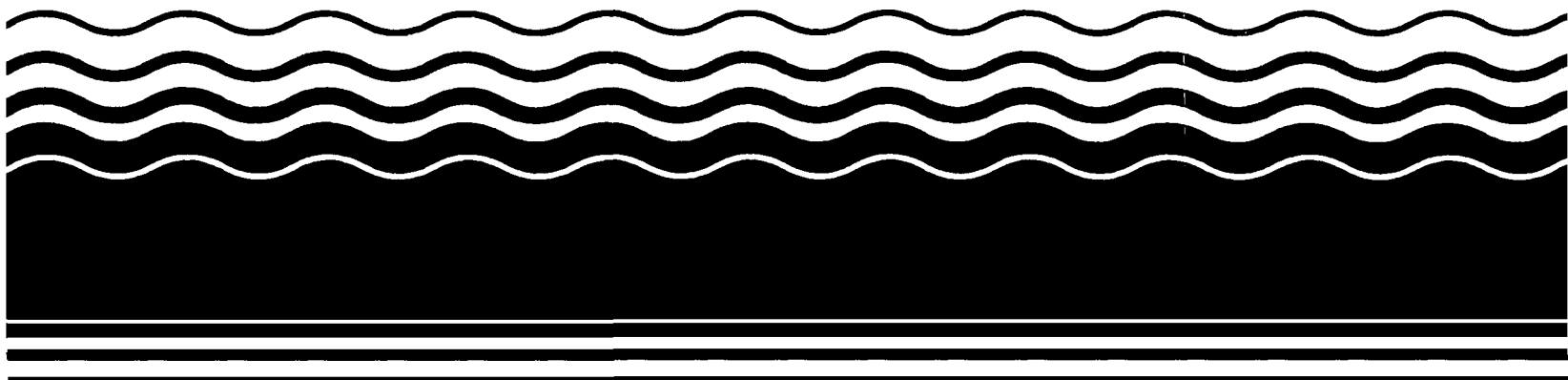




# **Superfund Record of Decision:**

Woodbury Chemical  
(Princeton Plant), FL



## **NOTICE**

The appendices listed in the index that are not found in this document have been removed at the request of the issuing agency. They contain material which supplement, but adds no further applicable information to the content of the document. All supplemental material is, however, contained in the administrative record for this site.

<b>REPORT DOCUMENTATION PAGE</b>	1. REPORT NO. EPA/ROD/R04-92/121	2.	3. Recipient's Accession No.			
4. Title and Subtitle SUPERFUND RECORD OF DECISION Woodbury Chemical (Princeton Plant), FL First Remedial Action - Final	5. Report Date 06/25/92		6.			
	8. Performing Organization Rept. No.		10. Project/Task/Work Unit No.			
7. Author(s)	11. Contract(C) or Grant(G) No. (C) (G)		13. Type of Report & Period Covered 800/000			
9. Performing Organization Name and Address		14.				
12. Sponsoring Organization Name and Address U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460		15. Supplementary Notes PB93-964012				
16. Abstract (Limit: 200 words)  The 5-acre Woodbury Chemical (Princeton Plant) site is a pesticide and fertilizer formulation and storage facility located approximately one-half mile southwest of Princeton, Dade County, Florida. Land use in the area is predominantly agricultural, with two residences located just north and west of the site. The estimated 20,000 people who reside in Princeton use the underlying sole-source Biscayne aquifer as their drinking water supply. From 1927 to 1959, the site was used as a tomato and potato packing house. From 1959 to the present, the site has been used for formulating technical-grade materials to produce pesticides and fertilizers. As a result of a tank leak or spill in the late 1970's, EPA conducted numerous investigations that revealed toxaphene contamination in soil. In 1990, a removal action was conducted at the site, which resulted in the excavation of contaminated soil. Soil contaminated with greater than 100 mg/kg of toxaphene was sent offsite to the GSX facility in Pinewood, South Carolina, and soil contaminated with less than 100 mg/kg was sent to the South Dade County landfill. The previous removal action has eliminated the principal threat at the  (See Attached Page)						
17. Document Analysis a. Descriptors Record of Decision - Woodbury Chemical (Princeton Plant), FL First Remedial Action - Final Contaminated Media: None Key Contaminants: None  b. Identifiers/Open-Ended Terms         c. COSATI Field/Group						
18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 70				
	20. Security Class (This Page) None	22. Price				

EPA/ROD/R04-92/121

Woodbury Chemical (Princeton Plant), FL

First Remedial Action - Final

Abstract (Continued)

site and no additional action is necessary to protect human health or the environment. Therefore, there are no contaminants of concern affecting this site.

The selected remedial action for this site is no further action, with quarterly ground water monitoring. The estimated total cost for this remedial action is \$22,500, which includes an O&M cost of \$10,000 for 1 year.

PERFORMANCE STANDARDS OR GOALS: Not applicable.

DECLARATION FOR THE  
RECORD OF DECISION

SITE NAME AND LOCATION

Woodbury Chemical Site  
Princeton, Florida

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Woodbury Chemical Site in Princeton, Florida. The final site remedy was chosen in accordance with the Comprehensive Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 U.S.C. Section 9601 et seq., and to the extent practicable, the National Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the administrative record file for this site.

The State of Florida concurs on the selected remedy.

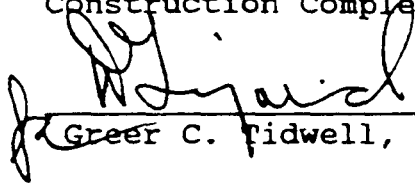
DESCRIPTION OF THE REMEDY

This remedy is the final action for the site. In the absence of any significant source of contamination remaining in the soil at the site, the No Further Action alternative was selected as the preferred alternative to address the soil. Due to a lack of significant ground water contamination, the No Action alternative was chosen for ground water at the site. However, the ground water will be monitored quarterly for one year to verify that no site-related release of contaminants is occurring. If the results of the monitoring show that there is no unacceptable risk from exposure to site-related contaminants in the ground water, then the site will be considered for deletion from the National Priorities List (NPL). However, should monitoring indicate that the site poses a threat to human health or the environment, EPA, in consultation with the State of Florida, will reconsider the protectiveness of the "No Action" alternative and the feasibility of groundwater remediation will be re-evaluated.

DECLARATION

Based on the results of the Remedial Investigation and Risk Assessment conducted at the Woodbury Chemical Site, EPA has determined that no further remedial action is necessary to ensure protection of human health and the environment. The removal action that took place at the site in January 1990 eliminated the need to conduct additional remedial action. The selected remedy is protective of human health and the environment. Because this remedy will not result in hazardous substances remaining on-site above health-based levels, the five-year review will not apply to

this action. EPA has determined that no further remedial action is necessary at this site. Therefore, the site now qualifies for inclusion in the "sites awaiting deletion" subcategory of the Construction Completion category of the National Priorities List.



Greer C. Tidwell, Regional Administrator

6/25/92  
Date

**Record of Decision**

**Summary of Remedial Alternative Selection**

**Woodbury Chemical Site**

**Princeton, Florida**

**Prepared by:  
U.S. Environmental Protection Agency  
Region IV  
Atlanta, Georgia**

## TABLE OF CONTENTS

1.0	Site Location and Description.....	1
2.0	Site History.....	4
3.0	Community Relations History.....	6
4.0	Scope and Role of Response Action.....	7
5.0	Summary of Site Characteristics.....	7
5.1	Site Drainage.....	7
5.2	Surface Water Features.....	9
5.3	Geology and Hydrogeology.....	9
5.4	Results of the Remedial Investigation.....	11
6.0	Summary of Site Risks.....	12
6.1	Contaminants of Concern.....	12
6.2	Exposure Assessment.....	13
6.3	Toxicity Assessment.....	24
6.4	Risk Characterization.....	24
6.5	Discussion of Uncertainty.....	31
6.6	Ecological Assessment.....	36
7.0	Description of "No Further Action" Alternative.....	36
8.0	Documentation of Significant Changes.....	37

## LIST OF FIGURES

Figure 1-1	Site Location Map.....	2
Figure 1-2	Detailed Site Map.....	3
Figure 1-3	Sump and Discharge Location.....	5
Figure 5-1	Paved/Prepaved Areas.....	8
Figure 5-2	C102 Canal.....	10



## LIST OF TABLES

Table 6-1	Current and Future Exposure Pathways.....	14
Table 6-2	Exposure Point Concentrations for Current Ground Water Exposure.....	15
Table 6-3	Exposure Point Concentrations for Future Ground Water Exposure.....	16
Table 6-4	Exposure Point Concentrations for Future Soil Exposure.....	16
Table 6-5	Exposure Assumptions for Oral Exposure to Ground Water.....	17
Table 6-6	Exposure Assumptions for Dermal Exposure to Ground Water.....	17
Table 6-7	Exposure Assumptions for Oral Exposure to Surface Soil.....	18
Table 6-8	Exposure Assumptions for Dermal Exposure to Surface Soil.....	18
Table 6-9	Chronic Daily Intake for Oral Exposure to Ground Water - Current Scenario.....	19
Table 6-10	Chronic Daily Intake for Oral Exposure to Ground Water - Future Scenario.....	20
Table 6-11	Chronic Daily Intake for Dermal Exposure to Ground Water - Future Scenario.....	21
Table 6-12	Chronic Daily Intake for Oral Exposure to Surface Soil - Future Scenario.....	22
Table 6-13	Chronic Daily Intake for Dermal Exposure to Surface Soil - Future Scenario.....	23
Table 6-14	Carcinogenic Toxicity Values.....	25
Table 6-15	Noncarcinogenic Toxicity Values.....	26
Table 6-16	Carcinogenic Risk from Exposure to Ground Water - Current Scenario.....	28
Table 6-17	Carcinogenic Risk from Exposure to Ground Water - Future Residential Scenario.....	28

## LIST OF TABLES (CONT.)

Table 6-18	Carcinogenic Risk from Exposure to Surface Soil - Future Residential Scenario.....	29
Table 6-19	Carcinogenic Risk from Exposure to Ground Water - Future Industrial Scenario.....	29
Table 6-20	Carcinogenic Risk from Exposure to Surface Soil - Future Industrial Scenario.....	30
Table 6-21	Noncarcinogenic Hazard from Oral Exposure to Ground Water - Current Scenario.....	32
Table 6-22	Noncarcinogenic Hazard from Exposure to Ground Water - Future Residential Scenario.....	32
Table 6-23	Noncarcinogenic Hazard to an Infant from Ingestion of Ground Water Nitrate.....	33
Table 6-24	Noncarcinogenic Hazard from Exposure to Surface Soil - Future Residential Scenario.....	33
Table 6-25	Noncarcinogenic Hazard from Exposure to Ground Water - Future Industrial Scenario.....	34
Table 6-26	Noncarcinogenic Hazard from Exposure to Surface Soil - Future Industrial Scenario.....	34
Table 6-27	Summary of Site Risks.....	35
Table 7-1	Estimated Monitoring Costs.....	38

## LIST OF APPENDICES

Appendix A	Remedial Investigation Sampling Data and Locations
Appendix B	Responsiveness Summary
Appendix C	State Concurrence Letter

**DECISION SUMMARY FOR THE RECORD OF DECISION  
WOODBURY CHEMICAL SITE  
PRINCETON, FLORIDA**

**1.0 SITE LOCATION & DESCRIPTION**

The Woodbury Chemical Site is a currently operating facility which occupies five acres along the west side of U.S. Route 1 (Dixie Highway) in southeast Dade County, approximately one-half mile southwest of Princeton, Florida (Figure 1-1). The street address is 13690 S.W. 248th Street (Coconut Palm Drive).

Woodbury Chemical is situated on low, flat terrain surrounded primarily by agricultural land and is sparsely populated. Princeton, Florida has an estimated population of 20,000. The Homestead Air Force Base is located 2.5 miles to the south. The area east of the site contains subdivisions, trailer parks, businesses, and Homestead Air Force Base housing facilities.

Five miles east of the site is Biscayne Bay, and the Everglades are located approximately 15 miles to the west. An estimated 2350 feet northeast of the site is a state-owned and operated canal identified as Canal C-102, which flows east toward and connects with Biscayne Bay. Directly underlying the site is the Biscayne Aquifer, which supplies all potable water for Dade County and has been designated as a sole-source aquifer.

The site is bordered to the north by S.W. 248th Street and to the east by Route 1, with two retail businesses northeast of the site at the intersection of these two roads. One is Greenstein Trucking and the other is C.A. Chambers Properties, with a vacant building situated between them. North of 248th Street is a tomato field with a horticulture nursery west of that. An abandoned railroad spur is located between the site and Route 1. To the west is a farm field owned by the Woodbury Chemical Company and west of that is an avocado grove. To the south of the site is Glade & Grove Supply, a tractor and farm equipment supply and repair business and FMC Agricultural Division Warehouse, a pre-packaged farm supplies distributor (Figure 1-2).

Five buildings utilized by the company are located on the property. In addition, a residence which is occupied by a company employee is situated at the north end of the site. Another residence just west of the site also houses a company employee. The office building was initially used as a warehouse in 1924 in the produce operation. The warehouse was formerly the tomato and potato packing and canning plant and is currently used for stocking bags of clay and other bulk solids. The formulation building houses the fertilizer formulation plant. Before it was built in 1977, this area was occupied by Woodbury's pesticide formulation operation. The shop is employed as a vehicle maintenance and repair area and

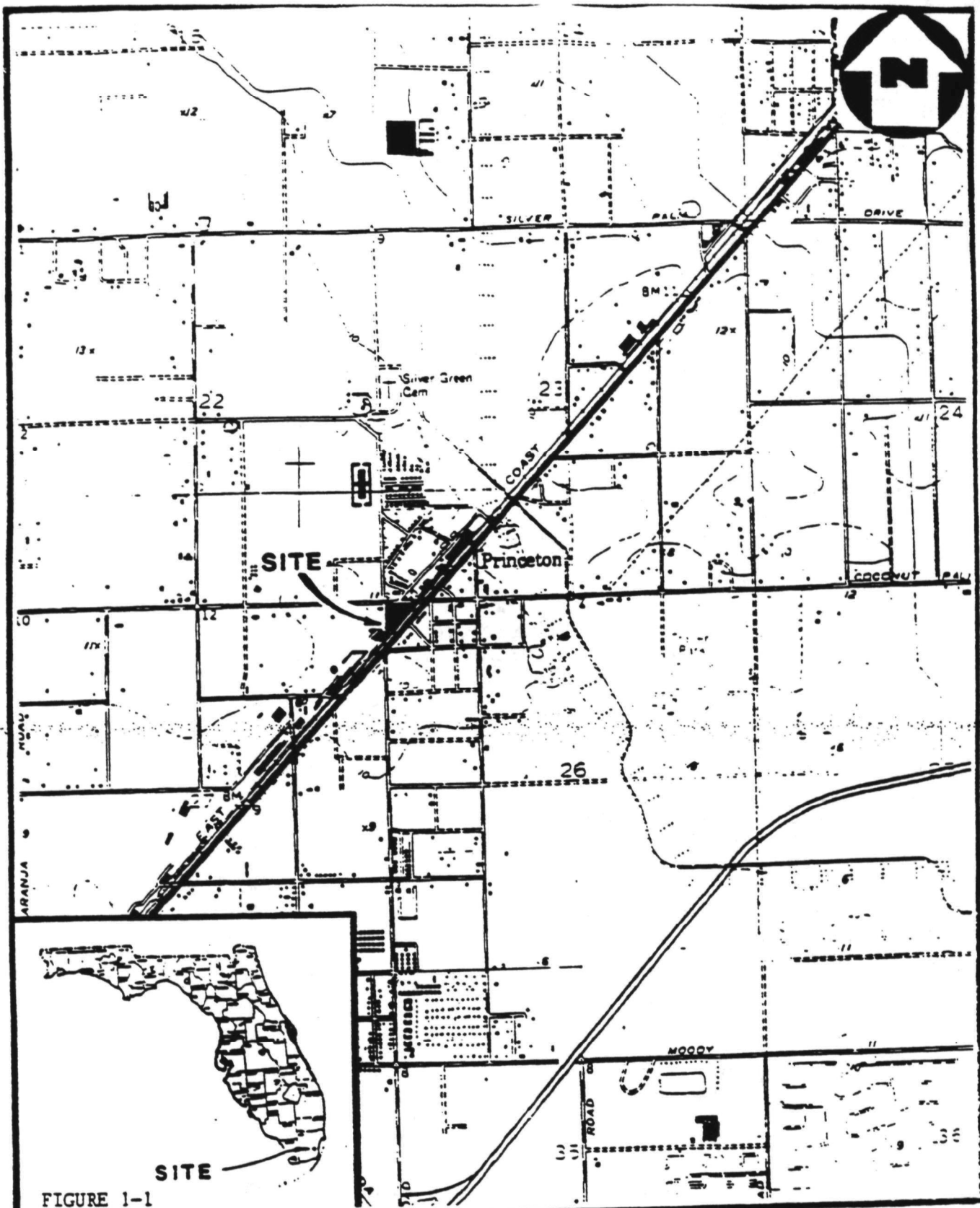
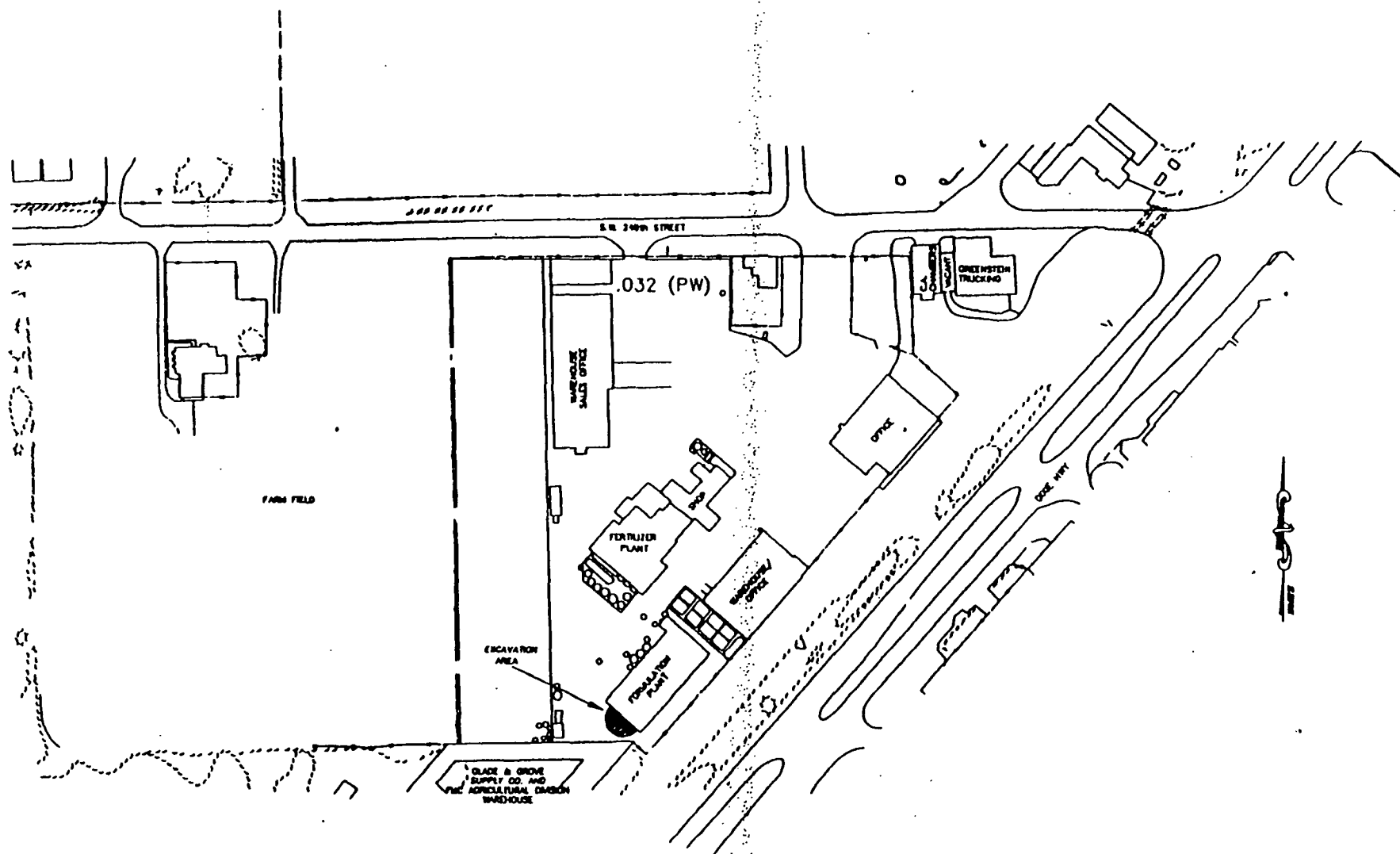


FIGURE 1-1

BASE MAP IS A PORTION OF THE USGS 7.5 MINUTE QUADRANGLE GOULDS, FLORIDA, 1955.  
**SITE LOCATION MAP**  
**WOODBURY CHEMICAL COMPANY**  
**PRINCETON, FLORIDA**



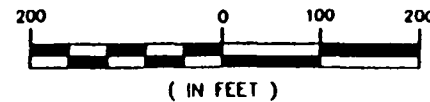
WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



FIGURE 1-2  
SITE LAYOUT MAP

LEGEND

SCALE



previously served as the mixing building. It was one of the original buildings used by previous occupants in the canning business. The sales office, known as S&M Farm Supply, was built between 1975 and 1977 and houses a retail store and warehouse for finished products.

