available for Contact	cm^2	20,000	USEPA, 1997a	þ	þ	Internal (Lifetime) Average Daily Dose
	EV	Event Frequency	events/day	1	(2)	þ	þ	$[(L)ADD_{int}]$ (mg/kg-day) =
	EF	Exposure frequency	days/year	350	USEPA, 1995a	þ	þ	
	ED	Exposure Duration	years	24	USEPA, 1995a	þ	þ	$\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT}$
	BW	Body Weight	kg	70	USEPA, 1991a	þ	þ	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, 1991a	þ	þ	
	AT-N	Averaging Time (Nin-Cancer)	days	8,760	USEPA, 1991a	þ	þ	

(1) Value is calculated using te equations presented in Section 6.1.2.3 and assuming an exposure time of 12 minutes (ET = 0.2 hr).

(2) The event frequency was based on best professional judgement.

TABLE 6-4.18

VALUES USED FOR DAILY INTAKE CALCULATIONS

SOUTHERN SOLVENTS SITES

Scenario Timeframe:	Future
Medium:	Groundwater
Exposure Medium:	Groundwater
Exposure Point:	Surficial Aquifer - PCE Plume Tap Water
Receptor Population:	Resident
Receptor Age:	Child

Exposure Route	Parameter Code	Parameter Definition	Units	RME Value	RME Rationale/ Reference	CT Value	CT Rationale/ Reference	Intake Equation/ Model Name
Ingestion	CW	Chemical Concentration in Groundwater	µg/l	See Table 6-3.6	See Table 6-3.6	þ	þ	
	IR-W	Ingestion Rate of Groundwater	liters/day	2	USEPA, 1995a	þ	þ	Potential (Lifetime) Average Daily Dose
	EF	Exposure Frequency	days/year	350	USEPA, 1995a	þ	þ	$[(L)ADD_{pot}]$ (mg/kg-day) =
	ED	Exposure Duration	years	6	USEPA, 1995a	þ	þ	
	CF	Conversion Factor	mg/µg	$1x10^{-3}$	þ	þ	þ	$\frac{CW \times IR\text{-}W \times EF \times ED \times CF}{BW \times AT}$
	BW	Body Weight	kg	15	USEPA, 1991a	þ	þ	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, 1991a	þ	þ	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, 1991a	þ	þ	
Dermal Absorption	DA	Dose Absorbed per Unit area per Event	mg/cm^2 - event	..	(1)	þ	þ	
	SA	Skin Surface Area Available for Contact	cm^2	7,213	USEPA, 1997a	þ	þ	Internal (Lifetime) Average Daily Dose
	EV	Event Frequency	events/day	1	(2)	þ	þ	$[(L)ADD_{int}]$ (mg/kg-day) =
	EF	Exposure frequency	days/year	350	USEPA, 1995a	þ	þ	
	ED	Exposure Duration	years	6	USEPA, 1995a	þ	þ	$\frac{DA \times SA \times EV \times EF \times ED}{BW \times AT}$
	BW	Body Weight	kg	15	USEPA, 1991a	þ	þ	
	AT-C	Averaging Time (Cancer)	days	25,550	USEPA, 1991a	þ	þ	
	AT-N	Averaging Time (Non-Cancer)	days	2,190	USEPA, 1991a	þ	þ	

(1) Value is calculated using te equations presented in Section 6.1.2.3 and assuming an exposure time of 12 minutes (ET = 0.2 hr).

(2) The event frequency was based on best professional judgement.

