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Agency

Office of
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Remedial Response

EPA/ROD/R04-90/076
March 1990

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Superfund Record of Decision:

Zellwood Groundwater Contamination, FL

50272-101

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 57-acre Zellwood Groundwater Contamination site is approximately 1/2-mile west of the town of Zellwood in Orange County, Florida. The site is situated in a rural area, and approximately 300 homes located within one mile of the site depend on private wells for their potable water supply. The site is comprised of four active industries and an open field with marshy wetlands. Prior to 1963, the area was used by several agriculturally related businesses. In 1963, a drum recycling facility began operations at the site. During the drum recycling process, onsite wastewaters were generated by draining and cleaning procedures, and two onsite evaporation/percolation ponds (#1 and #2) were used in the treatment and disposal of the wastewaters. A new treatment system was installed in 1980 and use of the ponds was discontinued. In 1981, the site owners drained the two ponds and moved some of the contaminated sediment to an offsite landfill. The remainder of the contaminated sediment was consolidated into a temporary sludge storage area before the sediment was moved offsite in 1982 and the onsite ponds were filled in. In 1982, EPA identified an abandoned drum storage area by a 6-acre field at the northern part of the site, which was apparently used for the disposal of drums and other wastes. Site investigations by EPA from 1988 to 1990 identified

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Zellwood Groundwater Contamination, FL
First Remedial Action (Amendment)
Contaminated Media: soil, sediment
Key Contaminants: VOCs (PCE, toluene, xylenes), other organics (PAHs, pesticides), metals (chromium, lead)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 66
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(See ANSI-Z39.18) *See Instructions on Reverse*

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(Formerly NTIS-35)
Department of Commerce

EPA/ROD/R04-90/076
Zellwood Groundwater Contamination, FL
First Remedial Action (Amendment)

Abstract (Continued)

contamination in the soil, sediment, and ground water at the site. This Record of Decision (ROD) addresses remediation of onsite source areas. Ground water remediation will be addressed in a subsequent ROD. The primary contaminants of concern affecting the soil and sediment are VOCs including PCE, toluene, and xylenes; other organics including PAHs and pesticides; and metals including chromium and lead.

The selected remedial action for this site includes excavating approximately 3,000 cubic yards of contaminated soil and sediment from the ditch, drum, and pond areas, followed by onsite stabilization and solidification of the soil and sediment; replacing the stabilized soil and sediment into the excavation area, covering the area with top soil and reseeding the area; evaluating existing ground water wells for decommissioning; and ground water monitoring. This ROD amends a 1987 ROD, which proposed treatment of contaminated soil and sediment by incineration with disposal of the residual ash onsite. The estimated total cost for this remedial action is $1,030,000, which includes an estimated total O&M cost of $250,000 over 10 years.

PERFORMANCE STANDARDS OR GOALS: Soil cleanup criteria were calculated using site specific soil and climatic data from the EPA, State, and other sources. Chemical-specific goals for soil include lead 220 mg/kg, chromium 100 mg/kg, total PAHs 10 mg/kg, PCE 1 mg/kg, toluene 30 mg/kg, and total xylenes 5 mg/kg.

AMENDED RECORD OF DECISION

FUNDAMENTAL CHANGE

SITE NAME AND LOCATION

Zellwood Groundwater Contamination Site
Operable Unit #1 (OU #1)
Zellwood, Orange County, Florida

STATEMENT OF PURPOSE

This document represents the rationale for an amended Record of Decision (ROD) for the selected remedial action for this Site developed in accordance with CERCLA, as amended by SARA, and, to the extent practicable, the National Contingency Plan. The amended ROD documents the significant changes in the remedy previously proposed by the Agency.

The State of Florida has concurred in this Amendemnt to the ROD.

STATEMENT OF BASIS

The decision is based upon the administrative record for the Zellwood Groundwater Contamination Site. The attached index identifies the items which comprise the administrative record upon which the selection of a remedial action is based.

DESCRIPTION OF THE SELECTED REMEDY

Approximately 3,000 cubic yards of soil at the Zellwood Groundwater Contamination Site contains elevated levels of lead, chromium, chlordane, tetrachloroethylene, toluene, ethylbenzene, xylenes and polyaromatic hydrocarbons (PAHs). The Florida Department of Environmental Regulation has concurred with EPA on the cleanup levels established for this remedial alternative. The Selected Remedy consists of a source control remedy which is consistent with an overall risk goal for this site.

To address the contamination at the site, the selected remedy includes the following activities.

Activity 1

- Excavation of the soils and/or sediments at the following locations depicted in Figures 2 and 3:
  - -- the existing abandoned drum areas;
  - -- former percolation pond #2;
  - -- abandoned drum pond;
  - -- Douglas Fertilizer Pond #1;
  - -- Middle Ditch South; and the
  - -- South Ditch West.

- Verification sampling of excavated areas.

Activity 2

- Stabilization/Solidification of the excavated soils and sediments; construction of a solidified monolith.

- Leachability testing of solidified soils during construction of the solidified monolith.

- Placement of the stabilized/solidified soils and sediments back into the excavated area, covering with topsoil and seeding.

Activity 3

- Operation and maintenance activities required to ensure the continued effectiveness of the remedy including:

  -- Long term groundwater monitoring to ensure that long term performance has been achieved with the solidification and stabilization process. This requires additional monitor wells to be constructed in the area of the remedy and in areas of past disposal.

  -- Evaluation of existing groundwater wells for decommissioning; appropriate wells will be decommissioned in accordance with Florida requirements.

Groundwater recovery and treatment will be addressed at a later date with a separate Record of Decision. The scope of groundwater remediation will be dependent on results of groundwater testing to be conducted during implementation of the remedy set forth in this ROD for Operable Unit #1.

EXPLANATION OF FUNDAMENTAL CHANGE

Further Characterization and Results from Treatability Study Information (Weston, 1989) developed by U.S. EPA during the Superfund Remedial Design Process demonstrates that the selected remedy described above satisfies EPA'S goals for source control. This change in method of source control is significantly different than the previous ROD, 1987. The ROD, 1987 had determined incineration of soil followed by solidification of ash to be the proper source control method. Solidification has been proven to be a viable, effective treatment for soils and sludges at the Zellwood site at a lower cost.

Specifically, the fundamental change in the previous remedy (ROD, 1987) and the new selected remedy, described herein, is as follows: First, solidification of contaminated soil and sludges at the locations described herein will increase soil volume in the constructed remedy. This is because incineration would reduce volume prior to solidification of ash. Second,

solidification is a different type of treatment criteria. Third, the cost of the selected remedy is substantially less than incineration and would therefore effectuate a quicker, cost effective treatment. This fundamental change will produce an effective solution to contaminants present at the site without removal of hazardous constituents off site. Further, the fundamental change meets Applicable and Relevant and Appropriate Requirements at a lower cost.

DECLARATION

The selected remedy is protective of human health and the environment, attains federal and state requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for treatment that reduces toxicity, mobility, or volume as a principal element. Finally, it is determined that this remedy utilizes a permanent solution and alternative treatment technology to the maximum extent practicable. The expected capital cost for this remedy is approximately $780,000 with an additional $250,000 for 12 years of operation and maintenance after the remedial action is completed for Operable Unit One.

MAR 0 1 1991

Date

Greer C. Tidwell
Regional Administrator

SUMMARY

of the

REMEDIAL ALTERNATIVE SELECTION

ZELLWOOD GROUNDWATER CONTAMINATION SITE

ORANGE COUNTY, FLORIDA

Prepared by:

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

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Amendment to the Record of Decision

Summary of Remedial Alternative Selection
Zellwood Groundwater Contamination Site
Operable Unit #1
Zellwood, Florida

1.0 INTRODUCTION

1.1 EXECUTIVE SUMMARY: Record of Decision, 1987

The Zellwood Contaminated Groundwater Site (the "Site") was included on the National Priorities List (NPL) in October, 1981. In 1984, the United States Environmental Protection Agency (EPA) Field Investigation Team (FIT) NUS Corporation began a Remedial Investigation/Feasibility Study (RI/FS) at the site. This RI/FS was conducted to identify the types, quantities, and locations of contaminants, and to assess methods for solving the problems presented by those contaminants. The results of the RI/FS delineated a variety of problems. These are:

* Contaminated sediments located in drainage ditches, the percolation pond, the Douglas Fertilizer Pond and abandoned drums areas.

* Contaminated groundwater downgradient from the Site.

* Contaminated local irrigation wells on the Site.

After review of the Remedial Action Alternatives presented in the Feasibility Study, EPA issued a Record of Decision (ROD) in December, 1987. This ROD is included as Appendix A. The ROD recommended the following actions:

* Excavation and incineration of soils/sediments in the on-site ditches, temporary sludge and two former percolation ponds, and waste piles.

* Appropriate leachability testing and disposal of the incinerated soil.

* Groundwater removal and treatment for the surficial aquifer.

1.2 SUBSEQUENT ACTION

After review of the ROD, the Florida Department of Environmental Regulation (FDER) concluded that the remedy selected by EPA was not substantiated by the FS. As a result, EPA and FDER agreed to re-assess the groundwater conditions relating to the Site, to re-evaluate the risk assessment, and to re-assess the remedial alternatives. Subsequently, in April 1988, EPA initiated an additional study to further evaluate the Site conditions since the time of the RI/FS, to further investigate the risk assessment, and to further evaluate the alternatives for clean-up. The analytical results of the 1988 study can be seen in Appendix A.

1.3 FUNDAMENTAL CHANGE IN PREVIOUS REMEDY

Further Characterization and Results from Treatability Study Information (Weston, 1989) developed by U.S. EPA during the Superfund Remedial Design Process demonstrates that the selected remedy described above satisfies EPA'S goals/(9 criteria) for source control. This change in method of source control is significantly different than the previous ROD, 1987: The ROD, 1987 had determined incineration of soil followed by solidification of ash to be the proper source control method. Solidification has been proven to be a viable, effective treatment for soils and sludges at the Zellwood site at a lower cost.

Specifically, the fundamental change in the previous remedy (ROD, 1987) and the new selected remedy, described herein, is as follows: First, solidification of contaminated soil and sludges at the locations described herein will increase soil volume in the constructed remedy. This is because incineration would reduce volume prior to solidification of ash. Second, solidification is a different type of treatment criteria. Third, the cost of the selected remedy is substantially less than incineration and would therefore effectuate a quicker, cost effective treatment. This fundamental change will produce an effective solution to contaminants present at the site without removal of hazardous constituents off site. Further, the fundamental change meets Applicable and Relevant and Appropriate Requirements at a lower cost.

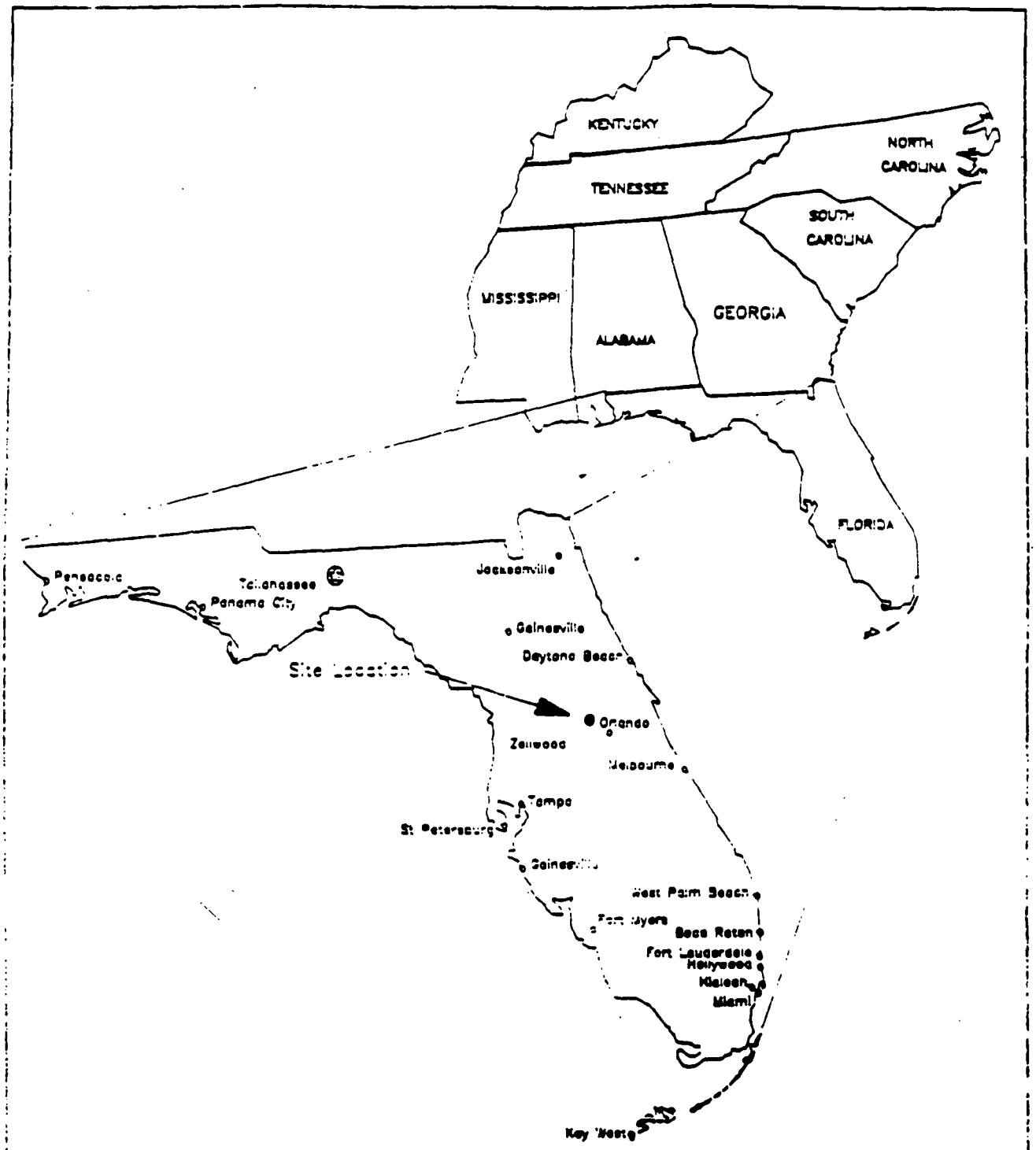
1.4 SITE LOCATION AND DESCRIPTION

The Zellwood Groundwater Contamination Site is located in the northwestern corner of Orange County, Florida; approximately one-half mile west of the unincorporated town of Zellwood. The 57-acre Site, as shown in Figure One, consists of an area occupied by four industries and an open field with a marshy wetlands area.

The Site is situated in a rural area. Small residential communities are located to the north and to the east with agricultural lands to the south and west. There are approximately 300 homes within a one-mile radius of the Site. These homes depend on private wells for potable water supply. In addition, Zellwood Water Users, Inc. has two public water supply wells within a half mile east of the Site servicing about 700 to 800 people. In addition to these industries and the residences, there are several plant nurseries, vegetable growing operations, and citrus groves.