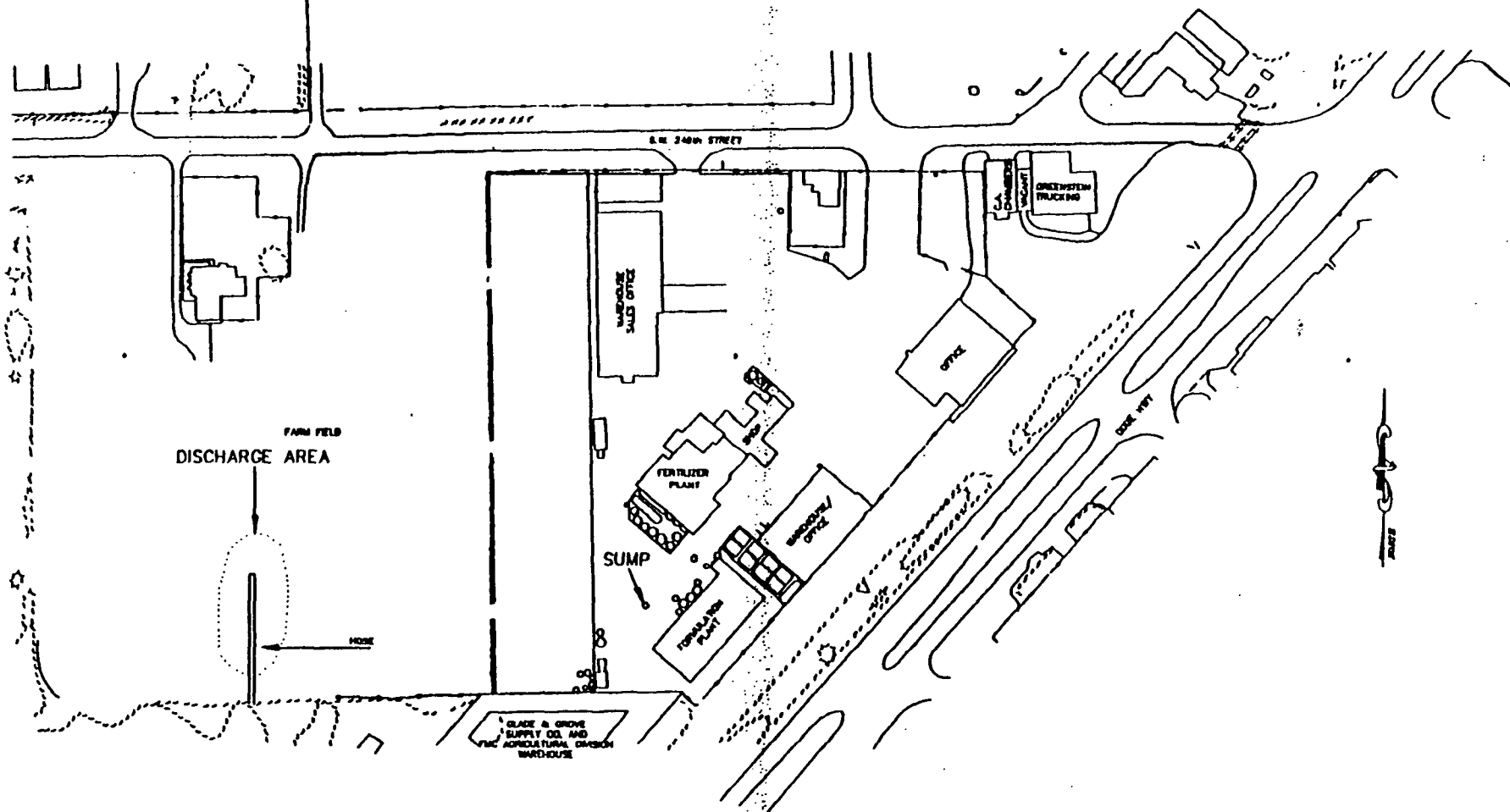
The site is fenced and the majority of it is paved. Surface runoff at the site flows to a sump drain, located between the formulation building and the vehicle maintenance shop. It leads to an underground concrete holding tank with a 1200-gallon capacity, which is occasionally pumped out through a hose leading into the adjacent farm field (Figure 1-3). The northern area of the site contains several French drains which allow runoff to percolate directly into the ground.

## 2.0 SITE HISTORY

Since 1959, Woodbury Chemical has been actively engaged in the formulation of technical-grade materials to produce pesticides and fertilizers. Operations were initiated in Goulds, Florida, three miles northeast of Princeton, and were relocated to Princeton in 1975. The current location had previously been used as a tomato and potato packing house and a labor camp for migrant farm workers.

Railroad access to the site was present until 1988 when the rails and cross ties were removed and the railroad bed was scraped level. The overburden from the railroad bed was used to fill the ditches that existed between the site and the tracks. While the railroad tracks were present, bulk product was delivered to the site via rail cars. These bulk products included potassium chloride, nitrogen, and methyl bromide.

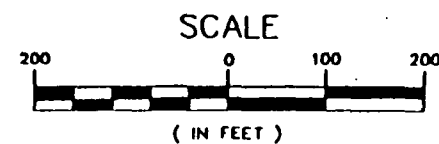
During the late 1970's (exact time-frame uncertain) an above-ground tank leaked or spilled the pesticide toxaphene onto the ground just south of the formulation building (Figure 1-2). In January 1979, Dade County Environmental Resources Management (DERM) inspector Bob Donoghue filed a formal in-house complaint against S&M Farm Supply, Inc. charging them with causing excessive levels of nitrates in the drinking water wells located upgradient, downgradient, and within the site. A February 20, 1980 EPA Hazardous Waste Site Identification and Preliminary Assessment Report recommended the Woodbury Chemical site for a Site Inspection. Another Preliminary Assessment was prepared by the Florida Department of Environmental Regulation (FDER) in August 1984. EPA performed a site screening investigation in July 1985 and based on the results, tasked NUS to resample the site in January 1986. NUS submitted a preliminary Hazardous Ranking System (HRS) scoring summary to EPA in February 1986 and a submitted a final HRS package in January 1987. The Woodbury Chemical Site was proposed for the National Priorities List (NPL) in June 1988 and was placed on the final list in August 1990. A Potentially Responsible Party (PRP) Search Report, completed in March 1990, indicated the only PRPs for the site to



WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



FIGURE 1-3  
SUMP AND DISCHARGE LOCATION



be those individuals and company names associated with the current operation at the site.

In January 1990, under the direction of EPA and DERM, Woodbury Chemical conducted a removal of toxaphene-contaminated soil in the area of the previously-mentioned spill. The removal was conducted in two phases. In Phase I, all soil containing toxaphene in concentrations greater than 100 parts per million (ppm) were excavated and shipped to the GSX facility in Pinewood, South Carolina. Phase II consisted of excavating soil containing toxaphene in concentrations less than 100 ppm and transporting it to the South Dade County Landfill. Confirmatory sampling ensured that the remaining soils, when subjected to the EPA Extraction Procedure (EP Tox) test, produced an extract that contained 0.005 mg/l or less toxaphene.

In March 1990, a Special Notice Letter was issued to the Woodbury Chemical Company to give the PRP the opportunity to conduct the Remedial Investigation and Feasibility Study (RI/FS) at the site. The PRP's response did not constitute a good-faith offer, and consequently, EPA decided to perform the RI/FS as an in-house project. In January and June 1991, EPA Region IV Environmental Services Division (ESD) personnel collected soil, sediment, subsurface soil and ground water samples as part of Phases I and II of the RI.

### 3.0 COMMUNITY RELATIONS HISTORY

The Woodbury Chemical Site is located in Princeton, Florida in unincorporated Dade County. The area is primarily agricultural with several more densely populated small towns located nearby. Goulds, Florida is approximately 2 miles northeast of the site, Naranja, Florida is 2.5 miles southwest, and the Homestead Air Force Base is 2.5 miles to the south.

Community interviews were conducted by EPA in August 1990 to determine public interest in the Woodbury Chemical Site. The conclusion drawn from these interviews is that the local community has little or no concern regarding the site. It appears that, since the area is heavily agricultural and the population is so familiar with pesticide use, the threat of pesticide contamination is not a serious concern. EPA held an Availability Session at the Homestead Public Library on September 27, 1990 to provide information and answer questions on the RI to be conducted at the Woodbury Chemical Site. The only attendee was the DERM project manager assigned to the site.

The RI, Risk Assessment, and Proposed Plan for the Woodbury Chemical Site were released to the public on March 31, 1992. These documents were made available in both the administrative record and an information repository maintained at the EPA Records Center in Region IV and at the South Dade Regional Library in Cutler Ridge,



Florida. The notice of availability for these two documents was published in the Miami Herald on March 24, 1992. A public comment period was held from March 31, 1992 through April 30, 1992. In addition, a public meeting was held on April 7, 1992. At the public meeting, which was attended by only two people (the PRP and his attorney), representatives from EPA answered questions about the findings of the RI and Risk Assessment and EPA's Proposed Plan for the site. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision. This decision document presents the selected remedial action for the Woodbury Chemical Site, in Princeton, Florida, chosen in accordance with CERCLA, as amended by SARA and, to the extent practicable, the National Contingency Plan. The decision for this site is based on the administrative record. These community relations activities fulfill the statutory requirements for public participation contained in CERCLA section 113(k)(2)(B)(i-v).

#### 4.0 SCOPE AND ROLE OF RESPONSE ACTION

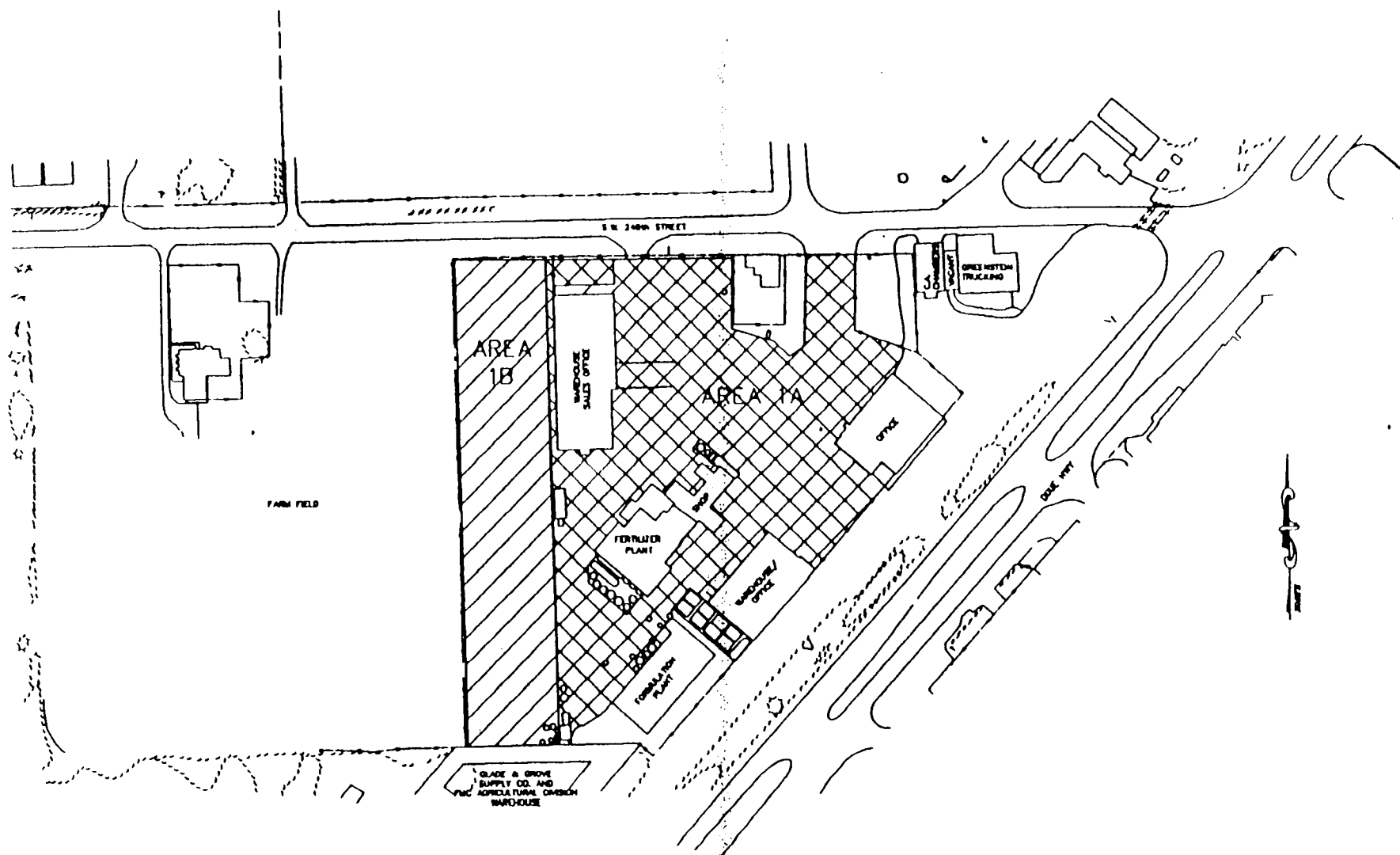
This ROD addresses the final response action for the Woodbury Chemical Site, addressing both soil and ground water. Because the baseline risk assessment indicates that the previous removal action eliminated the principal threat at the site, EPA proposes "No Further Action" for the soil at the site. Ground water analysis and results of the risk assessment suggest that "No Action with Monitoring" for the ground water will be protective of human health and the environment. The ground water will be monitored quarterly for one year to confirm that the few samples collected during the RI which contained contaminants above drinking water standards are not indicative of a release of contaminants from the Woodbury Chemical Site. If ground water monitoring indicates an unacceptable risk from contaminants used in Woodbury Chemical's operations, EPA will reconsider the protectiveness of the "No Action" alternative and the need for protective measures on groundwater re-evaluation.

Two areas that do not fall under the scope of this action are the elevated levels of nitrates that occur region-wide and arsenic, which is not site-related, found along the railroad right-of-way which runs adjacent to the site. The response actions are consistent with the NCP (40 CFR 300.68).

