SITE INSPECTION PRIORITIZATION (SIP) REPORT
VERTAC CHEMICAL CORPORATION
MSD990714081
VICKSBURG, WARREN COUNTY, MISSISSIPPI

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL
HAZARDOUS WASTE DIVISION
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TABLE OF CONTENTS

INTRODUCTION

The Mississippi Department of Environmental Quality, Office of Pollution Control (MS OPC), has conducted a Site Inspection Prioritization (SIP) of the Vertac Chemical Corporation, presently Vicksburg Chemical Company, facility located approximately one mile south of Vicksburg, Warren County, Mississippi. The SIP 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 facility consist of two plants, North Plant and South Plant, and is located on about 120 acres of the 600 acres owned by the company. Location of the facility is Latitude 32° 17' 45" North, Longitude 90° 54' 15" West; Sections 3, 4, 5, 9, and 10 Township 15 North, Range 3 East, Warren County, Mississippi (Reference 3).

BACKGROUND (Reference 4d)

The facility is a chemical production plant located near Vicksburg, Mississippi. It is separated into two sections known as the South Plant and the North Plant. The facility originally started under two separate ownerships. The South Plant began operations in approximately 1954 as Spencer Chemical Company. In 1964, Spencer was purchased by Gulf Oil. The North Plant was established in 1961 by Southwest Potash. In 1972, the two plants were purchased and merged by Vicksburg Chemical Company. Vicksburg Chemical was bought out by Vertac Chemical Corporation in 1975 which was taken over by the holding company, Dyticon, Inc., in 1978. The facility underwent a structural reorganization in 1986, when it became known as Cedar Chemical Corporation. This corresponded to the purchase of the business from Dyticon, Inc., by Fermenta A.B. of Sweden. The business again changed ownership in 1988 when Trans Resources bought portions of the facility. In a reorganization by Cedar Chemical Corporation the facility once again became Vicksburg Chemical Company as of January 1, 1993 (Reference 4f). A small part of the South Plant is referred to as the Perkins Company or Former Gulf Formaldehyde Plant and is owned by Borden.

When the South Plant began operating the main products were nitric acid, ammonia, unspecified fertilizers, and ammonium nitrate. The main products from the original North Plant were potassium nitrate and chlorine. In 1973, production of the pesticides Atrazine, Toxaphene, and Dinoseb began at the South Plant. Production of Atrazine continued until approximately 1979 and Toxaphene until 1982. Dinoseb was produced until 1986.

The Toxaphene facility was also used for the production of diethylhexyl phosphoric acid (DEHPA) and 2-ethyl-hexyl nitrate (EHN). DEHPA was produced in six-week runs in 1978, 1984, and 1985. EHN was produced for approximately two months in 1984. Methyl parathion was also produced at the South Plant until approximately 1978 when the facility was damaged by a large explosion and fire.

In 1983 the former methyl parathion facility was converted into a facility for the production of the arsenic herbicide monosodium methanearsonate (MSMA). This facility was also capable of producing disodium methanearsonate and sodium cacodylate. MSMA production continued until some time in 1984. The South Plant has also produced dimethyl urea, isopropyl amine, dinitro-ortho-cresol, Cyanazine, UNIHIB, and the intermediates, sulfonated ortho-sec-butyl phenol and diethylhexyl phosphochloridate.

Currently, the North Plant is involved in fertilizer manufacturing activities and produces potassium nitrate, chlorine, and nitrogen tetroxide. The South Plant is currently only producing nitric acid for consumption at the North Plant.

The facility has had two recorded releases. On March 7, 1978, a 10,000-gallon storage tank of methyl parathion exploded, triggering the explosion of three hundred to four hundred 55-gallon drums, the burning of a storage structure, and the burning of a sodium-nitrophenol warehouse.

On February 5, 1983, a dike on one of the three surface impoundments located at the South Plant failed, releasing approximately 700,000 gallons of wastewater into an adjacent bayou (Stout's Bayou).

WASTE CHARACTERISTICS

The areas of major concern at the South Plant consist of the three unlined surface impoundments and an unlined landfill. The three impoundments had an area of about 3.9 acres and a depth of 10 to 15 feet. The impoundments operated from 1955 until their closure in, and after, 1990. During their time of operation they received wastewater containing Toxaphene, Dinoseb, Atrazine, MSMA, and methyl parathion. At present the impoundments receive stormwater from the South Plant; wastewater from the North Plant that does not meet the facility's NPDES discharge requirements; and backwash from the Carbon Absorption System (Reference 4d, pp. 47-49).

The unlined landfill, covering approximately 2 to 3 acres, consisted of a disposal area used to contain discarded drums and five unlined pits. One of the pits had been used in an attempt to dissolve the waste drums with hydrochloric acid (HCl). The landfill received over time at least 4,000 empty Dinoseb formulation drums; residue and debris from the methyl parathion fire; 172 drums of hydrolyzed cyanuric acid from the production of Atrazine; 17 drums of spent activated carbon; 25 drums of dimethyl urea and isopropyl amine; 31 drums of sodium nitrophenol liners and empty bromine bottles; 80 drums of phosphorous trichloride, phosphorous sulfo chloride, and dimethyl phosphorous sulfochloride.

Three pits received sediment from the South Plant Surface Impoundments consisting of soil and Dinoseb. One pit received 200,000 gallons of Dinoseb wastewater. Another pit was used to neutralize empty Dinoseb drums with HCl. The wastes disposed in the landfill prior to 1975 were not recorded. In the early 1980's a large number of drums were reportedly removed and transferred offsite to a hazardous waste landfill. The landfill was subject to a non-RCRA type closure consisting of clay capping and vegetative cover (Reference 4d, pp. 45, 46).

In the North Plant area is an inactive unlined surface impoundment. The impoundment was used to neutralize the acidic effluent from the North Plant including process water from the production of potassium nitrate, nitrogen tetroxide, and chlorine; in addition, the impoundment also received rainwater and boiler and cooling tower blowdowns from the potassium nitrate plant (Reference 4d, pp. 78, 79).

REGULATORY HISTORY

RCRA HISTORY (Reference 4d)

The company submitted Part A of its hazardous waste permit application on November 18, 1980, thus gaining interim status. The Notification of Hazardous Waste Activity had been submitted previously on June 23, 1980. In the Part A Application, the company registered as a treatment, storage, and disposal facility (TSD) producing potassium nitrate and pesticides - dinobutyl phenol (Dinoseb) and Toxaphene.

A revised Part A Permit Application was submitted in September 1981. On August 10, 1983, the company submitted its Part B Permit Application, along with another modified Part A. The modifications to the company's Part A referred to the listing of units and waste streams at the facility. The facility's Part B Permit Application was found to be deficient with respect to closure, post-closure and groundwater monitoring plans. After five revisions, another Part B Application was submitted on June 18, 1985. Once again the application was found to be deficient in the areas of closure and post-closure plans, contingency plans, and groundwater monitoring plans.

On July 31, 1986, the facility was formally denied a RCRA permit and was required to submit a closure/post-closure plan or to amend the plan in the application to meet the specifications of the Mississippi Hazardous Waste Management Regulations (MHWMR), Part 265 within 15 days.

There have been numerous contacts with MS OPC regarding compliance with the MHWMR, along with numerous inspections of the facility (Reference 4d, p. 20). Beginning in 1980, the company was issued Commission Order No. 520-80 requiring compliance with NPDES Permit

No. MS0027995. In 1982, the company was issued Commission Order No. 599-82 in an effort to accelerate actions to reduce releases from the Inactive Landfill and South Plant Surface Impoundments. Commission Order No. 611-83 was issued on June 8, 1983, in response to the rupturing of a dike in the South Plant Surface Impoundment in January 1983.

In 1984, Commission Order No. 717-84 was issued requiring a revised Part B Permit Application and groundwater monitoring plan. After submission of the revised Part B in June 1985, Commission Order No. 948-85 was issued defining a January 10, 1986, deadline for the items still needing revision. The plant resubmitted the application in January 1986. This application was found to be deficient, and a list of recommendations was sent on July 2, 1986, along with the request for a show-cause meeting on July 8th. In the meeting, the company's RCRA history and the current violations were discussed. A hearing was scheduled for July 22, 1986, before the Mississippi Commission on Natural Resources regarding a penalty for the violations and a compliance schedule.

The company responded by filing a Motion to Dismiss based on the theory that the South Plant Surface Impoundments should not be RCRA-regulated and thus should not be governed by the Mississippi Commission on Natural Resources.

Commission Order No. 1046-86 was issued in response to the hearing. The Order defined the penalty and compliance schedule which would apply if they failed to demonstrate that the South Plant Surface Impoundments should not be RCRA-regulated at the hearing scheduled for September 16, 1986.

The MSDNR and EPA requested that the hearing be expanded to determine if the South Plant Surface Impoundments were regulated under RCRA due to the containment of past wastes associated with the production of Toxaphene.

On December 17, 1986, the Commission ruled in the company's favor by placing into effect Order of Dismissal No. 1153-86. On August 5, 1987, the Commission again ruled in favor of the company by issuing Order of Dismissal No. 1253-87, incorporating Order No. 1153-86 and vacating Order No. 1046-86.

Inspections of the facility were performed on August 7, 1986 (by EPA) and August 12, 1986 (by MSDNR). Findings during the inspections were: 1) land adjacent to the road had eroded into the South Plant Surface Impoundment, 2) the Drum Storage Area contained many leaking drums; some containers were stored on broken pallets and it was obvious that many drums had been stored for longer than 90 days, 3) large spills were observed on the ground in the Drum Storage and Return-Product Storage Area and floor drains and sumps were overflowing with waste contaminated water, and 4) yellow and black stains were noticed on the ground throughout the facility.

EPA maintains that the Drum Storage Area, having been found mismanaged in numerous inspections, is not a less than 90-day storage unit and therefore cannot operate without interim status or a permit. Since the storage violations cited in August 1986 had not been resolved, Commission Order No. 1162-87 was issued on January 28, 1987 against the company. Mismanagement of the Drum Storage Area was the basis for Order No. 1217-87 issued with a monetary fine on April 22, 1987 and Order No. 1316-88, along with another monetary fine, issued on February 10, 1988.

At a meeting held on December 17, 1987 to discuss the regulatory status of the facility, the company proposed to contain the South Plant Surface Impoundments by consolidating the sediment into a Solid Waste Consolidation Area, solidifying it, and capping it such that the remainder of the impoundment could still be used for the treatment of nonhazardous waste streams.

Formal closure plans for the South Plant Surface Impoundments were submitted on August 4, 1988. Some modifications to the plan were suggested for meeting RCRA requirements. On January 27, 1989, the company reported that the contract had been confirmed and the contractor moved on site and closed the impoundments.

Based on a Sampling Investigation performed by EPA in February 1989 and from previous inspections of the facility, the Director of Waste Management, Region IV, issued a Determination of Release for the facility on October 13, 1989, asserting that corrective actions must be taken to protect the environment. On October 30, 1989, an Endangerment Assessment was completed regarding contamination at the facility, with the exception of dioxin testing.

As a result of the Endangerment Assessment, a RCRA Facility Assessment was requested to investigate the Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) located at the facility. A total of 21 SWMUs were identified at the South Plant, 12 SWMUs at the North Plant, and one SWMU (the Junkyard and Waste Piles - SWMU 34) which was located throughout both Plants. A RCRA Facility Assessment Report was prepared on January 17, 1992. Due to the contamination found throughout the facility during the assessment a RCRA Facility Investigation (RFI) was suggested for the following twenty-six units (Reference 4d, p. 3): Drum Storage Areas, Inactive Landfill Area, South Plant Surface Impoundments, Carbon Adsorption System, South Plant Drainage System, Former Dinoseb Production Areas, Dinoseb Off-Loading Area, Dinoseb Drumming Area and Drains, Former MSMA Production Area, Former MSMA Salt Unloading Area, South Plant Drainage Ditches, Former Toxaphene Production Area, Former Methyl Parathion Production Area, Former Atrazine Production Area, Return Product Storage Area, Former Blue Tank, Railroad Car Unloading Station, North Plant Neutralization System, Inactive North Plant Surface Impoundment, Wastewater Pipes, C-10 Scrubber, Oil Collection Unit, Waste Oil Satellite Accumulation Area, No. 6

Fuel Oil Area, North Plant Drainage Ditches, and Junkyard and Waste Piles (Reference 4d, pp. 41-97).

On April 17, 1992, EPA issued a Consent Decree to the company requiring closure or a post-closure care plan for the Container Management Area. The Container Management Area includes the surface impoundments, landfill, sumps, catch basins, areas of contaminated soils, surface water runoff from the contaminated soils, and monitoring of the groundwater (References 4a, 4c, and 4d).

On January 4, 1994, the company submitted Progress Report Number twenty-one, as required by the Consent Decree, reporting requirements of the Interim Measures and RFI Scopes of Work (Reference 4b).

NPDES Permit History (References 4d and 16)

The company obtained NPDES Permit No. MS0027995 prior to 1980. The Permit was renewed on December 1, 1981, to expire on June 1986, and included three outfalls. Outfall 001, South Plant, was defined with limits of 3 lbs/day-daily average for Dinoseb, 150 lbs/day-daily average for total suspended solids, and 0.1 lbs/day-daily average for Toxaphene. Outfall 002, North Plant, had a limit of 6,000 lbs/day-daily average for nitrate. Outfall 001 and 002 discharge to Outfall 003. Outfall 003, total plant effluent discharged to the Mississippi River, had a limit of 6,310 lbs/day-daily average for nitrates (References 4d and 16).

On March 22, 1985, a meeting was held to discuss chronic noncompliance of NPDES limits with respect to pH, Dinoseb levels, and nitrate-nitrogen levels.

On April 29, 1985, the company submitted a report explaining that new pH control valves were to be installed, that some of the Dinoseb excursions were related to the pH problem, that the other Dinoseb releases were due to premature carbon breakthrough, and that the nitrate-nitrogen excursions were related to process problems which had already been corrected.

Another problem arose with the NPDES permit excursions in June 1985. Due to heavy rainfall, the South Plant Surface Impoundment was bypassed on three different occasions. The company did not notify MSDNR within 72-hours of each event and did not submit a plan to avoid recurrence. On September 6, 1985, a meeting was held to set up new guidelines for bypassing the impoundment.

The facility's NPDES permit came up for renewal in April 1986 and was reissued without any changes to effluent limits for Outfalls 001, 002, and 003. The company had requested, on March 10, 1986, permission to use an alternative method of process wastewater disposal utilizing the Dinoseb wastewater on a number of agricultural fields within 15 miles of the facility (Reference 4g).

The MSDNR requested guidance from the EPA in regulating or approving the proposal. The proposal was accepted and incorporated into the NPDES permit as Outfall 004.

On July 5, 1989, the company reapplied for its NPDES permit. Having ceased producing organic chemicals, the facility no longer generated wastewater from the production of Dinoseb. Thus, Outfall 004 was not included in this application. Only nitric acid, potassium nitrate, chlorine, and nitrogen tetroxide were listed as presently being produced.

Air Permit History (Reference 4d)

In order to obtain an Air Emission Permit in 1980 the company had to submit an emissions survey and install additional facilities to reduce or eliminate air releases. The facility's Permit covered air emissions from the production of nitric acid, potassium nitrate, Toxaphene, Atrazine, and Dinoseb.

PREVIOUS INVESTIGATIONS

The following list summarizes investigations that have occurred at the site:

October 28, 1981, EPA inspected the company and sampled the drainage from the landfill (Reference 4e).

November 9, 1983, Mississippi Bureau of Pollution Control (MS BPC) during an inspection sampled monitoring wells MW-1, MW-4, MW-5, MW-6, MW-7, and MW-8 (Reference 4e).

December 14, 1984, MS BPC sampled monitoring wells MW-1 and MW-8 (Reference 4e).

August 20, 1985, EPA conducted a Preliminary Assessment/Site Investigation (PA/SI) at the facility. Several seeps or run-off streams were observed near Hennessey's Bayou after the non-RCRA type closure of the inactive landfill (Reference 4e).

August 6, 1986, EPA inspected the container storage area and adjacent return product storage area. Numerous problems were noted (Reference 4e).

September 3, 1986, MS BPC conducted sampling to determine if hazardous waste were entering the surface impoundment through spills from process areas (Reference 4e).

October 31, 1986, MS BPC conducted a sampling investigation of the surface impoundments (Reference 4e).

February 19, 1987, EPA during an inspection noted two inches of standing yellow liquid in the Dinoseb production area (Reference 4e).

February 18 and 19, 1987, EPA conducted a Sampling Investigation at the facility. Groundwater samples, streamwater samples, sediment samples and soil samples were taken. Numerous chemical compounds were detected (Reference 4e).

February 1989, EPA conducted a Sampling Investigation of the facility (Reference 4d).

October 1989, EPA completed an Endangerment Assessment of the facility (Reference 4d).

January 17, 1992, EPA prepared a RCRA Facility Assessment Report for the facility. A total of 21 SWMUs were identified at the South Plant, 12 SWMUs at the North Plant, and one SWMU (the Junkyard and Waste Piles located throughout both plants) (Reference 4d).

Selected surface impoundment and landfill data is presented in Table 1. Selected groundwater data is given in Table 2.

Table 1

SELECTED SURFACE IMPOUNDMENT and LANDFILL SUMMARY DATA
October 1981 - February 1989
Reference 4e

Feature	Date	Findings	Constituents Detected	Notes
Landfill	10/28/81	Surface runoff from the landfill drained: (1) east into a surface impoundment (2) south into Hatcher Bayou (3) west into a small valley	Cyanazine, 21 mg/kg Atrazine, 84 mg/kg, Toxaphene, 13 mg/kg Arochlor-1254, 7 mg/kg Chromium, 30 mg/kg Lead, 20 mg/kg Mercury, 0.12 mg/kg	None of the constituents were detected in the Stout's Bayou Upstream Control Sample
Surface Impoundment, South Plant	2/83	Dike on one of the South Plant Surface Impoundments failed, releasing approximately 700,000 gallons of wastewater into Stout's Bayou	The last sampling of the water in the impoundment, prior to breaching the dike, indicated 4 ppm of Dinoseb.	
Landfill	8/20/85	Several possibly contaminated seeps or runoff streams observed near Hennesseys Bayou	No sampling data available	EPA PA/SI Report
Surface Impoundment	9/3/86	Sampling to determine if hazardous wastes were entering the surface impoundments through spills from process areas	Dinoseb in: sediment at returned product storage area (330,000 mg/L); water samples from sump below drumming area (260 mg/L); sump northwest of Dinoseb plant (300 mg/L); sump near returned product storage area (130 mg/L); influent pipe to surface impoundment (8 mg/L). Atrazine (5 mg/L); arsenic (362 mg/L); Chromium (123 mg/L); and lead (142 mg/L) were detected in surface impoundment sludge.	
Surface Impoundment	10/31/86	Eleven composite samples collected and analyzed	Ranges: Arsenic 7.1 - 216 mg/kg Atrazine 5-78,000 mg/kg Arochlor-1254 ND - 58.4 mg/kg Dinoseb 3.7 - 5910 mg/kg Toxaphene ND - 2320 mg/kg	Samples Taken at 0' - 2' 2' - 4' 4' - 6' Highest concentrations of contamination at 2' to 4' depth

Table 2

SELECTED GROUNDWATER SUMMARY DATA
October 1983 - February 1989
Reference 4e

Constituent/well	MW-1	MW-2	MW-3	Background MW-4	MW-5	MW-6	MW-7	MW-8
Aroclor-1254	(0-1)	(0-1)	(0-1)	(0-1)	1.1 (1-1)	(0-1)	(0-1)	(0-1)
Arsenic	(0-2)	(0-2)	(0-1)	(0-2)	19 (1-2)	15 (1-2)	30 (1-1)	80 (2-2)
Chromium	38 (2-2)	64 (2-2)	(0-1)	(0-3)	(0-1)	11 (2-3)	(0-2)	(0-2)
Mercury	(0-1)	(0-1)	(0-1)	(0-1)	0.2 (1-1)	0.2 (1-1)	(0-1)	(0-1)
Cyanide	72 (1-2)	(0-2)	(0-1)	(0-3)	(0-1)	120 (3-3)	(0-2)	(0-2)
Atrazine	80 (3-5)	22.4 (2-4)	(0-0)	(0-3)	10 (1-2)	100 (5-5)	4.5 (1-4)	191 (5-5)
Dinoseb	1200 (8-9)	(0-5)	(0-1)	(0-4)	(0-3)	(0-5)	1.2 (1-6)	(0-6)

Notes:
1. Less than "<" data not included.
2. First figure, when present, is highest concentration detected in μg/L.
3. ( ) first figure in ( ) is times detected during analysis.
4. ( ) second figure in ( ) is total times analyzed for.
5. Background well - MW-4.

GROUNDWATER PATHWAY

The plant is underlain by an aquifer occurring between depths of 10 and 50 feet. The aquifer is made up of pleistocene loess (silt) and is overlain by a clayey cap at a depth of 10 feet and underlain by an impermeable marl, of the Vicksburg Group, at a depth of 50 feet. The aquifer has a hydraulic conductivity range of 1.93 to 5.5 gallons per day per square foot and a transmissivity range of 40 to 200 gallons per day per foot. The groundwater beneath the facility could be considered a potential source of drinking water (Reference 4d).

Groundwater gradients in the facility area are low. Shallow groundwater moves in a north to south direction. Stout's Bayou and Hennessey's Bayou influence the groundwater flow direction and gradient. Groundwater mounding from either natural topographic effects or artificially induced recharged may exist beneath the Inactive Landfill and the South Plant Surface Impoundments. Groundwater velocities in the aquifer range from 0.01 to 0.18 feet per day. The groundwater may receive contaminants via the infiltration of surface water through the contaminated unsaturated zone (Reference 4d).

Sixteen groundwater monitoring wells are in place at the plant. Dinoseb and Atrazine have been detected in at least six of the monitoring wells, and arsenic in at least four. Dinoseb has been documented at 113μg/l in MW-1, and Atrazine in MW-8 at 191 mg/l. Other pesticides and inorganic elements have also been detected in the groundwater at the facility. The contaminated groundwater can discharge to either Stout's Bayou or Hennessey's Bayou (Reference 4d).

The nearest well is a domestic well at a distance of 4,600 feet from the facility. A total of five domestic wells and one stock well are within four miles of the facility. There are no public wells within four miles of the facility (References 5 and 6). The City of Vicksburg withdraws its water from the Mississippi and Yazoo Rivers upstream of this facility (References 9, 17, and 18).

CLIMATE AND SOILS

Annual precipitation for the Vicksburg, Warren County area is approximately 53 inches (Reference 8). Mean annual lake evaporation is about 44 inches; thus, the resultant net precipitation is nine inches (Reference 15). The two year, 24-hour rainfall is about 4.5 inches (Reference 10).

Approximately 60 percent of Warren County and all of the facility lie in an area that has been mapped as having Memphis-Natchez-Adler association soils. The Memphis and Memphis-Natchez soils encompass a majority of the land to the west of the facility, as well as land between the plants and the inactive landfill area. Both the Memphis and Natchez soils were formed in loess. The Memphis soils are found along the narrow ridgetops and the higher areas of the slopes. Natchez soils are predominant along the lower and middle areas of the slopes. Both soil types accept water slowly but have a high capacity once the water has permeated. Both soils are well-drained and erosion is moderate. The Memphis soils have a silty clay loam subsoil, while the Natchez subsoil consists of silt loam (References 4d and 12).

The South Plant of the facility lies on silty soil. This land is very similar to the Memphis-Natchez silt loams, only it has been greatly altered by man. The land has been cut and filled to allow for building sites. The terrain is generally rolling hills with moderate to steep slopes. The soil maintains the same characteristics as the Memphis-Natchez soils (References 4d and 12).

The North Plant is split between Memphis-Natchez silt loams and Adler silt loam. The Memphis-Natchez silt loams in the plant area are severely eroded and the surface layer consists mainly of the upper subsoil layer. The other half of the North Plant lies on Adler silt loam. The Adler silt loam also makes up the majority of the land east of the facility, including the South Plant Surface Impoundment (References 4d and 12).

Boring logs indicate that the plant is underlain by a silty clay fill to a depth of approximately 10 feet and silty clay pleistocene loess from 10 to 50 feet below the surface. The loess is underlain by marl at a depth of approximately 50 feet (Reference 4d).

SURFACE WATER PATHWAY

Two distinct physiographic regions meet in Warren County. These are the alluvial plains associated with the Mississippi River and its tributaries, and the loess hills. The facility is located directly on the border of these two regions. East of the facility are small flood plains and the western area consists mainly of steep hills and bluffs. The facility ranges from 80 to 150 feet above the mean sea level (References 3 and 4d).

The facility is bordered on the east by Stout's Bayou. This bayou flows south and joins with Hatcher Bayou at the southeast corner of the South Plant Surface Impoundment to form Hennessey's Bayou.

Surface drainage at the North Plant is easterly into Stout's Bayou. In the South Plant, the surface drainage is predominantly in a southwesterly direction into the major South Plant Drainage Ditch. The drainage ditch flows through a wetlands area into Hennessey's Bayou. Hennessey's Bayou flows south into the Mississippi River. Portions of the facility are within the floodplains of these bayous and are flooded during heavy rainfall (References 4a and 11). The bayous are used by wildlife and for recreational fishing. The surface water pathway ends in the Mississippi River (References 3 and 4d).

No threatened or endangered aquatic species are known to inhabit any of the waters of the 15-mile surface water pathway (References 3, 13, and 14).

SOIL EXPOSURE PATHWAY

The facility is bordered on the south by light industry, on the northeast to south by rural areas, and on the north to southwest by light residential areas. The estimated population within one mile of the facility is given below (References 3, 4d, and 7).

Distance, Mile	Houses Estimated	Population Estimated
0 - 1/4	40	109
1/4 - 1/2	72	196
1/2 - 1	71	193

The total estimated population within one mile of the facility, based on 2.72 persons per household (1990 census), is 498. The nearest residents live approximately 300 feet from the North Plant of the facility. There is no school or day care center within 200 feet of the facility.

There are no threatened or endangered terrestrial species known to inhabit Warren County (References 13 and 14).

CONCLUSIONS

The site is currently being handled as a RCRA matter. An RFA has been completed, and an RFI has been submitted to MS OPC for review. These actions and any required cleanup will be done under the terms of the Consent Order with EPA.

MS OPC recommends that no further action under CERCLA be planned as long as satisfactory progress is being made under RCRA.

REFERENCES

1. Environmental Protection Agency, 40 CFR Part 300, Hazard Ranking System; Final Rule, Federal Register, Vol. 55, Friday, December 14, 1990.

2. Superfund Chemical Data Matrix (SCDM), U.S. EPA.

3. Topographic Maps of the Vertac Chemical Corporation Area, Vicksburg, Mississippi.

   Vicksburg West, MS Quadrangle - 7.5 Minute Series
   Vicksburg East, MS Quadrangle - 7.5 Minute Series
   Yokena, Ms, Quadrangle - 7.5 Minute Series
   Big Black, MS Quadrangle - 7.5 Minute Series

4. Information from the MS OPC Hazardous Waste Division files on Vertac Chemical Corporation, Vicksburg, Mississippi.

5. Printout from U.S. Geological Survey Data Base of Wells Within the Vertac Chemical Corporation, Vicksburg, Mississippi Study Area.

6. Information on Public Water Supply Wells in Warren County, Mississippi, from the Water Supply Division, Mississippi State Department of Health, Division of Water Supply.

7. Average Population per Household, Warren County, Mississippi, April 1990 Census.

8. Mean Annual Precipitation Map, 1951-1980, Tishomingo County Geology and Mineral Resources, by Robert K. Merrill, Mississippi Bureau of Geology, p. 13.

9. Average Flow at Selected Streamgaging Sites, Sources for Water Supplies in Mississippi, by B. E. Wasson, U.S. Geological Survey, Revised 1986, p. 7.

10. Two-Year, 24-Hour Rainfall Map, "Rainfall Frequency Atlas of the United States," by David M. Hershfield, U.S. Department of Commerce, Technical Paper No. 40, 1961.

11. Flood Insurance Rate Map, 1979, Warren County, Mississippi, Map No. 2801980200B, Panel 200 of 275.

12. United States Department of Agriculture, Soil Survey, Warren County, Mississippppi, 1964, pp. 4, 5, 11, and 12, Legend and Plate 56 (in part).

13. U.S. Fish and Wildlife Service:

Vicksburg Office, Species List by County;
Jackson Office, Topographic Maps Indicating Sensitive Environments;
Region IV - Atlanta, "Endangered and Threatened Species."

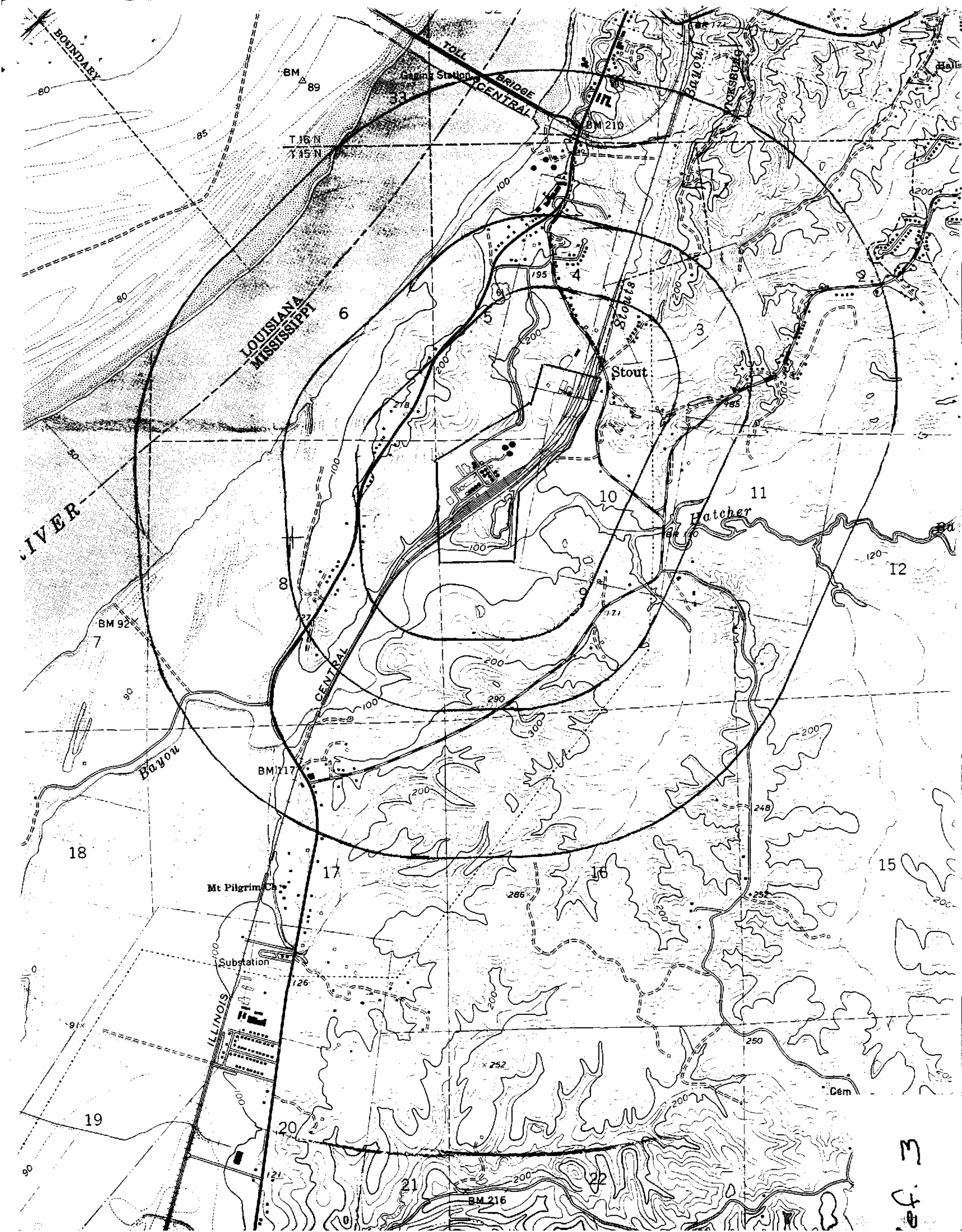
14. "Endangered Species of Mississippi, 1988," Mississippi Department of Wildlife Conservation, Museum of Natural Science.

15. Average Annual Lake Evaporation Map, "Evaporation Maps for the United States," by M.A. Kohler, T.J. Nordenson, and D. R. Baker, U.S. Department of Commerce, Weather Bureau, Technical Paper No. 37, Plate 1.

16. Information from the MS OPC Industrial Wastewater Control Branch files, Vertac Chemical Corporation, Vicksburg, Mississippi Facility.

17. Information on groundwater and surface water use from the Mississippi Office of Land and Water Resources, Jackson, Mississippi.

18. <u>Available Water for Industry in Adams, Claiborne, Jefferson, and Warren Counties, Mississippi</u>, 1964: Water Resources Division, U.S. Geological Survey and State of Mississippi Industrial and Technological Research Commission, pp. 7, 8, 24, and 25.



BOUNDARY
BM 89
Gaging Station
TOLL BRIDGE
CENTRAL
BM 210
T 16 N
T 15 N
33
LOUISIANA
MISSISSIPPI
RIVER
6
5
4
3
2
Stout
Stouts
Bayou
Hatcher
10
11
12
8
7
BM 92
CENTRAL
Bayou
BM 117
18
17
16
15
Mt Pilgrim Ch
Substation
ILLINOIS
19
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M

Sites," OSWER Directive 9345.1-08). If during any stage of the PA investigation you come across information that leads you to believe the site might be eligible for RCRA Subtitle C corrective action, notify your Regional EPA site assessment contact, who will discuss the situation with representatives of the RCRA program and decide whether to proceed with CERCLA investigative activities.

Table 2-1
RCRA Eligibility Checklist

1. Has the facility treated, stored, or disposed any RCRA hazardous waste for any period of time since November 19, 1980? (If the facility or site is a known "protective filer," check no.)

   ☒ Yes ☐ No

   IF THE ANSWER TO QUESTION 1 IS "NO", STOP; SITE IS NOT ELIGIBLE FOR RCRA RESPONSE.
   IF YES, CONTINUE WITH CHECKLIST.

2. Does the facility currently have a RCRA Part B Operating Permit or a post-closure permit?

   ☒ Yes ☐ No

3. Did the facility file a Part A Permit Application? ☒ Yes ☐ No

   If yes,

   - Does the facility currently have interim RCRA status? ☐ Yes ☐ No
   - Did the facility convert its status from TSF to "Generator" or "Non-handler"?

     ☐ Yes ☐ No

   If no,

   - Is the facility a "Non- or Late Filer"? ☐ Yes ☐ No

IF ANSWERS TO ALL QUESTIONS IN PARTS 2 AND 3 ARE "NO," THE SITE IS NOT ELIGIBLE FOR RCRA RESPONSE. IF THE ANSWER TO ANY QUESTION IS "YES," DISCUSS THE SITE WITH YOUR EPA SITE ASSESSMENT CONTACT.

2.2.2 CERCLA Petroleum Exclusion

CERCLA authorized Federal response to releases or threatened.releases of "hazardous substances" and "pollutants and contaminants." CERCLA excludes "petroleum, including crude oil or any *fraction thereof*" from the definition of these terms. However, CERCLA does not define the specific types of petroleum products excluded.

federal register

Friday
December 14, 1990

Part II

Environmental Protection Agency

40 CFR Part 300
Hazard Ranking System; Final Rule

Ref. 1

SUPERFUND CHEMICAL DATA MATRIX

9 March 1993

Ref. 2

FILE COPY

STATE OF MISSISSIPPI

DEPARTMENT OF ENVIRONMENTAL QUALITY

JAMES I. PALMER, JR.
EXECUTIVE DIRECTOR

September 10, 1993

Mr. Steve Boswell
Environmental Affairs Director
Vicksburg Chemical Company
P.O. Box 821003
Vicksburg, Mississippi 39182-1003

RE: Compliance Evaluation Inspection
Vicksburg Chemical Company
Vicksburg, Mississippi
MSD 990 714 081

Dear Mr. Boswell:

Enclosed please find an inspection report and checklist completed as a result of a compliance evaluation inspection conducted at Vicksburg Chemical Company on September 1, 1993. The following apparent violations were noted:

1. MHWMR 265.14(c) in that signs with the legend, " Danger- Unauthorized Personnel Keep Out", were not posted at each entrance of the container management area.

2. MHWMR 262.34(c)(ii) in that the two containers at the satellite accumulation area were not marked with the words, " Hazardous Waste", or with words that identify the contents of the containers.

Although no enforcement action will be taken at this time, we request your response within ten(10) days of receipt of this letter with actions that have been taken to correct these violations.

If you have any questions on this matter, please call me at 601-961-5389.

Sincerely,

Taher Diab

Taher F. Diab
TSD Facilities/ Hazardous Waste Division

cc: Mr. G. Alan Farmer, EPA IV(w\ enclosures)

Ref. 42

RCRA INSPECTION REPORT

1. Inspector and Author of Report

   Taher Diab, Environmental Engineer
   Mississippi Department of Environmental Quality (MDEQ)

2. Facility Information

   Vicksburg Chemical Company (VCC)
   Rifle Range Rd.
   P.O. Box 821003
   Vicksburg, MS 39182-1003
   MSD 990 714 081

3. Responsible Company Official

   Steve Boswell, Director
   Environmental Affairs

4. Inspection Participants

   David Keen, Environmental Specialist, VCC
   Otto Logue, Process Safety Coordinator, VCC
   Taher Diab, MDEQ

5. Date and Time of Inspection

   September 1, 1993 at 9:00 a.m.

6. Applicable Regulations

   Mississippi Hazardous Waste Management Regulations (MHWMR) Parts 262, 268 and applicable sections of 265.

7. Purpose of Inspection

   A Compliance Evaluation Inspection (CEI) to determine VCC's compliance status with the applicable regulations.

8. Facility Description

   Vicksburg Chemical Company (VCC) operates two Chemical plants on contiguous property south of Vicksburg, Mississippi. The North plant primarily produces potassium nitrate and nitrogen tetroxide with by-product production of chlorine gas. The South plant was primarily a manufacturer of specialty chemicals, such as dinoseb, atrazene, toxaphene and mono sodium methane arsenate (MSMA). The manufacture of these chemicals produced hazardous wastes. Specifically, the MSMA production generated K031, by-product salts generated in the production of MSMA; the toxaphene production generated two

RCRA wastes, K098, untreated process wastewater from the production of toxaphene, and K041, wastewater treatment sludge from the production of toxaphene; and the dinoseb production generated hazardous waste P020, Dinoseb. These wastes were managed in several units including: a container storage area, a pre-RCRA landfill, a surface impoundment, tanks and carbon adsorption units. The container storage area and the surface impoundment were considered to be RCRA regulated units. The south plant currently manufactures nitric acid.

The surface impoundment located in the South plant is primarily used for stormwater collection which contains low concentration of pesticides. This impoundment also receives, on occasions wastewater from the North plant. Numerous years of de minimis losses in the process area have contaminated the soil. The suspected source of groundwater contamination is stormwater infiltration contaminated from contact with these soils, leakage from the effluent line to the surface impoundment, and the surface impoundment prior to the retrofit with a double synthetic liner. An inactive landfill, adjacent to the surface impoundment, was closed in 1979. Improvement occurred in 1983 when grading and construction of the cap were approved by MDEQ.

The Vicksburg container management area was designed to contain drums of waste material which are classified as hazardous. In 1990, Vicksburg Chemical Corporation maintained that the container management area is a less-than-ninety-day storage area and therefore not subject to the interim status requirements of 40 C.F.R. Part 265. EPA asserted that the container management area did not meet the requirements for the less-than-ninety-day exemption and was therefore subject to interim status requirements. On April 17, 1992, the United States on behalf of EPA, issued a consent decree to Vicksburg Chemical requiring closure of the container management area. In May of 1992, VCC submitted a revised closure plan. The plan has been reviewed by the MDEQ. A decision for approval has not been taken yet. The container management area is currently used for storage of personal protective equipment contaminated with dinoseb (P020). Contaminated soil and concrete debris are sometimes generated during maintenance and cleanup and stored in this area.

9. <u>Findings</u>

The only hazardous waste material currently generated is personnel protective equipment contaminated with dinoseb (P020). During cleanup and maintenance, soil and concrete debris that may be contaminated are also managed as hazardous waste. At the time of inspection, no containers were present at the container management area. Warning signs (265.14(c)) and fire extinguisher were not available. The containers at the satellite accumulation area were not marked with words "Hazardous Waste" (262.34(c)(ii)). Personnel training records, shipping manifests and contingency plan were well organized and updated according to regulations.

10. Conclusion

Vicksburg Chemical Company is in apparent violation of the following regulations:

- MHWMR 265.14(c) in that signs with the legend, "Danger - Unauthorized Personnel Keep Out", were not posted at each entrance of the Container Management area.

- MHWMR 262.34(c)(ii) in that the two containers at the Satellite accumulation area were not marked with the words, "Hazardous Waste" or with words that identify the contents of the containers.

11. Signed

Inspector — Sept. 10, 93 Date

12. Approval

RCRA Supervisor — 9/10/93 Date

VICKSBURG CHEMICAL COMPANY

P.O. Box 821003 • Vicksburg MS 39182 • 601-636-1231 • FAX 601-636-5767

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 875 308 592

Mr. Sam Mabry, Chief
Hazardous Waste Division
Bureau of Pollution Control
MS Dept. of Env. Quality
P.O. Box 10385
Jackson, MS 39209

January 4, 1994

Re: Cedar Chemical Corporation, MSD 990714081
Consent Decree and RCRA Facility Investigation
Progress Report Number Twenty-One

Dear Mr. Mabry:

Please find enclosed a copy of the referenced Report as required by the terms of the Decree and related Scopes of Work (to become Workplans following approval).

Please contact Cedar Chemical with any comments or objections you may have concerning this report.

Sincerely,

Steven T. Boswell

Steven T. Boswell
Director of Env. Affairs

STB: pc

xc: Mr. Miles
Mr. Madsen
Mr. Malone, Apperson, Crump
Mr. Karkkainen, Woodward-Clyde

File

Ref. 46

VICKSBURG CHEMICAL COMPANY

P.O. Box 821003 • Vicksburg MS 39182 • 601-636-1231 • FAX 601-636-5767

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 875 308 591

Mr. John Dickinson, Chief
Waste Compliance Section
RCRA and FF Branch
U.S. EPA, Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

January 4, 1994

Re: Cedar Chemical Corporation, MSD990714081
Consent Decree and RCRA Facility Investigation
Progress Report Number Twenty-One

Dear Mr. Dickinson:

As required by Section XIV of the Consent Decree and the reporting requirements of the Interim Measures and RFI Scopes of Work, Cedar Chemical is submitting Progress Report Number Twenty-One, for the month of December, 1993. The report will track the items required to be reported as described in the Decree and Scopes of Work (later to be Workplans following approval).

Description and Estimate of the Percentage of the RFI Completed

The percentage of Interim Measures completed is estimated to be 5%. The percentage of RFI work completed is estimated to be 5%.

Summary of Inspections and Findings

Cedar continues to remove accumulating materials from sumps and catch basins.

Summary of Changes made to the IM and RFI during the Reporting Period

No changes were made during the reporting period.

Summary of Problems or Potential Problems

Rainfall erosion on "SWCA" and Old Landfill SWMUs has been minimal during the period.

Actions taken to Rectify Problems

None

Changes in Personnel

None

Projected Work for the Month

Preliminary work on the Interim Measures Design Document and CQA Plan documents required under the Scope of Work for Interim Measures is currently awaiting comment from EPA on previously submitted documents.

Results of Sampling and Analysis Activities during the Report Period

No samples were taken or analyzed for work to be performed under the Decree.

Please contact Cedar with any comments or objections you may have concerning this report.

Sincerely,

Steven I. Boswell

Steven I. Boswell
Director of Env. Affairs

SIB: pc

xc: Mr. Miles
Mr. Madsen
Mr. Malone, Apperson, Crump
Mr. Karkkainen, Woodward-Clyde
Mr. Sam Mabry, MSDEQ

HAZARDOUS WASTE AREA INSPECTION SHEET

FOR THE WEEK OF 12/27/93 TO 1/2/94

1. Drums in 90 Day Storage - Inspect weekly for leaks. Check dates, labeling, no. of drums, access, fire fighting equip.

   Date inspected 12/27/93 Inspected by W. Walker

   Results of inspection All Drums in Order (Non-hazardous)

2. South Pond - Record level daily, keep a minimum f[illegible]board of two feet. Inspect dike daily for washing, sa[illegible], sloughing. Report faster than normal loss of l[illegible]el immediately to Maintenance and Environmental.

   Check creek for build-up of debris which could hold water against dike in a flood. Write a work order for grass mowing when grass height is excessive.

DATE	POND LEVEL	INITIALS
12/27/93	8'7"	WW
12/28/93	6' 11	WW
12/29/93	4'10"	WW
12/30/93	7'9"	WW
12/31/93	5'11	WW
1-1-94	4'2"	[illegible]
1-2-94	5'9"	[illegible]

Report needs for corrective action to:

Maintenance Planner
Shift Superisor
South Plant Supervisor
Environmental Dept.

Results of weekly inspection and actions taken:

HAZARDOUS WASTE AREA INSPECTION SHEET

FOR THE WEEK OF 12/20 TO 12/26/93

1. Drums in 90 Day Storage - Inspect weekly for leaks. Check dates, labeling, no. of drums, access, fire fighting equip.

   Date inspected 12/20/93 Inspected by H. Wells

   Results of inspection All drums in order (Non. hazardous)

2. South Pond - Record level daily, keep a minimum freeboard of two feet. Inspect dike daily for washing, sagging, sloughing. Report faster than normal loss of level immediately to Maintenance and Environmental.

   Check creek for build-up of debris which could hold water against dike in a flood. Write a work order for grass mowing when grass height is excessive.

DATE	POND LEVEL	INITIALS
12/20/93	4'11	HW
12/21/93	3'10	HW
12/22/93	6'1	HW
12/23/93	10'2	HW
12/24/93	10'2	HW
12/25/93	9'7"	[illegible]
12/26/93	8'10"	[illegible]

Report needs for corrective action to:

Maintenance Planner
Shift Superisor
South Plant Supervisor
Environmental Dept.

Results of weekly inspection and actions taken:

OK

HAZARDOUS WASTE AREA INSPECTION SHEET

FOR THE WEEK OF 12/13 TO 12/19/93

1. Drums in 90 Day Storage - Inspect weekly for leaks. Check dates, labeling, no. of drums, access, fire fighting equip.

Date inspected 12/13/93 Inspected by W Atken

Results of inspection Good

53 metal drums marked + dated, (non-hazardous)

2. South Pond - Record level daily, keep a minimum freeboard of two feet. Inspect dike daily for washing, sa[illegible], sloughing. Report faster than normal loss of level immediately to Maintenance and Environmental.

Check creek for build-up of debris which could hold water against dike in a flood. Write a work order for grass mowing when grass height is excessive.

DATE	POND LEVEL	INITIALS
12/13/93	9'10	W Atken
12/14/93	8'	W Atken
12/15/93	10'3	W Atken
12/16/93	9'2"	[illegible]
12/17/93	9'4"	[illegible]
12/18/93	7'8	HW
12/19/93	6'1	HW

Report needs for corrective action to:

Maintenance Planner
Shift Superisor
South Plant Supervisor
Environmental Dept.

Results of weekly inspection and actions taken:

HAZARDOUS WASTE AREA INSPECTION SHEET

FOR THE WEEK OF 12-6-93 TO 12-12-93

1. Drums in 90 Day Storage - Inspect weekly for leaks. Check dates, labeling, no. of drums, access, fire fighting equip.

   Date inspected 12-6-93 Inspected by [signature]

   Results of inspection 53 Metal drums marked + Dated. (Non-hazardous drums)

2. South Pond - Record level daily, keep a minimum freeboard of two feet. Inspect dike daily for washing, sagging, sloughing. Report faster than normal loss of level immediately to Maintenance and Environmental.

   Check creek for build-up of debris which could hold water against dike in a flood. Write a work order for grass mowing when grass height is excessive.

DATE	POND LEVEL	INITIALS
12-6-93	8'0"	[initials]
12-7-93	8'5"	[initials]
12-8-93	9'6"	[initials]
12-9-93	9'10"	[initials]
12-10-93	10'6	[initials]
12-11-93	10'5	[initials]
12-12-93	10'11	[initials]

Report needs for corrective action to:

Maintenance Planner
Shift Superisor
South Plant Supervisor
Environmental Dept.