TABLE 6-5.1
NON-CANCER TOXICITY DATA - ORAL/DERMAL
SOUTHERN SOLVENTS SITE

Chemical of Potential Concern	Chronic/ Subchronic	Oral RfD Value	Oral RfD Units	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal RfD (2)	Units	Primary Target Organ	Combined Uncertainty Modifying Factors	Sources of RfD: Target Organ	Dates of RfD: Target Organ (3) (MM/DD/YY)
Organics										
Acetone	Chronic	1E-01	mg/kg-day	83%	8.3E-02	mg/kg-day	Liver, Kidney	1,000	IRIS	11/1/98:8/1/93
Benzene	Chronic	3E-03	mg/kg-day	100%	3.0E-03	mg/kg-day	Blood, Immune System	3,000	NCEA	07/02/96
Bromodichloromethane	Chronic	2E-02	mg/kg-day	100%	2.0E-02	mg/kg-day	Kidney	1,000	IRIS	11/1/98:3/1/91
Carbon Tetrachloride	Chronic	7E-04	mg/kg-day	100%	7.0E-04	mg/kg-day	Liver	1,000	IRIS	11/1/98:6/1/91
Chlorobenzen	Chronic	2E-02	mg/kg-day	13%	2.6E-03	mg/kg-day	Liver	1,000	IRIS	11/1/98:7/1/93
Chloroform	Chronic	1E-02	mg/kg-day	100%	1.0E-02	mg/kg-day	Liver	1,000	IRIS	11/1/98:9/1/92
Chloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibromochloromethane	Chronic	2E-02	mg/kg-day	100%	2.0E-02	mg/kg-day	Liver	1,000	IRIS	11/1/98:3/1/91
1,1-Dichloroethene	Chronic	9E-03	mg/kg-day	100%	9.0E-03	mg/kg-day	Liver	1,000	IRIS	11/1/98:4/1/89
1,2-Dichloroethene (total)	Chronic	9E-03	mg/kg-day	100%	9.0E-03	mg/kg-day	Liver	1,000	HEAST	1997
cis-1,3-Dichloropropene	Chronic	3E-04	mg/kg-day	80%	2.4E-04	mg/kg-day	> Organ Weight	10,000	IRIS	11/1/98:10/1/90
trans-1,3-Dichloropropene	Chronic	3E-04	mg/kg-day	80%	2.4E-04	mg/kg-day	> Organ Weight	10,000	IRIS	11/1/98:10/1/90
Methylene chloride	Chronic	6E-02	mg/kg-day	100%	6.0E-02	mg/kg-day	Liver	100	IRIS	11/1/98:3/1/88
Pentachlorophenol	Chronic	3E-02	mg/kg-day	50%	1.5E-02	mg/kg-day	Liver, Kidney	100	IRIS	11/1/98:2/1/93
1,1,2,2-Tetrachloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	Chronic	1E-02	mg/kg-day	100%	1.0E-02	mg/kg-day	Liver, >Body Wight	1,000	IRIS	11/1/98:3/1/88
1,1,2-Trichloroethane	Chronic	4E-03	mg/kg-day	80%	3.2E-03	mg/kg-day	Clinical Chemistry	1,000	IRIS	11/1/98:2/1/95
Trichloroethene	Chronic	6E-03	mg/kg-day	100%	6.0E-03	mg/kg-day	Liver, Kidney	3,000	NCEA	3/5/92

IRIS = Integrated Risk Information System

Heast = Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

N/A = Not Applicable

(1) Oral to Dermal Adjustment Factors were obtained from ATSDR with the following exceptions: The Adjustment factors cis-1,3-Dichloropropene, trans-1,3-dichloropropene, and 1,1,3-trichloroethane were based on the USEPA (1995a) default factor of 80% for VOCs: the adjustment factor for pentachlorophenol was based on the USEPA (1995a) default factor of 50% for SVOCs.

(2) The equation used to derive the adjusted dermal RfD is presented in the text.

(3) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.
For HEAST values, the date of HEAST is provide.
For NCEA values, the date of the article provided by NCEA is provided.