#### 5.0 SUMMARY OF SITE CHARACTERISTICS

##### 5.1 SITE DRAINAGE

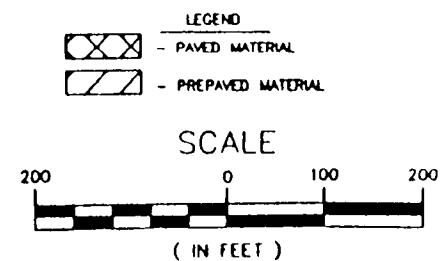
The Woodbury Chemical Site and surrounding area has very little topographic relief. The site is paved with asphalt except for the western portion of the site, extending from a line running north-south just west of the sales office (Figure 5-1). The area west of this line is covered with a pre-paving material consisting of



WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



FIGURE 5-1  
PAVED/PREPAVED AREAS



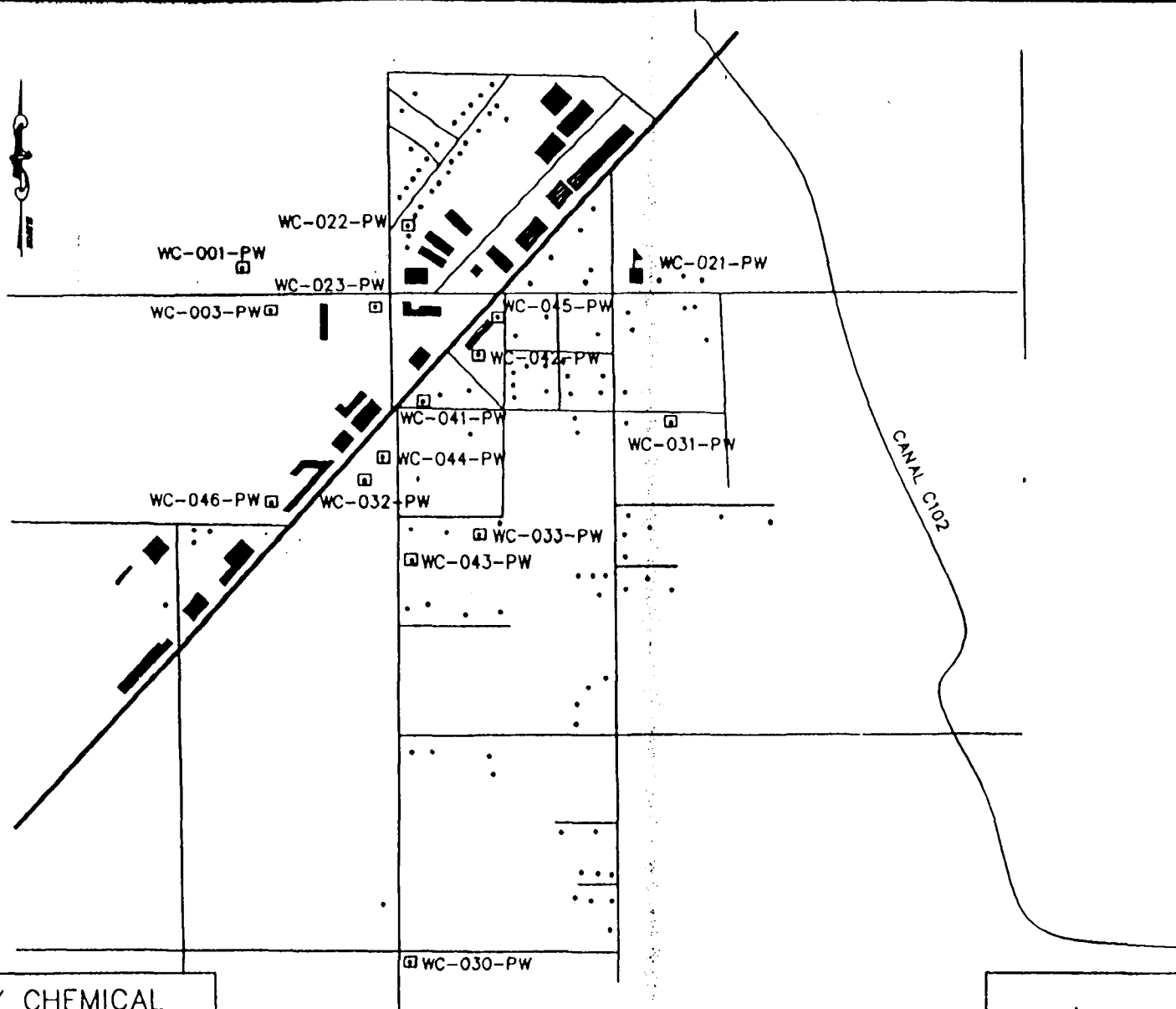
crushed gravel and sand mixed with a sealer. The pre-paved area is used to store farm equipment and portable storage tanks. The northern portion of the site has been graded such that the paved area facilitates the diversion of rainwater toward several French drains. The southern portion of the site surrounding the fertilizer plant and formulation building drain toward a large concrete sump, located between the two buildings. The sump is used to collect spillage resulting from the loading of trucks and tanks in the fertilizer and formulation area. The contents of the sump, which has a 1,200 gallon capacity) are then pumped onto the farm field to the west of the site. All permanent bulk storage tanks, including fuel tanks, are located in diked areas.

## 5.2 SURFACE WATER FEATURES

Five miles east of the site is Biscayne Bay, and the Everglades is located approximately 15 miles to the west. An estimated 2350 feet northeast of the site is a state-owned and operated canal identified as Canal C-102, which flows east toward and connects with Biscayne Bay (Figure 5-2). It is very unlikely that surface water runoff from the site would reach this canal, since the roadways surrounding the site are at higher elevations than the site itself. Furthermore, there are no man-made conveyances to provide for movement of water from one side of the road to the other.

## 5.3 GEOLOGY AND HYDROGEOLOGY

Directly underlying the site is the Biscayne Aquifer, which supplies all potable water for Dade County and has been designated as a sole-source aquifer. Geologically, the Biscayne Aquifer is composed of soils of Holocene age and limestone, sandstone, and sand ranging in age from Pleistocene through late Miocene. In the site vicinity, it is primarily limestone and extends to a depth of approximately 80 feet below sea level. Solution cavities occupy a significant volume of the limestone in the Biscayne Aquifer, causing it to have high horizontal and vertical permeabilities. The lower part of the oolitic limestone is also cavity riddled and is identified by the presence of bryozoans. A hard cavernous limestone underlies the bryozoan layer. Because of the extremely high permeability of this limestone, all large capacity wells are completed in this part of the aquifer, generally 40 to 100 feet below land surface. Transmissivity of the Biscayne Aquifer ranges from  $5.4 \times 10^4$  ft<sup>2</sup>/day where the aquifer is mostly sand to greater than  $1.6 \times 10^6$  ft<sup>2</sup>/day in the limestone-rich areas. Regional flow of ground water is to the southeast; however, the direction of flow may be influenced by drainage canals or well fields. Flow direction in the site area appears to be influenced by the C-102 Canal, as it ranges in direction from east to northeast.



WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



FIGURE 5-2

C-102 CANAL

▲ - SCHOOL • RESIDENTIAL UNITS  
UNITS = ug/l □ SAMPLE LOCATION

APPROXIMATE SCALE



( IN FEET )

1 inch = 1000ft.

#### 5.4 RESULTS OF THE REMEDIAL INVESTIGATION

The purpose of the Remedial Investigation (RI) was to gather and analyze sufficient data to characterize the site in order to perform the Baseline Risk Assessment, which determined the site's impact on human health and the environment. Both the RI and Risk Assessment are used to determine whether remedial action is necessary at the site.

The RI sampling at the Woodbury Chemical site was conducted in two phases. Phase I was conducted in January 1991 and included the collection of fifteen surface soil, fourteen subsurface soil, and eighteen ground water samples. These samples were analyzed for volatile and extractable organics, pesticides, PCBs, metals, cyanide, and nitrate/nitrite as nitrogen. In addition, selected surface and subsurface soils were analyzed for total organic carbon (TOC).

Phase II was conducted in June 1991 as a result of the findings of Phase I. During Phase II, some of the sample locations from Phase I were resampled to verify the findings. Other sample locations were added to determine the lateral extent of contamination found during Phase I. Eight surface soil samples were collected from the farm field to the west and analyzed for pesticides to find the horizontal extent of contamination detected on the western portion of the site. Three surface soil samples were collected east of the railroad right-of-way and analyzed for metals to determine the extent of arsenic contamination. Three monitoring well locations were resampled, and three new ones were installed along the railroad right-of-way. Six private wells were sampled, most of them east of U.S. Route 1 to determine if arsenic detected in the ground water along the railroad was migrating to the east. All ground water samples were analyzed for pesticides, metals, and nitrates.

Sampling locations and results from both phases of the RI can be found in Appendix A. Pesticides were detected in the surface soil mainly in the northern and western portions of the site as well as in the adjacent farm field. Pesticides in subsurface soils were localized in the southwestern corner of the site. In ground water, pesticides were detected mainly offsite to the south and east.

Arsenic was detected offsite only in the surface and subsurface soil and ground water along the abandoned railroad right-of-way east of the site, including areas that are not adjacent to the site.

Chromium was detected in soil onsite and in soil and ground water along the railroad right-of-way. It was found in the background sample as well. The source of this chromium is unknown.

Nitrates were detected in every ground water sample collected during both phases of the RI, including background. A few samples, including two located on site, contained nitrates above the drinking water standard.

A topographic survey of the Woodbury Chemical site was conducted by the U.S. Army Corps of Engineers. The resulting topographic map with a one-foot contour interval indicated that the site is very flat with drainage in the southern portion of the site (formulation and truck loading area) flowing toward an onsite sump. The northern part of the site is drained by French drains. The roads surrounding the site are at higher elevations than the site and serve as dikes to surface water runoff.

An analysis of current and historical aerial photography of the site was conducted by the EPA Environmental Photographic Interpretation Center (EPIC). Photographs from 1952 through 1990 were included in the study. They confirm that the site was paved in 1975 when the Woodbury Chemical took over the site. According to the photos, the site boundary was expanded to include a portion of the adjacent farm field some time between 1979 and 1985.

## 6.0 SUMMARY OF SITE RISKS

A Baseline Risk Assessment was conducted by EPA as part of the RI to estimate the health or environmental problems that could result if the Woodbury Chemical site were not remediated. It is incorporated as Chapter 6 in the RI Report. A Baseline Risk Assessment represents an evaluation of the "No Action" alternative, in that it identifies the risk present if no remedial action is taken. The assessment considers environmental media and exposure pathways that could result in unacceptable levels of exposure now or in the foreseeable future. Data collected and analyzed during the RI provided the basis for the risk evaluation. The risk assessment process can be divided into four components: contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

### 6.1 CONTAMINANTS OF CONCERN

The objective of contaminant identification is to screen the information that is available on hazardous substances present at the site and to identify contaminants of concern in order to focus subsequent efforts in the risk assessment process. Contaminants of concern are selected based upon their toxicological properties, concentrations and frequency of occurrence at the site. During the Risk Assessment for the Woodbury Chemical site, the following chemicals were identified as contaminants of potential concern in the ground water: aldrin, chlordane, DDD, DDT, dieldrin, heptachlor epoxide, chromium, arsenic, and nitrates. Although arsenic and nitrates were detected in control samples, they were retained as contaminants of concern because concentrations in some

wells approached or exceeded the drinking water standards. Contaminants of potential concern in the soil were identified as chlordane, DDD, DDE, DDT, dieldrin, and toxaphene.

Exposure point concentrations for the contaminants of concern were based on the reasonable maximum exposure (RME) or the maximum detected concentration, whichever was less.

## 6.2 EXPOSURE ASSESSMENT

An exposure assessment was conducted to estimate the magnitude of exposure to the contaminants of concern at the site and the pathways through which these exposures could occur. Exposure of workers to ground water was considered a possibility under the current scenario because onsite drinking water is obtained from private wells. However, there is currently no complete exposure pathway to the soil onsite because the site is paved. Estimating future potential risk at the site involved selecting the reasonably possible land use that resulted in the greatest level of risk, which in this case is the residential exposure scenario. This conservative approach is used so it is fairly certain that the actual risk will not exceed the risk associated with this scenario. Exposure of adults and infants to ground water as well as exposure of children to soil were assumed in the future residential scenario. It was assumed that the pavement would be removed if the site became residential. Current and future exposure pathways are listed in Table 6-1.

After exposure pathways were developed, the concentrations at the exposure points were calculated. These exposure point concentrations were based on the reasonable maximum exposure (RME) scenario - that is, the 95% upper confidence limit on the mean of the natural logarithm (ln) transformed data. The data are transformed because the data are assumed to be lognormal. In some cases, the RME concentration exceeded the maximum concentration detected, so the latter was used instead. Exposure point concentrations for soil and ground water at the Woodbury Chemical Site are listed in Tables 6-2 through 6-4.

Once exposure point concentrations were developed, the chemical intake at each exposure point was calculated. Assumptions made in quantifying chemical intake are listed in Tables 6-5 and 6-6 for oral and dermal ground water exposure and in Tables 6-7 and 6-8 for oral and dermal soil exposure. These assumptions, along with the exposure point concentrations, are plugged into equations to give the Chronic Daily Intake (CDI) for each exposure pathway. The CDI's calculated in the Woodbury Chemical Risk Assessment are listed in Tables 6-9 through 6-13.

TABLE 6-1  
EXPOSURE PATHWAY ANALYSIS

Exposure pathway for Site Media of Concern	Pathway complete for current &/or future scenario <sup>a</sup> ?	Comment
Ground water- Ingestion	current- yes future- yes	water consumption by worker, resident
Ground water- Dermal Contact	current- no future- yes	assume showering by resident
Ground water- Inhalation of volatilized compounds	current- no future- no	only one volatile compound which does not contribute significantly via this pathway
Surface Soil- Ingestion	current- no future- yes	currently, site is paved; future child resident assumed to play on exposed soil
Surface Soil- Dermal Contact	current- no future- yes	currently, site is paved; future child resident assumed to play on exposed soil
Surface Soil- Inhalation of airborne chemicals	current- no future- no	Site currently paved, so particulate emissions pathway not complete; contribution in future scenario would to be minimal

<sup>a</sup>Current scenario assumes a worker with a local ground-water well at the workplace. Future scenario assumes a resident family with a local ground-water well.



TABLE 6-2

GROUND WATER EXPOSURE POINT CONCENTRATIONS -  
CURRENT LAND USE SCENARIO (mg/l)

Contaminant	Onsite Worker <sup>a</sup>	Worker @ Business across U.S. 1 <sup>b</sup>
Arsenic	3.7E-3 <sup>c</sup>	5.0E-3 <sup>c</sup>
Chromium	5.0E-3 <sup>c</sup>	1.2E-3 <sup>c</sup>
Aldrin	2.5E-5 <sup>c</sup>	3.1E-5
Chlordane	9.5E-4	5.1E-5
DDT	2.8E-5 <sup>c</sup>	2.0E-4 <sup>c</sup>
DDD	2.5E-5 <sup>c</sup>	3.8E-5
Dieldrin	2.5E-5 <sup>c</sup>	6.4E-4
Heptachlor epoxide	2.5E-5 <sup>c</sup>	2.4E-5

<sup>a</sup>Values are based on samples taken from private onsite wells.<sup>b</sup>Values are based on samples taken from the private well WC-041-PW.<sup>c</sup>The chemical was not detected in the specific well. The value listed represents one half the sample quantitation limit.

TABLE 6-3

GROUND WATER EXPOSURE POINT CONCENTRATIONS -  
FUTURE LAND USE SCENARIOS

Contaminant	Ground water exposure point concentration - future land use scenario (mg/l)
Arsenic	9.0E-2 <sup>b</sup>
Chromium	3.8E-2 <sup>a</sup>
Aldrin	2.7E-5 <sup>a</sup>
Chlordane	9.5E-4 <sup>b</sup>
DDT	5.7E-5 <sup>a</sup>
DDD	3.8E-5 <sup>b</sup>
Dieldrin	1.1E-4 <sup>a</sup>
Heptachlor epoxide	6.0E-5 <sup>a</sup>
Nitrates	2.3E+1 <sup>a</sup>

<sup>a</sup>Value is the statistical upper confidence limit on the mean of the ln transformed data.<sup>b</sup>Value is the maximum detected concentration.

TABLE 6-4

SURFACE SOIL EXPOSURE POINT CONCENTRATIONS -  
FUTURE LAND USE SCENARIOS

Contaminant	Soil Exposure Point Concentration (mg/kg) <sup>a</sup>
Chlordane	1.1E-1
DDT	1.03E-1
DDE	1.31E-1
DDD	3.3E-2
Dieldrin	3.4E-2
Toxaphene	2.66E+0

<sup>a</sup>Value is the statistical upper confidence limit on the mean of the ln transformed data.

TABLE 6-5

EXPOSURE ASSUMPTIONS FOR ORAL EXPOSURE TO GROUND WATER<sup>a</sup>

Parameter.	Industrial/ Commercial Land Use <sup>b</sup>	Residential Land Use- Adult <sup>b</sup>	Residential Land Use- Infant <sup>c</sup>
Ingestion Rate	1 L/day	2 L/day	0.64 L/day
Exposure Frequency	250 days/yr	350 days/yr	350 days/yr
Exposure Duration	25 yrs	30 yrs	1 yr
Body Weight	70 kg	70 kg	4 kg
Averaging Time - Carcinogens	25,550 days	25,550 days	25,550 days
Averaging Time - Noncarcinogens	9,125 days	10,950 days	365 days

<sup>a</sup>for relevant equation, see figure 6-1.  
<sup>b</sup>sources for values: (USEPA, 1991a); <sup>c</sup>(USEPA IRIS- Nitrate)

TABLE 6-6

EXPOSURE ASSUMPTIONS FOR DERMAL EXPOSURE TO GROUND WATER-  
FUTURE RESIDENTIAL SCENARIO

Parameter	Value Used for Resident
Skin Surface Area	18,150 <sup>a</sup> cm <sup>2</sup>
Dermal Permeability Constant	Chemical-specific (see Table 6-7a)
Exposure Time	0.2 hrs/day <sup>b</sup>
Exposure Frequency	350 days/yr <sup>c</sup>
Exposure Duration	30 yrs <sup>c</sup>
Body Weight	70 kg <sup>c</sup>
Averaging Time - Carcinogens	25,550 days <sup>c</sup>
Averaging Time - Noncarcinogens	10,950 days <sup>c</sup>

For relevant equation, see figure 6-1.  
<sup>a</sup>source: (USEPA, 1990)  
<sup>b</sup>length of daily shower (USEPA Region 4 professional judgement)  
<sup>c</sup>source: (USEPA, 1991a)

TABLE 6-7

ASSUMPTIONS FOR ORAL EXPOSURE TO SURFACE SOIL<sup>a</sup>

Parameter	Value Used for Adult Worker	Value Used for Resident Child
Ingestion Rate	50 mg/day	200 mg/day
Fraction Ingested from contaminated source	1.0	1.0
Exposure Frequency	250 days/yr	350 days/yr
Exposure Duration	25 yrs	6 yrs
Body Weight	70 kg	15 kg
Averaging Time - Carcinogenic	25,550 days	25,550 days
Averaging Time - Noncarcinogenic	9,125 days	2,190 days

<sup>a</sup>For relevant equation, see figure 6-2  
source for values: (USEPA, 1991a)

TABLE 6-8

ASSUMPTIONS FOR DERMAL EXPOSURE TO SURFACE SOIL<sup>a</sup>

Parameter	Value Used for Adult Worker	Value used for Resident Child
Surface area (exposed skin)	1980 cm <sup>2</sup> (b)	1950 cm <sup>2</sup> (b)
Adherence factor	1.0 mg/cm <sup>2</sup> (c)	1.0 mg/cm <sup>2</sup> (c)
Absorption Fraction	0.01 <sup>d</sup>	0.01 <sup>d</sup>
Exposure Frequency	250 days/yr <sup>e</sup>	350 days/yr <sup>e</sup>
Exposure Duration	25 yrs <sup>e</sup>	6 yrs <sup>e</sup>
Body Weight	70 kg <sup>e</sup>	15 kg <sup>e</sup>
Averaging Time - Carcinogenic	25,550 days	25,550 days
Averaging Time - Noncarcinogenic	9,125 days	2,190 days

<sup>a</sup>For relevant equation, see figure 6-2.

<sup>b</sup>source: (USEPA, 1990).

<sup>c</sup>source: (USEPA, 1992).

<sup>d</sup>source: USEPA Region 4 value for organic chemicals (includes soil-chemical matrix effect).

<sup>e</sup>source: (USEPA, 1991a).

TABLE 6-9

## CHRONIC DAILY INTAKE FOR ORAL EXPOSURE TO GROUND WATER - CURRENT LAND USE SCENARIOS

Contaminant	Onsite Worker (Woodbury)		Offsite Worker	
	Carcinogenic CDI <sup>a</sup>	Noncarcinogen CDI <sup>a</sup>	Carcinogenic CDI <sup>a</sup>	Noncarcinogen CDI <sup>a</sup>
Arsenic	1.29E-5	3.62E-5	1.75E-5	4.89E-5
Chromium	N/A	4.89E-5	N/A	1.17E-5
Aldrin	8.74E-8	2.45E-7	1.08E-7	3.03E-7
Chlordane	3.32E-6	9.30E-6	1.78E-7	4.99E-7
DDT	8.74E-8	2.45E-7	6.99E-7	1.96E-6
DDD	8.74E-8	N/A	1.33E-7	N/A
Dieldrin	8.74E-8	2.45E-7	2.24E-6	6.26E-6
Heptachlor epoxide	8.74E-8	2.45E-7	8.39E-8	2.35E-7

<sup>a</sup>CDI- Chronic Daily Intake (mg/kg-d)N/A - Not Applicable - Chromium is not classified as a carcinogen by the oral route of exposure;  
No oral RfD has been verified for DDD.

