DOE/EA--0976

Finding of No Significant Impact
Proposed Corrective Action for the Northeast Site
at the Pinellas Plant in
Largo, Florida

AGENCY: U.S. Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has prepared an Environmental Assessment (EA) (DOE/EA-0976) of the proposed corrective action for the Northeast Site at the Pinellas Plant in Largo, Florida. The Northeast Site contains contaminated groundwater that would be removed, treated, and discharged to the Pinellas County Sewer System. Based on the analyses in the EA, the DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C.4321 et.seq. Therefore, the preparation of an environmental impact statement is not required and the DOE is issuing this Finding of No Significant Impact (FONSI).

SINGLE COPIES OF THE EA AND FONSI ARE AVAILABLE FROM:

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BACKGROUND: The Pinellas Plant encompasses approximately 99 acres in the center of Pinellas County, Florida. The plant is a governmental-owned facility that is administered by the DOE and operated by a DOE contractor. The plant was constructed in 1956 and 1957 as part of the nuclear weapons production complex, and the original products of the plant were neutron generators, a principal component of nuclear weapons. The production of these devices led to the manufacture of other weapons application products. In 1993, the DOE decided to phase out the Pinellas Plant and has proposed leasing all or portions of the plant to commercial enterprises. It is anticipated that the commercial enterprises would involve manufacturing processes that are identical or similar to the processes currently used at the Pinellas Plant.

Under the provisions of the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments (HSWA), the U.S. Environmental Protection Agency (EPA) issued the Pinellas Plant a HSWA Permit in 1990. The HSWA Permit, in conjunction with the Hazardous Waste Management Permit issued by the Florida Department of Environmental Protection (FDEP), authorizes the Pinellas Plant to operate as a hazardous waste storage and treatment facility. The HSWA Permit also sets forth the conditions and requirements for RCRA corrective actions at the plant. A corrective action is a measure or measures taken to protect human health and the environment from all releases of hazardous waste or constituents from any solid waste management unit (SWMU). Through the RCRA corrective action process, the Northeast Site has been identified as a SWMU needing corrective action.

SITE DESCRIPTION: The Pinellas Plant is located midway between the major municipalities of Clearwater and St. Petersburg. The closest cites are Largo and Pinellas Park. Light industry, including warehousing operations, is conducted in the area immediately surrounding the plant, and the closest residential area is approximately 0.3 miles from the plant. The Northeast Site is entirely within the boundaries of the Pinellas Plant and access to and use of the site is therefore strictly controlled.

The Northeast Site contains approximately 20 acres in the northeast corner of the Pinellas Plant and includes the East Pond. Numerous investigations of the Northeast Site, including a RCRA facility investigation in 1991, confirmed that groundwater in the surficial aquifer at the site is contaminated with volatile and semivolatile organic compounds. The surficial aquifer is very close to the surface and approximately 32 feet thick at the Pinellas Plant. No municipal water supplies are taken from the surficial aquifer due to the limited availability and naturally poor quality of the groundwater in the aquifer. The contaminated groundwater plume has remained within the boundaries of the Northeast Site.

In 1992, an interim corrective measure was implemented for the Northeast Site, primarily in response to the concern that the contaminant plume was potentially increasing in areal extent and could migrate offsite. The interim corrective measure consists of withdrawing contaminated groundwater from the surficial aquifer through recovery wells at the Northeast Site and treating the groundwater in the existing water treatment facility for the 4.5-Acre Site in the northeast corner of the Pinellas Plant. This water treatment facility uses an air stripper to remove volatile and semivolatile organic compounds from contaminated groundwater. The effluent from the treatment facility is discharged into the Pinellas County Sewer System.

PROPOSED ACTION: The proposed corrective action for the Northeast Site is pump-and-treat with air stripping. Groundwater recovery wells would be completed in the surficial aquifer to withdraw contaminated groundwater from the aquifer. The recovered groundwater would be piped to a groundwater treatment system that would be constructed at the Northeast Site and would use an air stripper for the removal of the volatile and semivolatile organic compounds. The treated groundwater would be discharged to the Pinellas County Sewer System. The corrective action would also include the installation of a soil/bentonite slurry wall at the northern boundary of the Northeast Site. This slurry wall would limit the volume of clean groundwater recovered and would limit the groundwater recovery zone to within the Pinellas Plant property. Groundwater monitoring would be conducted during and after the corrective action to evaluate the efficiency and effectiveness of the corrective action, to detect contaminant migration resulting from the corrective action, and to verify that the contaminant concentrations have been reduced to the media cleanup standards (MCSs) for the surficial aquifer at the Northeast Site. The MCSs for the Northeast Site are the Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) or the FDEP drinking water standards for the contaminants, whichever are less.

The corrective action would be performed in accordance with the HSWA and Hazardous Waste Management Permits and an EPA- and FDEP-approved corrective measure implementation plan. It is estimated that the corrective action would be conducted for 30 years, and the total estimated cost for 30 years of corrective action is $22.5 million.

No Action

The no action alternative would consist of continuing the interim corrective measure for the Northeast Site. Contaminated groundwater would continue to be withdrawn from the surficial aquifer through existing recovery wells and treated in the existing water treatment facility for the 4.5-Acre Site. The interim corrective measure includes a groundwater monitoring system. The water treatment facility for the 4.5-Acre Site does not have enough capacity for both the 4.5-Acre Site and Northeast Site corrective measures. Therefore, this alternative would result in one or both of the corrective measures operating at less than an optimum groundwater withdrawal rate. This would extend the time necessary for completion of a corrective action and could present the potential for offsite migration of contaminated groundwater.

Other Corrective Action Alternatives

During the Corrective Measures Study (CMS) for the Northeast Site, corrective action technologies were identified and screened to eliminate technologies that are not feasible. This screening resulted in the identification of corrective measure alternatives; the corrective measure alternatives identified for the Northeast Site were pump-and-treat with air stripping and pump-and-treat with ultraviolet (UV) oxidation. Pump-and-treat with air stripping is the proposed corrective action for the Northeast Site.

The UV oxidation alternative for corrective action at the Northeast Site would be the same as the proposed corrective action except that UV oxidation would be the primary groundwater treatment process instead of air stripping. Partially oxidized or unoxidized contaminants in the groundwater could require additional treatment, and controls could be required for emissions created by the UV oxidation process depending on the type of system used. This alternative could be difficult to operate due to the types of contaminants in the contaminated groundwater and could be more expensive than the proposed corrective action, especially over 30 years of corrective action.

ENVIRONMENTAL IMPACTS: The proposed corrective action would lower the contaminant concentrations in the surficial aquifer to the SDWA MCLs or FDEP drinking water standards for the contaminants, whichever are less. The SDWA MCLs or the FDEP drinking water standards for the contaminants are equal to or less than the contaminant concentrations that would achieve the EPA's upperbound target carcinogenic risk of no more than one excess cancer in a population of 10,000 people exposed (i.e., drinking contaminated groundwater from the surficial aquifer). The proposed corrective action would similarly reduce the potential for noncarcinogenic public health risks (e.g., liver degeneration). Without any corrective action, using contaminated groundwater from the surficial aquifer for domestic purposes other than drinking could result in public health effects ranging from six excess cancers in a population of 100,000 people exposed to two excess cancers in a population of 10 people exposed. Use of the surficial aquifer as a drinking water supply is very unlikely due to the limited availability and naturally poor quality of the groundwater in the aquifer. (Section 5.1)

To ensure worker protection, the proposed corrective action would be performed in compliance with all of the applicable health and safety requirements of the Occupational Health and Safety Administration as well as all applicable DOE and Pinellas Plant health and safety requirements. The proposed corrective action would also be performed in compliance with a site health and safety plan. (Section 3.1, Pg. 3-7)

The air stripper in the proposed groundwater treatment system would exhaust volatile and semivolatile organic compounds. These emissions would be regulated by the Pinellas Plant's Air Emissions Permit (Permit Number AO52-233355). Emissions of volatile and semivolatile organic compounds from the air stripper alone and combined emissions from the air stripper and the Pinellas Plant itself would not exceed no-threat levels established by the FDEP. A no-threat level is an estimate of a chemical's ambient exposure level that is not likely to cause appreciable human health risks. (Section 5.2)

Approximately 1.5 acres of soils would be temporarily disturbed by the proposed corrective action, and additional small areas of soils could be disturbed in the future for the installation of new groundwater recovery and monitoring wells and associated piping. All areas disturbed during the proposed corrective action would be graded to conform to the surrounding land surface and would be revegetated with plant species common the Pinellas Plant. (Section 5.3.1)

The proposed corrective action would lower the contaminant concentrations in surficial aquifer groundwater to the MCSs for the Northeast Site. Approximately 70 million gallons of contaminated groundwater would be withdrawn from the surficial aquifer during 30 years of the corrective action. The withdrawal of groundwater from the surficial aquifer would lower the water level in the aquifer and would slightly alter the direction of groundwater flow in the aquifer. It is estimated that the groundwater level and flow direction in the surficial aquifer would be restored to previous conditions in less than 10 years after completion of the corrective action. No municipal water supplies are taken from the surficial aquifer because the aquifer will not sustain adequate well yields and the groundwater quality is generally poor due to naturally high concentrations of chloride, iron, and organic constituents. (Section 5.4.2)

The treated groundwater from the proposed action would be discharged to the Pinellas County Sewer System in accordance with the Pinellas Plant's Industrial Wastewater Discharge Permit (Permit Number 153-1E), the Pinellas County Sewer Use Ordinance of March 1988, and the EPA's discharge standards for the metals finishing industry. If the volume of treated groundwater to be discharged to the sewer system would increase the total Pinellas Plant wastewater discharge by more than 10 percent, the Pinellas County Sewer System would be notified 30 days prior to the increase as required by the Industrial Wastewater Discharge Permit. (Section 5.4.2)

The East Pond has been designated as a wetlands by the Fish and Wildlife Service. The proposed corrective action would be located outside the East Pond, but groundwater modeling indicates that the withdrawal of groundwater from the surficial aquifer could lower the water level in the East Pond. The water level in the East Pond would be monitored during the corrective action. If the lowering of the water level was appreciable or if any adverse effects were observed, appropriate measures would be developed and implemented by the DOE in consultation with the appropriate regulatory agency or other authority. (Section 5.5.3)

The environmental impacts of the proposed action combined with the environmental impacts of other actions at the Pinellas Plant were also analyzed in the EA. The other actions included the ongoing corrective actions for contaminated surficial aquifer groundwater at the 4.5-Acre Site, other proposed corrective actions for contaminated surficial aquifer groundwater, and the proposed leasing of all or portions of the Pinellas Plant to commercial enterprises. The major environmental concerns were air quality, the withdrawal of groundwater from the surficial aquifer, and the discharge of treated groundwater to the Pinellas County Sewer System. (Section 5.2.1, Section 5.4.2)

The treatment of contaminated groundwater by air stripping would result in emissions of volatile and semivolatile organic compounds. An air quality analysis indicated that the greatest emissions of these compounds would occur if contaminated groundwater from all corrective actions were being treated in the 4.5-Acre Site treatment system at a rate or 50 gallons per minute. Dispersion modeling of these emissions showed that the concentrations of the volatile and semivolatile organic compounds at various locations would not exceed the FDEP no-threat levels. The modeling also showed that emissions from the groundwater treatment system and the Pinellas Plant itself would not result in exceedances of the FDEP no-threat levels. Commercial enterprises leasing all or portions of the Pinellas Plant may create air emissions, including emissions of volatile and semivolatile organic compounds. These emissions would be documented and regulated under the plant's Air Emissions Permit, and responsible enterprises would obtain any necessary permit modifications or additional permits that would be required to demonstrate compliance with air emissions requirements. Enterprises that would warrant substantial permit modifications or new permits would be closely monitored or would not be allowed at the plant. (Section 5.2)

Contaminated groundwater is currently withdrawn from the surficial aquifer for the interim corrective actions at the 4.5-Acre and Northeast Sites. The final corrective actions at these sites and corrective actions proposed for other areas at the Pinellas Plant would increase the amount of groundwater withdrawn from the aquifer, and this increase would result in additional lowering of the water level in the aquifer and could alter the direction of groundwater flow in the aquifer. No municipal water supplies are taken from the surficial aquifer because the groundwater is of limited availability and generally of poor quality due to naturally occurring constituents. After completion of the corrective actions, recharge of the surficial aquifer would then restore the groundwater level and flow direction to previous conditions. (Section 5.4.2)

The total amount of wastewater discharged from the Pinellas Plant into the Pinellas County Sewer System has decreased since 1991 due to decreased production activities at the plant. However, the amount of treated groundwater discharged from the 4.5-Acre Site treatment system into the sewer system has increased during the same time period. The final corrective actions for the 4.5-Acre and Northeast Sites and corrective actions proposed for other areas at the Pinellas Plant could further increase the amount of treated groundwater discharged into the sewer system, and commercial enterprises leasing all or portions of the plant could also create wastewater that would be discharged into the sewer system. All wastewater discharges into the sewer system would be subject to the plant's Industrial Wastewater Discharge Permit and would meet the existing discharge standards. If modifications of the Industrial Wastewater Discharge Permit were necessary, the modifications would be coordinated with the Pinellas County Sewer System and Pinellas County Water Quality Division. If any action would increase the total Pinellas Plant wastewater discharge by more than 10 percent, the Pinellas County Sewer System would be notified 30 days prior to the increase in accordance with Industrial Wastewater Discharge Permit. (Section 5.4.2)

An accident analysis of the proposed action indicated that an operational accident would be the most likely event that could affect the proposed action and cause adverse environmental consequences. An operational accident such as a break in the transfer piping between the groundwater recovery and treatment systems would result in the release of contaminated groundwater which, in turn, would result in the emission of organic vapors. Dispersion modeling of this emission of organic vapors showed that the concentrations of the vapors would not exceed the most conservative exposure limits and would therefore not adversely affect human health. The contaminated groundwater would be released in an area where an interim corrective action is already being conducted and a final corrective action is proposed; therefore, the contaminated groundwater would eventually be recovered and treated. The proposed action would incorporate several measures for both the prevention and mitigation of operational failures and accidents, and corrective action personnel would be trained to take appropriate actions at the time of such incidents to avoid potential hazards. (Section 5.7)

The no action alternative would have environmental impacts similar to those of the proposed corrective action because the interim corrective measure for the Northeast Site would be continued. Contaminated groundwater would continue to be withdrawn from the surficial aquifer and treated at an existing water treatment facility. Due to the capacity of this water treatment facility, this alternative would take longer than 30 years to complete and could present the potential for offsite migration of contaminated groundwater. (Section 5.4.2)

The UV oxidation alternative would have the same environmental impacts as the proposed corrective action. However, there would also be a very low potential for the exposure of the general public and corrective action workers to hydrogen peroxide and UV light used in the UV oxidation process. Due to the types of contaminants in the surficial aquifer groundwater, this alternative could also be difficult to operate at the Northeast Site which could increase the time necessary to complete the corrective action. (Section 5.1.3, Section 5.4.2)

FINDING: Based on the analyses in the EA, the DOE has determined that the proposed action does not constitute a major federal action significantly affecting the quality of the human environment within the meaning of the NEPA. Therefore, the Department is issuing this FONSI and an environmental impact statement for the proposed action is not required.

Issued at Largo, FL, on this 15th day of May, 1995.

R E Glass

Richard E. Glass
Area Manager
Pinellas Area Office

Management and Review Team
Concurrence Sign-Off
for Environmental Assessment
Approval

ACTION: Environmental Assessment of Corrective Action at the Northeast Site

ISSUE: Approval of the document as the final Environmental Assessment for this action and the issuance of a Finding of No Significant Impact (FONSI) for the Corrective Action at the Northeast Site

RECOMMENDATION: The Management and Review Team and the AL and PAO NEPA Compliance Officer concur in their recommendation that the DOE Manager approve this document as the final EA, DOE/EA-0976, for this action and issue a FONSI.

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DOE/EA-0976

Environmental Restoration Program

ENVIRONMENTAL ASSESSMENT OF CORRECTIVE ACTION AT THE NORTHEAST SITE

PINELLAS PLANT
LARGO, FLORIDA

February 1995

Draft

Prepared by:
U. S. Department of Energy
Albuquerque Operations Office

With the technical assistance of:
Environmental Restoration Program
Technical Support Office
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DOE/EA-0976

ENVIRONMENTAL RESTORATION PROGRAM

ENVIRONMENTAL ASSESSMENT OF CORRECTIVE ACTION AT THE NORTHEAST SITE

PINELLAS PLANT
LARGO, FLORIDA

February 1995

Prepared By:
U.S. DEPARTMENT OF ENERGY
ALBUQUERQUE OPERATIONS OFFICE

With the Technical Assistance of:
ENVIRONMENTAL RESTORATION PROGRAM
TECHNICAL SUPPORT OFFICE
LOS ALAMOS NATIONAL LABORATORY

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ACRONYMS

AQI	Air Quality Index
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMA	corrective measure alternative
CMS	corrective measure study
COC	contaminant of concern
DOE	U.S. Department of Energy
EA	environmental assessment
EPA	U.S. Environmental Protection Agency
EPI	Emergency Prediction Information (model)
FDEP	Florida Department of Environmental Protection
FWS	Fish and Wildlife Service
HSWA	Hazardous and Solid Waste Amendments
ISC	Industrial Source Complex
MCL	maximum contaminant level
MCS	media cleanup standard
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NTL	no-threat level
PCAQD	Pinellas County Department of Environmental Management, Air Quality Division
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
SDWA	Safe Drinking Water Act
SSC	species of special concern
SVOC	semivolatile organic compound
SWCFGWB	Southern West-Central Florida Groundwater Basin
SWMU	solid waste management unit
TLV-C	threshold limit value-ceiling
TLV-TWA	threshold limit value-time-weighted average
USGS	U.S. Geological Survey
UV	ultraviolet
VOC	volatile organic compound

1. BACKGROUND

1.1. INTRODUCTION

The National Environmental Policy Act (NEPA) requires federal agencies to assess the impacts that major federal actions may have on the quality of the human environment. The U.S. Department of Energy (DOE) procedures for implementing the NEPA are contained in the Code of Federal Regulations (CFR), Title 10, Part 1021 (10 CFR 1021) and DOE Order 5440.1E.

This document constitutes an environmental assessment (EA) of the proposed corrective action for the Northeast Site at the DOE Pinellas Plant (Figure 1.1). It examines the short- and long-term environmental effects of the proposed corrective action and the reasonable alternatives. The information and analyses presented here will be used to determine whether the proposed corrective action would have a significant impact on the environment. If the impact is determined to be significant, an environmental impact statement will be prepared for the proposed corrective action. If the impact is judged not to be significant, a Finding of No Significant Impact will be issued, and the proposed corrective action will be implemented. These procedures and documents are defined in regulations issued by the Council on Environmental Quality in 40 CFR 1500 through 1508, as well as in 10 CFR 1021.

Section 1 of this EA describes the Pinellas Plant and the Northeast Site, and Section 2 states the need for the DOE action. Section 3 describes the proposed corrective action and the reasonable alternatives to it. Section 4 describes the present condition of the environment, and Section 5 assesses the environmental impacts of the proposed corrective action and the reasonable alternatives. This EA does not contain all of the details of the studies on which it is based. The details are contained in the referenced supporting documents.

1.2. PINELLAS PLANT

The Pinellas Plant (Figure 1.1) is on approximately 99 acres in Section 13, Township 30 South, Range 15 East (Tallahassee Meridian), in the center of Pinellas County, Florida (Latitude 27° 52′ 30" North, Longitude 82° 45′ 00" West). The city of Tampa is approximately 20 miles east of the Pinellas Plant, and the city of St. Petersburg is about 6 miles to the south. Building 100 (Figure 1.2) is the most notable feature of the Pinellas Plant and houses the DOE Pinellas Area Office and most of the plant laboratory and production facilities. Numerous other structures function as storage, utility, and testing facilities throughout the plant.