FIGURE 1

General Site Location Map



E.P.A. Region IV
Weston T.A.T. Activity Location
TDD 8303-04
Zellwood GW Contamination NPL Site
Zellwood, Orange County, Florida

EPA

The industrialized section of the Site has been occupied since the 1960's by Zellwin Farms Company and Drum Service Company of Florida. In the early 1970's, Southern Liquid Fertilizer Company began its operation on the site. The business was operated until 1981 when the plant was purchased and operations were assumed by the Douglas Fertilizer and Chemical Company. Douglas Fertilizer sold the property and moved its operation to a new location in 1984. The former fertilizer production area is now occupied by Coatings Applications and Waterproofing Company. Chemical Systems, Incorporated, located on the western part of the Site, commenced operations in 1982.

1.5 SITE AND REGULATORY HISTORY

LAND USE

Prior to 1963 when the Drum Service Company of Florida was established, the area was almost entirely composed of agriculturally-related businesses such as citrus groves, nurseries, farmland, and muck farming. The Zellwood Groundwater Contamination Site is currently occupied by four active businesses: Drum Service Company of Florida, Chemical Systems of Florida, Zellwin Farms Company, and the former fertilizer area occupied by Coatings Application and Waterproofing Company. In addition, several other businesses are located in the industrial area surrounding the Site. Adjacent to the Zellwin Farms facility there is a migrant worker hotel.

Approximately one-half mile north of the Site are several residential developments and the Willow Street Community Center. The majority of residences north of the Site and the Willow Street Community Center have been established since 1965. Adjacent to the Site on the south side are muck farms. The remaining areas surrounding the Site are composed of citrus groves and pastureland. A main traffic artery, U.S. Highway 441, is located less than one-half mile east of the Site.

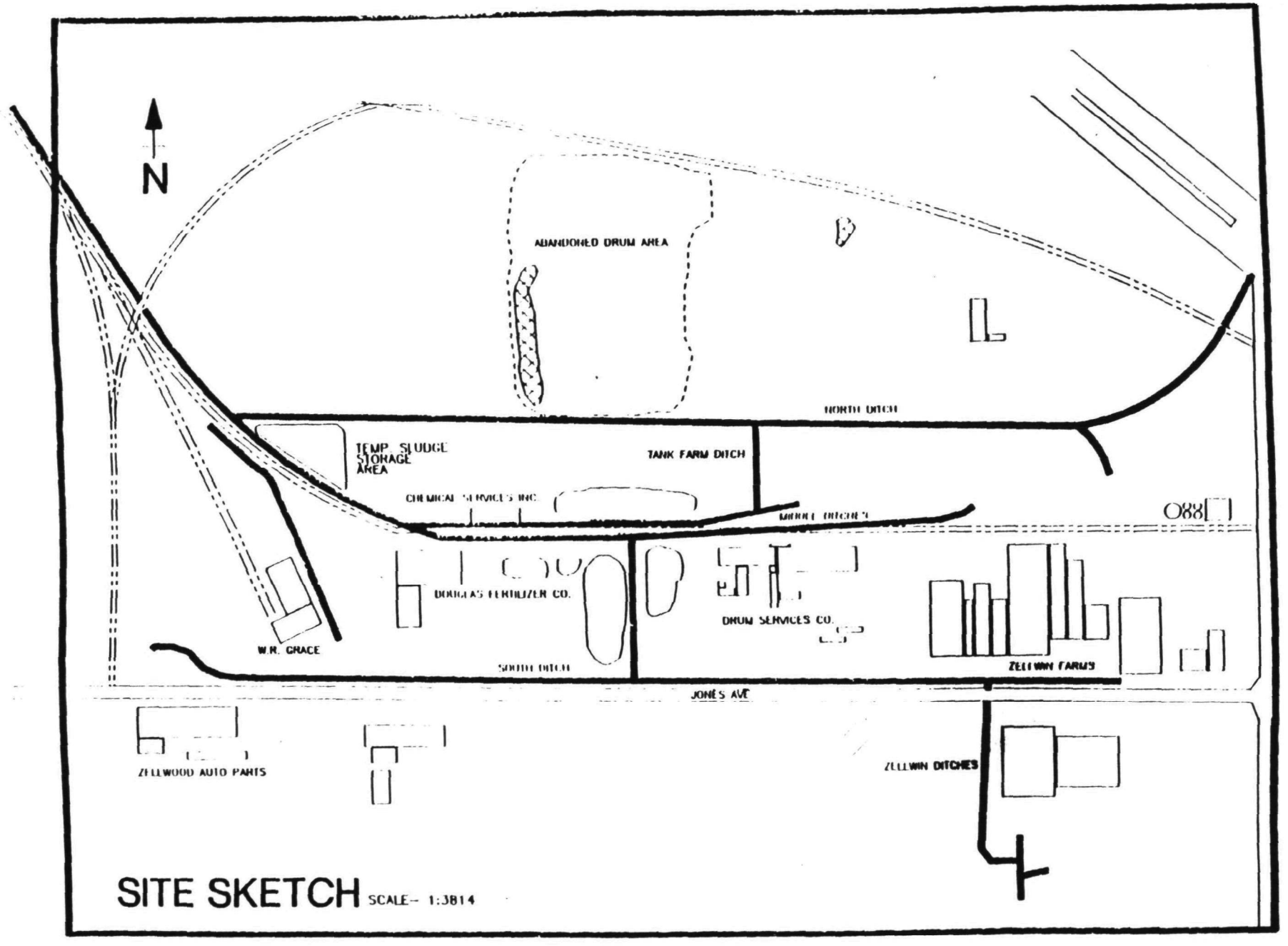
Land use in a one-mile radius of the Site can be divided into five major categories. Agriculture, primarily muck farms and citrus groves, accounts for 74 percent of the area land use. Residential use totals 10 percent, followed by commercial, industrial, and transportation areas occupying 9 percent. Seven percent of the land area is combined lake and wetland areas.

1.6 PREVIOUS SITE ACTIVITIES

Drum Service Company of Florida, a drum recycling facility, began operations in 1963. In the course of recycling used drums, wastewaters were generated through the draining and cleaning procedures. From 1963 until 1975, the Company used two on-site evaporation/percolation ponds for treatment and disposal of the wastewater. In 1980, the Company redesigned its treatment system, eliminating the use of the ponds for waste disposal. These ponds, former percolation ponds #1 and #2, are depicted in Figures 2 and 3.

FIGURE 2

Site Sketch



SITE SKETCH SCALE- 1:3814

Drainage and removal of contaminated sediments from the two ponds was initiated in August 1981. The sediments were collected and initially disposed of in the Astatula Landfill in Lake County, Florida. After August 21, 1981, the landfill operators changed their policy and refused to accept the wastes because the sediments had been generated in another county. To complete the clean-up of the two ponds, Drum Service Company of Florida constructed a temporary sludge storage area consisting of an earthen berm at the western edge of the drum storage area. The sludge was subsequently removed from the temporary storage area during October and November 1982, and hauled to the Brevard County Shredder Landfill. The areas where the ponds had been located were filled in and are presently used for parking and drum storage.

Douglas Fertilizer and Chemical Company and the previous business, Southern Liquid Fertilizer, had three unlined surface impoundments which received wastewater from their production process. The company is no longer at this location and, as of 1985, water remained in only the easternmost pond.

Chemical Systems, Inc., located northwest of the Drum Service Company of Florida, is a small facility producing cleaning products for the citrus concentrate industry. This company reportedly does not generate either solid or liquid wastes.

The Zellwin Farms Company facility is a vegetable washing and packing plant. From 1960 to 1983, all waters from the vegetable washing processes were discharged to the southern ditch which parallels Jones Avenue. In 1983, water from the carrot and radish cooling process and the run-off from the Zellwin Farms parking lot area north of the Jones Avenue facility were diverted to a drainage ditch south of Jones Avenue. The remainder of the water is still discharged to the southern ditch which parallels Jones Avenue.

In December 1982, EPA representatives discovered an abandoned drum storage area located on an approximately six-acre field north of the northern ditch and south of the Seaboard Coastline Railroad in the northern section of the Zellwood Groundwater Contamination Site. The abandoned drum area was apparently used for the disposal of drums and other wastes. Based on unsubstantiated reports from residents in the area, some of the material may have been there for more than 20 years.

The Zellwood Site was listed on the first final National Priorities List which was published in the Federal Register in 1983. In the fall of 1983, EPA's Region IV Emergency Response and Control Section (ERCS) oversaw a Potential Responsible Party (PRP) removal action at the abandoned drum area of the Site. In 1984, a Remedial Action Master Plan was developed and a Work Plan for the RI/FS was formulated. Negotiations with the PRPs were initiated, but the PRPs did not implement the EPA Work Plan. EPA, using its FIT, implemented the RI/FS in 1985. The Site was resampled in June 1988 to confirm levels of contamination in both water and soil.

1.7 REGULATORY ACTIONS

Between 1963 and 1971, Drum Service Company of Florida operated its wastewater disposal system without a regulatory permit. In 1971, Drum Service Company of Florida applied for and was granted Florida Department of Environmental Regulation (FDER) Operation Permit No. IC-1308. The permit was granted for a wastewater treatment system using evaporation and percolation ponds for treatment and disposal of wastes from the plant. In 1975, the system was redesigned to eliminate ponds except for temporary storage of wastewater. FDER issued Operation Permit No. [illegible]048-2077 for this system on July 31, 1975. In 1980, further design changes were made eliminating use of the ponds for storage of wastewater. As of 1985, Drum Service Company of Florida held FDER Permit No. AO48-27470B to operate a drum reclamation furnace for processing used drums by burning and melting the interior residue, and subsequent coating of interior and exterior drum surfaces.

The Douglas Fertilizer Chemical Company and the Zellwin Farm Company have not, in the past or currently, held any industrial waste treatment permits. Chemical Systems, Inc., reportedly did not generate either solid waste or wastewater, and thus would not have a permit.

In March 1986, the Florida Department of Environmental Regulation filed suit against the Drum Service Company for failure to comply with applicable air regulations. In May 1989, both the PRP and FDER reached a joint agreement for dismissal of the suit.

2.0 ENFORCEMENT ANALYSIS

Four businesses currently operate at the Zellwood Groundwater Contamination Site. The Drum Service Company recycles used steel drums. The drums are recycled by incinerating liquids and residuals that are present in the drums at a minimum temperature of 1600°F, followed by cooling, straightening, and repainting. Wastewater is generated by the draining and cleaning of the drums prior to incineration. Oil is separated from the wastewater by an oil separator. Recovered oil is stored in a 5,000 gallon tank until it is sold to an oil reclaimer. Prior to November 1980, effluent from the wastewater treatment system was discharged into two evaporation/percolation ponds. Presently all effluent is reportedly recirculated through a closed loop system and used as conveyor chain cooling water in the incinerator system.

Drum Service Company of Florida currently leases the business property from NAPA Inc. NAPA also owns the property which housed the abandoned drum area. NAPA Inc. funded the emergency removal that was supervised by EPA in 1983. NAPA hired Drum Service as the contractor for the emergency removal project.

Drum Service participated in negotiations to implement the RI/FS Work Plan. The company ultimately declined to implement the EPA RI/FS Work Plan. Drum Service did submit an RI/FS Work Plan of their own; however,

EPA did not accept that Work Plan as being technically equivalent to the EPA Work Plan. EPA then offered to split the Work Plan into surface and subsurface portions; thus, allowing any interested parties to perform at least part of the RI/FS with EPA performing the rest. This offer was declined. Drum Service has been cooperative in allowing EPA site access for the investigative work and has followed EPA activities at the Site. Drum Service has recently (May 1989) indicated their renewed interest in participating in the RD/RA activities associated with source remediation presented herein. Negotiations are being pursued at this time.

Douglas Fertilizer, which operated on the Zellwood Site from the mid 1970s to 1984, has relocated to another piece of property in Zellwood, Florida. According to FDER, the company currently operating on the old Douglas Fertilizer Company property, Coatings Applications and Waterproofing Company, does not require any environmental permits.

Chemical Systems Inc., leases the property it occupies from Drum Service Company. It also does not discharge any wastewater and thus requires no permit. Chemical Systems has been in business at this Site since 1982.

Seaboard Railroad, which owns the railroad right-of-way on the Site, was notified that they were a PRP during the negotiations. The company showed no interest in implementing the project.

3.0 CURRENT SITE STATUS

3.1 SITE GEOLOGY AND HYDROGEOLOGY

The Zellwood Site is underlain by an unconfined surficial aquifer and the artesian Floridan aquifer. Regionally, the water level ranges from immediately below ground surface to greater than twenty feet below ground surface. The shallow aquifer fluctuates in response to climatic recharge and discharge mechanisms. Seasonal fluctuation of up to ten feet are not uncommon. At the Site, the hydraulic gradient ranges from 0.35 to 0.63 feet per 100 feet, which is somewhat steeper than is regionally normal. This may be due to continuous pumping of surface water out of the muck farm area directly south of the Site. The general direction of flow is to the south-southwest.

Between the surficial and Floridan aquifers is the Hawthorne Formation. In the area, the Hawthorne consists of a green to yellowish-green clay which is underlain by a brown to white dolomite or dolomitic limestone. A clay-like sand layer in the upper Hawthorne retards the vertical movement of water between the surficial aquifer and the limestone of the Floridan. The dolomites and limestones of the lower Hawthorne may be considered to be hydraulically part of the Floridan aquifer. The Floridan is the major source of potable water for people living near the Zellwood Site.

Regional potentiometric surface maps indicate a northeasterly direction of groundwater flow in the Floridan aquifer. The water level measurements taken in the Floridan aquifer wells at the Site in May, June, and

September 1985, were plotted and contoured. Examination of this data confirms a divergency from the normal northeasterly flow and suggests that water levels at the Site are not representative for the determination of a regional flow direction in the Floridan aquifer. The anomalies of the potentiometric surface of the Floridan aquifer could be an effect of numerous factors including a structural depression at the top of the Floridan Formation, local pumpage of municipal and industrial wells, and localized flow patterns within the solution channels of the Floridan aquifer. Also, one of the three deep monitor wells was set in a solution channel immediately below the Hawthorne Formation while the other two were set in the limestone of the Floridan Aquifer.

3.2 PREVIOUS SITE INVESTIGATIONS

Numerous investigative activities have taken place at the Zellwood Groundwater Contamination Site since 1980. Following are a few of the more significant activities:

- The FDER collected wastewater samples from two ponds on Drum Service Company of Florida in July 1980. Several heavy metals were identified in the samples.

- In April 1981, the FDER analyses of groundwater samples collected from temporary monitor wells on Drum Service Company and downgradient of Southern Liquid Fertilizer indicated the presence of several contaminants. A sample collected from a well located between a pond on Drum Service Company and the large pond on Southern Liquid Fertilizer showed the presence of arsenic and other contaminants. A surface water sample was also collected from the large pond on Southern Liquid Fertilizer.

- In November 1981, Drum Service Company of Florida retained Seabury and Bottorf Associates, Inc. to conduct a soil and water sampling investigation along the right-of-way of the Seaboard Coastline Railroad. Samples were collected from three locations along the railroad and analyzed for residual arsenic. Arsenic concentrations ranging from 5.89 milligrams per kilogram (mg/kg) to 5.96 mg/kg were found in the soil at each of the three locations.