TABLE 6-5.2
NON-CANCER TOXICITY DATA - INHALATION
SOUTHERN SOLVENTS SITE

Chemical of Potential Concern	Chronic/ Subchronic	Value Inhalation RfC	Units	Adjusted Inhalation RfD (1)	Units	Primary Target Organ	Combined Uncertainty/ Modifying Factors	Sources of RfD:RfD: Target Organ	Dates (2) (MM/DD/YY)
Organics									
Acetone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	Chronic	6E-03	mg/m3	1.7E-03	mg/kg-day	Blood Chemistry	1,000	NCEA	7/2/96
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon Tetrachloride	Chronic	2E-03	mg/m3	5.7E-04	mg/kg-day	N/A	N/A	EPA 1998	1998
Chlorobenzene	Chronic	2E-02	mg/m3	5.7E-03	mg/kg-day	liver, Kidney	10,000	HEAST	1997
Chloroform	Chronic	3E-04	mg/m3	8.6E-05	mg/kg-day	N/A	N/A	EPA 1998	1998
Dibromochloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethene	N/A	NA	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,2-Dichloroethene (total)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	Chronic	2E-02	mg/m3	5.7E-03	mg/kg-day	Nasal Mucosa	30	IRIS	11/1/98:1/1/91
trans-1,3-Dichloropropene	Chronic	2E-02	mg/m3	5.7E-03	mg/kg-day	Nasal Mucosa	30	IRIS	11/1/98:1/1/91
Methylene chloride	Chronic	3E+00	mg/m3	8.6E-01	mg/kg-day	Liver	100	HEAST	1997
Pentachlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tetrachloroethene	Chronic	5E-01	mg/m3	1.4E-01	mg/kg-day	N/A	N/A	EPA 1998	1998
1,1,2-Trichloroethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Trichloroethene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

IRIS = Integrated Risk Information System

Heast = Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

EPA 1998 = EPA Region III October 1, 1998 RBC table.

N/A = Not Applicable

(1) Adjustment Factors applied to RfC to calculate RfD = 1/70kg x 20m³

(2) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.
For HEAST values, the date of HEAST is provide.
For NCEA values, the date of the article provided by NCEA is provided.

TABLE 6-6.1

NON-CANCER TOXICITY DATA - INHALATION

SOUTHERN SOLVENTS SITE

Chemical of Potential Concern	Oral Cancer Slope Factors	Oral to Dermal Adjustment Factor (1)	Adjusted Dermal Cancer Slope Factor (2)	Units	Weight of Evidence/ Cancer Guideline Description	Source	Dates (3) (MM/DD/YY)
Organics							
Acetone	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	2.9E-02	100%	2.9E-02	(mg/kg-day)^{1}	A	IRIS	11/1/98:10/16/98
Bromodichloromethane	6.2E-02	100%	6.2E-02	(mg/kg-day)^{1}	B2	IRIS	11/1/98:3/1/93
Carbon Tetrachloride	1.3E-01	100%	1.6E-01	(mg/kg-day)^{1}	B2	IRIS	11/1/98:6/1/91
Chlorobenzen	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	8.1E-03	100%	8.1E-03	(mg/kg-day)^{1}	B2	IRIS	11/1/98:3/1/91
Chloromethane	1.3E-02	100%	1.3E-02	(mg/kg-day)^{1}	C	HEAST	1997
Dibromochloromethane	8.4E-02	100%	8.4E-02	(mg/kg-day)^{1}	C	IRIS	11/1/98:1/1/92
1,1-Dichloroethene	6.0E-01	100%	6.0E-01	(mg/kg-day)^{1}	C	IRIS	11/1/98:2/1/98
1,2-Dichloroethene (total)	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
trans-1,3-Dichloropropene	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Methylene chloride	7.5E-03	100%	7.5E-03	(mg/kg-day)^{1}	B2	IRIS	11/1/98:2/1/95
Pentachlorophenol	1.2E-01	50%	2.4E-01	(mg/kg-day)^{1}	B2	IRIS	11/1/98:7/1/93
1,1,2,2-Tetrachloroethane	2.0E-01	100%	2.0E-01	(mg/kg-day)^{1}	C	IRIS	11/1/98:2/1/94
Tetrachloroethene	5.2E-02	100%	5.2E-02	(mg/kg-day)^{1}	þ	NCEA	No Date
1,1,2-Trichloroethane	5.7E-02	80%	7.1E-02	(mg/kg-day)^{1}	C	IRIS	11/1/98:2/1/94
Trichloroethene	1.1E-02	100%	1.1E-02	(mg/kg-day)^{1}	þ	NCEA	No Date

