

**FINAL
SCREENING SITE INSPECTION REPORT, PHASE II
CONOCO CHEMICAL COMPANY
ABERDEEN, MONROE COUNTY, MISSISSIPPI
EPA ID #MSD007031230**

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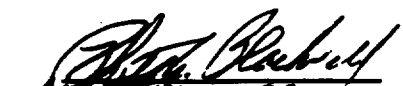
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EXECUTIVE SUMMARY

Conoco Chemical Company is located in the town of Aberdeen, Mississippi, at 33°48'32" N latitude and 88°32'33" W longitude. Conoco Chemical operated from 1963 to 1984. Vista Polymer Corporation purchased the facility in 1984 and is now the present operator. During the use by Conoco Chemical, the large industrial complex produced plasticizers and polyvinyl chloride (PVC) products.

Conoco Chemical Company is located near the northern edge of the Gulf Coastal Plain Physiographic Province. The site is underlain by the predominantly sandy strata of the Tuscaloosa and Eutaw formations. The aquifer of concern in this area is the Eutaw McShan aquifer which outcrops throughout central Monroe County encompassing the city of Aberdeen. It is composed of many thick to thin beds of sand, clay, and shale in the Eutaw and McShan formations of late Cretaceous Age. Wells completed in this aquifer range from 100 to 300 feet below land surface and yield 100 to 770 gallons per minute. The Eutaw McShan aquifer is the primary source for drinking water within the 4-mile radius of the facility.

Potentially affected populations include all persons served by the public water supply systems in Aberdeen and surrounding areas. Aberdeen has 3,200 connections to its system. Residents who use the Tombigbee River for boating and fishing may also be at some risk. Other people potentially at risk include students, employees and residents within a 4-mile radius of the facility. Population within a 4-mile radius of the facility is 7,184.

Analytical results from the field investigation indicate extremely high concentrations of bis (2-ethyl hexyl) phthalate and di-n-octylphthalate. The contamination was present in surface, subsurface soil samples, and a monitoring well sample taken from the vicinity of the former onsite landfills. Vinyl chloride and di-n-octylphthalate were present at elevated levels in a surface water sample taken downgradient from James Creek. James Creek enters the Tombigbee River approximately 5 miles southeast of the point at which the drainage ditch from the site enters James Creek.

Because of the significant contamination present at the facility and the presence of many people who are potentially at risk of being affected by this contamination, FIT 4 recommends that Phase I of a Listing Site Inspection be initiated at Conoco Chemical Company.

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1.0 INTRODUCTION

The NUS Corporation Region 4 Field Investigation Team (FIT) was tasked by the U.S. Environmental Protection Agency (EPA), Waste Management Division to conduct a screening site inspection (SSI) at the Conoco Chemicals site in Aberdeen, Monroe County, Mississippi. The investigation was performed under the authority of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA) and the Superfund Amendments and Reauthorization Act of 1986 (SARA). The task was performed to satisfy the requirements stated in Technical Directive Document (TDD) number F4-8901-64. The field investigation was conducted February 6, 1989 through February 10, 1989.

1.1 OBJECTIVES

The objectives of this investigation were to determine the nature of contaminants present at the site and to determine if a release of these substances has occurred or may occur. Further, this investigation sought to determine the possible pathways by which contamination could migrate from the site and the populations and environments it would potentially affect. Through these objectives, a recommendation was made regarding future activities at the site.

1.2 SCOPE OF WORK

The objectives were achieved through the completion of a number of specific tasks. These activities were to:

- Obtain and review background materials relevant to HRS scoring of site.
- Obtain information on local water systems.
- Evaluate target populations associated with the groundwater, surface water, and air and onsite exposure pathways.
- Conduct a survey of private wells.

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- Determine location and distance to nearest potable well.
- Develop a site sketch.
- Conduct a geophysical screening of site to determine the landfill areas and whether buried drums may be present.
- Conduct field analytical screening to assist in determining CLP sample locations and provide Health and Safety information.
- Collect 36 environmental samples consisting of surface soil, subsurface soil, sediment, surface water and groundwater samples.

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2.0 SITE CHARACTERIZATION

2.1 SITE BACKGROUND AND HISTORY

The Conoco Chemical facility, presently Vista Polymer Corporation, is located on U.S. Highway 25, approximately 2000 feet west of the city of Aberdeen, Monroe County, Mississippi. Geographically, the site is located at latitude N 33°48'32" and longitude W 88°32'33" (Figure 1). During its use by Conoco Chemical, the large industrial complex produced plasticizers and polyvinyl chloride (PVC) products (Ref. 1).

Between 1963 and 1979, Conoco Chemical used four onsite landfills to dispose of waste containing bis (2-ethylhexyl) phthalate, PVC, and plasticizers (Refs. 2, 3). Conoco Chemical also had waste treatment facilities in which process waters from the plant were received and treated before being discharged (Ref. 1).

Conoco Chemical filed a CERCLA Notification of Hazardous Waste Activity form. The facility also filed a RCRA Part A application, but it was later withdrawn. Conoco Chemical operated under an NPDES permit while in business (Ref. 3). In July of 1984, Conoco Chemical was acquired by Vista Polymer Corporation. This transaction concluded the 20-year period of Conoco Chemical's operation (Ref. 3).

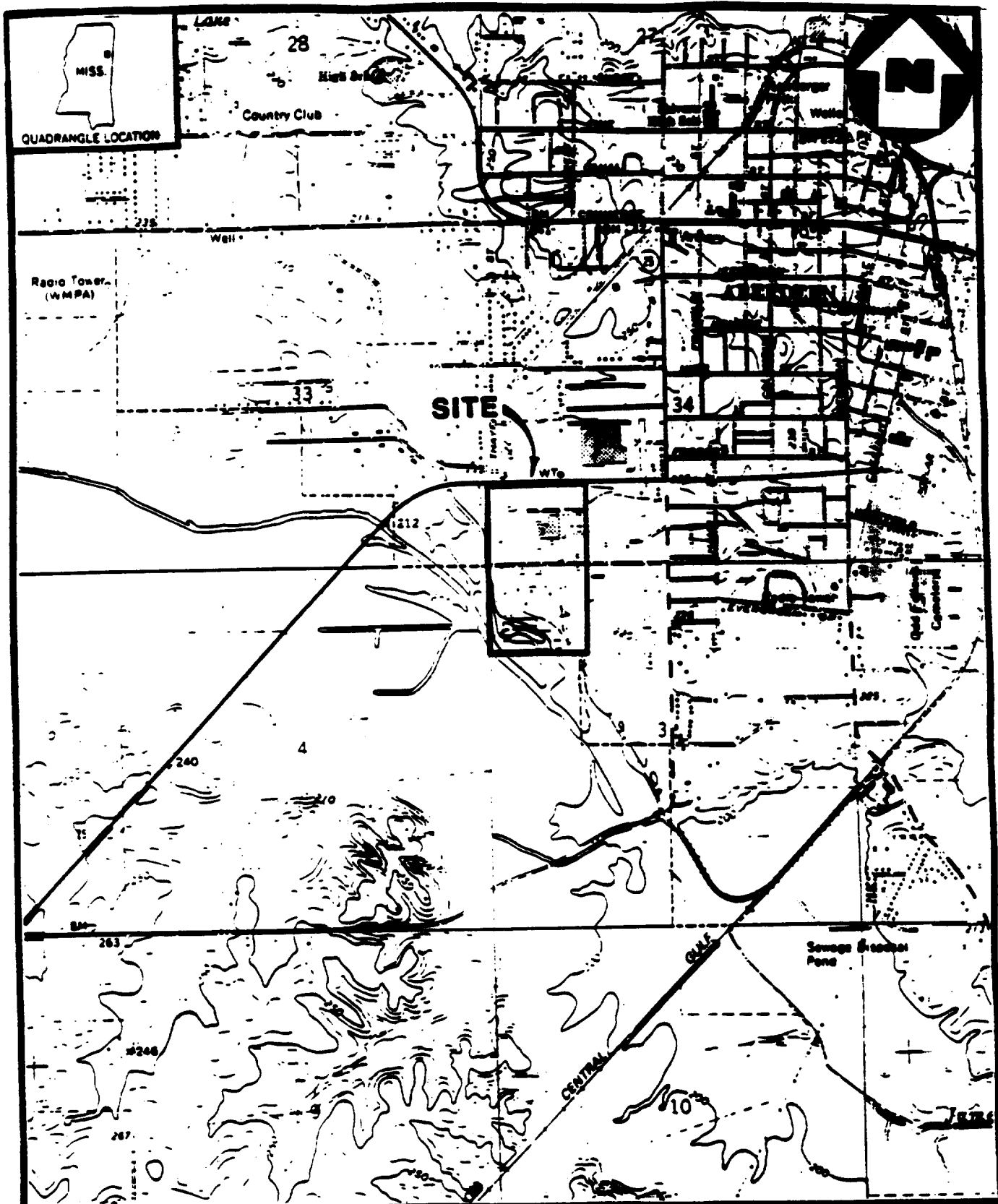
2.2 SITE DESCRIPTION

2.2.1 Site Features

The Conoco Chemical facility lies on a square tract of land encompassing an area of approximately 40 acres (Figure 1). Facility slope is approximately 8 percent and intervening terrain slope is estimated at 3 percent. Drainage is southeastward into James Creek, 200 feet away (Ref. 4).