- Geophysical studies conducted by the FDER in 1981 and the EPA Field Investigation Team (FIT) contractor, Ecology & Environment, Inc., (E&E) in April and July 1982, indicated the presence of possible groundwater contamination plumes on the south side of both Drum Service Company and Douglas Fertilizer Company.

- During July and August 1982, FIT (E&E) conducted a sampling investigation and installed six groundwater monitor wells in three locations. Surface water and sediment, soil, and groundwater samples were collected for analysis. However, much of the data was unusable because of Quality Assurance reasons.

- The EPA Environmental Services Division (ESD) conducted a hazardous waste site field investigation during December 1982. Several metals and organic compounds were detected in the soil/sediment and water samples. Cadmium and lead were found in two potable water wells.

- The ESD resampled two private wells in April 1983. The two metals of concern, cadmium and lead, were not detected in either sample.

These were the investigations that took place prior to the initiation of the 1984 FIT Remedial Investigation and Feasibility Study.

In June 1988, EPA resampled all private and industrial wells and soils on the Site. The two primary metals of concern that were detected were lead and chromium.

3.3 REMEDIAL INVESTIGATION RESULTS

Previous studies at the Zellwood Groundwater Contamination Site indicated several major concerns. The combined factors of the shallow water table and the known waste disposal/treatment practices led to the public health concern of groundwater contamination. Another concern is the transport of contaminants off-site via the drainage ditches since these ditches have historically been collection points for run-off of contaminated surface water and soil. A third concern is the potential public health threat that may exist from contaminant migration and direct contact with on-site contaminants or waste, or both.

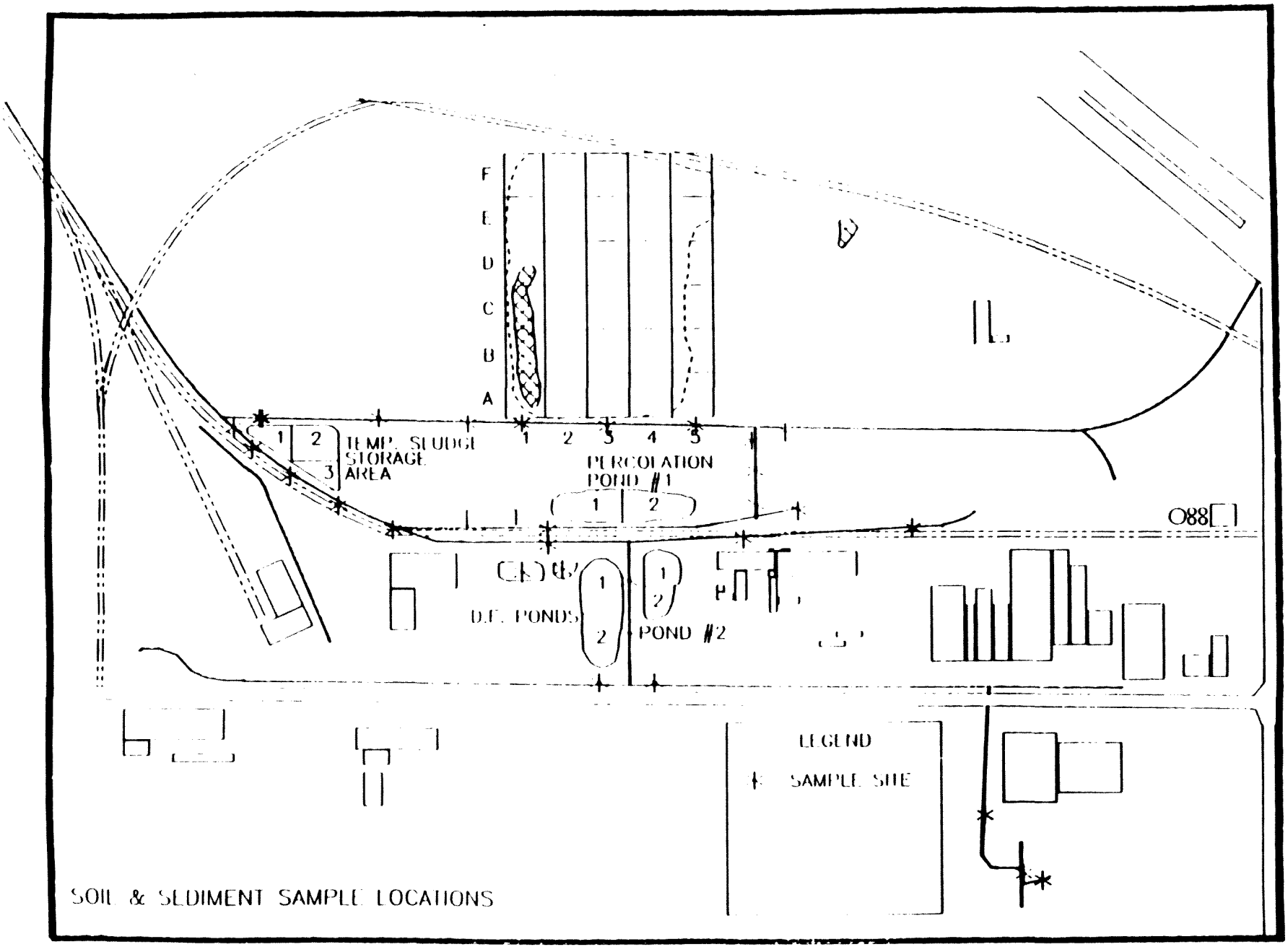
Groundwater quality in both the surficial and Floridan aquifers and the other potential contamination migration routes were investigated during the RI. The investigation included a subsurface boring program, installation of 17 monitor wells, groundwater sampling and analysis, and data evaluation.

Surface water and sediment samples were also collected from ditches within the study area. The results were compared with previous study results to assess changes in water quality and sediment contaminant levels. The contaminants found in the surface water and sediment samples were evaluated to identify source areas. The analytical results of the sampling investigations for 1982, 1985, and 1988 have been compiled in tabular form in Appendix A. A drastic change in contaminant concentrations can be seen by reviewing the data. The changes could be attributed to the pump wells nearby as well as many other factors. The pump rates are approximately 125 million gallons per month in the dry season and 1.3 billion gallons per month in the wet season. This could eventually draw slugs of contamination accross the area at varying rates and be observed in a random sampling.

The waste areas at the Site were identified using historic aerial photographs and geophysical techniques. Surface and subsurface soil samples were collected from these areas to evaluate the potential for contaminants to migrate to groundwater. The results of the analyses were also used to estimate the vertical extent of contamination.

FIGURE 3

Soil and Sediment Sampling Locations


F
E
D
C
B
A
1
2
3
TEMP. SLUDGE STORAGE AREA
1
2
3
4
5
PERCOLATION POND #1
1
2
D.E. PONDS
1
2
POND #2
LEGEND
SAMPLE SITE
SOIL & SEDIMENT SAMPLE LOCATIONS

3.3.1 SOILS INVESTIGATION

In June 1988, as part of additional RI/FS work, post 1987 ROD, EPA conducted a thorough resampling of the Site to determine contaminant levels and migration patterns.

Soil samples were collected in several designated areas of the Site including the following areas: 1) abandoned drum area; 2) former Drum Service percolation ponds; 3) temporary sludge storage area; 4) railroad right-of-way; and 5) current Drum Service area. The soil sampling locations are depicted in Figure 3.

3.3.2 SUBSURFACE INVESTIGATION

Test Boring Program

As part of the June 1988 investigation, a test boring program was instituted at the Zellwood Groundwater Contamination Site to further characterize the Site geologically and to determine intervals for well screens prior to well installation. A test borehole was advanced at each of the seven monitor well locations. Except for location number two, all test borings were advanced 200 feet or to the top of the Floridan aquifer, whichever was less. The confining Hawthorne Formation was not penetrated at location number two because of the suspected high levels of contamination in this area.

During the June 1988 study, geologic information generated during the RI was examined to further characterize the Site. Well logs were used to develop cross sections to illustrate the geology on and around the Site. Figures 5(a) and 5(b) show the locations of cross sections. These figures also show fence diagrams for the Site developed using wells logs from all test boring locations.

3.3.3 DISCUSSION OF JUNE 1988 SAMPLING ACTIVITIES

This sampling activity was comprised of multimedia sampling. All soil, sediment, and groundwater samples were collected in accordance with the 1986 EPA Region IV - Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual, referred to as the SOP. Twenty-six percent of the total specific site samples were split with the PRP, as requested by the PRP. Surveying of soil and groundwater sampling locations was conducted by the EPA Emergency Response Team (ERT), Edison, New Jersey.

The Zellwood Site was divided into five soil and sediment sampling areas to confirm soil contamination levels.

1. Abandoned Drum Area
   A sample grid pattern 100' x 100' was used in this area depicted in Figure 4. Each grid point was surveyed. The grid pattern