Results of weekly inspection and actions taken:

Area good shape

HAZARDOUS WASTE AREA INSPECTION SHEET

FOR THE WEEK OF 11/29/93 TO 12/5/93

1. Drums in 90 Day Storage - Inspect weekly for leaks. Check dates, labeling, no. of drums, access, fire fighting equip.

   Date inspected 11/29/93 Inspected by W Allen

   Results of inspection Normal

2. South Pond - Record level daily, keep a minimum freeboard of two feet. Inspect dike daily for washing, sagging, sloughing. Report faster than normal loss of level immediately to Maintenance and Environmental.

   Check creek for build-up of debris which could hold water against dike in a flood. Write a work order for grass mowing when grass height is excessive.

DATE	POND LEVEL	INITIALS
11/29/93	9'1"	WAW
11/30/93	1'5"	WAL
12/1/93	7'11"	WAL
12/2/93	8'4"	WAL
12/3/93	8'2"	WAL
12-4-93	7'4"	BJ
12-5-93	8'4"	BJ

Report needs for corrective action to:

Maintenance Planner
Shift Superisor
South Plant Supervisor
Environmental Dept.

Results of weekly inspection and actions taken:

INTERNAL CORRESPONDENCE

Date: 4 Jan 94

To:
Steven T. Boswell

From: David U. Keen

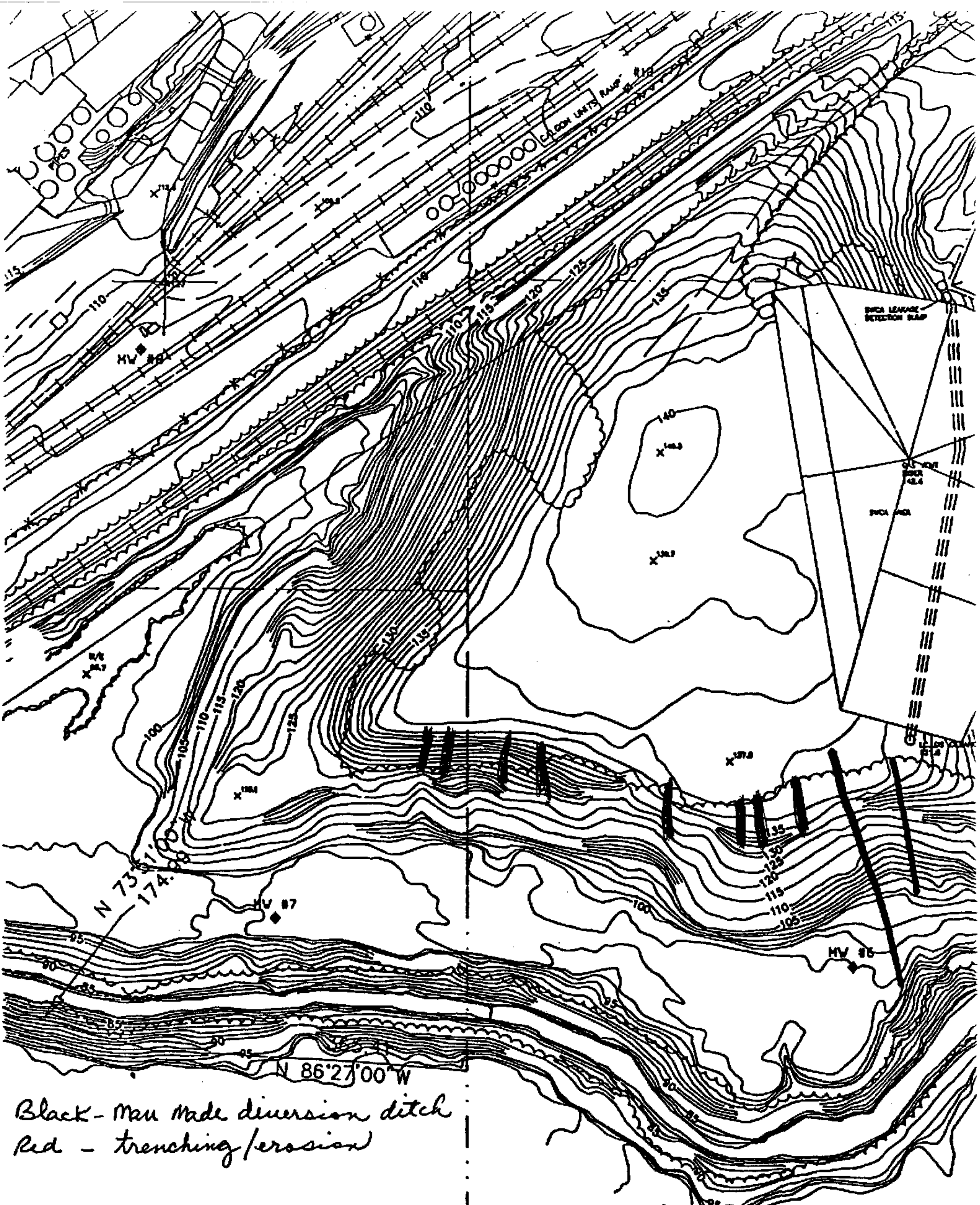
cc:
D. Madsen
file

Subject: Monthly Inspection of Landfill for December

Grasses and vegetation are flourishing on both the SWCA and the old landfill. Grasses covering the SWCA Unit (Solid Waste Containment Area) are continuing to spread and become more dense. There is no erosion or trenching on the SWCA hillsides. Bermuda and Rye grass are growing more dense where grass seeds were spread on the areas that were reworked. There are no yellow spots or any erosion features on the SWCA.

There are no discolored or yellow spots on top of landfill at this time. Areas that were capped with clean soil and seeded have grasses sprouting and growing more dense in these reworked areas also.

Bermuda and Rye Grass seeds that were spread in reworked areas on the West side of landfill are continuing to grow. There is no erosion or trenching. nor is there any yellowing or discoloration of the soil on the West side of the landfill. Vegetation and grasses on the East side of the landfill are essentially unchanged since the last report. Erosion and trenching on the East side of the landfill are also unchanged since the initial reporting on the Monthly Inspection of the Landfill for April,1992.



Black - Man made diversion ditch
Red - trenching/erosion

DEC 93
MONTHLY INSPECTION

THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF MISSISSIPPI

SOUTHERN DISTRICT OF MISSISSIPPI
FILED
APR 17 1992
J. T. NOBLIN, CLERK
BY ________ DEPUTY

UNITED STATES OF AMERICA,

Plaintiff,

v.

CEDAR CHEMICAL CORPORATION,

Defendant

Civil No.: [illegible]

CONSENT DECREE

WHEREAS, plaintiff, the United States of America, at the request of and on behalf of the Administrator of the United States Environmental Protection Agency (hereafter "EPA"), filed its Complaint in this action on January 23 1992, seeking injunctive relief under Section 3008(a), (g) and (h) of the Resource Conservation and Recovery Act (RCRA), as amended, 42 U.S.C. § 6928(a), (g) and (h), and the federal regulations and state hazardous waste management laws and regulations promulgated thereunder.

WHEREAS, plaintiff's claims arose from the operation, by past and present owners and operators, of a chemical manufacturing facility located in Vicksburg, Mississippi;

WHEREAS, plaintiff and defendant have agreed to the entry of this Consent Decree, in order to settle plaintiff's claims against defendant without further litigation;

WHEREAS, the entry of this Decree does not constitute an admission of fact or law by any party as to any issue raised in this action;

Ref. 4c

DEPARTMENT OF JUSTICE
90-7-1-463
LANDS DIVISION

WHEREAS, the entry of this Decree does not constitute a release of any claims not expressly resolved herein nor a release of any claims whatsoever against others not party to this Decree;

WHEREAS plaintiff and defendant agree, and this Court finds, that the settlement of the claims resolved herein without further litigation is in the public interest and that the entry of this Decree is the most appropriate means of resolving these matters.

NOW THEREFORE, it is hereby ORDERED, ADJUDGED and DECREED as follows:

I. JURISDICTION

This Court has jurisdiction over the subject matter of this action and over the parties to this Decree under Section 3008(a) and (h) of RCRA, 42 U.S.C. § 6928(a) and (h), and 28 U.S.C. §§ 1331, 1345 and 1355. For purposes of entering and enforcing this Consent Decree, plaintiff's Complaint states a cause of action upon which relief can be granted.

Venue is appropriate in this judicial district pursuant to Section 3008(h) of RCRA, 42 U.S.C. Section 6928(h)(1) and 28 U.S.C. Section 1391(b).

II. DEFINITIONS

Whenever the following terms are used in this Decree and the attachments hereto, the definitions specified hereinafter shall apply. All terms not defined herein shall have the meaning used in RCRA and the applicable regulations.

A. "C.F.R." means the Code of Federal Regulations.

B. "CMI" means Corrective Measures Implementation

C. "CMS" means Corrective Measures Studies.

D "Days" means calendar days.

E. "Defendant" means Cedar Chemical Corporation.

F. "EPA" or "Agency" means the United States Environmental Protection Agency.

G. "Facility" means all contiguous property owned by Cedar Chemical Corporation located on Rifle Range Road in Vicksburg, Mississippi, including but not limited to the North and South plants.

H "HSWA" means the Hazardous and Solid Waste Amendments of 1984, Pub. L. 98-616.

I. "MSDEQ" means the Mississippi Department of Environmental Quality.

J. "Plaintiff" means the United States of America, on behalf of EPA.

K. "RCRA" means the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., as amended.

L. "RFI" means RCRA Facility Investigation.

M. "Settling parties" means the parties to this Decree, that is, the United States of America and Cedar Chemical Corporation.

III. PARTIES BOUND

A. The provisions of this Decree shall apply to and be binding upon the United States and the defendant, its officers, directors, employees, agents, successors and assigns, and upon all persons, firms, corporations, contractors and consultants acting under or for the defendant.

B. The defendant shall provide a copy of this Decree to all contractors, subcontractors, laboratories and consultants retained to conduct or monitor any portion of the work performed pursuant to this Decree within ten (10) calendar days after entry of the Decree by the Court or within ten (10) calendar days after the defendant enters into a contract with any such third party, whichever occurs later. The defendant shall include an express requirement in each such contract that the contractor comply with all of the terms of this Decree. For purposes of determining compliance with the terms of this Decree, any action of defendant, defendant's contractor's, subcontractor's, laboratories and consultants in carrying out any provisions of this Decree, shall be deemed an action of defendant.

C. The undersigned representative(s) of each party to this Decree certifies that he or she is fully authorized by the party whom he or she represents to enter into the terms and conditions of this Decree and to legally bind that party to all such terms and conditions, provided however, that each undersigned representative executes this Decree solely in his or her representative capacity and does not thereby assume or incur personal liability for the obligations of the party whom he or she represents.

D. The defendant shall give notice in writing of the existence and terms of this Decree to any successors in interest prior to any transfer of ownership or control of all or part of the subject Facility or of any shares of stock of defendant. The defendant shall simultaneously provide a copy of such written notice to plaintiff.

E. No change in ownership of all or part of the subject Facility or in the corporate status of defendant will in any way alter the defendant's responsibilities and obligations under this Decree.

IV. <u>CLOSURE AND POST-CLOSURE CARE</u>

A. Within sixty (60) calendar days following entry of this Decree by the Court, the defendant shall submit to plaintiff and to MSDEQ, a plan for clean closure of the container management area. The container management area encompasses all areas within and immediately adjacent to the returned product storage area designated in Figure A-1 in the Scope of Work for Interim Measures attached to and incorporated in this Consent Decree, in which hazardous wastes were previously managed.

B. No later than forty-five (45) days following notice of a determination by plaintiff that defendant cannot clean close the container management area, defendant shall submit a post-closure care plan.

C. Plaintiff may hereafter designate in writing additional hazardous waste management units requiring closure and post-closure care pursuant to this Paragraph. Subject to the dispute resolution provisions of Paragraph XVI below, the defendant shall submit and implement plans or permit applications for closure and post-closure care with respect to those additional hazardous waste management units designated by plaintiff, in accordance with the requirements of this Paragraph, as if those additional hazardous waste management units were listed in Subparagraph A above.

D. The hazardous waste management unit listed in Subparagraph A above, together with those units designated by plaintiff pursuant to Subparagraph C above, shall hereafter be collectively referred to as the "Closing Units."

E. Each plan for closure or post-closure care shall meet the applicable requirements of MHWR Part 265, Subparts G, K, L, M and N and any other applicable state or federal regulations and requirements, including, with respect to any units to be closed by removal, the applicable requirements of MHWR §§ 264.228, 264.258 and 264.280(e). Each plan shall be submitted in the form required under the applicable regulations.

F. Each closure plan shall contain a detailed estimate of the cost of closing the facility, which meets the requirements of MHWR § 265.142, and each post-closure plan shall contain a detailed estimate of the cost of post-closure monitoring and maintenance of the facility, which meets the requirements of MHWR § 265.144.

G. Plaintiff shall review each of the closure and post-closure plans submitted by the defendant and may confer with each other on the adequacy of the plan. Each proposed closure and post-closure plan or permit application will be subject to review, modification and approval under the procedures established in Paragraph XI below.

H. The defendant shall commence closure within fifteen (15) days of notification by EPA of approval of its closure plan, unless the plan, as approved, provides for a different date to commence closure; and the closure activities shall be completed and the appropriate certifications submitted within the time limits specified in each approved closure plan.

I. Following completion of closure of each Closing Unit a determination will be made by EPA of the need for post-closure care. If the Agency concludes that such care is necessary, the defendant shall undertake and continue the post-closure care required under the approved post-closure care plan, submitted pursuant to B above, until such time as a post-closure permit is issued.

J. Upon written request by plaintiff pursuant to MHWR § 270.1, the defendant shall submit to plaintiff and to MSDEQ a post-closure permit application for each subject Closing Unit. Each such application shall be submitted within the time period specified in plaintiff's request.

K. Each post-closure permit application will be subject to review, modification and approval under the procedures established in Paragraph X below.

L. Following issuance of the post-closure permit for each Closing Unit, the defendant shall undertake and continue the post-closure care required under the terms of the permit.

V. FINANCIAL ASSURANCE FOR CLOSURE

A. For the subject Facility, the defendant is required to establish financial assurance for the closure of the Closing Units.

B. The wording of the financial assurance vehicle for any closure trust fund shall be identical to the wording specified in the state regulation equivalent to 40 C.F.R. § 264.151(a)(1), and any closure financial assurance vehicle must be accompanied by a formal certification of acknowledgement, such as that set out in the state regulation equivalent to 40 C.F.R. § 264.151(a)(2). Any proposed closure financial assurance vehicle shall be subject to review, modification and approval under the procedures established in Paragraph X below.

C. Each such financial assurance vehicle shall be fully funded either by cash, by bank letter of credit, by corporate guaranty, or by some other vehicle specifically recognized under the applicable regulations for providing financial assurance for such closure, within 30 days after final approval of the financial assurance vehicle. The release of funds from each such closure financial assurance vehicle shall be governed by the provisions of the state regulation equivalent to 40 C.F.R. § 265.143.

D. The financial assurance vehicle shall be held until such time as the defendant makes a request for the release of the funds meeting the requirements of the state regulation equivalent to 40 C.F.R. § 265.143(a) and (h) or the defendant makes a request for the reimbursement of expenditures meeting the requirements of the state regulation equivalent to 40

C.F.R.§ 265.143 (a)(10). The financial assurance vehicle shall continue to be held for any Closing Unit with respect to which such a request has not been made and accepted pursuant to Subparagraph E below.

E. If plaintiff accepts the defendant's request for the release of funds or for the reimbursement of expenditures under Subparagraph D above, the Agency shall authorize the release of the funds for that Closing Unit or the reimbursement of the expenditures, as the case may be, within sixty (60) calendar days after receipt of the request.

F. If plaintiff rejects the defendant's request under Subparagraph D above, plaintiff shall so notify the defendant in writing within sixty (60) calendar days after receipt of the request. The defendant may then further pursue the release of the funds in question pursuant to the dispute resolution provisions of Paragraph XVII below, or may subsequently file an amended request.

VI. FINANCIAL ASSURANCE FOR POST-CLOSURE CARE

A. For the subject Facility, the defendant shall establish a financial assurance vehicle to provide financial assurance for post-closure care of any Closing Units for which clean closure cannot be accomplished pursuant to this Consent Decree.

B. The wording of the financial assurance vehicle for such post-closure care shall be identical to the wording specified in the state regulation equivalent to 40 C.F.R. § 264.151(a)(1), and the financial assurance vehicle must be accompanied by a formal certification of acknowledgement, such as that set out in the state regulation equivalent to 40 C.F.R. § 264.151(a)(2).

C. A proposed post-closure financial assurance vehicle for any applicable Closing Unit shall be submitted to plaintiff within forty-five (45) days following notice of a determination by plaintiff that defendant cannot clean close the Closing Unit. The post-closure financial assurance vehicle shall be subject to review, modification and approval under the procedures established in Paragraph X below.

D. The amount of financial assurance required for post-closure care with respect to the Closing Unit shall be the amount of the post-closure cost estimate specified in the closure and post-closure plans approved for the Facility under Paragraph IV above.

E. Subsequent adjustments to the fund shall be made annually in accordance with the applicable regulations.

F. Should the Agency determine that clean-closure has been accomplished prior to the entry of this Consent Decree, then defendant shall not be required to establish a financial assurance vehicle to provide financial assurance for post-closure care of the Closing Units referred to in Paragraph IV.A. of this Consent Decree. Such determination shall only pertain to this Section and shall not alter defendant's obligations under the remainder of this Decree.

VII. CORRECTIVE ACTION

A. All work undertaken pursuant to this Consent Decree shall be performed in a manner consistent with, at a minimum, all applicable, relevant and appropriate EPA Guidance Documents and the Scopes of Work (attached hereto) and adopted and incorporated herein by reference, including the following:

The Interim Measures (IM) Scope of Work for the subject facility (Attachment A hereto) ; the RCRA Facility Investigation (RFI) Scope of Work for the subject facility (Attachment B hereto); the Corrective Measures Study (CMS) Scope of Work for the subject facility (Attachment C hereto); the Corrective Measures Implementation (CMI) Scope of Work for the subject facility (Attachment D hereto); RCRA and its federal and state implementing regulations; all applicable, relevant and appropriate EPA guidance documents such as the "RCRA Groundwater Monitoring Technical Enforcement Guidance Document" (OSWER Directive 9950.1, Sept. 1986); "RCRA Facility Investigation (RFI) Guidance" (EPA 530/SW-87-001), "Test Methods for Evaluating Solid Waste" (SW-846, Third Edition); "Guidance for Preparation of QA Project Plans" (OWR5-QA-1, May 1984); and EPA Region IV Engineering Support Branch's Standard Operating Procedure and Quality Assurance Manual (SOP); and, where so notified by Plaintiff, any additional, applicable, relevant and appropriate state guidance documents.

B. The defendant shall submit to plaintiff and to MSDEQ an RFI Workplan for the subject facility, pursuant to the schedules established in the attached RFI Scope of Work.

C. The RFI Workplan is subject to review, modification and approval under the procedures established in Paragraph X below. The RFI Workplan shall be developed in accordance with, at a minimum, RCRA, its implementing regulations and applicable, relevant and appropriate EPA and state guidance documents including those described in Subparagraph A of this Paragraph. The RFI Workplan shall be developed and implemented in a manner consistent with the RFI Scope of Work.

D. In accordance with the provisions of the attached RFI Scope of Work, the RFI Workplan shall be designed to determine the presence, magnitude, extent, direction and rate of movement of any hazardous wastes or hazardous constituents within and beyond the subject Facility boundaries. The RFI Workplan shall document the procedures the defendant shall use to conduct those investigations necessary (1) to characterize the potential pathways of contaminant migration, (2) to characterize the source(s) of contamination, (3) to define the degree and extent of contamination, (4) to identify actual or potential receptors, and (5) to support the development of alternatives from which corrective measures will be selected by plaintiff. A specific schedule for implementation of all activities at the subject facility shall be included in the RFI Workplan.

E. The defendant shall submit an RFI Report to plaintiff and to MSDEQ for the subject Facility in accordance with the schedules contained in this Decree and the appropriate Scope of Work and Workplan. The RFI Report shall be subject to review, modification and approval under the procedures established in Paragraph X below.

F. Upon completion of the RFI at the subject facility and approval of the RFI report, the defendant shall conduct a Corrective Measures Study (CMS) in accordance with the CMS Scope of Work.

G. The defendant shall submit a CMS Report to plaintiff and to MSDEQ for the subject facility in accordance with the schedules contained in this Decree and the Scope of Work and Workplan. The CMS Report shall be subject to review, modification and approval under the procedures established in Paragraph X below.

H. Upon approval by plaintiff of a CMS Report for the facility, EPA shall make available to the public for review and comment for at least forty-five (45) calendar days, a summary of EPA's proposed corrective measures and EPA's justification for its selection. Included in the justification will be a copy of the RFI and CMS Report for the facility.

I. Following the public review and comment period provided for in Subparagraph H above, plaintiff shall notify defendant of the corrective measures selected by plaintiff for the subject facility. If the corrective measures recommended in the CMS Report are not the corrective measures selected by plaintiff after consideration of public comments, plaintiff shall inform defendant in writing of the reasons for the decision. Defendant shall modify the RFI and CMS based upon public comment, if directed to do so by plaintiff, within the time frame established by EPA in the notification.

J. The Administrative Record supporting the selection of the corrective measures for the subject facility will be available for public review at the following location:

RCRA and FF Branch
Waste Compliance Section
Region IV

United States Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30365

K. Within ninety (90) calendar days after defendant's receipt of notification of plaintiff's final selection of the corrective measures for the facility, defendant shall submit to plaintiff and to MSDEQ a Corrective Measures Implementation (CMI) Program Plan. The CMI Program Plan shall be subject to review, modification and approval under the procedures established in Paragraphs X below.

The CMI Program Plan shall be developed in accordance with, at a minimum, RCRA, its implementing regulations and applicable, relevant and appropriate EPA and state guidance documents including those described in Subparagraph A of this Paragraph. The CMI Program Plan shall be developed and performed in a manner consistent with the CMI Scope of Work.

L. The CMI Program Plan shall provide for the design, construction, operation, maintenance and monitoring of corrective measures at the subject facility. In accordance with the provisions of the attached CMI Scope of Work, the CMI Program shall include four principal tasks, as follows: (1) CMI Program Plan, (2) Corrective Measures Design, (3) Corrective Measures Construction, and (4) Reports. These tasks will include the elements outlined in the CMI Scope of Work.

M. The defendant shall commence and complete implementation of the tasks required by the approved workplan and program plan in accordance with the standards, specifications and schedules stated in the particular plan.

N. In the event that the post-closure permit for a Closing Unit is called pursuant to Paragraph IV above, the corrective action process undertaken at the Facility under this Paragraph will be coordinated with the corrective action requirements under the post-closure permit, in a manner to be determined by plaintiff.

VIII. FINANCIAL ASSURANCE FOR CORRECTIVE ACTION

A. Defendant is required to establish financial assurance for corrective action at the facility in compliance with 40 CFR 264.101(b).

B. The financial assurance vehicle shall be established and fully funded prior to defendant's implementation of the corrective measures in accordance with the CMI Program Plan.

IX. QUALITY ASSURANCE, QUALITY CONTROL AND SAMPLING

A. Throughout all sample collection and analysis activities, the defendant shall use EPA-approved quality assurance, quality control and chain-of-custody procedures, and where so notified by the MSDEQ, any additional state-approved quality assurance, quality control and chain-of-custody procedures.

B. In addition, the defendant shall:

1. Ensure that laboratories used by defendant for analyses perform such analyses according to the EPA methods included in "Test Methods for Evaluating Solid Waste" (SW-846, Third Edition, November 1986 and subsequent updates), "RCRA Groundwater Monitoring Technical Enforcement Guidance Document"

(OSWER Directive 9950.1, Sept. 1986) or other methods approved by plaintiff. If methods other than the EPA methods included in the above-referenced guidance document are to be used, defendant shall submit all protocols to be used for analyses to plaintiff for approval at least thirty (30) calendar days prior to the commencement of the analyses.

2. Ensure that laboratories used by defendant for analyses participate in a quality assurance/quality control program equivalent to that which is followed by EPA. As part of such a program, and upon request by plaintiff, such laboratories shall perform analyses of samples provided by plaintiff to demonstrate the quality of the analytical data.

3. Notify plaintiff at least ten (10) calendar days in advance of the selection of laboratories which will be used by the defendant and require by contract with each such laboratory that EPA personnel and EPA-authorized representatives have reasonable access to the laboratories and personnel used for analyses. Denial of access to EPA personnel or its representatives constitutes an independent, non-reviewable ground for rejection of that laboratory's data.

4. Use EPA guidance to evaluate all data to be used in plans and reports to be submitted under this Decree. This evaluation shall be provided to plaintiff as part of the plans and reports and shall be updated as required by plaintiff.

C. The defendant shall notify plaintiff in writing at least ten (10) calendar days before engaging in any field activities, such as well drilling, installation of equipment or sampling.

At the request of plaintiff, the defendant shall provide to plaintiff, or allow plaintiff or its authorized representative to take, split samples of all samples collected by the defendant pursuant to this Decree. Similarly, at the request of the defendant, plaintiff shall allow the defendant to take split or duplicate samples of all samples collected by plaintiff under this Decree.

X. REVIEW AND APPROVAL PROCESS

A. Except as otherwise provided in this Decree, each plan, report, permit application or other document submitted to plaintiff and MSDEQ shall be subject to review, modification and approval by plaintiff and MSDEQ.

B. Each plan, report, permit application or other document to be submitted by the defendant to plaintiff shall also be submitted to MSDEQ, and each recipient agency shall be given three copies of each such submission, unless another number of copies is requested by an agency in writing.

C. Each report, plan, or other document submitted by Defendant and approved by plaintiff hereunder shall be deemed incorporated by reference into this Decree as if fully set forth herein.

XI. MODIFICATIONS AND ADDITIONAL WORK

A. In order to protect human health or the environment, plaintiff may determine that work is required in addition to the tasks and deliverables required under this Decree and its attachments. In this event, plaintiff shall direct in writing that the defendant perform the additional work and shall specify the basis for plaintiff's determination that the additional work is needed. Subject to the dispute resolution provisions of Paragraph XVII below, the defendant shall perform the additional work requested.

B. If defendant declines to undertake some or all of the additional work required pursuant to paragraph A above, plaintiff retains authority to undertake the work at Defendant's expense or to take any other action authorized under CERCLA, RCRA or other applicable statutes or laws.

C. If plaintiff determines that any activities undertaken pursuant to this Decree have caused or may cause a release to the environment of hazardous waste, constituents or substances or a threat to the public health or the environment, plaintiff shall notify defendant of the potential release or threat and may order the defendant (1) to stop immediately any specified activities under this Decree for such period of time as may be needed to abate any such release or threat and (2) to undertake any action which plaintiff determines is necessary to abate such release or threat. Relevant schedules affected by the work stoppage shall be extended by any period during which implementation is stopped by order of plaintiff, provided that the release or threat is not due to noncompliance by defendant with this Decree.

D. Except as provided in Subparagraphs A, B and C above, the obligations of defendant and the schedules for their performance, as set out in the Scopes of Work attached to this

Decree and in the Workplans approved pursuant to this Decree, may be modified only by agreement of the settling parties in writing, which agreement shall be incorporated herein by reference. Such an agreement to modify a Scope of Work or Workplan does not require approval by the Court but shall be effective upon its signature by the representatives of plaintiff and defendant authorized to receive submissions pursuant to Paragraph XII, Subparagraphs A and C below.

E. Except as provided in this Paragraph and in Paragraphs XII and XIII below, the terms of this Decree may be modified only by order of the Court.

XII. SUBMISSIONS

A. All documents, including reports, approvals, disapprovals, notifications and other correspondence, required to be submitted pursuant to this Decree, shall be sent by certified mail or by overnight mail to the following addressees, or to such other addressees as the settling parties hereafter may designate in writing:

1. Documents or correspondence to plaintiff shall be sent to:

John Dickinson, Chief
Waste Compliance Section
RCRA and FF Branch
U.S. EPA-Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

2. Additionally, copies of all documents or correspondence to plaintiff related to any matter with respect to which the dispute resolution provisions of Paragraph XVII

have been invoked shall be sent to the addressee designated in Subparagraph 4 below for the appropriate state regulatory agency and to:

Chief
Environmental Enforcement Section
Land and Natural Resources Division
U.S. Department Of Justice
P.O. Box 7611
Ben Franklin Station
Washington, D.C. 20044

3. Documents or correspondence to the defendant shall be sent to:

Plant Manager
Cedar Chemical Corporation
Vicksburg Plant
Rifle Range Road
Vicksbug, Mississippi 39180

4. Documents or correspondence to the state regulatory agencies shall be sent to:

Mr. Sam Mabry, Chief
Hazardous Waste Division
Bureau of Pollution Control
Mississippi Department of
Environmental Quality
P.O. Box 10385
Jackson, Mississippi 39209

5. Documents or correspondence to the defendant related to any matter with respect to which the dispute resolution provisions of Paragraph XVII have been invoked shall be sent to:

Mr. Allen T. Malone, Esq.
Apperson, Crump, Duzane & Maxwell
One Commerce Square
Suite 2110
Memphis, Tennessee 38103

B. In any instance in which notification by EPA is provided for or required under the terms of this Decree, such notification may be made separately by EPA or jointly by EPA and MSDEQ.

XIII. PROJECT COORDINATORS

A. The settling parties and the MSDEQ designate the following individuals to act as Project Coordinators, to monitor the progress of the activities required under this Decree, to communicate informally concerning problems which have arisen or which are anticipated in the implementation of this Decree and to coordinate communications among defendant, plaintiff and the state regulatory agency:

As to plaintiff:

Ms. Jeaneanne Gettle
Waste Compliance Section
RCRA and FF Branch
U.S. EPA, Region IV
345 Courtland Street, NE
Atlanta, Georgia 30365

As to the defendant:

Steve Boswell, Director
Environmental Affairs
Vicksburg Plant
Rifle Range Road
Vicksburg, Mississippi 39180

As to the state MSDEQ:

Mr. Steve Spengler
Chief, RCRA TSD Branch
Mississippi Department of Environmental Quality
P.O. Box 10385
Jackson, Mississippi

B. Such coordination and informal communication by the Project Coordinators shall not relieve the parties of any notice and reporting requirements set forth elsewhere in this Decree and its attachments.

C. Plaintiff, the defendant and MSDEQ shall each have the unilateral right to change their respective Project Coordinators. Such a change does not require approval of the Court and shall be accomplished by notifying the other Project Coordinators of the change in writing at least seven calendar days prior to the effective date of the change.

XIV. ADDITIONAL REPORTING REQUIREMENTS

A. Beginning with the first full month following the effective date of this Decree, the defendant shall provide plaintiff and the MSDEQ with monthly written progress reports. The reports shall be mailed by the tenth day of the month in which they are due and shall conform to the requirements in the relevant Scope of Work. These reports may be submitted in the form of a certified letter with attachments, which may include bar graphs or other graphic material.

B. In the event that a spill or other release of hazardous substances or wastes occurs at the Subject Facility, requiring the notification of state or federal emergency response personnel, the defendant shall also notify the Project Coordinators for plaintiff and MSDEQ within twenty-four (24) hours after the occurrence of the spill or release. Such notification may be given orally and shall be in addition to any notice otherwise required to be given under federal or state law.

XV. ACCESS

A. Until termination of this Decree, plaintiff, MSDEQ, and their employees, contractors and duly designated representatives, shall have access to the subject facilities at any reasonable time. Nothing in this Decree shall be construed to limit any rights of access that plaintiff or MSDEQ have under federal, state or local laws, regulations or permits. Plaintiff's right of access under this Decree shall be in addition to, and not in substitution for, its right of entry and access under applicable federal laws. The rights of access of plaintiff and MSDEQ under this Decree shall include, but not be limited to, access for the purposes of:

1. Inspecting and verifying compliance with this Decree;

2. Monitoring the progress of activities required by this Decree;

3. Inspecting sampling data and all other records generated pursuant to this Decree; and

4. Verifying any data or information submitted to plaintiff in accordance with this Decree.

B. To the extent that work required by this Decree, or by any plan approved pursuant to this Decree, must be performed in whole or in part on property not owned or controlled by the defendant, defendant shall use its best efforts to obtain site access agreements from the present owners of such property within twenty (20) calendar days after approval of any plan for which site access is required. "Best efforts" as used in this paragraph shall include, at a minimum, a certified letter from the defendant to the present owners of such property requesting access agreements to permit the defendant, plaintiff, the MSDEQ and their authorized representatives access to such property. If the defendant does not obtain necessary agreements for access within twenty (20) calendar days after plaintiff's approval of a plan which identifies the need for access, the defendant shall inform plaintiff in writing of both their efforts to obtain access agreements and their failure to obtain such agreements, within ten (10) calendar days after their efforts cease. Plaintiff may then assist the defendant in obtaining access or itself undertake to obtain the required access, by agreement or any other lawful means. Defendant shall bear all costs incurred by Plaintiff in gaining access.

C. In connection with any voluntary transfer of ownership or control of all or any part of the subject facilities, the defendant shall require the transferee to agree in writing to allow access to the subject facility by the defendant, plaintiff, and MSDEQ, and their employees, contractors, and duly designated representatives.

XVI. DELAY IN PERFORMANCE/STIPULATED PENALTIES

A. Unless there has been a written modification of a compliance date by agreement of the parties or there has been excusable delay as defined under the "Force Majeure" provisions contained in Paragraph XVIII below, for each day or part thereof that defendant fails to comply with any submission, requirement or other deadline set forth in this Decree, including any deadline in a schedule set forth in a plan approved pursuant to this Decree, the defendant shall pay to plaintiff the following stipulated penalties:

1. For failure to commence work as prescribed in this Consent Decree and EPA approved plans and reports under this Decree: 4,000 dollars ($4,000) per day per violation for one to seven days of delay , 6,000 dollars ($6,000) per day per violation for eight to fifteen days of delay and 10,000 dollars ($10,000) per day per violation for each day of delay or part thereof, thereafter;

2. For failure to submit any preliminary and final reports or workplans, at the time required pursuant to this Consent Decree: 3,000 dollars ($3,000) per day per violation for one to seven days of delay, 5,000 dollars ($5,000) per day per violation for eight to fifteen days of delay and 9,000 dollars ($9,000) per day per violation for each day of delay or part thereof, thereafter;

3. For failure to submit other deliverables required by this Consent Decree: 2,000 dollars ($2,000) per day per violation for one to seven days of delay, 4,000 dollars ($4,000) per day per violation for eight to fifteen days of delay and 8,000 dollars ($8,000) per day per violation for each day of delay or part thereof, thereafter.

4. For other failure to comply with provisions of this Consent Order after notice by EPA of noncompliance and a reasonable opportunity to comply: 10,000 dollars ($10,000) per

day per violation for each day of noncompliance or part thereof, thereafter.

B. Separate stipulated penalties shall accrue with respect to each submission, requirement and deadline. Nothing herein shall preclude the simultaneous and cumulative accrual of such separate penalties for separate violations of this Consent Decree.

C. Stipulated penalties under this Paragraph shall accrue from the date of the violation and shall be due and payable 30 days after demand by plaintiff for payment. Stipulated penalties which are due and payable shall be paid by certified check delivered to:

U.S. Environmental Protection Agency

The check shall be made payable to the "United States Treasury" and shall reference United States v. Cedar Chemical Corporation, Civil No.____. The defendant shall simultaneously send a copy of the transmittal letter to the addressee specified for plaintiff in Paragraph XII, Subparagraph A above.

D. If the defendant refuses to pay stipulated penalties, plaintiff may exercise any and all legal remedies available to plaintiff. However, nothing in this Paragraph shall prohibit, alter or in any way limit plaintiff's right to seek any other remedies or sanctions available by virtue of the defendant's violation(s) of this Decree or of the statutes and regulations upon which this Decree is based.

E. The provisions of this Decree, including the provision for the payment of stipulated penalties pursuant to this Paragraph, shall not limit or affect the claims of plaintiff or defendant as against any third parties who are not parties to this Decree.

F. The defendant may dispute plaintiff's right to the stated amount of stipulated penalties by invoking the dispute resolution procedures established under Paragraph XVII below. Payment, but not accrual, of stipulated penalties with respect to any issue so disputed shall be stayed pending resolution of the dispute. If the defendant does not prevail upon resolution of the dispute, plaintiff may collect all stipulated penalties which accrued prior to and during the period of dispute. If the defendant prevails upon resolution of the dispute, no penalties shall be payable.

XVII. DISPUTE RESOLUTION

A. The settling parties agree to use their best efforts to resolve all disputes or differences of opinion informally and in good faith. If a disagreement is not resolved informally, the defendant may pursue the matter formally by invoking the dispute resolution procedures of this Paragraph. The dispute resolution provisions of this Paragraph shall be applicable to any and all disputes which may arise under this Decree.

B. If the defendant disagrees, in whole or in part, with any decision or directive of plaintiff, the defendant shall promptly notify plaintiff and MSDEQ in writing of its objection(s) and each ground therefor. The notice shall set forth the specific points in dispute, the position that the defendant asserts should be adopted as consistent with the requirements of this Decree, the grounds for the defendant's position and any other facts which it desires plaintiff to consider.

C. The parties shall have a period of twenty (20) calendar days after plaintiff's receipt of the defendant's written objections to attempt to resolve the dispute. If agreement is reached, the resolution shall be reduced to writing, signed by representatives of each settling party and incorporated herein by reference.

D. If the parties are unable to reach an agreement within twenty (20) calendar days after plaintiff's receipt of the defendant's written objections, plaintiff shall then provide to the defendant, within ten (10) calendar days, its written decision on the dispute. Plaintiff's decision shall control unless the defendant files a petition for resolution of the dispute with the Court, pursuant to Subparagraph E below.

E. If plaintiff has issued a written decision on a dispute pursuant to Subparagraph D above, plaintiff's position shall control the issue unless the defendant files with the Court a petition which describes the nature of the dispute and includes a proposal for its resolution. The defendant's petition must be filed no later than thirty (30) calendar days after its receipt of plaintiff's written decision. Plaintiff shall then have thirty (30) calendar days to respond to the petition. In any such dispute to be resolved by the Court, the defendant shall bear the burden of proof.

XVIII. FORCE MAJEURE

A. The defendant shall perform the requirements of this Decree, its attachments and any plans approved pursuant to this Decree within the time limits set forth therein, unless the performance is prevented or delayed by events which constitute a force majeure. A force majeure is defined as any event arising from causes not foreseeable and beyond the control of defendant, which could not be overcome by due diligence and which delays or prevents performance. Increased costs of performance of the terms of this Decree, changed economic circumstances or the defendant's financial inability to carry out the provisions of this Decree shall not constitute force majeure events.

B. The defendant shall notify plaintiff in writing within ten (10) calendar days after it becomes aware of events which the defendant knows or should know may constitute a force majeure. Such written notice shall include the anticipated length and cause of the delay, the measures taken or to be taken to prevent or minimize the delay, and the timetable by which defendant intends to implement these measures. The defendant's failure to comply with the notice requirements of the two preceding sentences with respect to an event which is later claimed to constitute a force majeure shall constitute a waiver of its right to invoke the force majeure provisions of this Paragraph and to request a waiver of any of the requirements of this Decree with respect to that event.

C. If the settling parties agree that the delay or anticipated delay has been caused by a force majeure event, the time for performance hereunder will be extended for a period equal to the delay resulting from the event. This extension shall be accomplished through a modification pursuant to Paragraph XI, Subparagraph D above.

D. If plaintiff does not agree with defendant that any delay in the achievement of the requirements of this Decree has been caused by a force majeure event, plaintiff shall so notify defendant in writing. Plaintiff's decision shall control unless the defendant pursues a resolution of the dispute, pursuant to Paragraph XVII above.

E. In the event that the defendant invokes the dispute resolution provisions of Paragraph XVII of this Decree with respect to the application of this Paragraph, defendant shall have the burden of proving that the delay was caused by a force majeure event.

XIX. WAIVER OF RIGHTS OF APPEAL

Except as expressly provided herein, defendant waives any and all rights of judicial and administrative review or appeal otherwise available to them under the applicable federal and state laws and regulations. The mechanisms for dispute resolution provided herein shall constitute the sole remedy available to defendant in the event of any dispute concerning the interpretation or implementation of this Decree. However, nothing herein shall prohibit either party from appealing an adverse decision under Paragraph XVII.

XX. COVENANT NOT TO SUE

Effective upon termination of this Decree pursuant to Paragraph XXVI below, plaintiff covenants not to sue the defendant for relief pursuant to Section 3008(a), (g) and (h) of RCRA, 42 U.S.C. § 6928(a), (g) and (h), for violations of RCRA which arose prior to entry of this Decree and which are alleged in plaintiff's Complaint.

XXI. RESERVATION OF RIGHTS

A. Except as expressly provided in Paragraph XX above, plaintiff reserves any and all rights and remedies available to it, including, without limitation, the right to take enforcement action pursuant to Section 7003 of RCRA, 42 U.S.C. § 6973, and to take enforcement or response actions pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. § 9601 et seq., as amended.

B. Neither plaintiff nor the defendant waives any legal or equitable claims or defenses against persons not party to this Decree.

C. Nothing in this Decree shall constitute an admission by any of the settling parties.

D. Compliance by the defendant with the terms of this Decree shall not relieve defendant of its obligations to comply with RCRA and its implementing regulations, including any changed statutory or regulatory requirements thereunder, nor shall it relieve the defendant of its obligations to comply with other applicable local, state or federal laws or regulations.

E. This Decree is not intended to be, nor shall it be construed as, a permit under any state or federal law or regulation.

XXII. INDEMNIFICATION

Defendant agrees to indemnify and save and hold harmless the United States government, its agencies, departments, agents and employees, from any and all claims or causes of action arising from or on account of the acts or omissions of defendant or its officers, employees, agents, contractors, receivers, trustees, successors, assigns or any other person or entity acting on its behalf in carrying out activities pursuant to this Decree.

XXIII. RECORD PRESERVATION

Defendant shall preserve, during the pendency of this Decree and for a minimum of six (6) years after its termination, at least one copy of all records and documents in its possession or in the possession of its divisions, employees, agents, accountants, contractors or attorneys, which relate in any way to this Decree, notwithstanding any document retention policy of any defendant. The defendant shall notify plaintiff thirty (30) calendar days prior to the destruction of any such records or documents and shall provide plaintiff with the opportunity to inspect and take possession of any such records or documents. The defendant shall require that its employees, agents, accountants, contractors and attorneys comply with the provisions of this Paragraph.

XXIV. PUBLIC ACCESS TO INFORMATION

All data, factual information and documents submitted by the defendant to plaintiff or to MSDEQ pursuant to this Decree shall be subject to public inspection or release unless at the time of submission the defendant asserts a confidential business information or trade secret claim pursuant to applicable federal or state law. Information for which such an assertion is made shall be treated in accordance with the requirements of 40 C.F.R. Part 2 and the applicable state statutes and regulations. Defendant's failure to assert such a claim at the time the information is submitted to EPA or MSDEQ shall preclude defendant from thereafter raising any objection to the release of the information. The defendant shall not assert a claim of confidentiality regarding any hydrogeological, chemical or sampling data generated pursuant to this Decree.

XXV. ADMISSIBILITY OF DATA

Defendant shall not object to the admissibility in any subsequent proceeding of analytical data that it or anyone acting on its behalf gathered or generated pursuant to this Decree on the grounds of hearsay or failure to maintain chain of custody.

XXVI. EFFECTIVE PERIOD OF THE DECREE

A. This Decree is effective upon its entry by the Court.

B. The defendant shall notify plaintiff when it determines that it has fully complied with all the terms of this Decree. Within 120 days of receipt of said notice, plaintiff shall inform the defendant in writing whether the terms of this Decree have been fully satisfied. If plaintiff agrees with defendant, the settling parties shall file a joint motion with the Court to terminate this Decree. If plaintiff disagrees with the defendant as to their full compliance with this Decree, then the defendant may seek to resolve the dispute pursuant to Paragraph XVII above.

XXVII. RETENTION OF JURISDICTION

This Court shall retain jurisdiction over this Decree for the purpose of ensuring compliance with its terms and conditions.

XXVIII. COSTS AND ATTORNEYS FEES

Each settling party shall bear its own costs and attorneys fees in this action.

XXIX. NOTICE REQUIREMENTS

The parties acknowledge that final approval by plaintiff and the entry of this Decree are subject to the public notice and comment requirements of 28 C.F.R. § 50.7.

WHEREFORE, the parties enter into this Decree and respectfully submit it to the Court in order that it may be approved and entered.

DONE AND SO ORDERED this 17th day of April, 1992.

William H. Barbour, Jr.

United States District Judge

For the Defendant Cedar Chemical Corporation:

F. L. Adkins / Plt. Mgr — 12/11/90

NAME/TITLE
CEDAR CHEMICAL CORPORATION
Date

1/22/91

ALLEN T. MALONE, ESQ.
Apperson, Crump, Duzane & Maxwell
One Commerce Square
Suite 2110
Memphis, Tennessee 38103
(901) 525-1711
Date

William L. Smith — 12/11/90

WILLIAM L. SMITH, ESQ.
Brunini, Grantham, Grower & Hewes
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248 East Capitol Street
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(601) 948-3101
Date

For the United States of America:

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ATTACHMENT A

SCOPE OF WORK FOR INTERIM MEASURES (IM)

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

ATTACHMENT A

SCOPE OF WORK FOR INTERIM MEASURES (IM)

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

PURPOSE

The purpose of Interim Measures (IM) is to mitigate the potential threat to human health and the environment. Interim measures must be consistent with and integrated into any long term solution at the Facility.

SCOPE

The Interim Measures program consists of the following four tasks:

Task I Interim Measures Workplan

A. Interim Measures Objectives
B. Health and Safety Plan
C. Community Relations Plan

Task II Interim Measures Design Program

A. Design Plans and Specifications
B. Operations and Maintenance Plan
C. Project Schedule
D. Final Design Documents

Task III Interim Measures Construction Quality Assurance Plan

A. Construction Quality Assurance Objectives
B. Inspection Activities
C. Sampling Requirements
D. Documentation

Task IV Reports and Other Submissions

A. Progress Reports
B. Interim Measures Workplan
C. Final Design Documents
D. Draft Interim Measures Report
E. Final Interim Measures Report

TASK I INTERIM MEASURES WORKPLAN

The Defendant shall prepare an Interim Measures Workplan. The Workplan shall include the following:

A. Interim Measures Objectives

The Workplan shall specify the objectives of the interim measures, demonstrate how the interim measures will abate releases and threatened releases, and to the extent possible, be consistent and integrated with any long-term solution at the Facility. The Interim Measures Workplan will include a discussion of the technical approach, engineering design, engineering plans, schedules, budget, and personnel. The Workplan will also include a description of qualifications of personnel performing or directing the interim measures, including contractor personnel, and document the overall management approach to the interim measures. Specific interim measures shall include, but not be limited to:

1. Management of surface impoundments

   Defendant shall prepare a report, within thirty (30) days of the effective date of this Order, providing information on the current status of the surface impoundment, including but not limited to, engineering drawings and specifications depicting the closure or planned closure of the unit. Additionally, the report shall include a topographich site plan showing the inlet to the surface impoundment and th source of water flow into the inlet during rain events as well as dry periods and showing areas of direct run on.

2. Management of the landfill

   The landfill will be maintained so as to prevent potential releases of hazardous constituents and erosion of the existing cap. Vegetation on the cap shall be maintained and soil with a vegetative cover shall be placed in areas of visual contamination. The IM Workplan shall include details for this maintenance.

3. Management of surface water runoff and areas with contaminated soils

   The IM Workplan shall include a plan for ensuring that areas where soils have been sampled, and found to contain contaminants or areas which the defendant knows to be contaminated, shall be managed to prevent infiltration or migration of the contaminants, including but not limited to, that caused by runoff of surface water. At a minimum, this plan shall include the areas identified in Figure A-1 and Table A-1.

   The soils and sediment within inactive process areas in the South plant are contaminated with pesticides. The surface drainage from the South plant is intended to flow to the surface impoundment where contaminated sediment will settle within the surface impoundment or be filtered out by the carbon in the carbon absorption vessels. In order to accomplish that objective, the surface water running in ditches along the railroad track south of the inactive atrazine plan must be forced to flow into the south sump from which water is pumped into the surface impoundment. The IM Workplan shall include a plan for ensuring that the surface water is managed in the above manner.

The sampling, analysis and corrective measures studies for these areas will be left to the RFI/CMS process; however, the IM Workplan shall include details for the construction and installation of a temporary device or devices to prevent further infiltration or migration of potentially contaminated sediment into the areas identified in Table A-1 and Figure A-1. The temporary devices may include, but are not limited to:

- caps, and
- infiltration fences.

The IM Workplan shall include construction details of the temporary devices, and an Operating and Maintenance Procedure which shall provide for repair and maintenance following periods of substantial rainfall, or other events which result in repair or maintenance being necessary for the continued effective operation of the devices.

This IM Workplan shall be submitted within thirty (30) days of the effective date of the consent decree.