The facility is located in a slightly populated area, but it is surrounded by a fence (Figure 2). Approximately 50 percent of the property within the fenced area is floored by concrete. The remainder of the property is gravel and vegetated with grasses and weeds (Ref. 5).

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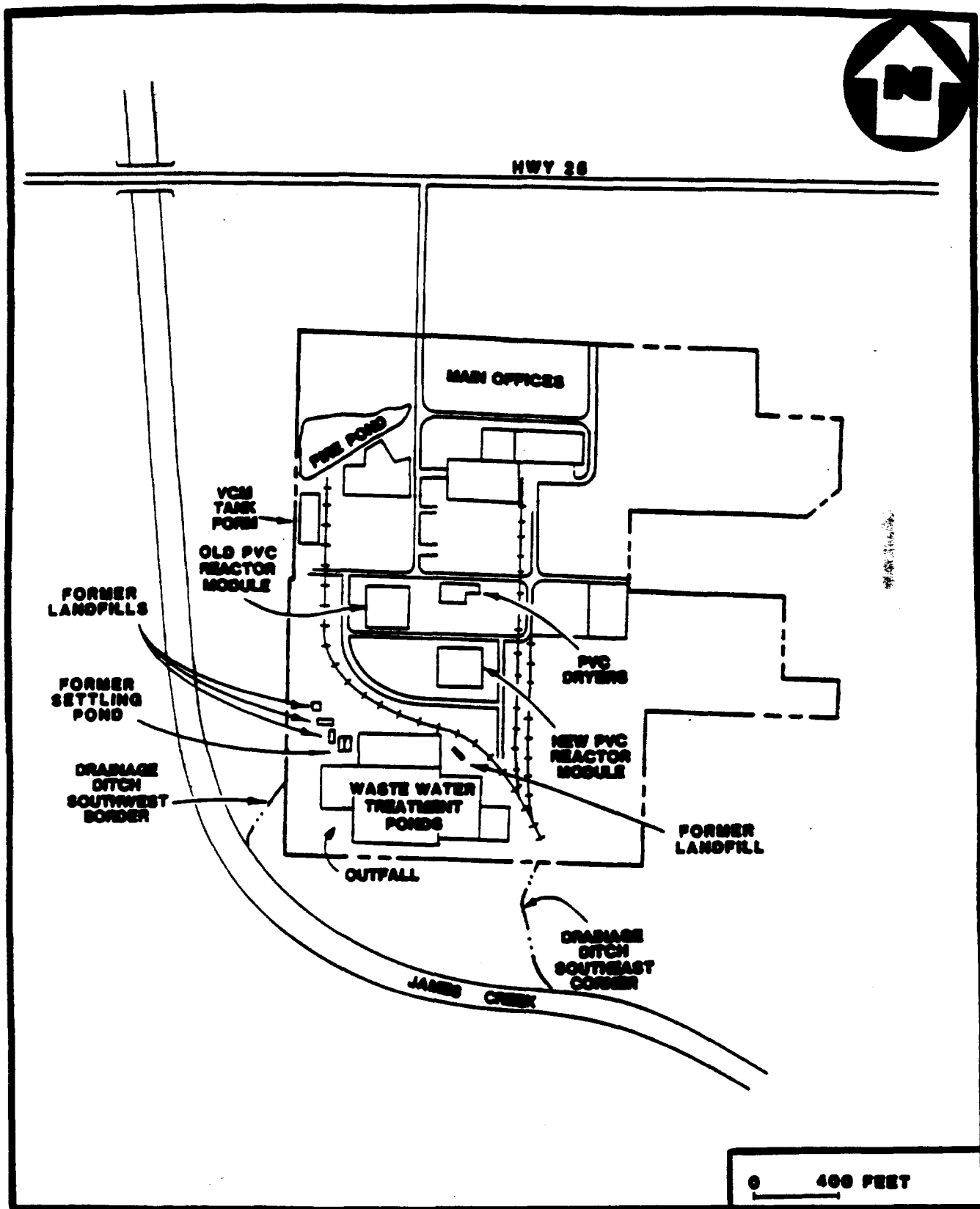
BASE MAP IS A PORTION OF THE USGS 7.5 MINUTE QUADRANGLE ABERDEEN, MISS., 1962.

**SITE LOCATION MAP
CONOCO CHEMICALS
ABERDEEN, MISSISSIPPI**

FIGURE 1



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**SITE LAYOUT MAP
CONOCO CHEMICALS
ABERDEEN, MONROE COUNTY, MISSISSIPPI**

FIGURE 2



A guard shack is situated along the northern edge of the property, facing U.S. Highway 25. A parking lot for employees and visitors is located just northwest of the guard shack. The main offices and fire pond are located outside of the fenced area of the facility. Inside the fenced area are several buildings which include: vinyl chloride monomer (VCM) tank farm, old PVC reactor module, PVC dryers and new PVC reactor module. Located in the rear of the property are wastewater treatment ponds and former landfills. There are railroad tracks leading throughout the property (Figure 2) (Ref. 5).

2.2.2 Waste Characteristics

Conoco Chemicals produced plasticizers and polyvinyl chloride (PVC) products. Production capacity by Conoco Chemicals yielded 1.4 million pounds of PVC resin and 68,000 pounds of plasticizers per day (Ref. 1).

The facility has four former landfill areas in which 97,000 gallons (nearly 500 cubic yards) of American Petroleum Institute (API) separator sludge and filter cake was disposed of between 1963 and 1979. Landfill number one is reported to contain an estimated 4,000 gallons of API sludge containing polyvinyl chloride (PVC) and plasticizers. Landfill number two contains an estimated 75,000 gallons of mixture of bis (2-ethylhexyl) phthalate and carbon filter cake. Landfill number three contains an estimated 13,000 gallons of PVC and plasticizer sludge from the API separator. Landfill number four contains an estimated 5,000 gallons of bis (2-ethylhexyl) phthalate filter cake. The estimated depth of the disposal of the API sludge and filter cake waste in all the landfills is 10 feet (Refs. 2, 3).

File material indicates that, in 1983, the state planned to sample the then inactive landfill areas on the property (Ref. 2). Results of any such sampling, however, are not present in the files, nor is there any evidence that this sampling was ever done.

File material does contain analytical results, from November 1983, for water samples collected from Conoco's USGS well and process well #2. These samples were analyzed for bis (2-ethylhexyl) phthalate. The analyses indicated the presence of the contaminant at a concentration of 17 ug/l in the sample taken from the USGS well. The contaminant was not detected in the other sample (Ref. 6).

3.0 REGIONAL POPULATIONS AND ENVIRONMENTS

3.1 POPULATION AND LAND USE

3.1.1 Demography

Conoco Chemical is located in Aberdeen, Mississippi. Aberdeen is a rural town with a population of 7,040 (Refs. 4, 7). The closest residential community to the facility is located less than one quarter of a mile away (Ref. 4).

There are six public schools located in the city of Aberdeen. There are a total of 2,400 students attending Aberdeen public schools. The closest school to the facility is Aberdeen High School with 700 students attending and is approximately one quarter of a mile from the facility (Ref. 8). The population within a 1-mile radius is approximately 3,371 (Ref. 9). The facility employs 250 workers (Ref. 10).

3.1.2 Land Use

Land in the study area is used for agricultural, industrial, residential, and recreational purposes. Agricultural use is mainly crop production. Industries include small manufacturing businesses. Residential areas are comprised of both apartment and single-family homes (Ref. 4).

3.2 SURFACE WATER

3.2.1 Climatology

Conoco Chemicals is situated in a humid continental region of northeastern Mississippi. The average annual precipitation is 54 inches with an average temperature of 63°F (Ref. 11, pp. 3, 32-34; 12).

3.2.2 Overland Drainage

The facility lies within the Tombigbee River basin. Drainage from the site flows into James Creek which runs into the Tombigbee River approximately 5 miles downstream (Refs. 4, 13, pp. 15-28).

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3.2.3 Potentially Affected Water Bodies

The Tombigbee River, located approximately 2 miles east of the facility, is not a source of drinking water for the city of Aberdeen. It is, however, used for boating and fishing as well as transport of industrial and agricultural goods downstream (Ref. 4).

3.3 GROUNDWATER

3.3.1 Hydrogeology

The facility is located in Aberdeen, Monroe County, Mississippi. Monroe County is situated near the northern edge of the Gulf Coastal Plain Physiographic Province. Monroe County lies within part of the Tombigbee River Hills or Fall Line Hills physiographic division and part of the Black Prairie belt (Refs. 13, p. 15; 13). The surface area is generally hilly and ranges from low smoothly rounded hills of 40 to 50 feet relief, with broad intervening valleys, to hills and ridges of 200 feet relief, with steep slopes, narrow crests, and narrow separating valleys. All of Monroe County lies within the drainage basin of Tombigbee River which flows south to Aberdeen, and a little east of south to its junction with the Buttahatchie at the southern boundary of the county (Ref. 13, p. 15).