(1) Oral to Dermal Adjustment Factors were obtained from ATSDR with the following exceptions: The adjustment factor for 1,1,2-trichloroethane was based on the USEPA USEPA (1995a) default factor of 80% for VOCs; the adjustment factor for pentachlorophenol was based on the USEPA (1995a) default factor of 50% for SVOCs.

(2) The equation for deriving the adjusted dermal cancer slope factors are presented in the text.

(3) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.
For HEAST values, the date of HEAST is provided.
For NCEA values, the date of the article provided by NCEA is provided.

EPA Group:

A - Human carcinogen

B1 - Probable human carcinogen - indicates theat limited human date are available

B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans

C- Possible human carcinogen

D - Not classifiable as a human carcinogen

IRIS = Integrated Risk Information System

Heast = Health Effects Assessment Summary Tables

NCEA = National Center for Environmental Assessment

TABLE 6-6.2
CANCER TOXICITY DATA - INHALATION
SOUTHERN SOLVENTS SITE

Chemical of Potential Concern	Unit Risk	Units	Adjustment (1)	Inhalation Cancer Slope Factor	Units	Weight of Evidence/ Cancer Guideline Description	Source	Date (1) (MM/DD/YY)
Organics								
Acetone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Benzene	7.80E-06	$(ug/m^3)^{-1}$	3500	2.7E-02	$(mg/kg\text{-}day)^{-1}$	A	IRIS	11/1/98:10/16/98
Bromodichloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Carbon tetrachloride	1.50E-05	$(ug/m^3)^{-1}$	3500	5.3E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/1/98:6/1/91
Chlorobenzene	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chloroform	2.30E-05	$(ug/m^3)^{-1}$	3500	8.1E-02	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/1/98:3/1/91
Dibtomochloromethane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1-Dichloroethene	5.00E-05	$(ug/m^3)^{-1}$	3500	1.8E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/1/98:2/1/98
1,2-Dichloroethene (total)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
cis-1,3-Dichloropropene	3.70E-05	$(ug/m^3)^{-1}$	3500	1.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	1997
trans-1,3-Dichloropropene	3.70E-05	$(ug/m^3)^{-1}$	3500	1.3E-01	$(mg/kg\text{-}day)^{-1}$	B2	HEAST	1997
Methylene chloride	4.70E-07	$(ug/m^3)^{-1}$	3500	1.6E-03	$(mg/kg\text{-}day)^{-1}$	B2	IRIS	11/1/98:2/1/95
Pentachlorophenol	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1,1,2,2-Tetrachloroethane	5.80E-05	$(ug/m^3)^{-1}$	3500	2.0E-01	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/1/98:2/1/94
Tetrachloroethene	5.80E-07	$(ug/m^3)^{-1}$	3500	2.0E-03	$(mg/kg\text{-}day)^{-1}$	–	NCEA	No Date
1,1,2-Trichloroethane	1.60E-05	$(ug/m^3)^{-1}$	3500	5.7E-02	$(mg/kg\text{-}day)^{-1}$	C	IRIS	11/1/98:2/1/94
Trichloroethene	1.70E-06	$(ug/m^3)^{-1}$	3500	6.0E-03	$(mg/kg\text{-}day)^{-1}$	–	NCEA	No Date

IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment

(1) Adjustment factor applied to Unit Risk to calculate Inhalation Slope Factor = 70kg x $1/20^3$/day x 1000 µg/mg.
(2) For IRIS values, the date IRIS was searched and the date of the most recent review are provided.
For HEAST values, the date of HEAST is provided.
For NCEA values, the date of the article provided by NCEA is provided.