4. Management of sumps and catch basins

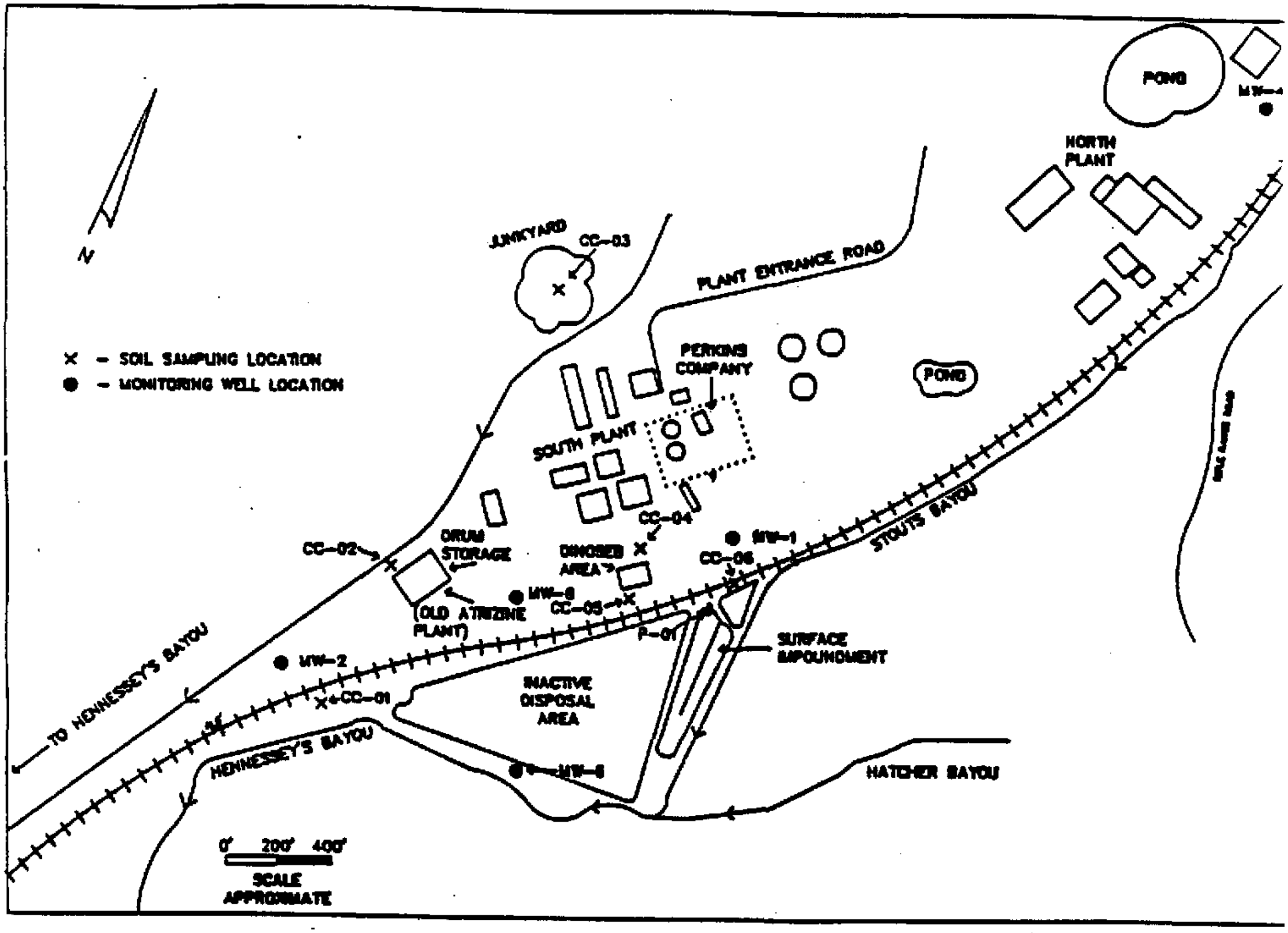
Within seven (7) calendar days of the effective date of the consent decree, the defendant shall begin removal of spilled or leaked hazardous waste constituents and accumulated precipitation from sumps and catch basins, if these units are not intended to be used for drainage of precipitation. After removal of waste, the defendant shall close or cover the sumps and catch basins so as to preclude subsequent accumulation of hazardous waste constituents or precipitation. If the collected material is a hazardous waste under 40 CFR Part 261, it is subject to management as a hazardous waste in accordance with all applicable requirements of 40 CFR Parts 260 through 270. Subsequent to the initial removal of material from the sumps, the defendant shall remove any additional material which accumulates in them, within four (4) days of its accumulation.

5. Monitoring of Ground Water

The IM Workplan shall provide for modification of the existing ground water monitoring program based upon information available at the time of the Workplan development. This plan shall ensure that all hazardous waste management units, and solid waste management units or areas of concern which have known releases, have a sufficient number of monitoring wells to immediately detect a release from the unit or to define the rate and extent of contamination.

FIGURE A-1

AREAS FOR MANAGEMENT OF CONTAMINATED SEDIMENTS



Modified from U.S. Environmental Protection Agency, February, 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

TABLE A-1

AREAS OF CONTAMINATED SOILS AT VICKSBURG CHEMICAL CORPORATION

Location	Sample Reference ID Number
Small valley (mud flat) at the west corner of the landfill	CC-01a, VL-003b
Eroded area east of the landfill	VL-002
Area adjacent to the hazardous container (drum) storage area	CC-02, Fc
Junkyard north of the south plant	CC-03
Area north of the dinoseb production area	CC-04, G
Area between the dinoseb area and the Illinois Central Railroad	CC-05
Area between the surface impoundment at the south plant and the Illinois Central Railroad	CC-06

Notes:

The descriptions of the locations in this table are the best available descriptions from the source documents that were used. These documents are listed below.

a. Source of information for samples numbered CC-01 through CC-06 -- U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

b. Source of information for samples numbered F and G -- Jack McCord, MDNR, September 22, 1986. Memorandum to file. Subject: September 3, 1986 Sampling Trip to Vicksburg Chemical.

c. Source of information for samples numbered VL-002 and VL-003 -- U.S. Environmental Protection Agency, January 26, 1982. Report: Hazardous Waste Site Investigation, January 22, 1982, Vertac Chemical Corporation, Vicksburg, Mississippi.

The IM Workplan shall include a Sampling and Analysis Plan which specifies procedures and techniques for sample collection, sample preservation and shipment, analytical procedures and chain of custody control.

Subsequent to the modification of the groundwater monitoring program and implementation of the sampling and analysis plan, the Defendant shall submit an annual groundwater monitoring report on or before March 1 following each calendar year. This report shall include, at a minimum, the calculated rate of migration of hazardous waste or hazardous waste constituents in the groundwater, the calculated rate of migration of the groundwater, and a summary of groundwater data previously generated.

B. <u>Health and Safety Plan</u>

Defendant shall prepare a facility Health and Safety Plan.

1. Major elements of the Health and Safety Plan shall include:

   a. Facility description including availability of resources such as roads, water supply, electricity, and telephone service;

   b. Description of the known hazards and an evaluation of the risks associated with each activity conducted, including, but not limited to on- and off-site exposure to contaminants during the implementation of interim measures at the Facility.

   c. A list of key personnel and alternates responsible for site safety, response operations, and for protection of public health;

   d. Delineation of the work area;

   e. Protection levels to be worn by personnel in work area;

   f. Procedures to control site access;

   g. Decontamination procedures for personnel and equipment;

   h. Site emergency procedures;

   i. Emergency medical care for injuries and toxicological problems;

   j. Description of requirements for an environmental surveillance program;

   k. Specifications for any routine and special training required for responders; and

   l. Procedures for protecting workers from weather-related problems.

2. The Facility Health and Safety Plan shall be consistent with:

   a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

   b. United States Environmental Protection Agency (EPA) Order 1440.1 - Respiratory Protection;

   c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

   d. Facility Contingency Plan;

   e. EPA Standard Operating Safety Guide (1984);

   f. OSHA regulations, particularly in 29 CFR 1910 and 1926;

   g. State and local regulations; and

   h. Other EPA guidance as provided.

C. <u>Community Relations Plan</u>

Defendant shall prepare a written plan, for the dissemination of information to the public, regarding interim measure activities and results. In the event that public meetings are scheduled, defendant shall prepare fact sheets and be present for participation in the meetings.

<u>INTERIM MEASURES DESIGN PROGRAM</u>

The Interim Measures Design Program shall be incorporated in the Interim Measures Workplan to implement the interim measure(s) at the Facility. The Interim Measures Design Program includes four activities: design plans and specifications, operations and maintenance plans, project schedules, and final design documents. The design program shall include measures discussed in the Interim Measures Workplan objectives.

A. <u>Design Plans and Specifications</u>

Defendant shall develop clear and comprehensive design plans and specifications which include but are not limited to the following:

1. Discussion of the design strategy and the design basis, including:

   a. Compliance with all applicable or relevant environmental and public health standards; and

   b. Minimization of environmental and public impacts.

2. Discussion of the technical factors of importance including:

    a. Use of currently accepted environmental control measures and technology;

    b. The constructability of the design, and

    c. Use of currently acceptable construction practices and techniques.

3. Description of assumptions made and detailed justification of these assumptions;

4. Discussion of the possible sources of error and references to possible operation and maintenance problems;

5. Detailed drawings of the proposed design including:

    a. Qualitative flow sheets;

    b. Quantitative flow sheets;

    c. Facility layout; and

    d. Utility locations.

6. Tables listing materials, equipment and specifications;

7. Tables giving material balances; and

8. Appendices including:

    a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

    b. Derivation of equations essential to understanding the report; and

    c. Results of laboratory or field tests.

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, Respondent shall coordinate and cross-check the specifications and drawings and complete the proofing of the edited specifications and required cross-checking of all drawings and specifications.

B. <u>Operation and Maintenance Plans</u>

Defendant shall prepare an Operation and Maintenance Plan to cover both implementation and long-term maintenance of the interim measures. The plan shall be composed of the following elements:

1. Equipment start-up and operator training:

   Defendant shall prepare and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjust- ment, start-up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

2. Description of normal operation and maintenance (O&M):

   a. Description of tasks for operation;

   b. Description of tasks for maintenance;

   c. Description of prescribed treatment or operation conditions;

   d. Schedule showing frequency of each O&M task; and

   e. Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing:

   a. Description of monitoring tasks;

   b. Description of required laboratory tests and their interpretation;

   c. Required QA/QC; and

   d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.

4. Description of equipment:

   a. Equipment identification;

   b. Installation of monitoring components;

   c. Maintenance of site equipment; and

   d. Replacement schedule for equipment and installed components; and

5. Records and reporting mechanisms required:

   a. Daily operating logs;

   b. Laboratory records;

   c. Mechanism for reporting emergencies;

   d. Personnel and maintenance records; and

   e. Monthly/annual reports to Federal/State agencies.

The Operation and Maintenance Plan shall be submitted with the Final Design Documents.

C. Project Schedule

Defendant shall develop a detailed Project Schedule for construction and implementation of the interim measure(s) which identifies timing for initiation and completion of all critical path tasks. Defendant shall specifically identify dates for completion of the project and major interim milestone(s) which are enforceable terms of this Order. A Project Schedule shall be submitted simultaneously with the Final Design Documents.

D. Final Design Documents

The Final Design Documents shall consist of the Final Design Plans and Specifications (100% complete), the Final Draft Operation and Maintenance Plan, and Project Schedule. Defendant shall submit the final documents 100% complete with reproducible drawings and specifications. The quality of the design documents should be such that Defendant would be able to include them in a bid package and invite contractors to submit bids for the construction project.

INTERIM MEASURES CONSTRUCTION QUALITY ASSURANCE PLAN

The Interim Measures Construction Quality Assurance (CQA) Plan shall be incorporated in the Interim Measures Workplan to ensure, with a reasonable degree of certainty, that a completed interim measure(s) meets or exceeds all design criteria, plans, and specifications. The CQA Plan must be submitted to EPA for approval prior to the start of construction. This CQA Plan shall include the following elements: construction quality assurance objectives, inspection activities, and documentation. Upon EPA and MSDEQ review, and EPA approval of the CQA Plan, Defendant shall construct and implement the interim measures in accordance with the approved design, schedule, CQA plan, and operation and maintenance plan.

A. Construction Quality Assurance Objectives

In the CQA Plan, Defendant shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to, the following: responsibility and authority, personnel qualifications, inspection activities, sampling requirements, and documentation. The responsibility and authority of all organizations (i.e. technical consultants, construction firms, etc.), and key personnel involved in the construction of the interim measure shall be described fully in the CQA Plan. Defendant must identify a CQA officer and the necessary supporting inspection staff.

B. Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the interim measure(s) shall be summarized in the CQA Plan. The Plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited, to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection should also ensure compliance with all health and safety procedures. In addition to oversight inspections, Defendant shall conduct the following activities:

1. Preconstruction inspection and meeting

Defendant shall conduct a preconstruction inspection and meeting to:

a. Review methods for documenting and reporting inspection data;

b. Review methods for distributing and storing documents and reports;

c. Review work area security and safety protocol;

d. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and

e. Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person, and minutes should be transmitted to all parties.

2. <u>Prefinal inspection</u>

Upon preliminary project completion, Defendant shall notify EPA and MBPC for the purposes of conducting a prefinal inspection. The prefinal inspection shall consist of a walk-through inspection of the entire project site. The inspection is to determine whether the project is complete and consistent with the contract documents and the EPA-approved interim measure. Any outstanding construction items discovered during the inspection will be identified and noted. Additionally, treatment equipment will be operationally tested by Defendant. Defendant will certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed. The prefinal inspection report should outline the outstanding construction items, actions required to resolve items, completion date for these items, and date for final inspection.

3. Final inspection

Upon completion of any outstanding construction items, Defendant shall notify EPA and MSDEQ for the purposes of conducting a final inspection. The final inspection shall consist of a walk-through inspection of the project site. The prefinal inspection report shall be used as a checklist, with the final inspection focusing on the outstanding construction items identified in the prefinal inspection. Confirmation shall be made that outstanding items have been resolved.

4. Sampling and testing requirements

The CQA Plan shall present sampling and testing activities, sample size, sample and test locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems.

C. Documentation

Reporting requirements for CQA activities shall be described in detail in the CQA Plan. This plan shall include such items as daily summary reports, inspection data sheets, problem identification and interim measures reports, design acceptance reports, and final documentation.

Provisions for the final storage of all records shall be presented in the CQA Plan.

<u>REPORTS</u>

The Interim Measures Workplan shall include reporting requirements. The reports shall include, but not be limited to the following: progress reports, the Interim Measures Workplan, design plans and specifications, operation and maintenance plan, final design documents, and the draft and final interim measures report.

A. Progress Reports

Defendant shall, at a minimum, provide EPA and MSDEQ with signed, monthly progress reports containing:

1. A description and estimate of the percentage of the interim measures completed;

2. Summaries of all findings;

3. Summaries of all changes made in the interim measures during the reporting period;

4. Summaries of all contacts with representatives of the local community, public interest groups, or State government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Interim Measures Workplan

Defendant shall submit an Interim Measures Workplan to EPA and MSDEQ as discussed in this attachment within thirty (30) calendar days of the effective date of this Order.

C. Final Design Documents

Defendant shall submit Final Design Documents as discussed in this attachment within thirty (30) calendar days of approval of the Interim Measures Workplan.

D. Draft Interim Measures Report

At the "completion" of project construction (except for long-term operation, maintenance and monitoring), Defendant shall submit an Interim Measures Implementation Report to EPA and MSDEQ. The Report shall document that the project is consistent with the design specifications, and that the interim measures are performing adequately. The Report shall include, but not be limited to, the following elements:

1. Synopsis of the interim measures and certification of the design and construction;

2. Explanation of any modifications to the plans and why these were necessary for the project;

3. Listing of the criteria, established before the interim measures were initiated, for judging the functioning of the interim measures and also explaining any modification to these criteria;

4. Results of facility monitoring, indicating that the interim measures will meet or exceed the performance criteria; and

5. Explanation of the operation and maintenance (including monitoring) to be undertaken at the Facility.

This report shall include but not be limited to: inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviation from design and material specifications (with justifying documentation), and as-built drawings.

E. Final Interim Measures Report

Defendant shall finalize the Interim Measures Workplan and the Interim Measures Implementation Report incorporating comments received on draft submissions.

FACILITY SUBMISSION SUMMARY

FACILITY SUBMISSIONS	DUE DATE *
INTERIM MEASURES Workplan - Interim Measures Objectives - Health and Safety Plan - Community Relations Plan	Within thirty (30) calendar days of the effective date of the consent decree
FINAL DESIGN DOCUMENTS - Design Plans and Specifications - Operation and Maintenance Plan - Project Schedule	Within thirty (30) calendar days of approval of the workplan
CONSTRUCTION QUALITY ASSURANCE PLAN - Construction Quality Assurance Objectives - Inspection Activities	Within thirty (30) calendar days of approval of the workplan
Draft Interim Measures Report	Within sixty (60) calendar days of completion of construction
Final Interim Measures Report	Thirty (30) days after receipt of EPA and MSDEQ comments on Draft Interim Measures Report
Progress Reports	Monthly
Ground Water Monitoring Reports	March 1, annually

ATTACHMENT B

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION (RFI)

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

PURPOSE

The purpose of this RCRA Facility Investigation (hereafter "RFI") is to determine the nature and extent of releases of hazardous wastes and/or hazardous constituents from regulated units, solid waste management units, and other source areas at the facility and to gather all necessary data to support the Corrective Measures Study. Defendant shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RCRA facility investigation at Cedar Chemical Corporation, in Vicksburg, Mississippi (hereafter "the Facility").

The Defendants shall prepare plans and conduct investigations that satisfy the tasks listed below, which are more specifically developed in the following pages. Such plans and investigations shall be submitted in accordance with the requirements of the Consent Decree, using the applicable guidance listed therein, or as designated by EPA and MSDEQ (hereafter "the Agencies"). All documents shall be certified by appropriate individuals, as specified in the regulations.

SCOPE

The RCRA Facility Investigation consists of seven tasks:

Task I: Description of Current Conditions

A. Facility Background
B. Nature and Extent of Contamination
C. Implementation of Interim Measures

Task II: Pre-Investigation Evaluation of Corrective Measures Technologies

Task III: RFI Workplan Requirements

A. Project Management Plan
B. Data Collection Quality Assurance Plan
C. Data Management Plan
D. Health and Safety Plan
E. Site Characterization Plan
F. Community Relations Plan

Task IV: Groundwater Assessment

Task V: Implementation of the Facility Investigation

Task VI: Investigation Analysis

A. Data Analysis
B. Protection Standards

Task VII: Laboratory and Bench-Scale Studies

Task VIII: Reports and Other Submissions

A. Preliminary and Final Workplan Submissions
B. Progress Reports
C. Draft and Final RFI Reports
D. Groundwater Assessment Workplan and Report

TASK I: DESCRIPTION OF CURRENT CONDITIONS

Defendant shall submit, within thirty (30) days of the effective date of the Consent Decree, a report summarizing the background information pertinent to the facility, contamination, and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included. This report shall be subject to the Agencies' review and approval procedures as established in the Consent Decree. Data gathered during any previous investigations or inspections and other relevant data shall be included.

A. Facility Background

Defendant's report shall summarize the regional location, pertinent boundary features, general facility physiography, and hydrogeology. The report shall also summarize historical use of the facility for the treatment, storage, or disposal of solid and hazardous wastes including but not limited to those areas or units designated in the RCRA Facility Assessment and the following areas or units (see Figures B-1 and B-2):

- Activated carbon treatment units
- Container (drum) storage area
- Returned product storage area
- Surface impoundment (south plant)
- Wastewater storage tank(s)
- Dinoseb drumming area
- Dinoseb loading/unloading area
- Dinoseb production area
- Landfill (inactive disposal area) and pits used inside the boundaries of the landfill including the area of the former dinoseb wastewater pond
- Equalization/neutralization pond (north plant)
- Pond (north plant)
- Drains, sumps, and catch basins and piping
- Drum storage areas

- Surplus equipment storage
- Neutralization tanks (south plant)
- Chemical crypt

Defendant's report shall include:

1. A map(s) for each item listed below:

   Note: The North area must point to the top of the page

   a. General geographic location;

   b. General Cross-sectional map, including but not limited to, Cross-sections of solid and hazardous waste management units;

   c. Property lines, with the owners of all adjacent property clearly indicated;

   d. Topography and surface drainage depicting all waterways, wetlands, floodplains, water features, drainage patterns, and surface-water containment areas;

   e. A survey map showing soil classifications for the entire site;

   f. All tanks, buildings, utilities, paved areas, easements, right-of-ways, and other features; within the property boundaries;

   g. All solid or hazardous waste treatment, storage, or disposal areas active after November 19, 1980, including but not limited to the areas identified in Task I Section A or in Figures B-1 and B-2;

   h. All known past solid or hazardous waste treatment, storage, or disposal areas regardless of whether they were active on November 19, 1980, including but not limited to the areas identified in Task I Section A or in Figures B-1 and B-2;

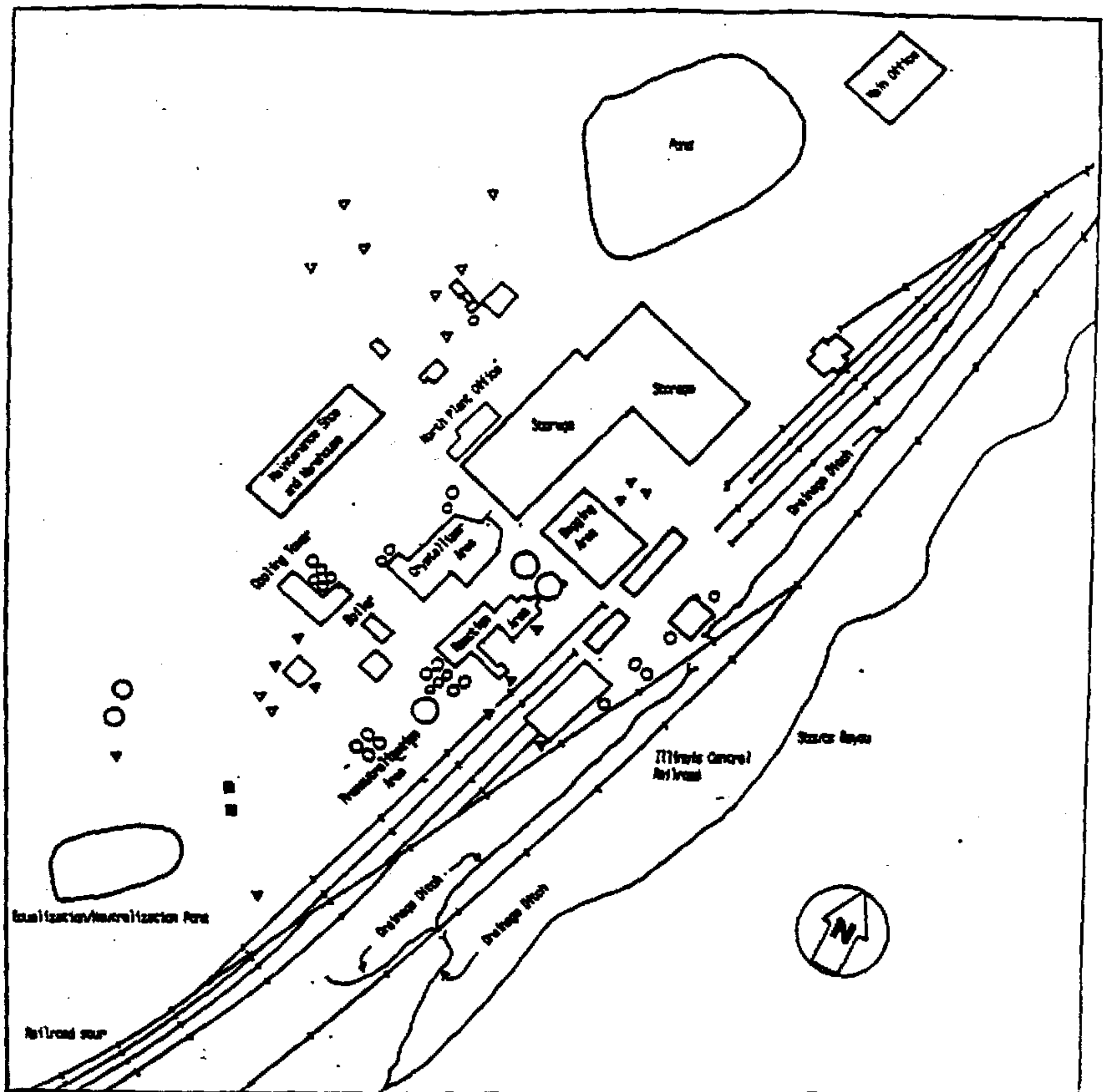
   i. All known past and present product and waste underground tanks or piping;

   j. Surrounding land uses (residential, commercial, agricultural, recreational);

   k. The location of all production recovery, underground injection, and ground-water monitoring wells, including but not limited to, RCRA and CERCLA wells. These wells shall be clearly labeled, with ground and top of casing elevations and construction details included (these elevations and details may be included as an attachment);

FIGURE B-1

CEDAR CHEMICAL CORPORATION
LAYOUT OF THE NORTH PLANT INCLUDING PAST AND PRESENT FEATURES



Legend

- ○ Tanks (vertical or horizontal)
- ■ Drums
- ▼ Staining (liquid, general staining, or dark toned material)
- ▽ Waste pile

Approximate scale: 167 feet = 1 inch

Reproduced from

Developers International Services, Corp., Memphis, TN, Vertac Chemical Corporation Facility, Plot Plan and Ground Contours, November 10, 1981.

Kraft Engineering Services, Inc., Monroe, LA, Vicksburg Chemical Corporation, Effluent System Improvements, March 6, 1974.

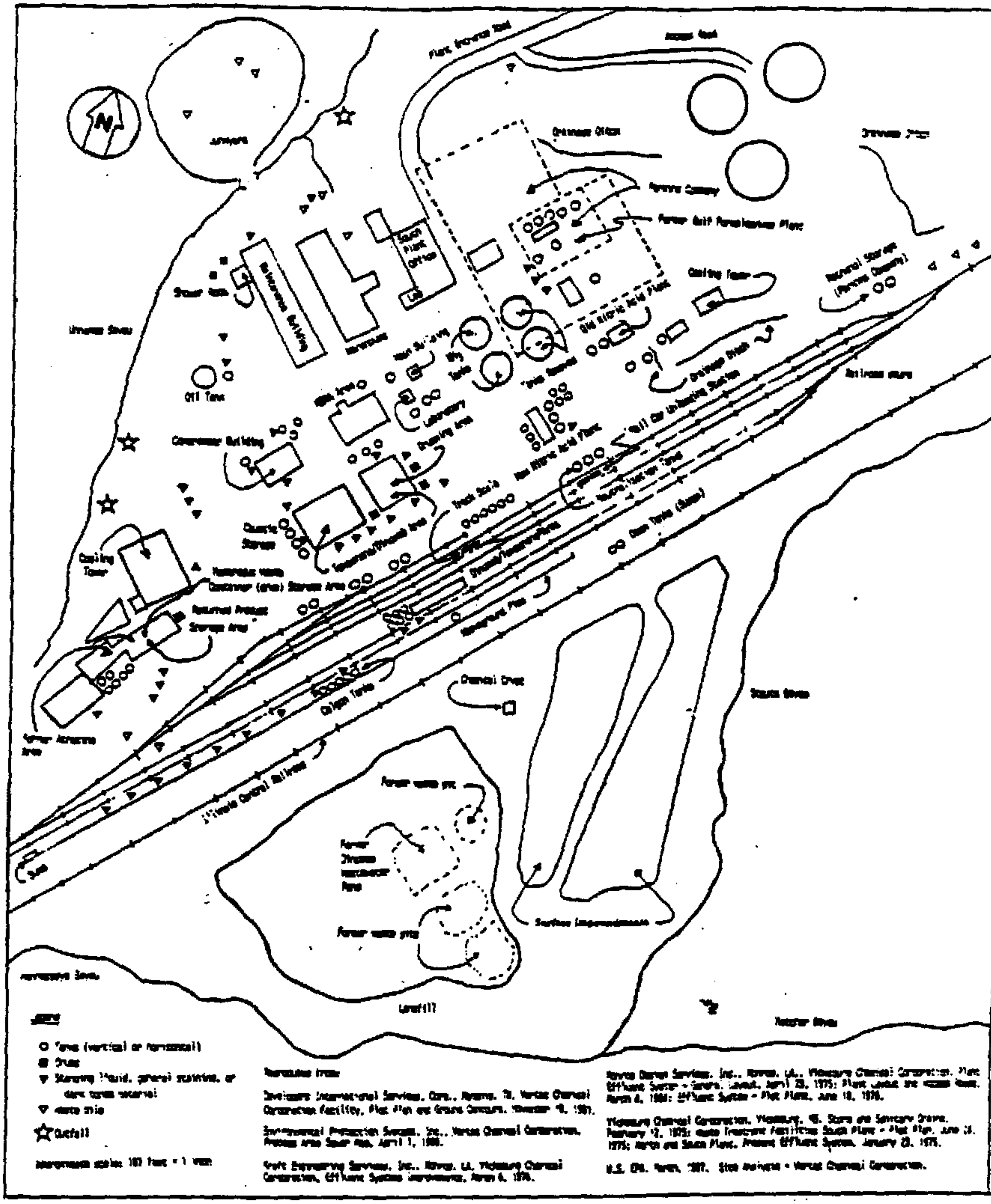
Monroe Design Services, Inc., Monroe, LA., Vicksburg Chemical Corporation, Plant Layout and Access Roads, March 6, 1984.

Vicksburg Chemical Corporation, Vicksburg, MS, North and South Plant, Present Effluent System, January 23, 1978.

U.S. EPA, March, 1987. Site Analysis - Vertac Chemical Corporation.

FIGURE B-2

CEDAR CHEMICAL CORPORATION
LAYOUT OF THE SOUTH PLANT INCLUDING PAST AND PRESENT FEATURES



1. Aerial photographs of the entire facility, one taken in normal light and one taken by infrared photography.

All maps shall be consistent with the requirements set forth in 40 CFR Part 270.14 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site; all maps shall be aligned with the north direction arrows perpendicular to the edge of the page;

2. A history and description of facility ownership and operation, and solid and hazardous waste generation, treatment, storage, and disposal activities at the facility;

3. Dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, State, or Federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

4. A summary of past permits requested and/or received, any enforcement actions and their subsequent responses, and a list of documents and studies prepared for the facility.

B. Nature and Extent of Contamination

Defendant shall prepare and submit for the Agencies' review and approval, as provided in the Consent Decree, a preliminary report describing the existing information on the nature and extent of contamination at or from the facility. This report shall be submitted in conjunction with the RFI.

1. Defendant's report shall summarize all possible source areas of contamination. This, at a minimum, shall include all regulated units, solid waste management units, spill areas, and other suspected source areas of contamination or areas of concern. For each area, Defendant shall submit to the Agencies a list identifying all waste streams and waste materials subject to storage, treatment, or disposal in each waste management unit. This list shall include all wastes whether it is hazardous or non-hazardous which are destined for the area. These source areas of contamination shall include but are not limited to those identified in Table A-1, Task I Section A or in Figures B-1 and B-2. For each area, Defendant shall, at a minimum, identify the following:

   a. Location of unit/area depicted on a facility map (see requirements of 40 CFR);

   b. Quantities of solid and hazardous wastes;

c. Hazardous wastes or constituents, to the extent known; and

d. Identification of areas where additional information is necessary.

2. Defendant shall prepare an assessment and description of the existing degree and extent of contamination at or from the facility. This shall include:

a. Available monitoring data and qualitative information on locations and levels of contamination at the facility;

b. A minimum of three cross-sectional maps with at least two transecting at right angles to each other delineating local geology, with the extent of the plume(s) superimposed (define a zero line for the plume[s]).

c. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and

d. The potential impact(s) on human health and the environment, including demography, ground-water and surface-water use, and land use.

C. Implementation of Interim Measures

Defendant's report shall document interim measures which were or are being undertaken at the facility in accordance with the Interim Measures Workplan in Attachment A. This shall include a discussion of:

1. Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long-term solution at the facility;

2. Design, construction, operation, and maintenance requirements;

3. Schedules for design, construction, and monitoring; and

4. Schedule for progress reports.

TASK II: PREINVESTIGATION EVALUATION OF CORRECTIVE MEASURE TECHNOLOGIES

In conjunction with the submittal of the RFI Workplan, the Defendant shall submit to the Agencies a report that identifies the potential corrective measures technologies that may be used on-site or off-site for the containment, treatment, remediation, and/or disposal of contamination. This report shall also identify any field, laboratory, bench, or pilot scale data that needs to be collected during the facility investigation to facilitate the evaluation and selection of the final corrective measure or measures (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of wastes, etc.).

TASK III: RFI WORKPLAN REQUIREMENTS

Defendant shall prepare a RCRA Facility Investigation (RFI) Workplan and submit it within sixty (60) days of approval of the report due pursuant to Task I above. This RFI Workplan shall include the development of several plans, which shall be prepared concurrently. Each plan shll include a proposed site specific implementation schedule. During the RCRA FAcility Investigation, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accommodate the facility specific situation. The RFI Workplan shall include the following:

A. Project Management Plan

The RFI Workplan shall contain a Project Management Plan which includes a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan shall also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This Plan shall also document the overall management approach to the RCRA Facility Investigation.

1. Summary of Personnel Qualifications

The Summary of Personnel Qualifications section of the Project Management Plan shall include at a minimum the following:

a. Name, title and qualifications of the engineer and/or geologist directing the project.

b. Name, title and qualifications of any contractors, subcontractors and their personnel involved with the project

B. Data Collection Quality Assurance Plan

The RFI Workplan shall include a plan to document all monitoring performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented.

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance

Plan shall include, but not be limited to, the following:

a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses;

b. Description of methods and procedures to be used to assess the precision, accuracy, and completeness of the measurement data;

c. Description of the rationale used to assure that the data accurately and precisely represent any characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Examples of factors which shall be considered and discussed include:

   i) Environmental conditions at the time of sampling;

   ii) Number of sampling points;

   iii) Representativeness of selected media; and

   iv) Representativeness of selected analytical parameters.

d. Description of the measures to be taken to assure that the following data sets can be compared to each other:

   i) RFI data generated by Defendant over some time period;

   ii) RFI data generated by an outside laboratories or consultants versus data generated by the Defendant;

   iii) Data generated by separate consultants or laboratories, and

   iv) Data generated by an outside consultant or laboratory over some time period.

e. Details relating to the schedule and information to be provided in quality assurance reports. The reports should include but not be limited to:

   i) Periodic assessment of measurement data accuracy, precision, and completeness;

   ii) Results of performance audits;

   iii) Results of system audits;

   iv) Significant quality assurance problems and recommended solutions; and

v) Resolutions of previously stated problems.

2. Sampling Strategy and Procedures

The sampling section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate sampling locations, depths, etc.;

b. Providing a statistically sufficient number of sampling sites;

c. Measuring all necessary ancillary data;

d. Determining conditions under which sampling should be conducted;

e. Determining which media are to be sampled (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of sampling and length of sampling period;

h. Selecting the types of samples (e.g., composite vs. grab) and number of samples to be collected;

i. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;

j. Documenting field sampling operations and procedures, including:

i) Documentation of procedures for preparing reagents or supplies which become an integral part of the sample (e.g., filters, preservatives and absorbing reagents);

ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

iii) Documentation of specific sample preservation methods;

iv) Calibration of field devices;

v) Collection of replicate samples;

vi) Submission of field-biased blanks, where appropriate;

vii) Potential interferences present at the facility;

viii) Construction materials and techniques, associated with monitoring wells and piezometers;

ix) Field equipment listing and and type of sample containers;

x) Sampling order; and

xi) Decontamination procedures.

k. Selecting appropriate sample containers;

l. Sample Preservation; and

m. Chain-of-custody procedures, including;

i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and

ii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

3. Field Measurements

The field measurements section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate field measurement locations, depths, etc.;

b. Providing a statistically sufficient number of field measurements;

c. Measuring all necessary ancillary data;

d. Determining conditions under which field measurements should be conducted;

e. Determining which media are to be addressed by appropriate field measurements (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of field measurements and length of each field measurement period; and

h. Documenting field measurement operations and procedures, including:

i) Procedures and forms for recording raw data and the exact location, time, and facility-specific considerations associated with the data acquisition;

ii) Calibration of field devices;

iii) Collection of replicate measurements;

iv) Submission of field-biased blanks, where appropriate;

v) Potential interferences present at the facility;

vi) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;

vii) Field equipment listing;

viii) Order in which field measurements are to be made; and

ix) Decontamination procedures.

4. Sample Analysis

The Sample Analysis section of the Data Collection Quality Assurance Plan shall specify the following:

a. Chain-of-Custody procedures, including:

i) Identification of a responsible party to act as sample custodian at the laboratory facility and authorized to sign for incoming field samples, to obtain documents of shipment, and to verify data entered onto the sample custody records;

ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and

iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.

b. Sample storage procedures and holding times;

c. Sample preparation methods;

d. Analytical procedures, including:

i) Scope and application of the procedure;

ii) Sample matrix;

iii) Potential interferences;

iv) Precision and accuracy of the methodology; and

v) Method detection limits.

e. Calibration procedures and frequency;

f. Data reduction, validation and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

i) Method blank(s);

ii) Laboratory control sample(s);

iii) Calibration check sample(s);

iv) Replicate sample(s);

v) Matrix-spiked sample(s);

vi) "Blind" quality control sample(s);

vii) Control charts;

viii) Surrogate samples;

ix) Zero and span gases; and

x) Reagent quality control checks.

h. Preventive maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turn-around time.

EPA may conduct a performance audit of the laboratories selected by the Defendant.)

C. <u>Data Management Plan</u>

Defendant shall develop, within the RFI Workplan, and initiate, within the RFI, a Data Management Plan to document and track investigation data and results. This plan shall identify and establish data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation, including the following:

1. Data Record

   The data record shall include the following:

   a. Unique sample or field measurement code;

   b. Sampling or field measurement location and sample or measurement type;

   c. Sampling or field measurement raw data;

   d. Laboratory analysis identification number;

   e. Property or component measured; and

   f. Results of analysis (e.g., concentration).

2. Tabular Displays

   The following data shall be presented in tabular displays:

   a. Unsorted (raw) data;

   b. Results for each medium, or for each constituent monitored;

   c. Data reduction for statistical analysis;

   d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

   e. Summary data.

3. Graphical Displays

   The following data shall be presented in graphic format (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three-dimensional graphs, etc.):

   a. Display sampling location and sampling grid;

   b. Indicate boundaries of sampling area, and areas where more data are required;

   c. Displays levels of contamination at each sampling location;

   d. Display geographical extent of contamination;

e. Display contamination levels, averages, and maxima;

f. Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and

g. Indicate features affecting intramedia transport and show potential receptors.

D. Health and Safety Plan

Defendant shall prepare a facility Health and Safety Plan which ensures the health and safety of workers and other individuals within the immediate area.

1. Major elements of the Health and Safety Plan shall include:

   a. Facility description including availability of resources such as roads, water supply, electricity, and telephone service;

   b. Description of the known hazards and evaluation of the risks associated with each activity conducted, including but not limited to, on-site and off-site exposure to contaminants during the implementation of interim measures at the facility;

   c. List of key personnel and alternates responsible for site safety, response operations, and for protection of public health;

   d. Delineation of the work area;

   e. Discription of protection to be worn by personnel in work area;

   f. Procedures to control work area access;

   g. Discription of decontamination procedures for personnel and equipment;

   h. Establish site emergency procedures;

   i. Emergency medical care for injuries and toxicological problems;

   j. Discription of the environmental surveillance program;

   k. Discription of the safety training provided to personnel in the work area; and

   l. Establish procedures for protecting workers from weather-related problems.

- The uppermost aquifer, that is, the geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs; and

- Water-bearing zones above the first confining layer that may serve as pathways for contaminant migration, including perched zones of saturation;

v) From data obtained from groundwater monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, generate a representative description of water level or fluid pressure monitoring, including:

- Water-level contour and/or potentiometric maps;

- Hydrologic cross sections showing vertical gradients;

- The flow system, including the vertical and horizontal components of flow; and

- Any temporal changes in hydraulic gradients, for example, due to tidal or seasonal influences; and

vi) A description of man-made influences that may affect the hydrogeology of the site, identifying:

- Active and inactive local water supply and production wells with an appropriate schedule of pumping; and

- Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

b. Soils

The Defendants shall conduct a program to characterize the soil and rock units above the water table over the entire site. Such characterization may include, but should not be limited to, the following information:

i) Unified soil classification
ii) Surface soil distribution (in map form);
iii) Soil profile, including ASTM classification of soils;
iv) Transects of soil stratigraphy (include all structural features);
v) Hydraulic conductivity (saturated and unsaturated);

vi) Relative permeability;
vii) Bulk density;
viii) Porosity;
ix) Soil sorptive capacity;
x) Cation exchange capacity (CEC);
xi) Soil organic content;
xii) Soil pH;
xiii) Particle size distribution;
xiv) Depth of water table;
xv) Moisture content;
xvi) Effect of stratification on unsaturated flow;
xvii) Infiltration;
xviii) Evapotranspiration;
xix) Storage capacity;
xx) Vertical flow rate; and
xxi) Mineral content.

c. Surface Water and Sediment

The Defendants shall conduct a program to characterize the surface water bodies in the vicinity of the facility. Such characterization shall include, but not be limited to, the following information:

i) Description of the temporal and permanent surface water bodies including:

- For open water (e.g. lakes and estuaries): location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;

- For rivers, streams, creeks, springs, ditches, and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, discharge points, general content and flooding tendencies (i.e., 100 year events);

- For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;

- Drainage patterns; and

- Evapotranspiration.

ii) Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3, NO_3^-/NO_2^-, PO_4^{-3}), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

2. The Facility Health and Safety Plan shall be consistent with:

   a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

   b. EPA Order 1440.1 -- Respiratory Protection;

   c. EPA Order 1440.3 -- Health and Safety Requirements for Employees Engaged in Field Activities;

   d. Facility Contingency Plan;

   e. EPA Standard Operating Safety Guide (1984);

   f. OSHA regulations particularly in 29 CFR 1910 and 1926;

   g. State and local regulations; and

   h. Other EPA guidance as provided.

E. Site Characterization Plan

The RFI Workplan shall include a Site Characterization Plan which includes provisions for investigating the following areas or, in the alternative, clearly states the technical basis for no further investigation of that area. The plan shall also include a proposed schedule for implementation.

1. Environmental Setting

The Defendants shall collect information to supplement and verify existing information on the environmental setting at the facility. The Defendants shall characterize the following:

a. Hydrogeology

The Defendants shall conduct a program to evaluate hydrogeologic conditions at the facility. This program may utilize information gathered pursuant to any other investigation conducted at the facility. However, at a minimum, the program shall provide the following information:

i) A description of the regional and facility specific geologic and hydrogeologic characteristics affecting groundwater flow beneath the facility, including:

   - Regional and facility specific stratigraphy: description of strata including strike and dip, identification of stratigraphic contacts;

   - Structural geology: description of local and regional structural features (e.g., folding, faulting, jointing, strike and dip);

- Depositional history;
- Identification and characterization of areas and amounts of recharge and discharge;
- Regional and facility specific groundwater flow patterns, both horizontally and vertically; and
- Characterization of seasonal variations in the groundwater flow regime.

ii) An analysis of any topographic features that might influence the groundwater flow system. Include stereographic analysis of both normal light and infrared aerial photographs;

iii) Based on field data, tests, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:

- Hydraulic conductivity and porosity (total and effective);
- Lithology, grain size, sorting, degree of cementation;
- Aquifer interconnection analysis/interpretation of hydraulic interconnection between saturated zones. Identify from field data collected, including aquifer and aquitard testing, the depths, thickness, degree of lateral continuity and hydraulic characteristics of any continuous confining units between water-bearing zones underneath the facility; and
- The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content etc.);

iv) Field studies and cores, structural geology and hydrogeology cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways, identifying:

- Sand and gravel deposits in unconsolidated deposits;
- Zones of fracturing or channeling in consolidated or unconsolidated deposits;
- Zones of higher permeability or low permeability that might direct and restrict the flow of contaminants;

iii) Description of sediment characteristics including:

- Deposition area (include a map);
- Thickness profile; and
- Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

d. Air

The Defendants shall provide information characterizing the climate in the vicinity of the facility. Such information shall include, but not be limited to:

i) A description of the following parameters:

- Annual and monthly rainfall averages;
- Monthly temperature averages and extremes;
- Wind speed and direction;
- Relative humidity/dew point;
- Atmospheric pressure;
- Evaporation data;
- Development of inversions; and
- Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurence.

ii) A description of topographic and manmade features which affect air flow and emission patterns, including:

- Ridges, hills or mountain areas;
- Surface water bodies (e.g. rivers, streams, surface impoundments);
- Wind breaks and forests;
- Buildings; and
- Canyons or valleys.

2. <u>Source Characterization</u>

The Defendants shall have a program to collect analytical data to characterize completely the wastes and the areas where wastes have been placed, collected or removed, including type, quantity, physical form, disposition (containment or nature of deposits), and facility characteristics affecting release, including facility security fencing, engineered barriers, NPDES outfalls, etc. This shall include quantification of the following specific characteristics, at each source area, subsequent to November 1980 and to the extent known or ascertainable for the period prior thereto:

a. Unit/Disposal Area characteristics:

i) Location of unit/disposal area;
ii) Type of unit/disposal area;
iii) Design features;
iv) Operating practices (past and present);
v) Period of operation;
vi) Age of unit/disposal area;
vii) General physical conditions; and
viii) Method used to close the unit/disposal area.

b. Waste Characteristics:

i) Type of waste placed in the unit:

- Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent, or listed hazardous wastes);
- Quantity; and
- Chemical composition.

ii) Physical and chemical characteristics:

- Physical form (solid, liquid, gas);
- Physical description (e.g., powder, oily sludge);
- Temperature;
- pH;
- General chemical class (e.g., acid, base, solvent);
- Molecular weight;
- Boiling point;
- Viscosity
- Solubility in water;
- Cohesiveness of the waste;
- Vapor pressure;
- Flash point; and.
- Density

iii) Migration and dispersal characteristics of the waste:

- Sorption;
- Biodegradability, bioconcentration, biotransformation;
- Photodegradation rates;
- Hydrolysis rates; and
- Chemical transformations.

The Defendants shall document the procedures used in making the above determinations.

3. <u>Contaminant Characterization</u>

The Defendants shall have a program to collect analytical data on groundwater, soils, surface water, sediment and subsurface gas in the vicinity of the facility, in accordance with the sampling and analysis plan. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis. The Defendants shall address the following types of contamination at the facility:

a. Groundwater Contamination

The Defendants shall conduct a Groundwater Quality Assessment Program (GQAP), pursuant to the requirements of the Consent Decree. This program shall, at a minimum, satisfy the requirements of 40 CFR §§ 265.93(d)(3) and 270.14(c) and the applicable portions of 40 CFR 264.

b. Soil Contamination

The Defendants shall conduct an investigation to characterize the contamination of the soil and rock units above the saturation zone in the vicinity of a contaminant release. The investigation shall include, but not be limited to, the following information:

i) A description of the vertical and horizontal extent of contamination;

ii) A description of contaminant and soil chemical properties within the contaminant source areas and plumes. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation;

iii) Specific contaminant concentrations;

iv) The velocity and direction of contaminant movement; and

v) An extrapolation of future contaminant movement.

The Defendants shall document the procedures used in making the above determinations.

c. Surface Water and Sediment Contamination

The Defendants shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the facility. The investigation shall include, but not be limited to, the following information:

i) A description of the horizontal and vertical extent of any plume(s) originating from the facility, and the extent of contamination in underlying sediments;

ii) The horizontal and vertical direction of contaminant movement;

iii) The contaminant velocity;

iv) An evaluation of the physical, biological and chemical factors influencing contaminant movement;

v) An extrapolation of future contaminant movement; and

vi) A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

The Defendants shall document the procedures used in making the above determinations.

d. Air Contamination

The Defendants shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere or any structures or buildings. This investigation shall provide the following information:

i) Description of the horizontal and vertical direction and velocity of contaminant movement;

ii) The rate and amount of the release; and

iii) The chemical and physical composition of the contaminant(s) released, including horizontal and vertical concentration profiles.

The Defendants shall document the procedures used in making the above determinations.

e. Subsurface Gas Contamination

The Defendants shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste and hazardous constituents in the groundwater. This investigation shall include the following information:

i) A description of the horizontal and vertical extent of subsurface gases mitigation;

ii) The chemical composition of the gases being emitted;

iii) The rate, amount, and density of the gases being emitted; and

iv) Horizontal and vertical concentrations profiles of the subsurface gases emitted.