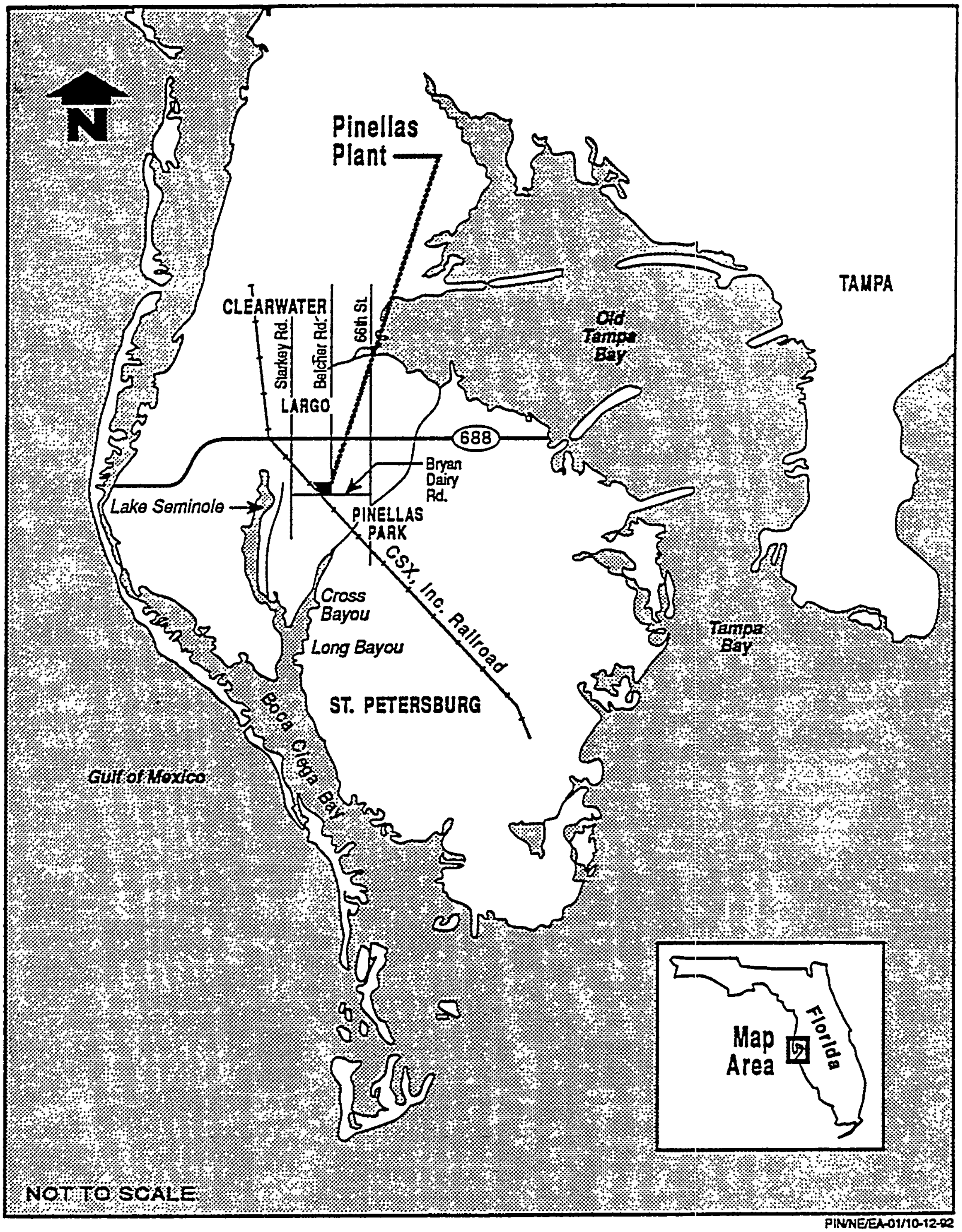
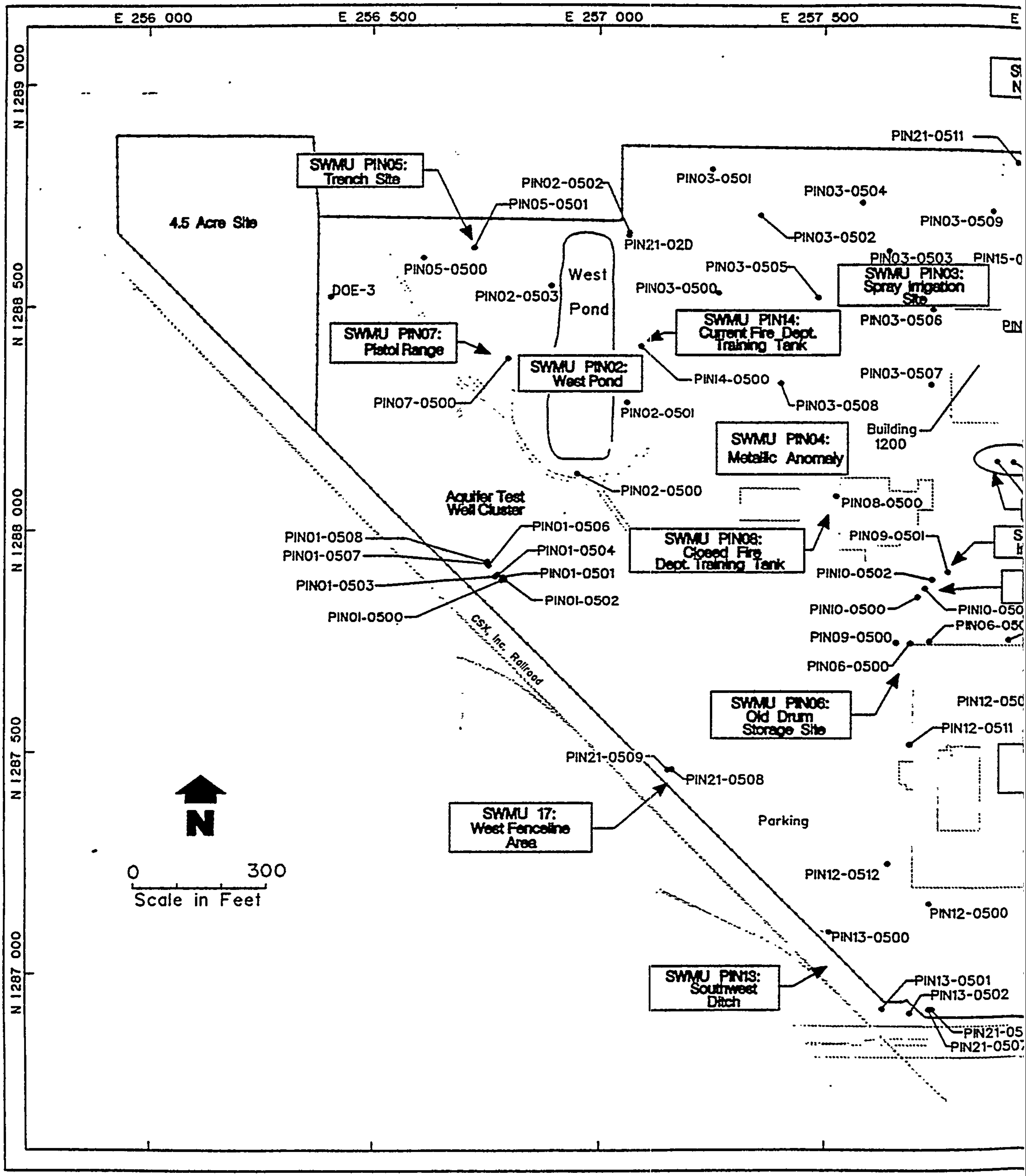


Figure 1.1. Pinellas Plant location.



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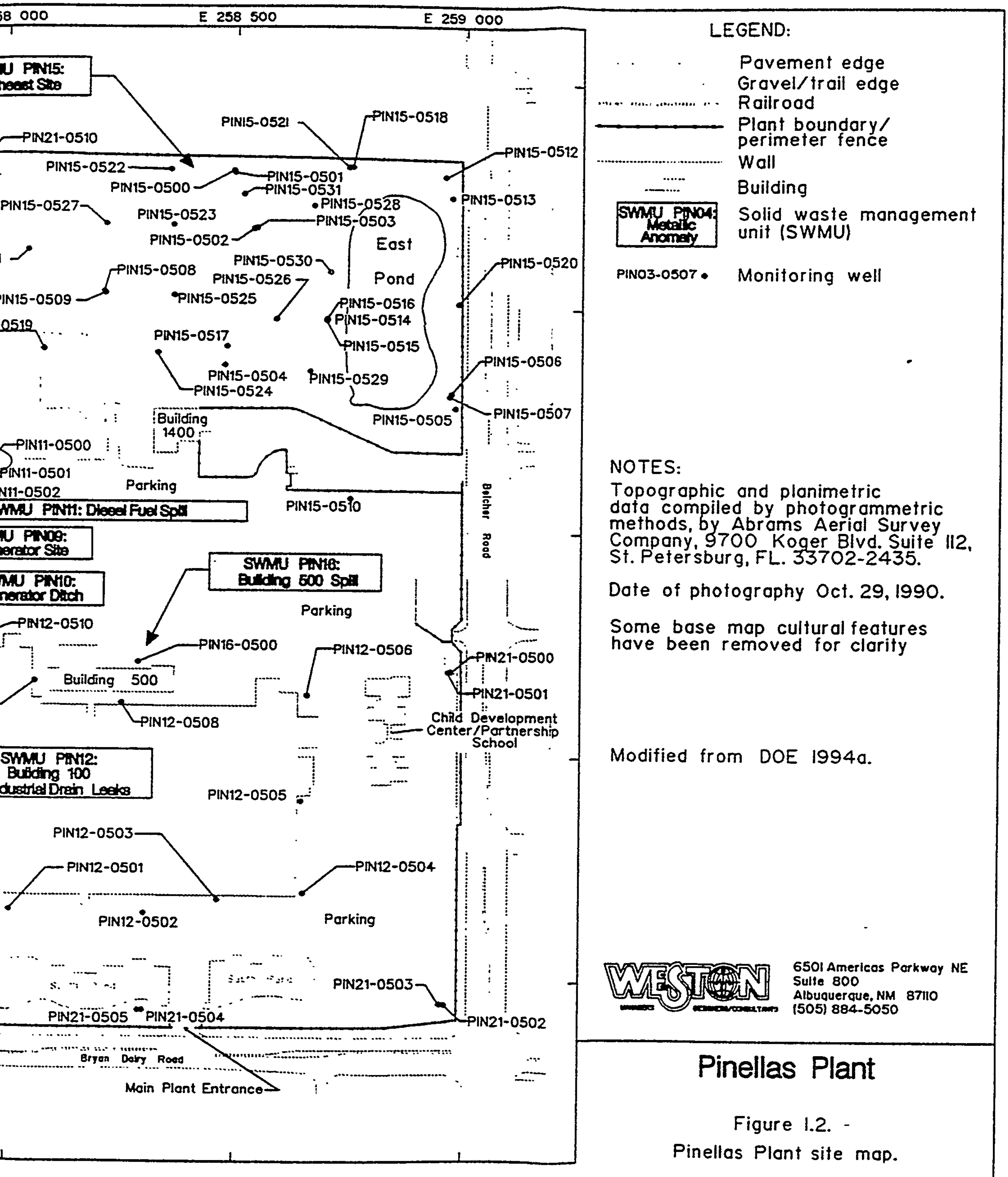


Figure 1.2. - Pinellas Plant site map.

The Pinellas Plant is a government-owned facility that is administered by the DOE Albuquerque Operations Office and operated by a DOE contractor. The plant was constructed in 1956 and 1957 as part of the nuclear weapons production complex, and the original products of the plant were neutron generators, a principal component of nuclear weapons. The production of these devices required the development of several uniquely specialized areas of competence and supporting facilities which led to the manufacture of other weapons application products. The plant also maintains the capability for applied research that is necessary for the manufacture of plant products. In 1993, the DOE decided to phase out the Pinellas Plant and has proposed leasing all or portions of the plant to commercial enterprises. It is anticipated that the commercial enterprises would involve manufacturing processes identical or similar to the processes currently used at the Pinellas Plant (DOE 1994d).

The types of waste generated at the Pinellas Plant have been fairly consistent throughout the plant's history. Solid, liquid, and gaseous wastes generated at the plant are both radioactive and nonradioactive. These wastes are stringently controlled by a variety of treatment, control, and monitoring systems. Currently, all hazardous wastes are either treated onsite to render them nonhazardous or are shipped offsite to permitted waste treatment or disposal facilities.

Under the provisions of the Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments (HSWA), the U.S. Environmental Protection Agency (EPA) issued the Pinellas Plant a HSWA Permit in 1990 (EPA 1990a). The HSWA Permit, in conjunction with the Hazardous Waste Management Permit issued by the Florida Department of Environmental Protection (FDEP) (FDEP 1994), authorizes the Pinellas Plant to operate as a hazardous waste storage and treatment facility. The HSWA Permit also sets forth the conditions and requirements for RCRA corrective actions at the plant. A corrective action is a measure or measures taken to protect human health and the environment from all releases of hazardous waste or constituents from any solid waste management unit (SWMU).

In 1988, the EPA identified 14 SWMUs at the Pinellas Plant (PIN02 through PIN15 on Figure 1.2) (EPA 1988a), and the DOE identified an additional SWMU (PIN16 on Figure 1.2) in 1990 (DOE 1990c). To satisfy the requirements of the HSWA Permit, an RCRA facility investigation (RFI) was completed in 1991 to address contaminant releases and environmental conditions at the 15 SWMUs (DOE 1991b; 1992a; 1993b). The EPA concurred with the DOE's recommendations that 11 of the SWMUs did not require any further action because they did not present a threat to human health and the environment. The EPA also concurred that corrective measures studies (CMSs) would be conducted for the remaining four SWMUs (Hammond 1992). Three of these SWMUs are the Northeast Site, Building 100 Industrial Drain Leaks, and Old Drum Storage Site, all of which have contaminated groundwater in the surficial aquifer. The fourth SWMU, the Pistol Range, had lead contamination in surface soils which has been cleaned up. In 1993, the DOE identified another SWMU at the Pinellas Plant (PIN17 on Figure 1.2) (DOE 1993a). This SWMU, the West Fenceline Area, also has contaminated groundwater in the surficial aquifer, and the EPA has concurred with the DOE's recommendation that a CMS be conducted (DOE 1993e; Franzmathes 1993).

1.3. NORTHEAST SITE

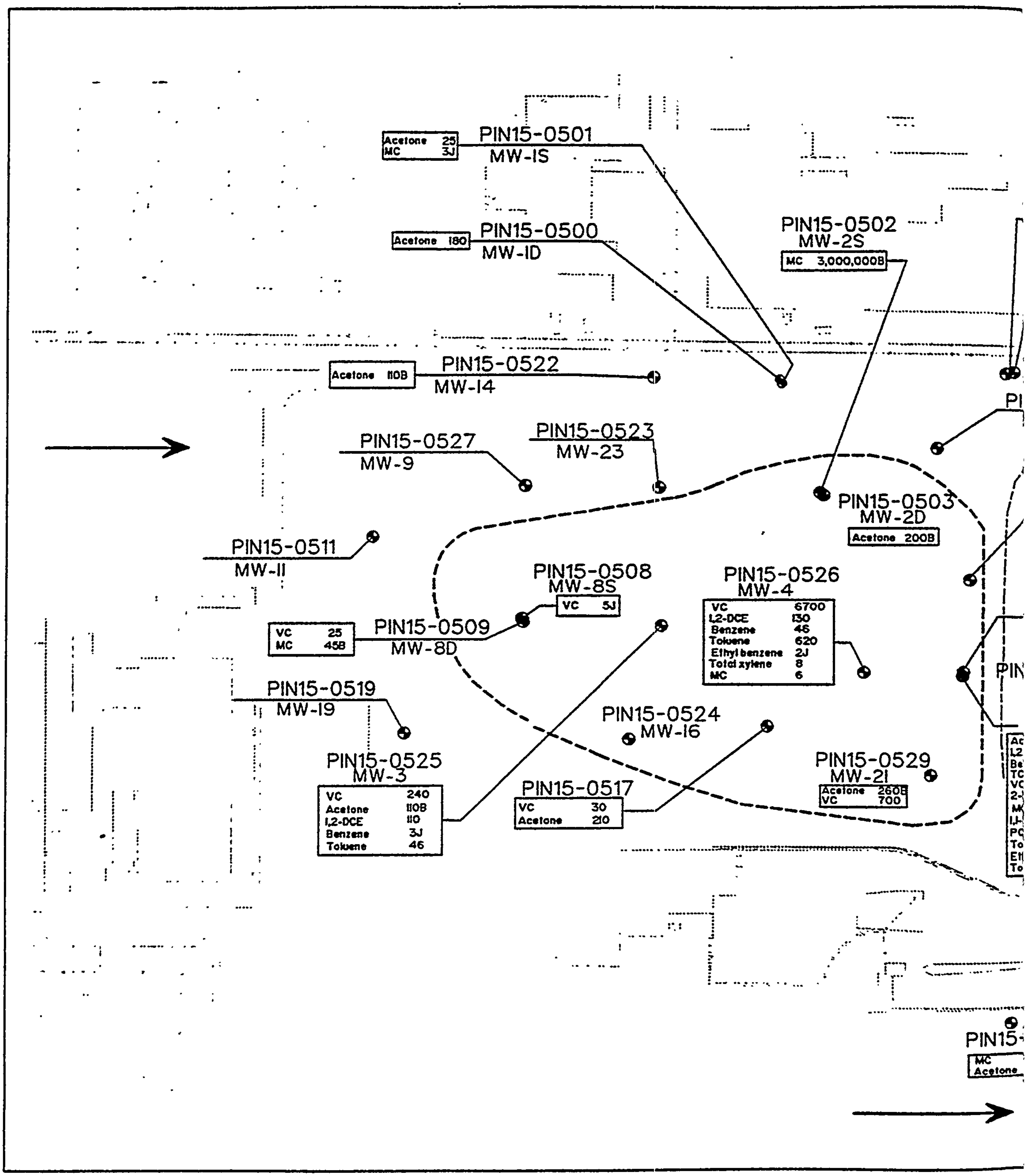
EPA Region IV has designated the Northeast Site (approximately 20 acres) to include all of the northeast section of the Pinellas Plant located within the perimeter fence and bounded by the Spray Irrigation Site on the west and a parking lot to the south (Figure 1.2). The concerns with the Northeast Site are the former drum storage and disposal activities conducted at the site and the past discharge of industrial waste to the East Pond (DOE 1991b).

The East Pond was constructed in 1968 next to a naturally swampy area. The East Pond was deepened in late 1972, and the removed soil was used to cover the swampy area and reportedly to build the backstop at the former Pistol Range. The East Pond currently has a capacity of 3.25 million gallons (CH2M Hill 1987). From 1968 until 1972, the East Pond received storm water runoff and pH-neutralized wastewater; in 1972, the industrial wastewater was redirected to the West Pond. Liquid waste from the West Pond was discharged through a spray irrigation system that was equipped with a drainage system for intercepting infiltrating water and diverting it to the East Pond. These operations continued until 1982 when the spray irrigation system was abandoned. The East Pond currently receives only storm water runoff from the area between the Northeast Site and Building 100 and is connected through a closed underground piping system to the South Pond (DOE 1987). East Pond overflow discharges through a county drainage pipe, south along Belcher Road, and then east along Bryan Dairy Road until it empties into a county drainage ditch. Flow continues southward, entering Cross Bayou Canal, Cross Bayou, and finally Boca Ciega Bay (Figure 1.1). For an undetermined period of time between 1968 and 1972, the East Pond discharge reportedly flowed north along Belcher Road; Pinellas County rerouted the flow south when the area north of the Pinellas Plant became residential (DOE 1991b).

Before 1968, the naturally swampy area west of the East Pond was used as a staging area for drums of waste solvents and construction debris. All of the waste drums were to have been removed when the East Pond was constructed. However, three drums buried near the East Pond were found in October 1984. Two of these drums were empty, and one drum contained construction debris and rebar (DOE 1987). Partially due to this discovery, investigations of the Northeast Site and East Pond were conducted in 1985 and 1987 (Fernandez 1985; DOE 1987; CH2M Hill 1987). These investigations consisted of electromagnetic surveys, trenching, soil sampling, test borings, monitoring well installation, groundwater sampling of new and existing monitoring wells, and surface water sampling of the East Pond. A VOC groundwater plume was identified west of the East Pond.

The RFI (DOE 1991b) confirmed that surficial aquifer groundwater in Northeast Site monitoring wells contained concentrations of VOCs and SVOCs that exceeded Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) and FDEP drinking water standards. The RFI also indicated the presence of mercury in the East Pond. The potential contaminants of concern (COCs) in groundwater were identified as dichloromethane (methylene chloride), 1,2-*trans*-dichloroethene, benzene, 4-methylphenol (p-cresol), trichloroethene, chloroethene (vinyl chloride), and phenol. Therefore, the DOE recommended, and the EPA concurred (Hammond 1992), that a CMS of the surficial aquifer groundwater and surface water pathways be conducted for the Northeast Site. The CMS for the Northeast Site (DOE 1993c; 1993d; 1994b) identified corrective action objectives and screened corrective measure technologies that would meet those objectives. Corrective measure technologies that were found to be feasible were then combined to form corrective measure alternatives (CMAs), which were evaluated against technical, environmental, human health, and institutional criteria as required by the HSWA Permit. The CMS resulted in a recommendation that pump and treat with air stripping be implemented as the corrective action for the contaminated surficial aquifer groundwater at the Northeast Site. Implementation of the proposed corrective action for the Northeast Site is pending regulatory approval by the EPA and FDEP.

Additional groundwater sampling was performed for the CMS. The concentrations of contaminants in CMS groundwater samples were generally higher than those measured in the RFI samples, and two distinct contaminant plumes were identified in the surficial aquifer. The two separate contaminant plumes are just west of the northern and southern portions of the East Pond, and the vertical extent of the contamination is from approximately 16 to 26 ft below the ground surface. Low concentrations of contaminants were also detected in monitoring wells along the eastern boundary of the Pinellas Plant. For the purpose of this EA, the two contaminant plumes in the surficial aquifer were considered to be one, as shown in Figure 1.3 (DOE 1993b). Surface water samples taken from the East Pond during the RFI contained mercury concentrations slightly above the SDWA MCL and FDEP drinking water standard (DOE 1991b). Supplemental RFI sampling of surface water in the East Pond was approved by the EPA (Hammond 1992; Ingle 1992a,b), and was conducted to confirm or refute the presence of mercury. This sampling indicated that mercury was not present above the SDWA MCL and FDEP drinking water standard. Mercury is, therefore, no longer considered to be a potential COC for the Northeast Site, and the CMS Report recommends that the surface water pathway be deleted from the CMS for the Northeast Site. The CMS also resulted in a recommendation that phenol be eliminated as a COC because phenol does not have an appreciable influence on human health risks (DOE 1993c). Soil and sediment sampling did not identify any COCs for these media, and the RFI Report concluded that no measurable contaminant mass remained in the vadose zone at the Northeast Site (DOE 1991b).