The site is located on the outcrop of the Eutaw Formation and underlain by the McShan, Gordo and Coker formations. The aquifer of concern in this area is the Eutaw-McShan aquifer, which outcrops throughout central Monroe County encompassing the city of Aberdeen. It is composed of many thick to thin beds of sand, clay, and shale in the Eutaw and McShan formations of Late Cretaceous Age. The aquifer is thickest in the south, exceeding 400 feet, and thins to the north eventually disappearing.

The Eutaw consists of two units, the lower Eutaw and the upper Tombigbee sand member. The lower unit of the Eutaw has a thickness of 200 to 250 feet, and the Tombigbee sand has an average thickness of 100 feet or less. The Eutaw is predominantly fine-grained to medium-grained micaceous glauconitic sand, but contains considerable gray to black clays, which is chiefly in the lower member. Plant fragments and pieces of lignite are common in these clays. Other features are small lenses, stringers of small pebbles, and fossiliferous. The Tombigbee sand member is a massive glauconitic somewhat calcareous sand, some layers of which are hardened and contain concretionary masses. The Eutaw Formation dips, a little south of west, approximately 30 feet per mile (Ref. 13, pp. 25, 26).

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The Eutaw formation is underlain by the Tuscaloosa aquifer system consisting of the Gordo and Coker formations. The Gordo crops out along the eastern border of north Mississippi and in northwest Alabama. The formations dip to the southwest and thicken downdip. The Gordo Formation is composed of an upper clay unit, which separates it from the Eutaw-McShan, and a lower sand and gravel unit. The Coker consists of an upper unnamed member of mixed clay, sand, and gravel, and a basal massive sand. The Gordo and Coker formations are hydraulically connected (Ref. 14, p. 65).

Large municipal wells in the Eutaw-McShan aquifer pump as much as 770 gpm, but some produce under 100 gpm. Transmissivities determined range from 200 to 4,900 ft²/d. Hydraulic conductivities average 13.4 ft/d and specific capacities average 3.3 (gpm)/ft of drawdown. Water in the outcrop area is hard calcium-bicarbonate type having excessive iron. Large quantities of water are also available from the underlying Tuscaloosa aquifer and are frequently utilized rather than the Eutaw-McShan aquifer (Ref. 14, pp. 65, 73). Recharge to the Eutaw-McShan aquifer is primarily from rainfall on the outcrop area. Water movement is downdip from the outcrop (Ref. 14, p. 59).

The Gordo Formation shows transmissivities of 535 to 21,400 ft²/d and an average hydraulic conductivity of 42.8 ft/d. The Coker Formation indicates transmissivities ranging from 762 to 80,200 ft²/d. Large wells in the Gordo commonly produce 500 to 1,000 gpm and large wells in the Coker produce 1,500 to 1800 gpm. Increased use of the Coker aquifer can be expected in the future due to low water levels in areas where the Gordo and the overlying Eutaw-McShan aquifers are being drawn down excessively (Ref. 15, p. 73).

3.3.2 Aquifer Use

There are 10 public water supply wells and approximately 250 private wells within a 4-mile radius of the facility. The city of Aberdeen produces water from all 10 municipal wells. Each of these wells is anywhere from 150 feet to 450 feet deep. The closest well to the facility is well #4. It is located 4,000 feet northeast of the facility. Aberdeen serves water to approximately 3,200 connections, respectively (Ref. 15). All 10 municipal wells and the 250 private wells are completed in the Eutaw and McShan aquifer (Refs. 4, 16, 17).

3.4 SUMMARY OF POTENTIALLY AFFECTED POPULATIONS AND ENVIRONMENTS

There are four pathways of concern for the facility: the groundwater, surface water, air, and onsite exposure pathways. The groundwater migration pathway is of concern because the Eutaw and McShan aquifer, the aquifer used for drinking water in the area, is a highly transmissive, water-table

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aquifer that readily accepts recharge from land surface (Ref. 13). All ten public supply wells within a 4-mile radius of the facility are completed in the Eutaw and McShan aquifer. Approximately 3,200 connections are served by groundwater within a 4-mile radius of the site (Ref. 16). There are 250 private wells within 4 miles of the facility (Ref. 17).

The surface water pathway is of concern because James Creek flows adjacent to the facility and receives surface drainage from the facility. James Creek flows into the Tombigbee River, which is used for boating and fishing as well as a waterway (Ref. 4, 17).

The air pathway is of concern because the facility is located in a populated area. If there was a release by air, the nearby population could be affected (Ref. 4).

The onsite exposure is of concern also because of the facility's daily operations and previous operations taken place at the facility. Employees as well as visitors could be affected (Ref. 1).

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4.0 FIELD INVESTIGATION

During the field investigation conducted the week of February 6, 1989, FIT 4 attempted to identify and characterize contaminants which may be present in the environment as a result of activities that were conducted at Conoco Chemicals. To accomplish this, FIT conducted a geophysical survey, field analytical screening and also collected 36 environmental samples from a number of strategic onsite and offsite locations.

4.1 GEOPHYSICAL SCREENING

The purpose of the geophysical screening was to provide the sampling team with information that would aid in the selection of environmental sampling locations. To accomplish this task, suspected disposal areas were surveyed with an EM-31 Non-Contacting Terrain Conductivity Meter. A complete summary of the geophysical method is presented in Appendix B.

4.1.1 Methodology

The EM-31 was calibrated according to standard operating procedures in a clear field located approximately 300 feet east of the eastern entrance road to the plant. Five conductivity readings were taken at 20-foot intervals along a grid line oriented east-west. The average value of the five stations (51.8 micromhos per meter) was used as the background value.

Two areas were gridded and surveyed to locate anomalous features. The first area was located north of the main aeration pond over an old settling pond that had been filled in with soil to conform with the surrounding topography. The grid lines were oriented east-west and were located 20 feet apart. Stations along the grid lines were separated by a distance of 20 feet. A total of 154 station readings were taken in the first grid area. The second area surveyed was located adjacent to the settling pits, west of the first grid area. The grid consisted of one main grid line oriented north-south with station distances of 20 feet. Grid lines of varying length were located off of the main grid line at distances of 20 feet where the area permitted the extra grid stations. A total of 137 station readings were taken in the second grid area.

4.1.2 Results of the Geophysical Screening

Readings above background were noted in both survey areas. The first grid area had conductivity values that ranged between 90 and 200 micromhos per meter. The second area had conductivity values that ranged between 60 and 250 micromhos per meter. Soil samples collected for both CLP and FASP were collected within the survey areas, which were selected based on areas of anomalously high conductivity readings. Because of anomalously high conductivity readings, a total of five soil samples were collected for both CLP and FASP purposes.

4.2 FIELD ANALYTICAL SUPPORT PROGRAM

The purpose of the Field Analytical Screening Program (FASP) was to provide the sampling team with information that would aid in the selection of environmental sampling locations. The primary instrument that was to be used to accomplish this task was the Tracor 540 Gas Chromatograph (GC). During the set-up of this instrument in the mobile lab, several power failures occurred. The final power failure caused a power surge which overloaded several of the circuits in the Tracor 540 GC. The overloading rendered the Tracor 540 GC inoperative. The back-up instrument that was used was the Photovac 10550 GC. This instrument can analyze for volatile organic compounds in water and soil samples.