FIGURE 4

Sample Grid Pattern

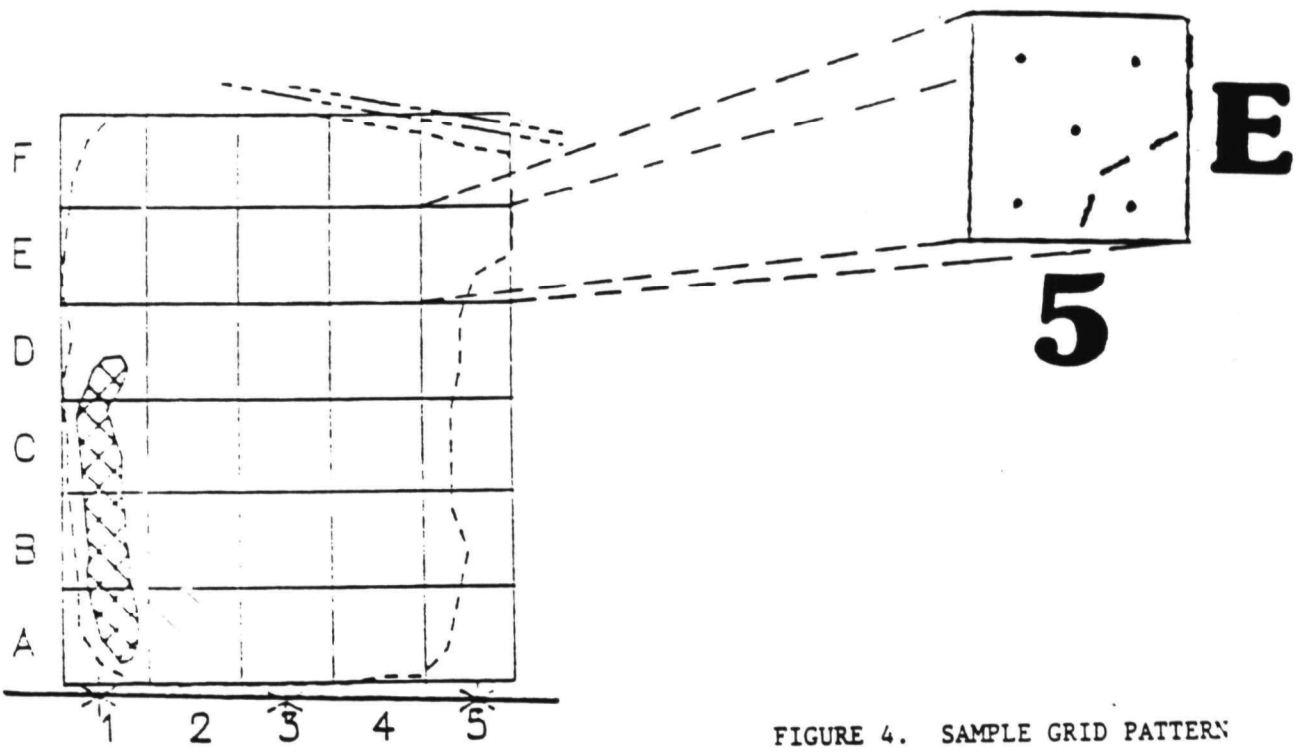


FIGURE 4. SAMPLE GRID PATTERN

FIGURE 5A AND 5B

Vertical Distribution of Contaminants

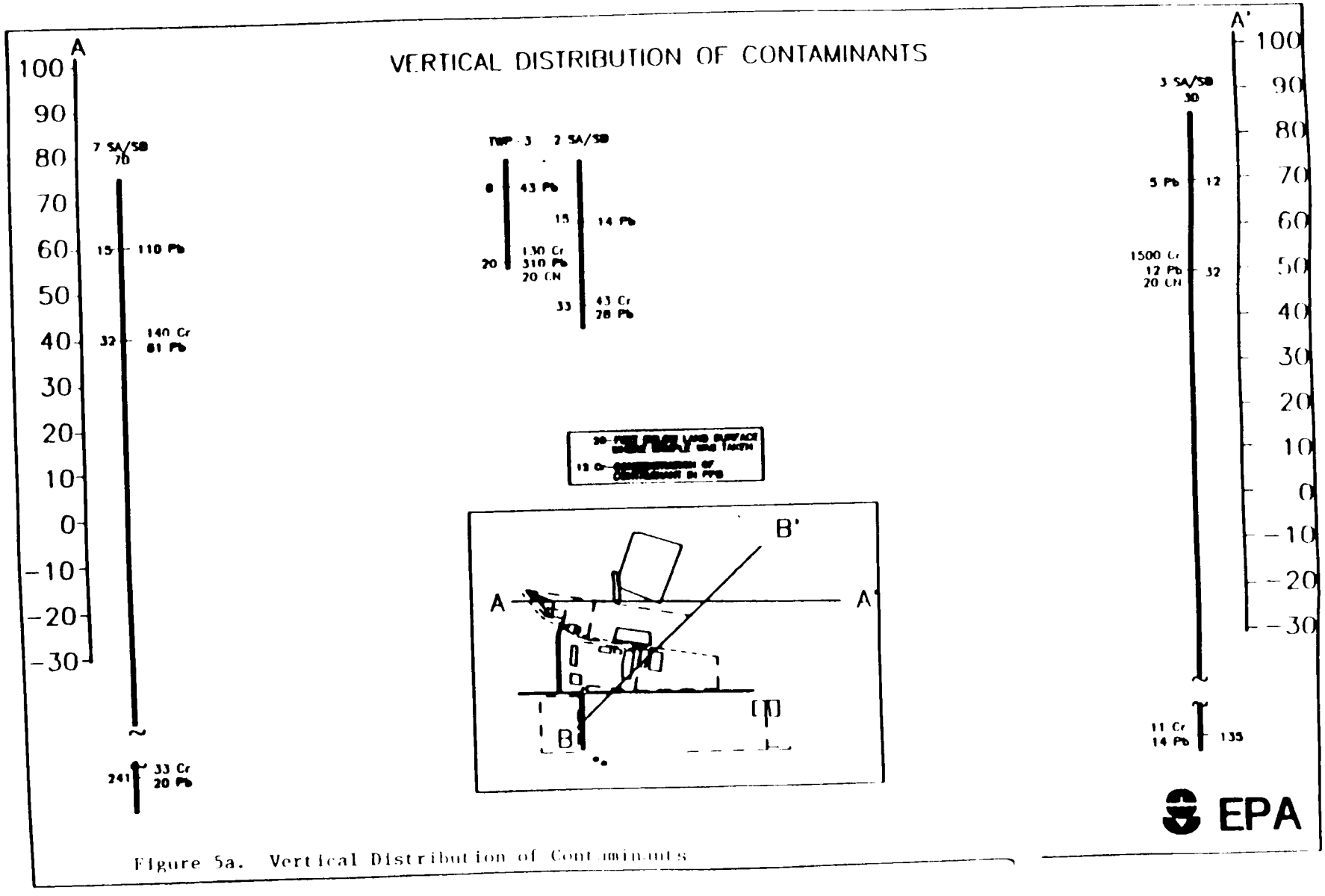


Figure 5a. Vertical Distribution of Contaminants

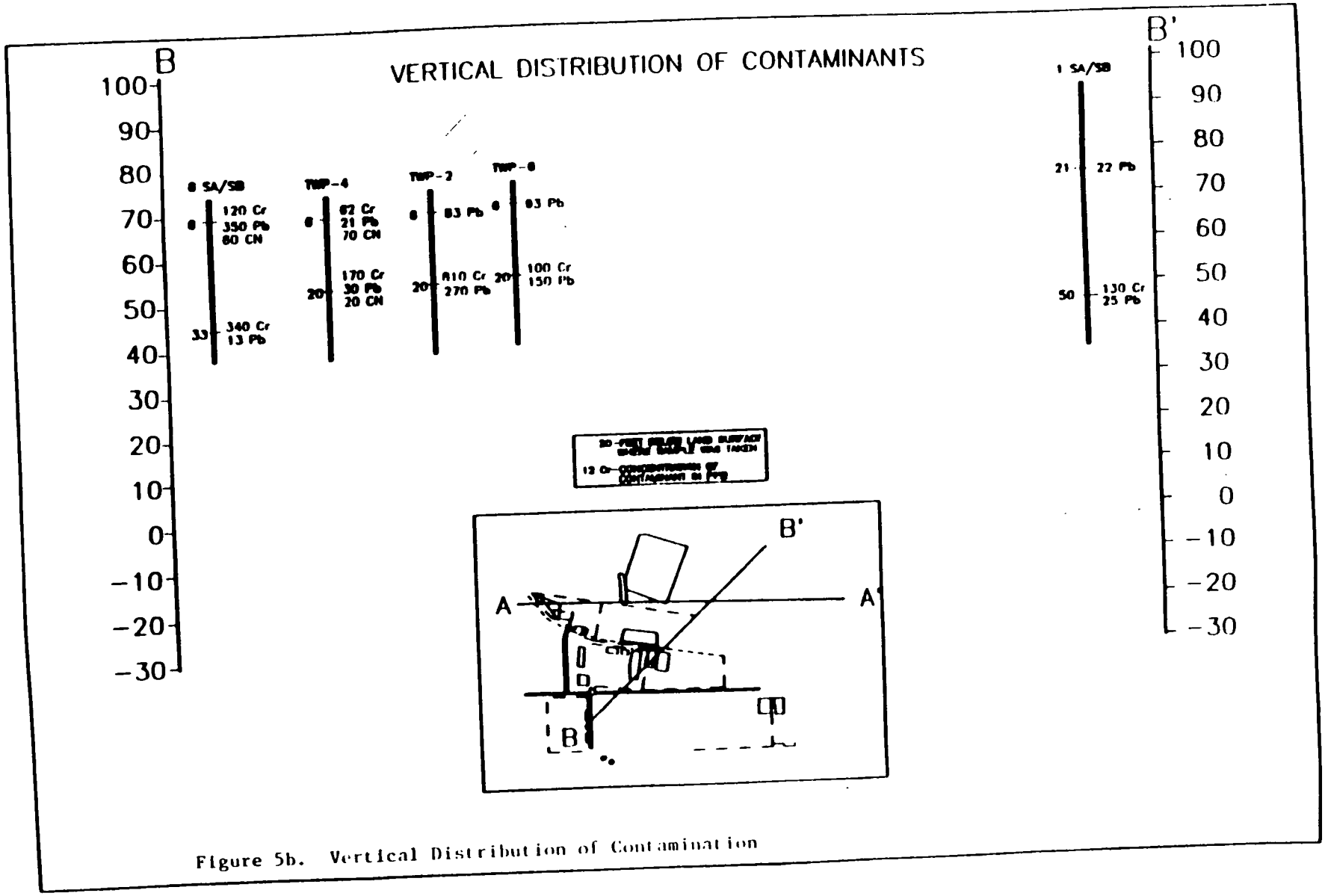


Figure 5b. Vertical Distribution of Contamination

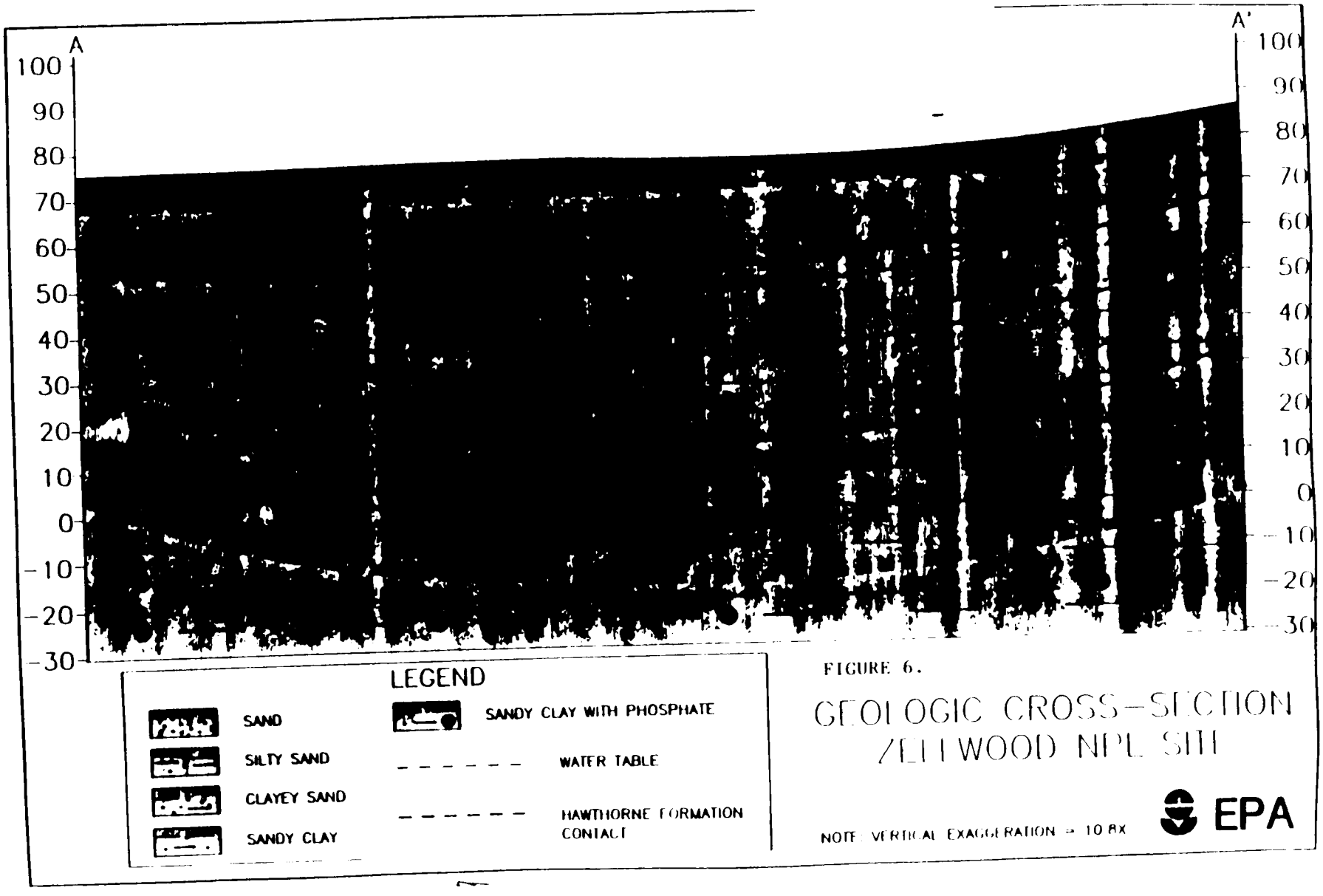


FIGURE 6.

GEOLOGIC CROSS-SECTION
/ELLWOOD NPL SITE

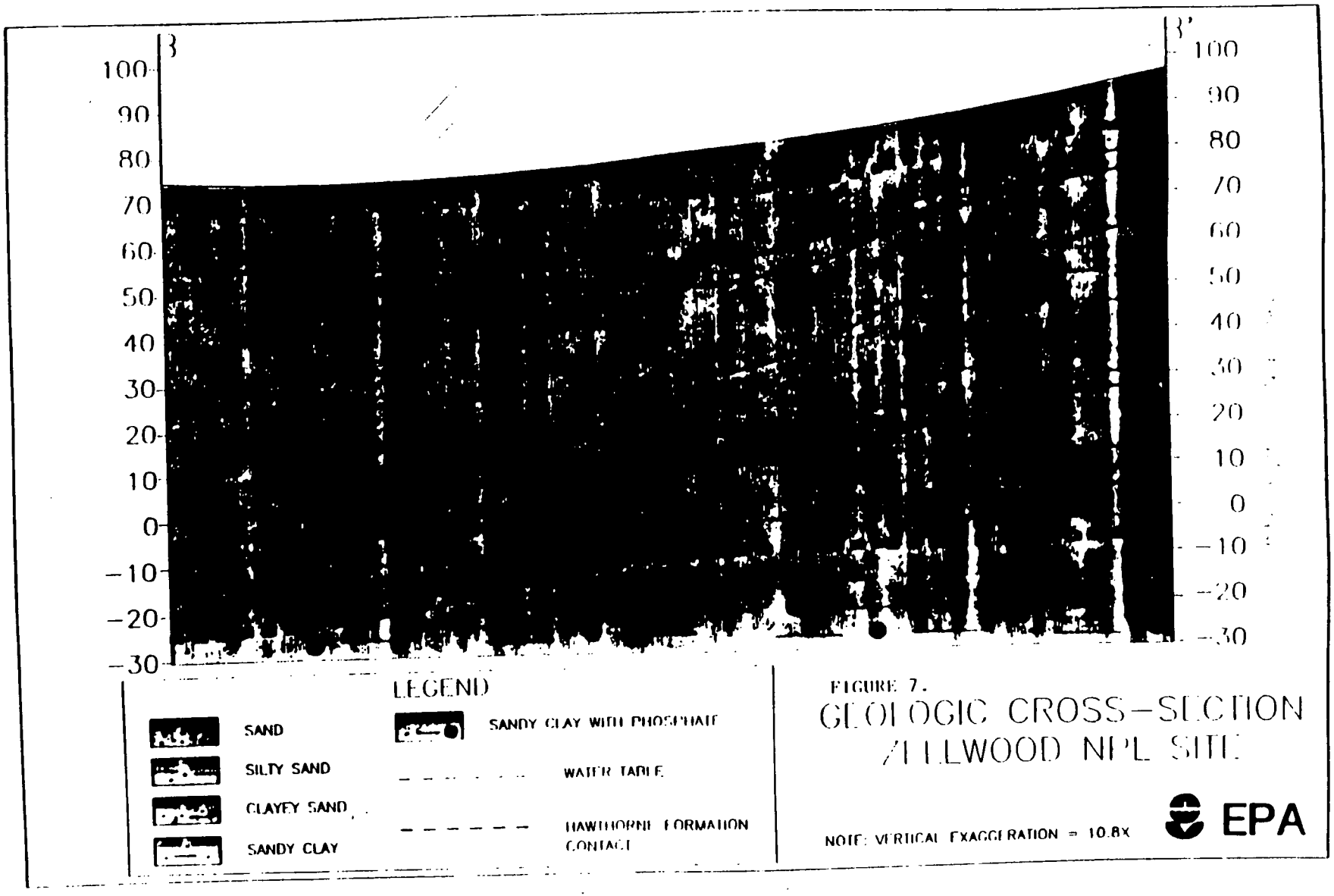


FIGURE 7.

GEOLOGIC CROSS-SECTION

ANTLWOOD NPL SITE

NOTE: VERTICAL EXAGGERATION = 10.8X

EPA

was four columns wide and five rows high. Row A of the actual grid pattern was placed in the approximate position of Row B in the sampling plan. Row F could not be placed in the drum area, therefore, it was eliminated. The pond in the drum area fell outside of the grid pattern, and the entire pattern was tilted, northeast to southwest approximately 20°.

2. Sludge Storage Area

One composite sample was collected per cell from five distinct sample points. Sample depth was six to 12 inches for two reasons. First, the sludge storage area is now located in a fairly high traffic area. Therefore, surface soils would not be representative. In addition, over the last five years the surface soils have been scraped occasionally by the site operator.

3. Existing Ponds

There are currently four ponds on-site. Sediment samples composited from five distinct points were collected from each pond or pond section.

a. Douglas Fertilizer Ponds

During the years that Douglas Fertilizer was in operation, wastewater from fertilizer formulations was discharged into three unlined ponds. One composite sample was collected from the dry pond at a depth of zero to six inches. Samples were sent to Contract Laboratory Program (CLP) for a full Target Compound List (TCL) scan, and split with ERT for screening of metals and cyanide (CN). The larger Douglas Fertilizer pond is below the water table and always contains water. Due to its size, the pond was divided into two sections. Each section had one composite sediment sample. Samples were sent to the CLP laboratory for a full TCL scan and to ERT for screening of pesticides.

During an investigation of the Douglas Fertilizer property, a stained area was found. It was sampled, labeled DFP-O, and screened for pesticides by ERT.

b. Abandoned Drum Area Pond

The pond was sampled as one composite sediment sample. The sample was sent to the CLP laboratory for a full TCL scan, and split with ERT for screening of metals and CN.

4. Former Percolation Ponds

The two percolation ponds used by Drum Services Company were excavated and backfilled in 1982. Because of this, samples were collected at a depth below three feet. Each pond was divided into two sections with one composite sample collected per

section. Each of the five distinct points per composite sample were measured from the survey points and laid out in a random pattern. All four samples were sent to CLP for a full TCL scan, split with ERT for a full TCL scan and three samples were split with the PRP.

5. Ditches

a. North Ditch

Grab samples were collected at 200' intervals along the north ditch in the area of highest contamination as indicated in the 1985 sampling data. The first sampling location (ND-1) was placed 200' from the north-middle ditch intersection. All samples were sent to ERT for screening analysis of metals and CN. The two grab samples directly below the abandoned drum area (ND-4 and ND-5) were split and sent to the CLP laboratory for a full TCL scan.

b. Middle Ditches

There were two sections to the middle ditches. The first section was from the north-middle ditch intersection to the culvert under the railroad tracks. In this area, grab samples were collected every 100' for a total of six samples. The sample closest to the north-middle ditch intersection and on each side of the railroad tracks were sent to CLP for a full TCL analysis. All six samples were sent to ERT for screening of metals and CN.