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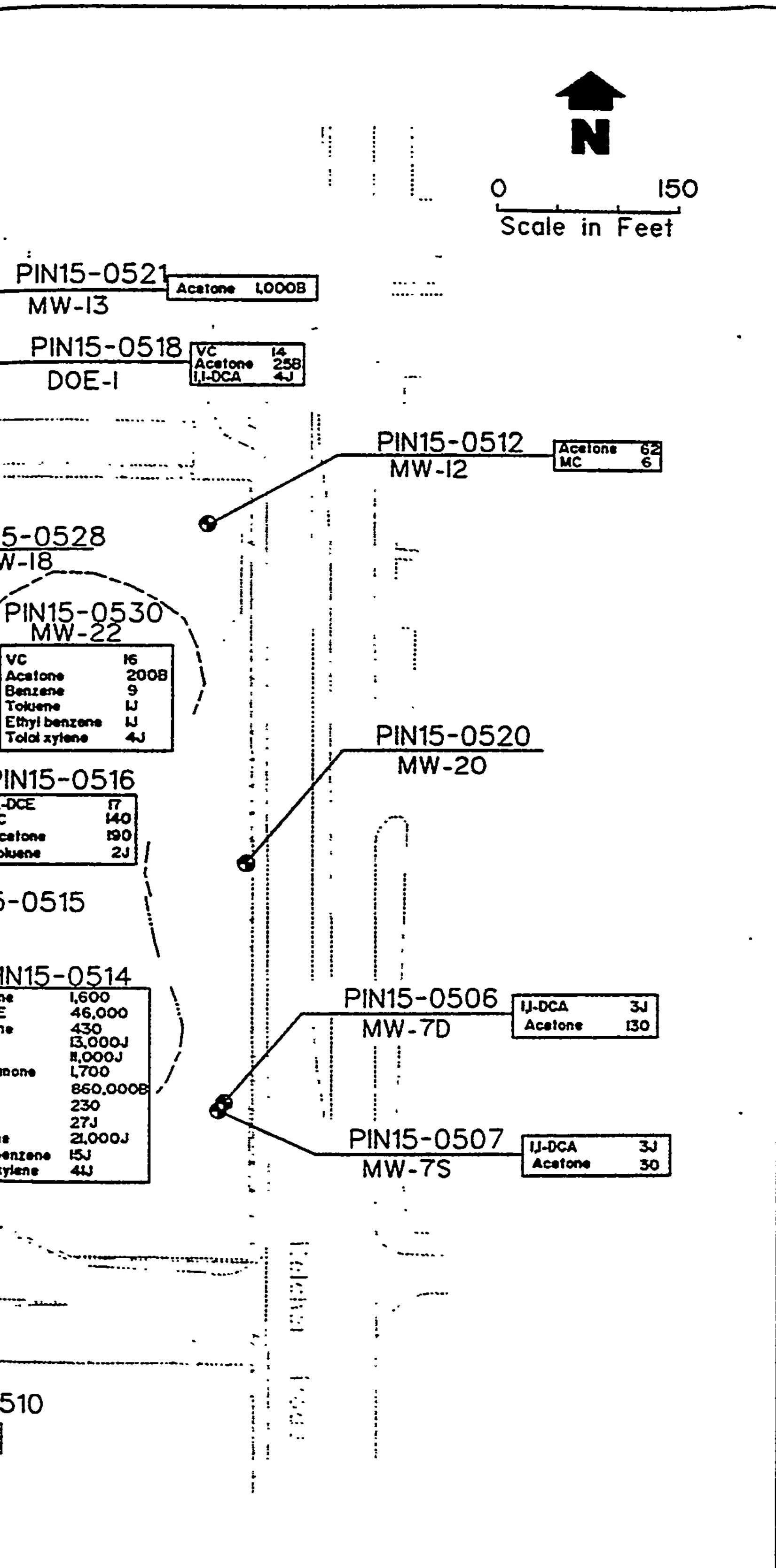


LEGEND:

Pavement edge
Railroad
Plant boundary/ perimeter fence
Pond outline
Building

PIN15-0525 — Monitoring well with volatile organic compound concentrations in micrograms per liter

VC	240
Acetone	110B
1,2-DCE	110
Benzene	3J
Toluene	46

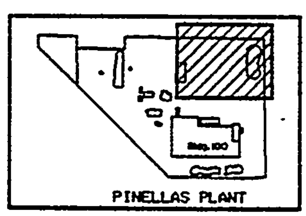
1,1-DCA	1,1-Dichloroethane
VC	Chloroethene
MC	Dichloromethane
1,2-DCE	1,2-Dichloroethene
TCE	Trichloroethene
J	Estimated value
B	Present in blank

Approximate boundary of the organic compound plume in the shallow surficial aquifer.

Approximate direction of surficial aquifer groundwater flow

NOTES:
Topographic and planimetric data compiled by photogrammetric methods, by Abrams Aerial Survey Company, 9700 Koger Blvd. Suite 112, St. Petersburg, FL. 33702-2435.
Date of photography Oct. 29, 1990.

Ref: DOE 1993c.



6501 Americas Parkway NE
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Pinellas Plant

Figure 1.3.

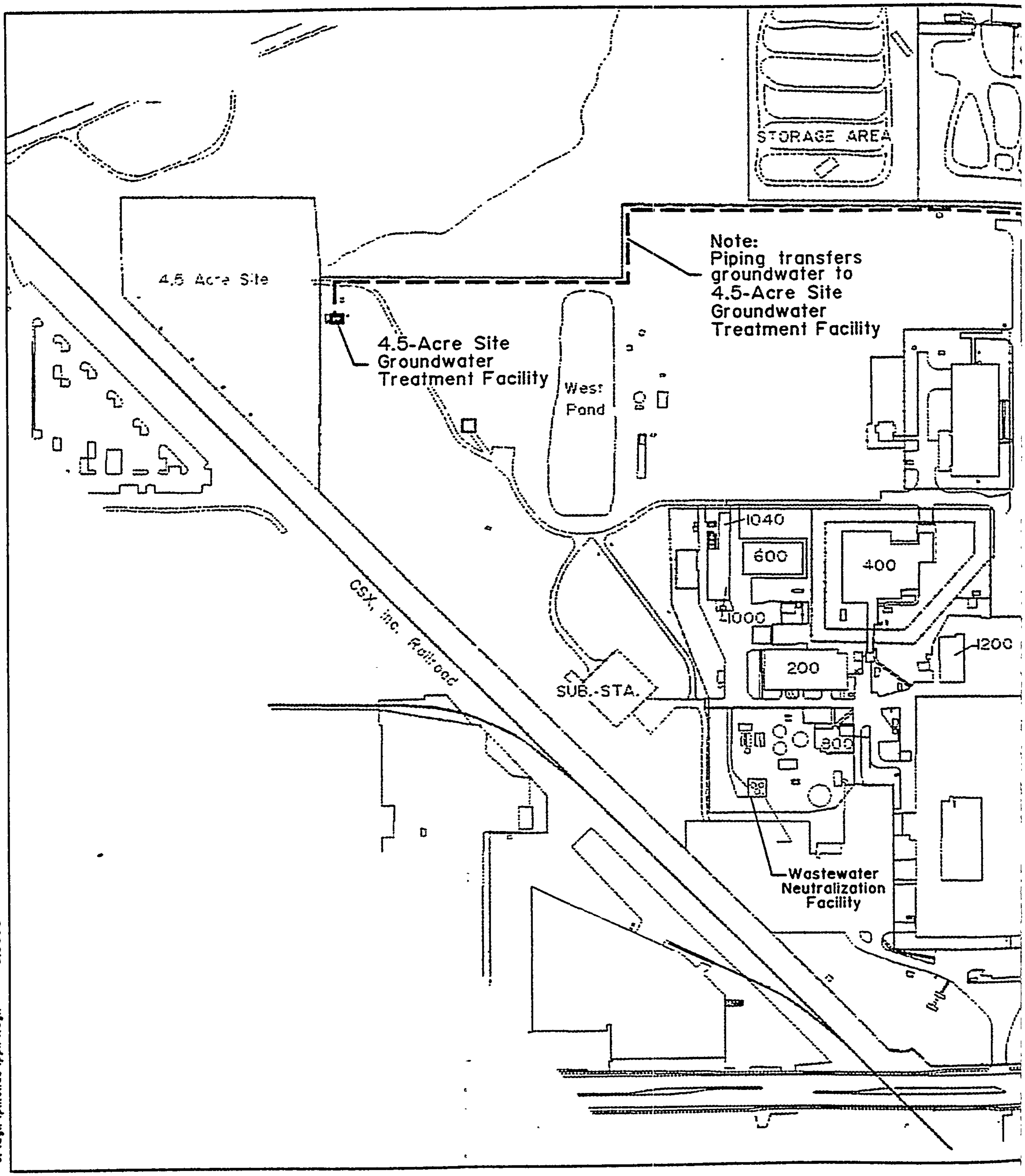
Extent of groundwater contamination at the Northeast Site (June 1992).

1.4. CORRECTIVE ACTIONS

As stated in subsection 1.2, four SWMUs at the Pinellas Plant have contaminated groundwater in the surficial aquifer. These SWMUs are the Northeast Site, Building 100 Industrial Drain Leaks, Old Drum Storage Site, and the West Fenceline Area (Figure 1.2). In addition, there is contaminated surficial aquifer groundwater at the 4.5-Acre Site, which is just outside the northwest corner of the Pinellas Plant (Figure 1.2). Corrective actions are either ongoing or proposed for these SWMUs and the 4.5-Acre Site, and all of the corrective actions together could have cumulative environmental impacts (e.g., the withdrawal of groundwater from the surficial aquifer).

After the 1987 investigation of the Northeast Site (CH2M Hill 1987), a preliminary CMS (CH2M Hill 1989b) was prepared in 1989 as an internal document until the RFI process was completed. Efforts associated with this preliminary CMS were concerned primarily with groundwater conditions in the surficial aquifer west of the East Pond and with the surface water quality of the East Pond. In 1991, an interim CMS (CH2M Hill 1991) was prepared for the Northeast Site in response to concern that the areal extent of the contaminant plume was potentially increasing and could migrate offsite. This CMS recommended a groundwater recovery system consisting of four recovery wells, use of an existing water treatment facility, discharge of treated groundwater to the Pinellas County Sewer System, and a groundwater monitoring system as an interim corrective measure for the Northeast Site. A review of the interim groundwater recovery system resulted in a determination that the system was categorically excluded from further NEPA review and documentation (i.e., did not require the preparation of an EA or an environmental impact statement), and the system was installed in January 1992.

The four recovery wells for the interim groundwater recovery system were installed west of the East Pond (Figure 1.4). Each well is 24 to 30 ft deep and cased with polyvinylchloride (PVC) plastic. The wells were equipped with pneumatic pumps, and contaminated groundwater from the surficial aquifer is being pumped from each well through underground piping to a holding tank north of the wells. The contaminated groundwater is then pumped from the holding tank through underground piping to the 4.5-Acre Site groundwater treatment facility in the northwest corner of the Pinellas Plant (Figure 1.4). This groundwater treatment facility uses an air stripper to remove VOCs and SVOCs from the contaminated groundwater, and the effluent from the treatment system is pumped to the Pinellas Plant wastewater neutralization facility for further treatment and eventual discharge with sanitary wastewater into the Pinellas County Sewer System (CH2M Hill 1989a; DOE 1992b).



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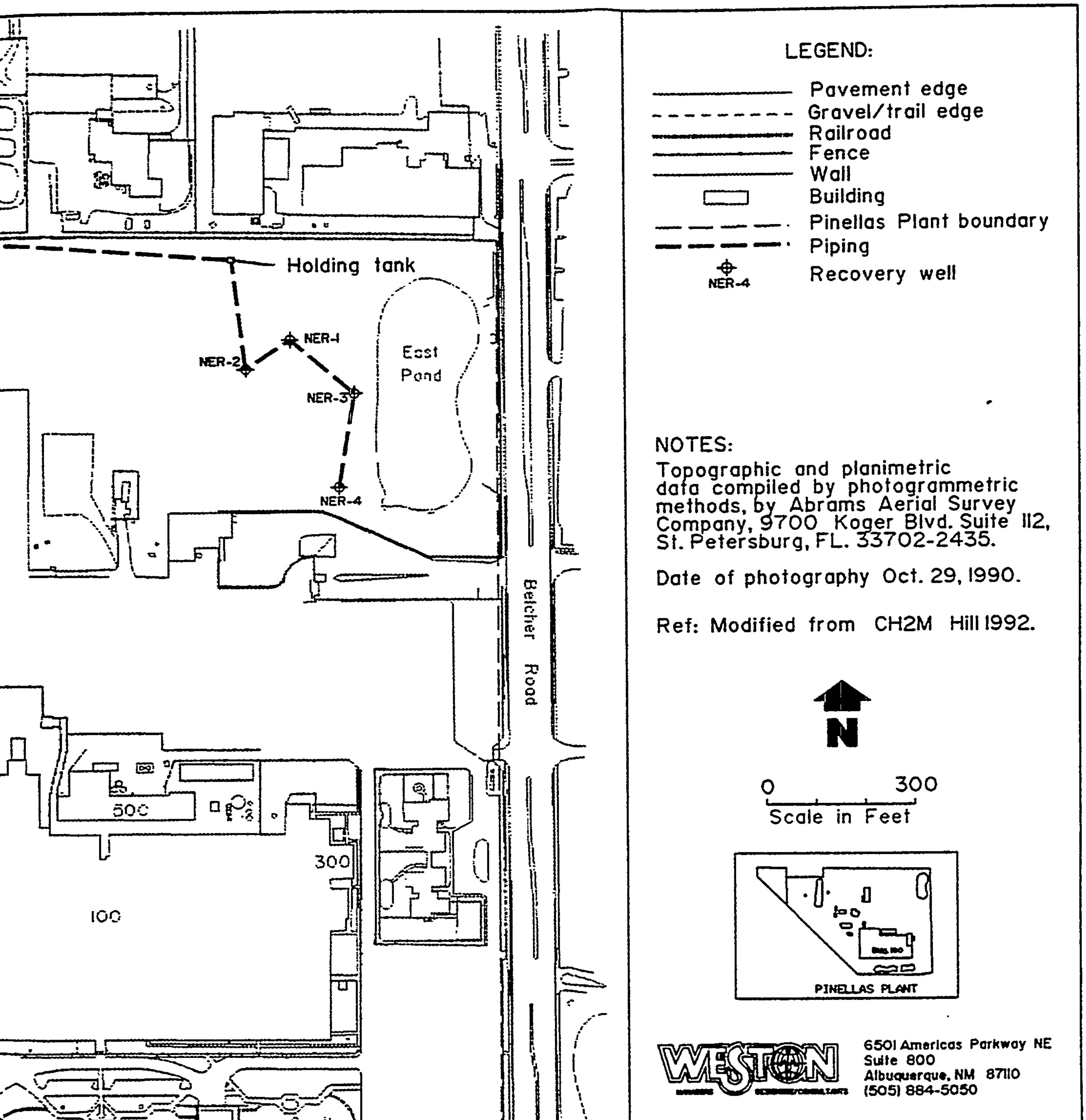


Pinellas Plant

Figure 1.4.

Northeast Site interim groundwater recovery system.

Interim corrective action for contaminated surficial aquifer groundwater is also underway at the 4.5-Acre Site. The 4.5-Acre Site is at the northwest corner of the Pinellas Plant (Figures 1.2 and 1.4) and was previously part of the plant. The site was sold to a private individual in 1972, and in 1984 it was discovered that the area had been used to bury drums of solvent and resinous waste in the 1960s. The buried drums were removed, and an assessment of the contamination began in 1985 and has continued to date. In 1985, three contaminated groundwater plumes were identified at depths of 0, 10, and 30 ft; monitoring data from 1987 indicated plume migration offsite (CH2M Hill 1991). The COCs at the 4.5-Acre Site are 1,1-dichloroethane, 1,1-dichloroethene, 1,2-*trans*-dichloroethene, benzene, bromodichloromethane, dichloromethane, ethylbenzene, tetrachloroethene, toluene, trichloroethene, trichlorofluoromethane, chloroethane, xylene, arsenic, chromium, and manganese (DOE 1992c). A contamination assessment report (S&ME 1986) and a subsequent interim corrective action plan (S&ME 1987) were approved by the FDEP in 1988, and a groundwater recovery and treatment system was put into operation in December 1990. The groundwater treatment system uses an air stripper to remove the VOCs and SVOCs, and the treated groundwater is then pumped to the Pinellas Plant wastewater neutralization facility for final discharge into the Pinellas County Sewer System. The groundwater treatment system for the 4.5-Acre Site currently operates at its design water inflow capacity of 20 gallons per minute because the system is treating contaminated groundwater from both the 4.5-Acre and Northeast Sites. The DOE proposes to increase the treatment capacity of the system to 50 gallons per minute to provide sufficient capacity for the final corrective action at the 4.5-Acre Site, the interim corrective action at the Northeast Site, and other possible corrective actions (e.g., Building 100 area). Based on past and projected performance of the groundwater recovery and treatment system, it is estimated that the corrective action for the 4.5-Acre Site will be completed by 1999. This ongoing corrective action at the 4.5-Acre Site constitutes a voluntary action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

The Building 100 Industrial Drain Leaks and the Old Drum Storage Site adjacent to Building 100 (Figure 1.2) are collectively called the Building 100 Area. Because of the proximity and the similar groundwater contamination at these SWMUs, one CMS was conducted for the Building 100 Area (DOE 1994a). The potential COCs at the Building 100 Area are the VOCs benzene, chloroethane, chloroethene, 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethene (total), tetrachloroethene, 1,1,1-trichloroethane, and trichloroethene. The contaminants are concentrated around the northwest corner of Building 100, but the contaminant plume has the potential to migrate. The CMS resulted in the recommendation of groundwater recovery and treatment as the preferred corrective action. The groundwater treatment would be accomplished by routing the recovered groundwater to the groundwater treatment system for the 4.5-Acre Site. The implementation of corrective action for the Building 100 Area is pending regulatory approval by the EPA and FDEP, and it is estimated that the corrective action would be completed in 20 years.

The West Fenceline Area is a new SWMU that was identified by regular groundwater monitoring at the plant. It is located at the western Pinellas Plant boundary west of Building 100 (Figure 1.2). A RCRA facility assessment of the West Fenceline Area revealed chloroethene in the surficial aquifer. The contamination is confined to an area approximately 150 ft by 225 ft, but it was detected beyond the Pinellas Plant boundary. The contamination may be the result of past waste disposal practices and may be associated with a nearby former storage area (DOE 1993a). An interim corrective measures work plan (DOE 1994c) has been prepared, and implementation of the interim corrective action — air sparging with soil vapor extraction — has been approved by the EPA and FDEP (Franzmathes 1994; Nuzie 1994; Ingle 1994). Using these techniques, pressurized air would be injected into the saturated zone at high flow rates to volatize the contaminant, and oxygen would be added to the air to enhance the rate of biological degradation of organic contaminants by naturally occurring microbes. Vapor extraction wells would be installed in the unsaturated zone to recover the sparged vapors, which would be treated prior to discharge. If air sparging with soil vapor extraction is not successful in removing the VOC contamination, a groundwater recovery system could be installed at the West Fenceline Area, and the contaminated surficial aquifer groundwater would be routed to the groundwater treatment system for the 4.5-Acre Site.

2. PURPOSE AND NEED FOR ACTION

The RFI (DOE 1991b; 1992a; 1993b) and subsequent investigations (DOE 1993c,d; 1994b) have confirmed that groundwater in the surficial aquifer at the Northeast Site is contaminated with VOCs and SVOCs. These contaminants pose a potential threat to human health and the environment. The DOE needs to manage this groundwater contamination in accordance with the EPA's HSWA Permit (EPA 1990a) and the FDEP's Hazardous Waste Management Permit (FDEP 1994).

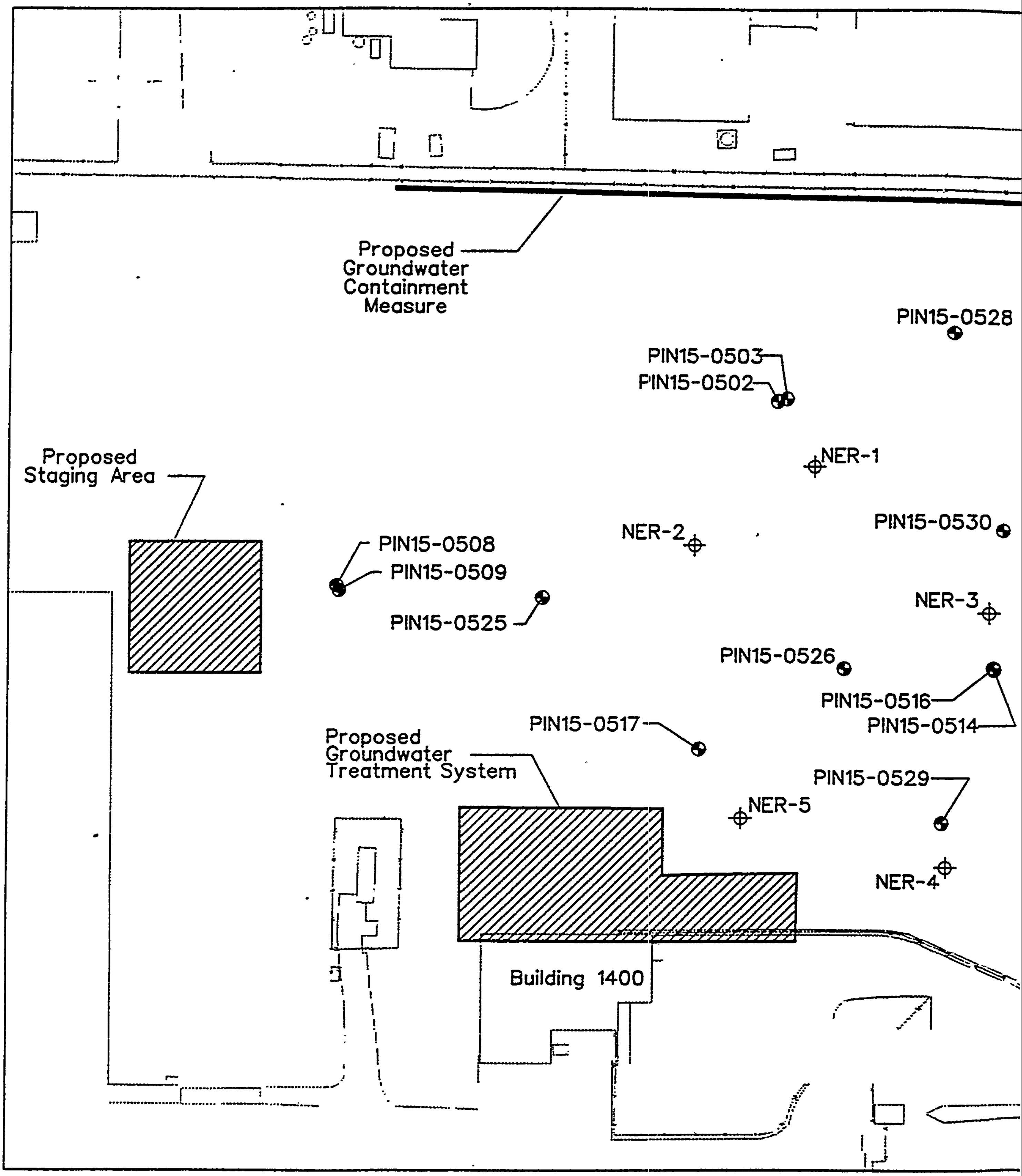
3. CORRECTIVE ACTION ALTERNATIVES

3.1. THE PROPOSED CORRECTIVE ACTION

The proposed corrective action for the Northeast Site is pump-and-treat with air stripping and includes the installation of a groundwater containment measure and groundwater monitoring. The conceptual design for the proposed corrective action was developed to satisfy the requirements of the HSWA and Hazardous Waste Management Permits for the Pinellas Plant (EPA 1990a; FDEP 1994) and to meet the established corrective action objectives. The design for the corrective action may be modified to reflect technological advances or site-specific conditions. All design modifications would be approved by the EPA and FDEP prior to implementation. Details of the conceptual design for the proposed corrective action are provided in the CMS Report for the Northeast Site (DOE 1993c,d; 1994b), and the major features of the conceptual design are summarized below.