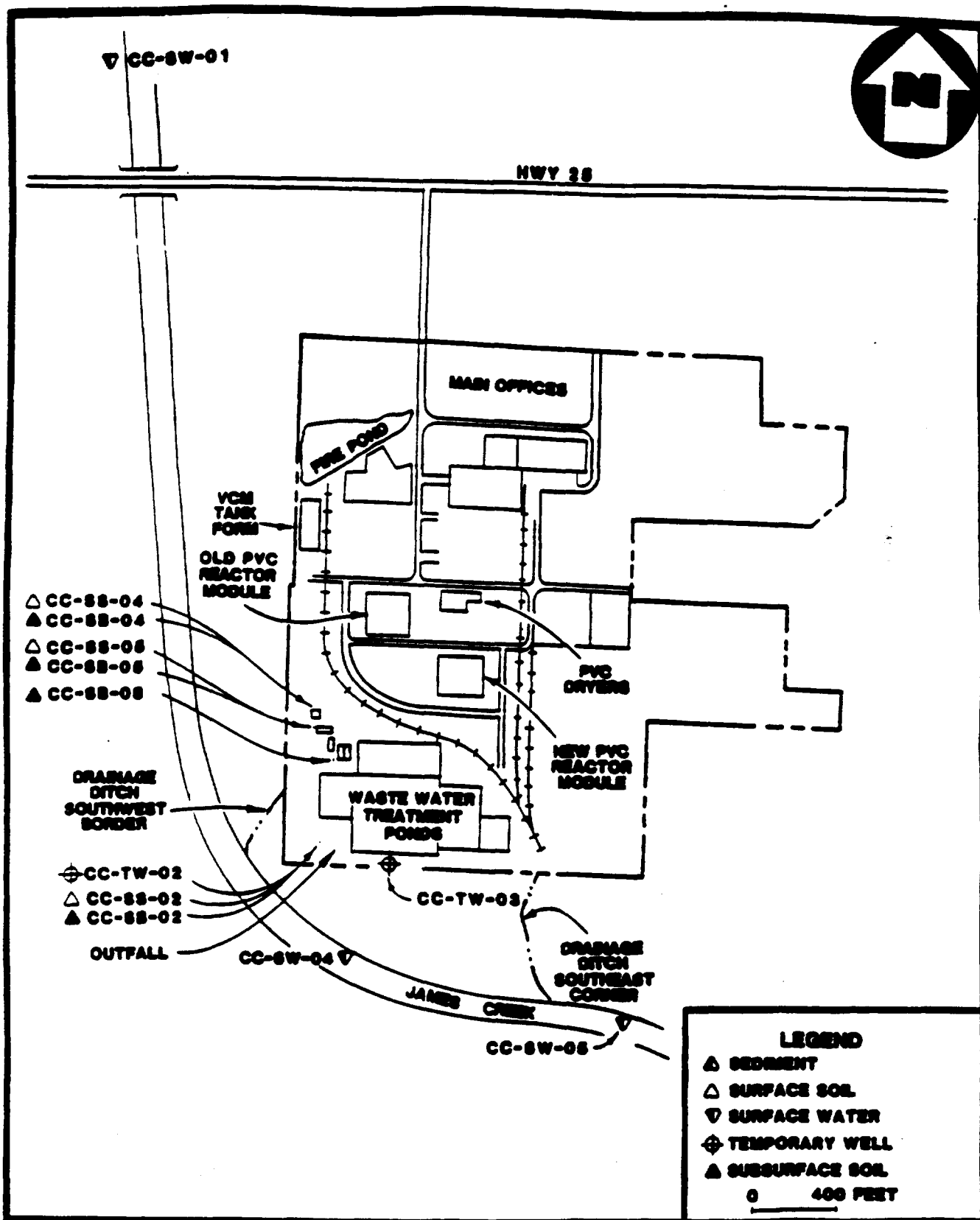
4.2.1 Methodology

Based upon the results from the geophysical survey, five soil samples were collected from the former landfill area. These samples were collected because of known prior disposal practices. A total of seven water samples were collected at random. These water samples were taken from nearby James Creek and from temporary wells near the wastewater treatment ponds on site. FASP sample locations are shown on Figure 3 and are described in Table 1.

Because the Photovac 10550 GC was only a back-up instrument for this project, the standard needed to calibrate the instrument was not available. The only preparation that was performed before samples were analyzed was to analyze a zero air blank and a preparation blank to determine whether the column, syringe and deionized water were free of volatile organic compounds.

The water samples were prepared for analysis by filling a volatile organic analysis (VOA) vial with approximately 30 milliliters of a water sample. The soil samples were prepared for analysis by filling a VOA vial half full with a soil sample and adding 20 milliliters of deionized water. The VOA sample

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**FIELD ANALYTICAL SUPPORT PROGRAM (FASP)
SAMPLE LOCATION MAP
CONOCO CHEMICALS
ABERDEEN, MONROE COUNTY, MISSISSIPPI**

TABLE 1

**FASP SAMPLE DESCRIPTIONS AND ANALYTICAL RESULTS
CONOCO CHEMICAL COMPANY**

Sample ID No.	Sample Type	Location/Rationale	Results
CC-SW-01	Surface Water	Offsite - Upstream/characterize background conditions	-
CC-SW-04	Surface Water	Offsite - Downstream/determine presence or absence of contaminants	-
CC-SW-05	Surface Water	Offsite - Downstream/determine presence or absence of contaminants	*
CC-PB-01	Groundwater	Offsite - Municipal well #4 and #6/determine presence or absence of contaminants	-
CC-PB-02	Groundwater	Offsite - Municipal well #4 and #6/determine presence or absence of contaminants	-
CC-TW-02	Groundwater	Onsite - Near outfall/determine presence or absence of contaminants	*
CC-TW-03	Groundwater	Onsite - South of largest lagoon near edge of property/determine presence or absence of contaminants	*
CC-SS-04	Surface Soil	Onsite - Near northern landfill #1/determine presence or absence of contaminants	*
CC-SS-05	Subsurface Soil	Onsite - Near northern landfill #1/determine presence or absence of contaminants	*
CC-SB-04	Surface Soil	Onsite - Near landfill #2/determine presence or absence of contaminants	*
CC-SB-05	Subsurface Soil	Onsite - Near landfill #2/determine presence or absence of contaminants	*
CC-SB-08	Subsurface Soil	Onsite - Former pond/determine presence or absence of contaminants	*

- No contamination detected
- * Contamination detected

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vials were shaken for approximately 1 minute then the gases in the head-space were allowed to reach equilibrium. The gases that collected in the head-space of the VOA vials were analyzed by injecting them into the Photovac 10550 GC with a syringe. The Photovac 10550 GC analyzed each sample and printed out the results. The complete methodology can be found in Appendix C.

4.2.2 Results of Field Screening

Since a calibration standard could not be analyzed before the samples were analyzed, the FASP results could only determine if there was contamination or no contamination present in the samples. Of the 12 samples analyzed, 8 samples were contaminated with volatile organics. The water samples analyzed indicated the presence of contamination. Sample CC-SW-05 indicated that contamination may be migrating off site into James Creek. There were also contaminants found in the two temporary well samples. The results of the analyses of the two temporary wells indicated contaminants may be present in the shallow aquifer. Analyses of the five soil samples indicated the presence of contamination. These samples were taken from the former landfill areas. Based on the FASP results, samples were recollected from all FASP sample locations, as well as several additional locations, for CLP analysis.

4.3 SAMPLE COLLECTION

4.3.1 Sample Collection Methodology

All sample collection, sample preservation, and chain-of-custody procedures used during this investigation were in accordance with the standard operating procedures as specified in Sections 3 and 4 of the Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual; United States Environmental Protection Agency, Region IV, Environmental Services, Division, April 1, 1986.

4.3.2 Duplicate Samples

Mr. Frank Jensen, Environmental Coordinator, accepted duplicate samples of all samples.

4.3.3 Description of Samples and Sample Locations

The purpose of this sampling investigation was to identify and characterize contaminants which may be present in the environment as a result of activities that were conducted at Conoco Chemicals.

Surface and subsurface soil samples were collected from potentially contaminated areas that were defined by the geophysical survey. Monitoring wells and temporary wells were sampled to determine if site-related constituents have migrated into the groundwater from the facility.

Thirty-six environmental samples were collected for the investigation: seven surface soil samples, eight subsurface soil samples, eight sediment samples and thirteen groundwater samples. Sample code descriptions and locations are contained in Table 2 and Figures 4 and 5.

4.3.4 Field Measurements

The pH, temperature and conductivity were measured and recorded for each water sample collected. These measurements, along with the date and time each sample was collected, are shown in Table 3.

4.4 SAMPLE ANALYSIS

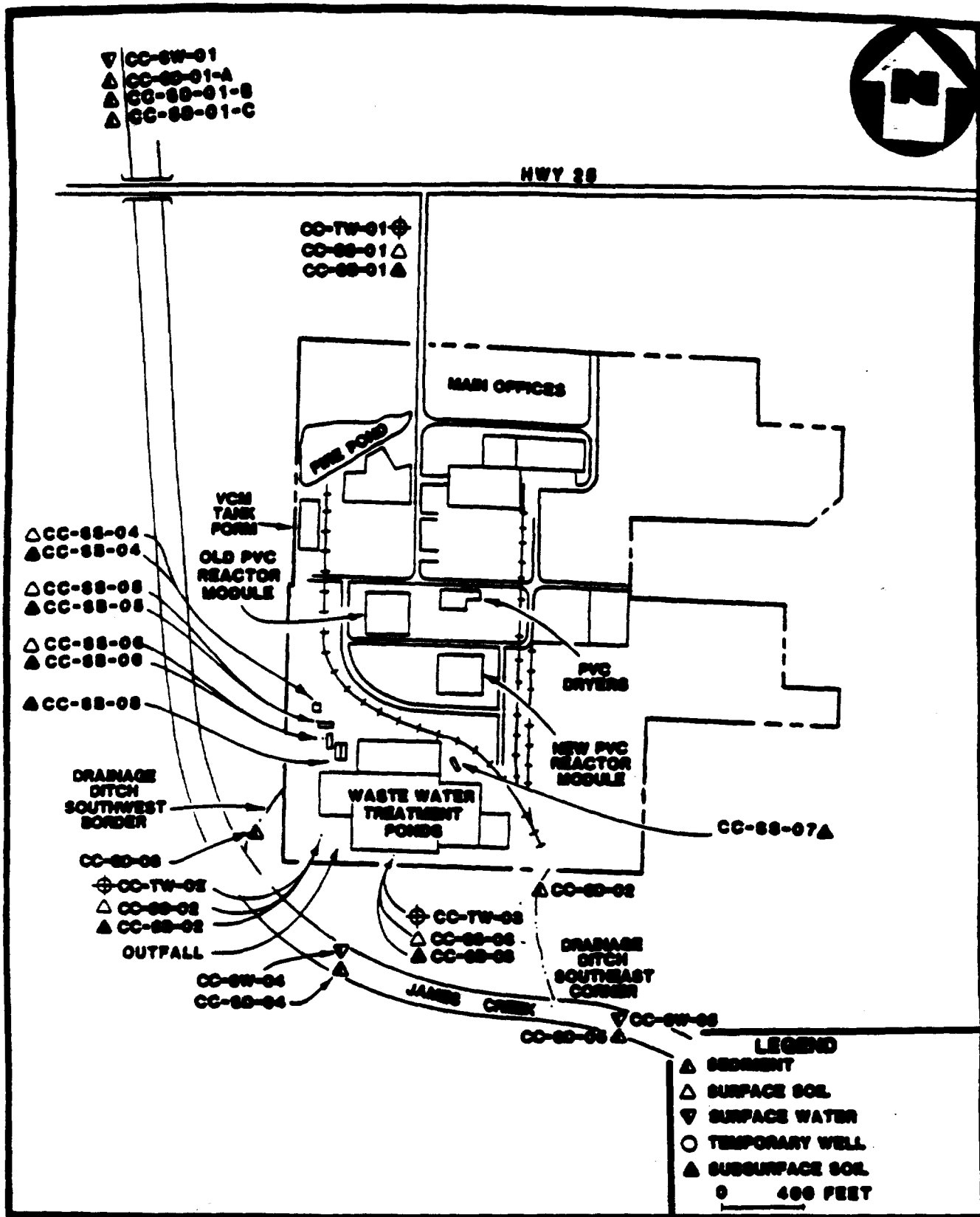
4.4.1 Analytical Support and Methodology