The Defendants shall document the procedures used in making the above determinations.

4. <u>Potential Receptor Identification</u>

The Defendants shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

a. Local uses and possible future uses of groundwater including:

i) Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

ii) Location of groundwater users, including wells and discharge areas.

The above information should also indicate the aquifer or hydrogeologic unit used and/or impacted for each item.

b. Local uses and possible future uses of surface waters impacting the facility:

i) Domestic and municipal (e.g. potable and lawn/gardening watering);

ii) Recreational (e.g. swimming, fishing);

iii) Agricultural;
iv) Industrial; and
v) Environmental (e.g. fish and wildlife propagation).

c. Human use or access to the facility and adjacent lands including, but not limited to:

i) Recreation;
ii) Hunting;
iii) Residential;
iv) Commercial;
v) Zoning; and
vi) Relationship between population locations and prevailing wind direction.

d. A description of the biota in surface water bodies on, adjacent to, or affected by the facility;

e. A description of the ecology overlying and adjacent to the facility;

f. A demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to: age; sex; and sensitive subgroups; and

g. A description of any endangered or threatened species near the facility.

F. <u>Community Relations Plan</u>

Defendant shall prepare and adhere to a plan for disseminating information to the public regarding investigation activities and results.

<u>TASK IV: GROUNDWATER ASSESSMENT PROGRAM</u>

The Defendants shall prepare and submit to EPD and MSDEQ, a Groundwater Assessment Program Workplan (GWA) and an Annual Groundwater Assessment Report. The GWA Workplan shall be due to EPA and MSDEQ within sixty (60) days of the approval of the report describing current conditions (Task I). The Annual Groundwater Assessment Report will be due no later than March 1 of each year.

A. <u>Groundwater Assessment Workplan</u>

The Defendant's Groundwater Assessment Program must be capable of determining: 1) Whether hazardous waste or hazardous waste constituents have entered the groundwater; 2) The rate and extent of migration of hazardous waste or hazardous waste constituents in the groundwater;

and 3) The concentrations of hazardous waste or hazardous waste constituents in the groundwater. Defendant's Groundwater Assessment Workplan shall include:

1. The number, location, depth of wells, and the rationale for the well placement;

2. Construction logs for each monitoring well;

3. A list of the monitoring parameters, this list shall include indicator parameters as well as the hazardous wastes or hazardous constituents in 40 CFR 261, Appendix IX;

4. Geologic cross-sections;

5. Sampling and analytical methods for those hazardous wastes or hazardous constituents at the facility;

6. Evaluation procedures, including any use of previously-gathered groundwater quality information; and

7. A schedule of implementation.

The Groundwater Assessment Program Workplan is subject to approval by EPA and MSDEQ.

B. Annual Groundwater Assessment Report

The Annual Groundwater Assessment Report shall evaluate the groundwater quality, monitoring system and program, as well as the abatement system at the facility. Pursuant to this Decree, wells shall be sampled according to an EPA approved sampling plan as outlined in Section IV.A.3 of the "Scope of Work". The Defendant's Annual Groundwater Assessment shall include, but not be limited to:

1. Groundwater surface elevations measured on a quarterly basis, for each well specified in the Groundwater Assessment Program Workplan;

2. Annual determination of the rate of groundwater flow and direction in the uppermost aquifer;

3. Concentrations or values of the indicator parameters obtained from quarterly analysis at each groundwater monitoring well;

4. Evaluation of the indicator parameters as outlined within the Facility's Groundwater Assessment Program Workplan.

5. Results of the analysis from each groundwater monitoring well as indicated in the Groundwater Assessment Program Workplan;

6. Calculated hydraulic conductivity and effective porosity; and

7. Summary of results.

TASK V: IMPLEMENTATION OF THE FACILITY INVESTIGATION

Upon notice of approval or modification of the RFI Workplan, the Defendant shall have fifteen (15) days to begin implementation the RFI Workplan as it is approved or modified, pursuant to the approved schedules contained therein. The Defendant shall conduct those investigations necessary to: characterize the potential pathways of contaminant migration (Environmental Setting); define the source(s) of contamination (Source Characterization); define the degree and extent of contamination (Contamination Characterization); identify actual or potential receptors; and to support the development of alternatives from which corrective measures will be selected. The implementation ("Facility Investigation") shall provide data of adequate technical quality to support the development and evaluation of the corrective measures alternative or alternatives during the Corrective Measures Study.

The RFI activities shall follow the plans set forth in Task III, RFI Workplan Requirements. All sampling and analysis shall be conducted in accordance with the Data Collection Quality Assurance Plan. All sampling locations shall be documented in a log and identified on a detailed site map.

TASK VI: INVESTIGATION ANALYSIS

Defendant shall prepare and submit to EPA and MSDEQ, for approval by EPA, an analysis and summary of all Facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g. quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study.

A. Data Analysis

The Defendant shall prepare and submit to the Agencies for approval a draft RFI Report which shall contain an analysis and summary of all facility investigations implemented pursuant to Task V and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and the environment, and to support the Corrective Measures Study. The report shall include the identification of applicable protection standards including those under item B below.

B. Protection Standards

1. Ground-Water Protection Standards

For regulated units, Defendant shall provide information to support the Agencies selection/development of Groundwater Protection Standards for all of the Appendix IX constituents found in the ground water during the Facility Investigation (Task V).

a. The Ground-Water Protection Standards shall consist of:

   i) For any constituents listed in Table 1 of 40 CFR 264.94, the respective value given in that table (Maximum Concentration of Constituents for Ground-Water Protection) if the background level of the constituent is below the one given in Table 1; or

   ii) The background level of that constituent in the groundwater; or

   iii) An EPA-approved Alternate Concentration Limit (ACL).

b. Information to support the Agencies' subsequent selection of Alternate Concentration Limits (ACLs) shall be developed by Defendant in accordance with EPA's guidance. For any proposed ACLs, Defendant shall include a justification based upon the criteria set forth in 40 CFR 264.94(b).

c. Following the receipt of any proposed ACLs, the Agencies shall notify Defendant in writing of approval, disapproval, or modifications. The Agencies shall specify in writing the reason(s) for any disapproval or modification.

d. Within sixty (60) calendar days of receipt of the notification of approval or disapproval of any proposed ACL, Defendant shall amend and submit revisions to EPA.

2. Other Relevant Protection Standards

Defendant shall identify all relevant and applicable standards for the protection of human health and the environment (e.g., National Ambient Air Quality Standards, Federally-approved State Water Quality Standards, etc.).

<u>TASK VII: LABORATORY AND BENCH-SCALE STUDIES</u>

Defendant shall conduct laboratory and/or bench-scale studies to determine the applicability of a corrective-measure technology or technologies to facility conditions. Defendant shall analyze the technologies, based on literature review, vendor contracts, and past experience, to determine the testing requirements.

Defendant shall develop a testing plan identifying the types(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, Defendant shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

Defendant shall prepare a report summarizing the testing program and its results, both positive and negative.

TASK VIII: REPORTS AND OTHER SUBMISSIONS

A. Preliminary Reports and Workplan Submissions

Defendant shall submit to the Agencies, as required herein and in the Consent Decree, reports and workplans including the Description of Current Conditions and the Pre-Investigation Evaluation.

B. Progress Reports

Defendants shall at minimum provide EPA with signed, monthly progress reports containing:

1. A description and estimate of the percentage of the RFI completed;
2. Summaries of all findings;
3. Summaries of all changes made in the RFI during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups, or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel involved with the RFI during the reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

C. Draft and Final Reports

Within forty-five (45) days of completion of the RFI, the Defendant shall prepare, for the Agencies' review, a Draft RCRA Facility Investigation Report which presents the results of studies conducted under Tasks V and VI. The RCRA Facility Investigation Report shall be subject to the review and approval process established in the Consent Decree. The results of studies conducted under Task VII shall be submitted as a separate report when the first revised RCRA Facility Investigation Report is submitted. All reports become final upon approval by the Agencies.

D. <u>Ground-Water Assessment Program Workplan and Report</u>

Defendant shall submit to the Agencies, a plan for a Ground-Water Quality Assessment Program, as required in this Scope of Work.

FACILITY SUBMISSION SUMMARY

An abbreviated summary of the information reporting requirements contained in the RCRA Facility Investigation Scope of Work is presented below:

FACILITY SUBMISSION	DUE DATE *
Description of Current Situation Task I	thirty (30) days
Pre-Investigation Evaluation of Corrective Measure Technologies Task II	sixty (60) days **
Draft RFI Workplan Task III	sixty (60) days **
Groundwater Assessment Workplan Task IV	sixty (60) days **
Implementation of approved RFI Workplan Task V	Within fifteen (15) days of notice of approval of the RFI Workplan
Draft RFI Report Tasks VI and VIII	Within forty-five (45) days of the completion of the RFI
Revised RFI Report Tasks VI and VIII	Within thirty (30) days of agency comment on Draft RFI Report
Laboratory and Bench-Scale Studies Task VII	Concurrent with first revised RFI Report
Progress Reports on Tasks I through VI	Monthly

* All due dates are calculated from the effective date of the Consent Decree unless otherwise specified

** From approval or modification of the Report due under Task I

ATTACHMENT C

SCOPE OF WORK FOR A CORRECTIVE MEASURES STUDY

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

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PURPOSE

The purpose of this Corrective Measures Study (hereafter "CMS") is to develop and evaluate the corrective action alternatives and to recommend the corrective measure or measures to be taken at Cedar Chemical Corporation in Vicksburg, Mississippi. The Defendant will furnish the personnel, material, and services necessary to prepare the corrective measure study, except as otherwise specified herein. The Defendant shall submit to EPA and MSDEQ (hereafter "the Agencies"), sixty (60) calendar days after final approval of the RFI Report, a Draft CMS Report. This report shall contain all information requested in the tasks outlined below. The reports and plans to be submitted will be subject to review, modification and approval pursuant to the procedures established in the Consent Decree. Upon approval of the CMS Report, the Agencies will make the Report available to the public for review and comment and, following public review and comment, will inform the Defendants of the Corrective Measures selected for the Cedar Chemical Corporation Facility.

SCOPE

The Corrective Measures Study consists of four tasks:

Task I: Identification and Development of the Corrective Measures Alternatives

A. Description of Current Situation
B. Establishment of Corrective Action Objectives
C. Screening of Corrective Measures Technologies
D. Identification of the Corrective Measures Alternatives

Task II: Evaluation of the Corrective Measures Alternative or Alternatives

A. Technical/Environmental/Human Health/Institutional
B. Cost Estimate

Task III: Justification and Recommendation of the Corrective Measure or Measures

A. Technical
B. Environmental
C. Human Health

Task IV: Reports and Other Submissions

A. Progress Reports
B. Draft Reports
C. Final Reports
D. Public Notice and Final Selection of Corrective Measure

TASK I: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES

Based on the results of the RCRA Facility Investigation and consideration of the potential corrective measures technologies, the Defendant shall identify, screen, and develop the alternatives for removal, containment, treatment, and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

Defendant shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Report. Defendant shall provide an update to information presented in Task I of the RFI to the Agencies regarding previous response activities and any interim measures which have been or are being implemented at the facility. The Defendant's shall include a statement of the RFI findings identifying the actual or potential exposure pathways that shall be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

Defendant shall propose for the Agencies review and approval facility specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation, EPA guidance, and the requirements of any applicable Federal statutes. At a minimum, all corrective actions concerning ground-water releases from regulated units must be consistent with, and as stringent as, those required under 40 CFR 264.100.

C. Screening of Corrective Measures Technologies

Defendant shall review the results of the RCRA Facility Investigation, and reassess the technologies specified in Task II of the RFI, to identify additional technologies which are applicable at the facility. Defendant shall screen the preliminary corrective measures technologies identified in Task II of the RCRA Facility Investigation and any supplemental technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measures objectives within a reasonable time. The screening process should focus on eliminating those technologies which have severe limitations for a given set of waste and site specific conditions. The screening step may also eliminate technologies based on inherent technologic limitations. Site, waste and technologic characteristics which should be used to screen inapplicable technologies are described in more detail below.

Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

   Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration.

2. Waste Characteristics

   Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics should be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site).

3. Technology Limitations

   During the screening process, the level of technology development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. Identification of the Corrective Measures Alternative or Alternatives

Defendant shall develop the corrective measures alternatives based on the corrective action objectives established under B above and the screening of potential corrective measures technologies undertaken under C above. Defendant shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternatives, and each alternative may consist of an individual technology or combination of technologies.

The alternatives developed should represent a workable number of options that each appear to address adequately all site problems and corrective action objectives. The Defendant shall document the reasons for excluding technologies previously identified under Task II of the RFI.

TASK II: EVALUATION OF THE CORRECTIVE MEASURES ALTERNATIVE OR ALTERNATIVES

Defendant shall describe and evaluate each corrective measures alternative that passes through the Initial Screening in Task I. The evaluation shall be based on technical, environmental, human health, and institutional concerns. Defendant shall also develop cost estimates for each corrective measures alternative.

A. Technical/Environmental/Human Health/Institutional

Technical

1. The Defendant shall evaluate each corrective measures alternative based on technical concerns, including performance, reliability, implementability and safety.

   a. Defendant shall evaluate performance based on the effectiveness and useful life of the corrective measure:

      i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies.

      ii) Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measures technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each alternative shall be evaluated by comparing its projected service to the life of the project.

b. Defendant shall provide information on the reliability of each alternative including its operation and maintenance requirements and its demonstrated reliability:

   i) Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance activities. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance activities. The availability of labor and materials to meet these requirements shall also be considered.

   ii) Demonstrated and expected reliability is a way of evaluating the risk and effect of failure. Defendant shall evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

c. Defendant shall describe the implementability of each alternative including the relative ease of installation (constructability) and the time required to achieve a given level of response:

   i) Constructability is determined by conditions both internal and external to the facility conditions, including such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). Defendant shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities.

   ii) Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. Defendant shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

2. Environmental

Defendant shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of the short-term and long-term beneficial and adverse effects of the response alternative, any adverse effects on environmentally sensitive areas, and an analysis of measures to mitigate adverse effects.

3. Human Health

Defendant shall *assess* each alternative in terms of the extent to which it mitigates short and long term potential exposure to any residual contamination and protects human health both during and after implementation of the corrective measures. The assessment will describe the concentrations and characteristics of the contaminants on-site, potential exposure routes, and potentially affected population. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. The relative reduction of impact will be determined by comparing residual levels of contaminants for each alternative with existing criteria, standards, or guidelines for levels of contaminants acceptable to EPA.

4. Institutional

Defendant shall assess relevant institutional requirements for each alternative. Specifically the effects of Federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

B. <u>Cost Estimate</u>

Defendant shall develop an estimate of the cost of each corrective measures alternative and for each phase or segment of the alternative. The cost estimate shall include both fixed capital and working capital (operation and maintenance) costs. The fixed capital cost estimate will be used to compare corrective measures alternatives.

1. Fixed capital costs consist of direct (construction) and indirect (nonconstruction and overhead) costs.

   a. Direct capital costs include:

      i) Construction costs that is, costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure;

      ii) Equipment costs that is, costs of treatment, containment, disposal, and/or service equipment necessary to implement the action; these materials remain until the corrective action is complete;

      iii) Land and site-development costs that is, expenses associated with purchase of land and development of existing property; and

      iv) Building and services costs that is, costs of process and nonprocess buildings, utility connections, purchased services, and disposal costs.

   b. Indirect capital costs include:

      i) Engineering expenses that is, costs of administra- , design, construction supervision, drafting, and testing of corrective measures alternatives;

      ii) Legal fees and license or permit costs that is, administrative and technical costs necessary to obtain licenses and permits for installation and operation;

      iii) Start-up and shake-down costs that is costs incurred during corrective measures start-up; and

      iv) Contingency allowances that is, funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. Defendant shall consider the following operation and maintenance cost components:

   a. Operating labor costs that is, wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;

   b. Maintenance materials and labor costs that is, costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

c. Auxiliary materials and energy that is costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

d. Purchased services that is, sampling costs, laboratory fees, and professional fees for which the need can be predicted;

e. Disposal and treatment costs that is, costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;

f. Administrative costs that is costs associated with administration of corrective measures operation and maintenance not included under other categories;

g. Insurance, taxes, and licensing costs that is, costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;

h. Maintenance reserve and contingency funds that is, annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

i. Other costs that is, items that do not fit any of the above categories.

TASK III: JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURES

Defendant shall justify and recommend a corrective measures alternative or alternatives using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Trade-offs among health risks, environmental effects, and other pertinent factors shall be highlighted. EPA will select the corrective measures alternative or alternatives to be implemented based on the results of Tasks I and II. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measures which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;

2. Reliability - corrective measures which do not require frequent or complex operation and maintenance activities and that have

proven effective under waste and facility conditions similar to those anticipated will be given preference;

3. Implementability - corrective measures which can be constructed and operated to reduce levels of contamination and to attain or exceed applicable standards in the shortest period of time will be preferred; and

4. Safety - corrective measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Environmental

The corrective measures posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment will be favored.

C. Human Health

The corrective measures must comply with existing EPA and State criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time will be preferred.

TASK IV: REPORTS AND OTHER SUBMISSIONS

Defendant shall prepare a Corrective Measures Study Report presenting the results of Tasks I through III and recommending a corrective measures alternative. Copies of the draft report shall be provided by the Defendant to the Agencies for review and approval in accordance with the schedule approved in the CMS Workplan.

A. Progress Reports

Defendant shall submit to the Agencies signed, monthly progress reports which provide, at a minimum:

1. A description and estimate of the percentage of the CMS completed;

2. Summaries of all findings made during the reporting period;

3. Summaries of all changes made in the CMS during the reporting period;

4. Summaries of all contacts with representatives of the local community, and public interest groups during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel involved with the CMS during the reporting period;

8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory/ monitoring data, etc.

B. Draft Reports

The Corrective Measures Study Report shall at a minimum include:

1. A description of the facility;

   Site topographic map and preliminary layouts.

2. A summary for each corrective measures alternative, of the descriptions, assessments and evaluations made in Tasks I and II, above;

3. A summary of the recommended corrective measures;

   a. Description of the corrective measures and rationale for selection;

   b. Performance expectations;

   c. Preliminary design criteria and rationale;

   d. General operation and maintenance requirements; and

   e. Long-term monitoring requirements.

4. A summary of the RCRA Facility Investigation findings and impact on the recommended corrective measures:

   a. Field studies (ground water, surface water, soil, air); and

   b. Laboratory studies (bench scale, pilot scale).

5. Design and implementation precautions for the recommended Corrective Measures:

   a. Special technical problems;

   b. Additional engineering data required;

c. Permits and regulatory requirements;

d. Access, easements, right-of-ways;

e. Health and safety requirements; and

f. Community relations activities.

6. Cost Estimates and Schedules for the recommended Corrective Measures;

a. Fixed Capital cost estimate;

i) Study Cost Estimates for the comparisons of corrective measure technologies (±30% of projected final cost)

ii) Project Control Capital Cost Estimate for the chosen corrective measure technology (±10% of projected final cost)

b. Working Capital cost estimate (operation and maintenance); and

c. Preliminary project schedule (design, construction, opera-).

Copies of the draft shall be provided by the Defendants to the Agencies.

C. Final Reports

Defendant shall revise the Corrective Measures Study Report, incorporating comments received from the Agencies on the Draft Corrective Measures Study Report.

D. Public Review and Final Selection of Corrective Measures

Upon approval of the Corrective Measures Study Report, the Agencies will make available to the public for review and comment, as specified in the Consent Decree, a summary of the proposed corrective measures, and the justification for their selection. The Corrective Measures Study Report and RCRA Facility Investigation Report shall be included in the justification.

FACILITY SUBMISSION SUMMARY

Facility Submission	Due Date
CMS Workplan	Within sixty (60) calendar days of approval of RFI Report
Implementation of CMS Workplan	Begin within fifteen (15) calendar days of approval of CMS Workplan
Draft CMS Report	In accordance with the schedule contained in the approved workplan
Final CMS Report	Within thirty (30) calendar days of EPA and MSDEQ comment on the Draft CMS
Progress Reports	Monthly

ATTACHMENT D

SCOPE OF WORK FOR THE CORRECTIVE MEASURES IMPLEMENTATION

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

ATTACHMENT D

SCOPE OF WORK FOR THE CORRECTIVE MEASURES IMPLEMENTATION

AT

CEDAR CHEMICAL CORPORATION, VICKSBURG, MISSISSIPPI

PURPOSE

The purpose of this Corrective Measures Implementation (hereafter "CMI") program is to design, construct, operate, maintain, and monitor the performance of the corrective measure or measures selected to protect human health and the environment at the Cedar Chemical Facility. The Defendant shall furnish all personnel, materials, and services necessary for the implementation of the corrective measure or measures at the Facility. Reports and plans will be submitted to EPA and *MSDEQ (hereafter "the Agencies")*. These reports and plans will be subject to review, modification and approval pursuant to the procedures established in the Consent Decree.

SCOPE

The Corrective Measures Implementation program consists of four tasks:

Task I: Corrective Measures Implementation Program Plan

A. Program Management Plan
B. Community Relations Plan

Task II: Corrective Measures Design

A. Design Plans and Specifications
B. Operation and Maintenance Plan
C. Cost Estimate
D. Project Schedule
E. Construction Quality Assurance Objectives
F. Health and Safety Plan
G. Design Phases

Task III: Corrective Measures Construction

A. Responsibility and Authority
B. Construction Quality Assurance Personnel Qualifications
C. Inspection Activities
D. Sampling Requirements
E. Documentation

Task IV: Reports and Other Submissions

A. Progress Reports
B. Draft Reports and Submissions
C. Final Reports and Submissions

TASK I: CORRECTIVE MEASURES IMPLEMENTATION PROGRAM PLAN

The Defendant shall prepare a Corrective Measures Implementation Program Plan. This program will include the development and implementation of several plans, which require concurrent preparation. It may be necessary to revise plans as the work is performed to focus efforts on a particular problem. The Program Plan includes the following:

A. Program Management Plan

The Defendant shall prepare a Program Management Plan which will document the overall management strategy for performing the design, construction, operation, maintenance, and monitoring of corrective measure(s). The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation. The Program Management Plan shall also include a description of qualifications of key personnel directing the Corrective Measures Implementation Program, including contractor personnel.

B. Community Relations Plan

The Defendants shall revise the Facility Community Relations Plan, if one has previously been developed, during design and construction activities to include any changes in the level of information needed due to the concerns of the community.

1. Specific activities which must be conducted during the design stage are as follows:

   a. Revise the facility Community Relations Plan to reflect knowledge of citizen concerns and involvement at this stage of the process; and

   b. Prepare and distribute a public notice and an updated fact sheet at the completion of engineering design.

2. Depending on citizen interest at this point in the corrective action process, specific activities to be conducted during the construction stage could range from conducting group meetings to preparing fact sheets on the technical status.

TASK II: CORRECTIVE MEASURES DESIGN

The Defendant shall prepare final construction plans and specifications to implement the corrective measures at the facility as defined in the Corrective Measures Study. These plans and specifications shall be incorporated into a Corrective Measures Design Plan, which shall also include the following:

A. Design Plans and Specifications

The Defendant shall develop clear and comprehensive design plans and specifications which include, but are not limited to, the following:

1. Discussio f the design strategy and the ,ign basis, including:

    a. Compliance with all applicable or relevant and appropriate environmental and public health standards; and

    b. Minimization of environmental and public impacts.

2. Discussion of the technical factors of importance including:

    a. Use of currently accepted environmental control measures and technology;

    b. The constructability of the design; and

    c. Use of currently acceptable construction practices and techniques.

3. Description of assumptions made and detailed justification of these assumptions;

4. Discussion of the possible sources of error and references to possible operation and maintenance problems;

5. Detailed drawings of the proposed design including;

    a. Qualitative flow sheets; and

    b. Quantitative flow sheets.

6. Tables listing equipment and specifications;

7. Tables giving material and energy balances;

8. Appendices including:

    a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

    b. Derivation of equations essential to understanding the report; and

    c. Results of laboratory or field tests.

B. <u>Operation and Maintenance Plan</u>

The Defendant shall prepare an Operation and Maintenance Plan to cover both implementation and long-term maintenance of the corrective measures. The plan shall be composed of the following elements:

1. Description of normal operation and maintenance (O&M):

    a. Description of tasks for operation;

b. De iption of tasks for maintenanc

c. Description of prescribed treatment or operation conditions; and

d. Schedule showing frequency of each O&M task.

2. Description of potential operating problems:

   a. Description and analysis of potential operating problems;

   b. Sources of information regarding problems; and

   c. Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing:

   a. Description of monitoring tasks;

   b. Description of required laboratory tests and their interpretation;

   c. Required QA/QC; and

   d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.

4. Description of alternate O&M:

   a. Should systems fail, alternate procedures to prevent undue hazard; and

   b. Analysis of vulnerability and additional resource requirements should a failure occur.

5. Safety plan:

   a. Description of precautions, necessary equipment, etc., for site personnel; and

   b. Safety tasks required in the event of systems failure.

6. Description of equipment:

   a. Equipment identification;

   b. Installation of monitoring components;

   c. Maintenance of site equipment; and

   d. Replacement schedule for equipment and installed components.

7. Records a. reporting mechanisms required:

   a. Daily operating logs;

   b. Laboratory records;

   c. Records for operating costs;

   d. Mechanism for reporting emergencies;

   e. Personnel and maintenance records; and

   f. Monthly/annual reports to state agency.

A Draft Operation and Maintenance Plan shall be submitted simultaneously with the Prefinal Design Documents submission. The Final Operation and Maintenance Plan shall be submitted with the Final Design Documents.

C. Capital and Operating and Maintenance Construction Cost Estimate

The Defendant shall develop cost estimates for the purpose of assuring that the facility has the financial resources necessary to construct and implement the corrective measure. The cost estimate developed in the Corrective Measures Study shall be refined to reflect the more detailed, accurate design plans and specifications being developed. The cost estimate shall include both capital and operation and maintenance costs. A draft Cost Estimate shall be submitted simultaneously with the Prefinal Design Documents submission, and the Final Cost Estimate shall be submitted with the Final Design Documents.

D. Project Schedule

The Defendant shall develop a Project Schedule for constructing and implementing the corrective measure or measures which identifies timing for initiation and completion of all critical path tasks. The Defendant shall specifically identify dates for completion of the project and major interim milestones. A draft Project Schedule shall be submitted simultaneously with the Prefinal Design Documents submission, and the Final Project Schedule shall be submitted with the Final Design Documents.

E. Construction Quality Assurance Objectives

The Defendant shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to, the following: responsibility and authority, personnel qualifications, inspection activities, sampling requirements, and documentation. The draft Construction Quality Assurance Plan shall be submitted simultaneously with the Prefinal Design Documents submission, and the Final Construction Quality Assurance Plan shall be submitted with the Final Design Documents.

F. <u>Health and Safety Plan</u>

The Defendant shall modify the Health Safety Plan developed for the RCRA Facility Investigation to address the activities to be performed at the facility to implement the corrective measure(s). The draft revised Health and Safety Plan shall be submitted simultaneously with the Prefinal Design Document submission and the final revised Health and Safety Plan shall be submitted with the Final Design Documents.

G. <u>Design Phases</u>

The design of the corrective measure(s) should include the phases outlined below:

1. Preliminary design

The Defendant shall submit the preliminary design when the design effort is approximately 30% complete. At this stage, the Defendant shall have field-verified the existing conditions of the facility. The preliminary design shall reflect a level of effort such that the technical requirements of the project have been addressed and outlined so that they may be reviewed to determine if the final design will provide an operable and usable corrective measure. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The preliminary construction drawings by the Defendants shall reflect organization and clarity. The scope of the technical specifications shall be outlined in a manner reflecting the final specifications. The Defendant shall include, with the preliminary design submission, calculations reflecting the same percentage of completion as the design they support.

2. Intermediate design

Complex project design may necessitate review of the design documents between the preliminary and the prefinal/final design. At the discretion of the Agencies, a design review may be required at 60% completion of the project. The intermediate design submittal should include the same elements as the prefinal design.

3. Correlation of plans with specifications

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, the Defendant shall:

a. Coordinate and cross-check the specifications and drawings, and

b. Proof the edited specifications and cross-check all drawings and specifications.

These act [illegible]ties shall be completed prior [illegible] the 95% prefinal submittal to EPA an[illegible] [illegible]SDEQ.

4. Equipment start-up and operator training

The Defendant shall prepare and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start-up, and operation of the treatment systems and training covering appropriate operational procedures once the start-up has been successfully accomplished.

5. Additional studies

Corrective Measures Implementation may require additional studies to supplement the available technical data, and this need for additional studies may be identified by the Agencies or the settling defendant. For any such studies required, the Defendant shall furnish all services, including field work, materials, supplies, plants, labor, equipment, investigations, studies, and superintendents. Sufficient sampling, testing, and analysis shall be performed to optimize the required treatment and/or disposal operations and systems. When additional studies are required, there shall be an initial meeting of all principal personnel involved in the development of the program. The purpose will be to discuss objectives, resources, communication channels, roles of personnel involved, and orientation of the site, etc. The interim report shall present the results of the testing with the recommended treatment or disposal system (including options). A review conference shall be scheduled after the interim report has been reviewed by all interested parties. The final report of the testing shall include all data taken during the testing and a summary of the study results.

6. Prefinal and final design

The Defendant shall submit the prefinal/final design documents in two phases. The first submission shall be at 95% completion of design (i.e., prefinal). After approval of the prefinal submission, the Defendants shall execute the required revisions and submit the final documents 100% complete with reproducible drawings and specifications.

The prefinal design submittal shall consist of the Design Plans and Specifications, Operation and Maintenance Plan, Capital and Operating and Maintenance Construction Cost Estimate, Project Schedule, Quality Assurance Plan, and the revised Health and Safety Plan.

The final design submittal shall consist of the Final Design Plans and Specifications (100% complete), the Defendant's Final Construction Cost Estimate, the Final Operation and Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule, and Final Health and Safety Plan. The quality of the design documents should be such that the

Defendant would be able to include them in a bid package and invite contra rs to submit bids for the cons ction project.

TASK III: CORRECTIVE MEASURES CONSTRUCTION

Following approval of the final design documents, the Defendant shall develop, submit for approval and implement a Construction Quality Assurance Program (CQAP), in accordance with the CQA. This program shall ensure, with a reasonable degree of certainty, that a completed corrective measure(s) meets or exceeds all design criteria, plans, and specifications. The CQA plan is a facility-specific document which must be submitted to the Agencies for review and approval prior to the start of construction. At a minimum, the CQA plan should include the elements which are summarized below. Upon approval of the CQA plan, the Defendant shall construct and implement the corrective measures in accordance with the approved design, schedule, and CQA plan. The Defendant shall also implement the elements of the approved Operation and Maintenance Plan.

A. Responsibility and Authority

The responsibility and authority of all organizations (i.e. technical consultants, construction firms, etc.), and key personnel involved in the construction of the corrective measures shall be described fully in the CQA plan. The Defendant must identify a CQA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

The qualifications of the CQA officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessary to fulfill their identified responsibilities.

C. Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the corrective measure(s) shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to, air quality and emissions monitoring records and waste disposal records (e.g., RCRA transportation manifests). The inspections should also ensure compliance with all health and safety procedures. In addition to oversight inspections, the Defendants shall conduct the following activities:

1. Preconstruction inspection and meeting

The Defendant shall conduct a preconstruction inspection and meeting to accomplish the following purposes:

a. to review methods for documenting and reporting inspection data;

b. to review methods for distributing and storing documents and reports;

c. to review work area security and safety protocol;

d. to discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and

e. to conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person, and minutes should be transmitted to all parties.

2. Prefinal inspection

Upon preliminary project completion, the Defendant shall notify EPA and MSDEQ so that they may conduct a prefinal inspection. The prefinal inspection will consist of a walk-through inspection of the entire project site. The inspection is to determine whether the project is complete and consistent with the contract documents and the approved corrective measures. Any outstanding construction items discovered during the inspection will be identified and noted. Additionally, treatment equipment will be operationally tested by the Defendants. The Defendant will certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed. The prefinal inspection report shall outline the outstanding construction items, actions required to resolve items, completion date for these items, and date for final inspection.

3. Final inspection

Upon completion of any outstanding construction items, the Defendant shall notify EPA and MSDEQ so that they may conduct a final inspection. The final inspection will consist of a walk-through inspection of the project site. The prefinal inspection report will be used as a checklist with the final inspection focusing on the outstanding construction items identified in the prefinal inspection. Confirmation shall be made that outstanding items have been resolved.

D. <u>Sampling Requirements</u>

The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems as addressed in the project specifications should be presented in the CQA plan.

E. Documentat')

Reporting requirements for CQA activities shall be described in detail in the CQA plan. This should include such items as daily summary reports, inspection data sheets, problem identification and remedy reports, design acceptance reports, and final documentation. Provisions for the final storage of all records also should be presented in the CQA plan.

TASK IV: REPORTS AND OTHER SUBMISSIONS

The Defendant shall prepare plans, specifications, and reports as set forth in Task I through Task IV, to document the design, construction, operation, maintenance, and monitoring of the corrective measures. These reports shall be provided by the Defendant to EPA and MSDEQ as specified in the Consent Decree.

A. Progress Reports

The Defendants shall provide EPA and MSDEQ with monthly progress reports as specified in the Consent Decree. The reports shall contain at a minimum:

1. A description and estimate of the percentage of the CMI completed;

2. Summaries of all findings;

3. Summaries of all changes made in the CMI during the reporting period;

4. Summaries of all contacts with representatives of the local community, public interest groups or state government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, and laboratory/ monitoring data.

B. Draft Reports and Submissions

1. The Defendant shall submit a draft Corrective Measures Implementation Program Plan as outlined in Task I within ninety (90) calendar days of receipt of notification of the Agencies final selection of the corrective measures;

2. The Defendant shall submit draft Design Plans and Specifications, Design Reports, Operation and Maintenance Plans, Capital and Operating and Maintenance Construction Cost Estimates, Construction Quality Assurance Objectives, Health and Safety Plan, Schedules for Design Phases, and Study Reports as outlined in Task II;

3. The Defendant shall submit a draft Construction Quality Assurance Program Plan and Documentation as outlined in Task III, and

4. At the "completion" of the construction of the project, the Defendants shall submit a Corrective Measures Implementation Report to EPA and MSDEQ. The Report shall document that the project is consistent with the design specifications and that the corrective measures are performing adequately. The Report shall include, but not be limited to, the following elements:

   a. Synopsis of the corrective measures and certification of the design and construction;

   b. Explanation of any modifications to the plans and why these were necessary for the project;

   c. Listing of the criteria, established before the corrective measures were initiated, for judging the functioning of the corrective measures and also explaining any modification to these criteria;

   d. Results of facility monitoring, indicating that the corrective measures will meet or exceed the performance criteria; and

   e. Explanation of the operation and maintenance (including monitoring) to be undertaken at the facility.

   This report should include all of the daily inspection summary reports, inspection data sheets, problem identification and remedy reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation), and as-built drawings.

C. <u>Final Reports and Submissions</u>

The Defendant shall finalize the Corrective Measures Implementation Program Plan, the Corrective Measures Design Plan including, Design Plans and Specifications, the Operation and Maintenance Plan, the Capital and Operating and Maintenance Construction Cost Estimate, the Project Schedule, the Construction Quality Assurance Objectives, the Health and Safety Plan, the Design Phases, any additional studies which were conducted, and the Corrective Measures Implementation Report. This report shall include the final design and incorporate changes or explanations necessary to address comments received on draft submissions. The Defendant shall submit the Final Report to EPA and MSDEQ in accordance with the approved schedule.

RCRA FACILITY ASSESSMENT - INTERIM FINAL REPORT
CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

Prepared for

U.S. Environmental Protection Agency
Office of Waste Programs Enforcement
Washington, D.C. 20460

Work Assignment No.	:	R04019
EPA Region	:	IV
Site No.	:	MSD990714081
Contract No.	:	68-W9-0004
CDM FEDERAL PROGRAMS CORPORATION		
Document No.	:	TES7-R04019-FR-CQXV-2
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Date Prepared	:	January 17, 1992

Ref. 4d

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

I. EXECUTIVE SUMMARY

The 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) authorized EPA to require corrective action for releases of hazardous waste and/or hazardous constituents from Solid Waste Management Units (SWMUs) and other Areas of Concern (AOCs) at all operating, closed or closing RCRA-regulated facilities. The intention of this authority is to address previously unregulated releases to air, surface water, soil and ground water. The generation of subsurface gas is also addressed. The first phase of the corrective action program, as established by EPA, is development of a RCRA Facility Assessment (RFA). The RFA is a structured investigative process which includes a Preliminary Review (PR) of all available relevant documents, a Visual Site Inspection (VSI) and, if appropriate, a Sampling Visit (SV).

This RFA addresses the Cedar Chemical Corporation (CCC) facility near Vicksburg, Mississippi. It is based on a PR of U.S. EPA Region IV and the Mississippi Department of Natural Resources (MSDNR) files and a VSI of the facility. The PR was conducted during May and June 1990, and the VSI was conducted on July 31, 1990. The submissions of this interim final RFA report was delayed until October 1991 by contractual issues.

The purpose of the RFA is to identify SWMUs and AOCs located at the facility, and to evaluate their potential for release of hazardous constituents to the air, surface water, soil and ground water, along with the potential for subsurface gas generation. In addition to SWMUs, AOCs are also identified. AOCs may be potential sources of release of hazardous constituents to the environment which do not necessarily involve wastes.

The Cedar Chemical Corporation facility is a chemical production plant located near Vicksburg, Mississippi. The CCC facility is separated into two sections known as the North Plant and the South Plant. The North Plant is involved in fertilizer manufacturing activities and produces potassium nitrate, chlorine, and nitrogen tetroxide. The South Plant formerly produced many pesticides and other organic compounds, including Dinoseb, Toxaphene and Atrazine, but is currently only producing nitric acid for consumption at the North Plant.

The CCC facility has had two recorded releases. On March 7, 1978, a 10,000-gallon storage tank of methyl parathion exploded at the South Plant, triggering in the explosion of three to four hundred 55-gallon drums, the burning of the storage structure, and the burning of a sodium-nitro-phenol warehouse. No environmental effects were noted in the subsequent inspections conducted by the MSDNR. The second release occurred on February 5, 1983 when the dike on the east side of the South Plant Surface Impoundment (SWMU 3b) breached, releasing approximately 700,000 gallons of wastewater into Stouts Bayou. Again, no environmental effects were observed by the MSDNR.

Waste management practices at CCC focus primarily on the containment and treatment of process wastewaters and stormwater runoff. In the North Plant, the process wastewaters are contained, transported and treated before being released under NPDES Permit No. MS0027995. Treatment consists of neutralizing the acidic wastewaters in the North Plant Neutralization System (SWMU 22). Prior to the installation of this system in 1988, the wastewaters were neutralized with lime in the now Inactive North Plant Surface Impoundment (SWMU 23). The wastewaters treated at the North Plant originate from both the process areas and from the scrubbers which are used to treat the off-gases generated in fertilizer production. Stormwater runoff which is not contained by the North Plant Containment System (SWMU 24) flows via the North Plant Drainage Ditches (SWMU 33) into Stouts Bayou. This bayou flows south along the eastern border of the facility. The North Plant also collects waste oils for recycling.

In the South Plant, process wastewaters and stormwater runoff are collected and channeled to the South Plant Surface Impoundments (SWMU 3). The wastewaters are then treated by a Calgon Adsorption System (SWMU 4) before being released to surface waters. Any stormwater runoff which is not channeled to the impoundments flows into the South Plant Drainage Ditches (SWMU 13). The drainage ditch running along the western border of the facility also receives the NPDES permitted discharges from both the North and South Plants. This ditch flows west through a large wetland into Hennessey's Bayou.

The facility discarded both hazardous and nonhazardous solid wastes in the Inactive Landfill (SWMU 2). The unlined landfill went through a non-RCRA type closure in the early 1980's. Solid wastes generated at the South Plant after this unit ceased operation are either drummed for disposal offsite or temporarily discarded in the Junkyard and Waste Piles (SWMU 34), which are cleared out periodically. At the time of the VSI, a large Scrap Metal Dumpster (SWMU 19) was also present in the South Plant. The dumpster was used for the collection of large debris generated from the dismantling of the former production areas.

After three submissions of Part B Permit Applications, CCC was formally denied a RCRA Permit in July 1986. CCC then decided to contest the ruling by claiming that their South Plant Surface Impoundments (SWMU 3) should not be RCRA-regulated. The

Mississippi Commission on Natural Resources upheld Cedar's position by declaring the Dinoseb and Toxaphene losses found in the impoundment to be exempt from RCRA regulation by the "de minimus" exclusion of the mixture rule in 40 CFR Part 261.3. However, the facility has a RCRA-regulated storage unit (the Drum Storage Area, SWMU 1a) which is subject to regulatory and statutory requirements including corrective action requirements.

In October 1989, the EPA completed an Endangerment Assessment of the Cedar Chemical, Vicksburg facility. The Assessment included a Determination of Release from a Sampling Investigation conducted in February 1989 and from previous inspections of the facility. The investigations had found contaminants in soil and ground-water samples. The 1989 investigation found that soil samples taken from various locations at the South Plant showed concentrations of Dinoseb ranging from 15 μg/kg to 380,000 μg/kg. In the same investigation, two monitoring wells detected cyanide in the ground water, ranging from 0.14 mg/kg to 58.0 mg/kg. Sampling of the monitoring wells also detected Atrazine, Cyanazine and Propazine in the ground water.

As a result of the Endangerment Assessment, a RCRA Facility Assessment was requested to investigate the SWMUs and AOCs located at the facility. A total of 21 SWMUs were identified at the South Plant, 12 SWMUs at the North Plant, and one SWMU (the Junkyard and Waste Piles - SWMU 34) which was located throughout both Plants. No AOCs were identified.

Due to the amount of contamination found throughout the facility, an RFI is suggested for the following twenty-six units:

- Drum Storage Area (SWMU 1)
- Inactive Landfill Area (SWMU 2)
- South Plant Surface Impoundments (SWMU 3)
- Carbon Adsorption System (SWMU 4)
- South Plant Drainage System (SWMU 5)
- Former Dinoseb Production Area (SWMU 7)
- Dinoseb Off-Loading Area (SWMU 8)
- Dinoseb Drumming Area and Drains (SWMU 9)
- Former MSMA Production Area (SWMU 11)
- Former MSMA Salt Unloading Area (SWMU 12)
- South Plant Drainage Ditches (SWMU 13)
- Former Toxaphene Production Area (SWMU 14)
- Former Methyl Parathion Production Area (SWMU 15)
- Former Atrazine Production Area (SWMU 16)
- Returned Product Storage Area (SWMU 17)
- Former Blue Tank (SWMU 18)
- Railroad Car Unloading Station (SWMU 20)
- North Plant Neutralization System (SWMU 22)
- Inactive North Plant Surface Impoundment (SWMU 23)
- Wastewater Pipes (SWMU 25)
- C-10 Scrubber (SWMU 26)

- Oil Collection Unit (SWMU 29)
- Waste Oil SAA (SWMU 30)
- No. 6 Fuel Oil Area (SWMU 31)
- North Plant Drainage Ditches (SWMU 33)
- Junkyard and Waste Piles (SWMU 34).

Refer to the Executive Summary Table, Table I-1 for a synopsis of the facility SWMUs.

TABLE I-1
CEDAR CHEMICAL CORPORATION
SWMU/AOC ASSESSMENT SUMMARY

SWMU/AOC	TYPE OF UNIT	YEARS IN OPERATION	WASTES MANAGED	POLLUTANT MIGRATION PATHWAYS[4]	EVIDENCE OF RELEASES	EXPOSURE POTENTIAL[1]	NEED FOR INTERIM MEASURES	RECOMMENDATION		
								RFI	NO FURTHER ACTION	FURTHER ASSESSMENT
1. Drum Storage Areas	Less than 90 Day Storage Area	Varies	MSMA by-product salts, and solid wastes from the production of Dinoseb, Toxaphene, Atrazine, and MSMA	GW, S SW	YES	H M	--	X		
2. Inactive Landfill	Unlined Landfill	1972 to November 1980	Dinoseb formulation drums; debris from the methyl parathion fire; drums of hydrolyzed cyanuric acid, spent activated carbon, dimethyl urea, isopropyl amine, sodium nitrophenol liners, empty bromine bottles, phosphorous tri-chloride and sulfochloride, and dimethyl phosphorous sulfochloride; plus Dinoseb-contaminated soils and wastewater	GW, SW, S SS,A	YES	H M	--	X		
3. South Plant Surface Impoundments	Unlined Retention Ponds	1955 to present	Wastewaters containing Toxaphene, Dinoseb, MSMA, Atrazine and methyl parathion	GW, SW, S	YES	M	--	X		
4. Carbon Adsorption System	Neutralizing System	Mid 1970's to present	Wastewaters containing Toxaphene, Dinoseb, MSMA, Atrazine and methyl parathion	GW, SW, S	YES	M	--	X[2]		
5. South Plant Drainage System	Drainage System	Varies from 1950's to present	Nitric acid process water, and stormwater containing Toxaphene, Dinoseb, MSMA, Atrazine and methyl parathion	GW, SW, S	YES	M	--	X[3]		

1 M designates a moderate, H designates a high, and U designates Unknown exposure potential; see SWMU description for substantiation
2 Releases to surface waters are regulated via NPDES Permit No. MS0027995
3 An evaluation of the sewer system utilizing dye tests should be performed
4 GW designates Groundwater, SW designates Surface Water, S designates Soil, A designates Air, and SS designates Subsurface Gas
5 The unit was constructed over the former location of SWMU 15 and has therefore been recommended for an RFI
6 Releases to air are regulated via MS Air Permit No. 2780-00041

TABLE I-1
CEDAR CHEMICAL CORPORATION
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SWMU/AOC	TYPE OF UNIT	YEARS IN OPERATION	WASTES MANAGED	POLLUTANT MIGRATION PATHWAYS[4]	EVIDENCE OF RELEASES	EXPOSURE POTENTIAL[1]	NEED FOR INTERIM MEASURES	RECOMMENDATION: RFI	RECOMMENDATION: NO FURTHER ACTION	RECOMMENDATION: FURTHER ASSESSMENT
6. South Plant Mill Tank	Storage Tank	Early 1960's to 1989	Neutralized wastewater containing Dinoseb	--	NO	--	--		X	
7. Former Dinoseb Production Area	Inactive Production Area	1973 to December 1986	Spills of Dinoseb, DEHPA, and EHN	GW, S, SW	YES	H	--	X		
8. Dinoseb Off-Loading Area	Inactive Loading/ Unloading Area	1973 to December 1986	Dinoseb spillage	GW, S	YES	M	--	X		
9. Dinoseb Drumming Area and Drains	Inactive Product Drumming Area	1973 to December 1986	Dinoseb spillage	GW, S	YES	M	--	X		
10. Dinoseb Stock Storage Area	Storage Area	1973 to present	Dinoseb stock	--	NO	--	--		X	
11. Former MSMA Production Area	Inactive Production Area	January 1983 to present	MSMA production spillage, including methanol, MSMA by-product salts and arsenic; demolition debris suspected of contamination from MSMA	GW, S	YES	H	--	X[5]		
12. Former MSMA Salt Unloading Area	Waste Unloading Area and Dumpsters	January 1983 to July 1984	MSMA by-product salts and wastewaters which may contain traces of arsenic	GW, S	NO	M	--	X		

1 M designates a moderate, H designates a high, and U designates Unknown exposure potential; see SWMU description for substantiation
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6 Rel[illegible] to [illegible] re[illegible]ted v[illegible] Air [illegible]it N[illegible]10-00[illegible]

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13. South Plant Drainage Ditches	Unlined Drainage Ditches	Approx. 1954 to present	Stormwater runoff from the South Plant which may have contained Atrazine, Dinoseb, Toxaphene, arsenic or MSMA	GW, SW, S	YES	H	--	X		
14. Former Toxaphene Production Area	Inactive Production Area	1973 to 1982	Toxaphene, DEHPA and EHN production spillage	GW, S	YES	H	--	X		
15. Former Methyl Parathion Production Area	Inactive Production Area	Mid 1970's	Methyl parathion spillage	GW, S	YES	H	--	X		
16. Former Atrazine Production Area	Inactive Production Area	1973 to 1979	Atrazine production spillage	GW, SW, S	YES	H	--	X		
17. Returned Product Storage Area	Temporary Staging Area	1973 to present	Drums of returned Dinoseb product	GW, SW, S	YES	H	--	X		
18. Former Blue Tank	Storage Tank	1983 to approx. 1986	Unneutralized Dinoseb process wastewater	GW, S	YES	H	--	X		
19. Scrap Metal Dumpster	Open-topped Rolloff Container	Mid 1980's to present	Scrap material from the dismantling of the MSMA production area	--	NO	--	--		X	

1 M designates a moderate, H designates a high, and U designates Unknown exposure potential; see SWMU description for substantiation
2 Releases to surface waters are regulated via NPDES Permit No. MS0027995
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20. Railroad Car Unloading Station	Loading/ Unloading Station	Approx. 1955 to present	Spillage of raw materials and products, including Dinoseb, Toxaphene, MSMA, Atrazine and methyl parathion	GW, S	NO	U	--	X		
21. Vacuum Truck	Tank Truck	Mid 1980's to present	Wastewater contaminated with Dinoseb, Toxaphene, MSMA, arsenic, Atrazine and methyl parathion	--	NO	--	--	-	X	
22. North Plant Neutralization System	Treatment Unit with In-ground Sumps	December 1988 to present	All wastewater from the North Plant, including drainage from hoses, safety showers, and stormwater runoff	GW	NO	U	--	X[2]		
23. Inactive North Plant Surface Impoundment	Equalization/ Neutralization Pond	1962 to present	Acidic effluent from the North Plant, including process water from the production of potassium nitrate, nitrogen tetroxide, and chlorine	GW, S	NO	U	--	X[2]		
24. North Plant Containment System	Spillage and Runoff Collection System	Varies from Mid 1970's to present	Acidic wastewaters from fertilizer manufacturing operations	--	NO	--	--		X	
25. Wastewater Pipes	Pipes	1960's to present	Acidic and alkaline wastewater	GW, S	NO	U	--	X		
26. C-10 Scrubber	Air Pollution Control Device	1980 to present	Fertilizer production off-gases, such as chlorine and NO2; acidic wastewater	GW, S	NO	U	--	X[6]		

1 M designates a moderate, H designates a high, and U designates Unknown exposure potential; see SWMU description for substantiation
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27. Cooler Scrubber	Air Pollution Control Device	1980 to present	Fertilizer production off-gases, such as chlorine and NO2; acidic wastewater	--	NO	--	--		X[6]	
28. End Product Scrubber	Air Pollution Control Device	1980 to present	Air containing fertilizer particles such as potassium and nitrogen	--	NO	--	--		X[6]	
29. Oil Collection Unit	Collection Unit	1985 to present	Waste oils	GW, S, SS	NO	U	--	X		
30. Waste Oil SAA	Outdoor Drum Staging Area	1985 to present	Waste oils	GW, S	YES	M	--	X		
31. No. 6 Fuel Oil Area	Former Heating Oil Containment Structure	1960's to 1970's	Waste fuel oils	GW, S, SS	NO	U	--	X		
32. C-15 Scrubber	Air Pollution Control Device	Approx. 1980 to present	Fertilizer production, off-gases, and particulate matter	--	NO	--	--		X[6]	
33. North Plant Drainage Ditches	Drainage Ditches	Approx. 1960 to present	Stormwater runoff from the North Plant	--	NO	--	--	X		
34. Junkyard and Waste Piles	Temporary Disposal Areas	Approx. 1954 to present	Pesticide contaminated debris; refuse from North and South Plant facilities	GW, SW, S	YES	M	--	X		

[1] M designates a moderate, H designates a high, and U designates Unknown exposure potential; see SWMU description for substantiation
[2] Releases to surface waters are regulated via NPDES Permit No. MS0027995
[3] An evaluation of the sewer system utilizing dye tests should be performed
[4] GW designates Groundwater, SW designates Surface Water, S designates Soil, A designates Air, and SS designates Subsurface Gas
[5] The unit was constructed over the former location of SWMU 15 and has therefore been recommended for an RFI
[6] Releases to air are regulated via MS Air Permit No. 2780-00041

II. INTRODUCTION

The 1984 HSWA to the RCRA authorized EPA to require corrective action for releases of hazardous wastes and/or hazardous constituents at facilities authorized to operate under interim status. The intent of this authority is to address previously unregulated releases to air, surface water, soil and ground water. The generation of subsurface gas is also addressed. The first phase of the corrective action program, as established by EPA, is development of a RFA. The RFA includes a Preliminary Review (PR) of all available relevant documents, a VSI and, if appropriate, a SV.