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

TABLE 6-10.1 RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
SOUTHERN SOLVENTS

Scenario Timeframe: Current
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk (1)				Chemical	Non-Carcinogenic Hazard Quotient (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Offices (3830 Gunn Hwy)		–	–	–	–			–	–	–	–
			(Total)	–	–	–	–	(Total)		–	–	–	–
		Dibb's Plaza #1 (4123 Gunn Hwy)		–	–	–	–			–	–	–	–
			(Total)	–	–	–	–	(Total)		–	–	–	–
		Dibb's Plaza #2 (4113 Gunn Hwy)		–	–	–	–			–	–	–	–
			(Total)	–	–	–	–	(Total)		–	–	–	–

Total Risk Across [Groundwater] –

Total Risk Across All Media and All Exposure Routes –

Total Hazard Index Across All Media and All Exposure Routes

(1) All exposure route total cancer risks were less than 1×10^{-6} and all exposure route total hazard indices were less than one.

TABLE 6-10.2 RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Receptor Population: Industrial Worker
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk (1)				Chemical	Non-Carcinogenic Hazard Quotient (1)				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Site-wide											
		Surficial Aquifer	Tetrachloroethene	3.1E-02	–	–	3.1E-02	Tetrachloroethene	Liver, > Body Weight	170	–	–	170
		Tap Water	(Total)	3.1E-02	–	–	3.1E-02	(Total)		170	–	–	170
		Site-wide											
		Floridan Aquifer	Tetrachloroethene	8.2E-04	–	–	8.2E-04	Tetrachloroethene	Liver, > Body Weight	4.4	–	–	4.4
		Tap Water		–	–	–	–	Trichloroethene	Liver, Kidney	3.1	–	–	3.1
			(Total)	8.2E-04	–	–	8.2E-04	(Total)		7.5	–	–	7.5
		Concentrated											
		Surficial Aquifer	Tetrachloroethene	1.6E-02	–	–	1.6E-02	Tetrachloroethene	Liver, > Body Weight	86	–	–	86
		PCE Plume		–	–	–	–			–	–	–	–
		(MW-3R, MW-5,		–	–	–	–			–	–	–	–
		MW-7, MW-11R, MW-12)		–	–	–	–			–	–	–	–
		Tap Water	(Total)	1.6E-02	–	–	1.6E-02	(Total)		86	–	–	86
		Floridan Aquifer											
		PCE Plume	Tetrachloroethene	6.8E-04	–	–	6.8E-04	Tetrachloroethene	Liver, > Body Weight	3.6	–	–	3.6
		Tap Water		–	–	–	–	Trichloroethene	Liver, Kidney	2.4	–	–	2.4
			(Total)	6.8E-04	–	–	8.8E-04			6.0	–	–	6.4
						Total Risk Across [Groundwater]	–					Total Hazard Index Across All Media and All Exposure Routes (1)	–
						Total Risk Across All Media and All Exposure Routes (1)	–						

(1) All and hazard totals were not calculated since it is highly unlikely that exposures to groundwater from more than one of the data groupings would actually occur at the site.