A staging area would be located at the west boundary of the Northeast Site, and a groundwater containment measure (i.e., a slurry wall, infiltration gallery, or shallow well injection) would be installed along the northern boundary of the Northeast Site (Figure 3.1). This groundwater containment measure would limit the volume of clean water recovered and would limit the recovery well capture zone to within the Pinellas Plant property to prevent contamination migration from possible unknown sources on adjacent properties. A slurry wall would consist of a trench keyed into the Hawthorn Formation and filled with a soil/bentonite slurry. Almost all of the material excavated from the slurry wall trench would be backfilled into the trench as the soil/bentonite slurry; any excavation material remaining would be used to cover the slurry wall and restore the disturbed area along the slurry wall. An infiltration gallery or shallow well injection would consist of perforated PVC pipe buried a certain distance below the ground surface or a line of shallow injection wells along the northern boundary of the Northeast Site, respectively. Treated groundwater from the proposed corrective action would be recirculated into the surficial aquifer through the infiltration gallery or shallow well injection. For the purpose of this EA, a slurry wall was assumed to be the proposed groundwater containment measure because the slurry wall would remain permanently at the Northeast Site. An infiltration gallery or shallow well injection would be removed upon completion of the corrective action.

During installation of the slurry wall, five groundwater recovery wells would be completed in the surficial aquifer for the removal of the contaminated groundwater. The anticipated locations of these recovery wells are shown on Figure 3.1, but the exact number and locations of these wells would be determined during the final design of the corrective action. The drill cuttings produced from the completion of the recovery wells would be managed according to the applicable federal and state regulations.



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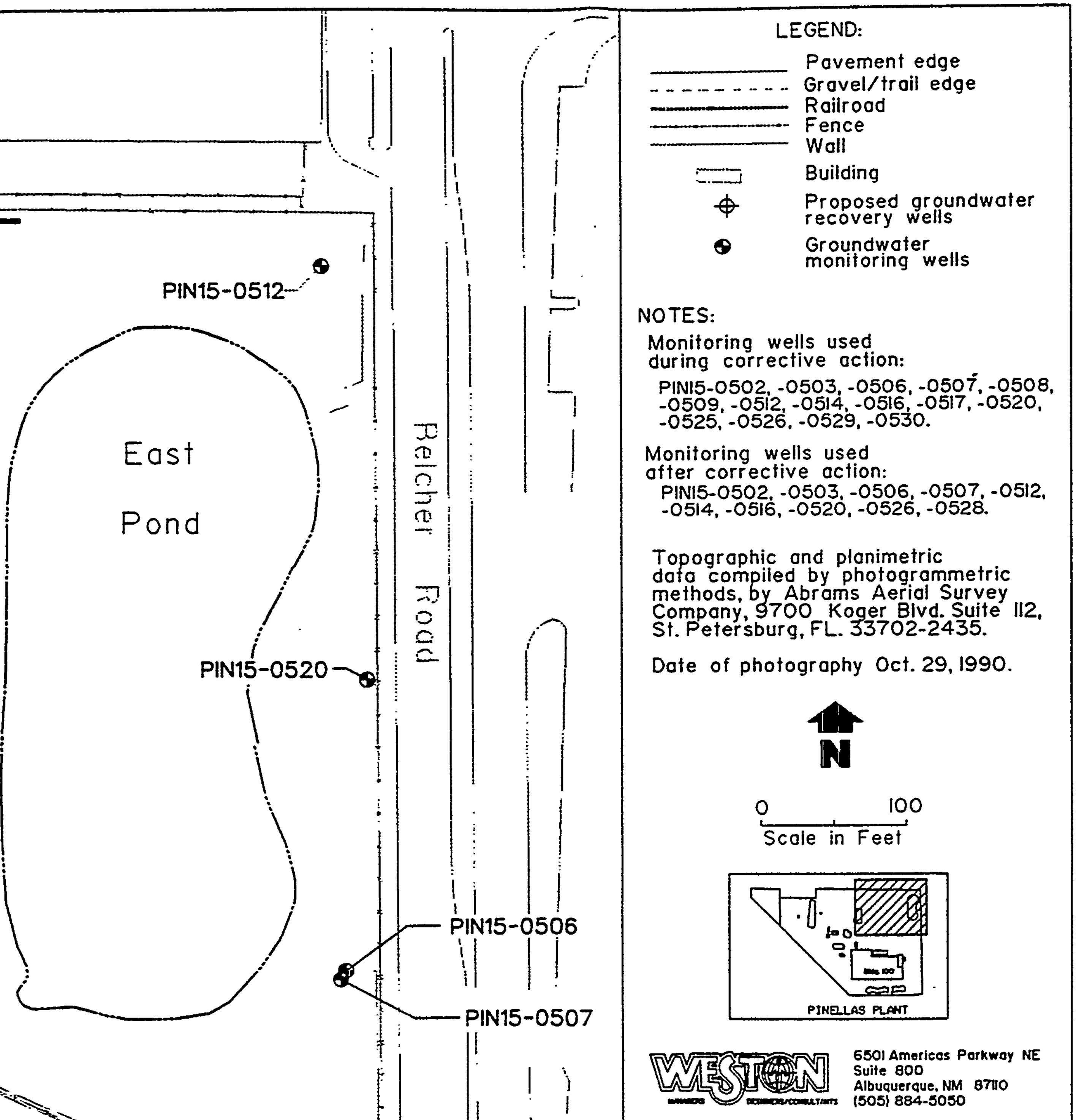

Pinellas Plant

Figure 3.1. - Plan view of proposed corrective action for the Northeast Site.

Each groundwater recovery well would be approximately 37 ft deep to fully penetrate the entire thickness of the surficial aquifer and to extend into the Hawthorn Formation approximately 5 ft to provide a sump. Each well would also be completed with stainless steel casing, a fully penetrating stainless steel well screen, and a stainless steel, submersible, variable-speed pump. The fully penetrating well screen and sump would allow the contaminated groundwater to be withdrawn from the entire saturated thickness of the surficial aquifer. Each recovery well would be individually controlled to optimize the well capture zone, and all of the recovery wells would be equipped with flow meters to accurately measure the volume of groundwater recovered. Each recovery well would also include a piezometer to monitor the groundwater level in the well. After completion of the corrective action, all of the recovery wells would be sealed and abandoned as required by the applicable regulations.

A groundwater treatment system would be installed in an area just north of Building 1400 at the southern boundary of the Northeast Site (Figure 3.1). This treatment system would have a capacity of 25 gallons per minute and would use an air stripper to remove the VOCs and SVOCs from the contaminated groundwater. The groundwater treatment system would be installed on a concrete pad that would be constructed with appropriate slopes, sumps, and catchment basins to contain any potential leaks or spills.

The groundwater recovery wells would be connected to the groundwater treatment system by underground PVC pipe. Contaminated groundwater would be pumped from the recovery wells to the treatment system where it would be placed in the influent storage tank (Figure 3.2). Water from the influent storage tank would be pumped into the pretreatment portion of the treatment system to remove naturally occurring iron and suspended solids. The pretreatment unit would consist of a clarifier and sand filter, and a flocculent would be added to the water in the clarifier to precipitate the iron out of solution. Effluent from the clarifier would flow by gravity through the sand filter and into a storage tank. Rejected water from the sand filter would flow back to the clarifier. Sediment from the clarifier would be pumped to a sludge tank, and the contents of the sludge tank would be manually pumped through a plate and frame filter press. Effluent from the filter press would be routed to the storage tank. The spent sand and filter cake from the sand filter and filter press would be collected in 55-gallon drums, analyzed by the Toxicity Characteristic Leaching Procedure, and then disposed of as solid or hazardous waste in accordance with the applicable regulations. Water from the storage tank would be pumped to the air stripper where the VOCs and SVOCs would be removed. Treated groundwater from the air stripper would be pumped to the effluent storage tank and then to the Pinellas Plant wastewater neutralization facility for final discharge into the Pinellas County Sewer System.

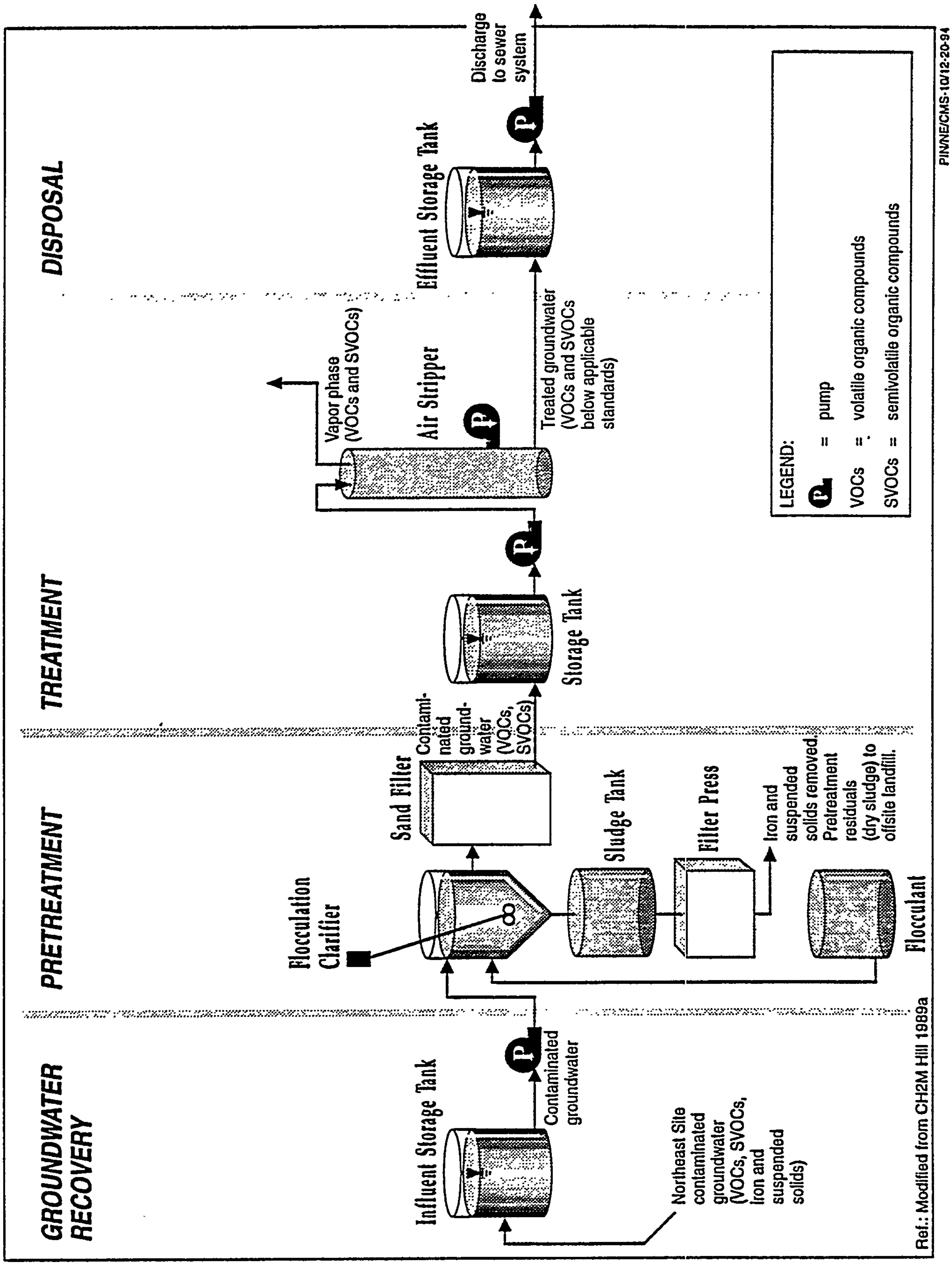

Figure 3.2. Flow diagram for groundwater treatment with air stripper.

The proposed corrective action would reduce the concentrations of the COCs in the surficial aquifer groundwater to the media cleanup standards. The media cleanup standards are the concentrations of the COCs that the EPA and FDEP approve as acceptable for completion of the corrective action. For the Northeast Site, it has been determined that the media cleanup standards will be the SDWA MCLs or the FDEP drinking water standards for the COCs, whichever are more stringent (DOE 1993c,d; 1994b). For this EA, the media cleanup standards, SDWA MCLs, and the FDEP drinking water standards for the COCs are collectively called the MCLs. Groundwater monitoring would provide data to verify the achievement of the MCLs in the surficial aquifer, to evaluate the efficiency and effectiveness of the corrective action, and to detect contaminant migration resulting from the corrective action. Therefore, groundwater monitoring would be conducted during the start-up and long-term operation of the corrective action and for at least one year after completion of the corrective action. During start-up and long-term operation, groundwater would be monitored in 15 monitoring wells located within and along the boundaries of the contaminant plume and along the perimeter of the Northeast Site (Figure 3.1). Groundwater monitoring after completion of the corrective action would be performed using 10 wells along the perimeter of the Northeast Site (Figure 3.1). All of these monitoring wells were installed for the Pinellas Plant RFI. The need for additional monitoring wells would be identified during the final design or long-term operation of the corrective action. If additional monitoring wells become necessary, they would be installed and completed in a manner similar to the groundwater recovery wells except that they would not be equipped with pumps. The need for and extent of long-term groundwater monitoring after completion of the corrective action would be determined in the EPA- and FDEP-approved Final Closure Report for the Northeast Site.

Most, if not all, of the areas to be disturbed during the corrective action activities have been previously disturbed by Pinellas Plant operations and by the various investigations of the Northeast Site, including the RFI. However, these disturbed areas would be restored to their original conditions or as close to their original conditions as possible. The disturbed areas would be graded to conform to the surrounding land surface and to avoid the ponding of surface runoff. The areas would then be revegetated with plant species that are common to the Pinellas Plant (e.g., St. Augustine grass).

Once implementation of the proposed corrective action was approved and contracted for, construction and installation of the slurry wall and the groundwater recovery and treatment systems would take a maximum of 6 months. Most, if not all, of these construction and installation activities would be performed concurrently. After the construction and installation, the corrective action would be operated for a 1-year start-up period, after which long-term operation would begin. Groundwater modeling of the corrective action indicates that long-term operation would continue for 29 years in order to meet the corrective action objectives and achieve the MCLs. During the 30 years of corrective action, approximately 70 million gallons of groundwater would be recovered, treated, and discharged to the Pinellas County Sewer System. Total capital costs (direct and indirect) for installation of the proposed corrective action would be approximately $4.5 million, and the first-year operation and maintenance costs would approximate $750,000. The total estimated cost for 30 years of operation and maintenance of the proposed corrective action is $22.5 million (1992 dollars).

The corrective action would be performed in accordance with the HSWA and Hazardous Waste Management Permits for the Pinellas Plant (EPA 1990a; FDEP 1994) and the EPA- and FDEP-approved Corrective Measure Implementation Plan. Implementation of the corrective action would require permits for the groundwater recovery and monitoring wells and for the air stripper. The completion of each groundwater recovery and monitoring well would require a "Permit to Construct, Repair, Modify or Abandon Well" issued by the Southwest Florida Water Management District. Installation and operation of the air stripper would require a "Permit to Operate/Construct Air Pollution Sources" issued by the FDEP. Other Federal, state, and local permits required for the proposed corrective action would be identified during the final design and would be obtained prior to implementation of the proposed corrective action.

The treated groundwater from the Northeast Site would be routed to the Pinellas Plant wastewater neutralization facility for final discharge into the Pinellas County Sewer System. The Pinellas Plant's discharge of wastewater to the sewer system is subject to the Industrial Wastewater Discharge Permit, Permit Number 153-IE, issued to the plant in 1994 by the Pinellas County Sewer System (PCSS 1994). The Pinellas County Sewer Use Ordinance of April 1991 specifies standards for discharge to the sewer system, but the ordinance does not specify any standards for organics. The Pinellas Plant is required to meet the metals finishing industry standards for organics, and the EPA standards (40 CFR 433) specify a pretreatment limit of 2.13 milligrams per liter (mg/L) for total toxic organics. Toxic organics, as defined by the EPA, include dichloromethane, trichloroethene, toluene, and chloroethene. Therefore, the limit for total toxic organics in the total Pinellas Plant discharge is 2.13 mg/L (CH2M Hill 1989a; DOE 1992b).

In addition to the required permits, the following standard operating procedures were incorporated into the proposed corrective action to reduce environmental impacts:

- Construction equipment used in the corrective action (e.g., backhoe and front-end loader) would be equipped with appropriate emissions control devices to control combustion emissions.

- Fugitive dust generated by corrective action activities (e.g., installation of the soil/bentonite slurry wall) would be controlled with water sprays.

- All areas disturbed during the corrective action would be restored (graded and revegetated) as soon as possible.

- The water level in the East Pond would be monitored during corrective action to determine if and how much the water level is being lowered and to assess any adverse effects on vegetation or wildlife in the East Pond. If the lowering of the water level is appreciable or if any adverse effects on vegetation or wildlife are observed, the DOE would develop and implement appropriate measures in consultation with the appropriate regulatory agency or other authority. The DOE would also evaluate the need for additional NEPA review and would conduct this review if necessary.

Workers involved in the proposed corrective action would be subject to potential exposure to contaminated groundwater and air emissions from the air stripper. Workers would also be exposed to the physical hazards associated with installation, operation, and maintenance of the corrective action (e.g., operating heavy construction equipment). The corrective action would be performed in compliance with all of the applicable health and safety requirements of the Occupational Health and Safety Administration, as set forth in 29 CFR 1900-1910 and 1926, as well as all applicable DOE and Pinellas Plant health and safety requirements. In addition, the corrective action would be performed in compliance with a site health and safety plan, as required by 29 CFR 1910.120; 29 CFR 1910.120 governs all work at uncontrolled hazardous waste sites including worker training and medical monitoring.

3.2. OTHER ALTERNATIVES

3.2.1. <u>No Action</u>

The no action alternative would consist of continuing the interim corrective action for the Northeast Site (subsection 1.4). The contaminated groundwater in the surficial aquifer would continue to be recovered using existing recovery wells and pumped to the existing groundwater treatment facility for the 4.5-Acre Site in the northwest corner of the Pinellas Plant (Figure 1.4). This groundwater treatment facility uses an air stripper to remove VOCs and SVOCs from contaminated groundwater, and the effluent from this facility is pumped to the Pinellas Plant's wastewater neutralization facility for eventual discharge into the Pinellas County Sewer System. The interim corrective action includes a groundwater monitoring system (CH2M Hill 1989a, 1991; DOE 1992b).

This alternative was evaluated during the CMS process. At the time the Northeast Site was recommended for interim corrective measures, excess groundwater treatment capacity was available at the 4.5-Acre Site facility because it was under interim status and the facility had been designed with enough capacity for its anticipated final corrective action. The 4.5-Acre Site will soon be proposed for final corrective action; therefore, at the time when the Northeast Site is ready for its final corrective measure, it is anticipated that the excess groundwater treatment capacity at the 4.5-Acre Site facility will not be available (DOE 1993c). If the groundwater treatment facility for the 4.5-Acre Site was used for the final corrective actions for both the 4.5-Acre and Northeast Sites, one or both of the corrective actions would have to operate at less than an optimum groundwater recovery rate. This could extend the time necessary for completion of a corrective action and could present the potential for offsite migration of contaminated groundwater.