This Chapter provides a summary of the file search and VSI, a description of facility's history, regulatory history, process operations, waste management practices, environment, and demographic setting. The SWMUs are described in Chapter III. Tables categorizing the units are presented in Chapter IV. The references used in this report are listed in Chapter VI. Appendix A contains the VSI log book and Appendix B presents the photographs documenting the physical condition of the SWMUs at the time of the VSI. Appendices C & D provide sampling data summaries and drainage reports for the facility's process sewers and surface waters.

A. File Search and VSI

This RFA report is based on a review of file material available at EPA Regional and State Offices, and on observations made during the VSI. The file review was conducted during May 1990 and included a review of RCRA, CERCLA, Clean Air and NPDES files available at EPA Region IV, Atlanta, Georgia, and the Mississippi Department of Natural Resources (MSDNR), Jackson, Mississippi. The VSI was conducted on July 31, 1990 at the Cedar Chemical Corporation facility near Vicksburg, Mississippi.

The Kearney VSI Team arrived at the Cedar Chemical facility at approximately 9:00 a.m. on July 31, 1990. The Team was greeted by facility representatives, Mr. Steven Boswell and Mr. Dave Madsen.

The VSI introductory meeting began at approximately 9:30 a.m. Attending the meeting were:

J. Evans	A.T. Kearney
R. Behl	A.T. Kearney
S. Boswell	Cedar Chemical Corporation
D. Madsen	Cedar Chemical Corporation

During the meeting, all raw materials and waste streams were discussed. The facility's history and operations were also discussed. Facility representatives provided layout drawings of the two plants and a hydrogeologic report characterizing the ground-water conditions at the facility.

The introductory meeting adjourned at approximately 10:30 a.m. At this time, the Team was joined by Mr. Toby Cook of MSDNR. Mr. Boswell and Mr. Cook accompanied the VSI Team on a tour of the facility. The Team viewed the SWMUs located in the South Plant area during the morning session (SWMUs 1 through 21). The temperature was approximately 90°F; skies were clear. The VSI Team adjourned for lunch at approximately 12:30 p.m.

The VSI resumed at 1:30 p.m. to view the North Plant (SWMUs 22 through 32). Following the tour, the VSI Team met with Mr. Boswell and Mr. Cook for a closeout meeting. Mr. Boswell of Cedar Chemical Corporation took photographs of the facility, along with J. Evans of the VSI Team, until his camera malfunctioned. At the request of the facility, it was agreed that Cedar Chemical Corporation would be provided copies of photographs taken by the VSI Team through the EPA Work Assignment Manager. The VSI Team left the facility at approximately 4:30 p.m.

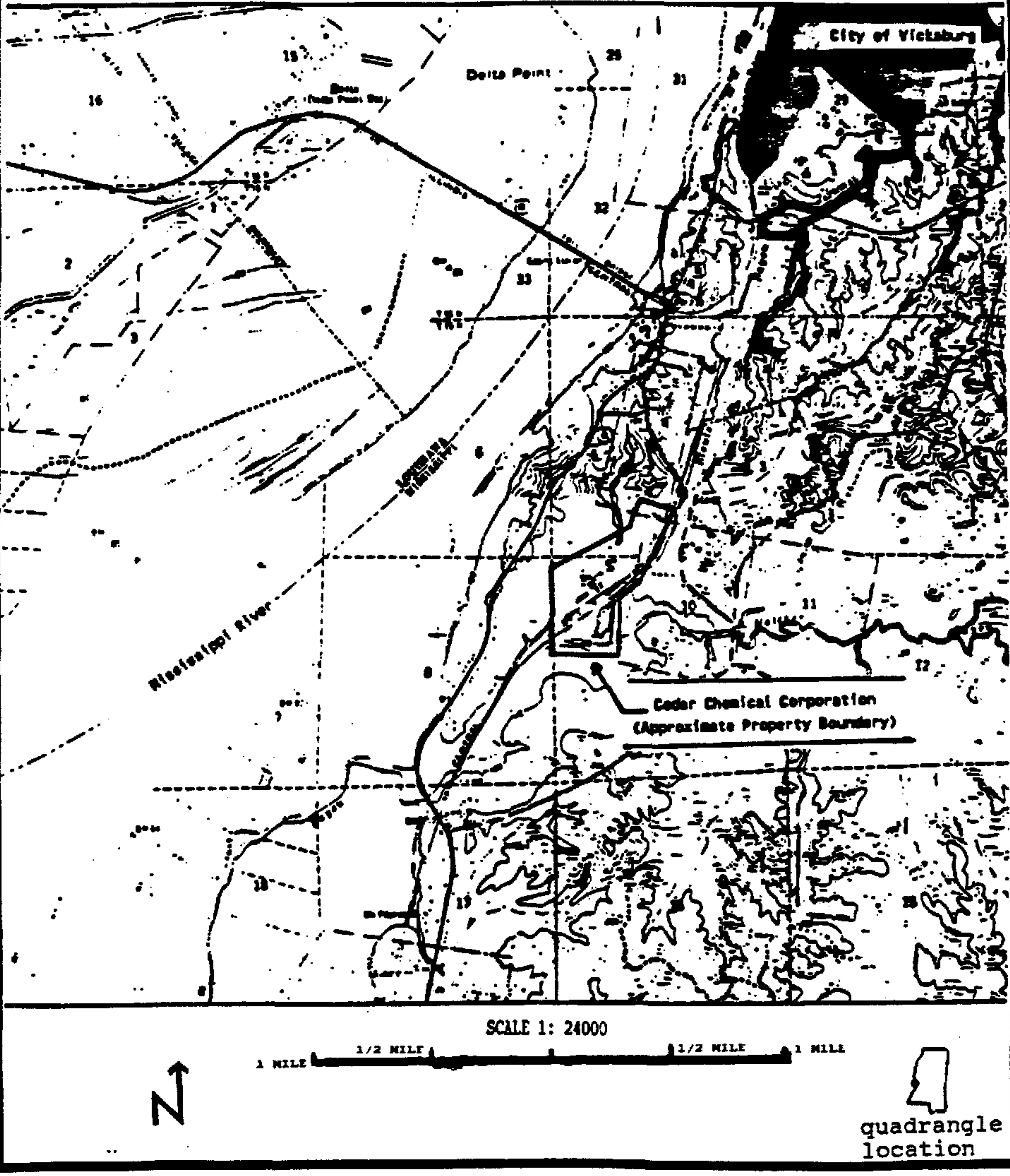
B. Facility History

Cedar Chemical Corporation owns a chemical production facility located near Vicksburg, Mississippi. The CCC facility is separated into two sections known as the North Plant and the South Plant. The North Plant currently produces potassium nitrate, chlorine, and nitrogen tetroxide (References 11, 257). The South Plant formerly produced many pesticides and other organic compounds but is currently only producing nitric acid for consumption at the North Plant (References 11, 133, 257).

The CCC facility is outlined on the USGS map of Vicksburg West, Mississippi (Figure II-1, page 12). It encompasses approximately 600 acres of land, of which approximately 20 percent is utilized by the North and South Plants. The facility is located southwest of Vicksburg, with a majority of the land between U.S. Highway 61 and Business U.S. Highway 61 (Figure II-2, page 13). The northwest point of the property extends as far as the Mississippi River bank. The North and South Plants are located along the Illinois Central Railroad, bounded on the east by Stout's Bayou and on the south by Hennessey's Bayou. The facility coordinates are latitude 32° 18', longitude 90° 05' (References 5, 133).

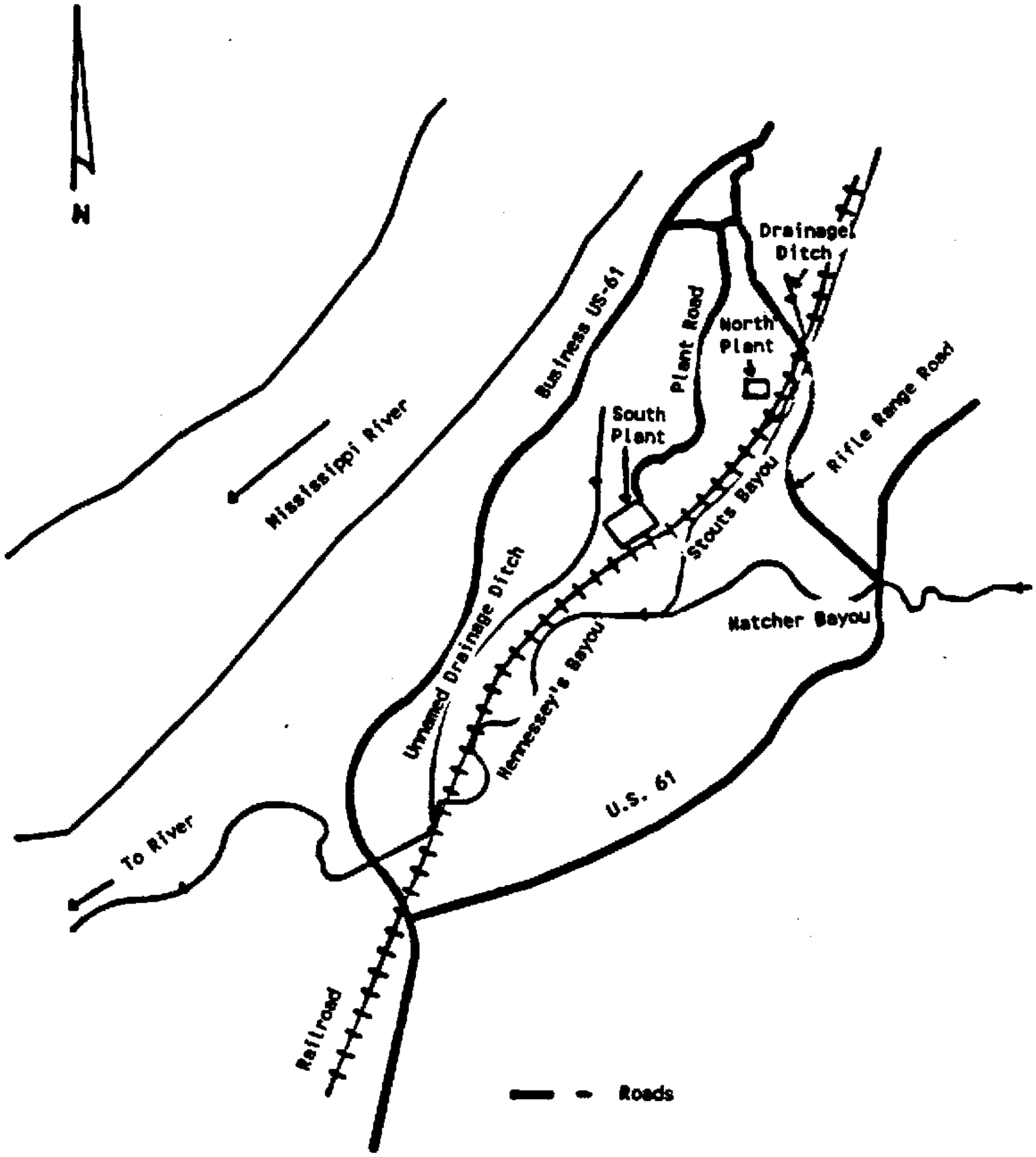
FIGURE II-1 Facility Location Map

GENERAL LOCATION MAP OF THE CEDAR CHEMICAL CORPORATION FACILITY IN VICKSBURG, MISSISSIPPI



Reproduced from U.S. Department of Interior, Geological Survey, 1962. Topographic map, Vicksburg West Quandrangle, Mississippi-Louisiana. (From Reference 33)

Figure II-2
Cedar Chemical Corporation Vicksburg Facility



Approximate Scale 1:24000

Reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

(Reference 5)

The CCC facility is bordered by light industry on the south, light residential areas spanning from north to southwest, and rural areas spanning from northeast to south (References 133, 257). The closest residence is approximately 0.25 miles from the plant (Reference 133). The facility is approximately three miles from the nearest densely populated area; however, a school is located within a one mile radius of the facility and a hospital within a two mile radius (References 183, 257). Prior to use by the chemical companies, the land on which the facility is located was primarily farm land (Reference 257).

The CCC facility originally started under two separate ownerships. The South Plant began operations in approximately 1954 as Spencer Chemical Company. In 1964, Spencer was purchased by Gulf Oil. The North Plant was established in 1961 by Southwest Potash. In 1972, the two plants were purchased and merged by the Vicksburg Chemical Company (Reference 257). Vicksburg was bought out by Vertac Chemical Corporation (VCC) in 1975. VCC was taken over by the holding company, Dyticon, Inc., in 1978 (Reference 133). The facility underwent a structural reorganization in 1986, when it became known as Cedar Chemical Corporation (CCC), a sister company to VCC (References 27, 107). This corresponded to the purchase of the business from Dyticon, Inc. by Fermenta A.B. of Sweden. The business again changed ownership in 1988 when Trans Resources bought portions of CCC, including the Vicksburg Chemical Division (Reference 257). A small portion of the South Plant is not owned by CCC. It is referred to as the Perkins Company or Former Gulf Formaldehyde Plant and is owned by Borden (References 5, 257).

When the South Plant began as Spencer, the main products were nitric acid, ammonia, unspecified fertilizers and ammonium nitrate. The main products from the original North Plant were potassium nitrate and chlorine. In 1973, the Vicksburg Chemical Company began producing of the pesticides Atrazine, Toxaphene and Dinoseb at the South Plant. Vertac Chemical Corporation (VCC) continued producing Atrazine until approximately 1979 and produced Toxaphene until 1982. Dinoseb was produced until CCC took control in 1986 (References 17, 257).

The Toxaphene facility was also used by VCC for the production of Diethylhexyl Phosphoric Acid (DEHPA) and 2-ethyl-hexyl nitrate (EHN). DEHPA was produced in six-week runs in 1978, 1984 and 1985 (References 132, 154). EHN was produced for approximately two months in 1984 (Reference 142). Methyl parathion was also produced at the South Plant until approximately 1978 when the facility was damaged by a large explosion and fire (References 255, 257).

In 1983, VCC converted the former methyl parathion facility into a facility for the production of the arsenic herbicide monosodium methanearsonate (MSMA). This facility was also capable of producing disodium methanearsonate (DSMA) and sodium cacodylate. MSMA production continued until some time in 1984 (References 213, 214, 257). The South Plant has also produced dimethyl urea, isopropyl amine, dinitro-ortho-cresol, Cyanazine, UNIHIB, and the intermediates, sulfonated ortho-sec-butyl phenol (OSBP) and diethylhexyl phosphochloridate (References 5, 17).

The only chemicals being produced at the time of the VSI were nitric acid in the South Plant, and potassium nitrate, chlorine and nitrogen tetroxide in the North Plant (Reference 257). The nitric acid in the South Plant is produced in a facility which was built in 1986 in accordance with New Source Performance Standards (NSPS). The former nitric acid facility reportedly experienced emissions problems from an ineffective catalytic reducer (Reference 260).

The CCC facility has had two recorded releases, both prior to Cedar Chemical acquiring the facility. On March 7, 1978, a 10,000-gallon storage tank of methyl parathion exploded, triggering the explosion of three to four hundred 55-gallon drums, the burning of the storage structure, and the burning of a sodium-nitro-phenol warehouse. No environmental effects were noted in subsequent visual inspections conducted by the MSDNR (Reference 255). No sampling data exists, however, to support this statement.

On February 5, 1983, the dike on the east side of the South Plant Surface Impoundment (SWMU 3b) failed, releasing approximately 700,000 gallons of wastewater into Stout's Bayou. The last sampling of Dinoseb in the impoundment before the breach indicated levels of 4 ppm. Sampling efforts were apparently made after the breach along the breached area of the dike, but no data was available. Visual inspections of the bayous indicated no apparent environmental effects (Reference 200).

C. Regulatory History

Part A and Part B Permit Applications

Pursuant to Section 3005 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6930, Cedar Chemical Corporation, as Vertac Chemical Corporation (VCC), submitted Part A of its hazardous waste permit application on November 18, 1980, thus gaining interim status. The Notification of Hazardous Waste Activity had been submitted previously on June 23, 1980, pursuant to Section 3010 of RCRA (Reference 5). In the Part A Application, VCC registered as a treatment, storage, and disposal facility (TSD) producing potassium nitrate and pesticides - dinobutyl phenol (Dinoseb) and Toxaphene (Reference 252).

A revised Part A Permit Application was submitted to U.S. EPA Region IV in September 1981 (References 239, 240). VCC submitted its Part B Permit Application, along with another modified Part A, on August 10, 1983. The modifications to the company's Part A referred to the listing of units and waste streams at the facility (Reference 183). The facility's Part B Permit Application was found to be deficient with respect to closure, post-closure and ground-water monitoring plans (Reference 160). After five revisions, CCC submitted another Part B Application on June 18, 1985 (References 128, 133, 148, 150). Once again the application was found to be deficient in the areas of closure and post-closure plans, contingency plans, and ground-water monitoring plans (Reference 111).

On July 31, 1986, CCC was formally denied a RCRA permit. CCC was required to submit a closure/post-closure plan or to amend the plan in the application to meet the specifications of the Mississippi Hazardous Waste Management Regulations (MHWMR) Part 265 within 15 days (Reference 95).

CCC has had numerous contacts with the MSDNR regarding compliance with the MHWMR, along with numerous inspections of the facility (see Table II-1, page 20). Beginning in 1980, VCC received Commission Order No. 520-80 requiring compliance with NPDES Permit No. MS0027995 (References 251, 252). In 1982, VCC received Commission Order No. 599-82 in an effort to accelerate actions to reduce releases from VCC's Inactive Landfill (SWMU 2) and South Plant Surface Impoundments (SWMU 3) (Reference 209). VCC received Commission Order No. 611-83 on June 8, 1983, in response to the rupturing of a dike in the South Plant Surface Impoundment (SWMU 3b) in January 1983 (Reference 184).

In 1984, Commission Order No. 717-84 was issued requiring VCC to submit a revised Part B Permit Application and ground-water monitoring plan (Reference 159). After submission of the revised Part B in June 1985, Commission Order No. 948-85 was issued defining a January 10, 1986 deadline for the items still needing revision. (References 109, 11, 133). The CCC submittal of January 1986 was again found to be deficient. A list of recommendations was sent to CCC on July 2, 1986, along with the request for a show-cause meeting on July 8th (Reference 100). In the meeting, MSDNR discussed with CCC their RCRA history and the current violations. A hearing was scheduled for July 22, 1986 before the Mississippi Commission on Natural Resources regarding a penalty for the violations and a compliance schedule (References 97, 99).

CCC responded by filing a Motion to Dismiss based on the theory that the South Plant Surface Impoundments (SWMU 3) should not be RCRA-regulated and thus should not be governed by the Mississippi Commission on Natural Resources (Reference 98). The hearing before the Commission was delayed until August 26th at CCC's request. Commission Order No. 1046-86 was issued in response to the hearing. The Order defined the penalty and compliance schedule which would apply to CCC if they failed to demonstrate that the South Plant Surface Impoundments (SWMU 3) should not be RCRA-regulated at the hearing scheduled for September 16, 1986 (Reference 92).

CCC's position regarding the declassification of the surface impoundment was based on the "de minimus" exclusion from the "mixture rule" in 40 CFR Part 261.3. This exclusion includes any losses from normal manufacturing operations of the product (Reference 89). The argument that the MSDNR brought forth was that releases from the Returned Product and Drum Storage Areas (SWMUs 17 & 1), which are not part of the manufacturing operations, could end up in the impoundment. CCC contested this by demonstrating that the drainage system from these areas had been segregated from the system entering the South Plant Surface Impoundments (SWMU 3). Furthermore, since November 1985, any losses of Dinoseb from production had been collected and either recycled or disposed of offsite. These points were brought forward at the Commission meeting on September 16, 1986, but no decision was rendered (References 85, 113).

The MSDNR and EPA requested that the hearing be expanded to determine if the South Plant Surface Impoundments (SWMU 3) were regulated under RCRA due to the containment of past wastes associated with the production of Toxaphene. These wastes included untreated process wastewater from the production of Toxaphene (K098), and the associated wastewater sludge (K041). CCC contested this theory by claiming that their Toxaphene process was different from the one used by EPA to set the standards, and therefore, the wastewater created was different (References 80, 85). On December 17, 1986, the Commission ruled in favor of CCC by placing into effect Order of Dismissal No. 1153-86 (Reference 75). On August 5, 1987, the Commission ruled in favor of CCC again by issuing Order of Dismissal No. 1253-87, incorporating Order No. 1153-86 and vacating Order No. 1046-86. Toxaphene losses were declared exempt by the "de minimus" exclusion in 40 CFR Part 261.3, just as Dinoseb losses had been (Reference 54).

EPA maintains that the Drum Storage Area (SWMU 1a), having been found mismanaged in numerous inspections (Refer to Table II-1, page 20), is not a less than 90-day storage unit and therefore cannot operate without interim status or a permit (Reference 50). Since the storage violations cited against CCC in August 1986 had not been resolved, Commission Order No. 1162-87 was issued on January 28, 1987 against CCC (Reference 71). CCC's mismanagement of the Drum Storage Area (SWMU 1a) was the basis for two more Orders issued by the Commission: Order No. 1217-87 was issued with a monetary fine on April 22, 1987; and Order No. 1316-88, along with another monetary fine, was issued on February 10, 1988 (References 44, 62).

On December 17, 1987, representatives from CCC, MSDNR, and EPA met to discuss the regulatory status of the facility. CCC proposed to contain the South Plant Surface Impoundments (SWMU 3) by consolidating the sediment into a Solid Waste Consolidation Area (SWCA) (SWMU 3d), solidifying it, and capping it such that the remainder of the impoundment could still be used for the treatment of nonhazardous waste streams (References 35, 36, 37).

MSDNR agreed to provide RCRA-guided comments on the technical aspects of the plan, once submitted (Reference 34).

CCC submitted formal closure plans to the MSDNR on August 4, 1988 (Reference 27). The MSDNR suggested some modifications to the plan for meeting RCRA requirements, but again stated that they were not certifying that the closure was in compliance with RCRA. CCC planned to go forward with the modified plans unless EPA voiced an objection (Reference 21). On January 27, 1989, CCC reported to the MSDNR that the contract had been confirmed and the contractor had moved on site to begin closure (Reference 18).

From a Sampling Investigation performed in February 1989 and from previous inspections of the facility, the Director of Waste Management, Region IV, issued a Determination of Release for CCC on October 13, 1989. From this determination it was further asserted that corrective actions must be taken to protect the environment. By October 30, 1989 an Endangerment Assessment was completed regarding contamination at CCC, with the exception of dioxin testing. Dioxin testing of the Inactive Landfill (SWMU 2) was scheduled later, and if necessary, the risk assessment will be revised based on these results (Reference 5).

<u>NPDES Permit History</u>

CCC (as VCC) first obtained its NPDES Permit No. MS0027995 prior to 1980 (Reference 252). The Permit was renewed on December 1, 1981, to expire in June 1986 (Reference 233). VCC's permit included three outfalls. Outfall 001 was defined with limits of 1.4 kg/day-daily average for Dinoseb, 68 kg/day-daily average for total suspended solids, and 0.05 kg/day-daily average for Toxaphene. Outfall 002 had a limit of 2727 kg/day-daily average for nitrate and Outfall 003 had a limit of 2868 kg/day-daily average for nitrate (Reference 102).

On March 1, 1985, the MSDNR requested a meeting with VCC to discuss chronic noncompliance of NPDES limits with respect to pH, Dinoseb levels, and nitrate-nitrogen levels. The meeting was held on March 22, 1985. On April 29, 1985, VCC submitted a report explaining that new pH control valves were to be installed, that some of the Dinoseb excursions were related to the pH problem (since a high pH causes decreased carbon-adsorption), that the other Dinoseb releases were due to premature carbon breakthrough, and that the nitrate-nitrogen excursions were related to process problems which had already been corrected (Reference 130).

Another problem arose with VCC's NPDES permit excursions in June 1985. Due to heavy rainfall, the South Plant Surface Impoundment (SWMU 3) was bypassed on three different occasions to avoid breaching the dike. VCC did not notify the MSDNR within 72-hours of each event and did not submit a plan to avoid recurrence. VCC subsequently requested a meeting to decide upon guidelines for future situations of similar nature (Reference 123). On September 6, 1985, the MSDNR met with VCC specifically to set up the new guidelines for bypassing the impoundment. These were defined as: 1) when the contents of the dike reach within six inches of overflow; and 2) when threat of human life is apparent (Reference 118).

VCC's NPDES permit came up for renewal in April 1986. The permit was reissued without any changes to effluent limits for Outfalls 001, 002, and 003 (Reference 102). VCC had requested, on March 10, 1986, for permission to use an alternative method of process wastewater disposal. The proposed method utilized the low-concentration Dinoseb wastewater (210 mg/l) as a marginal fertilizer for agricultural fields. The MSDNR requested guidance from the EPA in regulating or approving such a proposal. The proposal was accepted and incorporated into the NPDES permit as Outfall 004 (References 102, 104).

On July 5, 1989, CCC reapplied for their NPDES permit. Having ceased producing organic chemicals, the facility no longer generated wastewater from the production of Dinoseb. Thus, Outfall 004 was not included in this application. Only nitric acid, potassium nitrate, chlorine and nitrogen tetroxide were listed as presently being produced at CCC (Reference 11).

<u>Air Permit History</u>

In 1980, VCC, in order to obtain an Air Emissions Permit, had to submit an emissions survey and install additional facilities to reduce or eliminate air releases - about which the Air Division had received many complaints (References 252, 253). The facility's Permit covered air emissions from the production of nitric acid, potassium nitrate, Toxaphene, Atrazine and Dinoseb (Reference 249). A comprehensive list of compliance inspections at the CCC facility is presented in Table II-1.

Table II-1

Facility Inspections At Cedar Chemical Corporation
Vicksburg Facility
(Page 1 Of 5)

DATE	TYPE OF INSPECTION	PERFORMED BY	SWMU-RELATED FINDINGS	REFERENCE NUMBER
Jul 27, 1981	RCRA Compliance	EPA	Open and leaking drums in Drum Storage Area (SWMU 1a) and Returned-Product Storage Area (SWMU 17).	236, 237
Oct 6, 1981	Follow-Up RCRA	MSDNR	Storage Areas cleaned up, one deteriorating drum still not contained (SWMUs 1a, 17).	236, 237
Oct 28, 1981	Hazardous Waste Site Investigation	EPA	Inactive Landfill (SWMU 2) only partially covered with grass; yellow ground stains visible in many areas.	228
			Yellow stains visible throughout South Plant processing areas.	
			All surface runoff from Inactive Landfill (SWMU 2) did not enter the South Plant Surface Impoundments (SWMU 3):	
			(1) East corner - runoff drained south into Hennessey Bayou; heavy erosion damage noted. (2) Western edge - runoff soaking into ground before reaching Hennessey Bayou; also showed severe erosion.	
Sep 17, 1982	NPDES Compliance	MSDNR	Yellow stains around Inactive Landfill (SWMU 2)	215
			Runoff from Inactive Landfill (SWMU 2) entering North Plant Drainage Ditches (SWMU 33).	
Feb 8, 1983	Release Investigation	MSDNR	Dike break on east side of South Plant Surface Impoundment (SWMU 3) released ~ 700,000 gallons of wastewater into Stouts/Hennessey Bayou.	200
Oct 3, 1983	Compliance Evaluation	MSDNR	Work had begun on capping the Inactive Landfill (SWMU 2).	179
			Condition of South Plant Surface Impoundments (SWMU 3) dike deteriorated - work was to have begun already.	
			25 drums in Former MSMA Production Area (SWMU 11) were not within containment or under a roof.	

TABLE II-1

FACILITY INSPECTIONS AT CEDAR CHEMICAL CORPORATION
VICKSBURG FACILITY
(PAGE 2 OF 5)

DATE	TYPE OF INSPECTION	PERFORMED BY	SWMU-RELATED FINDINGS	REFERENCE NUMBER
Oct 11, 1983	Remedial Actions	MSDNR	Inactive Landfill (SWMU 2) capped - high hill area lowered and clean soil brought in, ditch west of landfill had not been capped. Work on South Plant Surface Impoundments (SWMU 3) dike had begun.	174
Oct 31, 1983	Compliance Evaluation	MSDNR	South Plant Surface Impoundments (SWMU 3) dike improvements on-going.	171
Nov 17, 1983	Compliance Evaluation	MSDNR	Grading and capping of Inactive Landfill (SWMU 2) did not extend as far as plans had been approved - western ditch along railroad track had filled with sediment and was supposed to be capped. South Plant Surface Impoundments (SWMU 3) dike construction completed; seeding of both areas finished.	168
Sep 20, 1984	NPDES Compliance Inspection	MSDNR	C-10 Scrubber (SWMU 26) had a break in the curbing allowing a small amount of wastewater to leave the area. A leak was observed in the dike around the DEHPA Facility, (Former Toxaphene Production Area - SWMU 14), with some liquid pooled outside the dike. Dike of South Plant Surface Impoundments (SWMU 3) was showing some erosion. Vegetative growth on Inactive Landfill and South Plant Surface Impoundment was not taking (SWMUs 2, 3).	146

TABLE II-1

FACILITY INSPECTIONS AT CEDAR CHEMICAL CORPORATION
VICKSBURG FACILITY
(PAGE 3 OF 5)

DATE	TYPE OF INSPECTION	PERFORMED BY	SWMU-RELATED FINDINGS	REFERENCE NUMBER
Dec 14, 1984	Compliance Evaluation	MSDNR	Grassing of Inactive Landfill and South Plant Surface Impoundment areas to prevent erosion appeared to be helping (SWMUs 2, 3).	140
Jul 22, 1985	NPDES Compliance	MSDNR	Dike of Inactive North Plant Surface Impoundment (SWMU 23) was very weak at one end.	122
Nov 22, 1985	Interim Status Compliance	MSDNR	Eastern corner of South Plant Surface Impoundments (SWMU 3) showed evidence of a recent release - yellow stains were observed on the dike and dead vegetation was noticed along the natural drainage path to the Bayou.	110
			Drum Storage Area (SWMU 1a) in disarray.	
			Plant process areas had numerous small spills on the ground.	
			Deteriorated asbestos pipe insulation noticed in many areas.	
Aug 7, 1986	RCRA Generator and Closure Inspection	EPA	Land adjacent to the road had eroded into the South Plant Surface Impoundment (SWMU 3)	86
			Drum Storage Area (SWMU 1a) contained many leaking drums; some containers were stored on broken pallets and it was obvious that many drums had been stored for longer than 90 days.	
			Large spills were observed on the ground in the Drum Storage and Returned-Product Storage Areas (SWMUs 1a, 17) and floor drains and sumps were overflowing with waste-contaminated water.	
			Yellow and black stains were noticed on the ground throughout the facility.	

TABLE II-1

FACILITY INSPECTIONS AT CEDAR CHEMICAL CORPORATION
VICKSBURG FACILITY
(PAGE 4 OF 5)

DATE	TYPE OF INSPECTION	PERFORMED BY	SWMU-RELATED FINDINGS	REFERENCE NUMBER
Aug 12, 1986	Generator	MSDNR	Drum Storage Area (SWMU 1a) contained many deteriorated and leaking drums and was cluttered with much unnecessary equipment.	93
			Evidence of frequent spills was noticed in the Drum Storage Area and Returned-Product Storage Areas (SWMUs 1a, 17).	
Jan 13, 1987	Sampling Reconnaissance	MSDNR	Former Dinoseb Production Area (SWMU 7) was flooded with approximately four inches of liquid.	73
			Yellow floor stains noted in Returned-Product Storage Area (SWMU 17).	
Feb 19, 1987	RCRA Interim Status Compliance and NPDES Compliance Sampling	EPA	Former Dinoseb Production Area (SWMU 7) was observed with two inches of standing yellowish liquid present. At two points, the liquid was going over the berm and into a catch basin outside the area (South Plant Drainage System - SWMU 5).	65, 70
			Drum Storage Area (SWMU 1a) had leaking, corroded and open drums present.	
			Evidence of erosion was noted on various locations of the South Plant Surface Impoundments (SWMU 3).	
			Two locations adjacent to the South Plant Surface Impoundment (SWMU 3) had standing liquid - possibly indicating seepage.	
			A water cut on the southwest side of the South Plant Surface Impoundment (SWMU 3) was the source of unknown liquid entering the Impoundment.	
			The Inactive Landfill (SWMU 2) had ponding on its surface and showed evidence of erosion.	

TABLE II-1

FACILITY INSPECTIONS AT CEDAR CHEMICAL CORPORATION
VICKSBURG FACILITY
(PAGE 5 OF 5)

DATE	TYPE OF INSPECTION	PERFORMED BY	SWMU RELATED FINDINGS	REFERENCE NUMBER
Nov 17, 1987	RCRA Interim Status and Comprehensive GW Monitoring	EPA MSDNR	Drums in Drum Storage Area (SWMU 1a) were in decent condition, but a few were noticed without proper labeling. The facility has attempted to clean the floor in the Returned-Product Storage Area (SWMU 17) by sweeping, scraping and chipping the cement. They've also tried reacting the Dinoseb with hydrogen peroxide and a ferrous ion catalyst to remove the stains.	46, 48
Feb 1, 1989	RCRA Compliance Evaluation and Sampling Investigation	MSDNR EPA	Drum Storage Area (SWMU 1a) in good condition, however inspection reports were not accurate.	12, 17

D. Process Description

The CCC facility consists of two separate manufacturing plants built in the early 1950s under different corporate ownerships. These plants shared a common boundary and were later acquired by Vertac Corporation in 1975, thereby becoming one operating facility (References 5, 12, 46). At the time of the VSI, the facility operated under the name of Cedar Chemical Corporation. The two separate plants are referred to as the North and South Plants (Reference 257).

The North Plant is used to manufacture potassium nitrate and potassium nitrate by-products such as chlorine gas, nitrogen tetroxide, and traces of bromine. The South Plant manufactures nitric acid for sale and for use by the North Plant. The South Plant was used to manufacture various agricultural chemicals under Vertac Corporation management during the mid-1970s to mid-1980s. The agricultural chemicals that were produced at the South Plant included Atrazine, Cyanazine, 2-sec-butyl-4,6-dinitrophenyl (DNBP/Dinoseb), methyl parathion, Toxaphene, and monosodium methanearsonate (MSMA) (References 5, 12, 17, 46).

Potassium nitrate is produced by combining potassium chloride and nitric acid. This reaction also forms chlorine and nitrogen tetroxide. The potassium nitrate is crystallized, centrifuged, dried, prilled, and then bagged or bulk stored in warehouses located at the North Plant. The potassium nitrate plant operates at approximately 16.7 tons per hour. The plant operates 24 hours per day, seven days per week (References 2, 13, 14).

Nitric acid is produced by combining ammonia, air, and water. Ammonia and air are passed through a platinum gauze catalyst allowing the ammonia to burn to produce the oxide. Nitrogen dioxide is produced as the gases are cooled and condensed. The nitrogen dioxide is then dissolved in water at an adsorption tower to form nitric acid. The nitric acid plant operates at a rate of 260 tons per day (References 2, 13, 259).

Facility representatives could not provide information pertaining to the past pesticide manufacturing activities conducted at the South Plant. The following process descriptions were prepared by using the available reference material as well as information provided in the Farm Chemicals Handbook, the British Crop Protection Council's Pesticide Manual, the Pesticide Manufacturing and Toxic Materials Control Encyclopedia, and the Herbicide Handbook of the Weed Science Society of America (Reference 259). The actual volumes of product manufactured could not be estimated from the generic manufacturing processes.

Dinoseb (2-(1-methylpropyl)-4,6-dinitrophenol) was produced at the South Plant from 1973 to December 1986. Dinoseb is produced by reacting 6-alkylphenol with concentrated sulfuric acid until the phenol is converted into a sulfonic acid derivative. The derivative is then dissolved in water. Nitric acid is added to the solution and agitated to convert the sulfonic acid derivative to the dinitrophenol compound. Following the addition of nitric acid, the mixture is stirred, cooled and the dinitro derivative is separated by either filtration, extraction with solvent, or decantation. According to facility representatives, the chelating agent ethylenediaminetriacetic acid (EDTA/versene) was also used in the production of Dinoseb (References 257, 259). The manufacture of Dinoseb may have created air emissions containing sulfur dioxide (1.2 kg/metric ton) and hydrocarbons (1.0 kg/metric ton). Most wastes from the production of Dinoseb were probably created from spillage of the product. The Vertac Corporation produced a phenol form and an ammonium salt form of Dinoseb. However, it could not be determined from the available file material whether one or both forms were produced at the Vicksburg facility. Dinoseb was banned by EPA due to significant risks of developmental toxicity. Remaining stocks retained by the facility were stored in the Dinoseb Stock Storage Area (SWMU 10) at the time of the VSI (Reference 5).

Toxaphene was produced at the facility's South Plant from 1973 to 1982. Wastes associated with this process are untreated process wastewater (K098) and wastewater treatment sludge (K041). Toxaphene is produced by combining camphene (a terpene produced from pine stumps) and chlorine. According to testimony from a Mississippi Order of Dismissal, the facility purchased camphene for the process rather than producing it themselves (Reference 27). The chlorination reaction used for the production of Toxaphene was conducted in a liquid phase utilizing approximately five parts carbon tetrachloride per part of camphene, with ultraviolet light as a catalyst. The carbon tetrachloride was removed from the reaction by distillation following the removal of excess chlorine and hydrochloric acid (HCl). Emulsifiable concentrate formulations of Toxaphene normally used mixed xylenes as carriers (Reference 259). Toxaphene production creates air emissions which may contain hydrogen chloride, chlorine, toluene, and a trace of Toxaphene. Emissions are generally controlled with alkali and water scrubbers, stripping, limestone adsorption, and baghouses. Muriatic acid is produced when waste hydrogen chloride gases from the chlorinator pass through a water absorber. The muriatic acid is either recovered or neutralized and disposed of via wastewater treatment. Emissions from dust formulation are usually vented to a baghouse and recycled to the formulation step (Reference 259).

Monosodium methanearsonate (MSMA) was produced at the facility's South Plant during 1983 and 1984. Wastes associated with this process are the by-product salts (K031). MSMA is produced utilizing arsenic trioxide, caustic, and methyl chloride. The facility had plans to produce disodium methanearsonate (DSMA) and sodium cacodylate (Caco) after the MSMA process was underway. DSMA is used at higher application rates and is less soluble than MSMA and therefore is not as widely used as MSMA. It is not clear from the available file material whether these additional products were produced at the Vicksburg facility. The 1987 Farm Chemicals Handbook lists Vertac as a basic producer of both Caco and DSMA (Reference 259). MSMA is produced by combining arsenic trioxide with caustic to produce sodium arsenite. The facility initially used sodium arsenite solution rather than arsenic trioxide due to OSHA regulations (e.g., requiring a separate building and a dust collection system for emptying the drums of arsenic trioxide) (Reference 217).

Sodium arsenite, when reacted with methyl chloride, produces DSMA. Safety requirements to minimize trace levels of arsenic include the incorporation of sodium hypochlorite to oxidize the trivalent arsenic to pentavalent arsenic. The DSMA may be separated from the salt and sold as product or be used as an intermediate for the production of MSMA. Sulfuric acid is added to the DSMA to produce MSMA. This also produces waste salt and sodium sulfate. MSMA is recovered by centrifuging. The underflow salt cake is a waste. The overflow is further evaporated and cooled to precipitate the salts which are pumped as a slurry and returned to the centrifuge. The slurry underflow consisting of sodium sulfate and sodium chloride salts is disposed of via roll-off sludge dumpsters which are transferred offsite to a landfill. The overflow is MSMA. According to the available file material, 35,000 pounds of slurry were produced per day (Reference 217).

Caco is produced by combining MSMA with sulfur dioxide, caustic, and methyl chloride, in a manner similar to the MSMA process. Waste salts from the Caco process include sodium chloride, sodium sulfite, and sodium sulfate (References 213, 217).

Atrazine (6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine) is produced by combining cyanuric chloride with equivalent amounts of ethylamine followed by equivalent amounts of isopropylamine. The addition of isopropylamine is conducted in the presence of an acid-binding agent. Waste emissions containing hydrogen cyanide, HCl, and cyanuric acid were treated via an alkali scrubber. If dusts were produced, emissions of dusts were treated via filters or wet scrubbers. The process also produced wastewater in addition to the scrubber water (Reference 259). Some of the production vessels at the Former Atrazine Production Area (SWMU 16) contained a methanol-water coolant. The typical manufacturing plant in 1980 produced approximately 20,000 metric tons of Atrazine per year. There was no information pertaining to the Cyanazine process in the available file material. However, these two herbicides are similar in activity and composition (Reference 259).

Methyl parathion is produced by combining o,o-dimethyl phosphorothionochloridate and sodium p-nitrophenoxide in an exothermic reaction at 80°C to 100°C. Lower temperatures such as from -10°C to +10°C can also be used to produce this material. The reaction is carried out at atmospheric pressure with reaction times ranging from approximately five hours at the high temperature and up to 18 hours at the lower temperature (Reference 259). Copper may be used as a catalyst or the reaction may be conducted in copper vessels. Potassium bromide may also be used as a cocatalyst. Other catalysts cited for the methyl parathion reaction include triethyl amine, tributyl amine, N-ethyl morpholine, and hexamethylene tetramine (Reference 259). Solvents used in this reaction may include benzene, alcohol, or chlorobenzene. According to the Pesticide Manufacturing and Toxic Materials Control Encyclopedia, the reaction product is an oily filtrate. The filtrate is separated into an oily layer and an aqueous layer. The oily layer may then be washed with dilute sodium carbonate solution, followed by a water wash and steam distillation to remove trimethyl thiophosphate. The material is cooled, then dried under vacuum to yield the product (Reference 259). The production of methyl parathion creates air emissions which may contain sulfur dioxide at approximately 410 kg/metric ton of pesticide produced. Small quantities of methyl parathion and methyl alcohol are also released to the air. Liquid wastes, including by-product HCl-NaCl, generally go through biological treatment before being released to the sewer. Sulfur and waste solvents are incinerated. Any sludges created are recycled and discharged to the sewer at a slow rate (Reference 259).

E. Waste Management

Waste management practices at CCC focus primarily on the containment and treatment of the process wastewaters and stormwater runoff. Solid wastes generated at the facility are either drummed and stored in the Drum Storage Area (SWMU 1) prior to offsite disposal, or discarded in the Junkyard and Wastes Piles (SWMU 34). Three Drum Storage Areas (SWMU 1a, 1b, and 1c) have been mentioned in the available file material. Air emissions at the facility are treated by various scrubbers.

In the North Plant, 0.26 million gallons per day of acidic wastewater are generated from potassium nitrate production. The acidic wastewater is generated at the End Product Scrubber (SWMU 28), the Cooler Scrubber (SWMU 27) and the production areas. Wastewater generated in the production areas is collected by the North Plant Containment System (SWMU 24) and treated at the North Plant Neutralization System (SWMU 22) prior to discharge to the Mississippi River under NPDES Permit No. 0027995. Off-gases from the potassium nitrate production areas are treated by the C-10 and C-15 Scrubbers (SWMUs 26 and 32). Alkaline wastewater generated by the C-10 Scrubber (SWMU 26) is discharged to the North Plant Neutralization System (SWMU 22) to aid in the neutralization of the acidic wastewater received by that unit.

The Inactive North Plant Surface Impoundment (SWMU 23) was formerly used to treat the North Plant wastewaters. This unlined unit used lime to neutralize the wastewater before being replaced by the North Plant Neutralization System (SWMU 22) (Reference 257). Wastewater generated at the North Plant is transported between the units via the Wastewater Pipes (SWMU 25) (Reference 257). Stormwater runoff which is not collected by the North Plant Containment System (SWMU 24) flows into the North Plant Drainage Ditches (SWMU 33). The drainage ditches merge and flow under the railroad tracks into Stout's Bayou (References 5, 261).

Another waste management practice at the North Plant is the collection of waste oils for disposal offsite. Two waste management units were identified for this purpose: the Oil Collection Unit (SWMU 29), and the Waste Oil SAA (SWMU 30). Waste oils have also collected in a sump located in the No. 6 Fuel Oil Area (SWMU 31) (References 257, 258).

The South Plant generates 0.07 million gallons per day of acidic wastewater. The process wastewater and stormwater are discharged to the South Plant Surface Impoundments (SWMU 3a, 3b, and 3c). The combined wastewaters and stormwaters are discharged offsite after treatment in the Carbon Adsorption System (SWMU 4). The wastewater and stormwater are transferred between various units throughout the South Plant via the South Plant Drainage System (SWMU 5). Wastewater is collected at various sumps located in the former pesticide production areas. The contents of the sumps are removed via the Vacuum Truck (SWMU 21) and are also treated at the Carbon Adsorption System (SWMU 4). Any stormwater runoff from the South Plant, especially from around the Former Atrazine Production Area (SWMU 16), which is not collected by the South Plant Drainage System (SWMU 5) flows into the South Plant Drainage Ditches (SWMU 13). The South Plant Hill Tank and Former Blue Tank (SWMUs 6 and 18) were previously used to contain Dinoseb wastewater prior to treatment or discharge (References 5, 257).