TABLE 6-10

## CHRONIC DAILY INTAKE FOR ORAL EXPOSURE TO GROUND WATER - FUTURE LAND USE SCENARIOS

Contaminant	Oral Ground Water CDI for Future Worker (mg/kg-d)		Oral Ground Water CDI for a Future Resident (mg/kg-d)	
	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic
Arsenic	3.15E-4	8.81E-4	1.06E-3	2.47E-3
Chromium	N/A	3.72E-4	N/A	1.04E-3
Aldrin	9.44E-8	2.64E-7	3.22E-7	7.51E-7
Chlordane	3.32E-6	9.3E-6	1.12E-5	2.60E-5
DDT	1.99E-7	5.58E-7	6.69E-7	1.56E-6
DDD	1.33E-7	N/A	4.46E-7	N/A
Dieldrin	3.84E-7	1.08E-6	1.88E-6	4.38E-6
Heptachlor epoxide	2.10E-7	5.87E-7	7.05E-7	1.64E-6

N/A - Not Applicable - Chromium is not classified as a carcinogen by the oral route of exposure;  
No oral RfD has been verified for DDD.

TABLE 6-11

CHRONIC DAILY INTAKE FOR DERMAL EXPOSURE TO GROUND WATER -  
FUTURE RESIDENTIAL LAND USE SCENARIO

Contaminant	Dermal Ground Water CDI for a future resident (mg/kg-d)	
	Carcinogenic	Noncarcinogenic
Arsenic	1.92E-6	4.48E-6
Chromium	N/A	3.78E-6
Aldrin	9.34E-10	2.18E-9
Chlordane	1.05E-6	2.46E-6
DDT	5.22E-7	1.22E-6
DDD	2.27E-7	N/A
Dieldrin	5.46E-8	1.27E-7
Heptachlor epoxide	1.41E-8	3.28E-8

N/A - Not Applicable - Chromium is not classified as a carcinogen by this route of exposure;  
No RfD has been verified for DDD.

TABLE 6-12

## CHRONIC DAILY INTAKE (CDI) FOR ORAL EXPOSURE TO SURFACE SOIL - FUTURE LAND USE SCENARIOS

Contaminant	Adult Worker CDI for Oral Exposure to Soil (mg/kg-d)		Child resident CDI for Oral Exposure to Soil (mg/kg-d)	
	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic
Chlordane	1.92E-8	5.38E-8	1.21E-7	1.41E-6
DDT	1.80E-8	5.04E-8	1.13E-7	1.32E-6
DDE	2.29E-8	N/A	1.44E-7	N/A
DDD	5.77E-9	N/A	3.62E-8	N/A
Dieldrin	5.94E-9	1.66E-8	3.73E-8	4.35E-7
Toxaphene	4.65E-7	N/A	2.92E-6	N/A

N/A - Not applicable since no Reference Doses have been verified for DDE, DDD, Toxaphene.



TABLE 6-13

## CHRONIC DAILY INTAKE (CDI) FOR DERMAL EXPOSURE TO SURFACE SOIL - FUTURE LAND USE SCENARIOS

Contaminant	Adult Worker CDI for Oral Exposure to Soil (mg/kg-d)		Child resident CDI for Oral Exposure to Soil (mg/kg-d)	
	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic
Chlordane	7.61E-9	2.13E-8	1.18E-8	1.37E-7
DDT	7.13E-9	2.00E-8	1.10E-8	1.28E-7
DDE	9.06E-9	N/A	1.40E-8	N/A
DDD	2.28E-9	N/A	3.59E-9	N/A
Dieldrin	2.35E-9	6.59E-9	3.63E-9	4.24E-8
Toxaphene	1.84E-7	N/A	2.84E-7	N/A

N/A - Not Applicable since no Reference Doses have been verified for DDE, DDD, Toxaphene.

### 6.3 TOXICITY ASSESSMENT

The purpose of a toxicity assessment is to weigh available evidence regarding the potential of the contaminants of concern to cause adverse effects in exposed individuals and to provide an estimate of the relationship between the extent of exposure and the likelihood of adverse effects. The toxicity assessment is based on toxicity values which have been derived from quantitative dose-response information. Toxicity values for cancer are known as slope factors (SFs) and those determined for noncarcinogenic effects are referred to as reference doses (RfDs).

Slope factors (SFs), which are also known as cancer potency factors (CPFs), have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of  $(\text{mg/kg-day})^{-1}$ , are multiplied by the estimated intake of a potential carcinogen, in  $\text{mg/kg-day}$ , to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. SFs are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. SFs for the contaminants of concern at Woodbury Chemical are listed in Table 6-14.

Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of  $\text{mg/kg-day}$ , are estimates of lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g. the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g. to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur. RfDs for the contaminants of concern at Woodbury Chemical are found in Table 6-15.

### 6.4 RISK CHARACTERIZATION

In this final step of the risk assessment, the results of the exposure and toxicity assessments are combined to provide numerical estimates of the carcinogenic and non-carcinogenic risks for the site. Excess lifetime cancer risks are determined by multiplying the intake level with the slope factor. These risks are probabilities that are generally expressed in scientific notation (e.g.  $1 \times 10^{-6}$  or  $1\text{E-}6$ ). An excess lifetime cancer risk of  $1 \times 10^{-6}$

TABLE 6-14  
CARCINOGENIC TOXICITY VALUES

Contaminant	Classification <sup>a</sup> / tumor site	Oral SF [(mg/kg-d) <sup>-1</sup> ]	Fraction Oral Dose Absorbed	Adjusted SF [(mg/kg-d) <sup>-1</sup> ]
Arsenic	A/skin	1.75E+0	0.95 <sup>b</sup>	1.8E+0
Aldrin	B2/liver	1.7E+1	0.65 <sup>c</sup>	2.6E+1
Chlordane	B2/liver	1.3E+0	0.8 <sup>b</sup>	1.6E+0
DDT	B2/liver	3.4E-1	0.8 <sup>b</sup>	4.2E-1
DDE	B2/liver	3.4E-1	0.8 <sup>b</sup>	4.2E-1
DDD	B2/liver	2.4E-1	0.8 <sup>b</sup>	3.0E-1
Dieldrin	B2/liver	1.6E+1	0.65 <sup>bc</sup>	2.5E+1
Heptachlor epoxide	B2/liver	9.1E+0	0.7 <sup>b</sup>	1.3E+1
Toxaphene	B2/liver	1.1E+0	0.7 <sup>b</sup>	1.6E+0

SF- Slope Factor for orally administered dose- obtained from EPA Integrated Risk Information System (IRIS) or Health Effects Assessment Tables (HEAST)  
oral ABS- fraction of orally administered chemical that is absorbed  
adjusted SF- slope factor for the absorbed dose- (adj SF = Oral SF/oral ABS); used to calculate dermal risk.

<sup>a</sup>Carcinogenic classification: A = Human Carcinogen (adequate human data); B2 = Probable Human Carcinogen (inadequate human data, adequate animal data).

<sup>b</sup>source: chemical-specific ATSDR Toxicological Profile (ATSDR).

<sup>c</sup>source: (USEPA/ECAO, 1991)

TABLE 6-15

## NONCARCINOGENIC TOXICITY VALUES

Contaminant	Target Organ/ System	Oral RfD (mg/kg-d)	Fraction Oral Dose Absorbed	Adjusted RfD
Arsenic	skin	3.0E-4	0.95 <sup>a</sup>	2.8E-4
Chromium (Cr <sup>+6</sup> )	liver	5.0E-3	0.11 <sup>a</sup>	5.5E-4
Aldrin	liver	3.0E-5	0.65 <sup>b</sup>	2.0E-5
Chlordane	liver	6.0E-5	0.8 <sup>a</sup>	4.8E-5
DDT	liver	5.0E-4	0.8 <sup>a</sup>	4.0E-4
Dieldrin	liver	5.0E-5	0.65 <sup>ab</sup>	3.2E-5
Heptachlor epoxide	liver	1.3E-5	0.7 <sup>a</sup>	9.1E-6
Nitrate- nitrogen	blood	1.6E+0	N/A	N/A

RfD- Reference Dose for orally administered dose; obtained from EPA Integrated Risk Information System (IRIS) or Health Effects Assessment Tables (HEAST)

oral ABS- fraction of orally administered chemical that is absorbed

adjusted RfD- Reference Dose for the absorbed dose (used to calculate dermal hazard). [adj RfD = oral RfD x oral ABS]

N/A- Not Applicable: EPA has determined that dermal exposure to nitrates is insignificant compared to oral exposure to infants. (USEPA/ECAO, 1991)

<sup>a</sup>source: chemical-specific ATSDR Toxicological Profile (ATSDR).

<sup>b</sup>source: (USEPA/ECAO, 1991)

indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer, over a 70-year lifetime, as a result of site-related exposure to a carcinogen. The NCP states that sites should be remediated to chemical concentrations that correspond to an upper-bound lifetime cancer risk to an individual not exceeding  $10^{-6}$  to  $10^{-4}$  excess lifetime risk. Carcinogenic risk levels that exceed this range indicate the need for performing remedial action at a site.

Carcinogenic risk levels for each exposure scenario at the Woodbury Chemical site are listed in Tables 6-16 through 6-20. Current carcinogenic risks from exposure to ground water were calculated separately for workers onsite and those at hydrologically downgradient businesses. Risk for the onsite worker is  $3.07\text{E-}5$  and is  $6.95\text{E-}5$  for the worker at the downgradient business. Both of these risk values are within the risk range determined to be protective by EPA ( $10\text{E-}4$  to  $10\text{E-}6$ ). Soil was not considered to be a current exposure pathway because the site is paved.

Future potential risk from exposure to contaminants at the site was calculated, based on the assumption that the site area would become residential in the future. Carcinogenic risk from future residential exposure to ground water at the site was calculated to be  $5.93\text{E-}5$ , and future risk from residential exposure to soil would be  $4.63\text{E-}6$ . These risks are within EPA's acceptable risk range.

Carcinogenic risk from exposure to arsenic was calculated separately because arsenic causes a different type of cancer than the other carcinogens. Section 6.5 of this document discusses why EPA allows higher risk from arsenic than from other contaminants. Furthermore, arsenic was found in the soil and ground water offsite, along the railroad right-of-way. The highest concentration was detected in an area that is not adjacent to the site. Information obtained by EPA indicates that the railroad sprayed arsenic-based herbicides along the right-of-way in the past. Risk from exposure to arsenic in ground water is  $1.85\text{E-}3$ , which is above the acceptable risk range. However, arsenic does not appear to be site-related and may extend over a long stretch of the railroad right-of-way. Therefore, the arsenic contamination is beyond the scope of this investigation. The railroad right-of-way has been referred to EPA's Site Assessment Section for further consideration.

To characterize potential noncarcinogenic effects, estimated intake levels are compared with toxicity values. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the Hazard Quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's reference dose). A HQ exceeding unity (1.0) indicates a potential for site-related noncarcinogenic health effects. By adding the HQs for all contaminants within a medium or across all media to which a given population may be

TABLE 6-16

## CARCINOGENIC RISK FROM ORAL EXPOSURE TO GROUND WATER - CURRENT LAND USE SCENARIOS

## Carcinogenic Risk

Contaminant	Onsite (Woodbury) Worker	Worker @ Business across U.S. 1
Aldrin	1.49E-6	1.84E-6
Chlordane	4.32E-6	2.32E-7
DDT	2.97E-8	2.38E-7
DDD	2.10E-8	3.19E-8
Dieldrin	1.40E-6	3.58E-5
Heptachlor epoxide	7.95E-7	7.63E-7
TOTAL Hepatocarcinogenic RISK	8.06E-6	3.89E-5
Risk from Arsenic	2.26E-5	3.06E-5

TABLE 6-17

CARCINOGENIC RISK FROM EXPOSURE TO GROUND WATER  
FUTURE RESIDENTIAL LAND USE SCENARIO

Contaminant	Oral Route Risk	Dermal Route Risk	Total Ground Water Risk
Aldrin	5.47E-6	2.43E-8	5.49E-6
Chlordane	1.45E-5	1.68E-6	1.62E-5
DDT	2.28E-7	2.19E-7	4.47E-7
DDD	1.07E-7	6.8E-8	1.75E-7
Dieldrin	3.01E-5	1.36E-6	3.14E-5
Heptachlor epoxide	6.41E-6	1.83E-7	6.59E-6
TOTAL Hepatocarcinogenic Risk	5.68E-5	3.54E-6	6.03E-5
Risk from Arsenic	1.85E-3	3.45E-6	1.85E-3

TABLE 6-18

CARCINOGENIC RISK FROM EXPOSURE TO SURFACE SOIL BY RESIDENT CHILD -  
FUTURE LAND USE SCENARIO

Contaminant	Oral Route Risk	Dermal Route Risk	Total Surface Soil Risk
Chlordane	1.57E-7	1.88E-8	1.76E-7
DDT	3.84E-8	4.62E-9	4.30E-8
DDE	4.88E-8	5.88E-9	5.47E-8
DDD	8.68E-9	1.06E-9	9.74E-9
Dieldrin	5.96E-7	9.08E-8	6.87E-7
Toxaphene	3.21E-6	4.55E-7	3.66E-6
TOTAL RISK	4.06E-6	5.76E-7	4.63E-6

TABLE 6-19

CARCINOGENIC RISK FROM ORAL EXPOSURE TO GROUND WATER -  
FUTURE INDUSTRIAL LAND USE SCENARIO

Contaminant	Risk to Future Worker from Ground-Water Consumption
Aldrin	1.60E-6
Chlordane	4.32E-6
DDT	6.77E-8
DDD	3.19E-8
Dieldrin	6.15E-6
Heptachlor epoxide	1.91E-6
TOTAL Hepatocarcinogenic Risk	1.41E-5
Risk from Arsenic	5.5E-4

TABLE 6-20

CARCINOGENIC RISK FROM EXPOSURE TO SURFACE SOIL BY ADULT WORKER -  
FUTURE LAND USE SCENARIO

Contaminant	Oral Route Risk	Dermal Route Risk	Total Surface Soil Risk
Chlordane	2.50E-8	1.22E-8	3.72E-8
DDT	6.12E-9	2.99E-9	9.11E-9
DDE	7.78E-9	3.81E-9	1.16E-8
DDD	1.38E-9	6.85E-10	2.07E-9
Dieldrin	9.51E-8	5.88E-8	1.54E-7
Toxaphene	5.11E-7	2.94E-7	8.06E-7
TOTAL RISK	6.47E-7	3.73E-7	1.02E-6



reasonably exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

Noncarcinogenic risks for the exposure scenarios at the Woodbury Chemical Site are listed in Tables 6-21 through 6-26. Calculation of the non-carcinogenic risk from current worker exposure to ground water at the site resulted in a Hazard Index (HI) of 0.32. Future potential residential exposure calculations yielded a HI of 0.94, not including the contribution from arsenic. These are both below 1.0 which is the level which indicates a potential for site-related non-carcinogenic health effects. The HQ for exposure to arsenic in ground water is 8.2 and will be dealt with separately, as stated above. The HI for future exposure to non-carcinogens in the soil is 0.039.

Nitrates (non-carcinogenic) and were detected in every ground water sample collected during the Woodbury Chemical RI. Their presence is most likely due to the heavy use of fertilizers in the area and is not due to activities at the site. A separate HQ was calculated for nitrates in the ground water because they cause adverse effects in infants at significantly lower doses than in adults. Therefore, exposure assumptions different from those for adults were used in the calculation. The HQ for future exposure of infants to ground water at the site is 2.21. Because the presence of nitrates in the ground water is an area-wide condition, EPA has reported analytical results for nitrates obtained during the Woodbury Chemical RI to state and local officials.

Table 6-27 summarizes the risks calculated for the Woodbury Chemical site. The results of the RI and Baseline Risk Assessment indicate that the 1990 removal of toxaphene-contaminated soils at the Woodbury Chemical site has reduced the risk from exposure to site-related contaminants to levels which are protective of human health and the environment.

#### 6.5 DISCUSSION OF UNCERTAINTY

Omission of polynuclear aromatic hydrocarbons (PAHs) from the risk assessment could result in some underestimation of the risk. The PAH concentrations found along the railroad right-of-way adjacent to the Woodbury Chemical site were similar to those found along the railroad away from the site, indicating that these compounds are not attributable to the site.

The only chemical which exceeds the acceptable carcinogenic risk levels is arsenic in ground water. It was retained as a contaminant of concern in the risk assessment because the detected levels exceed the Maximum Contaminant Level (MCL) established under the Safe Drinking Water Act. However, arsenic was not included when calculating the overall site risk for the following reasons.