All samples collected were analyzed under the Contract Laboratory Program (CLP) and analyzed for all parameters listed in the Target Compound List (TCL). Organic analysis of soil and water samples was performed by PEI Associates, Cincinnati, Ohio and Pacific Analytical, Carlsbad, California. Inorganic analysis of soil and water was performed by RMAL, Arvada, Colorado.

All laboratory analyses and laboratory quality assurance procedures used during this investigation were in accordance with standard procedures and protocols as specified in the Analytical Support Branch Operations and Quality Assurance Manual, United States Environmental Protection Agency, Region IV, Environmental Services Division, revised June 1, 1985; or as specified by the existing United States Environmental Protection Agency standard procedures and protocols for the contract analytical laboratory program.

4.4.2 Analytical Data Quality

All analytical data were subjected to a quality assurance review as described in the EPA Environmental Services Division laboratory data evaluation guidelines. In the tables, some of the concentrations of the organic and inorganic parameters have been flagged with a "J". This indicates that the qualitative analysis was acceptable, but the quantitative value has been estimated. A few other compounds are flagged with an "N" indicating that they were detected based on the

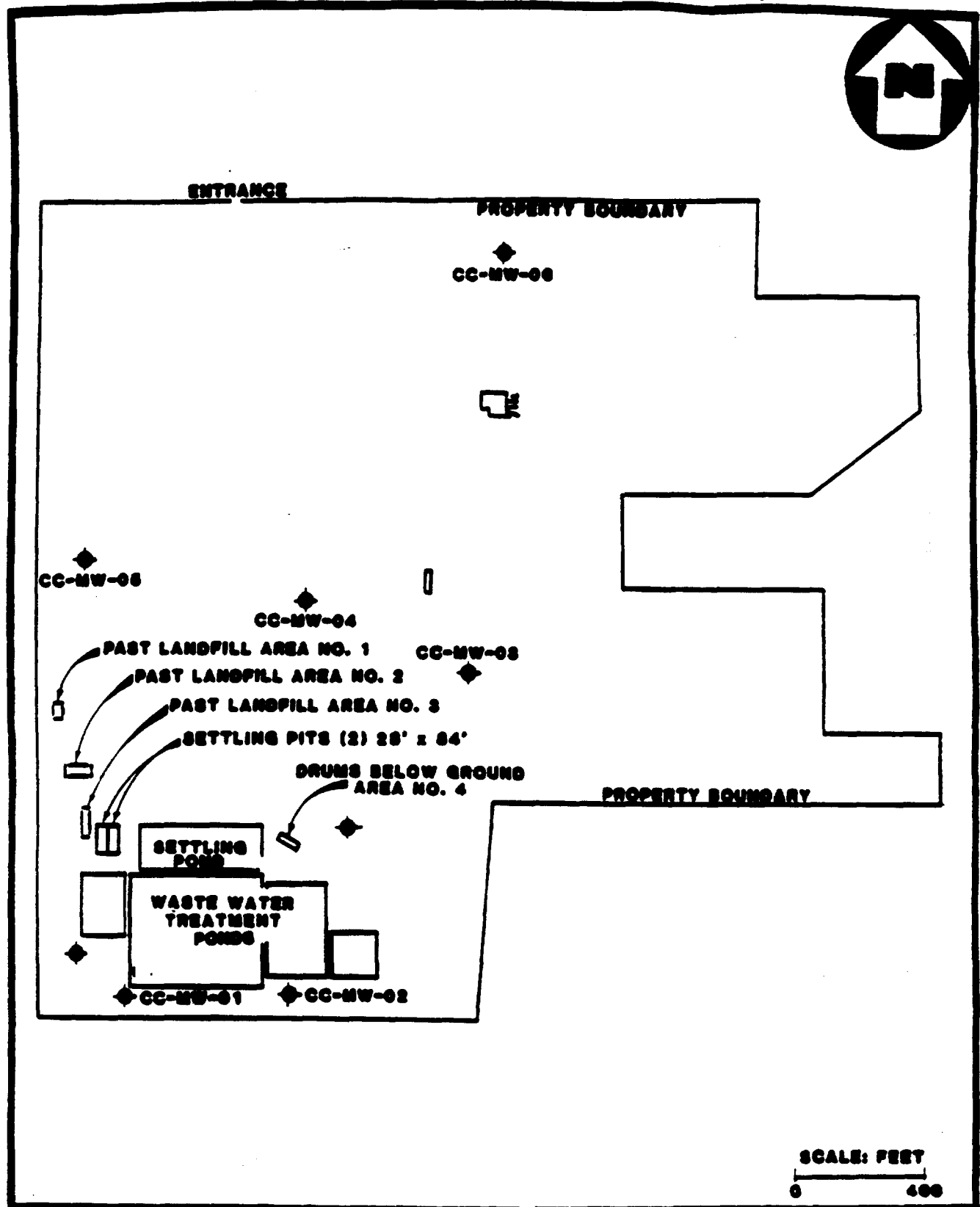


**CLP SAMPLE LOCATION MAP
CONOCO CHEMICALS
ABERDEEN, MONROE COUNTY, MISSISSIPPI**

FIGURE 4



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**EXISTING MONITORING WELL
SAMPLING LOCATIONS
CONOCO CHEMICALS
ABERDEEN, MISSISSIPPI**

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FIGURE 5



TABLE 2

**CLP SAMPLE CODES DESCRIPTIONS AND LOCATIONS
CONOCO CHEMICAL COMPANY
ABERDEEN, MONROE COUNTY, MISSISSIPPI**

Sample Code	Sample Type	Location/Rationale
CC-MW-01	Groundwater	Onsite/Characterize background conditions in southwest corner of test area
CC-MW-02	Groundwater	Onsite/Analysis used to characterize conditions in southeast
CC-MW-03	Groundwater	Onsite/Analysis used to characterize conditions in the east
CC-MW-04	Groundwater	Onsite from USGS well/determine presence or absence of contaminants
CC-MW-05	Groundwater	Onsite/Analysis used to characterize conditions in west area
CC-MW-06	Groundwater	Onsite/Analysis used to characterize conditions in north area
CC-TW-01 CC-SS-01 CC-SB-01	Groundwater Surface Soil Subsurface Soil	Onsite, upgradient/characterize background conditions in northwest
CC-TW-02 CC-SS-02 CC-SB-02	Groundwater Surface Soil Subsurface Soil	Onsite, near outfall/Determine presence or absence of contaminants
CC-TW-03 CC-SS-03 CC-SB-03	Groundwater Surface Soil Subsurface Soil	Onsite, south of largest lagoon near the edge of property/Determine presence or absence of contaminants
CC-PB-01 CC-PB-02	Groundwater Groundwater	Offsite, municipal well #4 and #6/Determine presence or absence of contaminants
CC-SW-01 CC-SD-01A CC-SD-01B CC-SD-01C	Surface Water Sediment Sediment Sediment	Offsite, upstream/Characterize background conditions
CC-SW-04 CC-SD-04	Surface Water Sediment	Offsite, downstream/Determine presence or absence of contamination
CC-SW-05 CC-SD-05	Surface Water Sediment	Offsite, downstream James Creek/Determine presence or absence of contamination