The pesticide production areas at the South Plant include the Former Dinoseb Production Area (SWMU 7), the Former MSMA Production Area (SWMU 11), the Former Toxaphene Production Area (SWMU 14), the Former Methyl Parathion Production Area (SWMU 15), and the Former Atrazine Production Area (SWMU 16). Other units which may have received spillage from pesticide production include the Dinoseb Off-Loading Area (SWMU 8), the Dinoseb Drumming Area and Drains (SWMU 9), the Dinoseb Stock Storage Area (SWMU 10), the Former MSMA Salt Unloading Area (SWMU 12), and the

Returned Product Storage Area (SWMU 17). Roll-off sludge dumpsters from the Former MSMA Salt Unloading Area (SWMU 12) were transferred offsite to a ChemWaste landfill located in Alabama. The Railroad Car Unloading Station (SWMU 20) has potentially received spillage of not only the pesticide products, but also the raw materials. At the time of the VSI, a Scrap Metal Dumpster (SWMU 19) was located near the Former MSMA Production Area (SWMU 11) for the disposal of large debris from the dismantling of that area. Debris collected in the dumpster was to be disposed of offsite at a permitted landfill (References 5, 257).

The facility utilized an Inactive Landfill (SWMU 2) in the South Plant for the disposal of pesticides and pesticide-related materials during the 1970s. The unlined unit was subject to non-RCRA-type closure activities in the early 1980s (Reference 257). Runoff from this area is meant to flow to the South Plant Surface Impoundments (SWMU 3), but on occasion has been observed entering the South Plant Drainage Ditches (SWMU 13).

F. Environmental and Demographic Setting

1. Meteorology

Cedar Chemical Corporation is located on the western border of Warren County Mississippi, approximately forty miles west of the state capital, Jackson. Warren County lies along the Mississippi River on the western border of Mississippi (Reference 256).

The climate in Warren County ranges from hot and humid in the summer to mildly cold and humid in the winter. The summer temperatures average at or above 90°F. Winter temperatures generally stay around 50°F. Winds are typically light, gaining strength in the winter. Rainfall is generally heavy throughout the year, lessening in autumn. The yearly average rainfall is approximately 50 inches and snow is rare (Reference 256).

2. Floodplain and Surface Waters

Two distinct physiographic regions meet in Warren County. These are the alluvial plains associated with the Mississippi River and its tributaries, and the loess hills. The Cedar Chemical facility is located directly on the border of these two regions. East of the facility are small flood plains and the western area consists mainly of steep hills and bluffs (Reference 256). The facility ranges from 80 to 150 feet above mean sea level (Reference 5).

The Cedar Chemical facility is bordered on the east by Stout's Bayou. This bayou flows south and joins with Hatcher Bayou at the southeast corner of the South Plant Surface Impoundment (SWMU 3) to form Hennessey's Bayou. Hennessey's Bayou flows west along the southwesterly border of the facility and eventually discharges into the Mississippi River. The bayous have median flow rates with constant variability due to weather conditions. Surface drainage at the North Plant is easterly into Stout's Bayou. In the South Plant, the surface drainage is predominantly in a southwesterly direction into the major South Plant Drainage Ditch (SWMU 13). The drainage ditch flows through a wetlands area into Hennessey's Bayou. Hennessey's Bayou flows south for approximately four miles into the Mississippi River. Portions of the CCC facility are within the floodplains of these bayous and are flooded during heavy rainfall events. The surface waters become contaminated from the contaminated soils which are washed into the bayous during flooding. The bayous are used by wildlife and for recreational fishing (References 5, 225, 256, 261). Process area sewers and surface water drainage have been described in greater detail in reports included as Appendix D. These reports include maps which show the runoff drainage pathways from each plant (Reference 261).

3. Soils and Geology

Approximately 60 percent of Warren County and all of the Cedar Chemical facility lie in an area that has been mapped as having Memphis-Natchez-Adler association soils. The Memphis and Memphis-Natchez soils encompass a majority of the land to the west of the facility, as well as the land between the plants and the inactive landfill area. Both the Memphis and Natchez soils were formed in loess. The Memphis soils are found along the narrow ridgetops and the higher areas of the slopes. Natchez soils are predominant along the lower and middle areas of the slopes. Both soil types accept water slowly but have a high capacity once the water has permeated. Both soils are well-drained and erosion is moderate. The Memphis soils have a silty clay loam subsoil, while the Natchez subsoil consists of silt loam. The Memphis Natchez soils are 0.25 to 1.5 feet thick and are underlain by 10 to 20 feet of silt or silty loam. These soils have a hydraulic conductivity of 0.8 to 2.5 inches per hour (Reference 256).

The south plant of the facility lies on silty soil. This land is very similar to the Memphis-Natchez silt loams, only it has been greatly altered by man. The land has been cut and filled to allow for building sites. The terrain is generally rolling hills with moderate to steep slopes. The soil maintains the same characteristics as the Memphis-Natchez soils (Reference 256). The boring log of MW-16, located in the center of the South Plant, gives an example of the soil layers beneath the facility (Reference 31). This information is provided in Figure II-3.

FIGURE II-3

Boring Log of No. MW-16
Vicksburg Chemical
Vicksburg, Mississippi

TYPE: Rotary wash & Shelby tube

LOCATION: See Plate 1

DEPTH, FT.	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	BLOWS PER FT	UNIT DRY WEIGHT LB/CU FT	COHESION, KIPS/SQ FT (1, 2, 3, 4) / PLASTIC LIMIT, WATER CONTENT, %, LIQUID LIMIT (20, 40, 60, 80)	ELEVATION, FT
			Meduim dense tan silt				
			Loose tan clayey silt -brown clayey silt, occasional wood below 12'				
			Firm tan silty clay -stiff below 17'				
			Very stiff gray clay				
			Medium dense tan clayey silt, with silty fine sand seams				
			Stiff gray clay -light grayish green clay below 37'				
			Medium dense green silty fine sand w/shell fragments				
			Hard light grayish green silty clay, w/shell fragments and occasional lithified ledges				

Depth scale: 5, 10, 15, 20, 25, 30, 35, 40, 50, 60

Note: Scale Change

COMPLETION DEPTH: 56 ft

DATE: 7/5/88

DEPTH TO WATER IN BORING: 7.4 ft after 20 min.

DATE: 7/5/88

WARE_LIND_FURLOW ENGINEERS

PLATE 5

Reference 31

The north plant is split between Memphis-Natchez silt loams and Adler silt loam. The Memphis-Natchez silt loams in the plant area are severely eroded and the surface layer consists mainly of the upper subsoil layer. The other half of the north plant lies on Adler silt loam. The Adler silt loam also makes up the majority of the land east of the facility, including the South Plant Surface Impoundment (SWMU 3). Adler soils are moderately well drained and have a high water capacity. Adler soils are 4 to 6 feet thick and have a hydraulic conductivity of 0.8 to 2.5 inches per hour (Reference 256.) Specifically, boring logs indicate that the plant is underlain by a silty clay fill to a depth of approximately 10 feet and silty clay pleistocene loess from 10 to 50 feet below the surface. The loess is underlain by marl at a depth of approximately 50 feet (Reference 46).

4. Ground Water

The plant is underlain by a confined aquifer occurring between depths of 10 and 50 feet showing mildly artesian conditions. The aquifer is made up of pleistocene loess (silt) and is overlaid by a clayey cap at a depth of 10 feet and underlain by an impermeable marl at a depth of 50 feet. The aquifer has a hydraulic conductivity range of 1.93 to 5.5 gallons per day per square foot (gpd/ft^2) and a transmissivity range of 40 to 200 gpd/ft. The ground water beneath the facility could be classified as Class IIB, a potential source of drinking water (References 5, 12).

Ground-water gradients in the facility area are low (Reference 12). Shallow ground water moves in a north to south direction. Stout's Bayou and Hennessey's Bayou influence the ground-water flow direction and gradient. Ground-water mounding from either natural topographic effects or artificially induced recharge may exist beneath the Inactive Landfill (SWMU 2) and the South Plant Surface Impoundments (SWMU 3) (Reference 46). Ground-water velocities in the aquifer range from 0.01 to 0.18 feet per day (ft/d) (Reference 12). The ground water may receive contaminants via the infiltration of surface water through the contaminated unsaturated zone (Reference 5).

Sixteen ground-water monitoring wells are in place at the plant (see Figure II-4, page 34 for ground-water monitoring well locations) (Reference 12). A diagram of MW-16 demonstrates the general structure of the monitoring wells at the facility (Figure II-5, page 35) (Reference 31). Dinoseb and Atrazine have been detected in at least six of the monitoring wells, and arsenic in at least four. Dinoseb has been documented at 1130 µg/l in MW-1, and Atrazine in MW-8 at 191 mg/l. Other pesticides and inorganic elements have also been detected in the ground water at the facility. The contaminated ground water can discharge to either Stouts Bayou or Hennessey's Bayou (Reference 5). A summary of

Figure II-4

Monitoring Well Locations

(Reference 12)

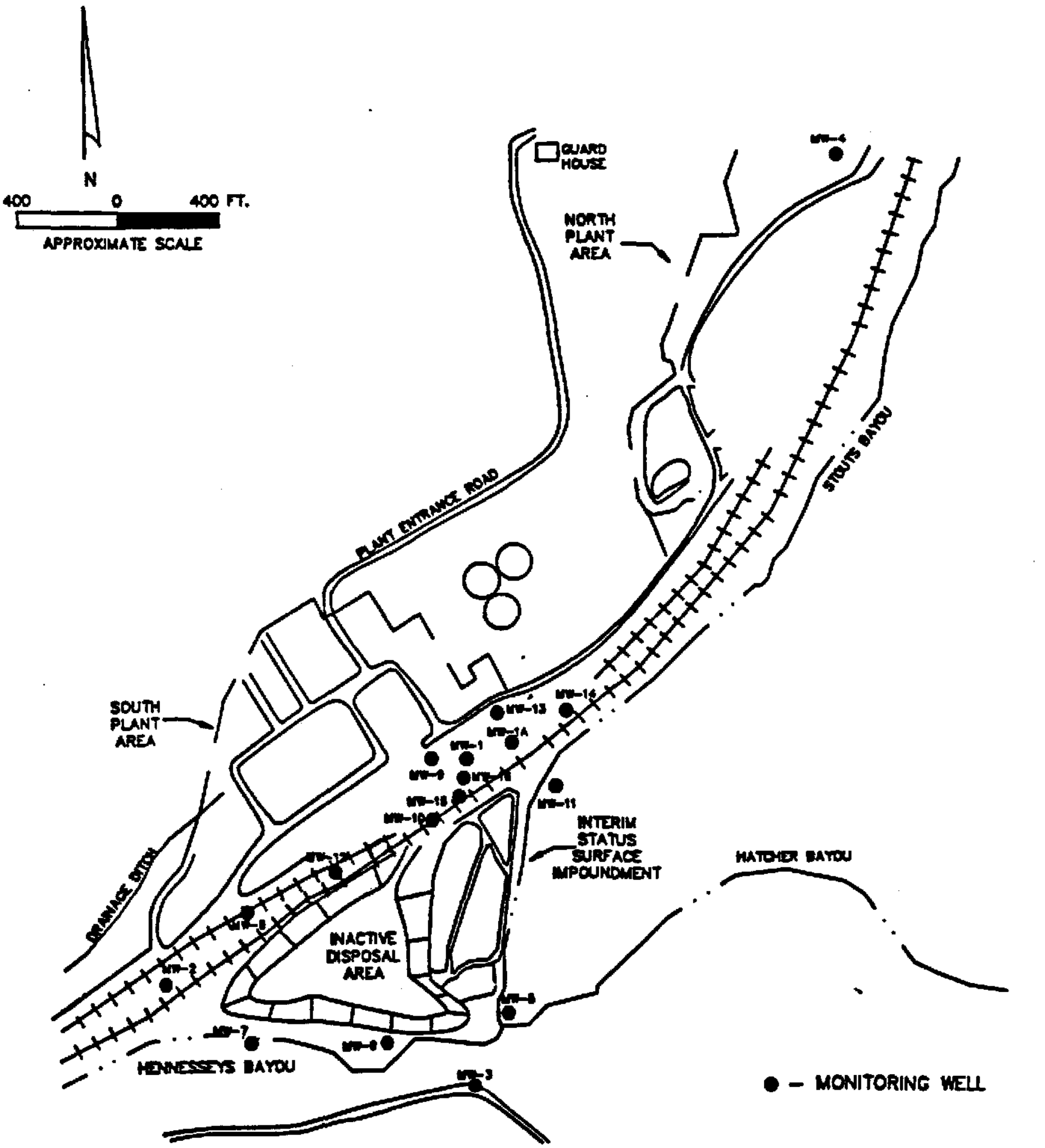


Figure II-5
Log of Groundwater Observat__on Well

Project & Location Vicksburg Chemical Vicksburg, Mississippi

Client Vicksburg Chemical Date of Report 7/15/88

Observation Well No. 16 Date Completed 7/16/88 Technician J. Malanchak

Riser Pipe: Material PVC Diameter 4 in. Type of Joints thread

Screen: Material PVC Slot Size .010" Diameter 4 in. Length 10 ft

Diameter of Borehole 8 in. Type of Filter Pack No. 3 blasing sand

Method of Placement of Filter Material 1¼" PVC tremie pipe

Type of Seal Above Screen bentonite pellets Backfill Above Seal cement/bentonite

Drilling Mud ______ used. Fresh Water Flush Before Setting Well Screen yes

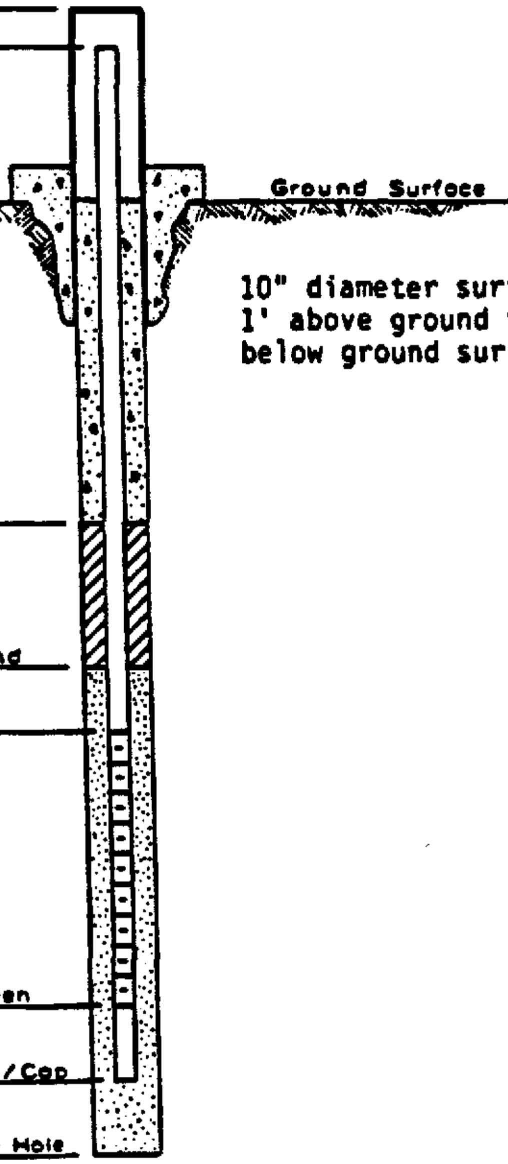
Well Developed by air lift Development Time 1½ hrs

Groundwater Level @ 2 hrs N/A @ 24 hrs ______ Other ______

ELEV, MSL / DEPTH, FT	FEATURE
25	Top of Shroud
2	Top of Riser Pipe
38	Top of Seal Plug
40	Top of Filter Sand
43	Top of Screen
52	Bottom of Screen
53	Bottom of Plug / Cap
56	Bottom of Bore Hole

GENERALIZED SOIL STRATIFICATION

DEPTH, FT



10" diameter surface casing from 1' above ground to a depth of 15' below ground surface

PLATE 6

the sampling data from CCC can be found in Appendix C, taken from the EPA Endangerment Assessment of October 1989, and the 1990 2nd Quarter Ground-Water Monitoring Report (Reference 5).

There are five public or private wells within a three-mile radius of the facility (Reference 27).

5. Toxicological Evaluation

The primary constituents of concern at the facility include Dinoseb, Toxaphene, arsenic, Atrazine, Arochlor-1254, and methyl parathion. Each of these have been found in either the soil or ground water at the facility (Reference 5). Table II-2 presents a summary of the SWMUs with confirmed contamination at the facility and the associated toxicological levels of concern.

Dinoseb has been banned from use as a pesticide by the EPA due to the significant health risk it creates for populations repeatedly exposed. These health risks include developmental toxicity, acute toxicity, reproductive toxicity, immunotoxicity and the induction of cataracts (Reference 5). Dinoseb is highly toxic to fish and moderately toxic to birds. The acute LD_{50} value (lethal dose for 50% of test population) for rats is estimated at 25 mg/kg, but this may vary depending upon formulation (References 259, 269).

Dinoseb is an orange solid which has been used in the past as a fungicide against mites and aphids, and as a contact herbicide to control seedling weeds and grasses in crops. Many applications of the pesticide were possible including preplant, preemergence and postemergence. Under normal use, buildup of the pesticide in the soil was prevented if the weather conditions were conducive to microbial breakdown. Dinoseb is not tightly absorbed in most agricultural soils, but may leach in porous, sandy soils (References 5, 259).

Toxaphene is one of the most widely used pesticides in the United States. The yellow wax, also known as Campheclor, is an organochlorine insecticide used on corn, cotton, and small grains. Long term observations have confirmed that residues are seldom present on agricultural crops. Toxaphene is considered to be moderately toxic with an acute oral LD_{50} for rats of 55 mg/kg. The pesticide, however, is highly toxic to many aquatic invertebrate and vertebrate species. In an effort to help protect freshwater aquatic life, the EPA set a concentration limit of 0.47 μg/l in freshwater (References 5, 259, 269).

Table II-2

Summary of SWMUs with Confirmed Contamination

SWMU Name/Number	Contaminant Concentrations	Type of Sample	LD_{50}[1]	LEVELS OF CONCERN MCL[2]	TLV[3]
1 Drum Storage Areas	550 mg/kg Arsenic	Soil	N/A	0.05 mg/l[7]	0.2 mg/m^3
	130 mg/kg Zinc	Soil	N/A	N/A[6] (5 mg/l secondary)	N/A
	5000 µg/kg Atrazine	Soil	1500 mg/kg	3µg/l	5 mg/m^3
	3700 µg/kg Toxaphene	Soil	55 mg/kg	0.003 mg/l[7]	0.5 mg/m^3
3 Surface Impoundment	13000 mg/l Dinoseb	Sediment	25 mg/kg	7 µg/l[7]	N/A
	2320 mg/kg Toxaphene	Sediment	55 mg/kg	0.003 mg/l[7]	0.5 mg/m^3
7 Former Dinoseb Production Area	640,000 µg/kg Dinoseb	Soil	25 mg/kg	7 µg/l[7]	N/A
9 Dinoseb Drumming Area/Drains	12,000-640,000 µg/kg Dinoseb	Soil	25 mg/kg	7 µg/l[7]	N/A
11 Former MSMA Production Area	820-1300 µg/kg Methyl Parathion	Soil/ Ground Water	6 mg/kg	N/A	0.2 mg/m^3
13 South Plant Drainage Ditches	550 mg/kg Arsenic	Soil	N/A	0.05 mg/l[7]	0.2 mg/m^3
	5000 µg/kg Atrazine	Soil	1500 mg/kg	3µg/l	5 mg/m^3
	240 µg/kg Cyanazine	Soil	149 mg/kg	N/A[6]	N/A
	3700 µg/kg Toxaphene	Soil	55 mg/kg	0.003 mg/l[7]	0.5 mg/m^3
14 Former Toxaphene Production Area	12,000 µg/kg Dinoseb	Soil	25 mg/kg	7 µg/l[7]	N/A
	47,000 µg/kg Toxaphene	Soil	55 mg/kg	0.003 mg/l[7]	0.5 mg/m^3
	94 mg/kg Zinc	Soil	N/A	N/A[6] (5 mg/l secondary)	N/A
15 Former Methyl Parathion Production Area	1300 µg/kg Methyl Parathion	Soil	6 mg/kg	N/A	0.2 mg/m^3
	820 µg/kg Methyl Parathion	Ground Water	6 mg/kg	N/A	0.2 mg/m^3
16 Former Atrazine Production Area	5000 µg/kg Atrazine	Soil	1500 mg/kg	3µg/l	5 mg/m^3

[1] Lethal dose for 50% of the population as applied orally to rats.
[2] Maximum Contaminant level as established under the Safe Drinking Water Act and RCRA for ground water.
[3] Threshold Limit Values as recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) for airborne concentrations which workers may be exposed to on a daily basis
[4] Ground-water contamination in the vicinity has not been *definitively linked to this unit.*
[5] N/A not available/applicable.
[6] Listed for regulation.
[7] Proposed limit under review.

Table II-2 (Cont.)

Summary of SWMUs with Confirmed Contamination

SWMU Name/Number	Contaminant Concentrations	Type of Sample	LD_{50}[1]	LEVELS OF CONCERN MCL[2]	TLV[3]
17 Returned Product Storage Area	5000 µg/kg Atrazine	Soil	1500 mg/kg	3µg/l	5 mg/m^3
	3700 µg/kg Toxaphene	Soil	55 mg/kg	0.003 mg/l[7]	0.5 mg/m^3
	550 mg/kg Arsenic	Soil	N/A	0.05 mg/l[7]	0.2 mg/m^3
	130 mg/kg Zinc	Soil	N/A	N/A[6] (5 mg/l secondary)	N/A
20 Railroad Car Unloading Station[4]	1200 µg/l Dinoseb	Ground Water	25 mg/kg	7 µg/l[7]	N/A
	80 µg/l Atrazine	Ground Water	1500 mg/kg	3µg/l	5 mg/m^3
34 Junkyard/Waste Piles	5400 µg/kg Atrazine	Soil	1500 mg/kg	3µg/l	5 mg/m^3
	30 µg/kg Cyanazine	Soil	149 mg/kg	N/A[6]	N/A
	710 µg/kg Arochlor-1254	Soil	1010 mg/kg	0.5 µg/l	N/A
	3000 µg/kg Propazine	Soil	N/A	N/A	N/A

[1] Lethal dose for 50% of the population as applied orally to rats.
[2] Maximum Contaminant level as established under the Safe Drinking Water Act and RCRA for ground water.
[3] Threshold Limit Values as recommended by the American Conference of Governmental Industrial Hygienists (ACGIH) for airborne concentrations which workers may be exposed to on a daily basis
[4] Ground-water contamination in the vicinity has not been definitively linked to this unit.
[5] N/A not available/applicable.
[6] Listed for regulation.
[7] Proposed limit under review.

Toxaphene has been classified as a Class B2 carcinogen - a probable human carcinogen, and has reportedly been the cause of degenerative lesions in the liver and kidney. Health risks from Toxaphene include reproductive toxicity, fetotoxicity, and maternal toxicity (liver lesions). EPA has established a maximum contaminant level (MCL) under the Safe Drinking Water Act, and under RCRA, a ground-water concentration limit of 3 mg/l (References 5, 259, 265).

Toxaphene has the potential to be adsorbed in soil, to run off with soils, and to bioaccumulate. Food chain contamination is likely. The potential for leaching and biodegradation are very low (Reference 268).

The main source of arsenic at CCC was the production of the herbicide MSMA. MSMA, used to control grass weeds, was reportedly almost completely inactivated in soil by ion exchange and surface decomposition. In addition, MSMA was not toxic to fish. The primary health concern comes from the arsenic which is found in the waste salts from the production of MSMA (Reference 259).

Arsenic is classified as a Class A carcinogen - a definite human carcinogen. It is both a chronic and an acute toxin. Most human exposure comes from ingestion or inhalation. Human lethal doses vary depending upon absorption of the compounds. Some examples of lethal doses include 60 mg trivalent arsenic and 250 mg pentavalent arsenic. Chronic exposure to arsenic can lead to skin cancer and respiratory tract tumors. Symptoms of exposure include vomiting, diarrhea, skin lesions, peripheral neuropathy, peripheral vascular disease, and a garlicky odor of the breath and skin. EPA has established a drinking water MCL and ground-water concentration limit of 50 μg/l (References 5, 259, 264).

Arsenic transport in the environment is controlled largely by adsorption and desorption processes in the soil. Concentrations of arsenic found in water are generally lower than concentrations in nearby soils due in part to reduction by bacteria in marine environments. Bioaccumulation of arsenic occurs readily in some aquatic organisms, thus contamination of the food chain is likely (Reference 267).

Atrazine is a triazine herbicide used in the control of broadleaf and grassy weeds as are Propazine and Cyanazine. This colorless powder is more readily adsorbed on muck or clay soils. Leaching of the herbicide is limited by adsorption to certain soil constituents. Microbial activity assists in the breakdown of the herbicide making bioaccumulation unlikely. Solubility of the herbicide suggests that it may migrate in ground water (References 259, 268).

Atrazine has a low toxicity for aquatic life. Toxic signs in animals have been very non-specific. They include decreased activity, muscular weakness, and difficulty in breathing. One study of chronic toxicity in animals reported finding leukopenia - a decrease in white blood cell concentrations. Atrazine is absorbed through the skin fairly easily and may be an irritant to the skin and eyes. The acute oral LD_{50} for rats is 1500 mg/kg (References 5, 259, 269).

Arochlor-1254 is classified as a polychlorinated biphenyl (PCB). PCBs can be taken into the body through inhalation, ingestion, and transdermal absorption. Once in the body, PCBs tend to concentrate in fatty tissues. Chronic exposure can cause skin and stomach lesions, impairment of liver function, and peripheral neuropathy. PCBs are characterized as carcinogens and may lead to reproductive toxicity and fetotoxicity. Chronic threshold toxicity values could not be found for humans. For aquatic life, however, the chronic threshold values for vertebrates ranged from 0.3 to 9 μg/l, and for invertebrates, from 0.8 to 400 μg/l. The acute exposure limit of PCBs for ambient water quality is set at 2 μg/l. The MCL for PCBs as established by EPA is set at 0.5 mg/l (References 5, 264). PCBs have a low potential for leaching and biodegradation. They are adsorbed to soil organic matter and can bioaccumulate. Food chain contamination is likely. PCBs are known to be persistent in the environment (Reference 268).

Methyl parathion is an organophosphorus insecticide. The insecticide is highly toxic to mammals, primarily an acute toxin. The colorless crystals can enter the body through inhalation, ingestion, or transdermal absorption. The compound is considered non-toxic until it reaches the liver. At this point, methyl parathion is converted into paraoxon, which inhibits acetylcholinesterase activity. Severe acute toxic effects may include coma or death. Symptoms of exposure include headache, vertigo, blurred vision, salivation, lacrimation, muscular weakness, and difficulty in breathing. The acute oral LD_{50} for rats is 6 mg/kg (References 5, 259, 269).

Methyl parathion is biodegradable in soil, thus making bioaccumulation unlikely. However, residues have been observed and soil adsorption is possible. The volatility of the material could pose an inhalation problem if soils are disturbed (Reference 268).

III. SWMU DESCRIPTIONS

This section presents SWMU Data Sheets completed to provide descriptions and release assessments of the Solid Waste Management Units (SWMUs) identified during the PR and VSI of the Cedar Chemical Corporation in Vicksburg, Mississippi.

Prior to the individual SWMU Sheets are SWMU location maps for the South Plant (Figure III-1, page 42) and the North Plant (Figure III-2, page 73). The SWMUs are presented on these Figures by number as identified in the following descriptions.

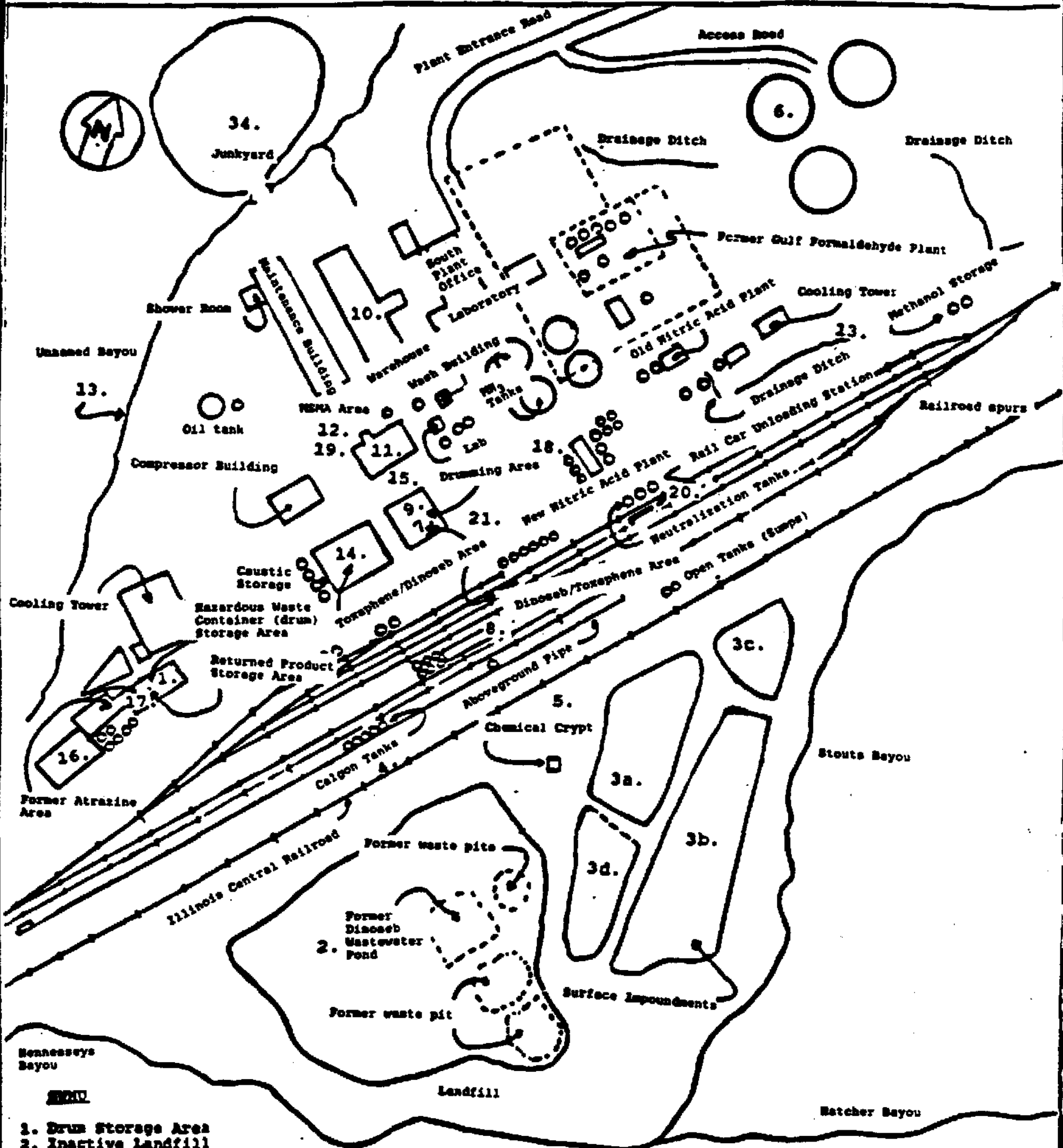
In the SWMU Data Sheets, the following designations are used to assess the unit's potential for release to the environment via the various pathways:

L (Low)	minimal potential for release
M (Medium)	moderate potential for release
H (High)	evidence suggests that release(s) have occurred
U (Unknown)	no information is available

FIGURE III-1

South Plant SWMU Map

(Reference 33)



SWMU

1. Drum Storage Area
2. Inactive Landfill
3. South Plant Surface Impoundments
4. Carbon Adsorption System
5. South Plant Drainage System
6. South Plant Mill Tank
7. Former Dinoseb Production Area
8. Dinoseb Off-Loading Area
9. Dinoseb Drumming Area and Drains
10. Dinoseb Stock Storage Area
11. Former MSMA Production Area
12. Former MSMA Salt Unloading Area
13. South Plant Drainage Ditches
14. Former Toxaphene Production Area
15. Former Methyl Parathion Production Area
16. Former Atrazine Production Area
17. Returned Product Storage Area
18. Former Blue Tank
19. Scrap Metal Dumpster
20. Railroad Car Unloading Station
21. Vacuum Truck
34. Junkyard and Waste Piles

Approx. scale: 167 feet = 1 inch

SWMU locations not to scale

SWMU NUMBER: 1 **PHOTO NUMBER:** 1.1, 1.2

NAME: Drum Storage Areas

TYPE OF UNIT: Less-than-90 day storage areas

PERIOD OF OPERATION: Varies

PHYSICAL DESCRIPTION AND CONDITION: The unit consists of three drum storage areas (SWMUs 1a, 1b, 1c) located in the South Plant. SWMU 1a is located in the vicinity of the Former Atrazine Production Area (SWMU 16) in the south section of the South Plant. The area was initially used in 1980 to store drums of hazardous waste generated at the various pesticide production areas in the South Plant. At the time of the VSI, the area was utilized for staging drums of floor scrapings and similar hazardous wastes generated from the activities associated with dismantling the former pesticide production areas.

The capacity of the unit is approximately 1,000 55-gallon drums and covers an area 80 feet by 80 feet. The unit is constructed of concrete and was covered by a tin roof. The roof was reportedly blown down during a storm in the spring of 1990. Secondary containment consists of six-inch tall concrete curbs on the unit's south, west, and north sides. Runoff from the pad is collected via a concrete sump approximately 30 inches in diameter and two feet deep. The sump previously discharged to the South Plant Surface Impoundments (SWMUs 3a, 3b, 3c). The drain from the sump was plugged with concrete in February 1987 and the contents of the sump are presently removed via the Vacuum Truck (SWMU 21). The floor of the unit appeared pitted and stained yellow with Dinoseb. The concrete around the sump also appeared pitted and was covered with a white chalky material that appeared to be Atrazine. The major South Plant Drainage Ditch (SWMU 13) is situated west of the unit.

SWMU 1b was located between the drumming building and the New Nitric Acid Plant, in the central area of the South Plant. No secondary containment of the area existed. Wastes handled and period of operation are unknown for this unit. The third drum staging area, SWMU 1c, could not be located by facility representatives.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: Unit 1a formerly managed by-product salts from the production of MSMA, and solid wastes associated with Dinoseb, Toxaphene and Atrazine production. Currently, the unit is used to stage waste floor scrapings containing MSMA. However, no drums were observed at this unit at the time of the VSI. Information concerning the contents of the drums staged in SWMUs 1b and 1c could not be provided at the time of the VSI.

RELEASE PATHWAYS: Air (L) Surface Water (M) Soil (H) Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The VSI team observed the base of SWMU 1a to be cracked, pitted, and stained yellow. The unit has a history of drum mismanagement including leaking drums and the storage of wastes in drums that were in poor condition (See Table II-1). Analysis of soil samples collected from an area immediately northwest of the unit during February 1987 indicated 550 mg/kg arsenic, 130 mg/kg zinc, 5000 µg/kg Atrazine, and 3,700 µg/kg Toxaphene.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 12, 17, 26, 28, 48, 65, 73, 85, 86, 93, 133 138, 183, 226, 239, 241, 244, 257, 258, 260

COMMENTS: The facility should determine the location and contents of drum storage areas 1b and 1c so that their potential for release can be determined.

SWMU NUMBER: 2 **PHOTO NUMBER:** 2.1, 2.2, 2.3, 2.4, 2.5, 4.1

NAME: Inactive Landfill

TYPE OF UNIT: Unlined landfill

PERIOD OF OPERATION: 1972 to November 1980

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the vicinity of the South Plant Impoundments (SWMUs 3a, 3b, 3c) in the southeast section of the South Plant. The unit consisted of a disposal area used to contain discarded drums and five unlined pits. One pit had been used in an attempt to dissolve the waste drums with hydrochloric acid. A large number of drums were reportedly removed from the unit in early 1980 and transferred offsite to a hazardous waste landfill. The unit was subject to a non-RCRA closure consisting of clay capping and vegetative cover. The landfill covers approximately two to three acres.

The unit is bounded on the northeast by the South Plant Surface Impoundments (SWMUs 3a, 3b, 3c) which are in the vicinity of the confluence of Stouts and Hatchers Bayou. The unit was covered in grass and weeds at the time of the VSI. The slope between the landfill and the surface impoundment was covered with a geotextile fabric. The cover was reportedly used to prevent soil erosion from the landfill interfering with the retrofitting activities being conducted at the impoundment. Three monitoring wells are in place to monitor the landfill area. Ground-water mounding from either natural topographic effects or artificially induced recharge may exist under this unit.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: According to a 1989 U.S. EPA Endangerment Assessment for the facility, the unit is known to have received at least 4000 empty Dinoseb formulation drums; residue and debris from the methyl parathion fire; 172 drums of hydrolyzed cyanuric acid from the production of Atrazine; 17 drums of spent activated carbon; 25 drums of dimethyl urea and isopropyl amine; 31 drums of sodium nitrophenol liners and empty bromine bottles; 80 drums of phosphorous trichloride, phosphorous sulfochloride, and dimethyl phosphorous sulfochloride.

Three pits at the landfill received sediment from the South Plant Surface Impoundments (SWMU 3) consisting of soil and Dinoseb. One pit received 200,000 gallons of Dinoseb wastewater. Another pit was used to neutralize empty Dinoseb drums with HCl. The wastes disposed in the unit prior to 1975 were not recorded.

RELEASE PATHWAYS: Air (M) Surface Water (H) Soil (H) Ground Water (H) Subsurface Gas (M)

HISTORY AND/OR EVIDENCE OF RELEASE(S): There is documented ground-water contamination resulting from past waste management practices at this unit. In addition, since volatile wastes including toluene and carbon tetrachloride from toxaphene production may have been disposed of in the unit, hazardous discharges to the air and the creation of subsurface gas should be investigated. Traces of carbon tetrachloride were found in soil/sediment samples taken from the unit in a Hazardous Waste Site Investigation of January 26, 1982.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 9, 133, 136, 138, 140, 162, 163, 167, 168, 170, 173, 174, 179, 183, 202, 203, 204, 206, 209, 215, 218, 224, 228, 239, 244, 254, 257, 258

COMMENTS: Capping of the area was the subject of Commission Order No. 599-82, issued November 10, 1982.

SWMU NUMBER: 3 **PHOTO NUMBER:** 3.1, 3.2, 3.3, 3.4, 3.5, 2.5

NAME: South Plant Surface Impoundments

TYPE OF UNIT: Unlined retention ponds

PERIOD OF OPERATION: 1955 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the immediate vicinity of the Inactive Landfill (SWMU 2) in the southeast section of the South Plant. The unit is bounded to the east by Stouts Bayou. Beyond Stouts Bayou is the city of Vicksburg POTW. The unit was undergoing retrofitting activities at the time of the VSI. The impoundments receive stormwater from the South Plant; wastewater from the North Plant that does not meet the facility's NPDES discharge requirements; and backwash from the Carbon Adsorption System (SWMU 4). In the past, the unit consisted of three unlined surface impoundments (SWMUs 3a, 3b, and 3c) with combined capacities of 3,500,000 to 6,000,000 gallons. With the closure activities, another area has been established, the Solid Waste Consolidation Area (SWMU 3d). At the time of the VSI, wastewater was expected to flow from Impoundment C to Impoundment B, and through Impoundment A after the completion of the retrofitting activities. The three impoundments encompassed approximately 3.9 acres.

Prior to the retrofitting activities, each impoundment was 10 to 15 feet deep including sludge, possibly reaching the confined aquifer below the area. The impoundment embankments are constructed of soil (loess, common to the area) and are vegetated with grass for erosion prevention. The south border of the unit is adjacent to Hennessey's Bayou and the eastern border parallels Stouts Bayou. The sludges from Impoundment A were solidified with lime kiln dust and disposed of in the Solid Waste Consolidation Area (SWCA) within the area previously covered by Impoundment A. The SWCA consists of a double-lined landfill. Sludges from the other two impoundments will also be disposed of in the SWCA (SWMU 3d).

South Plant Impoundment A (SWMU 3a) is situated between Impoundment B (SWMU 3b) and the Inactive Landfill (SWMU 2). Impoundment A previously received wastewater from the South Plant. At the time of the VSI, the impoundment was being retrofitted with a 60 mm liner and was not receiving any wastewater. The liner reportedly had leaks which were expected to be repaired by the installation contractor. Pipes were observed in place for use when Impoundment A (SWMU 3a) became operational. Impoundment A was rectangular in shape with dimensions of 600 feet by 150 feet and the impoundment encompassed approximately 2.1 acres. With SWCA (SWMU 3d) taking approximately half of the previous area, Impoundment A was last estimated as being 300 feet by 165 feet. The SWCA (SWMU 3d) was described by a facility representative as being somewhat triangular in shape, with a base of approximately 300 feet and a hypotenuse of approximately 360 feet. As of October 1990, retrofitting of Impoundment A was complete and closure procedures had been started on Impoundment B.

South Plant Impoundment B (SWMU 3b) is situated between Impoundment A and Stouts Bayou. Impoundment B receives secondary wastewater through a pump. At the time of the VSI, soil discoloration and scum were observed along the pond's edge. The pond is rectangular in shape with dimensions of 450 feet by 150 feet and encompasses approximately 1.5 acres.

South Plant Impoundment C (SWMU 3c) is situated northwest of the Impoundments A and B. At the time of the VSI, Impoundment C received all wastewater and stormwater runoff from the South Plant. Impoundments A and C were connected by a 10-foot cut-away section of the dividing dike-road at the time of the VSI. The impoundments are expected to be connected by pipes in the future. Impoundment C is triangular, encompassing approximately 0.3 acres. The impoundment is scheduled to be lined after Impoundment B is completed. Impoundment C also receives backwash from the Carbon Adsorption System (SWMU 4) and any effluent from the North Plant Neutralization System (SWMU 22) which does not meet the pH range (pH 6 to 9) for discharge. The VSI team observed an oil-like sheen on the water surface in the vicinity of one of the pipes discharging to the impoundment, and soils stained with what appeared to be Dinoseb along the southern edge.

The South Plant Surface Impoundments were determined as not falling under RCRA regulation by the Mississippi Commission of Natural Resources in December 1986 and again in August 1987. On December 17, 1986 the Commission found the impoundments exempt under the de minimus exclusion as applied to Dinoseb wastes received. On August 5, 1987 the Commission found that Toxaphene wastes received by the impoundments also fell under the de minimus exclusion. In an effort to please EPA, CCC in December 1987 proposed to consolidate wastes from the impoundments in accordance with RCRA standards such that the impoundments could still be used for non-hazardous wastes. While the activities being performed at the site have been reviewed by MSDNR, MSDNR has not certified the closure as in compliance with RCRA.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives stormwater containing "de minimus" quantities of Dinoseb and acidic wastewater from the fertilizer manufacturing operations. In the past, the unit received wastewaters containing Toxaphene, Dinoseb, Atrazine, MSMA, and methyl parathion.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): There is documented soil contamination resulting from past waste management practices conducted at this unit. Up to 13,000 mg/l Dinoseb and up to 2,320 mg/kg Toxaphene were detected in sediment samples taken from the impoundment during 1986. Ground-water mounding from either natural topographic effects or artificially induced recharge may exist beneath this unit.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 46, 48, 49, 65, 72, 73, 80, 85, 86, 77, 88, 89, 91, 110, 113, 118, 123, 133, 136, 138, 140, 141, 145, 146, 162, 163, 167, 168, 172, 173, 174, 176, 180, 183, 184, 185, 187, 189, 191, 193, 199, 200, 211, 228, 239, 241, 244, 257, 258, 260

Comments: None

SWMU NUMBER: 4 **PHOTO NUMBER:** 4.1, 4.2, 4.3, 8.1

NAME: Carbon Adsorption System

TYPE OF UNIT: Neutralizing system

PERIOD OF OPERATION: Mid-1970's to present

PHYSICAL DESCRIPTION AND CONDITION: This unit is located along the railroad tracks in the south section of the South Plant. The system consists of six vertical tanks containing approximately 20,000 pounds each of activated carbon and two wastewater holding tanks (river tanks). The wastewater is contained by the two aboveground vertical river tanks prior to treatment in the carbon adsorption tanks. These tanks are constructed of carbon steel with capacities of approximately 12,000 to 15,000 gallons. The tanks receive wastewater collected by the Vacuum Truck (SWMU 21) and combined stormwater and wastewater contained by the South Plant Surface Impoundments (SWMUs 3a, 3b and 3c). The river tanks discharge into the carbon adsorption tanks. The adsorption tanks are connected in series and are designed to remove pesticides from the wastewater. Wastewater flows from the top to the bottom of each tank. The adsorption unit has a treatment capacity of 1,200,000 gallons per day.

At the time of the VSI, the system was set up as two units, each unit consisting of two tanks in series. An additional tank is used for standby and another is used as back-up. One unit in series is used for treating the wastewater collected by the Vacuum Truck (SWMU 21) which is discharged to the unit via a sump within the secondary containment. The other unit in series treats the liquid effluent from the South Plant Surface Impoundments (SWMUs 3a, 3b, and 3c). Both units discharge the treated wastewaters offsite via NPDES-permitted Outfall 001 which flows to the Mississippi River. Backwash water from the unit is returned to the surface impoundment and the spent carbon is transferred offsite for regeneration. Secondary containment for the unit consists of a concrete pad approximately 100 feet long, 20 feet wide, with containment curbs approximately 1 foot tall. The sump, utilized during the Vacuum Truck (SWMU 21) unloading operations, is approximately four feet long, four feet wide, and three feet deep. The concrete pad was stained yellow with what appeared to be Dinoseb. The concrete around the sump appeared stained and eroded.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: In the past the unit received wastewater containing Dinoseb, Atrazine, methyl parathion, MSMA and Toxaphene. At the time of the VSI, the unit received stormwater containing "de minimus" amounts of Dinoseb as well as wastewater (containing Dinoseb, Atrazine, Toxaphene, MSMA, and methyl parathion) collected from sumps by the Vacuum Truck (SWMU 21).

RELEASE PATHWAYS: Air (L) Surface Water (M) Soil (M) Ground-Water (M) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): Although releases to surface water are regulated via the facility's NPDES permit, there have been several excursions consisting of releases of untreated wastewater.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 83, 113, 123, 130, 133, 139, 183, 219, 223, 226, 228, 239, 244, 257, 258

COMMENTS: None

SWMU NUMBER: 5 **PHOTO NUMBER:** 5.1

NAME: South Plant Drainage System

TYPE OF UNIT: Drainage system

PERIOD OF OPERATION: The unit consists of drains, sumps, trenches, and pipes of varying ages dating from the 1950's to present.

PHYSICAL DESCRIPTION AND CONDITION: This unit is located throughout the South Plant. The unit is designed to transfer stormwater and process water to the South Plant Surface Impoundments (SWMUs 3a, 3b, and 3c) and offsite. The drainage system receives process and stormwater from the processing area, product loading and unloading areas, the drumming building, and the nitric acid production area. The pipes are made of varying materials of construction with diameters ranging from 4 to 24 inches. The materials of construction include cast iron, carbon steel, vitrified clay, reinforced concrete, fiberglass reinforced plastic, and polyvinyl chloride (PVC). Sumps and trenches are also of varying dimensions, but are primarily constructed of concrete. Most wastewaters received by this unit were formerly discharged to the South Plant Surface Impoundments (SWMU 3), although some areas discharged to the major South Plant Drainage Ditch (SWMU 13). Facility representatives reported that around November 1985 all areas related to the handling of Dinoseb were sealed off from the surface impoundments. At the time of the VSI, it was difficult to determine the drainage pathways since the piping is located underground. Wastewater collected in the sealed-off areas is reportedly removed by the Vacuum Truck (SWMU 21).

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives and transfers nitric acid process water, and stormwater containing Dinoseb, Atrazine, MSMA, methyl parathion, and Toxaphene.

RELEASE PATHWAYS: Air (L) Surface Water (M) Soil (M)
Ground Water (M) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The Endangerment Assessment prepared by EPA has documented Dinoseb in sediment and liquid samples from this unit. In addition, an evaluation conducted by Environmental Protection Systems, Inc. in March 1986 indicated that pipes in the nitric acid line leaked.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 257, 258, 261

COMMENTS: Integrity testing of the South Plant sewers and surface water drainage should be performed again to determine the release potential of this system.