TABLE 6-21

NONCARCINOGENIC HAZARD FROM ORAL EXPOSURE TO GROUND WATER -  
CURRENT LAND USE SCENARIOS

Noncarcinogenic Hazard

Contaminant	Onsite (Woodbury) Worker	Worker @ Business across U.S. 1
Chromium (Cr <sup>+6</sup> )	9.78E-3	2.35E-3
Aldrin	8.15E-3	1.01E-2
Chlordane	1.55E-1	8.32E-3
DDT	4.89E-4	3.91E-3
Dieldrin	4.89E-3	1.25E-1
Heptachlor epoxide	1.88E-2	1.81E-2
Hepatotoxic HAZARD	1.97E-1	1.68E-1
Hazard from Arsenic	1.21E-1	1.63E-1

TABLE 6-22

NONCARCINOGENIC HAZARD FROM RESIDENTIAL EXPOSURE TO GROUND WATER -  
FUTURE LAND USE SCENARIO

Contaminant	Oral route hazard	Dermal route hazard	Total Ground water Hazard
Chromium (Cr <sup>+6</sup> )	2.08E-1	6.87E-3	2.15E-1
Aldrin	2.50E-2	1.09E-4	2.51E-2
Chlordane	4.34E-1	5.12E-2	4.85E-1
DDT	3.12E-3	3.05E-3	6.17E-3
Dieldrin	8.77E-2	3.98E-3	9.16E-2
Heptachlor epoxide	1.26E-1	3.61E-3	1.30E-1
TOTAL Hepatotoxic Hazard	8.84E-1	6.88E-2	9.53E-1
Arsenic Hazard	8.22E+0	1.60E-2	8.24E+0

TABLE 6-23

NONCARCINOGENIC HAZARD TO AN INFANT FROM  
INGESTION OF GROUND WATER NITRATE

Contaminant	Hazard Index for Infant Oral exposure
Nitrate-nitrogen	2.21E+0

TABLE 6-24

NONCARCINOGENIC HAZARD FROM EXPOSURE TO SURFACE SOIL BY RESIDENT CHILD -  
FUTURE LAND USE SCENARIO

Contaminant	Oral Route Hazard	Dermal Route Hazard	Total Surface Soil Hazard
Chlordane	2.34E-2	2.86E-3	2.63E-2
DDT	2.63E-3	3.21E-4	2.95E-3
Dieldrin	8.69E-3	1.32E-3	1.00E-2
TOTAL HI	3.48E-2	4.50E-3	3.93E-2

TABLE 6-25

NONCARCINOGENIC HAZARD FROM EXPOSURE TO GROUND WATER -  
FUTURE INDUSTRIAL LAND USE SCENARIO

Contaminant	Risk to Future Worker from Ground-Water Consumption
Chromium (Cr <sup>+6</sup> )	7.44E-2
Aldrin	8.81E-3
Chlordane	1.55E-1
DDT	1.12E-3
Dieldrin	2.15E-2
Heptachlor epoxide	4.52E-2
TOTAL Hepatotoxic Hazard	3.06E-1
Arsenic Hazard	2.94E+0

TABLE 6-26

NONCARCINOGENIC HAZARD FROM EXPOSURE TO SURFACE SOIL BY ADULT WORKER -  
FUTURE LAND USE SCENARIO

Contaminant	Oral Route Hazard	Dermal Route Hazard	Total Surface Soil Hazard
Chlordane	8.97E-4	4.44E-4	1.34E-3
DDT	1.01E-4	4.99E-5	1.51E-4
Dieldrin	3.33E-4	2.06E-4	5.39E-4
TOTAL HI	1.33E-3	7.00E-4	2.03E-3

TABLE 6-27

## SUMMARY OF RISKS

Scenario	Total Cancer Risk (Liver)	Total Hazard Index (Liver)	Arsenic Risk	Arsenic Hazard
Current Offsite Worker	3.9E-5	0.17	3.1E-5	0.16
Future Onsite Worker	1.5E-5	0.31	5.5E-4	2.9
Groundwater Use by Future Resident	6.0E-5	0.95	1.8E-3	8.2
Soil Contact by Future Resident	4.6E-6	0.04	Arsenic not of concern as a soil contaminant	

Hazard Index for ingestion of nitrates in groundwater by resident infant	2.21
--	------

Since arsenic was not detected onsite and the highest level was detected in a control well, it appears that the presence of arsenic in the ground water is not a result of site activities. Furthermore, the carcinogenic effect on which the slope factor is based is a nonfatal form of skin cancer, whereas the other contaminants are of primary concern as liver carcinogens.

Some chemicals evaluated in assessment of the carcinogenic risk have not been assigned RfDs by which to calculate their noncarcinogenic effects. Therefore, the HI for the site may be underestimated. However, it is believed that a contaminant concentration that falls within EPA's cancer risk range will be protective against systemic toxic effects as well.

Use of the RME in calculating exposure point concentrations helps to assure that the true average for the site is not greater than the value used. Therefore, it is possible that the actual exposure point concentration is overestimated to some degree.

#### 6.6 ECOLOGICAL ASSESSMENT

A qualitative ecological assessment was performed for the Woodbury Chemical site due to the developed nature of the site and the surrounding area. The terrestrial non-human receptors associated with the site are expected to be those commonly associated with industrial/commercial/agricultural developed areas. The site is fenced and paved, thereby limiting exposure to wildlife.

The C-102 Canal is the closest water body to the site. There has been one report of an occurrence of a manatee, an endangered species, in this stretch of the canal. The presence of the manatees is considered an infrequent incidence. There is no known or apparent current surface or ground water pathway to the canal due to the lack of a ground water contaminant plume. The possibility of an historical ground water pathway cannot be eliminated, however, due to the high ground water migration rates. Current ground water contaminant levels would not be expected to impact the C-102 Canal. Wells between the site and the canal have very low or nondetectable contaminant levels.

The ecological risks associated with this site appear to be minimal and at an acceptable level requiring no further action unless the planned ground water monitoring would demonstrate a future threat to the C-102 Canal.

#### 7.0 DESCRIPTION OF THE "NO FURTHER ACTION" SELECTED ALTERNATIVE

EPA has determined, based on the results of the RI and Risk Assessment, that no further action is needed for the soil at the Woodbury Chemical Site. The removal of toxaphene-contaminated soil which was performed at the site in January 1990 sufficiently

reduced the risk from exposure to site-related contaminants in the soil to within EPA's protective range.

RI and Risk Assessment results also indicated that no action is necessary for the ground water at the Woodbury Chemical Site. However, because the future potential risk from exposure to the ground water at the site is close to the level at which EPA may consider taking action, the ground water at and around the site will be monitored quarterly for one year to confirm that the few samples collected during the RI which contained contaminants above drinking water standards are not indicative of a release of contaminants from the Woodbury Chemical Site. It is anticipated that at least two (2) permanent wells will have to be installed in areas where temporary wells were placed during the RI and an additional permanent monitoring well immediately downgradient of soil sample WC-011-SS. Quarterly monitoring will include all existing and newly installed EPA monitoring wells as well as a down gradient private well. The samples shall be analyzed for pesticides/PCBs. Based upon EPA's Cost of Remedial Action (CORA) model, the estimated cost of the monitoring is \$22,500 (Table 7-1). If monitoring indicates a potential threat to human health or the environment, EPA, in consultation with the State of Florida, will reconsider the protectiveness of this alternative and the need for protective measures or site remediation.

#### 8.0 DOCUMENTATION OF SIGNIFICANT DIFFERENCES

The selected remedy as presented in this decision document has no difference, significant or otherwise, from the proposed plan.

TABLE 7-1: Estimated Monitoring Costs

COPA GROUNDWATER MONITORING COST MODULE (503)

SITE NAME: WOODBURY CHEMICAL  
 OPERABLE UNIT: ENTIRE SITE ESTIMATED START: LATE FY 1992  
 SCENARIO: GROUNDWATER MONITORING  
 RUN BY: Diane Scott PHONE NUMBER: 404-347-2643

INPUTS		RESULTS	
Parameter	Value	Component	Total
Number of wells to install	2	CAPITAL COST	12,000
Average well depth (ft)	15	O & M COSTS	10,000
Protection during setup of drill rig & installation of above-grade piping	D		
Protection during drilling	D		
Average temp (degrees F)	85		
Confidence level	M		
Number of wells to monitor	5		
Monitoring frequency	4		
Monitoring requirements:			
24 Plasma Metals	N		
Pest/PCB	Y		
GC-BN	N		
GC-Acid	N		
HSLOIG	N		
VDA GC/MS	N		
Acid GC/MS	N		
B/N GC/MS	N		

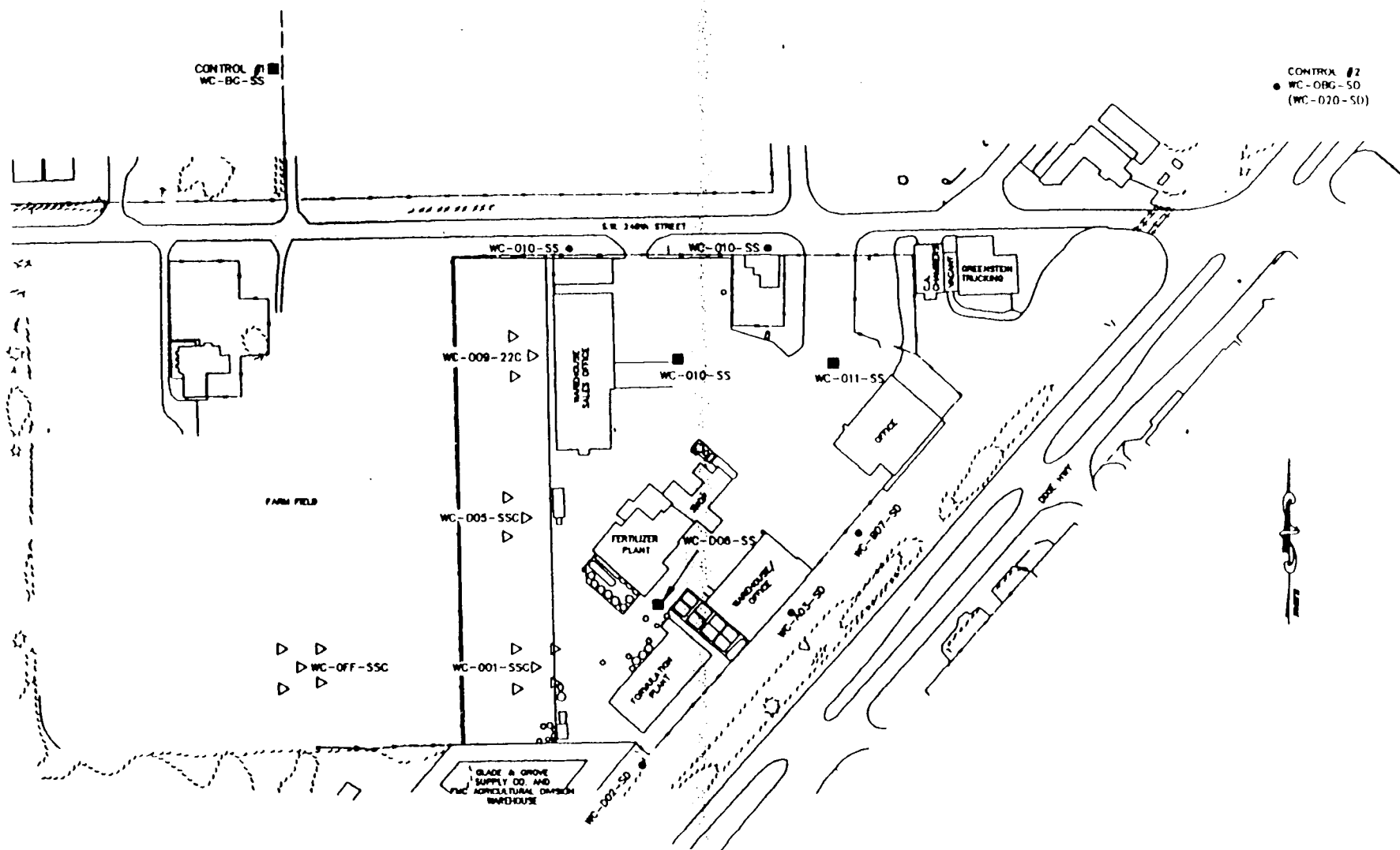
NOTES:

Ground water monitoring associated with no action response. Includes installation of 2 new wells and monitoring a total of 5 for pesticides



**APPENDIX A**

**REMEDIAL INVESTIGATION SAMPLING  
DATA AND LOCATIONS**



WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



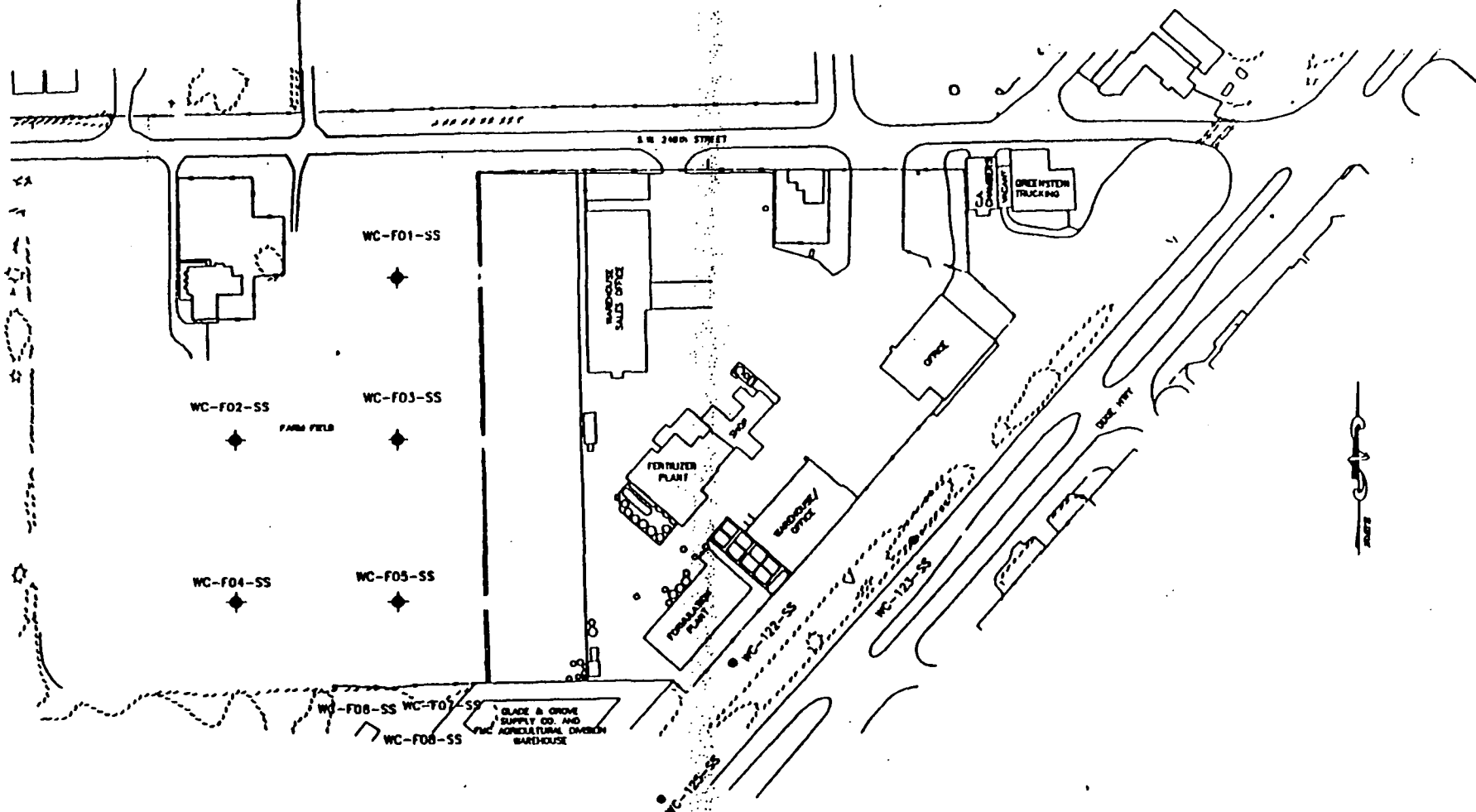
SURFACE (SEDIMENT) SOIL SAMPLES  
0 - 2 INCHES BLS  
PHASE I

**LEGEND**

- BLS - BELOW LAND SURFACE  
 ■ - SURFACE SOIL GRAB SAMPLE LOCATIONS (SS)  
 ▷ - SURFACE SOIL COMPOSITE SAMPLE (SSC)  
 ● - SEDIMENT GRAB SAMPLE (SD)

SCALE





WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



COMPOSITE/GRAB  
SOIL SAMPLE LOCATIONS  
PHASE II

### LEGEND

- ◆ COMPOSITE SOIL SAMPLE LOCATIONS  
● GRAB SOIL SAMPLES

SCALE



( IN FEET )

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
SURFACE SOIL-PESTICIDES/PCB DATA SUMMARY  
JANUARY, 1991

PESTICIDE/PCB COMPOUNDS	CONTROL #1	WC001SSC	WC005SSC	WC009SSC	WC010SS	WC011SS	WC0FFSSC	WC006SS
	WCBGSS μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
4,4'-DDD (P,P'-DDD)	--	280JC	32J	18J	14J	18JN	--	--
4,4'-DDE (P,P'-DDE)	--	240JC	39JC	16J	6.9J	120	16J	--
4,4'-DDT (P,P'-DDT)	--	140J	34J	18J	62J	37	--	--
ALPHA-CHLORDANE /2	NA	NA	NA	NA	8.6J	71	NA	NA
CIS-NONACHLOR /2	NA	NA	NA	NA	--	27	NA	NA
GAMMA-CHLORDANE /2	NA	NA	NA	NA	10J	110	NA	NA
OXYCHLORDANE /2	NA	NA	NA	NA	--	4.7J	NA	NA
TRANS-NONACHLOR /2	NA	NA	NA	NA	7.1JN	69N	NA	NA
Total Chlordane	--	--	--	--	25.7	281.7	--	--
DIELDRIN	--	--	--	--	33J	210	--	--
ENDOSULFAN I (ALPHA)	--	--	--	--	--	--	59	--
ENDOSULFAN II (BETA)	--	--	--	--	--	--	68	--
ENDOSULFAN SULFATE	--	--	--	--	--	--	13J	--
HEPTACHLOR	--	--	--	--	9.8J	--	--	--
HEPTACHLOR EPOXIDE	--	--	--	--	--	23	--	--
LORSBAN (DURSBAN)	--	--	--	--	6.3J	--	39	--
TOXAPHENE	--	11000	1700J	1400J	1500J	--	--	--

PESTICIDE/PCB COMPOUNDS	CONTROL #2	WC013SD	WC014SD	WC064SD	WCA03SD	WCB07SD	WCD02SD
	WCOBGSD μg/kg	μg/kg	μg/kg	Dup-014 μg/kg	μg/kg	μg/kg	μg/kg
4,4'-DDD (P,P'-DDD)	23N	20J	--	--	--	--	--
4,4'-DDE (P,P'-DDE)	17	16JC	--	--	--	--	--
4,4'-DDT (P,P'-DDT)	89N	27J	44N	33N	24N	34N	--
ALPHA-CHLORDANE /2	9.2J	NA	9.8J	8.6J	5.6J	4.3J	NA
CIS-NONACHLOR /2	8.3J	NA	--	--	--	4.5J	NA
GAMMA-CHLORDANE /2	13J	NA	41	38	14J	11J	NA
TRANS-NONACHLOR /2	15N	NA	14N	11JN	4.2JN	7.1JN	NA
Total Chlordane	45.5	--	64.8	57.6	23.8	28.9	--
DIELDRIN	--	--	--	--	--	9.1J	--
ENDOSULFAN SULFATE	--	--	20J	13J	--	--	--
ENDRIN KETONE	--	--	--	--	13J	--	--
GAMMA-BHC (LINDANE)	5.1J	--	--	--	--	--	--
LORSBAN (DURSBAN)	--	--	32	27	12J	5.5J	--
TOXAPHENE	--	1300J	--	--	--	--	--

PHASE II  
WOODBURY CHEMICAL SITE  
FARM FIELD-PESTICIDE/PCB DATA SUMMARY  
AUGUST, 1991

PESTICIDE/PCB COMPOUNDS	F11-SSC	F12-SSC	F13-SSC	F14-SSC	F54-SSC	F15-SSC	F16-SSG	F17-SSG	F18-SSG
	μg/kg	μg/kg	μg/kg	μg/kg	DUP-F14 μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
4,4'-DDE (P,P'-DDE)	--	5.6J	--	4.9J	17J	18JN	39JN	180J	410J
4,4'-DDT (P,P'-DDT)	--	40J	--	7.4J	31J	24J	120J	110J	320J
ALPHA-CHLORDANE /2	NA	NA	NA	NA	NA	NA	13	15	11
GAMMA-CHLORDANE /2	NA	NA	NA	NA	NA	NA	13N	15N	10N
TRANS-NONACHLOR /2	NA	NA	NA	NA	NA	NA	14N	15N	8.2N
Total Chlordane	--	--	--	--	--	40	45	29.2	--
DIELDRIN	--	--	--	--	--	2.5JN	20JN	--	--
ENDRIN KETONE	--	--	--	--	11J	7.6J	--	--	8.8J
TOXAPHENE	--	4900	--	710	1600	4600	1000	440	1900
O,P-DDD	--	--	--	--	--	--	12J	--	--