The second section was from the culvert past the railroad tracks to the middle of Drum Services. Grab samples were collected every 200' for a total of five samples. Samples MDS-1, and MDS-3 through MDS-5 were sent to CLP for a full TCL scan and all five samples were sent to ERT for screening of metals and CN.

c. South Ditch

From the 1985 sampling data, only one area had contamination of any significance in the south ditch. Therefore, only two grab samples were collected, one on each side of the ditch between Douglas Fertilizer and Drum Services. Both samples were sent to CLP for a full TCL scan and screened by ERT for a full TCL.

d. Zellwin Ditches

Grab samples were to be collected in the approximate locations as those collected in 1985. Two samples were collected, east and west of the Zellwin Farms discharge ditch. Sample ZFD-2 was sent to CLP for a full scan and screened through ERT for pesticides.

e. Tank Farm Ditch

There was a small ditch that ran from the Drum Services Company tank farm to the north ditch. Since the Site investigation conducted on May 17, 1988, the ditch was converted to a culvert. Because of this, one sample was collected at the mouth of the culvert at the north ditch, 18 inches deep. The sample was sent to CLP and ERT for a full TCL scan.

f. Douglas Fertilizer Ditch

This ditch runs between the old Douglas Fertilizer Company and Drum Services. Two grab samples were collected from this ditch and DFD-1 was sent to the CLP laboratory. Both samples were sent to ERT for a TCL scan.

3.3.4 AIR INVESTIGATION

No air samples were collected for analysis during the RI. However, under normal conditions, it is unlikely that particulate or volatile contaminants will present much of a threat to the nearby residents or workers. However, strong winds, heavy equipment operation, or continuous truck traffic within the Site could expose contaminated surface soils to airborne transport. Remedial activities are expected to consist of removing this exposure pathway through solidification of the contaminated soils. Possible dust control will be implemented at the Site during the remedial activities if airborne particulate increases. The extent of the exposure to the various chemicals via inhalation of contaminated dust from wind erosion is not anticipated to be significant. This exposure would occur only during times of heavy truck traffic within the drum storage areas. EPA toxicologists have evaluated this pathway and determined that, during soil excavation activities, air monitoring will be required for personnel protection.

3.4 ROUTES OF TRANSPORT AND POTENTIAL RECEPTORS

Surface Water and Sediment/Soil

Surface water features at the Site include several ponds and three distinctive drainage pathways referred to as the northern, middle, and southern ditches. Surface water run-off at the Site is either confined in the ponds or is channeled to one of the ditches. Although Site drainage is to the west and ultimately to the south toward the muck farms and Lake Apopka, the data from the RI showed little migration of surface water contaminants off-site. Unless there has been a heavy incidence of rain, the northern and middle ditches are usually fairly dry and contain only isolated areas of stagnant water. The southern ditch contains a fairly constant flow of water, since it receives a direct discharge and run-off from the Zellwin Farms large paved parking lot.

3.5 CONTAMINANTS OF CONCERN

One of the June, 1988 sampling activity goals was to determine the level of contaminants present in soil and groundwater. The predominant contaminants found were lead, chromium and PAHs. There is only one area of the site in which a different subset of chemicals was selected for evaluation. This different subset can be found in Table 2. This subset was developed using the "indicator chemical" process found in the Superfund Public Health Evaluation Manual (draft December 17, 1985, EPA). The sole purpose of the list was to evaluate the risk to public health that would remain if no remedial action was taken. The only place this list is utilized is in Section V of this ROD.

TABLE 1

Pesticides & Organics
at the
Zellwood Groundwater Contamination Site

METALS	EXTRACTABLE ORGANICS
Arsenic	Napthalene
Cadmium	Acenaphthylene
Chromium	Fluorene
Lead	Phenanthrene
Cyanide	Anthracene
PESTICIDES	Pyrene
Dieldrin	Benzyl Butly Phthlate
4'4' DDE	Drysene
4'4' DDD	Benzo Flouranthene
Gamma Chlordane	Benzo-A Pyrene
Alpha Chlordane	Ideno-Pyrene
	Benzo-Perylene

TABLE 2

PURGEABLE ORGANICS

Tetrachloroethene

Toluene

Ethyl Benzene

Total Xylene

TABLE 3

SAMPLE NUMBER
SOIL AND SEDIMENT SAMPLES
June 1988

Abandoned Drum Area

ADS-A1-1	Grid A1, 0" - 6"
ADS-A1-2	Grid A1, 6" - 18"
ADS-A2-1	Grid A2, 0" - 6"
ADS-A2-2	Grid A2, 6" - 18"
ADS-A3-1	Grid A3, 0" - 6"
ADS-A3-2	Grid A3, 6" - 18"
ADS-A4-1	Grid A4, 0" - 6"
ADS-A4-2	Grid A4, 6" - 18"
ADS-B1-1	Grid B1, 0" - 6"
ADS-B1-2	Grid B1, 6" - 18"
ADS-B2-1	Grid B2, 0" - 6"
ADS-B2-2	Grid B2, 6" - 18"
ADS-B3-1	Grid B3, 0" - 6"
ADS-B3-2	Grid B3, 6" - 18"
ADS-B4-1	Grid B4, 0" - 6"
ADS-B4-2	Grid B4, 6" - 18"
ADS-C1-1	Grid C1, 0" - 6"
ADS-C1-2	Grid C1, 6" - 18"
ADS-C2-1	Grid C2, 0" - 6"
ADS-C2-2	Grid C2, 6" - 18"
ADS-C3-1	Grid C3, 0" - 6"
ADS-C3-2	Grid C3, 6" - 18"
ADS-C4-1	Grid C4, 0" - 6"
ADS-C4-2	Grid C4, 6" - 18"
ADS-D1-1	Grid D1, 0" - 6"
ADS-D1-2	Grid D1, 6" - 18"
ADS-D2-1	Grid D2, 0" - 6"
ADS-D2-2	Grid D2, 6" - 18"
ADS-D3-1	Grid D3, 0" - 6"
ADS-D3-2	Grid D3, 6" - 18"
ADS-D4-1	Grid D4, 0" - 6"
ADS-D4-2	Grid D4, 6" - 18"
ADS-E1-1	Grid E1, 0" - 6"
ADS-E1-2	Grid E1, 6" - 18"
ADS-E2-1	Grid E2, 0" - 6"
ADS-E2-2	Grid E2, 6" - 18"
ADS-E3-1	Grid E3, 0" - 6"
ADS-E3-2	Grid E3, 6" - 18"
ADS-E4-1	Grid E4, 0" - 6"
ADS-E4-2	Grid E4, 6" - 18"
ADS-E5-1	Grid E5, 0" - 6"
ADS-E5-2	Grid E5, 6" - 18"

TSA-1	Temporary Sludge Storage - Grid 1
TSA-2	Temporary Sludge Storage - Grid 2

TABLE 3 (Cont'd.)
SAMPLE NUMBER
SOIL AND SEDIMENT SAMPLES
June 1988

	Ponds
ADP	Abandoned Drum Area
FPP-1-C1	Former Percolation Pond #1 - Grid 1
FPP-1-C2	Former Percolation Pond #1 - Grid 2
FPP-2-C1	Former Percolation Pond #2 - Grid 1
FPP-2-C2	Former Percolation Pond #2 - Grid 2
DFP-1-1	Douglas Fertilizer Pond #1 0" - 6"
DFP-2-1	Douglas Fertilizer Pond #2 0" - 6"
DFP-3-1	Douglas Fertilizer Pond #3 Grid 1
DFP-3-2	Douglas Fertilizer Pond #3 Grid 2
	Ditches
ND-1	North Ditch (north-middle intersection)
ND-2	North Ditch Sample #2
ND-3	North Ditch Sample #3
ND-4	North Ditch Sample #4
ND-5	North Ditch Sample #5
ND-6	North Ditch Sample #6
ND-7	North Ditch Sample #7
MD-1	Middle Ditch (north-middle intersection)
MD-2	Middle Ditch Sample #2
MD-3	Middle Ditch Sample #3
MD-4	Middle Ditch Sample #4
MD-5	Middle Ditch Sample #5
MD-6	Middle Ditch Sample #6
MDS-1	Middle-South Ditch Sample #1
MDS-2	Middle-South Ditch Sample #2
MDS-3	Middle-South Ditch Sample #3
MDS-4	Middle-South Ditch Sample #4
MDS-5	Middle-South Ditch Sample #5
SDE-1	South Ditch East Sample
SDW-1	South Ditch West Sample
ZFD-1	Zellwin Farm Ditch #1
ZFD-2	Zellwin Farm Ditch #2
TFN	Tank Farm North Sample 6" - 18"
DFD-1	Douglas Fertilizer Ditch Sample #1
DFD-2	Douglas Fertilizer Ditch Sample #2
DFP-0	Douglas Fertilizer Debris Area

4.0 CLEAN-UP CRITERIA

Based on calculations using site specific soil and climatic data and data from the Soil Conservation Service, the University of Florida, and the US EPA Environmental Research Laboratories, mathematical models, and best professional judgment, EPA determined the clean-up levels for the Zellwood Groundwater Contamination Site. Site wide clean-up levels are designated below:

Table 4 Clean-Up Criteria

Areas	Contaminant	Concentration
Abandoned Drum Pond	Lead	220 mg/kg
	Chromium	100 mg/kg
	Chlordane	7 mg/kg
	Total PAHs	10 mg/kg
Abandoned Drum Storage Area and Former Perc Pond #2		
	Tetrachloroethylene	1 mg/kg
	Toluene	30 mg/kg
	Ethyl Benzene	38 mg/kg
	Total Xylenes	5 mg/kg
Middle Ditch South		
	Lead	220 mg/kg
	Chromium	100 mg/kg
	Chlordane	7 mg/kg.

The total PAH's referred to are extractable organics and the total xylenes refer to the ortho, meta and para xylenes. These levels were selected by inputting climatic and soil data into the Pesticide Root Zone Model (PRZM) with consideration of the E.P. Toxicity data from the site. The model was calibrated to reproduce the average yearly water budget. This model ranked fifteen (15) chemicals found at the Site based on the potential to contaminate groundwater. Upon initiation of the remedial action at the Site, If EPA determines through the excavation efforts that the levels for cleanup are not attainable or approachable these levels will be reconsidered by both the State of Florida and EPA.

4.1 SOIL/SEDIMENT REMEDIATION

The remedial action selected will consist of removing the contaminated soils from the Site. Stabilization/Solidification of those soils will be conducted in a suitable area, large enough to contain the completed monolith and allow for workers to operate equipment and perform the necessary activities to mitigate the problems at this Site. There will be approximately 3,000 cubic yards of soil to be remediated. Dust control measures will be anticipated in the event of increased particulate into the atmosphere in the area of excavation and solidification. Treatability studies have been conducted to insure the mixtures of fixation agents will prevent the contaminants from leaching into the groundwater. Confirmation sampling will be conducted after excavation of the soils to ensure all contaminants have been removed from the Site; testing during construction will verify the success of the remedy.

5.0 ALTERNATIVES EVALUATION

The purpose of the Operable Unit One remedial action at the Zellwood Groundwater Contamination Site is to mitigate and minimize contamination in the soils, sediments, surface and groundwater, and to reduce current and future potential risks to human health and the environment. Based on the level of contaminants found at the Site, the endangerment assessment and regulatory requirements, the following clean-up objectives were determined:

- To protect the public health and environment from exposure to contaminated soils or sediments and water through inhalation, ingestion and direct contact.
- To prevent the spread of contaminants in the groundwater, surface water and soils.
- To reduce or prevent contamination of groundwater.

Clean-up goals were developed for the contaminated soil at the Zellwood Groundwater Contamination Site based on applicable or relevant and appropriate requirements (ARARs) of federal and state statutes or other regulations (Table 5-1). The goals were developed to prevent potential groundwater contamination from exceeding ARARs and to reduce potential cancer risk from inhalation.

An initial screening of possible technologies was performed to identify those technologies which best meet the criteria of Section 300.68 of the National Contingency Plan (NCP). Following the initial screening of technologies, potential remedial action alternatives were identified and analyzed. These alternatives were screened and those which best satisfied the clean-up objectives, while also being cost-effective and technically feasible, were developed further.

Table 5.2 summarizes the results of the screening process. Each of the remaining alternatives for soil and sediment remediation were evaluated based on cost, technical feasibility, institutional requirements, and degree of protection of public health and the environment.

5.1 ALTERNATIVE 1: NO ACTION

The risk assessment conducted as part of the remedial investigation showed that no action is not protective of human health from the Site conditions presently existing. Contaminant toxicity is not reduced in the absence of treatment. No action does not provide permanent source control, and does not satisfy a preference for treatment.

This alternative is required to be considered by the NCP and is presented to provide a base-level action against which other alternatives may be compared.

TABLE 5

TECHNOLOGIES CONSIDERED FOR SCREENING
ZELLWOOD GROUNDWATER CONTAMINATION SITE
ZELLWOOD, ORANGE COUNTY, FLORIDA

	Technology	Eliminated (E)* Retained (R)	
1.	No Action	E	Not protective to human health or the environment.
2.	Solidification/Fixation	R	
	Adsorption	E	Not Applicable due to waste characteristics.
	Lime Addition	R	
	Clay Addition	R	
3.	Off-site Disposal at RCRA permitted facility	E	Not applicable due to waste characteristics; State of FL Landfill and EPA policy restricts this activity.
4.	On-site Incineration	E	Metals cannot be incinerated; solidification of ash still needed resulting in additional costs; not appropriate or cost effective due to the minimal quantities of organics present within the waste stream.

*If Eliminated, Reason for Doing So.

5.2 ALTERNATIVE 2: SOLIDIFICATION/FIXATION

A silicate/cement-based stabilization process has been selected for evaluation of the solidification/fixation of soils at the Zellwood Groundwater Contamination Site. These methods have the ability to stabilize materials containing high concentrations of heavy metals, even under acidic conditions. Most processes use two inorganic chemical reagents which react with polyvalent metal ions to form a chemically and mechanically stable solid. The process is based on reactions between soluble silicates and silicate setting agents under controlled conditions to produce a solid matrix. Reagents commonly used include sodium silicate, fly ash, kiln dust, and Portland cement (as the setting agent). The resulting matrix is clay-like and displays properties of high stability, low permeability, high alkalinity, high bearing strength, and high cation exchange capacity. The resulting solid can be easily and economically handled, transported and stored. The volume added to the waste by the treatment process would be between 5 and 10 percent. A vegetative cover will be constructed over the solidified waste.

This alternative is considered innovative for metals; but experimental for organic compounds. During excavation and mixing of approximately 3,000 cubic yards of soil, some volatilization of organics will occur; leachability testing for verification and groundwater wells near the solidified monolith will monitor for any leaching of organic compounds.

Estimated Capital Cost: $780,000 includes monitor wells
$250,000 operation and maintenance

5.3 ALTERNATIVE 3: OFF-SITE DISPOSAL

This alternative requires the excavation of all contaminated soil and the disposal of the waste in an off-site RCRA permitted facility. Approximately 3,000 cubic yards of contaminated soil would be excavated. This soil would be placed in a pile near the excavated area and allowed to drain prior to loading into trucks. Water would drain from the soil into the excavated area. The upper six inches of the excavated area would be backfilled with topsoil and vegetated. Florida Landfill restrictions prohibits this activity. Soils would have to go out of state. EPA policy prefers on-site, permanent remedies as opposed to off-site landfilling.

Estimated Capital Cost: $1.12M

5.4 ALTERNATIVE 4: ON-SITE INCINERATION OF CONTAMINATED SOILS

It is estimated that it will take approximately (one) 1 year to incinerate approximately 3,000 cubic yards of on-site highly contaminated soils at about 1.75 tons per hour.