During the CMS process for the Northeast Site, two other no action alternatives were evaluated. The first no action alternative would consist of taking no corrective action. The groundwater contaminant plume would remain in its present location and condition, and the potential for offsite migration of the plume would continue to exist for an indefinite period of time. The second no action alternative would consist of taking no corrective action, but various institutional controls (e.g., deed restrictions) and groundwater monitoring would be implemented to prohibit or restrict access to the contaminated groundwater and to detect any future migration of the contaminant plume. These no action alternatives would not satisfy the requirements of the HSWA Permit for the Pinellas Plant and would not meet the established corrective action objectives for the Northeast Site (DOE 1993c). Therefore, neither of these alternatives were considered in this EA.

3.2.2. Ultraviolet Oxidation

The ultraviolet (UV) oxidation alternative for corrective action at the Northeast Site would be the same as the proposed action except that UV oxidation would be the primary groundwater treatment system instead of air stripping. The air stripper (Figure 3.2) would be replaced with a UV oxidation tank and a hydrogen peroxide tank. Hydrogen peroxide would be added to the contaminated groundwater to begin the destruction of the organic contaminants. The contaminated groundwater would then be exposed to UV light from a series of UV lamps in the UV oxidation tank which would complete the destruction of the majority of the organic contaminants. The contaminants would be oxidized to carbon dioxide, water, and inorganic salts. Partially oxidized or unoxidized contaminants, such as dichloromethane, could require additional treatment, and controls could be required for emissions created by the UV oxidation process depending on the type of system used. The UV oxidation alternative could be more expensive than pump-and-treat with air stripping, especially over 30 years of corrective action (DOE 1993c).

3.3. ALTERNATIVES DISMISSED FROM FURTHER CONSIDERATION

As stated in subsection 1.3, the CMS identified corrective action technologies that were screened to eliminate technologies that were not feasible to implement, were unlikely to perform satisfactorily or reliably, or may not achieve corrective action objectives with a reasonable period of time. Thirty-nine preliminary corrective action technologies were identified and screened for groundwater containment, collection, treatment, and disposal and for the disposal of solid wastes from groundwater treatment. These technologies included a slurry wall, sheet piling, and grout curtains for groundwater containment; recovery well and trench collection systems for groundwater collection; enhanced bioremediation, air stripping, UV oxidation, and filtration for groundwater treatment; an evaporation pond, shallow and deep well injection, and surface irrigation for groundwater disposal; and onsite and offsite landfill disposal of solid wastes from groundwater treatment. Eleven of the technologies were retained as feasible and, when combined, formed a number of technology options. From the technology options, pump-and-treat with air stripping and pump-and-treat with UV oxidation were identified as CMAs for the contaminated surficial aquifer groundwater at the Northeast Site. The CMAs were then evaluated against technical, environmental, human health, and institutional criteria according to the requirements of the HSWA Permit for the Pinellas Plant. Details on the screening of preliminary corrective action technologies and the CMA evaluations are provided in the CMS Report (DOE 1993c,d; 1994b).

4. AFFECTED ENVIRONMENT

4.1. WEATHER AND AIR QUALITY

4.1.1. Weather

The discussion below is based on data for Tampa, Florida, which is approximately 20 miles east of the Pinellas Plant. These data were provided primarily by the U.S. Department of Commerce (NOAA 1991); the Pinellas County Department of Environmental Management, Air Quality Division (PCAQD) (PCAQD 1989); and Trinity Consultants, Inc. (Trinity 1990).

The weather of central Florida can be characterized as a subtropical savanna climate with a primary wet season during the summer (June through September) and a secondary wet season during the winter (December through February) (PCAQD 1989). Winters are mild, and summers are long, rather warm, and humid. For the period 1961 through 1990, the average annual temperature was 72.3°F, and the average minimum and maximum temperatures were 63.3 and 81.2°F, respectively (NOAA 1991). Median rainfall during the primary wet season varies from 6 to 8 inches per month while median rainfall during the winter ranges from 1.8 to 3 inches per month (PCAQD 1989). For the period 1961 through 1990, the average annual precipitation was 48.38 inches (NOAA 1991).

The 1990 wind rose for Tampa shows that the prevailing winds are from the east and east-northeast. Winds from these directions occurred 29 percent of the year. The next most prevalent winds are from the northeast, east-southeast, and west almost 24 percent of the year. The wind rose is omnidirectional, and wind from any direction occurs no less than 2 percent of the year. The most common wind speeds are from 4.6 to 6.9 miles per hour (mph) and from 8.1 to 11.5 mph (Trinity 1990). The average wind speed at the Tampa International Airport in 1988 was 7.9 mph, and average wind speeds greater than 14 mph occur less than 1 percent of the year (PCAQD 1989). Winds exceeding 25 mph are not common and usually occur only with thunderstorms or tropical disturbances (NOAA 1991). Calm conditions with wind speeds less than 3 mph occur only 5.8 percent of the time (Trinity 1990), while wind speeds less than 1 mph occur less than 1 percent of the time (PCAQD 1989).

The potential for hurricanes and tropical storms exists in Pinellas County. The peak hurricane frequency occurs in September with 3.4 storms per decade, and the frequency of tropical storms is generally about the same as the frequency of hurricanes (PCAQD 1989). Based on records from 1866 through 1982, the average occurrence of a hurricane passing within a 50-nautical-mile radius of Tampa is 1 in every 8.4 years. From 1950 to 1980, 50 tornado-like events occurred in Pinellas County.

Thirty-seven of these events were classified as tornadoes and 13 as waterspouts coming ashore; most of these events (74 percent) occurred during April through September. The probability of a tornado striking the Pinellas Plant is 1 chance in 2,326. Waterspouts moving ashore typically dissipate soon after reaching land and would have very little potential for causing any damage at the plant (DOE 1983, 1990b).

4.1.2. Air Quality

The EPA has established the National Ambient Air Quality Standards (NAAQS) to protect public health and welfare (40 CFR 50). The primary standards are designed to protect the public health, and the secondary standards are designed to protect the public welfare, including the effects of air pollution on visibility, materials, and vegetation. The ambient air quality standards for the state of Florida and Pinellas County are the same as the NAAQS (PC 1992a).

Stagnation does not occur in the Tampa Bay area because land-water temperature differences always induce a wind circulation even if the large-scale wind gradient is flat or zero. Consequently, the air quality in Pinellas County is among the best in the nation for urban areas of similar size and density. Pinellas County continued to meet the NAAQS for all pollutants during 1987 and 1988. For these two years, the PCAQD reported 455 days with an Air Quality Index (AQI) of "Good" and 274 days with a "Moderate" AQI; only 1 day was in the "Unhealthful" AQI level. The AQI is a nation-wide standard method developed by the EPA for reporting daily air quality to the public in a health-related manner. Data for 1989 and 1990 show horizontal trends in the AQI and for all pollutants except for carbon monoxide, nitrogen dioxide, and particulates. Carbon monoxide and particulates had nominally to moderately decreasing trends. Nitrogen dioxide had a nominally increasing trend which is expected to continue due to the growth in vehicle miles traveled in the county (PCAQD 1989, 1991).

The Pinellas Plant is a high-technology facility, and VOCs are exhausted from approximately 200 chemical stacks and vents distributed over the roof of Building 100 (DOE 1991a). The Florida Air Toxics Permitting Strategy establishes a strategy for controlling toxic air emissions from stationary sources to levels that will not endanger public health. This policy includes the Florida Air Toxics Working List, which establishes conservative 8-hour, 24-hour, and annual no-threat levels (NTLs) for toxic chemicals and which is used by the FDEP and industry to determine air toxics permitting needs. The strategy is based on comparing the predicted ambient impact of individual toxic air contaminants with an estimate of the ambient exposure level of each chemical that is not likely to cause appreciable health risks. The policy has not been adopted as rule, but it is used as a guideline to identify emission sources for air permit applications (FDEP 1991).

An air quality permit application for the Pinellas Plant (DOE 1992d) was prepared in 1992, and the FDEP issued an Air Emissions Permit, Permit Number A052-233355, in 1993 (FDEP 1993). Air contaminants that could be of concern are dichloromethane (methylene chloride), trichloroethene, and 2,4,6-trichlorophenol. The ambient concentrations of these contaminants at various plant boundary locations were calculated using the Industrial Source Complex (ISC-2) dispersion model for short-term applications (EPA 1992), a commercially available Gaussian plume model. The highest calculated annual concentration of dichloromethane from Pinellas Plant emissions was 0.0009 (9.0E-04) milligrams per cubic meter (mg/m^3) at the south property boundary. The north plant boundary is the boundary closest to the location of the proposed groundwater treatment system; the calculated annual concentration of dichloromethane at the north property boundary was less than 2.0E-04 mg/m^3. The annual NTL for dichloromethane is 2.1E-03 mg/m^3. The calculated concentrations for trichloroethene and 2,4,6-trichlorophenol were well below their respective NTLs at all plant boundary locations (2,4,6-trichlorophenol does not have an established NTL, so the NTL for phenol was used for comparison).

4.2. GEOLOGY

4.2.1. Soils

The soil types at the Pinellas Plant are the Myakka Fine Sand, Wabasso Fine Sand, and Made-Land soils. These soils range in thickness from 5 to 50 ft across Pinellas County. The Myakka Fine Sands are gently sloping, moderately well drained soils that contain layers weakly cemented with organic matter at depths of 40 inches or less. The Myakka soils cover approximately 45 percent of the plant in the western half of the site. The Wabasso Fine Sands are nearly level, poorly drained soils, some of which have layers weakly cemented with organic matter. Light gray sands mixed with shell fragments are commonly found in the Wabasso soils between depths of about 50 to 62 inches. The Wabasso soils are found in the far east portion of the plant, covering approximately 25 percent of the site. Made-Land soils consist of mixed sand, clay, hard rock, shells, and shell fragments that have been transported, reworked, and leveled during earth-moving activities. Made-Land soils are nearly level and excessively altered by man and are found beneath and north of Building 100 and west of the East Pond (SCS 1972).

4.2.2. Geology

Figure 4.1 shows a generalized geologic cross section in the vicinity of the Pinellas Plant. Surficial deposits are terrace deposits consisting primarily of sands and shelly sands that are classified as the Myakka and Wabasso soils. The Tampa Formation has two parts: the lower part is known as the Tampa Limestone and is the uppermost carbonate unit of the upper Floridan aquifer that totals several

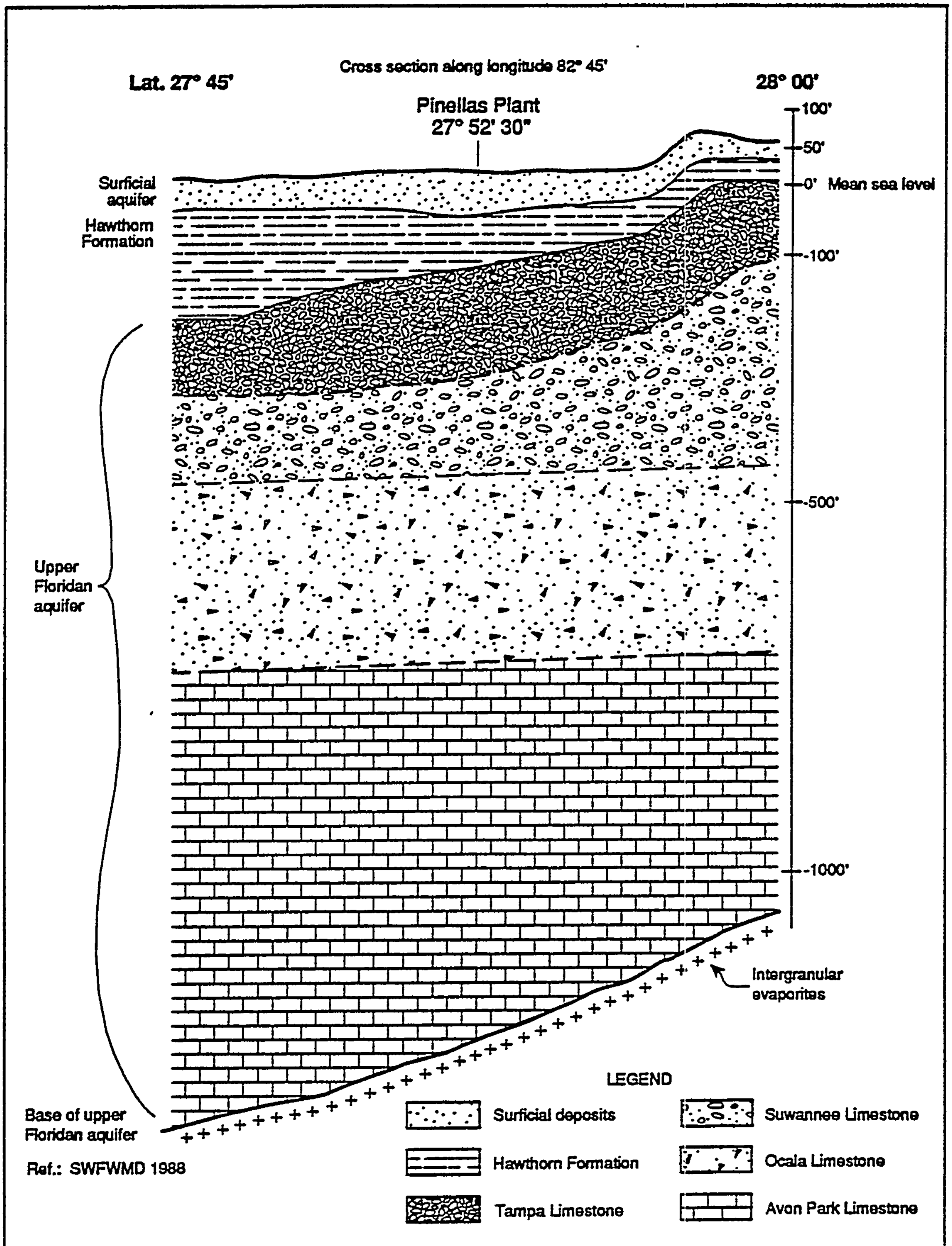

Figure 4.1. Generalized geologic cross section in the vicinity of the Pinellas Plant.

thousand feet in thickness; the upper part of the Tampa Formation has a higher clay content and, with the Hawthorn Formation, acts as a confining bed above the upper Floridan aquifer in the immediate area of the Pinellas Plant. Well logs for the Pinellas Plant show that the Hawthorn Formation and the clays of the upper Tampa Formation range from 55 to 78 ft in thickness. This variation in thickness is probably due to gradational contact between the strata (i.e., the exact contact between the strata is not clearly defined). Therefore, the confining bed consisting of the Hawthorn Formation and the upper part of the Tampa Formation is collectively called the Hawthorn Formation (DOE 1991b).

Sinkhole formation is common in Florida, and two types of sinkhole formation are observed in Pinellas County. Cover-collapse sinkholes occur when a subsurface void grows larger over time until the overlying sediment cannot support its own weight. Cover-subsidence sinkholes develop gradually as limestone is removed through dissolution and the overlying soil continuously fills the void. The depression created at the surface is also slowly filled, and cover-subsidence sinkholes are therefore more difficult to identify. The majority of sinkholes occur in northern Pinellas County where the sediments mantling the limestone are 25 to 50 ft thick. Six reported sinkholes are within a 5-mile radius of the Pinellas Plant; two of these are classified as cover-subsidence sinkholes and could not be confirmed. The probability of a sinkhole occurring at the Pinellas Plant is once every 1,340 years (Beck and Sayed 1991).

Earthquakes have occurred in Florida. The earliest recorded and most severe earthquake was on January 12, 1879, near St. Augustine; the only damage was minor and in St. Augustine. Several other events of less intensity have been reported since that time. There is no reasonable expectancy for damaging earthquakes at the Pinellas Plant. The seismic risk map of the United States shows central and southern Florida to be in Zone 0, which is defined as a "no damage" zone (Algermissen 1969).

4.3. HYDROLOGY

4.3.1. <u>Surface Water</u>

The terrain at the Pinellas Plant is generally flat. The total elevation difference over the plant area is approximately 2 ft, and most of this variation is associated with man-made structures. There is a slight downward slope in the southeast corner of the plant area, but there are no topographic high points or lineaments that would affect surface drainage. The plant is on the surface water divide of two drainage subbasins. Flow in the northwestern half of the plant is to the west, and flow in the southeastern half of the plant is to the southeast. Both of the subbasins drain into Boca Ciega Bay and eventually into the Gulf of Mexico (Figure 1.1) (DOE 1991b).

No natural surface waters exist at the Pinellas Plant, but three man-made ponds, with a combined surface area of approximately 5 acres, have been excavated initially as borrow pits or for storm water retention. The East and West Ponds (Figure 1.2) were excavated primarily as borrow pits and have capacities of 10 and 8 acre-ft, respectively. The East and West Ponds have received various waste in the past and are RCRA SWMUs (DOE 1991b). Both ponds were converted to storm water retention ponds and now receive only storm water runoff (DOE 1987). Overflow from the East Pond discharges through a county drainage pipe, south along Belcher Road, and then east along Bryan Dairy Road until it empties into a county drainage ditch. Flow continues southward, entering Cross Bayou Canal, Cross Bayou, and finally Boca Ciega Bay (Figure 1.1). There is no discharge from the West Pond. The South Pond (Figure 1.2) was constructed for storm water retention and has a capacity of 6 acre-ft. The concrete-lined South Pond is connected to the East Pond by a closed underground piping system that, if needed, would allow overflow from the East Pond to drain to the South Pond. There is no evidence that any overflow drainage ever occurred, and the South Pond is not a RCRA SWMU (DOE 1991b). Therefore, the South Pond is not considered further in this EA.

The water in the East and West Ponds has been sampled at various times, including during the RFI. Water quality investigations of the East and West Ponds in 1985 and 1987 indicated the presence of various contaminants including cadmium, chromium, lead, manganese, mercury, pesticides, PCBs, and organic solvents (Fernandez 1985; CH2M Hill 1987). RFI samples from the East Pond indicated mercury concentrations slightly above the SDWA MCL and FDEP drinking water standard (DOE 1991b); supplemental RFI sampling (Hammond 1992; Ingle 1992a,b) indicated that mercury was not present above standards (DOE 1993b). RFI samples from the West Pond did not contain concentrations of contaminants above SDWA MCLs and FDEP drinking water standards. Based on surface water samples taken during the RFI, the East and West Ponds have oxygen levels above the FDEP standard of 3.00 mg/L, which is sufficient to support aerobic life. Most of the oxygen profiles of the ponds ranged from 7 to 10 mg/L, and this range is considered able to support healthy aquatic biological conditions. Only oxygen levels 1 ft from the bottoms of the ponds showed any depletion (DOE 1991b).

The Pinellas Plant is not in a floodplain, which is defined as an area having a 1 in 100 chance on average of being inundated due to rainfall in any year (DOE 1988; PCDP 1991a). The greatest amount of flood damage would be caused by hurricane tidal flooding, and the U.S. Army Corps of Engineers has examined the Pinellas Plant in relation to the design hurricane for the area. The design hurricane is the hurricane that would occur in this area in 100 or more years. The maximum anticipated high tide associated with the design hurricane would be approximately 14 ft above mean sea level (MSL). The plant is several miles inland and has a minimum floor elevation of 18.5 ft above MSL; therefore, no damage from tidal flooding would be expected to occur (DOE 1991a).

No municipal water supplies in Pinellas County are supplied by surface water due to the limited dependable amount of surface water that is available and the high cost of treatment to meet drinking water standards (SWFWMD 1988).

4.3.2. Groundwater

Pinellas County is in the west-central portion of the 7,300-square-mile Southern West-Central Florida Groundwater Basin (SWCFGWB). The SWCFGWB contains a multi-layered aquifer system that includes the surficial, intermediate, and Floridan aquifers (SWFWMD 1988). In Pinellas County, the multi-layered, freshwater aquifer system consists of the surficial and Floridan aquifers. The intermediate aquifer does not exist in the county. Throughout the county, the surficial aquifer is unconfined and close to the ground surface and, therefore, susceptible to contamination. Infiltration to the surficial aquifer in Pinellas County is estimated to be 22 inches per year. The surficial aquifer will not sustain adequate well yields, and the surficial aquifer groundwater quality is generally poor due to high naturally occurring concentrations of chloride, iron, and organic constituents. Consequently, no municipal water supplies are taken from the surficial aquifer (SWFWMD 1988; Fernandez and Barr 1983; DOE 1993c).

The Floridan aquifer can be divided into the lower and upper Floridan aquifers. The lower Floridan aquifer does not contain potable water and is not considered further in this EA. The upper Floridan aquifer is the principal and most productive source of potable groundwater in Pinellas County, but withdrawal from the aquifer is restricted due to the available amount of good quality water and the aquifer's sensitivity to saltwater encroachment. Recharge rates to this aquifer in Pinellas County have been estimated to be from zero to less than 2 inches per year (Geraghty and Miller 1976; Stewart 1980; SWFWMD 1988).

The strata of concern underlying the Pinellas Plant are, in ascending order, the Tampa Limestone (upper Floridan aquifer), Hawthorn Formation, and surficial aquifer. The Tampa Limestone is the main source of water for Pinellas County and surrounding counties; however, the fresh water zone in the upper Floridan aquifer is thin. The Hawthorn Formation is an effective aquitard in most areas of Pinellas County but, if breached, could allow flow from the surficial aquifer to the Tampa Limestone. The surficial aquifer is not currently used to supply municipal water; it is unconfined, shallow, and susceptible to contamination (DOE 1991b; SWFWMD 1988).