SAL 000021507

TABLE 2

**CLP SAMPLE CODES DESCRIPTIONS AND LOCATIONS
CONOCO CHEMICAL COMPANY
ABERDEEN, MONROE COUNTY, MISSISSIPPI**

Sample Code	Sample Type	Location/Rationale
CC-SS-04 CC-SB-04	Surface Soil Subsurface Soil	Onsite, near northern landfill #1/Determine presence or absence of contaminants
CC-SS-05 CC-SB-05	Surface Soil Subsurface Soil	Onsite, near landfill #2/Determine presence or absence of contaminants
CC-SS-06 CC-SB-06	Surface Soil Subsurface Soil	Onsite, west of landfill #3/Determine presence or absence of contamination
CC-SS-07 CC-SB-07	Surface Soil Subsurface Soil	Onsite, east of landfill #4/Determine presence or absence of contamination
CC-SB-08	Subsurface Soil	Onsite, former pond/Determine presence or absence of contaminants
CC-SD-02	Sediment	Onsite, drainage ditch on southeast/Identify contaminant migration
CC-SD-03	Sediment	Onsite, drainage ditch on western border/Identify contaminant migration

SAL 000021508

TABLE 3
FIELD MEASUREMENTS
CONOCO CHEMICAL COMPANY
ABERDEEN, MONROE COUNTY, MISSISSIPPI

Sample Code	Date	Time	pH	Temp. °C	Conductivity (umhos/cm)
CC-MW-01	2/9/89	1555	7.7	10	785
CC-MW-02	2/9/89	1640	7.6	10	785
CC-MW-03	2/9/89	1500	7.8	16	615
CC-MW-04	2/9/89	1815	7.9	14	1170
CC-MW-05	2/9/89	1535	8.2	15	565
CC-MW-06	2/9/89	1610	8.0	15	535
CC-TW-01	2/8/89	1025	6.1	8	118
CC-TW-02	2/8/89	1545	6.7	14	1820
CC-TW-03	2/8/89	1820	6.7	12	1050
CC-SW-01	2/8/89	1420	7.7	5	253
CC-SW-04	2/8/89	1155	8.1	9	389
CC-SW-05	2/8/89	1115	6.7	10	1700
CC-PB-01	2/9/89	0915	7.7	14	585
Cc-PB-02	2/9/89	0935	7.8	13	565

presumptive evidence of their presence. This means that the compound was tentatively identified, and its detection cannot be used as positive identification to its presence. The complete analytical data sheets are provided in Appendix D.

4.4.3 Presentation of Analytical Results

The following sections present a discussion of the analytical results from the environmental samples collected during the investigation at Conoco Chemicals. The results of the soil and sediment samples are summarized in Tables 4-4 through 4-9. Groundwater and surface water results are summarized in Tables 4-10 through 4-17. Supporting data are presented in Appendix D.

4.4.3.1 Soil Samples

Seven surface soils samples were collected and analyzed. Inorganic analytical results show chromium and barium at elevated levels in most surface soil samples, and lead at an estimated value of 450 mg/kg is CC-SS-04 (Table 4).

Organic results show elevated levels of di-n-octylphthalate and bis (2-ethylhexyl) phthalate contamination in surface soil sample CC-SS-04 and CC-SS-05, which were collected on site in the vicinity of former landfills #1 and #2. Organic analytical results show small concentrations of ethylbenzene, phenanthrene and fluoranthene. All of the contaminants found in CC-SS-04 are at estimated values (Table 5). Slight organic contamination was also detected in CC-SS-03 and CC-SS-06.

Eight subsurface soil samples were collected and analyzed. Inorganic analytical results indicate no significant onsite contamination (Table 6).

Organic results show some onsite contamination in subsurface samples CC-SB-06 through CC-SB-08. Samples CC-SB-06 was collected west of former landfill #3, CC-SB-07 was collected east of former landfill #4, and CC-SB-08 was collected from a former pond on site. Each sample contained elevated levels of bis (2-ethylhexyl) phthalate, and samples CC-SB-07 and CC-SB-08 contained elevated levels of di-n-octylphthalate. CC-SB-08 and contain concentrations of chloroethane. Other contaminants found in sample CC-SB-07, such as vinyl chloride and fluoranthene, are at estimated values. The organic contaminants can be attributed to known disposal practices conducted at the facility (Table 7).

TABLE 4

**SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (mg/kg)	Background	Onsite					
	CC-SS-01	CC-SS-02	CC-SS-03	CC-SS-04	CC-SS-05	CC-SS-06	CC-SS-07
ALUMINUM	3600	20000	10000	13000	9300	10000	7300
ARSENIC	5.2	12	13	4.7	-	4.9	3.1
BARIUM	27	140	71	92	56	67	-
BERYLLIUM	-	18	-	-	-	-	-
CALCIUM	780	22000	6000	5600	3100	4500	5600
CHROMIUM	8	24	19	26	16	16	9.1
COBALT	2.2	8.7	5.6	6.5	2.9	8.3	6.7
IRON	6700J	27000J	16000J	18000J	13000J	16000J	11000J
LEAD	14J	16J	8.9J	460J	5J	8.8J	8.7J
MAGNESIUM	250	1900	1200	1100	1200	900	880
MANGANESE	220J	460J	240J	320J	130J	430J	280J
NICKEL	-	17	5.3	5.8	2	4.7	1.9
POTASSIUM	-	1100	590	860	1100	500	-
VANADIUM	13	56	32	39	22	32	20
ZINC	-	58	56	33	-	23	-

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value

SAL 000021511

TABLE 5

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE SOIL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI

PARAMETERS (ug/kg)	Background	Onsite					
	CC-SS-01	CC-SS-02	CC-SS-03	CC-SS-04	CC-SS-05	CC-SS-06	CC-SS-07
PURGEABLE COMPOUNDS							
ETHYL BENZENE	-	-	-	4J	-	-	-
UNIDENTIFIED COMPOUNDS/NO	-	-	3000J/2	-	-	70J/1	-
EXTRACTABLE COMPOUNDS							
PHENANTHRENE	-	-	84J	90J	-	-	-
FLUORANTHENE	-	-	110J	78J	-	170J	-
BIS (2-ETHYLHEXAL) PHTHALATE	-	-	-	64000	6700	-	-
DI-N-OCTYLPHTHALATE	-	-	-	2300	780J	-	-
CARYOPHYLLENE	300J/N	-	-	-	-	-	-
UNIDENTIFIED COMPOUNDS/NO	7000J/2	4000J/2	3000J/2	2000000J/9	1000J/1	1000J/1	800J/1
PESTICIDE/PCB COMPOUNDS							

- Material analyzed for but not detected above minimum quantitation limit

J Estimated value

N Presumptive evidence of presence of material

SAL 000021512

TABLE 6

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI

PARAMETERS	Background	Onsite							
	CC-SB-01	CC-SB-02	CC-SB-03	CC-SB-04	CC-SB-05	CC-SB-06	CC-SB-07	CC-SB-08	
ALUMINUM	9100	8400	20000	16000	11000	11000	5300	2600	
ARSENIC	32	31	38	45	-	27	51	-	
BARIUM	43	85	130	100	62	100	-	-	
BERYLLIUM	-	-	14	-	-	-	-	-	
CADMIUM	-	-	-	-	-	-	-	27	
CALCIUM	-	4700	18000	1200	1800	7200	3400	2200	
CHROMIUM	14	21	43	21	18	21	11	69	
COBALT	-	24	51	68	-	46	32	-	
IRON	15000J	11000J	23000J	19000J	9300J	21000J	13000J	3300J	
LEAD	54J	99J	11J	13J	88J	19J	24J	57J	
MAGNESIUM	670	1100	1900	1200	950	1300	640	460	
MANGANESE	190J	45J	190J	340J	36J	410J	120J	42J	
MERCURY	-	-	-	-	-	-	-	13J	
NICKEL	-	65	14	74	37	55	23	48	
POTASSIUM	590	790	1100	780	850	450	-	-	
VANADIUM	27	18	52	39	24	34	25	-	
ZINC	-	31	55	29	-	30	-	-	

- J Material analyzed for but not detected above minimum quantitation limit
Estimated value

SAL 000021513

TABLE 7

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SUBSURFACE SOIL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI

PARAMETERS (ug/kg)	Background	Onsite						
	CC-SB-01	CC-SB-02	CC-SB-03	CC-SB-04	CC-SB-05	CC-SB-06	CC-SB-07	CC-SB-08
PURGEABLE COMPOUNDS								
VINYL CHLORIDE	-	-	-	-	-	-	12/J	-
CHLOROETHANE	-	-	-	-	-	-	-	29
UNIDENTIFIED COMPOUNDS/NO	20/J/1	-	-	200/J/2	-	-	-	20/J/1
EXTRACTABLE COMPOUNDS								
FLUORANTHENE	-	-	-	-	-	-	120/J	-
BIS(2-ETHYLHEXYL) PHTHALATE	-	-	-	-	-	29000	58000	1900000
DI-N-OCTYL PHTHALATE	-	-	-	-	-	1700	-	160000
PROPENYLBENZENE	-	-	-	-	-	-	-	50000/JN
BIS(DIMETHYLETHYL)METHYLPHENOL	-	-	-	-	-	-	-	60000/JN
UNIDENTIFIED COMPOUNDS/NO	-	-	4000/J/2	800/J/1	-	6000/J/5	10000/J/9	800000/J/6
PESTICIDE/PCB COMPOUNDS								

- Material analyzed for but not detected above minimum quantitation limit

J Estimated value

N Presumptive evidence of presence of material

SAL 000021514

4.4.3.2 Sediment Samples

Seven sediment samples were collected and analyzed. Inorganic analytical results show some onsite contamination in samples CC-SD-02 and CC-SD-04. Sample CC-SD-02 was collected from a drainage ditch on the southeast portion of the property. Sample CC-SD-04 was collected downstream of the facility from James Creek. Each sample contained levels of chromium, over three times the background concentration (Table 8).