TABLE 6-10.3 RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Site-wide Surficial Aquifer - Tap Water	Tetrachloroethene	8.3E-02	–	4.7E-02	1.3E-01	Tetrachloroethene	Liver, > Body Weight	470	–	260	730
			(Total)	8.3E-02	–	4.7E-02	1.3E-01	(Total)		470	–	260	730
		Site-wide Floridan Aquifer - Tap Water	Tetrachloroethene	4.7E-05	–	1.5E-03	1.5E-03	1,2-Dichloroethene (total)	Liver	1.6	–	0.11	1.7
			Tetrachloroethene	2.2E-03	–	1.2E-03	3.4E-03	Pentachlorophenol	Liver, Kidney	0.038	–	1.2	1.2
			Trichloroethene	2.0E-04	–	2.9E-05	2.3E-04	Tetrachloroethene	Liver, > Body Weight	12	–	6.9	19
				–	–	–	–	Trichloroethene	Liver, Kidney	8.7	–	1.3	10
			(Total)	2.4E-03	–	2.7E-03	5.1E-03	(Total)		23	–	9.5	33
		Concentrated Surficial Aquifer PCE Plume (MW-3R, MW-5, MW-7, MW-11R, MW-12) Tap Water	Tetrachloroethene	4.3E-02	–	2.4E-02	6.7E-02	Tetrachloroethene	Liver, > Body Weight	240	–	140	380
				–	–	–	–			–	–	–	–
				–	–	–	–			–	–	–	–
			(Total)	4.3E-02	–	2.4E-02	6.7E-02	(Total)		240	–	140	380
		Floridan PCE Plume - Tap Water	Pentachlorophenol	3.1E-05	–	9.5E-04	9.8E-04	1,2-Dichloroethene (total)	Liver	1.1	–	0.081	1.2
			Tetrachloroethene	1.8E-03	–	1.0E-03	2.8E-03	Tetrachloroethene	Liver, > Body Weight	10	–	5.7	16
			Trichloroethene	1.5E-04	–	2.2E-05	1.7E-04	Trichloroethene	Liver, Kidney	6.7	–	0.98	8
			(Total)	2.0E-03	–	2.0E-03	4.0E-03			18	–	6.8	25
	Air	Site-wide Surficial Aquifer - Water Vapors at Showerhead	Tetrachloroethene	–	1.8E-03	–	1.8E-03	Chloroform	N/A	–	1.6	–	1.6
				–	–	–	–	Tetrachloroethene	N/A	–	18	–	18
			(Total)	–	1.8E-03	–	1.8E-03	(Total)		–	20	–	20
		Site-wide Floridan Aquifer - Water Vapors at Showerhead		–	–	–	–			–	–	–	–
			(Total)	–	–	–	–	(Total)		–	–	–	–

TABLE 6-10.3 RME (continued)
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Adult

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Air	Concentrated Surficial Aquifer PCE Plume (MW-3R, MW-5, MW-7, MW-11R, MW-12) Water Vapors at Showerhead	Tetrachloroethene	–	9.1E-04	–	–	Tetrachloroethene	N/A	–	9.5	–	9.5
				–	–	–	–			–	–	–	–
				–	–	–	–			–	–	–	–
			(Total)	–	9.1E-04	–	–	(Total)		–	9.5	–	9.5
		Floridan PCE Plume - Tap Vapors at Showerhead		–	–	–	–			–	–	–	–
			(Total)	–	–	–	–			–	–	–	–
							Total Risk Across [Groundwater] –						Total Hazard Index Across All Media Exposure Routes (1) –
							Total Risk Across [Air] –						
							Total Risk Across All Media and All Exposure Routes (1) –						

(1) Risk and hazard totals were not calculated since it is highly unlikely that exposures to groundwater from more than one of the data grouping would actually occur at the site.