At the Pinellas Plant, the top of the surficial aquifer is from 0 to 4 ft below the ground surface, and the aquifer has an average thickness of 32 ft. Horizontal and vertical hydraulic conductivities determined during the RFI suggest that stratigraphic control of groundwater flow in the aquifer is not a dominant process, and the ability of water to flow horizontally and vertically in the surficial aquifer is approximately the same. Storage coefficients for the surficial aquifer are also small compared to expected values for an unconfined aquifer, indicating that the effective porosity of the aquifer is low (DOE 1991b). A recharge area for the surficial aquifer is east of the West Pond, corresponding to a drainage basin divide. This divide is historically documented and is considered to be a natural groundwater divide (Fernandez 1985). Data collected for the RFI suggest that the direction of groundwater flow does not vary appreciably during the year, and the groundwater flow pattern across the plant site is expected to remain relatively constant throughout the year. Groundwater in the surficial aquifer flows east, southeast, and northwest from the groundwater divide. The gradient to the northwest seems to have increased, possibly due to the withdrawal of groundwater for the pump-and-treat project at the 4.5-Acre Site that is adjacent to the plant to the northwest. Other man-made influences, including nearby drainage channels, may periodically act as zones of recharge or discharge. The depth to the water table during the RFI ranged from less than 0.5 to approximately 6 ft (DOE 1991b).

The Hawthorn Formation is approximately 70 ft thick in the wells drilled through it at the Pinellas Plant. The Hawthorn Formation has a hydraulic conductivity that is several orders of magnitude less than that of the surficial aquifer or upper Floridan aquifer; therefore, the Hawthorn Formation is considered to act as an aquitard in the area of the Pinellas Plant (DOE 1991b). Slow vertical movement of water through the Hawthorn Formation has also been predicted by the U.S.Geological Survey (USGS). The USGS estimated that the vertical movement of water through 37 ft of the Hawthorn Formation would take 7,000 years (Hickey 1982).

The hydraulic properties of the upper Floridan aquifer have not been measured at the Pinellas Plant. Regional potentiometric surface data indicate that there is little variation in the potentiometric surface on a seasonal or annual basis and that groundwater flow in the aquifer in the vicinity of the plant is primarily east-northeast toward Tampa Bay (Barr and Schiner 1984; Barr 1984, 1985; Barr and Lewelling 1986; Lewelling 1987). Recharge to the upper Floridan aquifer is very low where the aquifer is overlain by thick, impermeable strata. Estimates of the recharge rate to the aquifer at the Pinellas Plant are in the range of zero to less than 2 inches per year (SWFWMD 1988; Stewart 1980).

Since the upper Floridan aquifer is the primary source of drinking water in Pinellas County, the vertical flow of water from the surficial aquifer through the Hawthorn Formation is a concern. Potentiometric data collected during the RFI show that there is a potential for the downward movement of water from the surficial aquifer to the upper Floridan aquifer. The estimated recharge from the Hawthorn Formation to the upper Floridan aquifer ranges from 0.36 to 0.52 inch per year (DOE 1991b), which is consistent with other estimates for Pinellas County that range from zero to less than 2 inches per year (SWFWMD 1988; Stewart 1980). With the flow-restricting properties of the Hawthorn Formation, appreciable migration through competent sections of the Formation is unlikely. However, features such as sinkholes and abandoned water wells that may breach the Formation could become hydraulic pathways from the surficial aquifer through the Hawthorn Formation. No recent sinkholes have been found at the Pinellas Plant, and the probability that a sinkhole will occur at the plant is considered to be very low (see subsection 4.2.2). Two wells are known to have been completed in the upper Floridan aquifer beneath Building 100. The well under the north-central portion of the building is documented as grouted and sealed (DOE 1991b). There is no documentation on the abandonment of the other well, but interviews of Pinellas Plant employees indicate that the well was sealed with concrete.

Due to the potential head difference between the surficial aquifer and the upper Floridan aquifer, the existence of a conduit or breach through the Hawthorn Formation would be evident in the surficial aquifer as a cone of depression in the water table surface. An examination of water levels measured at the Pinellas Plant during four RFI sampling events indicate no areas of localized water table depression at the plant. Furthermore, the Hawthorn Formation has a fairly high cation exchange capacity (CEC) and a very low permeability, and positively charged metal ions are not expected to migrate through the Hawthorn Formation due to this high CEC. Any brecciated zone associated with a sinkhole would be expected to have geochemical properties similar to the Hawthorn Formation, such as a high CEC. Therefore, downward contaminant migration through the Hawthorn Formation to the upper Floridan aquifer is considered to be unlikely. Three upper Floridan aquifer wells were sampled in 1988 and during the RFI and were consistently free of any contamination. These wells are downgradient from the contaminated groundwater plume at the Northeast Site (DOE 1991b).

Pinellas County is one of 16 counties in the Southwest Florida Water Management District, and groundwater from the Floridan aquifer provides over 95 percent of the water used in the district (DOE 1991a). Some small private and commercial users operate wells in permeable portions of the Hawthorn Formation, and available information indicates that there are no permitted production wells completed in the surficial aquifer (DOE 1991b). There are several municipal well fields in northern Pinellas County. The closest well field is approximately 5 miles northwest of the Pinellas Plant and has an average yield of 1.1 million gallons per day (SWFWMD 1988). There are no municipal well fields in southern Pinellas County due to saltwater intrusion in the upper Floridan aquifer. Pinellas County does not have adequate freshwater resources within its boundaries to support current and future demands. Consequently, about 90 percent of the municipal water supply is imported from adjacent counties (Geraghty and Miller 1976; SWFWMD 1988).

An inventory of all wells within a 1-mile radius of the Pinellas Plant was compiled from Southwest Florida Water Management District records. About 240 wells, ranging from 1 inch to 10 inches in diameter, were identified for the nine land sections in the vicinity of the plant, not including observation, test, or abandoned wells (CH2M Hill 1987; DOE 1990a). Based on the reported screen depths for the wells, all of the wells have been completed in the upper Floridan aquifer or in a permeable section of the Hawthorn Formation. The wells are used primarily for agricultural (irrigation) purposes, but domestic and recreational uses (e.g., lawn irrigation and swimming pools) are common (DOE 1991b).

In 1990, the water usage in Pinellas County was approximately 102 million gallons per day. Of this usage, 85.4 million gallons per day were for potable uses, 16.5 million gallons per day were for agriculture, and 0.02 million gallons per day were for industrial pumpage. The projected water demands for Pinellas County are 110 million gallons per day in 1995 and 118 million gallons per day in the year 2000, which represent increases of approximately 8 percent and 16 percent over the 1990 usage, respectively (PCDP 1991b). The water used at the Pinellas Plant is provided by the Pinellas County Water System, and the plant used a total of 74 million gallons of potable water during 1990 (DOE 1991a). In the future, the greater demands for water resources in the Pinellas County region will be met primarily by expanding well fields tapping the upper Floridan aquifer. The surficial aquifer is not capable of sustaining adequate well yields, and this aquifer is therefore not expected to experience any increased usage (DOE 1991b).

4.4. FLORA AND FAUNA

4.4.1. Flora and Fauna

The Pinellas Plant is in an area that is classified as pine flatwoods, which is the most extensive forest community in Pinellas County (PCDP 1991b). Pine flatwoods and remnant or disturbed pine flatwoods occur outside and along the western, northwestern, and southwestern boundaries of the Pinellas Plant (BDA 1992).

The pine flatwoods outside the western, northwestern, and southwestern boundaries of the Pinellas Plant are dominated by slash pine with wax myrtle, saw palmetto, shrub verbena, broomsedge, groundsel tree, blackberry, live oak, hat pins, Virginia creeper, laurel oak, muscadine, gallberry, bracken fern, pawpaw, false goldenrod, winged sumac, blueberry, blackroot, St. Johns wort, fetterbush, popcorn tree, catbrier, and Chapman's oak. Wildlife observed using the pine flatwoods include the osprey, mourning dove, fish crow, mockingbird, pine warbler, rufous-sided towhee, box turtle, eastern black racer, armadillo, red-bellied woodpecker, and marsh rabbit (BDA 1992).

The majority of the Pinellas Plant has been developed. Undeveloped areas of the plant are a large, maintained grass area and the East and West Ponds in the northern portion of the plant and a maintained grass area and the South Pond along the southern boundary of the plant. The grasses in the maintained areas are primarily St. Augustine and crabgrass. Wildlife observed in the northern grass area include mourning dove, boat-tailed grackle, mockingbird, starling, meadowlark, fish crow, mottled duck, and killdeer. Monk parakeets were also observed flying over the maintained grass areas, and there is a nesting colony in the Florida Power electrical substation in the western portion of the plant (BDA 1992).

The periphery of the East Pond is dominated by cattails. Other vegetation at the edge and on the bank of the East Pond includes pennywort, groundsel tree, Brazilian pepper, dog fennel, hempweed, crabgrass, carpet-weed, Carolina willow, beggar ticks, marsh fleabane, and ragweed. Wildlife using the East Pond include the common moorhen, boat-tailed grackle, red-winged blackbird, common tern, snipe, green-backed heron, Florida water snake, and laughing gull. Common plants such as pennywort, hempweed, Carolina willow, and cattails were observed at the West Pond. Wildlife associated with the West Pond include the great egret, common tern, double-crested cormorant, little blue heron, red-winged blackbird, boat-tailed grackle, mourning dove, Savannah sparrow, and marsh rabbit. There is an osprey nest at the top of a light pole west of the West Pond (BDA 1992).

Environmental surveys of the East and West Ponds were conducted in 1989. Aquatic species identified during the surveys included 19 species of phytoplankton and zooplankton. Only two species of fish were identified. Neither of these species was a game fish, and all of the fish captured were less than 5 centimeters in size. A smooth softshell turtle was also captured (MEE 1989). During the RFI, turtles were commonly observed in the East and West Ponds (DOE 1991b).

4.4.2. Threatened and Endangered Species

On July 17, 1991, the Fish and Wildlife Service (FWS) was consulted regarding federally listed, threatened or endangered species that may be present at the Pinellas Plant (Appendix A). According to the FWS, the Pinellas Plant is within the historic range of the endangered Florida golden aster. If no pine scrub vegetation exists at the plant, it is unlikely that this species is present. The threatened Eastern indigo snake may inhabit the Pinellas Plant, and the endangered southern bald eagle and wood stork may potentially feed in the storm water retention ponds at the plant. The nearest bald eagle nest is about 2 miles southwest of the plant near Cross Bayou. The eagles could feed as far north as the storm water retention ponds, but their feeding is most likely concentrated in Cross Bayou. Contaminants from the plant entering the Cross Bayou watershed could have some adverse effect on the eagles, but other activities within the plant site are not likely to have a direct effect on the nesting eagles (Carroll 1991). In 1992, the FWS stated that there had been no change in the federally listed, threatened or endangered species potentially present at the Pinellas Plant (PC 1992b).

The state of Florida provides endangered or threatened species protection and also provides protection for species of special concern (SSC). SSC are those species that, although relatively abundant and/or widespread in the state, may be especially vulnerable to certain types of environmental change and/or have experienced long-term population declines and could become threatened or endangered if not protected. State-listed species (endangered, threatened, or SSC) with a potential for occurring at the Pinellas Plant include the gopher tortoise, tricolored heron, little blue heron, snowy egret, Florida burrowing owl, Sanibel lovegrass, Tampa vervain, and scrub palmetto (BDA 1992).

No federally listed, threatened or endangered species were observed at the Pinellas Plant. One little blue heron was observed foraging in the West Pond. This medium-sized wading bird is state-listed as SSC due to the decrease in its numbers over the past few decades and the recent loss of wetlands habitat throughout Florida. Although the little blue heron was observed at the Pinellas Plant, no habitat for rookeries (i.e., nesting and breeding areas) for these or other wading birds occur at the plant. Several wading birds and waterfowl, including the little blue heron, snowy egret, and tricolored heron, could occasionally use the storm water retention ponds at any time of the year for foraging; however, there is a higher potential for smaller wading birds to use these ponds. No bald eagles or wood storks were observed at the plant, but these species may also forage in the storm water retention ponds. Listed plant species are not expected to occur at the Pinellas Plant, because the majority of the site has been disturbed, and because appropriate habitat for the Florida golden aster does not exist at the plant (BDA 1992).

4.4.3. Wetlands

The FWS has designated the East and West Ponds as wetlands (DOI n.d.). Public access to all of the ponds is restricted. Employees of the Pinellas Plant have access to the ponds, but the ponds are not used in any recreational capacity. There are no plans to use the ponds in the foreseeable future for any purpose other than storm water retention (DOE 1991b).

4.5. CULTURAL RESOURCES

There are a number of sites of historical and archaeological significance in Pinellas County, but none of these sites is close to the Pinellas Plant. The closest cultural resource sites are the Long Bayou temple and burial mound and the Oakhurst Mound burial mound (archaeological sites), approximately 3 miles southwest of the plant (DOE 1983; PCDP 1991a). Consultation with the Florida State Historic

Preservation Officer confirmed that no historical or archaeological sites listed or eligible for listing in the National Register of Historic Places are recorded or considered likely to be present within the Pinellas Plant boundaries (Percy 1991).

5. ENVIRONMENTAL IMPACTS

The environmental impacts of the proposed corrective action and the reasonable alternatives to it are discussed in this section. The environmental components (e.g., human health and groundwater) addressed in this section are limited to those that may be affected by the corrective action alternatives. The environmental impacts are based on conservative assumptions and impact assessment procedures and thereby represent a realistic upper limit on the severity of the impacts that may occur. The actual impacts that would occur would probably be less severe than those identified here.

The cumulative environmental impacts of the proposed corrective action and other actions at the Pinellas Plant are also discussed in this section. Other corrective actions for contaminated surficial aquifer groundwater (i.e., for the 4.5-Acre Site and Building 100 and West Fenceline Areas) would result in the same or similar environmental impacts as would the proposed action, such as the temporary disturbance of soils and the withdrawal of surficial aquifer groundwater. These impacts are discussed in this section. Leasing all or portions of the Pinellas Plant to commercial enterprises may also have environmental impacts. The impacts of commercial leasing on human health, soils, surface water, flora and fauna, and cultural resources were determined to be negligible and are not addressed in this section. The impacts of commercial leasing on air quality, the withdrawal of surficial aquifer groundwater, and the discharge of treated groundwater to the Pinellas County Sewer System are of concern and are discussed in this section.

5.1. HUMAN HEALTH EFFECTS

The average and maximum carcinogenic and noncarcinogenic risks for a future resident of the Northeast Site, in the absence of any corrective action (including the interim corrective action), were estimated to evaluate the human health risks from the contaminated groundwater at the Northeast Site. The estimates were performed in accordance with CERCLA guidance for the evaluation of human health (EPA 1989) and focused on the exposure to contaminants in surficial aquifer groundwater, which is not a primary drinking water source. The average and maximum observed concentrations of the COCs in surficial aquifer groundwater were used, and it was assumed that the future resident uses water from a contaminated onsite well for domestic purposes such as irrigation, swimming, and general cleaning. Due to the naturally poor quality of the surficial aquifer groundwater, it was further assumed that the future resident receives uncontaminated drinking water from a municipal supply. In this scenario, the future resident would be exposed to the COCs by the inhalation of COCs from contaminated groundwater and direct contact (dermal absorption) with contaminated groundwater.

The estimated average carcinogenic risk from exposure during the childhood and adult years is 6 excess cancers in an exposed population of 100,000 persons (6E-05). The estimated maximum carcinogenic risk from exposure during the childhood and adult years is 2 excess cancers in an exposed population of 10 persons (2E-01). The actual risk would be below the maximum risk, but the maximum risk is of potential concern because it exceeds the EPA upperbound target carcinogenic risk of no more than 1 excess cancer observed in a population of 10,000 people exposed (1E-04) (EPA 1988b) and the FDEP acceptable target carcinogenic risk of no more than 1 excess cancer observed in a population of 1,000,000 people exposed (1E-06). Exposure to the average observed concentrations of COCs would not result in the potential for noncarcinogenic public health risks (e.g., liver degeneration), but exposure to the maximum observed concentrations would have the potential for noncarcinogenic risks. As with the carcinogenic risk, the actual noncarcinogenic risk would be below the maximum risk.

5.1.1. Proposed Corrective Action

The proposed corrective action would be complete in 30 years and would lower the concentrations of the COCs in the surficial aquifer groundwater to the MCLs for the Northeast Site. The MCLs for the Northeast Site are the SDWA MCLs or the FDEP drinking water standards for the COCs, whichever are more stringent (subsection 3.1). The SDWA MCLs or the FDEP drinking water standards for the COCs are equal to or less than the contaminant concentrations that would achieve the EPA upperbound target carcinogenic risk of no more than 1E-04 excess cancer (EPA 1988b) or the FDEP acceptable target carcinogenic risk of no more than 1E-06 excess cancer. Therefore, 1E-04 represents a realistic upper limit for the carcinogenic public health risks from drinking groundwater from the surficial aquifer after the proposed corrective action at the Northeast Site. The proposed corrective action would similarly reduce the potential for noncarcinogenic public health risks, and other corrective actions for contaminated surficial aquifer groundwater would further reduce public health risks. Again, use of the surficial aquifer as a drinking water supply is very unlikely due to the limited availability and naturally poor quality of the groundwater in the aquifer.

5.1.2. No Action

The no action alternative would also lower the concentrations of the COCs in the surficial aquifer groundwater to the MCLs for the Northeast Site because the interim corrective measure would be continued. This would lower the public health risks from the contaminated groundwater to or below the EPA upperbound and FDEP acceptable target carcinogenic risks. However, the interim corrective measure probably could not withdraw groundwater at as large a rate as the proposed corrective action because it would share the groundwater treatment facility with the corrective measure for the 4.5-Acre

Site. This would result in a longer corrective action which would prolong the potential for public health risks. In addition, a less than optimum groundwater withdrawal rate for the interim corrective measure could present the potential for an increasing contaminant plume and possibly for offsite migration of the contaminant plume. This could increase the potential for public health risks from the contaminated surficial aquifer groundwater.

5.1.3. UV Oxidation

The alternative action of pump-and-treat with UV oxidation would also lower the concentrations of the COCs in the surficial aquifer groundwater to the MCLs for the Northeast Site. This would lower the public health risks from the contaminated groundwater to or below the EPA upperbound and FDEP acceptable target carcinogenic risks within approximately the same time period as the proposed corrective action. Groundwater treatment with UV oxidation would involve the use of hydrogen peroxide and UV light. Due to this, there would be an extremely small potential for public exposure to hydrogen peroxide and UV light which could result in a very small increase in the public health risks from this alternative corrective action.

5.1.4. Corrective Action Worker Health

The average and maximum carcinogenic and noncarcinogenic risks to a corrective action worker were also estimated for the proposed action. Again, the average and maximum observed concentrations of COCs were used. Corrective action workers could be exposed to the inhalation of the volatile and semivolatile COCs and to direct contact with the contaminated groundwater while working on the proposed corrective action (e.g., performing maintenance on the groundwater treatment system). The estimated maximum carcinogenic risk is 5 excess cancers in an exposed population of 100 workers (5E-02); the estimated average carcinogenic risk is 5 excess cancers in an exposed population of 100,000 workers (5E-05). Only the estimated maximum carcinogenic risk exceeds the EPA upperbound carcinogenic risk of 1E-04 (EPA 1988b), but both the estimated maximum and average carcinogenic risks exceed the FDEP acceptable target carcinogenic risk of 1E-06. Exposure to the maximum observed concentrations of COCs would also have the potential for noncarcinogenic risks to corrective action workers. The actual carcinogenic and noncarcinogenic risks to corrective action workers would be below the maximum risks due to measures implemented as part of the site health and safety plan (e.g., the use of personal protective equipment).

The no action and pump-and-treat with UV oxidation alternatives could also expose corrective action workers to inhalation of and direct contact with the same COCs at the same concentrations. Therefore, health risks to corrective action workers for these alternatives would be very similar to those for the proposed corrective action. The potential for health risks to corrective action workers would be prolonged for the no action alternative because the interim corrective measure might have to be performed longer due to a reduced groundwater recovery rate. The health risks to corrective action workers could be slightly increased for the UV oxidation alternative action because there would also be a potential for exposure of the workers to hydrogen peroxide and UV light.

The potential exposure of corrective action workers to contaminants are and would be controlled by performing all corrective actions (e.g., 4.5-Acre Site and Building 100 Area) in accordance with all applicable health and safety requirements and by implementing a site health and safety plan. Additional details on the applicable health and safety requirements and a site health and safety plan are provided in subsection 3.1.

5.2. AIR QUALITY

5.2.1. Proposed Corrective Action

The proposed corrective action would result in combustion emissions from construction equipment and possibly fugitive dust from surface disturbing activities such as the installation of the groundwater treatment system. The combustion emissions from the construction equipment (e.g., hydrocarbons and carbon monoxide) would be temporary in duration (three weeks maximum) and small in amount due to the small quantity of equipment involved. The construction equipment would be equipped with the appropriate emissions controls. The amount of fugitive dust generated by the corrective action would also be small due to the nature of the soils and the small areas that would be disturbed. If necessary, fugitive dust would be controlled with water sprays. The future installation of new groundwater recovery and monitoring wells and associated piping for the proposed corrective action and other corrective actions (e.g., Building 100 Area) would also result in combustion emissions and possible fugitive dust. These activities would be isolated incidents of very short duration, and the emissions and dust would be controlled with appropriate emissions controls and water sprays. Based on the existing air quality and wind circulation in Pinellas County (subsection 4.1), combustion emissions and fugitive dust from the proposed corrective action and other corrective actions would not be expected to result in any violations of air quality standards or any adverse effect on the AQI.

The major air quality concern for the proposed corrective action would be the emission of VOCs and SVOCs from the air stripper in the Northeast Site groundwater treatment system. These emissions would occur in conjunction with the same type of emissions from the 4.5-Acre Site groundwater treatment system. This concern was evaluated by first examining the two operational scenarios for the groundwater treatment systems for the Northeast and 4.5-Acre Sites.