Organic results show some offsite contamination in background sample CC-SD-01B, which was collected upstream of the facility from James Creek. Sample CC-SD-01B contained levels of (3- and/or 4-methylphenol and fluoranthene. Samples CC-SD-04 and CC-SD-05 contained estimated levels of di-n-octylphthalate. Sample CC-SD-05 was collected from the outfall of the wastewater treatment system located at the southeast corner of the property leading into James Creek.

4.4.3.3 Groundwater Samples

Six monitoring wells were sampled and analyzed. Locations of these wells are shown in Figure 5. Inorganic analytical results show some onsite contamination in samples CC-MW-02 through CC-MW-04. Sample CC-MW-02 was collected from a well in the southeast portion of the property. Sample CC-MW-04 was collected from the USGS well, which is located inside of a processing building. The building is located in the centermost portion of the property. Sample CC-MW-04 contained a trace amount of mercury (Table 10).

Organic results show onsite contamination in groundwater samples CC-MW-02 and CC-MW-04. Sample CC-MW-02 contained elevated levels of bis (2-ethylhexyl) phthalate (54 ug/l). Sample CC-MW-04 contained elevated levels of toluene (44 ug/l) (Table 11).

Three temporary wells were installed and sampled and analyzed (Figure 4). Inorganic analytical results show onsite contamination in samples CC-TW-02 and CC-TW-03. Sample CC-TW-02 was taken from the southeast section of the property near the outfall. Sample CC-TW-03 was taken south of the largest lagoon near the edge of the property. Both samples contained elevated chromium concentrations (Table 12).

Organic results of the temporary well samples show little onsite contamination. Sample CC-TW-02 contained toluene at 6 ug/l (Table 13).

SAL 000021515

TABLE 8

SUMMARY OF INORGANIC ANALYTICAL RESULTS
SEDIMENTS SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI

PARAMETERS (mg/kg)	Upstream			Onsite		Downstream	
	CC-SD-01A	CC-SD-01B	CC-SD-01C	CC-SD-02	CC-SD-03	CC-SD-04	CC-SD-05
ALUMINUM	3300	8200	8200	9800	7400	11000	9400
ARSENIC	-	-	41	65	38	42	34
BARIUM	24	-	77	86	48	91	89
CALCIUM	-	1700	-	63000	7500	7100	5200
CHROMIUM	77	18	16	29	17	25	19
COBALT	22	29	-	52	39	59	33
IRON	4700J	13000J	15000J	17000J	15000J	16000J	13000J
LEAD	67J	27J	6J	13J	83J	11J	11J
MAGNESIUM	250	560	1200	6500	1200	1400	1100
MANGANESE	110J	230J	190J	300J	210J	340J	240J
MERCURY	-	-	-	-	-	0.6J	-
NICKEL	-	38	26	81	38	89	5
POTASSIUM	-	610	920	730	740	1000	800
VANADIUM	-	28	22	35	26	30	29
ZINC	-	39	24	50	25	40	33

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value

SAL 000021516

TABLE 9

SUMMARY OF ORGANIC ANALYTICAL RESULTS
SEDIMENT SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI

PARAMETERS (ug/kg)	Upstream			Onsite		Downstream	
	CC-SD-01A	CC-SB-01B	CC-SD-01C	CC-SD-02	CC-SD-03	CC-SD-04	CC-SD-05
PURGEABLE COMPOUNDS							
BICYCLOHEPTANE		20JN					
UNIDENTIFIED COMPOUNDS/NO	80J/1					300J/2	
EXTRACTABLE COMPOUNDS							
3-AND/OR 4-METHYLPHENOL		610J					
PHENANTHRENE							
FLUORANTHENE		210J					
DI-N-OCTYLPHTHALATE						520J	180J
PINENE		4000JN					
LIMONENE		1000JN					
CARYOPHYLLENE		600JN					
UNIDENTIFIED COMPOUNDS/NO	3000J/2	50000J/12	2000J/2	90000J/4	5000J/4	7000J/4	2000J/1
PESTICIDE/PCB COMPOUNDS							

- Material analyzed for but not detected above minimum quantitation limit

J Estimated value

N Presumptive evidence of presence of material

SAL 000021517

TABLE 10

**SUMMARY OF INORGANIC ANALYTICAL RESULTS
MONITORING WELL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Upgradient	Downgradient				
	CC-MW-01	CC-MW-02	CC-MW-03	CC-MW-04	CC-MW-05	CC-MW-06
ALUMINUM	-	5500J	-	-	-	-
ARSENIC	-	16	-	-	-	-
BARIUM	370	600	190	310	130	140
CALCIUM	72000	74000	31000	48000	23000	25000
CHROMIUM	9	33	-	8	-	-
COBALT	-	7	-	-	-	-
IRON	3600J	35000J	-	12000J	-	-
LEAD	-	21	-	22	-	-
MAGNESIUM	16000	16000	6500	11000	4700	4700
MANGANESE	180	830	130	350	92	160
MERCURY	-	-	-	1	-	-
POTASSIUM	8600	13000	6400	89	5300	5600
SODIUM	21000	25000	47000	34000	52000	48000
ZINC	-	-	-	330J	-	-

- Material analyzed for but not detected above minimum quantitation limit
J Estimated value

SAL 000021518

TABLE 11

**SUMMARY OF ORGANIC ANALYTICAL RESULTS
MONITORING WELL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Upgradient	Downgradient				
	CC-MW-01	CC-MW-02	CC-MW-03	CC-MW-04	CC-MW-05	CC-MW-06
PURGEABLE COMPOUNDS						
TOLUENE	9	5	3J	44	-	-
EXTRACTABLE COMPOUNDS						
BIS(2-ETHYLHEXYL) PHTHALATE	-	54	-	-	-	-
IMIDAZOLIDINETHIONE	-	-	-	20JN	-	-
UNIDENTIFIED COMPOUNDS/NO.	100J/3	700J/6	-	2000J/7	-	-
PESTICIDE/PCB COMPOUNDS						

- Material analyzed for but not detected above minimum quantitation limit
 J Estimated value
 N Presumptive evidence of presence of material

SAL 000021519

TABLE 12

**SUMMARY OF INORGANIC ANALYTICAL RESULTS
TEMPORARY WELL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Background	Onsite	
	CC-TW-01	CC-TW-02	CC-TW-03
ALUMINUM	12000J	14000J	57000J
BARIUM	150	230	640
CALCIUM	6500	200000	110000
CHROMIUM	-	36	110
COBALT	-	-	26
IRON	14000J	11000J	96000J
LEAD	7	5	27
MAGNESIUM	2500	10000	10000
MANGANESE	420	350	1900
NICKEL	-	6	52
POTASSIUM	2900	-	4000
SODIUM	-	82000	71000
VANADIUM	25	41	160

- material analyzed for but not detected above minimum quantitation limit
- J Estimated value

SAL 000021520

TABLE 13

**SUMMARY OF ORGANIC ANALYTICAL RESULTS
TEMPORARY WELL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Background	Onsite	
	CC-TW-01	CC-TW-02	CC-TW-03
PURGEABLE COMPOUNDS			
TOLUENE	-	6	-
EXTRACTABLE COMPOUNDS			
DIMETHYLBENZENEMETHANOL	-	60JN	-
METHYETHENYBENZENE	-	-	20JN
PETROLEUM PRODUCT	-	-	-
UNIDENTIFIED COMPOUNDS/NO	-	30J/1	-
PESTICIDE/PCB COMPOUNDS			

- Material analyzed for but not detected above minimum quantitation limit
- J Estimated value
- N Presumptive evidence of presence of material

SAL 000021521

Two municipal wells were sampled and analyzed. Inorganic analytical results show some contamination in samples CC-PB-01 and CC-PB-02. Sample CC-PB-01 was collected from municipal well #4, which is located 4,000 feet northeast of the facility. CC-PB-02 was collected from municipal well #6, which is located 2.5 miles north of the facility. Both samples contained elevated levels of barium and manganese. None of the inorganic contaminants can presently be attributed to known disposal practices conducted at the site (Table 14). Organic results showed a trace of toluene present in CC-PB-02 (Table 15).