The lack of organic contamination in large quantity at the Site prevents this technology from being a viable alternative. The major contaminants

remaining within the soil are metals and few pesticides. In addition, there is a lack of readily available permitted mobile incinerators nationwide. There may be a considerable delay between the design of an incineration system and the set-up of an incinerator on-site. As indicated, this is not a feasible alternative due to the high metals concentration and minimal organic concentration. The ash from the incinerator would have to undergo treatment to bind the metals in the soil before the disposal of the ash making incineration a non-viable solution for the remedy.

Estimated Capital Cost: $1.75M plus cost of additional treatment for ash

5.5 COMPARATIVE ANALYSIS

This analysis will compare the alternatives presented in an evaluation of performance to the statutory criteria. On-site incineration and solidification/fixation will be compared due to the other two alternatives failing the threshold criteria.

Overall protection of human health and the environment; and compliance with applicable or relevant and appropriate requirements

- Both of the alternatives accomplish these criteria. Incineration requires compliance with a larger range of ARAR's than does solidification thus increasing the task of monitoring activities as well as technology challenges using incineration.

Long-term effectiveness and performance; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost

- Solidification is the leading alternative here. Incineration actually would not address the reduction in toxicity or mobility of contaminants at the site due to the remaining contaminants consisting largely of metals with minimal to no organic concentration. Treatment of the ash from the incineration unit would be required to address the remaining metals contamination. Both alternatives would give the same effectiveness both long and short-term since both alternatives require solidification of the soils from the site. Solidification is much more implementable and cost effective than the incineration alternative by almost half the cost.

State/support agency acceptance; and community acceptance

- Solidification receives more support and acceptance than initiating an incineration project within a local agricultural area. The burning of contaminants into the atmosphere has never been easily accepted by the public or many states, whereas solidification with monitoring of the area is more acceptable.

6.0 RECOMMENDED ALTERNATIVE

The recommended alternative for remediation of soil and sediment contamination at the Zellwood Groundwater Contamination Site includes

solidification and stabilization and backfilling of treated material on the Site. During the March, 1989 Treatability Study, different mixtures were analyzed for leachability of organics, pesticides and metals. A mix can be chosen fom that analysis that does not leach above drinking water standards into the groundwater. Therefore, solidification and stabilization of the contaminated soil provides a viable remedy for the Zellwood Site.

6.1 DESCRIPTION OF RECOMMENDED REMEDY

Contaminated soil will be treated using stabilization/solidification methods. Following treatment, the stabilized and solidified soil/sediment will be placed back into the excavated area, covered with approximately six inches of top soil and seeded to provide vegetative cover. At selected intervals, during excavation, soil samples will be collected and analyzed to determine the limits of excavations. Excavation will continue in designated areas until clean-up goals are reached.

TABLE 6

PRELIMINARY COST ESTIMATES
ZELLWOOD GROUNDWATER CONTAMINATION SITE
ZELLWOOD, ORANGE COUNTY, FLORIDA

Technology	Estimated Construction Cost	Estimated O&M Cost	Estimated Total Cost
Solidification /Fixation	$ 780,000	$250,000	$1,030,000
Incineration	$1,746,240	$250,000	$1,996,240
Off-Site Disposal at RCRA Facility	$1,117,370	-0-	$1,117,370

This recommended alternative meets the requirements of the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR, 300.68(j) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). This alternative permanently and significantly reduces the mobility of hazardous contaminants in the soil and the sediments in the lagoons and ditches. Another activity planned for Operable Unit One, groundwater evaluation, will determine the requirements for this remedy.

The alternative is cost-effective when compared with other applicable alternatives. The technology has been innovative and experimental, although the studies indicate the alternative is implementable at the Site. It is estimated that this alternative could be implemented within twelve months. Alternatives 2 and 4 would require from one to twelve additional months for implementation.

6.2 OPERATION AND MAINTENANCE

Long-term operation and maintenance requirements are expected for the alternative for this operable unit. Monitoring will determine the effectiveness of the alternative at reducing migration of inorganics/organics to the groundwater. At this time, it is anticipated that five well clusters of three wells each will be installed. Each of these wells would be sampled on a quarterly basis for the first two years after the construction of the remedy is completed, and semi-annually thereafter for a minimum 10 years. At the end of 12 years, the Agency, in coordination with FDER, may evaluate conditions and determine the sampling regime needed. Samples will be analyzed for the Target Compound List metals, cyanide, PAHs, volatiles and pesticides.

6.3 COST ESTIMATE

Solidification/stabilization is expected to have a total estimated capital cost of approximately $1.03 million. This estimate assumes a cost of $120 per ton for solidification/stabilization, with the inclusion of other related costs for construction bringing the construction costs to approximately $780,000. Monitoring cost is $75,000 each year for the first two years after implementation and $10,000 for each succeeding year for an additional 10 years.

6.4 COST EFFECTIVENESS

This alternative affords a higher degree of overall effectiveness in not only protecting the public against direct exposure but in removing the threat of future release of contaminants. The estimated capital cost of this alternative is $1.03 million (including operation and maintenance). This remedy is a practical remedy which can be implemented year-round. Operable Unit One, by providing source control and groundwater monitoring, will allow an opportunity to implement anticipated activities in Operable Unit Two which will address contamination of groundwater on-site.

6.5 SCHEDULE

This planned schedule for remedial activities at the Zellwood Groundwater Contamination Site is as follows:

September, 1989	--	Amend December 11, 1987, ROD
September, 1989	--	Complete RD
January, 1990	--	Complete Monolith
June 1990	--	Complete Installation of Monitor Wells

7.0 COMPLIANCE WITH OTHER ENVIRONMENTAL LAWS

Section 121(d)(2)(A) of CERCLA incorporates into law the CERCLA Compliance Policy, which specifies that Superfund remedial actions meet any Federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate requirements (ARARs). Also included is the provision that State ARARs must be met if they are more stringent than Federal requirements.

The requirements of the National Environmental Protection Act (NEPA) have been met. Additionally, the results of these studies are being presented to the public through a public notice, and the public has been given the opportunity to comment on the results of the studies and the proposed plan for the remedial action.

- Occupational Safety and Health Administration (OSHA)

A health and safety plan will be developed during remedial design and will be followed during field activities to assure that regulations of OSHA are followed.

- Safe Drinking Water Act (SDWA)

Additional groundwater studies will be conducted during Operable Unit One. A feasibility study to determine the appropriate clean-up alternative will include measures to ensure conformance with the SDWA.

Any discharge will be below the drinking water standards.

- National Pollutant Discharge Elimination System (NPDES)

The chosen alternative does not include any discharges, therefore this requirement does not apply.

- Clean Water Act

Soil remediation is aimed at source control, and implementation of the recommended alternative would result in an end to potential contamination of surface water.

- Resource Conservation and Recovery Act (RCRA)

  The requirements of the Resource Conservation and Recovery Act (RCRA) are applicable to RCRA characterized or listed hazardous wastes (40 CFR Part 261) which were disposed at a site after November 19, 1980. Examples of RCRA requirements include minimum technology standards, monitoring requirements, and storage and disposal prohibitions. No Federal or State contaminant-specific ARAR has been identified for PAH-contaminated soils. The levels for pesticides, metals and volatiles onsite have been obtained through groundwater modeling and acceptance by EPA and the State of Florida Department of Environmental Regulation. Land Disposal Restrictions (LDRs) are, however, applicable to remediation of contaminated soils. The LDRs are applicable to the waste on-site if the soils are excavated and removed or excavated and treated. In alternatives where the LDRs are applicable, the soil must be treated to the interim treatment levels prior to land disposal.

  Although the recommended remedy for soil/sediment contamination is not regulated under RCRA, in some instances, it may be considered "treatment" of hazardous waste. However, this action is treatment of hazardous substances under CERCLA, not hazardous waste. Therefore, LDR does not apply. Nevertheless, all solidification/stabilization activities will take place within a confined corrective action management unit (CAMU), and RCRA land disposal-type requirements will be substantially met.

- Florida Department of Environmental Regulation (DER)

  Compliance with other environmental laws (17-701 FAC Solid Waste for monolith cap) includes the cap cover and monitoring of the monolith. The cap over the solidified mass will consist of a minimum of six to ten inches of topsoil with seeding to initiate a vegetative cover. The monitoring wells will be installed to monitor the water quality around the monolith as well as monitor the monolith for a period of twelve years to ensure that the metals are not leaching into the groundwater.

8.0 COMMUNITY RELATIONS HISTORY

The following community relations activities were performed at the Zellwood Groundwater Contamination Site:

- A Fact Sheet on the Site was prepared in November 1986.

- A Community Relations Plan was developed and implemented.

- An information repository was established in January 1987, at:
  Zellwood Community Center - 6565 Willow St., Zellwood, FL
  Zellwood Elementary School - East Washington St., Zellwood, FL

- A press release providing an opportunity for a public meeting and information on the opening of the public comment period has been issued August, 1989.

- Public notices providing the same information will run in the morning and evening editions of the Orlando Sentinel, a daily paper determined to be the most widely read in the area.

9.0 STATE INVOLVEMENT

As required by CERCLA, Section 104(C), the State must assure payment of ten percent of all costs of remedial action if performed by EPA. Remedial action has been defined in SARA as including all construction and implementation activities until site remediation is completed. Activities required to maintain the effectiveness of the remedy following completion of the remedial action is considered operation and maintenance (O&M). The State is required to pay 100 percent of all O&M following completion of the remedial action. EPA and the State may enter into an agreement whereby EPA would fund 90% of O&M costs for a period not to exceed one year, until the remedy is determined to be operational and functional.

The State of Florida has been consulted on the selection of this remedy. The State has concurred with the selected remedy.

APPENDIX A

SOIL ANALYTICAL DATA

FROM MARCH, 1988

METALS AND CYANIDE
PESTICIDES
EXTRACTABLE ORGANICS
PURGEABLE ORGANICS

SOIL ANALYTICAL DATA
METALS AND CYANIDE

LAB	STATION	ARSENIC 1985	ARSENIC 1988	CADMIUM 1985	CADMIUM 1988	CHROMIUM 1985	CHROMIUM 1988	LEAD 1985	LEAD 1988	CYANIDE 1985	CYANIDE 1988
CLP	A1-1		6.50		16.00 J		190.00 J		1000.00 J		11.00 J
CLP	A1-2				1.50 R	1.50	J	800.00 J	32.00 R	2.80	
CLP	A2-1		3.60		1.60 J		76.00 J		360.00 J		5.40 J
CLP	A2-2		0.80				1.10 J		38.00 J		
CLP	A3-1						33.00 J		150.00 J		
CLP	A3-2				1.10		12.00 J		55.00 J		2.00 J
CLP	A4-1				2.00		5.20 J		16.00 J		
CLP	A4-2										
CLP	B1-1		2.40		2.90 J		360.00 J		610.00 J		26.00 J
CLP	B1-2		0.89		1.30 J		57.00 J		220.00 J		1.20 J
CLP	B2-1		7.80		1.50 J		36.00 J		280.00 J		4.30 J
CLP	B2-2		0.93				1.50 J		39.00 J		
CLP	B3-1				1.50		58.00 J		360.00 J		3.00 J
CLP	B3-2						8.40 J		35.00 J		1.20 J
CLP	B4-1						3.40 J		4.70 J		
CLP	B4-2										
CLP	C1-1				6.40		360.00 J		1500.00 J		35.00 J
CLP	C1-2			5.30		110.00	8.40 J	500.00 J	75.00 J		1.10 J
CLP	C2-1						43.00 J		110.00 J		2.60 J
CLP	C2-2						6.60 J		3.00 J		
CLP	C3-1						21.00 J		88.00 J		
CLP	C3-2			28.00 *		1200.00 *		5600.00 *	1.60 J	10.00 *	
CLP	C4-1								3.20 J		
CLP	C4-2						7.40 J	200.00 J	1.20 J	1.00	
ERT	D1-1				14.20		108.00		395.00		2.30
ERT	D1-2								11.30		
ERT	D2-1								58.00		2.10
ERT	D2-2							100.00 J	2.20	1.50	
ERT	D3-1		1.70						5.40		
ERT	D3-2										
ERT	D4-1						5.60		1.30		
ERT	D4-2								3.00		
ERT	E1-1						14.60		43.80		
ERT	E1-2								2.20		
ERT	E2-1								3.30		
ERT	E2-2						5.60		1.90		
ERT	E3-1								1.30		
ERT	E3-2								22.20		
ERT	E4-1								1.20		
ERT	E4-2								18.80		

FOOTNOTES UNITS IN PPM CLP-CONTRACT LAB PROGRAM ERT-EMERGENCY RESPONSE TEAM R QC INDICATES THAT DATA UNUSABLE J- ESTIMATED VALUE * 1982 ANALYTICAL DATA

LAB	STATION	ARSENIC 1985	ARSENIC 1988	CADMIUM 1985	CADMIUM 1988	CHROMIUM 1985	CHROMIUM 1988	LEAD 1985	LEAD 1988	CYANIDE 1985	CYANIDE 1988
CLP	TSA-1					51.00 *	8.40 J	120.00 *	6.60 J	1500.00 *	
CLP	TSA-2						15.00 J		28.00 J		
CLP	ADP			5.40		2.10	25.00 J	2000.00 J	290.00 J		0.90 J
CLP	PPP-1-C1				2.00	3.30 *	3.50 J	7.00 *	5.40 J	0.19 *	
CLP	PPP-1-C2				2.70	11.00	29.00 J	10.00 J	25.00 J		
CLP	PPP-2-C1				1.40	18.00 *J	12.00	15.00 *	22.00 J	1.00 *	
CLP	PPP-2-C2		34.00 J		2.40		130.00 J		660.00 J		25.00 J
CLP	DFP-1-1			5.50	12.00	200.00	77.00 J	100.00	44.00 J		5.70 J
CLP	DFP-1-2				24.00		170.00 J		260.00 J		6.70 J
CLP	DFP-2-1			62.00	1.30	160.00	10.00 J	60.00	7.10 J		0.67 J
CLP	DFP-2-2				2.50		16.00 J		21.00 J		
CLP	DFP-3-1		39.00		3.50	9.20	31.00 J	8.00	52.00 J		
CLP	DFP-3-2						7.20 J		20.00 J		
ERT	MD 1	9.20	1.90	3.40		100.00	7.80	280.00	33.10	3.00	
ERT	MD 2		2.60				39.00		88.60		
ERT	MD 3	80.00	3.70			30.60		2000.00	14.10		
CLP	MD 4	20.00					17.00 J	200.00	34.00 J		
CLP	MD-5						8.50 J		43.00 J		
ERT	MD 6	10.00				69.00		200.00	11.30		
ERT	MD 7								11.00		
CLP	MD 1				3.60		45.00 J		230.00 J		
ERT	MD 2				6.00		76.60		360.00		
ERT	MD 3	5.50		3.60		55.00		220.00	1.80	0.30	
ERT	MD 4								7.40		
CLP	MD 5					2.40	5.20 J	51.00	66.00 J		
CLP	MD 6						4.60 J		7.20 J	0.42	
CLP	MDS-1					3.90		10.00	9.20 J		
ERT	MDS-2		1.30			5.90		10.00	13.50		3.40
CLP	MDS-3				3.20		8.80 J		35.00 J		
CLP	MDS-4		8.00 J		1.40		41.00 J		160.00 J		
CLP	MDS-5		23.00 J				80.00 J		390.00 J		2.40 J
CLP	SDE-1	5.00		2.60		36.00	29.00 J	80.00	130.00 J	1.40	
CLP	SDW-1	9.00		4.70		43.00	160.00 J	190.00	220.00 J		
CLP	ZFD-1								4.00 J		
CLP	ZFD-2					6.20			5.00 J		
CLP	TPN						3.00 J		26.00 J		
CLP	DFD-1		20.00 J				4.90 J		19.00 J		
ERT	DFD-2		2.20				14.10		48.70		