The first operational scenario would be the operation of one groundwater treatment system at the 4.5-Acre Site for all of the corrective actions. This treatment system would operate at a capacity of 50 gallons per minute. The Northeast Site would contribute approximately 25 gallons per minute (the amount proposed for the separate Northeast Site groundwater treatment system), and the 4.5-Acre Site would contribute approximately 20 gallons per minute (the design capacity for the 4.5-Acre Site treatment system before the interim corrective action at the Northeast Site). The Building 100 and West Fenceline Areas could contribute 1 to 5 gallons per minute. The concentrations of the COCs in the groundwater at the Northeast Site are substantially higher than the concentrations of the COCs in the groundwater at the 4.5-Acre Site and the Building 100 and West Fenceline Areas. Therefore, the contaminant concentrations entering the treatment system in this scenario would be less than those in the Northeast Site groundwater due to the dilution of the COCs by groundwater from the 4.5-Acre Site. The treatment of contaminated groundwater from the Building 100 and West Fenceline Areas would result in further dilution of the contaminants. Table V.1 shows the estimated concentrations of the COCs in the influent to the groundwater treatment system that is proposed for the final corrective action at the Northeast Site (DOE 1993c,d; 1994b). These estimated concentrations reflect dilution of the COCs in the Northeast Site groundwater by the simultaneous recovery of uncontaminated groundwater during the corrective action, but they do not reflect the additional dilution that would be caused by the groundwater from the 4.5-Acre Site and the Building 100 and West Fenceline Areas. For this operational scenario, the concentrations of the COCs in the influent to the 4.5-Acre Site treatment system would be expected to be less than those shown in Table V.1.

The second operational scenario would be the operation of two groundwater treatment systems for the corrective actions. One treatment system would be at the 4.5-Acre Site, and the other treatment system would be at the Northeast Site. The treatment system at the Northeast Site would also use an air stripper which would have a capacity of 25 gallons per minute. The concentrations of the COCs in the influent to the Northeast Site treatment system would be expected to be the same as or very similar to those shown in Table V.1. The 4.5-Acre Site treatment system would continue to treat contaminated groundwater from the 4.5-Acre Site and possibly from the Building 100 and West Fenceline Areas. The treatment system would operate at less than 50 gallons per minute (estimated maximum of 25 gallons per minute), and the concentrations of the COCs in the influent to the system would be substantially lower than those shown in Table V.1.

Both of the operational scenarios described above would result in the emission of VOCs and SVOCs from air strippers in the groundwater treatment systems. The first scenario would create emissions from a single groundwater treatment system based on a system capacity of 50 gallons per minute and influent contaminant concentrations somewhat less than those shown in Table V.1. The second

Table V.1. Influent Contaminant Concentrations and Maximum Emissions Rates for the 4.5-Acre Site Air Strippers[a]

Contaminant of Concern	Influent Concentration (μg/L)[a]	Maximum Emission Rates (pounds per hour)[b]
Benzene	50	0.00125
Dichloromethane	3,000	0.075
Chloroethene	1,000	0.025
1,2-*trans*-dichloroethene	100	0.0025
Trichloroethene	1,300	0.0325
4-methylphenol	1,700	0.0425

[a]The influent contaminant concentrations are the estimated concentrations of the COCs in the influent to the groundwater treatment system that is proposed for the final corrective action at the Northeast Site. The influent contaminant concentrations in micrograms per liter (μg/L) were estimated by computer modeling used to simulate groundwater conditions for the proposed Northeast Site corrective action (subsection 5.4.2) (DOE 1993c, d; 1994b). The influent contaminant concentrations reflect dilution of the contaminants by uncontaminated groundwater but do not reflect additional dilution by groundwater from the 4.5-Acre Site and Building 100 and West Fenceline Areas.

[b]It was assumed that the 50 gallons per minute capacity of the 4.5-Acre Site groundwater treatment system would be provided by two air strippers operating in series. The maximum emission rates were calculated assuming complete volatilization of all COCs.

scenario would include two separate groundwater treatment systems which would have a combined capacity of approximately 50 gallons per minute. The concentrations of the COCs in the influent to one treatment system would be the same as or very similar to those shown in Table V.1, and the influent contaminant concentrations for the other treatment system would be less than those shown in Table V.1. Based on the treatment system capacities and the influent contaminant concentrations for the two scenarios, the emission of VOCs and SVOCs by the first operational scenario would be expected to be greater than that by the second scenario. Furthermore, the first scenario would have a single point source of emissions while the second scenario would have two separate point sources of emissions. Two separate point sources of emissions would result in lower concentrations of contaminants in the ambient air due to increased dispersion of the contaminants, the orientation of the point sources relative to the Pinellas Plant boundary, and the prevailing wind pattern at the Pinellas Plant. To be conservative in the assessment of air quality impacts, the first operational scenario was analyzed using a groundwater treatment system capacity of 50 gallons per minute and the influent contaminant concentrations shown in Table V.1.

The air quality impacts of the first operational scenario were analyzed using the ISC-2 dispersion model (EPA 1992) to calculate the concentrations of the COCs that would occur at various Pinellas Plant boundary locations due to the air stripper emissions. Table V.1 shows the concentrations of the COCs in the treatment system influent and the maximum air stripper emission rates that were used in the emissions calculations. It was assumed that the 50 gallons per minute capacity of the 4.5-Acre Site groundwater treatment system would be provided by two air strippers operating in series. It was also assumed that the COCs volatilized completely in the air strippers and that each air stripper was equipped with an emissions tower 42.5 ft in height, which is the height of the existing 4.5-Acre Site air stripper tower. Other assumptions and model inputs were as follows:

- Meteorological data from the Tampa International Airport for 1982 through 1986 were used to establish a meteorological data file for input to the model.

- Emissions from the air strippers are continuous (8,760 hours per year). A generic emission rate of one gram per second was used.

- The diameter of the air stripper towers (2 ft) and flow rate (400 standard cubic ft per minute) were used to calculate the exit velocities of the emissions in meters per second. Due to the 4.5-Acre Site's characteristics, the effects of buildings (i.e., downwash) was not considered, and the modeling was performed in the urban mode.

- The height of the concentration calculations was ground level.

- The modeling output was placed on a 330-ft, two-dimensional grid for the determination of critical receptor locations and the concentration at the south Pinellas Plant boundary location.

The ISC-2 modeling was used to establish the location of the critical receptor, which would be the receptor that would receive the maximum impact from the 4.5-Acre Site air stripper emissions. For the annual and 24-hour contaminant concentrations, the critical receptor was approximately 330 ft due west of the 4.5-Acre Site air strippers; the critical receptor for the 8-hour contaminant concentrations was approximately 330 ft northwest of the air strippers. These critical receptor locations are within the 4.5-Acre Site, which is leased and is therefore not considered to be DOE property. Due to the heights of the air stripper towers and the exit velocities of the emissions, the maximum contaminant concentrations would not occur closer to the 4.5-Acre Site air strippers than approximately 330 ft and would therefore not occur at actual Pinellas Plant boundary locations. The ISC-2 modeling was also used to establish the approximate area of the emissions impacts. Contaminant concentrations would be less than the respective NTLs up to approximately 2970 ft to the west, approximately 1980 ft to the north, approximately 1650 ft to the east, and approximately 3300 ft to the south of the 4.5-Acre Site air strippers. Contaminant concentrations beyond this impact area would be essentially zero. The geometry of the air emissions impact area would be due primarily to the relative frequencies of the omnidirectional winds at the Pinellas Plant (subsection 4.1.1).

Table V.2 shows that all of the calculated contaminant concentrations at the critical receptor locations would be below their respective NTLs. The calculated annual concentration of dichloromethane

Table V.2. Calculated Contaminant Concentrations at the Critical Receptor Locations Versus No Threat Levels[a]

Contaminant of Concern	8-Hour Concentration	8-Hour NTL	24-Hour Concentration	24-Hour NTL	Annual Concentration	Annual NTL
Benzene	4.7E-05	0.03	2.3E-05	0.0072	3.8E-06	0.00012
Dichloromethane[b]	3.0E-03	1.74	1.4E-03	0.4176	2.3E-04	0.0021
Chloroethene[b]	9.5-04	0.13	4.6E-04	0.0312	7.8E-05	0.00014
1,2-*trans*-dichloroethene	9.5E-05	7.93	4.6E-05	1.9	7.8E-06	NA[c]
Trichloroethene	1.2E-03	2.69	6.0E-04	0.6456	1.0E-04	NA[c]
4-methylphenol[d]	1.6E-03	0.19	7.9E-04	0.0456	1.3E-04	0.003

[a]The contaminant concentrations are due to emissions from the 4.5-Acre Site air strippers only. The contaminant concentrations were calculated using the ISC-2 dispersion model (EPA 1992). The NTLs are from the Florida Air Toxics Working List (FDEP 1991). All contaminant concentrations and NTLs are in mg/m^3. The critical receptor for the annual and 24-hour contaminant concentrations is approximately 330 ft west of the 4.5-Acre Site air strippers. The critical receptor for the 8-hour contaminant concentrations is approximately 330 ft northwest of the 4.5-Acre Site strippers.

[b]Dichloromethane is methylene chloride. Chloroethene is vinyl chloride.

[c]There is no annual NTL for 1,2-*trans*-dichloroethene or trichloroethene.

[d]4-methylphenol was evaluated as phenol because there are no NTLs for 4-methylphenol.

NTL - no threat level

ISC-2 - Industrial Source Complex dispersion model (methylene chloride) is 2.3E-04 mg/m^3, which is slightly greater than the same concentration calculated for emissions from the Pinellas Plant (Building 100) itself (2.0E-04 mg/m^3 in subsection 4.1.2) (DOE 1992d). Combined annual dichloromethane concentrations at the western critical receptor location and south Pinellas Plant boundary location due to emissions from the Pinellas Plant (Building 100) and the 4.5-Acre Site air strippers are shown in Table V.3. The combined dichloromethane concentrations at these two locations are below the respective NTLs. The highest combined concentration, 9.0E-04 mg/m^3, is at the south Pinellas Plant boundary location, which also has the highest calculated dichloromethane concentration due to Pinellas Plant (Building 100) emissions (subsection 4.1.2) (DOE 1992d). The combined concentration at this location is approximately two times greater than the combined concentration at the western critical receptor location (less than 4.3E-04 mg/m^3). The 4.5-Acre Site air strippers would contribute essentially nothing to the combined dichloromethane concentration at the south Pinellas Plant boundary location.

If all or portions of the Pinellas Plant were leased to commercial enterprises, these enterprises may involve processes that create air emissions, including emissions of VOCs and SVOCs. These air emissions would be documented and regulated under the plant's existing Air Emissions Permit (FDEP 1993), and the responsible enterprises would obtain any necessary permit modifications or additional permits that would be required by the FDEP or PCAQD to demonstrate compliance with air missions requirements and to ensure compliance with the NAAQS and the Florida State Implementation Plan. Enterprises that might be located at the Pinellas Plant would be reviewed by the DOE with respect to their impacts on air emissions, and the DOE would conduct additional NEPA review if necessary. Enterprises that would warrant substantial permit modifications or new permits would be closely monitored or would not be allowed at the plant (DOE 1994d).

5.2.2. <u>No Action</u>

The no action alternative would consist of continuing the interim corrective action for the Northeast Site. Contaminated surficial aquifer groundwater would continue to be recovered and treated in the groundwater treatment system for the 4.5-Acre Site. Contaminated groundwater from the 4.5-Acre Site, and possibly from the Building 100 and West Fenceline Areas, would also be treated in this system. The treatment system uses an air stripper to remove VOCs and SVOCs from the contaminated groundwater, and the air stripper emits VOCs and SVOCs, primarily dichloromethane and chloroethene. The existing groundwater treatment system for the 4.5-Acre Site has a water inflow capacity of 20 gallons per minute, and the DOE proposes to increase this capacity to 50 gallons per minute to provide sufficient capacity for the final corrective action at the 4.5-Acre Site, the interim corrective action at the Northeast Site, and other possible corrective actions (e.g., Building 100 Area). Based on the previous analysis of contaminant emissions from two air strippers operating at 50 gallons per minute,

Table V.3. Combined Annual Dichloromethane Concentrations[a]

Contaminant Source	Concentration at Critical Property Boundary Location[b]	Concentration at South Property Boundary Location[c]
Pinellas Plant (Building 100)	<2.0E-04	9.0E-04
4.5-Acre Site air strippers	2.3E-04	0[d]
Combined sources	<4.3E-04	9.0E-04

[a]Dichloromethane is methylene chloride. All concentrations are in mg/m^3.

[b]The critical receptor for the annual contaminant concentrations is approximately 330 ft west of the 4.5-Acre Site air strippers.

[c]The south Pinellas Plant boundary location has the highest calculated dichloromethane concentration due to Pinellas Plant (Building 100) emissions (subsection 4.1.2) (DOE 1992d).

[d]Presentation of the air dispersion modeling results on a 330-ft grid shows that there is essentially no dichloromethane contribution from the 4.5-Acre Site air strippers at the south Pinellas Plant boundary location.

< less than

the use of the 4.5-Acre Site groundwater treatment system for continuing the interim corrective action and other corrective actions would not result in exceedances of the NTLs for the COCs in the surficial aquifer groundwater.

5.2.3. UV Oxidation

The alternative action of pump-and-treat with UV oxidation would use UV oxidation instead of air stripping to remove the volatile and semivolatile COCs from the contaminated surficial aquifer groundwater. Ideally, the UV oxidation process would degrade the COCs to carbon dioxide, water, and inorganic salts, and there would be no air emissions depending on the type of UV oxidation system used. However, studies have shown that certain organic contaminants such as 1,1-dichloroethane are difficult to oxidize and are removed from the groundwater by air stripping during the UV oxidation treatment (EPA 1990b). Several of the COCs in Northeast Site groundwater (e.g., benzene and trichloroethene) would be readily oxidized and easily removed by UV oxidation. The COC dichloromethane is very similar to 1,1-dichloroethane, and it is believed that this contaminant would be removed from the surficial aquifer groundwater by air stripping during the UV oxidation process. Therefore, a groundwater treatment system with UV oxidation would be expected to produce some air emissions (DOE 1993c). These air emissions should be less than those produced by air stripping and should not result in exceedances of the NTLs for the COCs in Northeast Site groundwater.

Depending on the type of UV oxidation system used, the UV oxidation process could also create emissions such as hydrogen chloride which would require the use of emissions controls.

5.3. SOILS

5.3.1. Proposed Corrective Action

The proposed corrective action would result in the temporary disturbance of approximately 1.5 acres of soils from the installation of the staging area, a groundwater containment measure, groundwater recovery wells, piping, and groundwater treatment system. Most of the affected soils would be Made-Land soils, but a small area of Myakka Fine Sands would be affected in the western portion of the Northeast Site. All of these soils have been disturbed previously by the early dairy farm activities, normal Pinellas Plant operations, and by the RFI and interim corrective action activities. Additional small areas of soils could be temporarily disturbed in the future for the installation of new groundwater recovery and monitoring wells (0.01 acre per well) and piping from new recovery wells to the groundwater treatment systems (0.03 acre per 100 ft of piping) for the proposed corrective action and other corrective actions (e.g., Building 100 Area). All areas disturbed during the corrective actions would be restored to as close to their original condition as possible and revegetated.

5.3.2. No Action

The no action alternative would not result in any new disturbance of soils because the recovery wells, piping, and groundwater treatment system for the Northeast Site interim corrective measure have already been installed. Small areas of soils could be temporarily disturbed in the future for the installation of additional groundwater recovery and monitoring wells and any associated piping. All disturbed areas would be restored to as close to their original condition as possible and revegetated.

5.3.3. UV Oxidation

This alternative action would require the same equipment and facilities as the proposed corrective action except that a UV oxidation unit would be used in the groundwater treatment system instead of an air stripper. Therefore, this alternative would result in the same temporary disturbance of soils as the proposed corrective action. Additional small areas of soils could be temporarily disturbed in the future for the installation of new groundwater recovery and monitoring wells and associated piping. All disturbed areas would be restored to as close to their original condition as possible and revegetated.

5.4. HYDROLOGY

5.4.1. Surface Water

The proposed corrective action, no action, the UV oxidation alternative action, or other corrective actions (e.g., Building 100 Area) would have very little effect on surface water at the Northeast Site or Pinellas Plant. Surface disturbance associated with corrective action activities (e.g., installation of the groundwater containment measure) could cause a slight increase in erosion during heavy precipitation. However, the terrain at the Pinellas Plant is generally flat, and the areas disturbed during the corrective actions would be restored as soon as possible. The disturbed areas would be graded to conform to the surrounding land surface and to avoid the ponding of surface runoff, and the areas would then be revegetated with plant species common to the Pinellas Plant.

Groundwater modeling of the proposed corrective action indicates that pumping of the surficial aquifer could potentially lower the level of the water in the East Pond. This potential surface water impact could therefore result with the proposed action, no action, the UV oxidation alternative action, or other corrective actions (e.g., Building 100 Area). The potential lowering of the water level in the East Pond is discussed further in subsection 5.5.3.

5.4.2. Groundwater

Proposed Corrective Action

During the CMS, groundwater conditions at the Northeast Site were simulated by computer modeling to evaluate the fate of the contaminant plume during the proposed corrective action. Two COCs, dichloromethane and chloroethene, were chosen for the computer modeling due to their detected concentrations during groundwater sampling in 1991 and 1992. The concentrations of these COCs greatly exceed the concentrations of the other COCs identified for the Northeast Site and their use in the computer modeling provides conservative estimates of the fate of the contaminant plume. The assumptions and procedures for the groundwater modeling are described in detail in the CMS Report (DOE 1993c,d; 1994b).

The results of the groundwater modeling indicate that four groundwater recovery wells could be pumped at a total rate equal to or less than 6,358 gallons per day to keep any well from going dry. At this rate, the total volumes of contaminated groundwater recovered from the surficial aquifer in 20 and 30 years of corrective action would be approximately 46 and 70 million gallons, respectively. These volumes of groundwater are approximately 10 percent to 12 percent less than those that would be recovered if the soil/bentonite slurry wall was not installed at the northern boundary of the Northeast Site. The recovered groundwater would be treated and then discharged to the Pinellas County Sewer System (DOE 1993c,d; 1994b). However, no municipal water supplies are taken from the surficial aquifer because the groundwater is of limited availability and generally of poor quality due to naturally occurring constituents (SWFWMD 1988; Fernandez and Barr 1983; DOE 1993c).

Within the Northeast Site, the recovery of contaminated groundwater would lower the water level in the surficial aquifer approximately 15 to 19 ft. This lowering of the groundwater level would extend beyond the boundaries of the Northeast Site and the Pinellas Plant, but the soil/bentonite slurry wall would minimize the drawdown beyond the northern plant boundary. The recovery of contaminated groundwater and installation of the slurry wall would also change the direction of groundwater flow in the surficial aquifer. The direction of groundwater flow in the surficial aquifer is generally to the east, but this direction would be reversed as flow components from the north, south, and west would be added as pumping of the recovery wells progressed. The slurry wall would minimize the flow component from the north and would thereby lessen the volume of groundwater recovered during the corrective action by approximately 10 percent to 12 percent (DOE 1993c,d, 1994b).

Steady-state groundwater flow conditions were used in the computer modeling to calculate the movement of the contaminant plume with the soil/bentonite slurry wall installed and five recovery wells being pumped. The peak combined model concentration of 3,150,000 μg/L of dichloromethane and chloroethene was reduced to 10,314 μg/L after 10 years of pumping, and the highest combined concentrations of these COCs after 20 and 30 years of pumping were calculated to be 2,018 and 1,396 μg/L, respectively. The combined concentration of 1,396 μg/L after 30 years of pumping is distorted due to the way the computer modeling simulates dispersion of the contamination into the slurry wall. In reality, the slurry wall would act as a barrier to groundwater flow and contaminant transport, so the predicted combined concentration of dichloromethane and chloroethene after 30 years of pumping would likely be less than 1,396 μg/L (DOE 1993c,d, 1994b).

After completion of the proposed corrective action, recharge of the surficial aquifer would restore the groundwater level and flow direction to previous conditions. Infiltration to the surficial aquifer in Pinellas County is estimated to be 22 inches per year (SWFWMD 1988; Fernandez and Barr 1983). Based on the groundwater modeling, which showed the surficial aquifer reaching steady state within 4 to 6 years of pumping, it is estimated that the groundwater level and flow direction in the surficial aquifer would be restored to previous conditions in less than 10 years. The soil/bentonite slurry wall would remain permanently at the northern boundary of the Northeast Site and could slightly alter future groundwater flow from or to the north. However, it is anticipated that the general direction of groundwater flow to the east would be restored (DOE 1993c,d, 1994b).

As stated in subsection 3.1, a slurry wall was assumed to be the proposed groundwater containment measure for this EA because it would remain permanently at the Northeast Site. If an infiltration gallery or shallow well injection were implemented as the groundwater containment measure, the impacts to groundwater conditions at the Northeast Site would be slightly different from those from the slurry wall. Treated groundwater from the corrective action would be recirculated into the surficial aquifer through the infiltration gallery or shallow well injection. This could preclude or minimize the lowering of the groundwater level and changes in the direction of groundwater flow in the surficial aquifer. The recirculation of treated groundwater into the aquifer could also increase flushing of the aquifer and thereby decrease the time needed to reduce the concentrations of the COCs to the MCLs. However, an infiltration gallery or shallow well injection may not be as effective as a slurry wall in preventing contaminant migration from possible unknown sources on adjacent properties. The infiltration gallery or shallow well injection would be removed upon completion of the corrective action, and recharge of the surficial aquifer would restore the groundwater level and flow direction to previous conditions.