4.4.3.4 Surface Water Samples

Three surface water samples were collected and analyzed. Inorganic analytical results showed no significant contamination in samples CC-SW-01, CC-SW-04 and CC-SW-05. Samples CC-SW-01 was collected upstream of the facility from James Creek. CC-SW-04 and CC-SW-05 were collected downstream of the facility from James Creek (Table 16).

Organic results show offsite contamination in surface water sample CC-SW-05. Sample CC-SW-05 contained concentrations vinyl chloride (26 ug/l) and di-n-octylphthalate (16 ug/l) as well as trace amounts of endosulfan II (Beta) (Table 17).

TABLE 14

**SUMMARY OF INORGANIC ANALYTICAL RESULTS
PUBLIC WELL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Upgradient	Downgradient
	CC-PB-01	CC-PB-02
BARIUM	110	75
CALCIUM	22000	14000
MAGNESIUM	4400	2800
MANGANESE	67	49
POTASSIUM	4800	4300
SODIUM	52000	72000

- Material analyzed for but not detected above minimum
quantitation limit

SAL 000021523

TABLE 15

**SUMMARY OF ORGANIC ANALYTICAL RESULTS
PUBLIC WELL SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Upgradient	Downgradient
	CC-PB-01	CC-PB-02
PURGEABLE COMPOUNDS		
TOLUENE	-	7
EXTRACTABLE COMPOUNDS		
BIS(DIMETHYLETHYL)PHENOL	-	30JN
HYDROXYPHENYLETHANONE	-	-
PETROLEUM PRODUCT	-	N
UNIDENTIFIED COMPOUNDS/NO.	-	100J/4
PESTICIDE/PCB COMPOUNDS		

- Material analyzed for but not detected above minimum quantitation limit
- J Estimated value
- N Presumptive evidence of presence of material

SAL 000021524

TABLE 16

**SUMMARY OF INORGANIC ANALYTICAL RESULTS
SURFACE WATER SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Upstream	Downstream	
	CC-SW-01	CC-SW-04	CC-SW-05
ALUMINUM	1700J	960J	-
BARIUM	32	43	150
CALCIUM	39000	35000	25000
IRON	1500J	1000J	-
MAGNESIUM	1400	1600	4500
MANGANESE	27	49	63
POTASSIUM	-	2000	6200
SODIUM	-	25000	240000
VANADIUM	5	-	-

- Material analyzed for but not detected above minimum quantitation limit
- J Estimated value

SAL 000021525

TABLE 17

**SUMMARY OF ORGANIC ANALYTICAL RESULTS
SURFACE WATER SAMPLES
CONOCO CHEMICALS COMPANY
ABERDEEN, MISSISSIPPI**

PARAMETERS (ug/l)	Upstream	Downstream	
	CC-SW-01	CC-SW-04	CC-SW-05
PURGEABLE COMPOUNDS			
VINYL CHLORIDE	-	-	26
METHYLBUTANOL	-	-	40JN
DIMETHYLPENTANOL	-	-	10JN
EXTRACTABLE COMPOUNDS			
(3-AND/OR 4-)METHYLPHENOL	-	NA	-
PHENANTHRENE	-	NA	-
FLUORANTHENE	-	NA	-
BIS(2-ETHYLHEXYL) PHTHALATE	-	NA	-
DI-N-OCTYLPHTHALATE	-	NA	16
METHYLETHYLIDENEBISPHENOL	-	-	900JN
BENZENEDICARBOXYLIC ACID	-	-	30JN
HYDROXYPHENYLETHANONE	-	-	30JN
UNIDENTIFIED COMPOUNDS/NO.	-	-	100J/5
PESTICIDE/PCB COMPOUNDS			
ENDOSULFAN II (BETA)	-	NA	0.26

- Material analyzed for but not detected above minimum quantitation limit
- J Estimated value
- N Presumptive evidence of presence of material

SAL 000021526

5.0 SUMMARY

The field investigation conducted at Conoco Chemical Company consisted of three steps. The first step consisted of a geophysical screening of the former landfills on the property to detect anomalous areas of high resistivity. Once these areas were identified, the second part, which involved field analytical screening by FIT 4 the FASP Team, was conducted. Random samples were collected and analyzed to help select the most efficient CLP sample locations. Step three consisted of environmental sampling for CLP analysis. A total of 36 environmental samples were collected.

Analytical results of samples collected during the field investigation indicate subsurface soil contamination on site. Surface and subsurface soil samples collected from former landfill areas show extremely elevated concentrations of bis (2-ethylhexyl) phthalate and di-n-octylphthalate. This contamination can be attributed to former disposal practices into onsite landfills.

Four migration pathways are of concern for Conoco Chemical Company: the groundwater, surface water, air, and onsite exposure pathways.

The groundwater route is the primary pathway of concern. Toluene was found in two wells and bis (2-ethylhexyl) phthalate was found in one well at concentrations more than three times the detection limits. These analytical results constitute an "observed release" of contamination to groundwater in the shallow aquifer underlying the facility. Approximately 250 private wells are completed in this aquifer within 4 miles of the facility.

The surface water route is also a pathway of concern. Analytical results show an "observed release" vinyl chloride in a sample collected from James Creek. This indicates that contamination is attributable to the facility and is migrating off site via surface water runoff. James Creek flows adjacent to Conoco Chemical into the Tombigbee River, 2600 feet away. The Tombigbee River is used for fishing and boating as well as a major waterway.

The air and onsite exposure routes are also considered possible pathways due to the presence of significantly contaminated surface soils. Both potential exposure pathways are of concern since the facility is situated near a residential area. Approximately 2271 people live within 1 mile and 7,184 people reside within 4 miles of the facility. Although access to the public is restricted, 250 workers are currently employed at the facility.

SAL 000021527

Because of the significant contamination present at the facility and the presence of numerous targets that could be affected by this contamination, FIT 4 recommends that Phase I of a Listing Site Inspection be initiated.

SAL 000021528

REFERENCES

1. National Pollutant Discharge Elimination System Permit Application (No. MS00D1970) and attached Schematic of Water Flow for Conoco Chemicals Company, Aberdeen, Mississippi, September 28, 1979.
2. Jim Hardage, Mississippi Department of Natural Resources, Bureau of Pollution Control, memo to file, February 16, 1983. Subject: meeting with Conoco, Aberdeen Officials.
3. Melanie Rish, memo to file, March 8, 1986. Subject: Conoco Corporation/Vista Polymer Company, Aberdeen, Mississippi, 39730.
4. U.S. Geological Survey, 7.5 minute series Topographic Quadrangle Maps of Mississippi: Prairie 1966 (Photorevised 1982), Aberdeen 1966 (Photorevised 1982), Armory Southwest 1966 (Photorevised 1982), scale 1: 24,000.
5. NUS Corporation, Field Logbook No. F4-777 for Conoco Chemicals Company, Monroe County, Mississippi, TDD No. F4-8804-06, April 12, 1988.
6. Organics Analysis Data Sheet - Analysis of Waters received on November 17, 1983 from Mississippi Bureau of Pollution Control. Analysis performed by Mississippi State University, December 16, 1983. Department of Natural Resources; Analysis No. 677, 719, 677, 720.
7. United States Bureau of Census, Dallas Regional Census Center, telephone conversation with Kelvin A. Davis, NUS Corporation, January 17, 1990. Subject: Population of Aberdeen, Mississippi.
8. Sarah Poss, Monroe County Schools, Superintendent Office, telephone conversation with Kelvin A. Davis, NUS Corporation, September 25, 1989. Subject: Aberdeen Public Schools.
9. U.S. Environmental Protection Agency, Graphical Exposure Modeling System (GEMS) Data Base, compiled from U.S. Bureau of the Census data (1980).

10. NUS Corporation, Field Logbook No. F4-1234 for Conoco Chemicals Company, Monroe County, Mississippi, TDD No. F4-8901-64.
11. U.S. Department of Commerce, Rainfall Frequency Atlas of the United States, Technical Paper Number 40 (Washington, D.C.: GPO, 1963).
12. U.S. Department of Commerce, Climatic Atlas of the United States (Washington, D.C.: GPO, June 1968) Reprint: 1983, National Oceanic and Atmospheric Administration.
13. F. Vestal, "Monroe County Mineral Resources," Bulletin 57, (University, Mississippi: Mississippi State Geological Survey, 1943), pp. 15-28.
14. L. Stephenson and W. Monroe, The Upper Cretaceous Deposits, Bulletin 40 (Mississippi State Geological Survey, 1959).
15. L.A. Gandl, Characterization of Aquifers Designated as Potential Drinking Water Sources in Mississippi, (U.S. Geological Survey, Mississippi Department of Natural Resources, Bureau of Pollution Control, 1982).
16. Robert Ashley, Aberdeen Water Plant, telephone conversation with Kelvin A. Davis, NUS Corporation, August 10, 1989. Subject: Customers and municipal wells.
17. Robert Ashley, Aberdeen Water Plant, telephone conversation with Jeff Myers, NUS Corporation, September 30, 1988. Subject: Private wells and surface water use in Aberdeen area.

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