Footnote:

- NA - Not Analyzed
- N - Presumptive evidence of presence of material
- J - Estimated value
- - Material was analyzed for but not detected
- /2 - Constituents or metabolites of technical chlordane
- C - Confirmed GC/MS
- Highlight indicates contaminants of concern

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
SURFACE SOILS/METALS DATA SUMMARY  
JANUARY, 1991

	CONTROL #1 WCBGSS	WC001SSC	WC005SSC	WC009SSC	WC010SS	WC011SS	WC0FFSSC	WCD06SS
INORGANIC ELEMENTS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ALUMINUM	3000	4300	7600	13000	5200	10000	10000	4300
BARIUM	--	18	18	19	10	15	14	--
CALCIUM	300000	230000	230000	140000	280000	220000	200000	230000
CHROMIUM	--	13	30	43	--	24	39	--
COPPER	--	17	21	13	--	20	42	--
IRON	2000	3700	6300	12000	4000	8800	7700	3200
LEAD	--	46	--	--	--	82	--	--
MAGNESIUM	860	1100	1000	1000	910	1300	2200	1100
MANGANESE	45	75	180	210	56	170	1000	62
MERCURY	0.09	0.14	0.13	0.14	0.12	0.55	0.11	0.11
POTASSIUM	--	--	--	--	--	--	7200	--
STRONTIUM	2800	1500	1700	980	2800	1400	1500	1200
TITANIUM	41	84	130	190	100	150	200	92
VANADIUM	14	--	15	25	--	15	18	11
YTRIUM	--	--	--	15	--	--	13	--
ZINC	--	100	110	50	31	92	93	19

PHASE I  
WOODBURY CHEMICAL SITE  
SURFACE SOILS/METALS DATA SUMMARY  
JANUARY, 1991

	CONTROL #2 WCOBGSD (WC020SD)	WC013SD	WC014SD	WC064SD Dup-014	WCA03SD	WCB07SD	WCD02SD
INORGANIC ELEMENTS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ALUMINUM	5200	9800	5200	7400	1800	2500	2500
ARSENIC	150	--	--	--	--	76	85
BARIUM	51	19	22	23	10	15	--
CALCIUM	170000	210000	220000	200000	200000	240000	260000
CHROMIUM	26	29	26	35	11	12	--
COPPER	55	22	55	68	--	18	--
IRON	17000	7800	5200	6700	7000	6200	2300
LEAD	240	54	150	200	140	140	--
MAGNESIUM	2300	1000	1200	1100	1100	1100	670
MANGANESE	180	230	190	220	62	88	36
MERCURY	0.24	0.13	0.09	0.07	0.07	0.12	0.09
STRONTIUM	1300	1600	1200	1100	1400	2000	2200
TITANIUM	150	150	96	120	55	65	100
VANADIUM	15	15	11	12	--	--	--
ZINC	170	77	180	220	40	79	16

PHASE II  
WOODBURY CHEMICAL SITE  
SURFACE SOIL/METALS DATA SUMMARY  
JUNE, 1991

	WC120SS	WC123SS	WC125SS
INORGANIC ELEMENTS	mg/kg	mg/kg	mg/kg
ALUMINUM	3400	21000	6500
ARSENIC	54	--	--
BARIUM	25	35	16
CALCIUM	240000	140000	140000
CHROMIUM	14	55	17
COPPER	24	22	16
IRON	7900	18000	5400
LEAD	95	350	270
MAGNESIUM	2200	3600	1000
MANGANESE	84	250	180
MERCURY	0.15	0.20	--
NICKEL	8.6	14	6.9
SODIUM	330	--	--
STRONTIUM	1500	680	950
TIN	--	8.0	--
TITANIUM	110	320	96
VANADIUM	9.8	36	8.2
YTRIUM	4.5	22	5.9
ZINC	78	260	78

Footnote:

- - Material analyzed for but not detected
- Highlight indicates contaminant of concern

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
SURFACE SOIL-EXTRACTABLE ORGANICS DATA SUMMARY  
JANUARY, 1991

EXTRACTABLE ORGANIC COMPOUNDS	CONTROL #1	WC001SSC	WC005SSC	WC009SSC	WC010SS	WC011SS	WC0FFSSC	WC06SS
	WCBGSS µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
BENZO(B AND/OR K)FLUORANTHENE	--	--	--	--	160J	--	--	--
FLUORANTHENE	--	--	--	--	200J	--	--	--
PYRENE	--	--	--	--	180J	--	--	--
PHENANTHRENE CARBOXYLIC ACID, OCTAHYDRODIMETHYL (METHYLETHYL)METHYL ESTER	--	--	200JN	--	--	--	--	--
HEXANEDIOIC ACID, DIOCTYL ESTER	--	--	--	--	--	3000JN	--	--
PROMETON	--	--	400JN	--	--	--	--	--
TETRAMETHYLPHENANTHRENE	--	200JN	200JN	--	--	--	--	--

EXTRACTABLE ORGANIC COMPOUNDS	CONTROL #2	WC013SD	WC014SD	WC064SD	WCA03SD	WCB07SD	WCD02SD
	WCBGSD (WC020SD) µg/kg	µg/kg	µg/kg	DUP-014 µg/kg	µg/kg	µg/kg	µg/kg
(BIPHENYL)DICARBONITRILE	10000JN	--	--	--	2000JN	--	--
(BUTADIYNE)BISBENZENE	10000JN	--	--	--	--	--	--
ACENAPHTHYLENE	11000J	--	--	--	1700J	--	--
ANTHRACENE CARBONITRILE	9000JN	--	700JN	--	--	--	--
ANTHRACENE	5300J	--	--	--	--	--	--
ANTHRACENEDIONE	--	--	2000JN	2000JN	--	--	--
BENZANTHRACENONE	40000JN	--	5000JN	--	8000JN	7000JN	400JN
BENZO-A-PYRENE	57000	130J	6700	5500J	11000J	15000J	560J
BENZO(A)ANTHRACENE	54000	--	4500J	3800J	9700J	12000J	600J
BENZO(B AND/OR K)FLUORANTHENE	20000	280J	17000	11000J	26000	33000	1300J
BENZO(GHI)PERYLENE	33000	120J	5000J	4400J	7600J	9900J	540J
BENZOCERYSENE	10000JN	--	3000JN	2000JN	3000JN	--	--
BENZOFUORANTHENE (NOT B OR K)	200000JN	200JN	20000JN	9000JN	20000JN	40000JN	2000JN
BENZOFUORENE	30000JN	--	2000JN	--	--	--	--
BENZONAPHTHOFURAN	10000JN	--	--	--	--	--	--
BENZONAPHTHOTHIOPHENE	30000JN	--	2000JN	--	6000JN	--	--
BENZOTRIPHENYLENE	5000JN	--	3000JN	--	--	--	--
BINAPHTHALENE	6000JN	--	--	--	--	--	--
CERYSENE	58000	150J	7700	6500J	12000J	16000J	740J
CYCLOPENTAPHENANTHRENE	9000JN	--	800JN	--	--	--	--
DIBENZO(A,B)ANTHRACENE	2500J	--	--	--	1600J	--	--
DIBENZOCERYSENE	4000JN	--	--	--	--	--	--
DIMETHYLPHENANTHRENE	7000JN	--	--	--	--	--	--
FLUORANTHENE	73000	260J	12000	13000J	16000	21000J	1000J
INDENO (1,2,3-CD) PYRENE	36000	--	5200J	4500J	7600J	9600J	460J
METHYLBENZANTHRACENE	30000JN	--	2000JN	--	3000JN	8000JN	200JN
METHYLFLUORANTHENE	50000JN	--	900JN	--	10000JN	4000JN	400JN
METHYLPHENANTHRENE	20000JN	--	--	--	--	--	--
NAPHTHACENEDIONE	--	--	--	2000JN	--	3000JN	--
PENTACENE	5000JN	--	--	--	--	--	--
PHENANTHRENE	11000J	--	4500J	3900J	1400J	--	--
PHENYLNAPHTHALENE	8000JN	--	--	--	--	--	--
PYRENE	85000	220J	10000	11000J	20000	26000J	1100J
TETRAHYDROPYRENE	4000JN	--	--	--	--	--	--

	PHASE II JUNE, 1991								
	WCF01SS	WCF02SS	WCF03SS	WCF04SS	WCF05SS	WCF55SS DUP-05	WCF06SS	WCF07SS	WCF08SS
EXTRACTABLE ORGANIC COMPOUNDS	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4-NITROANILINE	--	--	--	--	--	--	--	--	160J
BENZO(A)ANTHRACENE	--	--	--	--	59J	--	--	--	--
BENZO(B AND/OR K)FLUORANTHENE	--	--	49J	130J	210J	170J	180J	1300J	200J
BENZO(GHI)PERYLENE	--	--	--	--	63J	65J	42J	--	--
BENZO-A-PYRENE	--	--	--	48J	82J	74J	84J	520J	60J
CHRYSENE	--	--	--	74J	94J	81J	94J	600J	63J
FLUORANTHENE	46J	--	72J	75J	170J	150J	150J	890J	89J
INDENO (1,2,3-CD) PYRENE	--	--	--	--	73J	63J	43J	--	--
PHENANTHRENE	--	--	--	--	67J	76J	87J	--	--
PYRENE	40J	--	47J	95J	120J	110J	170J	880J	130J
2 UNIDENTIFIED COMPOUNDS	--	--	800J	--	--	--	--	--	2000J
3 UNIDENTIFIED COMPOUNDS	--	--	--	--	--	--	--	20000J	--
6 UNIDENTIFIED COMPOUNDS	--	--	--	--	--	--	4000J	--	--
ETHENYLBENZOFURAN	--	--	--	--	--	--	--	--	200JN
HEXADECANOIC ACID	--	--	--	500JN	--	--	--	--	--
ISOMER OF DDD	--	--	--	--	--	--	200JN	--	2000JN
ISOMER OF DDE	--	--	--	--	--	--	400JN	--	2000JN
METHYL(METHYLETHYL)PHENANTHRENE	--	200JN	--	200JN	300JN	300JN	--	--	--
OCTAHYDRODIMETHYL(METHYLETHYL) PHENANTHRENE	--	--	--	--	--	--	--	--	--
CARBOLIC ACID, METHYLESTER	200JN	--	--	--	--	--	--	--	--
PETROLEUM PRODUCT	--	--	--	--	--	--	N	N	N
PHYTOL	--	--	--	300JN	--	--	--	--	--
TRICHLOROBENZENAMINE	--	--	--	--	200JN	--	--	--	--

Footnotes: J - Estimated Value N - Presumptive evidence of presence of material

PHASE I  
 WOODBURY CHEMICAL SITE  
 PRINCETON, DADE CO., FLORIDA  
 SURFACE SOIL-PURGEABLE ORGANICS DATA SUMMARY  
 JANUARY, 1991

PURGEABLE ORGANIC COMPOUNDS	CONTROL #1							
	WCBGSS µg/kg	WC001SSC µg/kg	WC005SSC µg/kg	WC008SSC µg/kg	WC010SS µg/kg	WC011SS µg/kg	WC0FFSSC µg/kg	WCD06SS µg/kg
TOLUENE	--	--	--	--	6.5J	9.7J	--	--

"SOILS" CONTINUED  
 WOODBURY CHEMICAL SITE  
 SEDIMENT-PURGEABLE ORGANICS DATA SUMMARY  
 JANUARY, 1991

PURGEABLE ORGANIC COMPOUNDS	CONTROL #2 WCOBGSD (WC020SD)	WC013SD	WC014SD DUP-014	WC064SD	WCA03SD	WCB07SD	WCD02SD
	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
TETRACHLOROETHENE (TETRACHLOROETHYLENE)	--	--	--	11J	--	--	--
TOLUENE	19J	8.8J	8.3J	72J	7.9J	--	7.1J

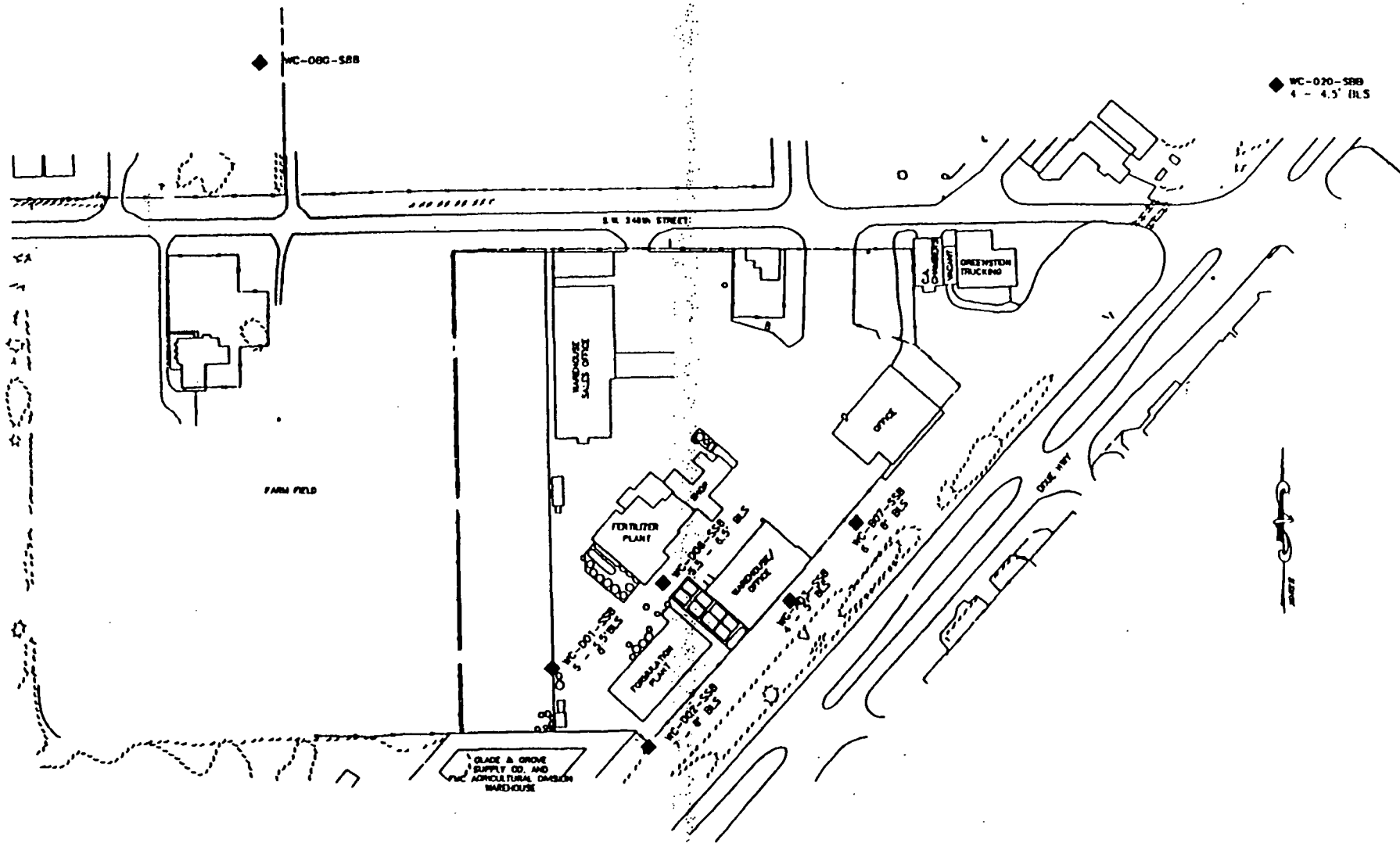
Footnote:

J - Estimated Value



( IN FEET )

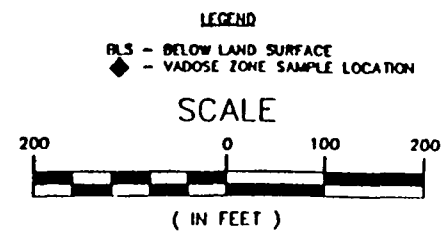




WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



VADOSE ZONE SAMPLES  
4 - 8 FEET BLS  
PHASE 1



PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
SUBSURFACE-PESTICIDES/PCB DATA SUMMARY  
JANUARY, 1991

	CONTROL #1 WCBGSBA	WC001SBA	WC07SBA	WC020SBA	WCA03SBA	WCD02SBA	WCD06SBA
PESTICIDE/PCB COMPOUNDS	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
4,4'-DDE (P,P'-DDE)	--	35	--	--	--	--	--
4,4'-DDT (P,P'-DDT)	--	24	--	--	4.7J	--	--
ALPHA-CHLORDANE /2	NA	210C	NA	NA	NA	NA	NA
BETA-CHLORDANE /2	NA	24C	NA	NA	NA	NA	NA
CIS-NONACHLOR /2	NA	34JC	NA	NA	NA	NA	NA
GAMMA-CHLORDANE /2	NA	50C	NA	NA	NA	NA	NA
GAMMA-CHLORDANE /2	NA	370C	NA	NA	NA	NA	NA
GAMMA-CHLORDANE /2	NA	49C	NA	NA	NA	NA	NA
OXYCHLORDANE (OCTACHLOR EPOXIDE) /2	NA	5.4JC	NA	NA	NA	NA	NA
TRANS-NONACHLOR /2	NA	150C	NA	NA	NA	NA	NA
Total CHLORDANE		892.4C					
HEPTACHLOR	--	12	--	--	--	--	--
HEPTACHLOR EPOXIDE	--	55N	--	--	--	--	--

WOODBURY CHEMICAL SITE  
VADOSE ZONE-PESTICIDES/PCB DATA SUMMARY  
JANUARY, 1991

	CONTROL #1 WCOBGSBB	WC001SBB	WC07SBB	CONTROL #2 WC020SBB	WCA03SBB	WCD02SBB	WCD06SBB
PESTICIDE/PCB COMPOUNDS	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg
ALPHA-CHLORDANE /2	NA	4.5J	NA	NA	NA	NA	NA
GAMMA-CHLORDANE /2	NA	8.7J	NA	NA	NA	NA	NA
TRANS-NONACHLOR /2	NA	4.5JN	NA	NA	NA	NA	NA
Total CHLORDANE		17.7J/JN					

Footnote:

- NA - Not Analyzed
- N - Presumptive evidence of presence of material
- J - Estimated value
- - Material was analyzed for but not detected
- /2 - Constituents or metabolites of technical chlordane
- C - Confirmed GC/MS
- Highlight indicates contaminants of concern