N/A = Not Available

TABLE 6-10.4 RME
RISK ASSESSMENT SUMMARY
REASONABLE MAXIMUM EXPOSURE
SOUTHERN SOLVENTS

Scenario Timeframe: Future
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Medium	Exposure Point	Chemical	Carcinogenic Risk				Chemical	Non-Carcinogenic Hazard Quotient				
				Ingestion	Inhalation	Dermal	Exposure Routes Total		Primary target Organ	Ingestion	Inhalation	Dermal	Exposure Routes Total
Groundwater	Groundwater	Site-wide											
		Surficial Aquifer	Tetrachloroethene	4.8E-02	–	2.0E-02	6.8E-02	Tetrachloroethene	Liver, > Body Weight	1,100	–	440	1,540
		Tap Water	(Total)	4.8E-02	–	2.0E-02	6.8E-02	(Total)		1,100	–	440	1,540
		Site-wide											
		Floridan Aquifer	Tetrachloroethene	2.8E-05	–	6.1E-04	6.4E-04	1,2-Dichloroethene (total)	Liver	3.6	–	0.19	3.8
		Tap Water	Tetrachloroethene	1.3E-03	–	5.2E-04	1.8E-03	Pentachlorophenol	Liver, Kidney	0.089	–	2.0	2.1
			Trichloroethene	1.1E-04	–	1.2E-05	1.3E-04	Tetrachloroethene	Liver, > Body Weight	29	–	12	41
				–	–	–	–	Trichloroethene	Liver, Kidney	20	–	2.1	22
			(Total)	1.4E-03	–	1.1E-03	2.6E-03	(Total)		53	–	16	69
		Concentrated											
		Surficial Aquifer	Tetrachloroethene	2.5E-02	–	1.0E-02	3.5E-02	Tetrachloroethene	Liver, > Body Weight	560	–	230	790
		PCE Plume		–	–	–	–			–	–	–	–
		(MW-3R, MW-5,		–	–	–	–			–	–	–	–
		MW-7, MW-11R,		–	–	–	–			–	–	–	–
		MW-12)		–	–	–	–			–	–	–	–
		Tap Water	(Total)	2.5E-02	–	1.0E-02	3.5E-02	(Total)		560	–	230	790
		Floridan Aquifer											
		PCE Plume	Pentachlorophenol	1.8E-05	–	4.0E-04	4.2E-04	1,2-Dichloroethene (total)	Liver	2.6	–	0.14	2.7
		Tap Water	Tetrachloroethene	1.1E-03	–	4.3E-04	1.5E-03	Pentachlorophenol	Liver, Kidney	0.058	–	1.3	1.4
				–	–	–	–	Tetrachloroethene	Liver, > Body Weight	24	–	9.7	34
				–	–	–	–	Trichloroethene	Liver, Kidney	16	–	1.7	18
			(Total)	1.1E-03	–	8.3E-04	1.9E-03			43	–	13	55
							Total Risk Across [Groundwater]						Total Hazard Index Across All Media and All Exposure Routes (1) –
							Total Risk Across All Media and All Exposure Routes (1) –						

(1) Risk and hazard totals were not calculated since it is highly unlikely that exposures to groundwater from more than one of the data grouping would actually occur at the site.

APPENDIX B

Responsiveness Summary

Appendix B

Responsiveness Summary
Southern Solvents Site

To follow are the comments which were received on the Southern Solvents proposed plan and a response to those comments.

1. **Comment: Are other agencies checking drinking water which goes out to the public for these site related contaminants?**

   Response: Yes. Local utilities are required by the State of Florida to test for many contaminants to ensure the drinking water they supply is safe for consumption. They are required to test for tetrachloroethylene (PCE) on a tri-annual basis unless they are on a special monitoring schedule to test more frequently. This information is supplied to the Hillsborough County Health Department which is the government agency responsible for ensuring that the drinking water supply in Hillsborough County remains safe for consumption.

2. **Comment: How will EPA investigate the Floridan aquifer? How will the Floridan aquifer will be cleaned up?**

   Response: Another remedial investigation will be conducted at the Site to fully characterize the Floridan aquifer. EPA discovered in the initial remedial investigation that the groundwater in the upper portion of the Floridan aquifer flows in a northerly direction. This is opposite the direction of the shallow aquifer and is in a different direction than the regional flow direction of the Floridan aquifer. This change is likely due to the draw from wells to the north. The second remedial investigation will focus on the Floridan aquifer and will likely result in the installation of additional groundwater monitoring wells to fully characterize the flow direction and extent of contamination. Once this is completed, a decision will be made on how to most effectively clean up any contamination which may have migrated into the Floridan aquifer.