...FOOTNOTES... UNITS IN PPM CLP: CONTRACT LAB PROGRAM ERT: EMERGENCY RESPONSE

R - QC INDICATES THAT DATA UNUSABLE J: ESTIMATED VALUE

* 1982 ANALYTICAL DATA

PESTICIDES

LAB STATION	DIELDRIN 1985	DIELDRIN 1988	4,4'DDE 1985	4,4'DDE 1988	4,4'DDD 1985	4,4'DDD 1988	GAMA CHLORDANE 1985	GAMA CHLORDANE 1988	ALPHA CHLORDANE 1985	ALPHA CHLORDANE 1988
CLP A1-1		1500.00 J		2200.00 J				12000.00 J		7900.00 J
CLP A1-2	800.00		1300.00	50.00				200.00 J		120.00 J
CLP A2-1		260.00 J		2100.00 J				7300.00 J		4900.00 J
CLP A2-2		59.00		260.00		150.00		570.00 J		370.00 J
CLP A3-1				500.00				1200.00 J		1300.00 J
CLP A3-2								590.00 J		650.00 J
CLP A4-1				66.00 J						
CLP A4-2										
CLP B1-1		2500.00 J		3000.00 J				14000.00 J		9100.00 J
CLP B1-2		660.00 J		980.00 J				4000.00 J		2700.00 J
CLP B2-1		1400.00 J		960.00 J				2100.00 J		1600.00 J
CLP B2-2		71.00		100.00		72.00		230.00		170.00 J
CLP B3-1								53000.00 J		37000.00 J
CLP B3-2								590.00 J		660.00 J
CLP B4-1				29.00 J						
CLP B4-2										
CLP C1-1		5900.00						21000.00 J		23000.00
CLP C1-2		63.00 J	200.00 J					220.00 J		240.00 J
CLP C2-1								2500.00 J		2400.00 J
CLP C2-2								23.00 J		24.00 J
CLP C3-1								580.00 J		700.00 J
CLP C3-2							18000.00 *		7300.00 *	
CLP C4-1								9.40 J		11.00 J
CLP C4-2										
CLP TSA-1				12000.00						
CLP TSA-2				440.00		130.00				
CLP ADP								5500.00		5800.00
CLP PPP-1-C1				35.00 J				73.00 J		88.00 J
CLP PPP-1-C2			68.00	11.00 J				26.00 J		30.00 J
CLP PPP-2-C1				180.00 J			5.90 *	560.00 J	5.60 *	600.00 J
CLP PPP-2-C2			5.00 J					4300.00 J		4700.00 J
CLP DFP-1-1										
CLP DFP-1-2										
CLP DFP-2-1										
CLP DFP-2-2				63.00		55.00		82.00 J		87.00 J
CLP DFP-3-1				41.00				33.00 J		37.00 J
CLP DFP-3-2				300.00				500.00 J		560.00
CLP MD-4				38.00				83.00 J		90.00 J
CLP MD-5				6200.00						
CLP MD-1										
CLP MD-5										
CLP MD-6										
CLP MDS-1				170.00						
CLP MDS-3								1100.00 J		1100.00 J
CLP MDS-4								6600.00 J		7400.00 J
CLP MDS 5						150.00		300.00 J		330.00 J
CLP SDE 1				440.00		1100.00		1400.00 J		1600.00 J
CLP SDW 1				2100.00		170.00				
CLP ZED 1				160.00		450.00				
CLP ZED 2				500.00				74.00 J		81.00 J
CLP TEN				94.00		6.10				
ERT DED 0								65.00 J		75.00 J
CLP DED 1				34.00						

...FOOTNOTES...

UNITS ARE PPB

CLP: CONTRACT LAB PROGR
FOR REFERENCE RESPONSE

R QC INDICATES THAT DATA UNUSABLE
J ESTIMATED VALUE

* 1982 ANALYTICAL DATA

EXTRACTABLE ORGANICS

LAB STATION	NAPTHALENE 1985	NAPTHALENE 1988	ACENAPHTHYLENE 1985	ACENAPHTHYLENE 1988	FLUORENE 1985	FLUORENE 1988	PHENANTHRENE 1985	PHENANTHRENE 1988	ANTHRACENE 1985	ANTHRACENE 1988	PYRENE 1985	PYRENE 1988
CLP A1-1		630.00 J						860.00 J		1200.00 J		1300.00 J
CLP A1-2												72.00 J
CLP A2-1		130.00 J								240.00 J		
CLP A2-2		44.00 J										
CLP A3-1												
CLP A3-2												
CLP A4-1												
CLP A4-2												
CLP B1-1												
CLP B1-2		2700.00 J				610.00 J		1700.00 J		870.00 J		1700.00 J
CLP B2-1								920.00 J				1200.00
CLP B2-2										200.00 J		
CLP B3-1												
CLP B3-2												
CLP B4-1												
CLP B4-2												
CLP C1-1		4800.00 J		4300.00 J		4300.00 J		19000.00		5200.00 J		25000.00
CLP C1-2												
CLP C2-1												
CLP C2-2												
CLP C3-1												
CLP C3-2												
CLP C4-1												
CLP C4-2	200 J						300 J		300 J		400 J	
CLP TSA-1												
CLP TSA-2												
CLP ADP		6400.00				1000.00 J		3300.00				2800.00 J
CLP FPP-1-C1								140.00 J				120.00 J
CLP FPP-1-C2	100 J											
CLP FPP-2-C1												
CLP FPP-2-C2												
CLP DPP-1-1												
CLP DPP-1-2												
CLP DPP-1-2												
CLP DPP-2-1												
CLP DPP-3-1												
CLP DPP-3-2												
CLP MD-4												310.00 J
CLP MD-5												
CLP MD-1								270.00 J				
CLP MD-2								390.00 J				
CLP MD-3												430.00 J
CLP MD-6												
CLP MDS-1												
CLP MDS-4				390.00 J				600.00 J		480.00 J		1600.00 J
CLP MDS-5								320.00 J		390.00 J		1400.00 J
CLP SDE-1								970.00 J				1700.00 J
CLP SDW-1								1000.00 J				1500.00 J
CLP ZED-1								340.00 J				530.00 J
CLP ZED-2								3700.00		800.00 J		4000.00
CLP TEH												
CLP DED-1												
CLP DED-2												

...FOOTNOTES...

UNITS IN PPB

CLP CONTRACT LAB PRO
FOR EMERGENCY RESPO

R-QC INDICATES THAT DATA UNUSABLE

J ESTIMATED VALUE

- 1982 ANALYTICAL DATA

LAB STATION	BENZYL BUTYL PHTHALATE 1985	BENZYL BUTYL PHTHALATE 1988	CHRYSENE 1985	CHRYSENE 1988	BENZO FLUORANTHENE 1985	BENZO FLUORANTHENE 1988	BENZO A PYRENE 1985	BENZO A PYRENE 1988	INDENO PYRENE 1985	INDENO PYRENE 1988	BENZO PERYLENE 1985	BENZO PERYLENE 1988
CLP A1-1		1800.00 J		750.00 J		4100.00 J		2100.00 J				
CLP A1-2						67.00 J		67.00 J		48.00 J		
CLP A2 1		280.00				510.00 J		250.00 J				
CLP A2 2												
CLP A3 1		530.00 J										
CLP A3 2												
CLP A4 1												
CLP A4 2												
CLP B1 1		1200.00 J				1700.00 J		870.00 J				
CLP B1 2		1200.00 J										
CLP B2 1		280.00 J		2900.00		3800.00 J		1900.00 J		1500.00 J		1100.00 J
CLP B2 2												
CLP B3 1		4600.00										
CLP B3 2												
CLP B4 1												
CLP B4-2				73.00 J								
CLP C1-1		1700.00 J		12000.00 J		13000.00 J		7600.00 J		6100.00 J		7300.00 J
CLP C1-2			2000 J		3000 J							
CLP C2 1												
CLP C2 2												
CLP C3-1												
CLP C3 2												
CLP C4 1												
CLP C4-2			200 J		400		200 J					
CLP TSA-1												
CLP TSA 2												
CLP ADP		3100.00 J		1100.00 J		810.00 J		590.00 J				
CLP DEP-1-C1				120.00 J		260.00 J				200.00 J		180.00 J
CLP DPP-1-C2												
CLP DPP 2 C1		1500.00										
CLP DPP-2-C2		98000.00										
CLP DEP-1-1												
CLP DEP-1 2												
CLP DEP-1-2												
CLP DEP-2 1												
CLP DEP 3 1												
CLP DEP-3-2												
DED HD 4				280.00 J		500.00 J						
CLP HD-5				520.00 J		820.00 J				280.00 J		450.00 J
CLP HD 1												
CLP HD 2						980.00 J						
CLP HD-3												
CLP HD-6												
CLP HDS-1				1300.00 J		1700.00 J		800.00 J		1000.00 J		1000.00 J
CLP HDS-4				1200.00 J		1700.00 J		1400.00 J		1100.00 J		1100.00 J
CLP HDS-5				1200.00 J		1100.00 J		700.00 J		710.00 J		620.00 J
CLP SDD 1				920.00 J		1500.00 J		810.00 J		870.00 J		850.00 J
CLP ZDD 1												
CLP ZDD 2				2100.00 J		3000.00 J		1300.00 J		920.00 J		870.00 J
CLP TFH												
CLP DED 1												
CLP DED-2												

FOOTNOTES

UNITS IN PPB

CLP--CONTRACT LAB PROGRAM

EPA--EMERGENCY RESPONSE TEAM

R--QC INDICATES THAT DATA UNUSABLE

J-ESTIMATED VALUE

*- 1982 ANALYTICAL DATA

LAB STATION	TETRACHLOROETHENE		TOLUENE		ETHYL BENZENE		TOTAL XYLENES	
	1985	1988	1985	1988	1985	1988	1985	1988
CLP A1-1								
CLP A1-2			35.00	J	11.00	3.00 J	760.00	68.00
CLP A2-1				770.00				
CLP A2-2						110.00		89.00
CLP A3-1			17.00					
CLP A3-2				10.00				
CLP A4-1				6.00 J				
CLP A4-2				170.00				
CLP B1-1				1100.00				
CLP B1-2						14.00		66.00
CLP B2-1								
CLP B2-2								11.00
CLP B3-1				9.00				
CLP B3-2				21.00				
CLP B4-1				3.00 J				
CLP B4-2				6.00				
CLP C1-1				35.00				
CLP C1-2				24.00				
CLP C2-1				5.00 J				
CLP C2 2				47.00				
CLP C3-1				5.00 J				
CLP C3-2			10000.00 *	1000.00 J	16000.00 *			
CLP C4-1								
CLP C4-2			5.00 J					
CLP D1-1								
CLP D1-2								
CLP D2-1								
CLP D2-2	5.00 J		11.00		5.00 J		78.00	
CLP D3-1								
CLP D3-2								
CLP D4-1								
CLP D4-2								
CLP E1-1								
CLP E1-2								
CLP E2-1								
CLP E2-2								
CLP E3-1								
CLP E3-2								
CLP E4-1								
CLP E4-2								
CLP TSA-1		17.00 J		21.00 J				
CLP TSA-2				21.00				
CLP ADP								
CLP FPP-1-C1				180.00		10.00		8.00
CLP FPP-1-C2	16.00		22.00	23.00	35.00	75.00	77.00	74.00
CLP FPP-2 C1		55.00	1.00 *J	75.00		510.00		1100.00
CLP FPP-2 C2		3900.00		17000.00		25000.00		21000.00

...FOOTNOTES...

UNITS IN PPB

CLP—CONTRACT LAB PROGRAM
ERT- EMERGENCY RESPONSE TEAM

R-QC INDICATES THAT DATA UNUSABLE
J- ESTIMATED VALUE

*- 1982 ANALYTICAL DATA

LAB STATION	TETRACHLOROETHENE 1985	TETRACHLOROETHENE 1988	TOLUENE 1985	TOLUENE 1988	ETHYL BENZENE 1985	ETHYL BENZENE 1988	TOTAL XYLENES 1985	TOTAL XYLENES 1988
CLP DFP-1-1				97.00				
CLP DFP-1-2								
CLP DFP-2-1								
CLP DFP-2-2								
CLP DFP-3-1								
CLP DFP-3-2								
CLP MD-1								
CLP MD-2								
CLP MD-3								
CLP MD-4								9.00 J
CLP MD-5				330.00 J				
CLP MD-6								
CLP MD-7								
CLP MD-1				48.00				
CLP MD-2								
CLP MD-3								
CLP MD-4								
CLP MD-6				480.00				
CLP MDS-1				18.00 J				
CLP MDS-2								
CLP MDS-3								
CLP MDS-4								
CLP MDS-5								
CLP SDE-1								
CLP SDW-1								
CLP ZFD-1				140.00				
CLP ZFD-2				35.00				
CLP TFH								
CLP DFD-1								
CLP DFD-2								

FOOTNOTES UNITS IN PPB CLP-CONTRACT LAB PROGRAM ERT-EMERGENCY RESPONSE T R-QC INDICATES THAT DATA UNUSABLE J-ESTIMATED VALUE *-1982 ANALYTICAL DATA

RESPONSIVENESS SUMMARY

This summary presents all of the Agency's responses to relevant comments received from the interested public and potentially responsible parties (PRPs) for the Zellwood Groundwater Contamination Site in Zellwood, Florida.

A. OVERVIEW

The alternative chosen in the original ROD involved the incineration of onsite soils to remove the organics and metals from the site. The amended ROD requires solidification/stabilization of the soils on-site to prevent the organic and metal contamination from leaching into the surrounding area, mitigating the threat to the environment and public. While the original ROD addressed both groundwater and soil remediation. The amended ROD addresses only soil contamination. Groundwater will be addressed specifically at a later date after the results of the soil remediation are analyzed and reviewed. The bifurcation of this action is being taken in response to the Florida Department of Environmental Regulation's (FDER) concerns regarding the Floridian Aquifer.

The general community, did not provide any comments on the proposed remedy for the amended ROD. Comments were received from the attorneys for two of the PRPs. This responsiveness summary will forcus on the comments from the attorney for Drum Service. The comments received from the attorney for Douglas Fertilizer were not related to the selection of a remedy and are therefore not adressed here.

The responsiveness summary is divided into the following sections:

- Background on Community Involvement.
- Summary of Comments Received during the Public Comment Period and Agency Responses.
- Remaining Concerns.