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
SUBSURFACE SOIL-METALS DATA SUMMARY  
JANUARY, 1991

INORGANIC ELEMENTS	Control #1			Control #2			
	WCBGSBA mg/kg	WC001SBA mg/kg	WC07SBA mg/kg	WC020SBA mg/kg	WCA03SBA mg/kg	WCD02SBA mg/kg	WCD06SBA mg/kg
ALUMINUM	1500	4600	1900	3900	2400	7300	2400
ARSENIC	--	--	--	81	--	100	--
BARIUM	--	--	--	18	--	--	--
CALCIUM	290000	310000	300000	290000	320000	260000	330000
CHROMIUM	--	--	--	--	--	11	--
COPPER	--	11	--	15	--	--	--
IRON	810	3600	1400	5400	2100	5000	1300
MAGNESIUM	770	1100	890	1300	1100	1000	1100
MANGANESE	19	85	26	64	32	92	19
MERCURY	0.07	0.18	0.08	0.11	0.06	0.25	0.05
STRONTIUM	3100	2100	2700	2200	2800	1900	2400
TITANIUM	32	98	67	100	72	140	69
VANADIUM	11	--	--	--	--	--	--
ZINC	--	37	--	24	--	16	--

WOODBURY CHEMICAL SITE  
VADOSE ZONE-METALS DATA SUMMARY  
JANUARY, 1991

INORGANIC ELEMENTS	CONTROL #1			Control #2			
	WCBGSBB mg/kg	WC001SBB mg/kg	WC07SBB mg/kg	WC020SBB mg/kg	WCA03SBB mg/kg	WCD02SBB mg/kg	WCD06SBB mg/kg
ALUMINUM	630	600	290	610	550	290	490
CALCIUM	350000	350000	350000	340000	350000	280000	300000
IRON	320	260	69	530	350	78	270
MAGNESIUM	760	980	940	1000	920	610	740
MANGANESE	11	12	--	12	14	--	--
MERCURY	--	0.06	--	0.06	0.07	--	0.06
STRONTIUM	3400	3400	3100	3100	3500	2600	3100
TITANIUM	--	--	--	18	--	37	44

Footnote:

- - Material was analyzed for but not detected
- Highlight indicates contaminants of concern

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
SUBSURFACE SOIL-EXTRACTABLE ORGANICS DATA SUMMARY  
JANUARY, 1991

EXTRACTABLE ORGANIC COMPOUNDS	CONTROL #1			CONTROL #2			
	WCBGSBA µg/kg	WC001SBA µg/kg	WC07SBA µg/kg	WC020SBA µg/kg	WCA03SBA µg/kg	WCD02SBA µg/kg	WCD06SBA µg/kg
(BIPHENYL)DICARBONITRILE	--	--	300JN	1000JN	--	--	--
2 UNIDENTIFIED COMPOUNDS	--	--	--	4000J	--	--	--
ACENAPHTHYLENE	--	--	300J	1100J	250J	--	--
ANTHRACENE	--	--	--	700J	--	--	--
ANTHRACENECARBONITRILE	--	--	--	400JN	--	--	--
BENZANTHRACENONE	--	--	900JN	10000JN	800JN	--	--
BENZO-A-PYRENE	--	--	1500	4900	1300J	150J	--
BENZO(A)ANTHRACENE	--	--	1300	6300	1200J	160J	--
BENZO(B AND/OR K)FLUORANTHENE	--	--	3200	10000	2300	370J	--
BENZO(GHI)PERYLENE	--	--	1000J	4800	1000J	--	--
BENZOCHRYSENE	--	--	400JN	--	300JN	--	--
BENZOFLUORANTHENE (NOT B OR K)	--	--	4000JN	40000JN	4000JN	200JN	--
BENZOFLUORENE	--	--	300JN	--	200JN	--	--
BENZONAPHTHOFURAN	--	--	--	1000JN	--	--	--
BENZONAPHTHOTHIOPHENE	--	--	700JN	2000JN	600JN	--	--
BENZOTRIPHENYLENE	--	--	200JN	--	200JN	--	--
BINAPHTHALENE	--	--	--	900JN	200JN	--	--
CARBAZOLE	--	--	--	400JN	--	--	--
CHRYSENE	--	--	1500	5600	1400J	230J	--
CYCLOPENTAPHENANTHRENE	--	--	200JN	2000JN	200JN	--	--
CYCLOPENTAPYRENE	--	--	--	2000JN	--	--	--
DIBENZO(A,B)ANTHRACENE	--	--	--	1600	--	--	--
DIBENZOTHIOPHENE	--	--	--	200JN	--	--	--
DIMETHYLPHENANTHRENE (4-ISOMERS)	--	--	--	2000JN	--	--	--
FLUORANTHENAMINE (2-ISOMERS)	--	--	--	2000JN	--	--	--
FLUORANTHENE	--	150J	2100	7600	2000	400J	--
FLUORENONE	--	--	--	200JN	--	--	--
INDENO (1,2,3-CD) PYRENE	--	--	1100J	4200	1000J	--	--
METHOXYPHENANTHRENE	--	--	200JN	--	--	--	--
METHYLBENZANTHRACENE (5-ISOMERS)	--	--	700JN	10000JN	900JN	--	--
METHYLFLUORANTHENE	--	--	1000JN	20000JN	1000JN	--	--
METHYLPHENANTHRENE (3-ISOMERS)	--	--	--	3000JN	--	--	--
NAPHTHACENE	--	--	--	2000JN	--	--	--
NAPHTHACENEDIONE	--	--	200JN	--	200JN	--	--
PHENANTHRENE	--	--	--	2300	170J	--	--
PHENYLNAPHTHALENE	--	--	--	2000JN	--	--	--
PYRENE	--	--	2600	8800	2500	430J	--
TRIPHENYLENE	--	--	200JN	--	200JN	--	--

PHASE I  
WOODBURY CHEMICAL SITE  
VADOSE ZONE-EXTRACTABLE ORGANICS DATA SUMMARY  
JANUARY, 1991

EXTRACTABLE ORGANIC COMPOUNDS	CONTROL #1			CONTROL #2			
	WCBGSBB µg/kg	WC001SBB µg/kg	WC07SBB µg/kg	WC020SBB µg/kg	WCA03SBB µg/kg	WCD02SBB µg/kg	WCD06SBB µg/kg
BENZO-A-PYRENE	--	--	--	--	470J	--	--
BENZO(A)ANTHRACENE	--	--	--	180J	500J	--	--
BENZO(B AND/OR K)FLUORANTHENE	--	--	--	360J	1100J	--	--
BENZO(GHI)PERYLENE	--	--	--	--	310J	--	--
BENZOFLUORANTHENE (NOT B OR K)	--	--	--	200JN	1000JN	--	--
BIS(DIMETHYLETHYL)METHYLPHENOL	--	--	--	400JN	--	--	--
CHRYSENE	--	--	--	210J	560J	--	--
FLUORANTHENE	--	--	--	270J	830J	--	--
HEXANEDIOIC ACID, DIOCTYL ESTER	7000JN	--	5000JN	--	--	--	--
INDENO (1,2,3-CD) PYRENE	--	--	--	--	310J	--	--
METHYLFLUORANTHENE	--	--	--	--	200JN	--	--
PYRENE	--	--	--	310J	1000J	--	--

Footnotes:

- J - Estimated value
- N - Presumptive evidence of presence of material
- - Material was analyzed for but not detected

WOODBURY CHEMICAL SITE  
 PRINCETON, DADE COUNTY, FLORIDA  
 SUBSURFACE SOIL-PURGEABLE ORGANICS DATA SUMMARY  
 JANUARY, 1991

	WCBGSBA 01/09/91	WC001SBA 01/09/91	WC07SBA 01/11/91	WC020SBA 01/14/91	WCA03SBA 01/10/91	WCD02SBA 01/14/91	WCD06SBA 01/14/91
PURGEABLE ORGANIC COMPOUNDS	$\mu\text{g/kg}$	$\mu\text{g/kg}$	$\mu\text{g/kg}$	$\mu\text{g/kg}$	$\mu\text{g/kg}$	$\mu\text{g/kg}$	$\mu\text{g/kg}$
TOLUENE	--	--	--	9.9J	--	--	--

Footnotes:

- J - Estimated value
- - Material was analyzed for but not detected

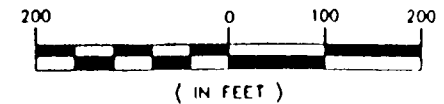


MONITORING WELL LOCATIONS  
14 - 20 FEET BLS  
PHASE I

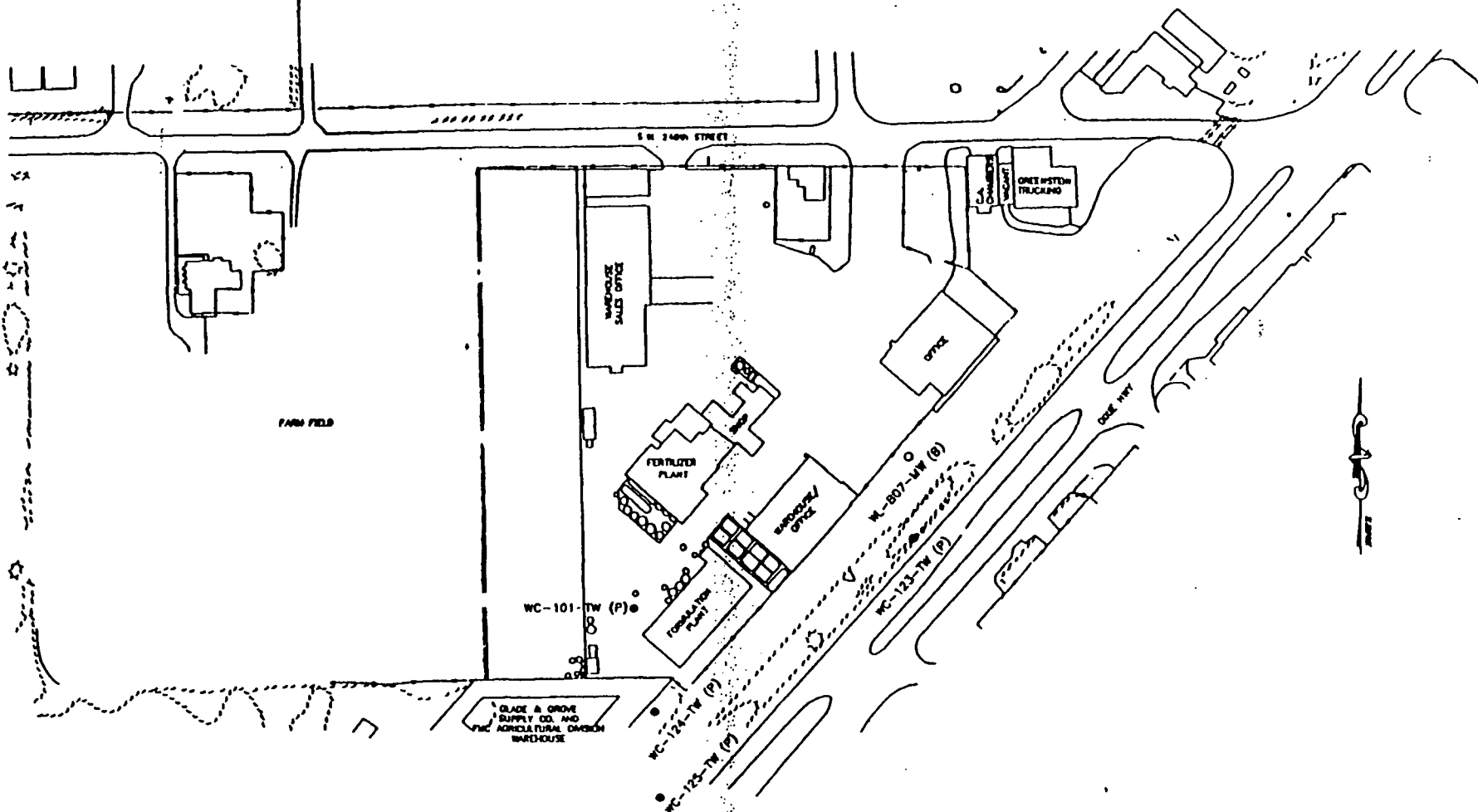
**LEGEND**

- BLS - BELOW LAND SURFACE
- - MONITORING WELL SAMPLES
- TW - TEMPORARY WELL SAMPLES
- MW - PERMANENT MONITORING WELL
- (B) - BAILED
- (P) - PERISTALTIC PUMP

SCALE



● WC-120-TW (P)



WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992



MONITORING WELL LOCATIONS  
5 - 12 FEET BLS  
PHASE II

LEGEND  
○ - PERMANENT MONITOR WELL  
● - TEMPORARY WELL  
(P) - PUMP  
(B) - BARREL

SCALE



( IN FEET )

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
MONITORING WELL-PESTICIDES/PCBS DATA SUMMARY  
JANUARY, 1991

	CONTROL #1		CONTROL #2		WCB07MW OFFSITE EAST	WCB57MW DUPLICAT	WCDEVBLK QA/QC	WCD02MW OFFSITE EAST	WCD06TW ONSITE CENTRAL	WCD07MW1 NORTH N.E.	WCD07MW2 SOUTH S.E.
	WCB07MW OFFSITE N.W.	WCD01TW ONSITE S.W.	WCD02TW OFFSITE N.E.	WCA03TW OFFSITE S.E.							
PESTICIDE/PCB COMPOUNDS	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
ALPHA-CHLORDANE /2	NA	NA	NA	--	--	--	--	--	NA	NA	0.47
CHLORDENE /2	NA	NA	NA	--	--	--	--	0.021	NA	NA	0.022
GAMMA-CHLORDANE /2	NA	NA	NA	--	--	--	--	--	NA	NA	1.8
GAMMA-CHLORDENE /2	NA	NA	NA	0.30	0.32	0.26	0.95	--	NA	NA	--
Total Chlordane				0.30	0.32	0.26	0.95	0.021			2.292
DIELDRIN	0.0071J	--	--	--	0.076	0.063	0.032M	1.0	0.0098J	--	11C
ENDOSULFAN SULFATE	--	--	--	--	0.017J	0.014J	0.012J	--	--	--	--
ENDRIN	--	--	--	--	--	--	--	0.044	--	--	--
ENDRIN KETONE	--	--	--	--	0.0089J	--	--	0.17	--	--	--
HEPTACHLOR EPOXIDE	--	--	--	--	--	--	--	0.27N	--	--	0.81N

PHASE II  
WOODBURY CHEMICAL SITE  
JUNE, 1991

	WC101TW ONSITE SOUTH	WC120TW OFFSITE N.E.	WC123TW OFFSITE EAST	WC124TW OFFSITE SOUTH	WC125TW OFFSITE S.E.	WCB07MW OFFSITE EAST
PESTICIDE/PCB COMPOUNDS	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
4,4'-DDD (P,P'-DDD)	--	--	--	.083JN	--	--
4,4'-DDE (P,P'-DDE)	--	--	--	.17N	--	--
4,4'-DDT (P,P'-DDT)	--	--	--	.18	--	--
ALDRIN	--	--	--	.014J	.0061J	--
DIELDRIN	--	--	--	.030JN	--	.017J
ENDOSULFAN II (BETA)	--	--	--	.046JN	--	--
ENDOSULFAN SULFATE	--	--	--	.013J	--	--
ENDRIN	--	--	--	.034J	--	--
HEPTACHLOR EPOXIDE	1.5	--	--	--	--	--

Footnote:

- NA - Not Analyzed
- N - Presumptive evidence of presence of material
- J - Estimated value
- - Material was analyzed for but not detected
- /2 - Constituents or metabolites of technical chlordane
- C - Confirmed GC/MS
- Highlight indicates contaminants of concern



PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
MONITORING WELLS-METALS DATA SUMMARY  
JANUARY, 1991

	CONTROL #1		CONTROL #2		WCB07MW OFFSITE EAST	WCB57MW DUPLICAT	WCDEVBLK QA/QC	WCD02MW OFFSITE EAST	WCD06TW ONSITE CENTRAL	WCD07MW1 NORTH N.E.	WCD07MW2 SOUTH S.E.
	WCBGMW OFFSITE N.W.	WC001TW ONSITE S.W.	WC020TW OFFSITE N.E.	WCA03TW OFFSITE S.E.							
INORGANIC ELEMENTS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CALCIUM	230	320	120	8300	1400	1300	93	100	200	6000	200
IRON	0.46	0.15	0.065	10	3.6	3.2	--	0.89	0.12	9.5	0.69
MAGNESIUM	4.9	6.0	1.3	21	6.6	6.2	3.2	2.6	4.3	15	2.1
POTASSIUM	6.7	110	--	--	13	--	15	16	19	--	24
SODIUM	14	14	5.0	--	14	14	10	9.6	12	25	3.8
	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
ALUMINUM	510	290	190	20000	5600	4700	--	1200	270	28000	1700
ARSENIC	--	--	150	--	--	--	--	--	--	--	51
BARIUM	13	24	--	--	--	--	--	17	--	--	--
CHROMIUM	15	--	--	--	54	56	--	60	--	--	--
COPPER	--	--	--	--	--	--	--	--	--	--	32
MANGANESE	17	--	--	--	86	81	--	44	--	270	23
NICKEL	--	--	--	--	--	--	--	41	--	--	--
STRONTIUM	2800	4800	1800	120000	20000	18000	950	1100	2900	86000	1400
TITANIUM	29	36	14	1300	200	180	12	35	24	810	35
ZINC	--	--	--	--	--	--	160	16	--	--	--

PHASE II  
WOODBURY CHEMICAL SITE  
JUNE, 1991

	WC101TW ONSITE SOUTH	WC120TW OFFSITE NE	WC123TW OFFSITE EAST	WC124TW OFFSITE SOUTH	WC125TW OFFSITE SE	WCB07MW OFFSITE EAST
	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
INORGANIC ELEMENTS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CALCIUM	340	140	130	1100	150	330
IRON	0.12	0.062	0.11	22	--	0.57
MAGNESIUM	8.6	1.1	1.4	4.7	2.2	3.6
POTASSIUM	85	--	2.8	--	4.5	13
SODIUM	31	3.8	4.7	3.9	7.8	10
	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
ALUMINUM	300	170	250	32000	160	880
ARSENIC	--	90	--	90	--	--
BARIUM	17	--	--	120	--	13
CHROMIUM	--	--	--	94	--	--
COPPER	--	--	--	510	--	--
LEAD	--	--	--	390	--	--
MANGANESE	16	--	--	900	--	15
STRONTIUM	7200	1800	2000	13000	2200	4600
TITANIUM	--	12	10	460	14	39
ZINC	--	--	--	1400	--	--

Footnotes:

-- - Material was analyzed for but not detected

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
TEMPORARY WELL-EXTRACTABLE ORGANICS DATA SUMMARY  
JANUARY, 1991

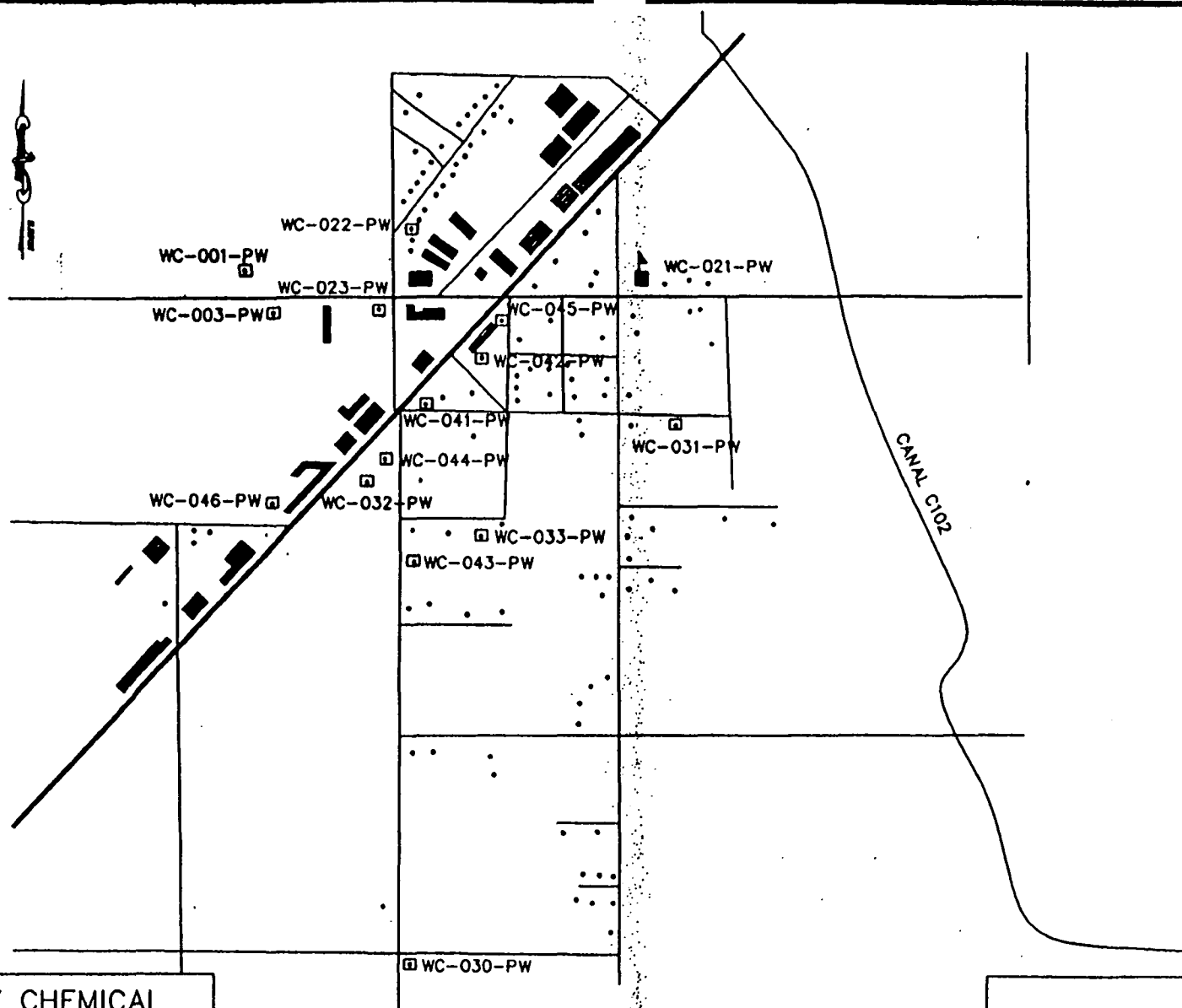
	CONTROL #1		CONTROL #2		WCB07MW OFFSITE EAST	WCB57MW DUPLICAT	WCDEVBLK QA/QC	WCD02MW OFFSITE EAST	WCD06TW ONSITE CENTRAL	WCD07MW1 NORTH N.E.	WCD07MW2 SOUTH S.E.
	WCBGMW OFFSITE N.W.	WC001TW ONSITE S.W.	WC020TW OFFSITE N.E.	WCA03TW OFFSITE S.E.							
EXTRACTABLE ORGANIC COMPOUNDS	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
(DIMETHYLETHYL)(METHYLTHIO)TRIAZINONE	--	1JN	--	--	--	--	--	--	--	--	--
(TETRAMETHYLBUTYL)PHENOL	--	--	--	--	--	--	--	--	1JN	--	--
1-UNIDENTIFIED COMPOUND	--	--	--	--	--	--	--	--	--	--	20J
ATRAZINE	--	--	--	2JN	1JN	1JN	1JN	--	--	--	--
BROMACIL	--	--	--	2JN	--	--	--	--	--	--	--
BUTYLATE	--	--	--	1JN	1JN	1JN	20JN	--	--	--	--
DODECANOIC ACID	--	--	--	1JN	--	--	--	--	--	--	--
HEXADECANOIC ACID	--	3JN	--	4JN	--	--	--	--	--	--	--
HYDROXYCHLORDENE	--	--	--	--	--	--	--	2JN	--	--	--
METETILACHLOR	--	--	--	4JN	2JN	2JN	7JN	--	--	--	--
METRIBUZIN	--	10JN	--	--	--	--	--	--	--	--	--
OCTANOIC ACID	--	--	--	1JN	--	--	--	--	--	--	--
PROMETON	--	2JN	--	10JN	1JN	1JN	--	--	--	--	3JN

PHASE II  
WOODBURY CHEMICAL SITE  
JUNE, 1991

	WC101TW ONSITE S.E.	WC120TW OFFSITE N.E.	WC123TW OFFSITE EAST	WC124TW OFFSITE SOUTH	WC125TW OFFSITE S.E.	WCB07MW OFFSITE EAST
EXTRACTABLE ORGANIC COMPOUNDS	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
(METHYLPROPYL)DINITROPHENOL	300JN	--	--	--	--	--
4 UNIDENTIFIED COMPOUNDS	600J	--	--	--	--	--
PROMETON	80JN	--	--	--	--	--

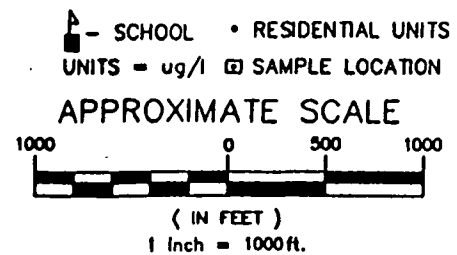
Footnotes:

- J - Estimated value
- N - Presumptive evidence of presence of material
- - Material was analyzed for but not detected



WOODBURY CHEMICAL  
PRINCETON, FLORIDA  
1992

PRIVATE WELLS



PRIVATE WELL/PESTICIDES/PCBS  
 WOODBURY CHEMICAL SITE  
 PRINCETON, DADE COUNTY, FLORIDA  
 AUGUST 1991

PESTICIDE/PCB COMPOUNDS	WCO41PW	
	001-GW	002-GW
	µg/l	µg/l
4,4'-DDD (P,P'-DDD)	.42U	.20U
4,4'-DDE (P,P'-DDE)	.20U	.10U
4,4'-DDT (P,P'-DDT)	.81U	.35U
ALDRIN	.32U	.14U
ALPHA-BHC	.10U	.10U
BETA-BHC	.20U	.10U
DELTA-BHC	.20U	.10U
DIELDRIN	.50U	.35U
ENDOSULFAN I (ALPHA)	.25U	.13U
ENDOSULFAN II (BETA)	.47U	.28U
ENDOSULFAN SULFATE	.54U	.30U
ENDRIN	.40U	.20U
ENDRIN KETONE	.53U	.29U
GAMMA-BHC (LINDANE)	.10U	.10U
HEPTACHLOR	.29U	.10U
HEPTACHLOR EPOXIDE	.25U	.13U
METHOXYCHLOR	1.1U	.50U
PCB-1016 (AROCOR 1016)	2.5U	1.2U
PCB-1221 (AROCOR 1221)	2.5U	1.2U
PCB-1232 (AROCOR 1232)	2.5U	1.2U
PCB-1242 (AROCOR 1242)	2.5U	1.2U
PCB-1248 (AROCOR 1248)	2.5U	1.2U
PCB-1254 (AROCOR 1254)	2.5U	1.2U
PCB-1260 (AROCOR 1260)	2.5U	1.2U
TOXAPHENE	20U	10U

\*\*\*\*\*  
 \*\*\*FOOTNOTES\*\*\*

- J - ESTIMATED VALUE  
 U - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM QUANTITATION LIMIT

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
PRIVATE WELL-PESTICIDE/PCB DATA SUMMARY  
JANUARY, 1991

PESTICIDE/PCB COMPOUNDS

GAMMA-CHLORDENE /2

WC001FW	WC002FW DUP-001	WC003FW	WC021FW	WC022FW	WC023FW	WC030FW	WC031FW	WC032FW	WC033FW
µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
NA	NA	NA	NA	NA	NA	NA	NA	NA	0.016J

PHASE II  
WOODBURY CHEMICAL SITE  
JUNE, 1991

PESTICIDE/PCB COMPOUNDS

4,4'-DDD (P,P'-DDD)  
ALDRIN  
GAMMA-CHLORDANE /2  
DIELDRIN  
ENDRIN  
ENDRIN KETONE  
HEPTACHLOR EPOXIDE

WC041FW	WC042FW	WC043FW	WC044FW	WC045FW	WC046FW	WC546FW DUP-046
µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
.038J	--	--	--	--	--	--
.031J	--	--	--	--	--	--
.062J	--	--	--	--	--	--
.70	--	--	--	.012J	--	--
.052J	--	--	--	--	--	--
.15J	--	--	--	--	--	--
.024J	--	--	--	--	--	--

Footnote:

- NA - Not Analyzed
- J - Estimated value
- - Material was analyzed for but not detected
- /2 - Constituent or metabolites of technical chlordane
- Highlight indicates contaminants of concern

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
PRIVATE WELLS-METALS DATA SUMMARY  
JANUARY, 1991

	CONTROL WC001PW N.E.	WC002PW DUP:001	WC003PW EAST	WC021PW N.E.	WC022PW N.E.	WC023PW ONSITE	WC030PW S.E.	WC031PW S.E.	WC032PW EAST	WC033PW S.E.
INORGANIC ELEMENTS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CALCIUM	120	120	110	100	120	110	110	110	120	120
IRON	--	--	--	--	0.054	--	--	--	--	--
MAGNESIUM	4.0	4.1	3.9	3.5	4.2	3.7	3.6	3.5	4.3	3.6
POTASSIUM	7.2	7.5	7.3	6.6	7.0	7.5	4.4	4.6	6.9	8.8
SODIUM	14	15	12	11	14	12	11	12	30	11
	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
BARIUM	11	11	12	11	11	12	10	--	13	13
BORON	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
COPPER	--	--	--	--	27	--	--	--	--	--
STRONTIUM	1100	1200	1100	1100	1200	1200	1100	1100	1100	1100
TITANIUM	15	15	14	12	15	14	14	14	15	14
ZINC	--	--	21	23	110	10	--	210	320	70

PHASE II  
WOODBURY CHEMICAL SITE  
JUNE, 1991

	WC041PW	WC042PW	WC043PW	WC044PW	WC045PW	WC046PW DUP 046
INORGANIC ELEMENTS	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
CALCIUM	120	110	120	110	100	110
IRON	--	--	--	--	0.014	0.019
MAGNESIUM	4.0	4.0	3.4	2.8	3.3	4.3
POTASSIUM	50	12	4.2	5.2	8.2	6.4
SODIUM	12	14	11	11	11	14
	µg/l	µg/l	µg/l	µg/l	µg/l	µg/l
ALUMINUM	80	74	85	120	81	76
BARIUM	14	14	5.5	--	10	11
COPPER	3.8	15	2.7	--	15	4.7
MANGANESE	25	3.4	--	--	--	--
STRONTIUM	1300	1200	1200	1300	1100	1100
TITANIUM	--	--	--	11	--	--
ZINC	4.1	280	76	68	89	77

Footnotes:

NA - Not analyzed  
-- - Material was analyzed for but not detected

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
PRIVATE WELL-PURGEABLE ORGANIC DATA SUMMARY  
JANUARY, 1991

	CONTROL #1 WC001PW BROYLS 1 N.W.	WC002PW BROYLS 2 DUP-001	WC003PW GARRETT S.E.	WC021PW NAZARENE N.E.	WC022PW 1st GRACE N.E.	WC023PW PRIVATE ONSITE	WC030PW MILLER S.E.	WC031PW FLOYD'S S.E.	WC032PW 1st NATL EAST	WC033PW HANSEN S.E.
PURGEABLE ORGANIC COMPOUNDS	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l
1,1,1-TRICHLOROETHANE	--	--	--	2.4J	--	--	--	--	--	--
1,2,3-TRICHLOROPROPANE	--	--	--	0.92J	--	--	--	--	--	--
BROMODICHLOROMETHANE	--	--	--	--	--	--	--	--	9.0	--
BROMOFORM	--	--	--	--	--	--	--	--	2.7J	--
CHLOROFORM	--	--	--	--	--	--	--	--	7.8	--
DIBROMOCHLOROMETHANE	--	--	--	--	--	--	--	--	10	--

WOODBURY CHEMICAL SITE  
MONITORING WELL-PURGEABLE ORGANIC DATA SUMMARY  
JANUARY, 1991

	CONTROL #1 WCBGMW CONTROL N.W.	WC001TW ONSITE S.W.	CONTROL #2 WC020TW ONSITE N.E.	WCA03TW OFFSITE S.E.	WCB07MW OFFSITE EAST	WCB57MW DUPLICAT	WCDEVBLK QA/QC	WCD02MW OFFSITE S.E.	WCD06TW ONSITE CENTRAL	WCD07TW1 NORTH N.E.	WCD07TW2 SOUTH S.E.
PURGEABLE ORGANIC COMPOUNDS	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l	µB/l
1,1,1-TRICHLOROETHANE	--	--	--	--	--	--	--	--	--	--	0.67J
1,1-DICHLOROETHENE(1,1-DICHLOROETHYLENE)	--	--	--	--	--	--	--	0.51J	--	--	--
1,2,3-TRICHLOROPROPANE	--	--	0.59J	--	0.80J	--	--	--	--	--	--
CHLOROFORM	--	--	--	--	.50J	--	--	--	--	--	--
TRICHLOROETHENE(TRICHLOROETHYLENE)	--	--	--	--	--	--	--	0.53J	--	--	0.64J
ISOPROPANOL	--	--	--	--	--	--	--	--	8JN	--	--

Footnotes:

- J - Estimated value
- N - Presumptive evidence of presence of material
- - Material was analyzed for but not detected

PHASE I  
WOODBURY CHEMICAL SITE  
PRINCETON, DADE COUNTY, FLORIDA  
PRIVATE WELLS-NITRATE/NITRITE DATA SUMMARY  
JANUARY, 1991

GENERAL INORGANIC PARAMETERS  
NITRATE-NITRITE NITROGEN

CONTROL WC001PW BROYLS 1 N.W.	DUP-01 WC002PW BROYLS 2 N.W.	WC003PW GARRETT S.E.	WC021PW NAZARENE N.E.	WC022PW 1st GRACE N.E.	WC023PW PRIVATE ONSITE	WC030PW MILLER S.E.	WC031PW FLOYD'S S.E.	WC032PW 1st NATL EAST	WC033PW HANSEN S.E.
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
6.5	6.6	8.7	6.9	7.5	8.7	6.8	5.8	11	11

PHASE II  
WOODBURY CHEMICAL SITE  
PRIVATE WELLS-NITRATE/NITRITE DATA SUMMARY  
JUNE, 1991

GENERAL INORGANIC PARAMETERS  
NITRATE-NITRITE NITROGEN

WC041PW RED SNAP	WC042PW PRIN PLA	WC043PW MATHIS	WC044PW SHELL ST	WC045PW REDLAND	WC046PW COOPERS	WC546PW DUP-046
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
.69	1.5	.52	.49	.62	.66	.63

PHASE I  
WOODBURY CHEMICAL SITE  
MONITORING WELL-NITRATE/NITRITE DATA SUMMARY  
JANUARY, 1991

GENERAL INORGANIC PARAMETERS  
NITRATE-NITRITE NITROGEN

CONTROL #1 WCBQMW OFFSITE N.W.	WC001TW ONSITE S.W.	CONTROL #2 WC020TW OFFSITE N.E.	WCA03TW OFFSITE S.E.	WCB07MW OFFSITE EAST	WCB57MW DUP-B07	WCDEVBLK QA/QC	WCD02MW OFFSITE EAST	WCD06TW ONSITE CENTRAL	WCD07MW1 NORTH N.E.	WCD07MW2 SOUTH S.E.
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
4.9	120	0.39	9.0	8.4	8.6	9.2	NA	27	4.8	5.7

PHASE II  
WOODBURY CHEMICAL SITE  
MONITORING WELL-NITRATE/NITRITE DATA SUMMARY  
JUNE, 1991

GENERAL INORGANIC PARAMETERS  
NITRATE-NITRITE NITROGEN

WC101TW ONSITE SOUTH	WC120TW OFFSITE NE	WC123TW OFFSITE EAST	WC124TW OFFSITE SOUTH	WC125TW OFFSITE SE	WCB07MW OFFSITE EAST
mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
1.2	.71	1.5	1.1	.78	1.1



**APPENDIX C**

**STATE CONCURRENCE LETTER**



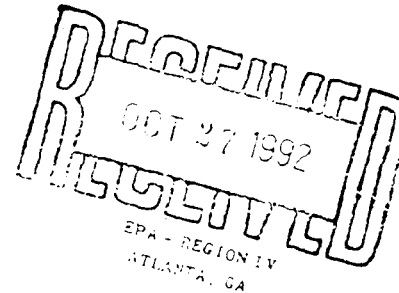
*Florida Department of Environmental Regulation*

Twin Towers Office Bldg • 2600 Blair Stone Road • Tallahassee, Florida 32399-2

Lawton Chiles, Governor

Carol M. Browner, Secretary

October 2, 1992



Mr. Greer Tidwell  
Regional Administrator  
U.S. EPA, Region IV  
345 Courtland Street, N.E.  
Atlanta, Georgia 30365

Dear Mr. Tidwell:

The Florida Department of Environmental Regulation (DER) concurs with the EPA's proposed remedial alternative for the Woodbury Chemical Superfund site in Princeton, Florida.

The selected "no action with monitoring" alternative as outlined in the June 1992 Record of Decision provides for one year of quarterly sampling of existing monitoring wells, a private off-site well and three additional monitoring wells. We understand that the EPA will insure that groundwater filters continue to be installed in the off-site private well. At the end of the monitoring period, the EPA and the DER will confirm the appropriateness of the "no action" alternative prior to site delisting. No state cost share is necessary.

We look forward to the deletion of the site from the National Priorities List.

Sincerely,

Carol M. Browner  
Secretary

CMB:khh