If no corrective action were taken at the Northeast Site, the contaminant plume would remain in its present location and condition, and the potential for offsite migration of the plume would continue to exist for an indefinite period of time. This scenario was also simulated using the computer modeling to estimate the contaminant movement over a period of 30 years. With no corrective action, the peak model concentration of dichloromethane and chloroethene would be reduced to 1,260,300 and 587,520 μg/L after 10 and 30 years, respectively. After 50 years, the peak model concentration would have decreased to 3,056 μg/L. These decreases in the concentrations of the COCs would be the result of natural dispersion of the contamination within the surficial aquifer. However, after 30 years, the groundwater contamination would have spread both north and south within the Northeast Site and would encroach upon the East Pond. The combined concentration of dichloromethane and chloroethene at the northern boundary of the Northeast Site would have increased from the present concentration of less than 1 μg/L to 8 μg/L during this 30-year period (DOE 1993c,d, 1994b).

Corrective action at the 4.5-Acre Site involves the surficial aquifer as would other corrective actions at the Pinellas Plant (e.g., Building 100 Area). These corrective actions do and would increase the amount of groundwater withdrawn from the aquifer which would increase or alter the changes in the groundwater conditions that would result from the proposed corrective action (i.e., lowering the water level and changing the groundwater flow direction). No municipal water supplies are taken from the surficial aquifer because the groundwater is of limited availability and generally of poor quality due to naturally occurring constituents (SWFWMD 1988; Fernandez and Barr 1983; DOE 1993c). After completion of the corrective actions, recharge of the surficial aquifer would restore the groundwater level and flow direction to previous conditions. Other corrective actions for contaminated surficial aquifer groundwater at the Pinellas Plant would reduce the concentrations of contaminants in the groundwater faster than natural dispersion.

The treated groundwater from the proposed corrective action would be pumped to the Pinellas Plant wastewater neutralization facility for final discharge into the Pinellas Country Sewer System. In 1991, 1992, and 1993, the total wastewater discharges from the Pinellas Plant into the sewer system were approximately 250, 90, and 78 million gallons, respectively. The decrease in discharged wastewater from 1991 to 1993 was due to decreased production activities at the plant. The volumes of groundwater treated in the 4.5-Acre Site treatment system during these same years were approximately 2.5, 3.4, and 8.7 million gallons, respectively. The 1992 and 1993 volumes of treated groundwater included surficial aquifer groundwater from both the Northeast and 4.5-Acre Sites. If the groundwater treatment system for the Northeast Site was operating at 25 gallons per minute and if the capacity of the 4.5-Acre site treatment system was increased to 50 gallons per minute, the total volume of treated groundwater pumped to the wastewater neutralization facility would be approximately 39.4 million gallons per year. This volume of treated groundwater would represent more than a 400-percent increase in the volume of treated groundwater discharged in 1993 (8.7 million gallons) and would represent approximately 50 percent of the total Pinellas Plant wastewater discharge in 1993 (78 million gallons). It is very unlikely that both of the groundwater treatment systems for the Northeast and 4.5-Acre Sites would operate at maximum capacities for 365 days per year. The groundwater treatment system for the 4.5-Acre Site would probably operate at a maximum capacity of only 30 gallons per minute even if contaminated groundwater from the Building 100 and West Fenceline Areas were being treated in the system. There would be periodic shutdowns of each system for maintenance and fluctuations in the treatment flow rates of each system because the groundwater recovery wells do not pump continuously. Each groundwater recovery well automatically stops pumping when the groundwater in the well is lowered to a certain level. If the volume of treated groundwater to be discharged to the sewer system would increase the total Pinellas Plant wastewater discharge by more than 10 percent, the Pinellas County Sewer System would be notified 30 days prior to the increase in accordance with the requirements of the plant's Industrial Wastewater Discharge Permit (PCSS 1994).

If all or portions of the Pinellas Plant were leased to commercial enterprises, these enterprises may involve processes that create wastewater that would be discharged into the Pinellas County Sewer System. These discharges would be subject to the plant's existing Industrial Wastewater Discharge Permit (PCSS 1994), and potential commercial enterprises would be required to demonstrate that any wastewater discharges would meet the existing discharge standards. The DOE provides information to the Pinellas County Sewer System before initiating additional processes at the plant, and separate information would be provided for each potential enterprise or new process. If any potential process were substantially different than ongoing processes, the Industrial Wastewater Discharge Permit may require modification. Any modifications of the existing permit would be coordinated with the Pinellas County Sewer System and Pinellas County Water Quality Division, and the DOE would conduct additional NEPA review if necessary. If any potential process would increase the total Pinellas Plant wastewater discharge by more than 10 percent, the Pinellas County Sewer System would be notified 30 days prior to the increase in accordance with the Industrial Wastewater Discharge Permit (DOE 1994d).

No Action

The no action alternative would continue the interim corrective action for the Northeast Site, and groundwater would continue to be recovered from the surficial aquifer and treated. Therefore, no action would have impacts on groundwater very similar to those of the proposed corrective action. The no action alternative would require the use of the groundwater treatment system that is being used for the 4.5-Acre Site corrective action. This treatment system does not have enough capacity for the optimum groundwater recovery rates of both corrective actions; therefore, one or both of the corrective actions would have to be operated at less than the optimum groundwater recovery rate. This would extend the time required for one or both of the corrective actions to be completed and could present the potential for offsite migration of contaminated groundwater. It is anticipated that a less then optimum groundwater recovery rate for either corrective action would still permit onsite containment of the contaminated groundwater and thereby preclude or minimize this potential.

UV Oxidation

This alternative action would involve the same recovery and treatment of surficial aquifer groundwater as the proposed corrective action. Therefore, the groundwater impacts of this alternative action would be the same as the proposed action. Due to the types and concentrations of COCs in the surficial aquifer groundwater, it is possible that some of the COCs would not be completely removed by the UV oxidation process. This could require additional treatment processes or careful and continued manipulation of the operating parameters for the groundwater treatment system. This could, in turn, increase the time required for completion of the corrective action and prolong the environmental impacts of the corrective action.

approximately 1.5 acres of land for the
and the groundwater recovery wells and
reas of land could be similarly disturbed in
and monitoring wells and associated piping
ons (e.g., Building 100 Area). Most, if not
y disturbed but has been revegetated and
corrective actions would be restored and
nt, such as St. Augustine grass.

t Pond were different species of birds and
species are permanent residents of the
, and human activity associated with the
rarily disturb wildlife at the Northeast Site
ly 3 weeks. Similar disturbance of wildlife
uring the installation of new groundwater
activities would be performed infrequently
of the corrective action could result in the
nd could possibly cause the permanent
d species would probably relocate to other
y disturbance or permanent displacement
ective action would be doubtful, because
mal plant operations, as evidenced by the
1992).

e actions for contaminated surficial aquifer
e species at the Pinellas Plant. Displaced
nt or to nearby similar habitat. Permanent
ful that many, if any, of the wildlife species
ife species at the plant seem to adapt to

rary disturbance of vegetation and wildlife because the
ative have already been installed. The future installation
and monitoring wells and associated piping could
These activities would be performed infrequently and
s would be restored and revegetated with plant species
han optimum groundwater recovery rate, completion of
ast Site could take longer than the proposed corrective
sturbance of wildlife species and possible permanent

impacts on vegetation and wildlife as the proposed
e restored and revegetated with plant species common

angered plant or wildlife species were observed at the
ed SSC, was observed at the West Pond. Wading birds
ter retention ponds at any time, but these species are
A 1992). Installation and long-term operation of the
alternative action, or other corrective actions for
e.g., Building 100 Area) could temporarily disturb any
storm water retention ponds, but there are adequate
you. Therefore, the proposed action, no action, the
or contaminated surficial aquifer groundwater would not
ered species.

ximately 6 ft. When the water level in the pond reaches
charges into a county drainage ditch and eventually into
ond fluctuates depending on the frequency and amount
, and water level measurements taken during the RFI

indicate that the maximum fluctuation is less than 1 ft (DOE 1991b). This fluctuation of the level does not seem to affect the vegetation or wildlife in the East Pond. The periphery of th Pond is dominated by cattails, and vegetation on the bank includes pennywort, Brazilian pe hempweed, crabgrass, Carolina willow, and ragweed. Wildlife using the East Pond include cor moorhen, red-winged blackbird, common tern, green-backed heron, laughing gull, and Florida snake (BDA 1992).

Groundwater modeling performed for the CMS Report (DOE 1993c,d; 1994b) indicates that pum of the groundwater recovery wells for the proposed corrective action, no action, or the UV oxid alternative action could lower the water level in the East Pond. Other corrective actions contaminated surficial aquifer groundwater (e.g., Building 100 Area) could have a similar impact. amount of this decline is not known, but it is not expected to be substantial. Furthermore, due to amount of precipitation received at the Pinellas Plant, it is anticipated that inflow into the East Po would frequently replace this water loss. The lowering of the water level due to groundwater pump would not be expected to adversely affect vegetation or wildlife in the East Pond, but it could redu or eliminate discharge from the pond after heavy precipitation. During any corrective action contaminated surficial aquifer groundwater, the water level in the East Pond would be monitored determine the amount of lowering and to assess any adverse effects. If the lowering of the water lev was substantial or if any adverse effects were observed, appropriate measures would be develope and implemented by the DOE in consultation with the appropriate regulatory agency or other authorit The DOE would also evaluate the need for additional NEPA review and would conduct this review necessary. The most likely measure would be to supplement inflow into the East Pond with wate from an uncontaminated source such as the South or West Pond or with treated effluent water from the groundwater treatment system.

5.6. CULTURAL RESOURCES

As stated in subsection 4.6, there are no cultural resource sites within approximately 3 miles of the Pinellas Plant. Therefore, the proposed corrective action, no action, the alternative action, or other corrective actions would have no effect on cultural resources.

5.7. ACCIDENT ANALYSIS

A natural event or an operational failure could adversely affect the operation of the Northeast Site groundwater treatment system and associated groundwater recovery systems and could thereby cause adverse environmental consequences. Accidents related to the operation of the groundwater recovery and treatment systems could also cause adverse environmental consequences.

The natural events evaluated in this analysis are a hurricane or tropical storm, a tornado or tornado-like event (e.g., waterspout), the formation of a sinkhole, and an earthquake. As stated in subsections 4.1.1, and 4.2.2, the probabilities of these natural events occurring at the Pinellas Plant are very low. Operational failures that could affect the proposed action include the rupture of a containment device such as the influent storage tank (Figure 3.2) and a leaking valve. Examples of an operational accident are the spillage of a chemical used in the groundwater treatment system (e.g., the flocculent used in the pretreatment portion of the treatment system) or the inadvertent cutting of the transfer piping between the groundwater recovery and treatment systems. The primary adverse environmental consequence of any of these natural events or operational failures and accidents would be the uncontrolled release of contaminated groundwater or hazardous materials.

The tanks, piping, and other equipment that would comprise the groundwater recovery and treatment systems for the Northeast Site would contain two primary hazardous components that could be released. These components would be contaminated groundwater and filter press sludge. It is expected that the flocculent that would be used in the pretreatment portion of the groundwater treatment system would not be hazardous. April 1994 groundwater sampling results indicated that the dominant contaminants in the Northeast Site groundwater at that time were dichloroethene, trichloroethene, dichloromethane, chloroethene, and toluene. Iron is the only metal that is regularly detected above regulatory limits in the groundwater, and the detected concentrations are only slightly above regulatory limits (Terra 1994). The iron is a natural constituent of the surficial aquifer groundwater and is not a substantial health or environmental concern.

Waste sludge would be generated by the filter press in the Northeast Site groundwater treatment system (Figure 3.2). It is expected that this waste sludge would be similar to the waste sludge generated by the 4.5-Acre Site groundwater treatment system, which contains iron hydroxide and calcium hydroxide precipitates. The 4.5-Acre Site waste sludge is relatively inert and does not pose a serious health or environmental hazard. Pending a final EPA categorization of the Northeast Site waste sludge as either hazardous or nonhazardous, the Pinellas Plant would manage the sludge as hazardous in accordance with the applicable Federal, state, and DOE procedures. Drums of the sludge could be breached during a natural event or operational accident, resulting in a spill; however, the spill would be contained within the berms around the waste sludge storage area and would not result in serious environmental consequences.

Natural events such as a hurricane or earthquake could overturn containment devices or cause the rupture of containment devices and/or associated piping, resulting in an uncontrolled release of contaminated groundwater. The majority of the transfer piping associated with the groundwater recovery and treatment systems would be underground and would therefore not be susceptible to rupture during a hurricane, tornado, or tornado-like event. However, the piping could rupture due to the formation of a sinkhole or an earthquake. An operational failure or accident such as the rupture of a tank or a worker inadvertently cutting transfer piping during the installation of utility lines could also result in the uncontrolled release of contaminated groundwater. An operational accident is a likely event; operational failures are less likely but are possible. The consequences of an operational failure or accident would be essentially the same as the consequences of a similarly destructive natural event. Therefore, the primary accident scenario would be a break in the transfer piping. This accident scenario adequately characterizes the risks to human health and the environment from both natural events and operational failures or accidents.

A break in the transfer piping between the Northeast Site groundwater recovery and treatment systems would result in an uncontrolled release of contaminated groundwater. The contaminants in the groundwater are VOCs and SVOCs; therefore, the release of the contaminated groundwater could result in the escape of organic vapors. It is expected that a break in the transfer piping between the groundwater recovery and treatment systems would occur where the piping enters the above-ground influent storage tank. At this point, the piping would be exposed and more susceptible to an operational accident. It was assumed that the closest potential receptor would be 50 ft from the transfer piping break. This potential receptor would likely be a contractor's trailer or comparable structure. It was also assumed that the influent storage tank would be located no closer than 100 ft from the northeast corner of Building 1400 (Figure 3.1). Building 1400 is separated from the Northeast Site by a fence and therefore represents a potential receptor location where access is not restricted by a physical boundary. The concentrations of organic vapors resulting from the break in the transfer piping were modeled using the Emergency Prediction Information (EPI) Gaussian plume model (Holmann Associates 1988). For modeling the release of contaminated groundwater, chloroethene was chosen from the dominant groundwater contaminants due to its high vapor pressure and low exposure limits. The other assumptions and inputs for the EPI modeling were as follows:

- The chloroethene concentration is 12,000 μg/L (Terra 1994).
- The release is continuous, but the release area is restricted because the groundwater treatment system is isolated after 15 minutes. The realistic response time to shutdown the treatment system is 15 minutes.
- The release and receptor heights are ground level, and the atmospheric stability class would result in maximum vapor concentrations at a given location. The wind speed is 3.3 ft per second, and the terrain factor is standard and conservative.
- The treatment system inflow rate is 25 gallons per minute, and 375 gallons are released (25 gallons per minute for 15 minutes).

- The release area is 1,548 square ft (375 gallons at a depth of 0.4 inch), and the radius of the release area is 22 ft.

- The evaporation rate for 0.0012 percent of chloroethene in solution was calculated with the EPI model equation (0.0010 pounds per minute). The vapor pressure of chloroethene at 32 degrees C was calculated with the Antoine Equation, and the partial pressure of the chloroethene and water solution was calculated with the Reoult Equation.

Based on the relatively low initial concentration of chloroethene (a maximum of 0.0012 percent or 12,000 μg/L), the release of contaminated groundwater would not be expected to result in adverse effects on human health. The results of the EPI modeling for the accident scenario indicate that the maximum concentrations of chloroethene vapor at 50 and 100 feet would be 0.5 and 0.19 part per million (ppm), respectively. Both of these concentrations are below the threshold limit value-time weighted average (TLV-TWA) of 1 ppm and the threshold limit value-ceiling (TLV-C) of 5 ppm. The TLVs are the most conservative published exposure limits which have been established by regulatory standards, industrial guidelines, and the consensus of government agencies to assist in the control of health hazards. The TLV-TWA is the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effects. The TLV-C is the concentration that should not be exceeded at any time (ACGIH 1992a, b; NIOSH 1990). The chloroethene vapor concentration at an offsite receptor would be substantially less than the concentration of 0.19 ppm at 100 ft. The Pinellas Plant boundaries closest to the proposed location of the groundwater treatment system are the north and east boundaries which are approximately 460 and 520 ft away, respectively.

Personnel operating and maintaining the groundwater recovery and treatment systems could be exposed to both physical and chemical hazards as a result of natural events and operational failures or accidents. Corrective action personnel would be trained to take appropriate actions at the time of such incidents to avoid potential hazards. This training and the appropriate actions would be set forth in the site health and safety plan that is required for the proposed corrective action by 29 CFR 1910.120. Additional information on protection from potential hazards would be provided in procedural manuals for the proposed corrective action. For example, the operation and maintenance manual for the pretreatment portion of the groundwater treatment system would provide safety information about the flocculent and any other chemicals that may be used. Subsection 3.1 provides more details on the health and safety requirements applicable to the proposed corrective action for the Northeast Site.

The groundwater treatment system for the Northeast Site would incorporate several measures for both the prevention and mitigation of accidents. All tanks would be contained within bermed areas that have sumps. The berms would be high enough to contain a release from any tank within the bermed area. The bermed areas would drain to sumps that could be used to pump the released liquid back into the treatment system. A manual pump could also be used to pump released liquids out of the sumps and into other containers for appropriate disposal. The sumps would be provided with float switches that would shut down the groundwater treatment system when the water in the sumps reached a certain level. If a float switch were activated, a red light above the air stripper tower would be illuminated to signal a problem to plant personnel. In addition, control wires would be installed for the full length of the transfer piping between the groundwater recovery and treatment systems. If the transfer piping were cut, the control wires would also be severed, and the groundwater recovery pumps would be automatically deactivated.

Pinellas Plant personnel are on call 24 hours per day to respond to any incident involving the groundwater recovery and treatment systems. If an uncontrolled release of contaminated groundwater or hazardous materials were to occur, an on-site hazardous materials team is available to respond. This team is equipped with personal protective equipment, absorbent materials, containers, and other appropriate equipment and materials to accomplish effective control and/or cleanup of a release. The hazardous materials team coordinates its operations with local emergency response organizations and can obtain support from local fire departments.

An uncontrolled release of contaminated groundwater or hazardous materials could cause the contamination of soils, surface water, and groundwater at the plant. Both natural events and operational failures and accidents may result in the shutdown of the groundwater recovery and treatment systems which would delay the proposed corrective action for the Northeast Site. The groundwater contaminant plume would remain in its current location and condition until the damages to the groundwater recovery and treatment systems were repaired and the systems were restarted. The Northeast Site groundwater treatment system and waste sludge storage area would be contained within berms, and the bermed areas would drain to sumps. These measures would prevent uncontrolled releases to the environment. Therefore, the most severe human health and environmental consequences would result from an accident that involves a break in the transfer piping between the groundwater recovery and treatment systems. Such a break could occur due to a natural event or operational failure but would be much more likely to occur due to an operational accident.

All of the transfer piping between the Northeast Site groundwater recovery and treatment systems would be located in an area that is already designated as a SWMU. A break of the transfer piping in this area would simply transfer the contaminated groundwater from one part of the SWMU to another part. Corrective action is already being conducted in this area so the contaminated groundwater would eventually be recovered and treated. If a break in the transfer piping released contaminated groundwater into an area within the Pinellas Plant that is not designated as a SWMU, the area of the release would be assessed for potential designation as a SWMU. If the area was determined to be a SWMU, the area would be subject to the corrective action requirements set forth in the Pinellas Plant HSWA Permit (EPA 1990). Corrective action for this new SWMU could potentially expose corrective action workers, and the health risks due to this exposure would be similar to those described in subsection 5.1.4.

6. AGENCIES, ORGANIZATIONS, AND PERSONS CONSULTED

Agency/Organization	Person	Subject
Pinellas County Department of Environmental Management Clearwater, Florida	Peter Hessling Don Moores	Air quality Surface water
Florida Department of State, Division of Historical Resources, Tallahassee, Florida	George Percy	Cultural resources
U.S. Department of the Interior, Fish and Wildlife Service, Vero Beach, Florida	Joseph Carroll	Threatened and endangered species

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United States Department of the Interior
FISH AND WILDLIFE SERVICE
P.O. BOX 2676
VERO BEACH, FLORIDA 32961-2676

July 25, 1991

Mr. Paul J. Behrens
Senior Environmental Scientist
Systematic Management Services, Inc.
11701 Belcher Road
Suite 103
Largo, FL 34643

Dear Mr. Behrens:

This responds to your letter, dated July 17, 1991, regarding threatened or endangered species that may be present on the U.S. Department of Energy's Pinellas Plant in Largo, Pinellas County, Florida.

The property is within the historic range of the endangered Florida golden aster (Chrysopsis floridana). The species was recorded historically from St. Petersburg Beach and from Seminole, but urban development has apparently extirpated the species from those two sites. If a remnant of pine scrub vegetation is present on the property, it should be thoroughly searched for the species. If sand pine scrub is not present on the property, it is unlikely that the species is present there.

The nearest bald eagle nest (designated PI-19 by the Florida Game and Fresh Water Fish Commission) is located about 2 miles southwest of the property, near Cross Bayou. Although the eagles could feed as far north as the retention ponds on the property, their feeding is most likely concentrated in Cross Bayou. If contaminants from the plant are entering the Cross Bayou Watershed, some adverse effect on the eagles may occur. Otherwise, activities within the property are not likely to have a direct effect on the nesting pair.

The threatened Eastern indigo snake may inhabit the property. Detailed study of the site would be required to determine its presence or absence.

The endangered wood stork may feed seasonally in the retention ponds on the property.

No other Federally listed species are likely to occur near the property. You should contact the Florida Game and Fresh Water Fish Commission regarding species listed by the State.

If the Department of Energy determines that an action is likely to adversely affect a Federally listed species, they should notify this office in writing to request consultation under Section 7 of the Endangered Species Act.

Thank you for the opportunity to comment.

Sincerely yours,

Joseph D. Carroll
Acting Field Supervisor

cc:
FG&FWFC, Tallahassee, FL
FWS, Jacksonville, FL

DISCLAIMER