SWMU NUMBER: 6 **PHOTO NUMBER:** 6.1

NAME: South Plant Hill Tank

TYPE OF UNIT: Storage tank

PERIOD OF OPERATION: Early 1960's to 1989

PHYSICAL DESCRIPTION AND CONDITION: The unit was located on a hill between the South and North Plants. The unit was a carbon steel tank with a capacity of 1,600,000 gallons. The unit's dimensions were 300 feet by 300 feet. The tank was used to store neutralized wastewater from Dinoseb production before disposal offsite or release under the facility's NPDES permit through the Carbon Adsorption System (SWMU 4). The tank was formerly used to store NH_4NO_3 solution. Two other tanks were situated in the immediate vicinity of the unit and utilized for nitric acid storage. In 1989 the tank was sold as scrap metal after the stored wastewater was discharged to the Carbon Adsorption System (SWMU 4). The VSI team observed the former location of the unit which consisted of the soil berm and the concrete pads.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit received neutralized wastewater containing Dinoseb.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE: No evidence of release was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 5, 65, 86, 133, 138, 176, 183, 187, 196, 226, 239, 241, 244, 257, 258

COMMENTS: The unit was originally declared as a treatment unit on the facility's 1980 Part A application, but the facility later classified it as a storage tank on their 1983 application.

SWMU NUMBER: 7 **PHOTO NUMBER:** 7.1

NAME: Former Dinoseb Production Area

TYPE OF UNIT: Inactive production area

PERIOD OF OPERATION: 1973 to December 1986

PHYSICAL DESCRIPTION AND CONDITION: The unit is located between the MSMA facility and the railroad tracks in the central section of the South Plant. The unit consists of sumps, trenches, production vessels, and a storage tank associated with the Dinoseb production operations. The production area is approximately 40 feet long and 25 feet wide. The exact nature of the operations could not be provided by facility representatives. The VSI team observed what appeared to be yellow Dinoseb stains outside the production facility on the surrounding gravel-covered area.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: This area contains spills from the production of Dinoseb, along with DEHPA and 2-ethyl-henyl-nitrate (EHN) which were also produced in this area.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The VSI team observed yellow stained areas outside the production area. Previous NPDES and RCRA compliance inspection personnel also noted spills in the vicinity of the former unit (see Table II-1, page 20). Analysis of soil samples collected immediately north of the unit during February 1987 indicated 640,000 $\mu g/kg$ Dinoseb.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 65, 73, 132, 146, 154, 257, 258, 259

COMMENTS: None

SWMU NUMBER: 8 **PHOTO NUMBER:** 8.1, 8.2, 8.3

NAME: Dinoseb Off-Loading Area

TYPE OF UNIT: Inactive loading/unloading area

PERIOD OF OPERATION: 1973 to December 1986

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the central section of the South Plant. It consists of a concrete pad and a sump situated in the southwest corner of the pad. The pad was used to contain spillage associated with the truck loading/unloading operations at the Dinoseb Drumming Area and Drains (SWMU 9). The contents of the sump are periodically emptied by the Vacuum Truck (SWMU 21) for treatment at the Carbon Adsorption System (SWMU 4). The pad is approximately 25 feet long and 15 feet wide. The sump is approximately 2 feet long, 1.5 feet wide, and approximately 2 feet deep. The concrete curbs, concrete pad, and the concrete surrounding the sump appeared stained (yellow) and in poor condition. The liquid contained by the sump had a yellow-brown scum floating on the surface that appeared to be Dinoseb.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit received Dinoseb spillage.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H) Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): An endangerment study prepared by EPA identified the unit as a potential area of release due to Dinoseb traces found in the ground water. The inspection noted the possibility of Dinoseb wastes being present in the sump. It could not be determined if the Dinoseb-like material observed in the sump at the time of the VSI was due to contaminated ground water seeping into the sump or whether the unit contained collected rainfall contaminated with Dinoseb.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 65, 70, 73, 257, 258

COMMENTS: None

SWMU NUMBER: 9 **PHOTO NUMBER:** 9.1

NAME: Dinoseb Drumming Area and Drains

TYPE OF UNIT: Inactive product drumming area

PERIOD OF OPERATION: 1973 to December 1986

PHYSICAL DESCRIPTION AND CONDITION: This unit is located inside a warehouse in the central section of the South Plant in the vicinity of the Dinoseb Off-Loading Area (SWMU 8). The VSI team observed a concrete trench situated inside a warehouse that was approximately 30 feet long, 1 foot wide, and 1 foot deep. The trench is connected to a sump approximately three feet long, two feet wide, and two feet deep. The drain and sump collection system were formerly routed to the South Plant Surface Impoundments (SWMUs 3a, 3b, and 3c). According to facility representatives, the unit was sealed off from the South Plant Drainage System (SWMU 5) before November 1985. The sump and drain have reportedly been emptied by the Vacuum Truck (SWMU 21) since 1985. The VSI team observed yellow stains that appeared to be Dinoseb on the floor, on either side of the trench.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit received Dinoseb spillage.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): An endangerment study prepared by EPA identified the unit as a potential area of release due to Dinoseb found in ground water and soil. Soil samples from the immediate vicinity of the unit contained Dinoseb concentrations of 640,000 μg/kg and 12,000 μg/kg.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (**X**)

REFERENCE(S): 5, 257, 258

COMMENTS: None

SWMU NUMBER: 10 **PHOTO NUMBER:** 10.1

NAME: Dinoseb Stock Storage Area

TYPE OF UNIT: Storage area

PERIOD OF OPERATION: 1973 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located inside a warehouse in the central section of the South Plant. The unit consists of an area approximately 20 feet by 30 feet within the warehouse used to stage Dinoseb drums and containers until the EPA determines the method of disposal for the Dinoseb product. The drums were underlain by concrete that appeared in good condition at the time of the VSI.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit manages the facility's existing and returned Dinoseb stock.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 257, 258

COMMENTS: None

SWMU NUMBER: 11 **PHOTO NUMBER:** 11.1, 11.2

NAME: Former MSMA Production Area

TYPE OF UNIT: Inactive production area

PERIOD OF OPERATION: January 1983 to Present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the central section of the South Plant. The unit consists of concrete trenches, sumps, production trenches and product storage tanks which are partially covered by roofing. The unit was being dismantled at the time of the VSI. According to facility representatives, rainwater and spillage collected in the trenches were contained in a 10,000-gallon steel tank and recycled through the process, or treated in a 6,000-gallon carbon steel tank, drummed and disposed of offsite through deep-well injection. The tanks had been dismantled at the time of the VSI. The debris not contaminated with MSMA was stored in the Former MSMA Salt Unloading Area (SWMU 12) before being disposed of offsite. Floor sweepings and other debris suspected of being contaminated with MSMA, were being collected in three 55-gallon drums located within this area. The drums were to be transferred to the Drum Storage Area (SWMU 1a) when full. This unit was constructed over the remains of the Former methyl parathion Production Area (SWMU 15).

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit formerly received rainwater collected within the containment area and spillage related to the production of MSMA including methanol, by-product salts and arsenic. In addition, spillage and debris from methyl parathion production was also handled in this area. At the time of the VSI, the area contained demolition debris which was possibly contaminated with MSMA.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release was observed during the VSI. The 1989 Endangerment Assessment documented soil contamination with levels of arsenic up to 550 mg/kg. The soil sample used for analysis, however, was not collected in the immediate vicinity of the unit. Soil and ground-water samples from this vicinity did, however, indicate methyl parathion concentrations of approximately 820 μg/kg to 1300 μg/kg.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 179, 257, 258, 214, 217, 259

COMMENTS: None

SWMU NUMBER: 12 **PHOTO NUMBER:** 12.1, 12.2, 11.2

NAME: Former MSMA Salt Unloading Area

TYPE OF UNIT: Waste unloading area and dumpsters

PERIOD OF OPERATION: January 1983 to July 1984

PHYSICAL DESCRIPTION AND CONDITION: The unit is located adjacent to the Former MSMA Production Area (SWMU 11). The unit was used to off-load MSMA salts generated by the MSMA production area. The MSMA by-product salts were discharged from a centrifuge into polyethylene lined roll-off sludge dumpsters. Full containers were transferred offsite to a ChemWaste landfill in Alabama. The area consisted of two unloading bays (approximately 15 feet long and 10 feet wide) which were partially covered by roofing and underlain by concrete that appeared in good condition at the time of the VSI. The bays were situated adjacent to the building. Secondary containment was provided by concrete curbs approximately four inches tall that appeared in poor condition. Currently the area is being used for the containment of the wastes produced from the dismantling activities of the production area. The scraps are being tested for arsenic content to determine whether they can be sold as scrap metal or if they must be disposed of as hazardous wastes.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: Managed by-product salts from the production of MSMA (K031, contains arsenic as a constituent) and wastewaters which may include traces of arsenic. At the time of the VSI, debris from the dismantling operations were staged at this unit.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (M) Ground Water (M) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): An inspection conducted on September 28, 1983 observed approximately 25 drums of MSMA waste in poor condition located in a noncontained area. No spillage was identified in the available file material as a result of these activities; however, sampling is suggested.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 80, 119, 136, 138, 178, 179, 211, 213, 214, 217, 257, 258

COMMENTS: None

SWMU NUMBER: 13 **PHOTO NUMBER:** No Photograph

NAME: South Plant Drainage Ditches

TYPE OF UNIT: Unlined drainage ditches

PERIOD OF OPERATION: Approximately 1954 to present

PHYSICAL DESCRIPTION AND CONDITION: A few minor natural unlined drainage ditches and one major unlined drainage ditch are located at the South Plant. The minor ditches are located primarily in the northern area of the South Plant and do not appear to discharge to surface waters. The major drainage ditch flows along the western border of the South Plant (this is referred to as an unnamed bayou on the SWMU map). This major drainage ditch receives runoff from the South Plant and the NPDES permitted discharges. The ditch flows south through a large wetland into Hennessey's Bayou, which in turn flows into the Mississippi River.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The drainage ditches receive stormwater runoff from the South Plant and the neutralized wastewater from the North Plant. The South Plant runoff may contain residues from the production and handling of Atrazine, Dinoseb, MSMA and Toxaphene. The major drainage ditch has received drainage from the Former Atrazine Production Area (SWMU 16) and the Returned Product and Drum Storage Areas (SWMUs 17 and 1).

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): Soil samples taken in the vicinity of the South Plant's major drainage ditch behind the Former Atrazine Production Area (SWMU 16), showed contamination of arsenic (550 mg/kg), Atrazine (5000 μg/kg), Cyanazine (240 μg/kg) and Toxaphene (3700 μg/kg).

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 33, 257, 261

COMMENTS: None

SWMU NUMBER: 14 **PHOTO NUMBER:** 14.1

NAME: Former Toxaphene Production Area

TYPE OF UNIT: Inactive production area

PERIOD OF OPERATION: 1973 to 1982

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the central section of the South Plant adjacent to the Former Dinoseb Production Area (SWMU 7). The area is unsheltered and consists of concrete trenches, sumps, production vessels and product storage tanks associated with the Toxaphene production operations. The production area is approximately 80 feet long and 25 feet wide. The exact nature of the operations conducted at the unit could not be provided by facility personnel.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: This unit received rainwater collected within the containment area and spillage from the production of Toxaphene, DEHPA, and EHN.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The 1989 EPA Endangerment Assessment included analyses of soil samples collected immediately southeast of the unit which indicated 12,000 μg/kg Dinoseb, 47,000 μg/kg Toxaphene, and 94 mg/kg zinc.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 257, 258, 259

COMMENTS: None

SWMU NUMBER: 15 **PHOTO NUMBER:** 11.1, 11.2, 12.1, 12.2

NAME: Former methyl parathion Production Area

TYPE OF UNIT: Inactive production area

PERIOD OF OPERATION: Mid 1970's

PHYSICAL DESCRIPTION AND CONDITION: The former production area was located at the same site as the Former MSMA Production Area (SWMU 11) in the central section of the South Plant. The unit consisted of trenches, sumps, production tanks and vessels associated with methyl parathion operations. The production facility was destroyed by fire in the mid 1970's. The debris associated with that event was disposed of in the Inactive Landfill (SWMU 2). Analysis of sediment samples collected from the South Plant Surface Impoundments (SWMU 3) indicate up to 400 mg/kg methyl parathion.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit received spillage associated with the production of methyl parathion.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): Details of the fire were not provided by facility representatives. Analysis of soil samples collected in the vicinity of the south end of the South Plant and ground water from MW-10 during February 1989 indicate 1300 μg/kg and 820 μg/kg, respectively, of methyl parathion.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 257, 258, 259

COMMENTS: None

SWMU NUMBER: 16 **PHOTO NUMBER:** 16.1, 16.2, 17.1, 1.1

NAME: Former Atrazine Production Area

TYPE OF UNIT: Inactive production area

PERIOD OF OPERATION: 1973 to 1979

PHYSICAL DESCRIPTION AND CONDITION: This area is located adjacent to the Drum Storage Areas (SWMU 1a) and the Returned Product Storage Area (SWMU 17) in the south section of the South Plant. The unit consisted of concrete trenches, sumps, production vessels, and tanks associated with Atrazine production operations. The production area is approximately 100 feet long and 25 feet wide with a roof and concrete floor. The exact nature of the operations conducted at the unit could not be provided by facility personnel. The major South Plant Drainage Ditches (SWMU 13) are located immediately west of the unit.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit received spillage associated with Atrazine production operations.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The VSI team observed an Atrazine-like odor in the immediate vicinity of the unit. Analysis of soil samples collected immediately west of the unit during February 1987 indicated 5000 $\mu g/kg$ Atrazine.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 257, 258, 259

COMMENTS: None

SWMU NUMBER: 17 **PHOTO NUMBER:** 1.1, 1.2

NAME: Returned Product Storage Area

TYPE OF UNIT: Temporary staging area

PERIOD OF OPERATION: 1973 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located adjacent to the Drum Storage Areas (SWMU 1) in the south section of the South Plant. The unit was an area used to store returned pesticide products. It was reportedly located on a concrete slab floor with a metal roof, and shared a sump with the Drum Storage Areas (SWMU 1). According to an EPA Endangerment Assessment, this unit was, at times, indistinguishable from the Drum Storage Areas (SWMU 1). The unit and the Drum Storage Areas (SWMU 1) have a history of drum mismanagement. At the time of the VSI, the unit was no longer in use but had not undergone closure. The major South Plant Drainage Ditches (SWMU 13) are located immediately west of the unit.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit formerly received drums of returned Dinoseb product and blends.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H) Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): This unit has been cited in many inspections for deteriorated and leaking drums (refer to Table II-1, page 20). Analysis of soil samples collected from the immediate vicinity of the unit during February 1987 indicated 5,000 μg/kg Atrazine, 3,700 μg/kg Toxaphene, 550 mg/kg arsenic, and 130 mg/kg zinc.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 46, 48, 86, 93, 236, 237, 257, 258, 260

COMMENTS: None

SWMU NUMBER: 18 **PHOTO NUMBER:** 5.1

NAME: Former Blue Tank

TYPE OF UNIT: Storage tank

PERIOD OF OPERATION: 1983 to approximately 1986

PHYSICAL DESCRIPTION AND CONDITION: The unit was located north of the Former Dinoseb Production Area (SWMU 7) and adjacent to the Nitric Acid Production Area in the South Plant. The unit was used as a holding tank for untreated Dinoseb wastewater to reduce the quantity of wastewater discharged to the Carbon Adsorption System (SWMU 4) from the South Plant Hill Tank (SWMU 6). Untreated Dinoseb wastewater was stored in the tank prior to offsite deep well injection. The tank was reportedly leased to the facility from the deep well injection contractor. The original tank was fiberglass and had a capacity of 16,000 gallons. According to the available file material, the tank leaked after two failed repair attempts. The fiberglass tank was replaced by a stainless steel tank which was formerly a facility product tank. It could not be determined whether the fiberglass tank was used after the repair incidents in 1983 or whether the facility continued to use the stainless steel tank. The facility representatives could not provide exact details pertaining to the operation of the unit.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The tank received unneutralized Dinoseb process wastewater prior to offsite deep-well injection.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H) Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The unit has a history of leaking. The VSI team observed a gravel covered area at the reported location of the former unit.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 138, 183, 196, 257, 258

COMMENTS: None

SWMU NUMBER: 19 **PHOTO NUMBER:** 19.1

NAME: Scrap Metal Dumpster

TYPE OF UNIT: Open-topped rolloff container

PERIOD OF OPERATION: Mid 1980's to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located on concrete pavement outside the Former MSMA Production Area (SWMU 11) in the central section of the South Plant. The unit is used to store non-hazardous demolition debris associated with the dismantling operations of the Former MSMA Production Area (SWMU 11). The wastes are transferred to an industrial landfill for scrap metal recycling. The dumpster is skid mounted and is approximately 18 feet long, 8 feet wide, and 6 feet tall.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: This unit contains scrap material from the dismantling of the MSMA production area.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 257, 258

COMMENTS: None

SWMU NUMBER: 20 **PHOTO NUMBER:** No Photograph

NAME: Railroad Car Unloading Station

TYPE OF UNIT: Loading/unloading station

PERIOD OF OPERATION: Approximately 1955 to present

PHYSICAL DESCRIPTION AND CONDITION: As shown in Figure III-2, the unit is located in the central section of the South Plant, east of the New Nitric Acid Plant. The unit consists of the primary area for the loading/unloading of materials for the various operations conducted at the South Plant. No secondary containment was evident at the time of the VSI. The operational details of the unit were not specified in the available file material or by the facility representative. Stormwater runoff from the unit either enters the South Plant Drainage Ditches (SWMU 13) or the South Plant Drainage System (SWMU 5).

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit has received spillage from the loading/unloading operations conducted there. The spillage may include Dinoseb, Toxaphene, Atrazine, MSMA, or the various raw materials used in the production of these pesticides.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (U)
Ground Water (U) Subsurface Gas (L)

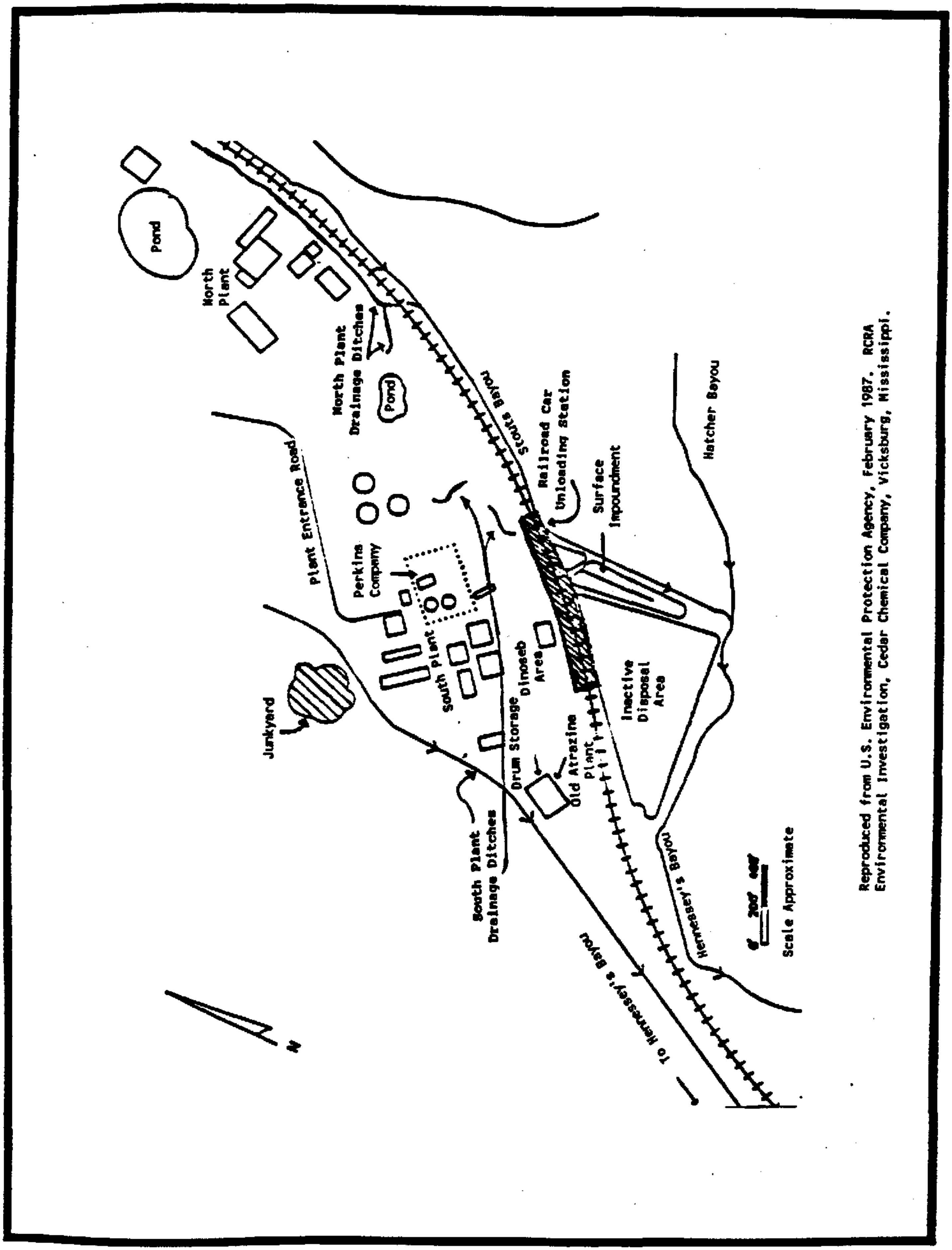
HISTORY AND/OR EVIDENCE OF RELEASE(S): Ground-water sampling in the vicinity of the unit has found Dinoseb and Atrazine at concentrations of 1,200 $\mu g/l$ and 80 $\mu g/l$, respectively. This ground water contamination has not been definitely linked to this unit.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 33, 260

COMMENTS: None

Figure III-2
\rea Specific SWMU Map



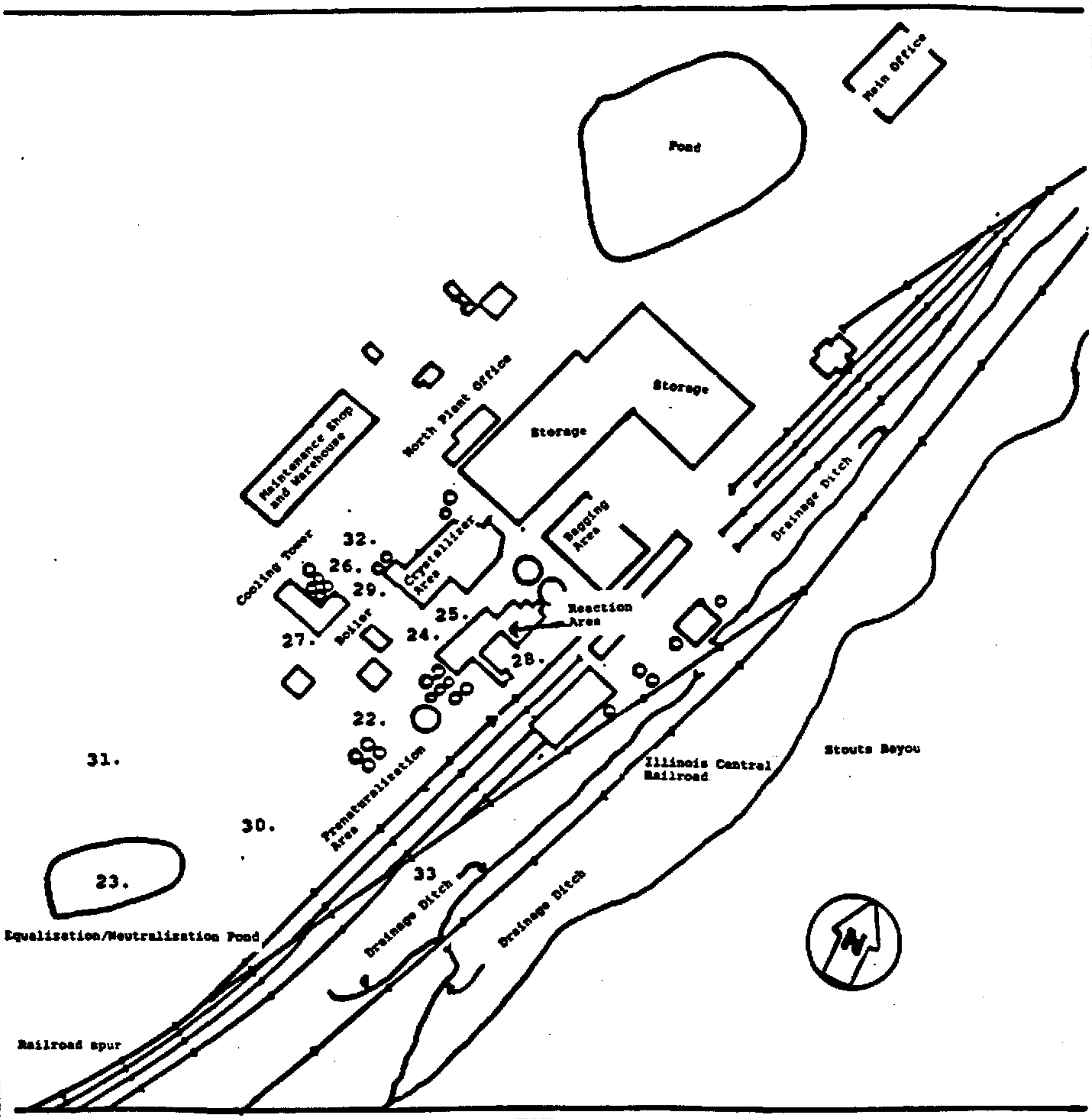
Reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

(Reference 5)

FIGURE III-3

North Plant SWMU Map

(Reference 33)



SWMU

22. North Plant Neutralization System
23. Inactive North Plant Surface Impoundment
24. North Plant Containment System
25. Wastewater Pipes
26. C-10 Scrubber
27. Cooler Scrubber
28. End Product Scrubber
29. Oil Collection Unit
30. Waste Oil SAA
31. No. 6 Fuel Oil Area
32. C-15 Scrubber
33. North Plant Drainage Ditches

SWMU NUMBER: 21 **PHOTO NUMBER:** 21.1

NAME: Vacuum Truck

TYPE OF UNIT: Tank truck

PERIOD OF OPERATION: Mid 1980's to Present

PHYSICAL DESCRIPTION AND CONDITION: The unit consists of a stainless steel tank with an approximate capacity of 500 gallons mounted on a medium sized truck. The truck is equipped with pump and hoses used to collect wastewater from the sumps located at the Drum Storage Areas (SWMU 1), the Dinoseb Off-Loading Area (SWMU 8), and the numerous sumps associated with the South Plant Drainage System (SWMU 5). The contents of the truck are emptied into the Carbon Adsorption System (SWMU 4). At the time of the VSI, the truck was parked in the vicinity of the Dinoseb Off-Loading Area (SWMU 8), in the central section of the South Plant.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit manages wastewater contaminated with Dinoseb, Toxaphene, MSMA, arsenic, Atrazine, and methyl parathion.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L) Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 257, 258

COMMENTS: None

SWMU NUMBER: 22 **PHOTO NUMBER:** 22.1, 22.2, 22.3

NAME: North Plant Neutralization System

TYPE OF UNIT: Treatment unit with in-ground sumps

PERIOD OF OPERATION: December 1988 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is primarily located in the south-central section of the North Plant, with three pump tanks located in the northern area of the South Plant. The unit is a neutralization system designed to treat acidic wastewaters generated by, and stormwater from, the fertilizer production areas. The unit neutralizes wastewater utilizing sodium hydroxide. The system consists of two neutralization tanks constructed of fiberglass reinforced plastic and a sump constructed of concrete. Piping interconnects the sump and neutralization tanks with the South Plant pump tanks for wastewater discharge. The unit receives wastewater from the North Plant Containment System (SWMU 24), the C-10 Scrubber (SWMU 26), the Cooler Scrubber (SWMU 27), and the End Product Scrubber (SWMU 28) via the Wastewater Pipes (SWMU 25). The tank capacities are approximately 500 gallons each and the tanks are elevated above the gravel covered surface by concrete pads approximately 1 foot tall. The in-ground concrete sump is approximately ten feet long, six feet wide, and five feet deep. The sump is covered with a fiberglass grate and contained by concrete curbing. The unit neutralizes wastewater from the North Plant, then discharges it to the Mississippi River through NPDES-permitted Outfall 002 or via the pump tanks at the South Plant to Outfall 003.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: This unit manages all wastewater from the North Plant, including drainage from safety showers, hoses, and stormwater runoff.

RELEASE PATHWAYS: Air (L) Surface Water (*) Soil (L) Ground Water (U) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of unpermitted releases was observed during the VSI or identified in the available file material. However, since concrete is not impermeable, integrity testing of the unit should be performed.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 33, 257, 258, 260

COMMENTS: *Releases to surface water are regulated via NPDES Permit No. MS0027995. Integrity testing of this unit has been suggested.

SWMU 23

SWMU NUMBER: 23 **PHOTO NUMBER:** 23.1, 23.2

NAME: Inactive North Plant Surface Impoundment

TYPE OF UNIT: Equalization/neutralization pond

PERIOD OF OPERATION: 1962 to present

PHYSICAL DESCRIPTION AND CONDITION: This unit is an unlined impoundment located between the North and South Plants. It was formerly used for pH control of wastewater from the North Plant. The pH was controlled using limestone held in a pit adjacent to the impoundment. Since the commissioning of the North Plant Neutralization System (SWMU 22) in December 1988, the wastewater is no longer routed through the impoundment. At the time of the VSI, the pond contained liquid which the facility representatives asserted was rainwater.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The pond was used to neutralize the acidic effluent from the North Plant including process water from the production of potassium nitrate, nitrogen tetroxide, and chlorine; in addition, the pond also receives rainwater and boiler and cooling tower blowdowns from the potassium nitrate plant.

RELEASE PATHWAYS: Air (L) Surface Water (*) Soil (U) Ground Water (U) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of unpermitted releases was observed during the VSI. The facility has had problems in the past, around 1985, with nitrate-nitrogen excursions of the NPDES Permit limitations. The excursions were controlled by procedural changes. Refer to Chapter II, Regulatory History Section, for more details. Since the pH of the liquid in the unit is unknown, further investigation is necessary.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 5, 48, 86, 138, 183, 228, 257, 258

COMMENTS: *Releases to surface water are regulated via NPDES Permit #MS0027995. Analysis of the standard liquid in this impoundment has been suggested.

SWMU NUMBER: 24 **PHOTO NUMBER:** 24.1, 24.2

NAME: North Plant Containment System

TYPE OF UNIT: Spillage and runoff collection system

PERIOD OF OPERATION: Varying ages from the mid-1970's to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located throughout the fertilizer production areas in the central section of the North Plant. The unit consists of concrete pads, curbs, and trenches designed to collect minor spillage and runoff from unsheltered concrete pads situated beneath the production areas. The concrete trenches are connected to the North Plant Neutralization System (SWMU 22) via the Wastewater Pipes (SWMU 25). There are approximately 300 linear feet of trenches within the containment system.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit manages acidic wastewater from the fertilizer manufacturing operations.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 257, 258

COMMENTS: None

SWMU NUMBER: 25 **PHOTO NUMBER:** 22.1, 24.1

NAME: Wastewater Pipes

TYPE OF UNIT: Pipes of varying ages and materials of construction

PERIOD OF OPERATION: 1960's to present

PHYSICAL DESCRIPTION AND CONDITION: The unit consists of pipes of varying dimensions and materials of construction located throughout the North Plant. The pipes are used to transfer acidic wastewaters from the North Plant Containment System (SWMU 24), the C-10 Scrubber (SWMU 26), the Cooler Scrubber (SWMU 27), and the End Product Scrubber (SWMU 28) to the North Plant Neutralization System (SWMU 22) and then offsite through an NPDES-permitted outfall. The pipes are constructed of carbon steel and PVC and are located above and below ground.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit transfers wastewater, acidic and alkaline, to the North Plant Neutralization System (SWMU 22).

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (U)
Ground Water (U) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release was observed during the VSI or identified in the available file material. However, integrity testing of the unit is suggested.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 257, 258, 261

COMMENTS: Integrity testing of this unit is suggested.

SWMU NUMBER: 26 **PHOTO NUMBER:** 26.1, 22.3

NAME: C-10 Scrubber

TYPE OF UNIT: Air pollution control device

PERIOD OF OPERATION: 1980 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the central section of the North Plant in the vicinity of the North Plant Neutralization System (SWMU 22). The unit is used to scrub chlorine off-gases generated by the fertilizer production operations. The unit consists of two scrubbing columns approximately 25 feet tall and 4 feet in diameter. The columns are constructed of reinforced concrete. One column is used at a time; the other column is used as a back-up unit. The scrubbers utilize sodium hydroxide (NaOH). The scrubber water containing sodium hydroxide is discharged to and utilized by the North Plant Neutralization System (SWMU 22). Secondary containment for wastewater consists of concrete curbing around the unit. Air emissions are regulated by conditions specified in Mississippi (MS) Air Permit No. 2780-00041.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives fertilizer production off-gases such as chlorine and NO_2. Scrubber liquid is recycled until it reaches 2% or less NaOH at which time it is discharged to the North Plant Neutralization System (SWMU 22) via the Wastewater Pipes (SWMU 25).

RELEASE PATHWAYS: Air (*) Surface Water (L) Soil (U) Ground Water (U) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The VSI team observed a brown emission (NO_2) discharging from the scrubber. According to facility representatives, the emissions were the result of the operations associated with rebuilding one of the scrubbers. An NPDES compliance inspection in September 1984 documented a break in the curbing around this unit with some wastewater escaping (refer to Table II-1, page 20).

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 2, 119, 146, 257, 258

COMMENTS: *Releases to air are regulated via MS Air Permit No. 2780-00041.

SWMU NUMBER: 27 **PHOTO NUMBER:** 27.1

NAME: Cooler Scrubber

TYPE OF UNIT: Air pollution control device

PERIOD OF OPERATION: 1980 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is situated between the dryer and cooler at the crystallization area in the central section of the North Plant. The unit is used to scrub the off-gases generated by cooling the fertilizer after it is dried. The off-gases are scrubbed with water which is discharged to the North Plant Neutralization System (SWMU 22) via the Wastewater Pipes (SWMU 25). The scrubber is approximately 15 feet long and is constructed of carbon steel.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit scrubs the off-gases generated by cooling the fertilizer, thus producing acidic wastewater which is discharged to the Wastewater Pipes (SWMU 25).

RELEASE PATHWAYS: Air (*) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of unpermitted releases was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 1, 257, 258

COMMENTS: *Releases to air are regulated via MS Air permit 2780-00041

SWMU NUMBER: 28 **PHOTO NUMBER:** 28.1

NAME: End Product Scrubber

TYPE OF UNIT: Air pollution control device

PERIOD OF OPERATION: 1980 to present

PHYSICAL DESCRIPTION AND CONDITION: This unit is located in the east section of the North Plant. The unit is used to scrub fertilizer particles generated during the fertilizer bagging operations. The unit utilizes water which is discharged to the North Plant Neutralization System (SWMU 22) via the Wastewater Pipes (SWMU 25). The unit is a small venturi type scrubber constructed of carbon steel. The scrubber receives air containing fertilizer particles via ducts approximately one foot in diameter.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives air containing fertilizer particles containing potassium and nitrogen. The water used by the scrubber is discharged to the North Plant Neutralization System (SWMU 22) via the Wastewater Pipes (SWMU 25).

RELEASE PATHWAYS: Air (*) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of unpermitted releases was observed during the VSI or identified in the available file material.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCE(S): 1, 257, 258

COMMENTS: *Releases to air are regulated via MS Air Permit No. 2780-00041.

SWMU NUMBER: 29 **PHOTO NUMBER:** 29.1

NAME: Oil Collection Unit

TYPE OF UNIT: Collection unit

PERIOD OF OPERATION: 1985 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located beneath the potassium nitrate cooler in the central section of the North Plant. The unit is used to collect waste oil drippage from the potassium nitrate cooling cylinder. The collection unit consists of a metal pipe approximately five feet long which connects an oil funnel-type collector to a 55-gallon drum. The oil discharges through the pipe via gravity. Oil stains were observed along the walls adjacent to the pipe and drum. The unit is underlain by concrete. The condition of the concrete could not be observed due to a thick pile of absorbent used to cover the area surrounding the drum.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives waste oils.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (U)
Ground Water (U) Subsurface Gas (U)

HISTORY AND/OR EVIDENCE OF RELEASE(S): Oil stains were observed along the walls adjacent to the pipe and drum during the VSI. The potential for release to soil and ground water is dependent upon the integrity of the concrete underlying the area. The unit's integrity should be determined.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 1, 257, 258

COMMENTS: Integrity testing of this unit is suggested.

SWMU NUMBER: 30 **PHOTO NUMBER:** 30.1

NAME: Waste Oil Satellite Accumulation Area

TYPE OF UNIT: Outdoor drum staging area

PERIOD OF OPERATION: 1985 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the south section of the North Plant downgradient from the Inactive North Plant Surface Impoundment (SWMU 23). The unit consists of an unlined, gravel covered area used to stage drums of waste lubricant oils prior to offsite recycling. The area is situated in the vicinity of a lubricant storage area which consists of a concrete slab partially covered by a metal roof. The VSI Team observed dark stains in the immediate vicinity of the waste oil staging area and the lubricant storage area.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives waste oils.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): Dark stains were observed on the gravel cover surrounding and in the immediate vicinity of the unit. No evidence of release was identified in the available file material.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 257, 258

COMMENTS: None

SWMU NUMBER: 31 **PHOTO NUMBER:** 31.1

NAME: No. 6 Fuel Oil Area

TYPE OF UNIT: Former heating oil containment structure

PERIOD OF OPERATION: 1960's to 1970's

PHYSICAL DESCRIPTION AND CONDITION: This unit is located in the south section of the North Plant. The unit consists of an earthen dike surrounding two aboveground storage tanks, an aboveground sump to collect spillage during loading and unloading activities, and the associated metal pipes. The tanks have a capacity of approximately 15,000 gallons and are situated upgradient from the sump. The dike area was drained via a metal pipe that discharged in the immediate vicinity of the sump. The metal pipes were used to transfer product between the unloading area and the tanks. The metal pipes are approximately 50 feet long. Two additional belowground metal pipes were used to transfer No. 6 fuel oil to the boilers located in the North Plant. The concrete sump is ten feet long, four feet wide, and has walls that are three feet high.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: This unit manages spills and leaks associated with handling No. 6 fuel oils.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (U) Ground Water (U) Subsurface Gas (U)

HISTORY AND/OR EVIDENCE OF RELEASE(S): The VSI team observed a residual layer of No. 6 fuel oil inside the concrete sump. The residual fuel in the sump should be removed and disposed of and the integrity of the sump and pipes should be determined. The potential for release to soil and ground water is dependent upon the integrity of the sump containment structure and pipes.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCE(S): 257, 258

COMMENTS: Integrity testing of this unit is suggested.

SWMU NUMBER: 32 **PHOTO NUMBER:** 32.1

NAME: C-15 Scrubber

TYPE OF UNIT: Air pollution control device

PERIOD OF OPERATION: Approximately 1980 to present

PHYSICAL DESCRIPTION AND CONDITION: The unit is located in the central area of the North Plant, adjacent to the Crystallization Area. The unit consists of a rectifier scrubber/sieve tower utilized in the production of potassium nitrate. The scrubbing liquid is water which is recycled through the process.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The unit receives fertilizer production off-gasses, such as chlorine and NO_2, and particulate matter.

RELEASE PATHWAYS: Air (*) Surface Water (L) Soil (L)
Ground Water (L) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of unpermitted releases of hazardous constituents was identified in the available file material or observed during the VSI.

RECOMMENDATIONS: No Further Action (X)
RFI Necessary ( )

REFERENCES: 1, 2, 257, 258

COMMENTS: *Releases to air are regulated via MS Air Permit No. 2780-00041.

SWMU NUMBER: 33 **PHOTO NUMBER:** No Photograph

NAME: North Plant Drainage Ditches

TYPE OF UNIT: Drainage ditches

PERIOD OF OPERATION: Approximately 1960 to present

PHYSICAL DESCRIPTION AND CONDITION: An unlined drainage ditch runs along the railroad tracks, across from and parallel to Stouts Bayou. The location of this unit is shown in Figure III-2 (see page 73). The ditch receives drainage from the northern portion of the North Plant. A smaller branch which receives drainage from the North Plant, joins the drainage ditch at the southern end of the North Plant and flows under the tracks and into Stouts Bayou.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: The drainage ditches receive stormwater runoff from the North Plant which is not contained by the various drainage systems.

RELEASE PATHWAYS: Air (L) Surface Water (L) Soil (L) Ground Water (L) Subsurface (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): No evidence of release of hazardous constituents was observed in the available file material or during the VSI. Since possible contamination is not visible to the naked eye, sampling is necessary to determine possibility of release of hazardous constituents.

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCES: 5, 33, 257

COMMENTS: None

SWMU NUMBER: 34 **PHOTO NUMBER:** No Photograph

NAME: Junkyard and Waste Piles

TYPE OF UNIT: Temporary disposal areas

PERIOD OF OPERATION: Approximately 1954 to present

PHYSICAL DESCRIPTION AND CONDITION: The main junkyard is located on the western border of the South Plant, adjacent to the major South Plant Drainage Ditch (SWMU 13). Other waste piles have been observed throughout both the North and South Plants. The operations concerning the units are unclear from the available file material. A facility representative has stated that the area is used for temporary disposal of old equipment, paint, or other scrap materials. The former piles have reportedly been removed for recycling.

WASTES AND/OR HAZARDOUS CONSTITUENTS MANAGED: These units have received debris from the various operations at the facility including old equipment and paint. From the analysis of a soil sample taken from the junkyard, it appears that pesticide-contaminated wastes may have been disposed in the area.

RELEASE PATHWAYS: Air (L) Surface Water (H) Soil (H)
Ground Water (H) Subsurface Gas (L)

HISTORY AND/OR EVIDENCE OF RELEASE(S): A RCRA Environmental Investigation of February 1987 found the soil from the junkyard to be contaminated with Atrazine (5400 $\mu g/kg$) Cyanazine (approximately 30 $\mu g/kg$), Arochlor-1254 (710 $\mu g/kg$) and Propazine (approximately 3000 $\mu g/kg$).

RECOMMENDATIONS: No Further Action ( )
RFI Necessary (X)

REFERENCES: 5, 33, 260

COMMENTS: None

IV. SUMMARY

Chapter IV consists of four tables which list the Solid Waste Management Units (SWMUs) identified during the VSI conducted on July 31, 1990 and categorize them according to the findings and recommendations developed in the SWMU Data Sheets in Chapter III. Table IV-1 lists all SWMUs identified during the VSI. Table IV-2 is a listing of the SWMUs requiring no further action at this time. Table IV-3 lists the RCRA-regulated units. Table IV-4 lists the SWMUs requiring RFI activities.

Table IV-1

Cedar Chemical Corporation Vicksburg Facility

List of all Solid Waste Management Units (SWMUs)

SWMU Number	SWMU Name
	South Plant
1.	Drum Storage Areas
2.	Inactive Landfill
3.	South Plant Surface Impoundments
4.	Carbon Adsorption System
5.	South Plant Drainage System
6.	South Plant Hill Tank
7.	Former Dinoseb Production Area
8.	Dinoseb Off-Loading Area
9.	Dinoseb Drumming Area and Drains
10.	Dinoseb Stock Storage Area
11.	Former MSMA Production Area
12.	Former MSMA Salt Unloading Area
13.	South Plant Drainage Ditches
14.	Former Toxaphene Production Area
15.	Former Methyl Parathion Production Area
16.	Former Atrazine Production Area
17.	Returned Product Storage Area
18.	Former Blue Tank
19.	Scrap Metal Dumpster
20.	Railroad Car Unloading Station
21.	Vacuum Truck
	North Plant
22.	North Plant Neutralization System
23.	Inactive North Plant Surface Impoundment
24.	North Plant Containment System
25.	Wastewater Pipes
26.	C-10 Scrubber
27.	Cooler Scrubber
28.	End Product Scrubber
29.	Oil Collection Unit
30.	Waste Oil SAA
31.	No. 6 Fuel Oil Area
32.	C-15 Scrubber
33.	North Plant Drainage Ditches
	Both Plants
34.	Junkyard and Waste Piles

Table IV-2

Cedar Chemical Corporation Vicksburg Facility

List of SWMUs Requiring No Further Action

SWMU Number	SWMU Name
	South Plant
6.	South Plant Hill Tank
10.	Dinoseb Stock Storage Area
19.	Scrap Metal Dumpster
21.	Vacuum Truck
	North Plant
24.	North Plant Containment System
27.	Cooler Scrubber
28.	End Product Scrubber
32.	C-15 Scrubber

Table IV-3

Cedar Chemical Corporation Vicksburg Facility

List of SWMUs that are RCRA-Regulated Units

SWMU Number	SWMU Name
1a.	Drum Storage Area

Table IV-4

Cedar Chemical Corporation Vicksburg Facility

List of SWMUs Requiring an RFI*

SWMU Number	SWMU Name
	South Plant
1.	Drum Storage Areas
2.	Inactive Landfill
3.	South Plant Surface Impoundments
4.	Carbon Adsorption System
5.	South Plant Drainage System
7.	Former Dinoseb Production Area
8.	Dinoseb Off-Loading Area
9.	Dinoseb Drumming Area and Drains
11.	Former MSMA Production Area
12.	Former MSMA Salt Unloading Area
13.	South Plant Drainage Ditches
14.	Former Toxaphene Production Area
15.	Former Methyl Parathion Production Area
16.	Former Atrazine Production Area
17.	Returned Product Storage Area
18.	Former Blue Tank
20.	Railroad Car Unloading Station
	North Plant
22.	North Plant Neutralization System
23.	Inactive North Plant Surface Impoundment
25.	Wastewater Pipes
26.	C-10 Scrubber
29.	Oil Collection Unit
30.	Waste Oil Satellite Accumulation Area
31.	No. 6 Fuel Oil Area
33.	North Plant Drainage Ditches
34.	Junkyard and Waste Piles

* See SWMU descriptions for more details concerning suggested RFI activities for each unit.

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185. Vertac Chemical Corporation, R.F. Maraman, Correspondence to MSDNR, Division of Solid Waste, Charles Estes. RE: Hazardous Waste Inspection Sheet for Dike, June 9, 1983.

186. Correspondence between U.S. EPA, Region IV, Surveillance & Analysis Division, and Vertac Chemical Corporation. RE: Variance to use a Chromatropic Acid Method, March-June, June 3, 1983.

187. Vertac Chemical Corporation, Dick Karkkainen, Correspondence to MSDNR, Chuck Estes. RE: RCRA Part B, May 13, 1983.

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189. Vertac Chemical Corporation, Dick Karkkainen, Correspondence to MSDNR, BPC. RE: Plans for Improving Surface Impoundment, April 7 & April 25, 1983.

190. Vertac, Dick Karkkainen, Correspondence to MSDNR, Division of Solid Waste Management, Charles Estes. RE: Ground-water Monitoring, Includes "Final Report Monitoring Well Installation Program" by MCI, April 7, 1983.

191. MSDNR, BPC, Stephen Spengler and Chuck Estes, Correspondence to Vertac, Dick Karkkainen. RE: Meeting on March 14, 1983, March 31, 1983.

192. MSDNR, Division of Solid Waste Management, James B. Hardage, Correspondence to WESES, Waterways Experiment Station, Vic McFarland. RE: Well water sampling at Vertac, March 25, 1983.

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194. Memorandum from Henry Folmar to Stephen Spengler. RE: Vertac Bioassay, March 11, 1983.

195. Memorandum from Mitch Walker to Stephen Spengler. RE: Vertac Chemical MSMA Facility, March 10, 1983.

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198. MSDNR, Division of Solid Waste Management, Charles Estes, Correspondence to Vertac, Dick Karkkainen. RE: Monitoring well locations, March 1, 1983.

199. Vertac Chemical Corporation, R.F. Maraman, Correspondence to MSDNR, Hazardous Waste Division, Charles Estes. RE: Report on Holding Pond Incident, February 18, 1983.

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201. Vertac Chemical Corporation, R.F. Maraman, Correspondence to MSDNR, Industrial Wastewater Control Section, Steve Spengler. RE: Quarterly Bioassay, February 15, 1983.

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203. Vertac Chemical Corporation, R.W. James, Correspondences to Illinois Gulf Central Railroad, A.E. Chance. RE: Regrading near Railroad tracks, January 26, and February 3, 1983.

204. Vertac, Dick Karkkainen, Correspondences to MSDNR, Division of Solid Waste Management, Charles Estes. RE: Commission Order No. 599-82, December 20, 1982 and January 25, 1983.

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208. Vertac, R.F. Maraman, Correspondence to MSDNR, Industrial Wastewater Control Section, Steve Spengler. RE: Discharge Line to Mississippi River, November 16, 1982.