B. BACKGROUND ON COMMUNITY INVOLVEMENT

Community interest in the Zellwood Groundwater Site has been very limited dating back to September 29, 1986 when EPA held a public meeting at the Zellwood Elementary School. Four letters were received by EPA following the public meeting, three from interested citizens and one from a PRP. Following the meeting, EPA set up repositories at the Zellwood Elementary School and at EPA Regional Offices in Atlanta, Georgia. The minutes of the public meeting have been placed in the Administrative Record at both repositories. The administrative record at the repositories have been updated when new relevant information has become available. On September 5, 1989 EPA issued a public notice in The Orlando Sentinel informing the public of the fundamental change to the December 1987 Record of Decision. Fact sheets were sent to all interested parties, PRPs, local media and officials. EPA received

one response to the release, that being from the attorney for Drum Service, one of the PRPs. Based on a comment from one of the PRPs, EPA discovered that the information previously placed in the repository at the Zellwood Elementary School was missing. As a result, EPA replaced these materials and began updating the information that had previously been put into the Administrative Record and EPA Library for the Zellwood Groundwater Contamination Site.

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

EPA mailed the Notice of Fundamental Change Fact Sheet to all interested parties on September 29, 1989. EPA received two responses, one from the Attorney for Drum Service Company of Florida, one from the Attorney for Douglass Fertilizer. As noted above, this summary will focus only on the comments from the Drum Service Attorney. Their comments were broken down into several categories and this response will follow the same format. A summary of the comments and EPA's response to those comments is set out below.

1. Public Record Deficiencies.

The PRP commented on the lack of new information at the repository set up in the Zellwood Elementary School and the fact that the proposed amended ROD was not available for review before the end of the 10 day public comment period. Claims were made by the PRP's that the materials they felt were necessary for review and reference were not made available to them at the Zellwood Elementary School Repository, although these materials were apparently received from the Florida DER and EPA by the PRP. The PRP also claimed the 10 day public comment period was unreasonable considering the extent of the changes and inaccessibility of certain materials.

EPA Response: Since the public meeting in 1986, EPA has maintained an Administrative Record in Repositories at the Zellwood Elementary School in Zellwood, Florida and the EPA Region IV offices in Atlanta, Georgia. Both Repositories are updated as necessary with additional information. Recently, September 22, 1989, information supporting the changes in the ROD was sent to both places.

The Agency recognizes that one purpose of the repositories is to provide interested parties with sufficient relevant information supporting Agency's choice of a remedy such that they may comment on the proposed remediation technique. As noted in Section B above, EPA discovered that materials that had been placed in the Zellwood Elementary School Repository had been removed by unknown parties. Upon discovery, the missing documents were replaced with copies from the Atlanta Repository. As a result, all of the items that were intended to be in the Zellwood Repository may not have been placed there before the release of the public notice. However, the information was replaced on September 29, 1989 and was always available in the Atlanta Repository and through the Florida DER. Further, EPA had mailed the Notice of Fundamental Change and Fact Sheet to all interested groups and individuals in October, 1989. This notice referred the recipients to contact persons at EPA if more

information was needed. As noted, many of the documents were available to the public from the Florida DER under the Sunshine Law which requires the release of all requested documents and information with the exception of certain proprietary information. Based on the comments in the PRPs letter, it appears the PRP took advantage of this source. Thus, although the information was not immediately available at the Zellwood Elementary School, all the necessary, relevant information was available through EPA in Atlanta and other sources.

Further, it is important to note that every document in the Agency's files need not be included in the Administrative Record in the repository files. In addition to being the official record of the Site, one purpose of the Administrative Record is to provide information supporting the Agency's decision concerning the remedial alternative chosen for the ROD. This would allow an interested party an opportunity to review and comment on the ROD. The PRP noted that several documents that were referenced in the Florida State agency files were not included in the record. However, the memorandums indicated in the October 15, 1989 letter from the PRPs were not all pertinent to the decision making process. Memorandums 1, 3, and 4 were not considered in the decision process while memorandum 2 was used to determine the soil clean-up levels protective of a Class II Ground Water. Although the levels represented in memorandum 4 were modified to allow for the lead and chromium levels to be higher based on the fact that the leachate concentrations of lead and chromium in soil would not lead to groundwater contamination above drinking water standards at the concentrations listed in the amended ROD. The PRP also commented that a copy of the amended ROD was not available for review. At that point, the amended ROD was in draft form. As such, it is a predecisional document and not available for review. However, the Fact Sheet sent out with the Notice of Fundamental Change described the changes that were being considered for the amended ROD. Also, based on the comments in his letter, the PRP had apparently received a copy of the draft Amended ROD as well as the materials he discussed in his letter from the Florida DER under the Sunshine Law.

The PRP's last comment under this heading addressed the length of the 10 day comment period set for responses to the changes presented in the Amended ROD. The primary difference between the original ROD and the Amended ROD is the choice of the remedy for the Site. The information and facts presented are the same for both documents. Since the changes to the ROD were not extensive and interested parties had sufficient relevant information to review and comment on these changes, it is the EPA's opinion that a 10 day comment period was adequate to address the changes and not arbitrary and capricious as suggested by the PRP.

2. Endangerment Assessment

The PRP asked if there had been a formal reevaluation of the endangerment assessment and if so, was the evaluation reflected in written document.

EPA Response: The endangerment assessment for this site was not formally reevaluated. Of course, the information contained in this document was reviewed during the decision making process. This review would not constitute

an implicit reevaluation of the endangerment assessment. EPA will not reevaluate the original endangerment assessment unless the concentrations reported during Operable Unit II justify a reevaluation of the endangerment assessment. In the event that a reevaluation is conducted, the document will be sent to the repository. The endangerment assessment, if reevaluated, will not be sent to the PRPs for comment.

The PRP wanted to know if EPA based its new remediation alternative on the same risk and endangerment assessment which previously led EPA to conclude that incineration was the proper remedy.

EPA Response: EPA did not conclude based on the endangerment assessment alone that the remedy was to be incineration; many other factors and information were taken into consideration to form a conclusion as to the proper remedy. As mentioned before, the population affected by the contamination, the environment affected, migration pathway and the contaminants present are all considered along with the endangerment assessment.

At the time of remedy selection, the best available alternative was incineration for the quantity of organic and pesticide contamination reported to be present at the site. Although, the soil concentrations of organics at this time are lower than those previously reported, the metals contamination from the Site remains the same, therefore thus using the previous endangerment assessment for the soils is appropriate. This is not to say that the organic concentrations are low enough to justify reducing the remedy to no action or off site land disposal. The leachability of the contaminants into the surrounding areas and groundwater remain to be a major concern.

3. Remedy Selection

The PRP inquired into how EPA determined the clean-up levels/goals for the site set out in the notice and summary of the Amended ROD.

EPA Response: The clean up goals chosen are not arbitrary, but are based on research and review of available information concerning the specific site and meet the requirements of the NCP. EPA utilized many sources of information in order to determine the clean-up goals for the site. This included the analysis of soils and groundwater from the site, use of the groundwater models available to EPA, the PRZM model and the leachability tests used to characterize the area and understand the relationship between the aquifer and the prevention of the contamination from entering the water table. This information was compiled and reviewed to determine the clean-up goals for the site, both to be protective of human health and the environment on a long-term basis. In summary, these levels in no way can be specified as arbitrary and capricious as the PRP has stated in their comments.

The PRP also questioned the use of the PRZM model in EPAs estimation of a clean-up goal for the site.

EPA Response: The PRP has questioned the use of the PRZM model. At the same time, the other concerns expressed seem to state that they have no information as to how the model was applied. It is difficult to understand how the PRP's technical consultants are able to reach the conclusion that the model was misapplied and at the same time state that they have no information as to how it was applied in this specific instance. The PRZM was used to evaluate the ability of pesticides to leach into the groundwater. In addition this information was used by the Ground-Water Technology Unit in their derivation of soil remediation goals.

We recognize that the site-specific pesticides are likely to be highly adsorbed to the organic material in the site soils; our derivation of these soil remediation goals took into account the partitioning behavior of the pesticides based upon their solubility and the octanol/water partitioning characteristics of these compounds. What must be recognized here is that no matter how strongly the pesticides may be adsorbed to the soil, there will always be some portion of the adsorbed mass which will partition into the ground water. Given that the appropriate ground-water protection standards for these contaminants are set at very low concentrations, the result is that the soil concentrations protective of ground water are correspondingly low. It is correct that the PRZM was not used to derive soil remediation goals for metals on the site. This would be inappropriate, in our view. The metals criteria were derived from an examination of soil quality data from the borings and the corresponding ground-water quality data from the same boring locations.

The PRP also expressed that EPA improperly eliminated Alternative 3, off-site disposal as the appropriate remediation method for the site.

EPA Response: CERCLA, as amended by SARA, Section 121 (b)(1) and (d)(2)(A), (3) and (4) set out the relevant Federal requirements related to the Zellwood proposed plan. After review of the alternative, the Agency has determined that an on-site remedial action is preferred over an off-site remedy. Off-site disposal would be acceptable only if on-site treatment is not feasible, which is not the case for Zellwood. Further, offsite disposal of the contaminated materials from a CERCLA site must be placed in a facility that fully meets the requirements of RCRA which in this case would render this option cost prohibitive.

The PRP has questioned the permanance of the remedy chosen in that past EPA SITE reports consider the alternative "experimental for organic compounds" and "innovative for metals".

EPA Response: The remediation alternative has been analyzed in the laboratory with extensive leachate tests on the soil for both organics and metals. The results prove the remedy chosen will mitigate the posibility of organics and metals contamination entering the surrounding groundwater above the drinking water standards set by the State of Florida. Therefore the alternative meets Agency requirements in that the environment and public are being protected. Solidification of the contaminated soils on site is the best available technology to be implemented at the Site at this time. Transportation of the

wastes to a landfill for disposal does not conform to the permanent remedy solution in that the problem is being transferred to a different location with the potential to contribute to a larger problem in the future. EPA as well as the industry realizes that in the future technology will advance to a level capable of addressing the problems that are faced by the present environmental community in a more cost effective and efficient manner. As stated earlier the alternative chosen is the best available technology for the site at this time and delaying the remediation would not be in the best interest for all involved.

The PRP raised a question as to how the level of clean-up could be chosen before the groundwater was addressed.

EPA Response: The clean-up levels chosen are protective of the groundwater. In this case, the source of the contamination has been the focus of Operable Unit #1 in which soil removal will mitigate the contamination from continuing to be released into the groundwater. Which in turn initiates groundwater remediation. With the removal of the source of contamination the groundwater contaminant concentration will decrease. Goundwater clean-up will then be addressed in further detail during Operable Unit #2.

4. Clean-up Goals.

The PRP claims that the specific clean-up goals set for the Site were arbitrary, caprcious and unreasonable.

EPA Response: The PRP based this claim on the arguments that other clean-up guidelines are lower; the average of the data for certain metals at this Site are less than the clean-up goal; rain may have caused isolated areas of contamination affecting the samples that were taken from the drum disposal area; based on the comparison of soil composite lead EP toxicity extract data levels found in other materials, the removed materials should be placed in a solid waste landfill; and other sites and RODs for drum handlers have had stringent clean-up standards.

As discussed in the response to the PRP concerns with the remedy selection, the clean-up levels set for the Site were based on a review of site specific information, general information as well as appropriate models. All of this information is taken into consideration when the clean-up goals are set. As such, the goals set were not arbitrary, capricious nor unreasonable as alleged by the PRP. Further, the goals were set in accordance with the provisions of CERCLA. In support of their allegation, the PRP suggested that although there were high levels of lead, other values of lead were lower and in a range acceptable in other situations. The PRP then refers to standards set in several other countries and in a 1986 EPA study. The fact is that some of the data represents samples taken from areas that may have had low levels of contamination. However, there were also unacceptable, high levels of lead (as well as other metals and substances) present at the Site.

This argument is similar to the PRPs next comment concerning the use of average values in place of absolute values of the data for certain metals in determining the clean-up goals. The use of an average of all samples taken at the Site is clearly not appropriate or relevant in setting clean-up goals. Wher a large number of samples are examined, averaging the data can mask the higher (as well as lower) values. The purpose of the soil investigation was to define the areas of contamination that will require remediation. This would result in sampling data from areas that had low or no contamination. Averaging the data serves no purpose in this type of investigation. In sum, the fact that the average value, site wide for a certain parameter, may fall below the remedial goal is not relevant.

The PRP also suggested that the 1983 samples from the drum disposal area may have been inaccurate due to rain causing isolated bits of contamination to be mixed in the surface soil and mud. A review of all of the Site data taken over time does not support this contention. The data clearly indicates the presence of these contaminants at high levels supporting the need for the remediation. Further, based on this argument, overtime the flushing action of the rainfall and/or the volitilization of the soils caused by heat should result in lower levels of contamination which is not the case at this Site.

The PRP's next comment suggests that based on the results of the analysis of the EP Toxicity extract from a soil composite sample, lower lead clean-up standards would be appropriate. However, a soil composite sample is not reflective of the absolute levels of contamination at the Site. Actually, it is an average of the samples that make up the composite sample. Further, in this case, the sample tested was a solidified treated sample, not raw soil rendering this comparison irrelevent.

The PRP next compares the level of contamination found at other drum handling facilities that did not require clean-up and suggests that the proposed levels may be more demanding than levels the EPA has proposed in other Florida drum handlers RODs. Further, the PRP complained that the period of time set for public comment did not allow sufficient time for comparison of the other Florida drum site RODs to the remedy chosed for this Site. In either case, it is important to remember that many site specific factors such as location, population, public access, contaminants present, effects to public drinking water, number of private drinking water wells in area, migration pathways of contaminants, etc. are considered when remedies are chosen and clean-up levels are set for a specific site (or determining if clean-up is necessary). Abstract comparison of remedies or contaminant levels found at similar industries is inappropriate.

5. Miscellaneous.

The PRP mentions that they have made significant and enormous changes to the plants and businessess over the past 15 years to prevent further pollution of the environment. The PRP stated that EPA has neglected to account for this in the contaminant levels dropping at the site.

EPA Response: EPA recognizes the advancement the PRPs have made in the manner in which they handle their wastes and obvious growth the PRPs have experienced over the years; but in no way does this account for the reduction of waste contamination. The PRPs are becoming aware of the serious liability involved in releasing waste into the environment and taking precautions to prevent any further releases. However, the advancement and modifications to the businesses does not remediate the contamination previously released by any industry or business nor does it relinquish the companies from their responsibility for remediation of the site. From a hydrological stand point the levels of organic contaminants may have been reduced over the years due to the large transfer of groundwater through the soil, in essence, flushing the organics out of the area and diluting the contaminants over time.

D. REMAINING CONCERNS

EPA is mainly concerned with the contamination on site migrating into the groundwater that may be used for public water supply. FDER has raised concerns with the PRPs and EPA concerning the Floridian Aquifer and its present condition as well as stressing that they would not recommend further conduits into the aquifer from the Zellwood site. Further studies may be needed to confirm the concentration of contaminants or lack of contaminants from the site into the Floridian aquifer before the site can be deleted from the NPL. This issue will be brought to the table in the future once Phase II of the remedial investigation is completed by EPA. The citizens have not raised any concerns since the October 5, 1989 public notice. EPA plans to keep the public and local officials informed of the activities EPA is undertaking at the site along with any new information that may involve the site.