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210. Vertac, R.F. Maraman, Correspondence to MSDNR, Industrial Wastewater Control Section, Steve Spengler. RE: Quarterly Bioassay, November 8, 1982.

211. Correspondence between Vertac, Dick Karkkainen, and MSDNR, Industrial Wastewater Control Section, Steve Spengler. RE: MSMA Plant, October-November, November 4, 1982.

212. MSDNR, Industrial Wastewater Control Section, Steve Spengler, Correspondence to EPA, Effluent Guidelines Division, George M. Jett. RE: Proposed MSMA Facility at Vertac, October 6, 1982.

213. Vertac, Dick Karkkainen, Correspondence to MSDNR, BPC. RE: Permits for MSMA Facility, September 20, 1982.

214. Memorandum from Steve Spengler to Vertac File. RE: Meeting with Dick Karkkainen/Vertac, June 11, 1982.

215. Correspondence from MSDNR, Industrial Wastewater Control Section, Steve Spengler, to Vertac, Fred Ahlers, and Vertac File. RE: NPDES Compliance Inspection on September 17, 1982, November 3, 1982.

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217. Air Emissions Equipment Construction Permit Application, Submitted by Vertac, October 20, 1982.

218. Vertac, Dick Karkkainen, Correspondences to MSDNR, Division of Solid Waste Management, Charles Estes. RE: Soil Sampling, June 18 and September 28, 1982.

219. Vertac, R.F. Maraman, Correspondence to MSDNR, Charles Estes. RE: Louisiana Hazardous Waste Numbers and Calgon Adsorption System Operating Manual, August 9, 1982.

220. Vertac, R.F. Maraman, Correspondence to MSDNR, Industrial Wastewater Control Section, Bill Barnett. RE: Quarterly Bioassay, August 3, 1982.

221. Vertac, R.F. Maraman, Correspondence to MSDNR, BPC, Industrial Wastewater Control Section, Steve Spengler. RE: Free Available and Total Residual Chlorine and Ammonia Nitrogen, Outfall 003, June 29, 1982.

222. Vertac, Dick Karkkainen, Correspondence to MSDNR, Division of Solid Waste, Charles Estes. RE: Ground-water Wells, May 13, 1982.

223. Correspondence between MSDNR, Industrial Wastewater Control Section, Steve Spengler, and Vertac, Dick Karkkainen. RE: NPDES Permit No. MS0027995, March-April, April 13, 1982.

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225. Hydrogeological Investigation of Vertac, Prepared by Developers, International Services Corporation, November 21, 1981.

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228. U.S. EPA, Environmental Services Division, Hazardous Waste Site Investigation Report, Vertac Chemical Corporation, Conducted October 28, 1981, Docket No. 003, January 26, 1982.

229. Vertac, R.F. Maraman, Correspondence to MSDNR, Industrial Wastewater Control Section, Bill Barnett. RE: Quarterly Bioassay, January 5, 1982.

230. Vertac, R.F. Maraman, Correspondence to MSDNR, Steve Spengler. RE: Vertac DNBP Waste water to City of Vicksburg Sewage Treatment System, December 16, 1981.

231. City of Vicksburg, Ray Heffner, Correspondence to Vertac, Fred Ahlers. RE: DNBP Waste Treatment, December 7, 1981.

232. Memorandum from Steve Spengler to Vertac file RE: Vertac Meeting with City of Vicksburg, November 16, 1981.

233. NPDES Permit No. MS0027995, Issued to Vertac, December 2, 1981.

234. Vertac, R.F. Maraman, Correspondence to MSDNR, Compliance Monitoring Section, Carl Chaplin. RE: Responses to Performance Audit Inspection, NPDES Permit No. MS0027995, November 30, 1981.

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240. Vertac, Dick Karkkainen, Correspondence to U.S. EPA, Region IV, RCRA Activities, Paul Keith. RE: Application for Hazardous Waste Permit, September 3, 1981.

241. Vertac, R.F. Maraman, Correspondence to MSDNR, Solid Waste Division, David Lee. RE: Closure Plan, Contingency Plan, and Waste Facility Training Program, August 11, 1981.

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253. Correspondence between MSDNR, Air Emissions Section, Jerry Banks, and Tully Hall. RE: Chlorine Emissions from Vertac, September, September 22, 1980.

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APPENDIX C

SAMPLING DATA SUMMARY

concentration from 2 ug/l of tetrachlorophenol to 562 ug/l of dinoseb. Other organic compounds detected were: atrazine, bromacil, trichloroethene, pentachlorophenol, and cyanazine. The other three wells contained from two to five organic contaminants (See Table 5).

Six composite soil samples were collected from various areas around the south plant. Organic compounds were detected in each of the six samples. The analytical data is summarized in Table 6.

Eight surface water and eight stream sediment samples were collected during the investigation. The samples generally showed an increase in organic concentrations downstream of the facility. The data for these samples are summarized in Tables 7 and 8.

Stream sediment data may be found in Table 8.

In February 1989, EPA again conducted a sampling investigation at CCC. The investigation included groundwater and soil samples. Generally, the samples showed contamination with organics and metals (see Tables 11 and 12). Cyanide was detected in two wells and atrazine, cyanazine and propazine were detected in a third well. Dinoseb was detected in the soil samples ranging in concentration from 15 ug/kg to 380,000 ug/kg. Additionally, six other pesticide/PCB compounds were detected in the soil samples.

On October 13, 1989, the Director of the Waste Management Division, Region IV determined that: (1) there is or has been a release of hazardous waste and/or hazardous constituents into the environment from the CCC Facility, and (2) corrective action will be required to protect human health and the environment (See Attachment A).

B. Groundwater Investigations

On January 24, 1984, MSDEQ notified CCC that the facility was affecting the groundwater quality. As a result, CCC submitted a groundwater corrective action plan. On December 14, 1984, MSDEQ sampled groundwater monitoring wells at the CCC site. Organic compounds were detected in two of the wells sampled, MW-1 and MW-8. Compounds found in MW-1 included 1000 ug/l dinoseb and 15 ug/l trichloroethene. Compounds found in MW-8 included 60 ug/l 2,5-diethyltetrahydrofuran and 60 ug/l atrazine (See Table 9).

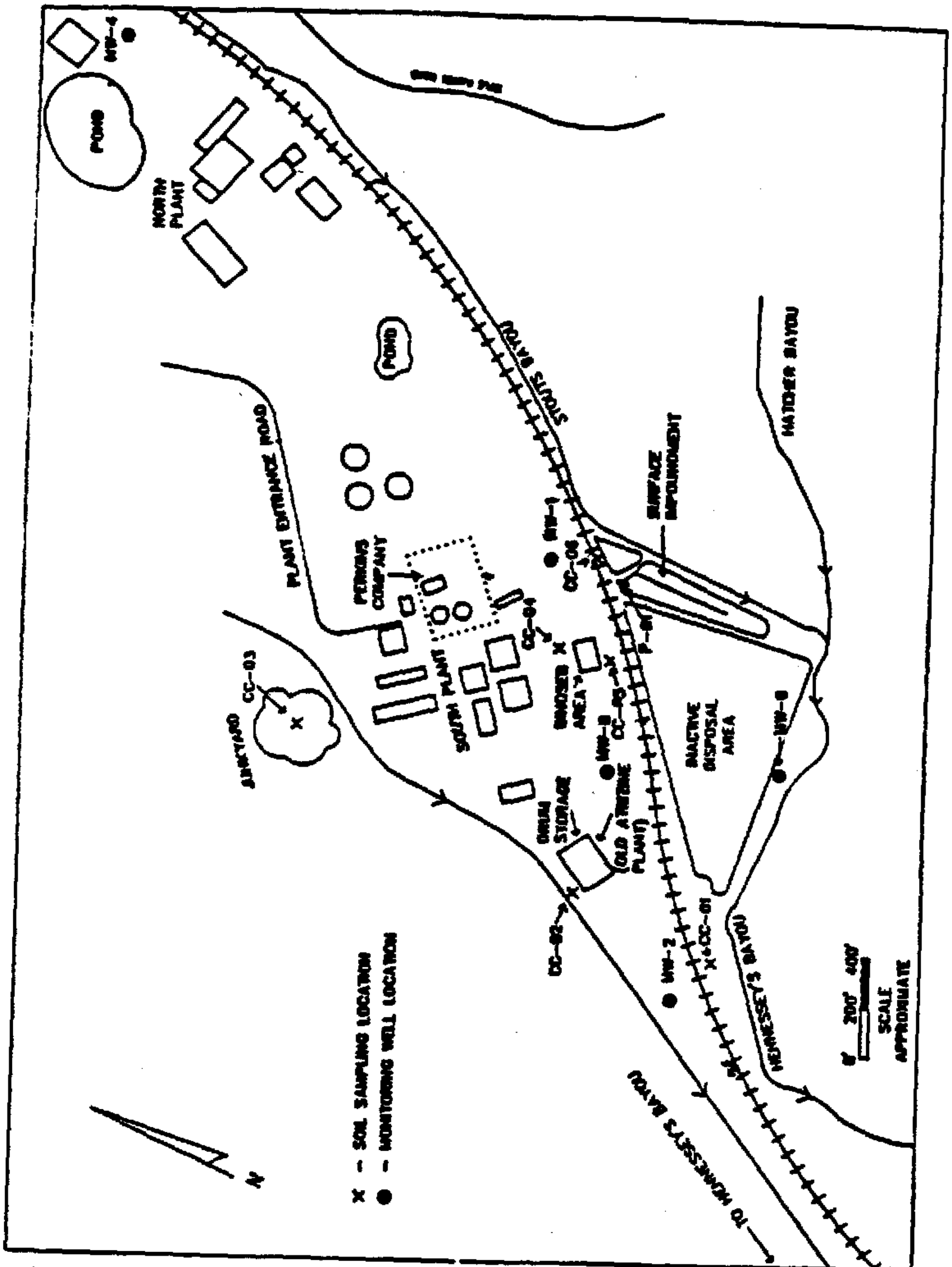
From May 23, 1985 through June 10, 1985, CCC sampled wells MW-1 through MW-8 and analyzed the samples for Appendix VIII constituents. The results of the analyses, shown in Table 9, indicated the following:

- Concentrations of several chemicals were detected in well MW-1 but not detected in background well MW-4: chromium, chloroform, total cyanide, dinoseb, nickel, pentachlorophenol, and trichloroethene.

- Barium was detected in all wells. Wells MW-5 and MW-8 showed barium concentrations twice as high as background, and well MW-6 showed barium three times higher than background.

FIGURE 5

MONITORING WELL AND SOIL SAMPLING LOCATIONS
FEBRUARY 1987



Note:

Reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

TABLE 3

SUMMARY OF RESULTS OF DINOSEB FLOW STUDY

Sample Location ID Letter[a]	Sample Type/Location	Concentrations[b] (mg/L for liquids and mg/kg for solids)							
		Dinoseb	Atrazine	Total Chromium	Arsenic	Lead	Barium	Cadmium	Seleniu:
A	Water; Influent pipe to surface impoundment	8	trace	0.03	0.29	0.008	0.04	0.02	<0. 3
B	Sludge; SI Cell No. 1	13,000	ND[b]	123	362	142	64.2	1.90	2.
C	Water; SI Cell No. 2	6.3	0.07	0.05	0.74	0.01	0.06	0.01	0.05
C	Sludge; SI Cell No. 2	5.8	2.6	10.2	21	5.3	49.3	1.30	0.
D	Water; sump at returned product storage area	23	15	0.03	2.47	0.005	0.02	0.02	¯0
E	Water; sump below dinoseb drumming area	260	12	108	0.68	2.9	0.97	0.03	0.11
F	Sediment; returned product storage area	330,000	ND[c]	47.1	44.3	16.7	78.5	5.5	4.06
G	Soil; northwest of dinoseb plant	95	ND	40.1	27.8	170	71.5	3.0	1.27
H	Water; sump northwest of dinoseb plant	30	0.01	<0.03	0.03	0.02	0.05	0.01	<0 --3

Notes:

Data reproduced from Jack McCord, MDNR, September 22, 1986. Memorandum to file. Subject: September 3, 1986 sampling trip to Vicksburg Chemical.

a Sample location identification letters are used in Figure 5.

b Concentrations of chemicals in water are reported in mg/L. Concentrations of chemicals in soil or sludge are reported in mg/kg.

c ND indicates chemical not detected.

TABLE 4

SUMMARY OF RESULTS OF SURFACE IMPOUNDMENT SEDIMENT STUDY (MG/KG)

Composite Samples Sample Numbers	Concentrations (mg/kg) Arsenic	Atrazine	Aroclor 1254	Dinoseb	Toxaphene	Others	
** 0 to 2 feet							
1, 1A	114	8,000	ND[a]	1,600	17.5	4-Nitrophenol	70
2, 5	216	2,000	ND	160	18.1	---	
3, 4	108	360	ND	620	1.8	4-Nitrophenol	30
6, 7, 8	93.5	220	ND	15	1.2	4-Nitrophenol	Trace
9, 10, 11, 12	39.2	13	ND	11	ND	---	
13, 14	41	230	ND	10	ND	---	
15, 16	57.8	1,500	ND	4	ND	---	
17, 18	16.9	1,000	51.9	6	22	4-Nitrophenol	Trace
						Pentachlorophenol	1.2
19, 20	46.2	300	4.7	92	29	---	
21, 22, 24	50.3	5	9.2	60	4.6	---	
23, 25	96.5	--	33.8	--	42.9	---	
** 2 to 4 feet							
1, 1A	143	3,900	ND	5,910	2,320	Methyl Parathion	400
2, 5	66.9	78,000	ND	330	541	---	
3, 4	40.1	30,000	ND	1,100	381	4-Nitrophenol	50
6, 7, 8	7.9	15,000	ND	25	6.3	2,4-Dinitrophenol	Trace
						4-Nitrophenol	Trace
** 4 to 6 feet							
1, 1A	43.8	21,000	ND	64	536	1,3-Dichlorobenzene	20
						Methyl Parathion	400
2, 5	7.1	3,000	53.4	40	223	---	
3, 4	14.5	9,000	ND	770	680	---	
6, 7, 8	9.0	8,000	37.1	170	322	---	

Notes:

Reproduced from Mississippi State Chemical Laboratory, Mississippi State University, November 18, 1986. Analytical Results of 19 Sediment Samples from Vicksburg Chemical Company.

a ND - Not detected.

TABLE 5

GROUND-WATER DATA -- SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (ug/L)	MW-1	MW-2	MW-4[a]	MW-6	MW-8	P-01[b]
Aluminum	1900	26,000	3,000	6,600	920	1,100
Arsenic	--	--	--	--	67	140
Barium	270	450	250	600	470	37
Chromium	38	64	--	11	--	75
Nickel	22	--	--	--	--	--
Strontium	760	560	250	610	350	85
Zinc	--	91	16	21	--	13
Cyanide	--	NA	--	8	--	--
Atrazine	26	--	--	3.9	63	29
Bromacil	3JN	--	--	--	--	--
Bromodichloromethane	--	--	--	--	--	6.7
Carbon tetrachloride	--	--	--	--	--	70
Chlorobis(methylethyl)-triazinediamine	--	--	--	--	3JN	--
Chloroform	2.8J	--	--	--	--	42
Cyanazine	6.6J	--	--	1.2	0.82	1.3
Dibromochloromethane	--	--	--	--	--	4.2J
Dinoseb	562	--	--	--	--	200JN
Methyl parathion	--	--	--	--	--	0.011J
Phenol	--	1.0J	--	--	--	--
Pentachlorophenol	68	--	--	--	--	--
Petroleum product	N	N	--	N	N	--
Tetrachlorophenol	2JN	--	--	--	--	--
Trichloroethene	8.5	--	--	--	--	4.2J
Vinyl chloride	--	--	--	--	2.5J	--

Notes:

Data reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

a Upgradient well, used for comparison to wells downgradient of waste management units.

b Sample of influent liquid into surface impoundment.

-- Material was analyzed for but not detected.

J -- Estimated value.

N -- Presumptive evidence of presence of material.

NA -- Not analyzed.

TABLE 6

SOIL DATA -- SUMMARY OF HAZARDOUS CONSTITUENTS
FEBRUARY 1987

Parameter (mg/kg)	CC-01	CC-02	CC-03	CC-04	CC-05	CC-06
Aluminum	6,000	4,500	11,000 <	7,200	8,800	6,200
Arsenic	53	550 <	19	18	27	10J
Barium	100	72	150	100	140	210
Chromium	44	14	27	37	18	12
Mercury	--	--	0.1	--	--	0.25
Strontium	34	190	35	39	35	48
Zinc	53	130 <	65	75	94	35
(ug/kg)						
Atrazine	100,000JN	5,000 <	5,400 <	4,000	32J	25J
Cyanazine	6000JN	240 <	30J	--	--	--
Dinoseb	--	--	--	640,000	12,000	--
Heptachlor epoxide	38	--	--	--	--	--
Methyl ethyl ketone	--	--	--	23J	--	--
Aroclor-1254	--	--	710	--	--	200
Propazine	7,000JN	--	3,000JN	--	--	--
Toluene	--	--	--	3.8J	--	--
Toxaphene	6,700	3,700 <	--	--	47,000	--
Total PAHs	33,890	--	11,920	18,900	3,100	--
Total xylenes	--	--	--	2.8J	--	--

Notes:

Data reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

J = Estimated value.

N = Presumptive evidence of presence of material.

TABLE 7

SURFACE WATER DATA -- SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (ug/L)	A-1	A-2	A-3	B-1	B-2	C-1	D-1	E-1
Aluminum	260	370	1,100	440	780	8,900	2,900	420
Arsenic	--	--	--	--	--	--	--	89
Barium	80	120	220	170	170	170	160	170
Cyanide	6	--	--	--	--	--	--	--
Atrazine	--	0.18N	0.64JN	--	--	0.20N	0.28N	26A
Bromocyclohexene	--	--	1JN	--	--	--	--	--
Bromodichloromethane	3.6J	1.7J	1J	--	11	--	--	--
Carbon tetrachloride	--	--	--	--	--	--	1.3J	--
Chloroform	5.1	4.9J	16	--	14	--	2J	--
Chlorocyclohexanol	--	--	5JN	--	--	--	--	--
Chlorobis(methylethyl)-triazinediamine	--	--	--	--	--	--	--	3JN
Cyanazine	--	--	--	--	--	--	--	6.8A
Dibromochloromethane	2.7J	1.2J	--	--	--	--	--	--
Dichlorocyclohexane	--	--	70J	--	--	--	--	--
Diethyltetra-hydrofuran	--	7JN	10JN	--	--	--	--	--
Dihydroindolone	--	--	4JN	--	--	--	--	--
Dinoseb	--	--	--	--	--	--	--	4.6AN
Heptanol	--	--	8JN	--	--	--	--	--
Nitrosomorpholine	--	--	1JN	--	--	--	--	--
Aroclor-1254	--	--	3.0	--	--	--	--	--
Trichloroethene	--	--	--	--	--	--	--	11
Tri(butoxyethanol)-phosphate	--	--	--	3JN	5JN	--	--	--
Toluene	0.8J	--	--	--	--	--	--	--
Three unidentified compounds	--	--	70J	--	--	--	--	--

Notes:

Data reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

A = Average value.

J = Estimated value.

N = Presumptive evidence of presence of material.

TABLE 8

STREAM SEDIMENT DATA -- SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (mg/kg)	A-1s	A-2s	A-3s	B-1s	B-2s	C-1s	D-1s	E-1s
Aluminum	7,400	11,000	4,500	5,500	8,400	13,000	11,000	5,000
Arsenic	--	9.2	--	--	--	6.0	6.9	44
Barium	120	260	220	120	130	62	170	96
Chromium	13	22	97	17	14	12	17	71
Nickel	11	21	14	8.4	13	7.0	16	9.6
Lead	14	20	13	45	21	11	15	8.8
Mercury	--	0.12	--	--	--	--	--	--
Strontium	33	24	84	51	28	19	29	35
Zinc	66	78	35	51	62	19	52	41
ug/kg								
Atrazine	--	--	--	--	--	--	--	970
Chloroform	--	--	8.4	--	--	--	--	--
Chrysene	1,300J	--	--	--	--	--	--	--
Fluoranthene	1,300J	--	--	--	--	--	--	--
Aroclor-1254	--	3,700	--	--	--	--	--	7,400
Pyrene	1,400J	--	--	--	--	--	--	660J
Toluene	--	--	--	--	38	--	--	--
Total unidentified alkylhydrocarbons	--	--	--	--	200J	--	--	--

Notes:

Data reproduced from U.S. Environmental Protection Agency February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

A = Average value.

J = Estimated value.

N = Presumptive evidence of presence of material.

TABLE 9

SUMMARY OF ANALYSES OF WATER SAMPLES FROM MONITORING WELLS MW-1 THROUGH MW-8

Sheet 1 of 3

Constituent	Concentration (ug/L) and Well Number[a] 1	2	3	4	5	6	7	8
Sampled by Respondent on October 31, 1983[b]								
Atrazine (mg/L)	62.6	22.4	--[g]	--	NR[h]	75.0	4.5	191
Dinoseb	117	<25	--	--	NR	<25	<25	<25
Toxaphene	<0.3	<0.3	--	--	NR	<0.3	<0.3	<0.3
Sampled by MBPC on November 9, 1983[c]								
2-Bromo-cyclo-hexanol	5	--	--	ND[i]	ND	ND	ND	ND
Atrazine	ND	--	--	ND	ND	20	ND	150
Dinoseb	1200	--	--	ND	ND	ND	ND	ND
Sampled by Respondent in November 1983[d]								
Atrazine	80[j]	10	--	--	10	100	<10	110
Dinoseb	<25	<25	--	--	<25	<25	<25	<25
Toxaphene	<5	<5	--	--	<5	<5	<5	<5
Total organic halide[j]	0.22	0.11	--	NR	0.046	0.054	0.044	0.014
Specific conductance (umhos)[k]	3988	1022	--	NR	1448	1491	778	1095
Sampled by MBPC on December 14, 1984[e]								
2-Bromo-cyclo-hexanol	100	--	--	--	--	--	--	ND
2,5-Diethyl-tetrahydro-furan	ND	--	--	--	--	--	--	200
Atrazine	ND	--	--	--	--	--	--	60
Diethyl phthalate	140	--	--	--	--	--	--	ND
Dinoseb	1000	--	--	--	--	--	--	ND
Pentachloro-phenol	50	--	--	--	--	--	--	ND
Trichloroethene	15	--	--	--	--	--	--	ND

TABLE 9

SUMMARY OF ANALYSES OF WATER SAMPLES FROM MONITORING WELLS MW-1 THROUGH MW-8

Sheet 2 of 3

Constituent	Concentration (ug/L) and Well Number 1	2	3	4	5	6	7	8
Sampled by Respondent in May and June 1985[f]								
Aroclor-1254	<1.0	<1.0	<1	<1.0	1.1	<1	<1	<1.0
Arsenic	<10	<10	<10	<10	19	15	30	80
Barium	302	243	360	253	614	915	400	600
Chloroform	10.6	<10	<1.6	<10	<1.6	<1.6	<1.6	<10
Chromium	30	<30	<20	<30	<20	<20	<20	<30
Cyanide, Total	72	<25	<25	<25	<25	120	<25	<25
Copper	<10	<10	<10	<10	<10	20	<10	<10
Dinoseb	1130	<25	<10	<25	<10	<10	<10	<25
Mercury	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.2	<0.2
Nickel	30	<20	<20	<20	<20	<20	<20	<20
Pentachloro-phenol	34	<25	<3.6	<25	<3.6	<3.6	<3.6	<25
Trichloro-ethene	19.5	<10	<1.9	<10	<1.9	<2.8	<1.9	<10

Notes:

[a] All concentrations are reported in ug/L except for atrazine as reported on October 31, 1983, which is reported in mg/L.

[b] Data reproduced from Dick Karkkainen, Vertac Chemical Corporation, January 13, 1984. Analytical Results for Ground-Water Sampling of Well Numbers 1, 2, 5, 6, 7, and 8, taken in November 1983 at the Vicksburg Plant. Letter to Charles Estes, MDNR.

[c] Data reproduced from James P. Minyard, Jr., Mississippi State Chemical Laboratory, December 16, 1983. Analytical Results for Vertac Well Water Samples taken November 9, 1983.

[d] Data reproduced from Dick Karkkainen, Vertac Chemical Corporation, March 9, 1984. Analytical Results for Ground-Water Sampling at the Vicksburg Plant. Letter to Chuck Estes, MDNR.

[e] Data reproduced from Mississippi State Chemical Laboratory, Mississippi State University, February 18, 1985. Analytical Results of Ground-Water Samples from Vertac Chemical Wells 1 and 8.

TABLE 9

SUMMARY OF ANALYSES OF WATER SAMPLES FROM MONITORING WELLS MW-1 THROUGH MW-8

Sheet 3 of 3

Notes (Continued):

f Data reproduced from John G. Hill, Vertac Chemical Corporation, September 4, 1985. Appendix VIII Analytical Results for Ground-Water Monitoring Wells at the Vicksburg Plant. *Letter to* Charles Estes, MDNR.

g -- indicates that the well was not sampled

h NR - not reported. These wells were reported to be sampled, but the data were not reported.

i ND - not detected.

j This value is semi-quantitative because of interference peak.

k These values are the results of averaging four measurements.

TABLE 10

ANALYSES OF WATER FROM SEVERAL WELLS FOR DINOSEB

Date	Dinoseb Concentration (ug/L) MW-1	MW-1A	MW-9	MW-15
October 15, 1985[a]	370	--[e]	ND[f]	--
December 6, 1985[a]	600	--	125	--
March 5, 1986[b]	940	--	<40	--
July 28, 1986[c]	--	265	--	--
July 29, 1986[c]	--	380	--	--
February 6, 1987[d]	--	290	<40	1130

Notes:

a Data reproduced from IT Corporation, January 8, 1986. Final Report, Groundwater Assessment Program, Prepared for Vertac Chemical Corporation, Vicksburg, Mississippi, IT Corporation Project No. 846545-02.

b Data reproduced from John G. Hill, Environmental Engineer, Vertac Chemical Corporation, March 12, 1986. Letter to Jack McCord, Mississippi Department of Natural Resources, Bureau of Pollution Control, Industrial Wastewater Section. Subject: Latest analytical results.

c Data reproduced from John G. Hill, Environmental Engineer, Vertac Chemical Corporation, August 4, 1986. Letter to Jack McCord, Mississippi Department of Natural Resources, Bureau of Pollution Control, Industrial Wastewater Section. Subject: Analytical results of ground-water samples from monitoring well MW-1A.

d Data reproduced from John G. Hill, Cedar Chemical Corporation, February 16, 1987. Letter to Jack McCord, Mississippi Department of Natural Resources, Bureau of Pollution Control, Industrial Wastewater Section. Subject: Commission Order No. 1046-86.

e -- indicates that the well was not sampled or the data not reported.

f ND indicates that the compound was analyzed for but not detected.

TABLE 11

ANALYTICAL DATA SUMMARY (GROUND WATER)
CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI
FEBRUARY 1989

	CC-TB TRIP BLANK 02/01/89 1610	MW-4 UPGRADNT WELL 01/31/89 1230	MW-16 NEW WELL 01/31/89 1545	MW-6 DOWNGRAD WELL 02/01/89 0930	MW-7 DOWNGRAD WELL 02/01/89 1000	MW-2 DOWNGRAD WELL 02/01/89 1540
INORGANIC ELEMENTS	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
CALCIUM	--	97	74	220	100	150
IRON	--	0.59	3.3	3.9	3.4	3.3
MAGNESIUM	--	43	29	120	46	63
SODIUM	--	15	12	28	16	28
	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	--	620	410	3200	1300	2600
BARIUM	--	210	320	620	290	260
CHROMIUM	--	--	--	10	--	--
COBALT	--	--	--	19	--	--
MANGANESE	--	340	190	340	1100	480
STRONTIUM	--	230	270	490	310	460
TITANIUM	--	30	17	130	48	130
ZINC	--	13	20	22	15	.36
GENERAL INORGANIC PARAMETERS	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
CYANIDE	--	--	--	.006	--	--
PESTICIDE/PCB COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ATRAZINE	--	--	--	17C	--	--
CYANAZINE	--	--	--	47C	--	--
DINOSEB (DNBP)	--	--	--	1.2	1.2	--
PROPAZINE	--	--	--	2.6C	--	--
EXTRACTABLE ORGANIC COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CHLOROBIS(METHYLETHYL)TRIAZINEDIAMINE	--	--	--	2JN	--	--
PURGEABLE ORGANIC COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
1,1,1-TRICHLOROETHANE	--	--	--	--	0.60J	--
CIS-1,2-DICHLOROETHENE	--	--	--	--	--	3.6J
TRICHLOROETHENE(TRICHLOROETHYLENE)	--	--	--	--	--	1.1J

FOOTNOTES

- NA - NOT ANALYZED
- J - ESTIMATED VALUE
- N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
- -- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED
- C - CONFIRMED BY GC/MS

TABLE 12

ANALYTICAL DATA SUMMARY (SOIL)
CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI
FEBRUARY 1989

	CC-BG BACKGROUND SOIL 02/01/89 1300	CC-1 S. END OF PLANT 02/01/89 1310	CC-2 S.E. END IMPOUND 02/01/89 1355	CC-3 S.E. END LANDFILL 02/01/89 1420	CC-4 SW OF MW-10 02/01/89 1500
INORGANIC ELEMENTS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
ALUMINUM	19000	8200	7300	12000	7100
ARSENIC	--	13	--	--	7.2
BARIUM	140	46	120	120	110
CALCIUM	1700	31000	30000	38000	31000
CHROMIUM	18	22	12	16	34
COBALT	6.7	5.5	4.3	9.2	2.9
COPPER	17	14	12	13	26
IRON	24000	20000	12000	16000	16000
LEAD	--	--	17	14	40
MAGNESIUM	3400	14000	19000	13000	9200
MANGANESE	730	420	440	530	220
MERCURY	--	--	--	--	0.24
MOLYBDENUM	--	--	--	--	2.3
NICKEL	19	12	12	15	13
POTASSIUM	1900	1100	1100	1400	910
SODIUM	--	--	370	280	270
STRONTIUM	22	28	32	29	32
TITANIUM	510	240	360	280	300
VANADIUM	44	22	22	28	19
YTTRIUM	11	8.2	9.3	11	6.9
ZINC	49	43	59	43	82
GENERAL INORGANIC PARAMETERS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
CYANIDE	--	--	--	0.14	58.3A
PESTICIDE/PCB COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
ATRAZINE	--	680J	200JN	100J	4800J
DIELDRIN	--	--	--	--	530J
DINOSEB (DNBP)	15	250000	96	57000	380000
ENDRIN	--	--	--	--	1500J
ENDRIN KETONE	--	--	--	--	430
HEPTACHLOR EPOXIDE	--	53	--	--	--
METHYL PARATHION	--	1200	--	--	820J
TOXAPHENE	--	48000	--	--	160000JN
EXTRACTABLE ORGANIC COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
4-NITROPHENOL	--	920J	--	--	--
BENZO(B AND/OR K)FLUORANTHENE	--	290J	--	--	--
BENZO(GHI)PERYLENE	--	100J	--	--	--
CHRYSENE	--	180J	--	--	--
FLUORANTHENE	--	310J	--	--	--
HEXACHLOROBENZENE (HCB)	--	140J	--	--	--
PHENANTHRENE	--	190J	--	--	--
PYRENE	--	260J	--	--	--
(METHYLPROPYL)DINITROPHENOL	500JN	400000JN	200000JN	200JN	687JN
1 UNIDENTIFIED COMPOUND	--	--	--	--	200000J
2 UNIDENTIFIED COMPOUNDS	--	10000J	--	--	--
BUTYLDINITROANISOLE	--	10000JN	--	--	--
DIMETHYLHEPTANONE	--	--	600JN	300JN	--
HEXADECANOIC ACID	400JN	300JN	800JN	500JN	--
METHOXYNITROBENZENE	--	800JN	--	--	--
OCTANOIC ACID	--	--	300JN	200JN	--
PURGEABLE ORGANIC COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
ACETONE	--	--	--	--	330J
METHYL ETHYL KETONE	--	--	--	--	94J
O-XYLENE	--	--	--	--	9.9J
FOUR UNIDENTIFIED COMPOUNDS	--	--	--	300JN	--
TRIMETHYLBENZENE	--	--	--	--	30JN

FOOTNOTES

- A - AVERAGE VALUE
- NA - NOT ANALYZED
- J - ESTIMATED VALUE
- N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
- -- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED

- Arsenic was detected in wells MW-5, MW-6, and MW-8, but not in background well MW-4.

- Cyanide was detected in MW-1 and MW-6.

On several occasions CCC analyzed groundwater for the presence of dinoseb. Dinoseb was detected in concentrations ranging from 125 ug/l to 1130 ug/l (See Table 10).

On January 10, 1986, CCC submitted a groundwater assessment report. This report purported to define the rate and extent of migration of hazardous waste or hazardous waste constituents in the groundwater. The report concluded that the contamination was caused by surface water contamination. EPA has determined this report to be inadequate.

III. FACTORS AFFECTING MIGRATION

Several bayous flow through or near the CCC property (see Figures 3 and 4). Stouts Bayou flows south along the eastern perimeter of the facility. This bayou drains the south side of the City of Vicksburg. Hatcher Bayou flows from the east to the southwest and joins Stouts Bayou near the south side of the facility to form Hennesseys Bayou. This bayou flows south approximately four miles downstream until it meets the Mississippi River.

Several unnamed streams flow through or near the CCC property (See Figures 3 and 4). A small unnamed stream (shown as a drainage ditch in Figure 3) runs parallel to Stouts Bayou near the north plant, and is separated from Stouts Bayou by the Illinois Central Railroad. The northern branch of this unnamed stream flows from north of the north plant, while a small southern branch receives drainage from the north plant. These two branches combine before flowing under the tracks and into Stouts Bayou. Another unnamed tributary flows south and drains the western perimeter of the south plant. This tributary flows through a large wetland before entering Hennesseys Bayou near the railroad crossing.

The ground surface at CCC varies from 80 to 150 feet above mean sea level (MSL). Below the ground surface lie several strata. The top stratum consists of a silty clay (fill) extending from the surface to a depth of less than 10 feet. This stratum is underlain by a Pleistocene loess characterized as a silty clay-clayey silt extending from 10 to 50 feet below the surface. The loess overlays a stiff hard sandy clay and marl (Bryam member of the Vicksburg formation). The loess-marl contact is marked by variable sand and fossil fragments. A seam of sand with small gravel is associated with this initial clayey layer.

The aquifer below the CCC property is approximately 40 feet thick and consists almost exclusively of Pleistocene loess. The direction of groundwater movement is generally toward Stouts or Hennesseys Bayous. Calculated groundwater flow velocities are 0.01 to 0.20 feet per day in the direction of Stouts or Hennesseys Bayous. Groundwater flow velocities are reported to increase dramatically in the areas adjacent to the bayous. Withdrawal yields of less than one to two gallons per minute would be expected from wells placed in this aquifer.

Cedar Chemical Corporation
Groundwater Elevations
6/7 - 6/8/90

Well No.	Water Elevation
1A	108.4'
2	101.7'
4	108.5'
5	91.2'
6	92.2'
7	94.6'
8	104.1'
9	112.0'
10	108.8'
11	98.7'
12	110.7'
13	110.3'
14	107.9'
16	109.9'

EPS Analytical Services
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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13948 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
		REGULATORY LIMIT				ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18231.00									
Arsenic, Total	[illegible]g/l	<0.003				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	[illegible]g/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	[illegible]g/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	[illegible]g/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18231.00 GROUNDWATER MONITORING WELL 2

COLLECTION DATE/TIME:
06/08/90 06/08/90 08:32

CERTIFICATION:

Ray Hudsall
Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13947 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18230.00									
Arsenic, Total	[illegible]g/l	<0.003				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	[illegible]g/l	362				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	[illegible]g/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	[illegible]g/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION: 18230.00 GROUNDWATER MONITORING WELL 1A

COLLECTION DATE/TIME: 06/08/90 06/08/90 10:10

CERTIFICATION:

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Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13950 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18233.00									
Arsenic, Total	mg/l	<0.003				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	ug/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	ug/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18233.00 GROUNDWATER MONITORING WELL 5

COLLECTION DATE/TIME:
06/07/90 06/07/90 10:45

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert A. Johnston
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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13949 PAGE NO.: 1

LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18232.00									
Arsenic, Total	mg/l	<0.003				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	ug/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	ug/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18232.00 GROUNDWATER MONITORING WELL 4

COLLECTION DATE/TIME:
06/07/90 06/07/90 09:00

CERTIFICATION:

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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13952 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18235.00									
Arsenic, Total	mg/l	0.006				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	mg/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	mg/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18235.00 GROUNDWATER MONITORING WELL 7

COLLECTION DATE/TIME:
06/07/90 06/07/90 11:15

CERTIFICATION:
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Quality Assurance and Quality Control
Herbert B. Johnston
Analytical Services

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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13951 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18234.00									
Arsenic, Total	mg/l	<0.003				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	ug/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	ug/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION: COLLECTION DATE/TIME:
18234.00 GROUNDWATER MONITORING WELL 6 06/07/90 06/07/90 11:00

CERTIFICATION:
Ray Hudnall
Quality Assurance and Quality Control
Herbert C. Johnston
Analytical Services

PS Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM
LOCATION: VICKSBURG, MS 39180
DATE: 06/18/90
PROJECT LOCATION: VICKSBURG, MS.
COLLECTED BY: CLIENT
RECEIPT DATE: 06/08/90
REPORT NO.: 13954
PROJECT NO.:
PAGE NO.: 1

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18237.00									
Arsenic, Total	mg/l	0.004				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	mg/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	mg/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18237.00 GROUNDWATER MONITORING WELL 9

COLLECTION DATE/TIME:
06/08/90 06/08/90 10:30

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

EPS Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13953 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18236.00									
Arsenic, Total	mg/l	0.042				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	ug/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	ug/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18236.00 GROUNDWATER MONITORING WELL 8

COLLECTION DATE/TIME:
06/07/90 06/07/90 10:30

CERTIFICATION:
Ray Hudnall
Quality Assurance and Quality Control
Herbert A. Johnston
Analytical Services

EPS Analytical Services

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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13956 PAGE NO.: 1

LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION: ANALYST	DATE	TIME	BATCH QUALITY CONTROL: SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18239.00									
Arsenic, Total	mg/l	0.004				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	ug/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	ug/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18239.00 GROUNDWATER MONITORING WELL 11

COLLECTION DATE/TIME:
06/08/90 06/08/90 08:50

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

EPS Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90
LOCATION: VICKSBURG, MS 39180
PROJECT LOCATION: VICKSBURG, MS.
COLLECTED BY: CLIENT
RECEIPT DATE: 06/08/90
REPORT NO.: 13955
PAGE NO.: 1
PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION: ANALYST	DATE	TIME	BATCH QUALITY CONTROL: SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		10238.00									
Arsenic, Total	mg/l	0.005				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	mg/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	mg/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
10238.00 GROUNDWATER MONITORING WELL 10

COLLECTION DATE/TIME:
06/08/90 06/08/90 08:40

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert R. Johnston
Analytical Services

EPS Analytical Services
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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13958 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
		REGULATORY LIMIT				ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18241.00									
Arsenic, Total	mg/l	0.008				BSC	06/12/90	15:00	0.200	102	0
Dinitrobutylphenol	mg/l	<30				SCP	06/12/90	10:00	200	92	8.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	mg/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18241.00 GROUNDWATER MONITORING WELL 13

COLLECTION DATE/TIME:
06/08/90 06/08/90 10:40

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

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Analytical Services

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LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13957 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
		REGULATORY LIMIT				ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18240.00									
Arsenic, Total	mg/l	0.008				WSC	06/12/90	13:00	0.200	102	0
Dinitrobutylphenol	mg/l	<30				SCP	06/12/90	10:00	200	92	6.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	mg/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18240.00 GROUNDWATER MONITORING WELL 12

COLLECTION DATE/TIME:
06/08/90 06/08/90 09:00

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert R. Johnston
Analytical Services

EPS Analytical Services

5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13960 PAGE NO.: 1

LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18243.00									
Arsenic, Total	mg/l	<0.003				BSC	06/12/90	13:00	0.200	102	0
Dinitrobutylphenol	mg/l	<30				SCP	06/12/90	10:00	200	92	8.[illegible]
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	mg/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION:
18243.00 GROUNDWATER MONITORING WELL 16

COLLECTION DATE/TIME:
06/08/90 06/08/90 10:20

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert R. Johnston
Analytical Services

EPS Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: VICKSBURG CHEMICAL DIV OF CEDAR CHEM DATE: 06/18/90 COLLECTED BY: CLIENT REPORT NO.: 13959 PAGE NO.: 1
LOCATION: VICKSBURG, MS 39180 PROJECT LOCATION: VICKSBURG, MS. RECEIPT DATE: 06/08/90 PROJECT NO.:

ANALYTE	UNITS	LABORATORY RESULTS				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
		REGULATORY LIMIT				ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		18242.00									
Arsenic, Total	mg/l	<0.003				BSC	06/12/90	13:00	0.200	102	0
Dinitrobutylphenol	ug/l	<30				SCP	06/12/90	10:00	200	92	6.9
Methylene Chloride	mg/l	<0.1				SCP	06/14/90	11:45	40	93	9.3
Toxaphene	ug/l	<0.24				SCP	06/11/90	08:20	25	101	12

SUPPLEMENTARY INFORMATION:
Analyses conducted in accordance with 40 CFR, Part 261, November 1986, "Test Methods for Evaluating Solid Waste" (SW-846).

SAMPLE DESCRIPTION: 18242.00 GROUNDWATER MONITORING WELL 14

COLLECTION DATE/TIME: 06/08/90 06/08/90 10:00

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

APPENDIX D

PROCESS AREA SEWERS
AND SURFACE WATER DRAINAGE REPORTS

A PLANT EVALUATION AND INVESTIGATION
OF
THE SURFACE WATER DRAINAGE SYSTEMS

FOR

VERTAC CHEMICAL CORPORATION (NORTH PLANT)
VICKSBURG, MISSISSIPPI

Report No. 1.85.7953.03
December, 1985

ENVIRONMENTAL
PROTECTION SYSTEMS, INC.
Engineering & Analytical
Jackson, Mississippi

A PLANT EVALUATION AND INVESTIGATION OF THE SURFACE WATER DRAINAGE SYSTEMS

FOR

VERTAC CHEMICAL CORPORATION (NORTH PLANT)
VICKSBURG, MISSISSIPPI

Prepared by

Environmental Protection Systems, Inc.
Jackson, Misssissipi
Pensacola, Florida
Mobile, Alabama

Report No. 1.85.7953.03
December, 1985

TABLE OF CONTENTS

1.0 INTRODUCTION

Vertac Chemical Corporation operates an agricultural chemical complex in Vicksburg, Mississippi. The operation complex is divided into North Plant and South Plant operations. The North Plant operation, which is the subject of this report, manufactures potassium nitrate (KNO_3), chlorine gas and liquid nitrogen tetroxide (N_2O_4). This plant has changed ownership several times since its inception, thus drawings of the surface water drainage system are out of date. Vertac Chemical Corporation, desiring to update its surface water drainage system drawing and to gather information for the purposes of understanding stormwater runoff, contracted Environmental Protection Systems, Inc. (EPS), to assist in this work.

2.0 SCOPE OF SERVICES

EPS has conducted Phase 2, the confirmatory phase of this surface water drainage system inventory. The purpose of Phase 2 was to identify all areas which contribute stormwater runoff to the plant's sewer system that is routed directly to the property boundaries of the North Plant. From the investigation, a detailed surface water drainage map for the North Plant has been prepared. A narrative description of the drainage area is included and, when observed, pipe materials and diameters are noted in the report (See Attached Table). Dry weather flows are noted but were not quantitatively measured. Nine dye tests and one clear water drainage test were conducted during the period November 21-22, 1985.

3.0 NARRATIVE DESCRIPTION OF DRAINAGE AREA

In 1984, the Environmental Protection Agency published regulations (49 FR 37996) addressing issues concerning the National Pollutant Discharge Elimination System (NPDES) program administered under the Clean Water Act. One aspect of those rules concerned the regulation of point sources of stormwater runoff and defined stormwater discharges as conveyances of stormwater contaminated by process waste, raw materials, toxics, hazardous pollutants, or oil and grease. Discharges from industrial lands or facilities are identified as point sources. Group I stormwater dischargers are those subject to effluent limitation guidelines or are located in an industrial plant or plant associated area. Group I dischargers are required to complete Form 1 plus submit a narrative description of the drainage area, the receiving waters, and any treatment applied to the discharge. In lieu of Form 2C data and sampling, applicants are required to indicate whether their discharges fall within the Group I or Group II category. The following sections contain descriptions of the North Plant areas which contribute untreated stormwater runoff directly to Stout's Bayou which borders the east side of the plant.

3.1 North (N) Plant Area

This area consists of the gravel parking lot north of the agricultural storage building, the road north to the plant gate, the track area north of the agricultural storage building, and the administration building and surrounding hills. General surface drainage in this area is downhill to the east on to the large gravel parking lot and plant road. East of the parking lot, which is the track area, ground elevations are indistinct, but general drainage is toward the east into the bayou. In the north area, there is one main storm sewer (N-1) which originates at the agricultural storage building by collecting water from a surface trench surrounding the agricultural storage building and which proceeds northward from its origin (See Drawing 1). One section of this sewer (N-3) is routed underneath the plant road through an 18-inch culvert to a large collection box at the foot of the administration building hill (See Drawing 2). This collection box is also fed by a 15-inch reinforced concrete pipe (N-4) coming from the administration building area from an unknown source. From the collection box, the sewer turns eastward in twin 36-inch reinforced concrete pipes (N-5 and N-6) and empties into the bayou. The drain at the carwash empties into the southernmost of these twin culverts.

3.2 West (W) Plant Area

In this area are the instrument and electrical shop, the maintenance offices, and the maintenance shops and warehouse. At the north end of the shops and warehouse, a 10-inch steel culvert (W-2) passes underneath the plant road and drains onto the surface of the ground near the west wall of the agricultural storage building. At the southern end of the shops and warehouse is an unusual culvert (W-5/W-6), which makes a 90^{0} turn (north to south turning east to west). The north end of this culvert is a 15-inch reinforced concrete pipe, while the east end is a 12-inch CMP. The fact that these two ends are connected was verified by a clear water drainage test.

3.3 South (S) Plant Area

This area includes everything south of the cooling tower, except the neutralization system. Surface drainage in this area is from west to east, eventually draining into the bayou east of the plant. There is a 30-inch concrete culvert (S-1) collecting water from the hills behind the maintenance shops and warehouse which carries water to the southernmost collection box. There is also a new 24-inch plastic culvert (S-2) underneath the road leading up to the impoundment pond which drains over-the-ground to the east. Stormwater overflow from the neutralization system enters a collection box and is fed through an 18-inch concrete culvert (S-5) to the southernmost collection box. Stormwater drainage from the plant roads and the process area is collected in a drain at the northeast corner of the neutralization area and is diverted through a 20-inch plastic culvert (S-6) to the southernmost collection box. This collection box (the southernmost one) consists of two compartments connected by a 24-inch reinforced concrete pipe (S-9). In addition to the storm culverts already mentioned, the collection box also receives storm drainage through a 20-inch reinforced concrete (S-4) pipe from the direction of the South plant. From this main collection box, the water is routed to the property boundary through twin 36-inch reinforced concrete pipes (S-7 and S-8) which drain into the bayou.

3.4 East (E) Plant Area

The east plant area consists of the track area east of the plant process area. Stormwater in this area drains off the property over the surface of the ground. There is one 12-inch corrugated metal culvert (E-1) shown on old drawings; however, dye tests confirmed that this culvert is blocked and abandoned and that water fed into its drain ends up in the neutralization pits.

3.5 Receiving Water

All surface water diverted into the stormwater drainage system at Vertac Chemical Corporation's North Plant is received by Stout's Bayou which borders the east side of the north plant. This stream ultimately flows into the Mississippi River via Hennessey's Bayou.

4.0 RECOMMENDATIONS

This report addresses the immediate requirements of current NPDES rules concerning stormwater runoff; however, based on good business practices, EPS recommends the following:

1. EPS recommends that a baseline stormwater survey be conducted to include:

   a. Collecting water from the southernmost and northernmost collection boxes shortly after a significant rainfall end.

   b. Analyzing the stormwater for the principal pollutants it potentially could contain.

2. EPS recommends that a stormwater runoff model be developed to include:

   a. Design storm events

   b. Peak flow rate

   c. Total diversion volume

3. EPS recommends that the model be used to develop a concept design for an optimum diversion and impounding system.

4. EPS recommends that a stormwater management plan be prepared and implemented.

5. EPS recommends the preparation of a Spill Prevention Control and Countermeasure Plan, in accordance with 40 CFR 112, to include all chemical materials which may adversely affect the environment when spilled.

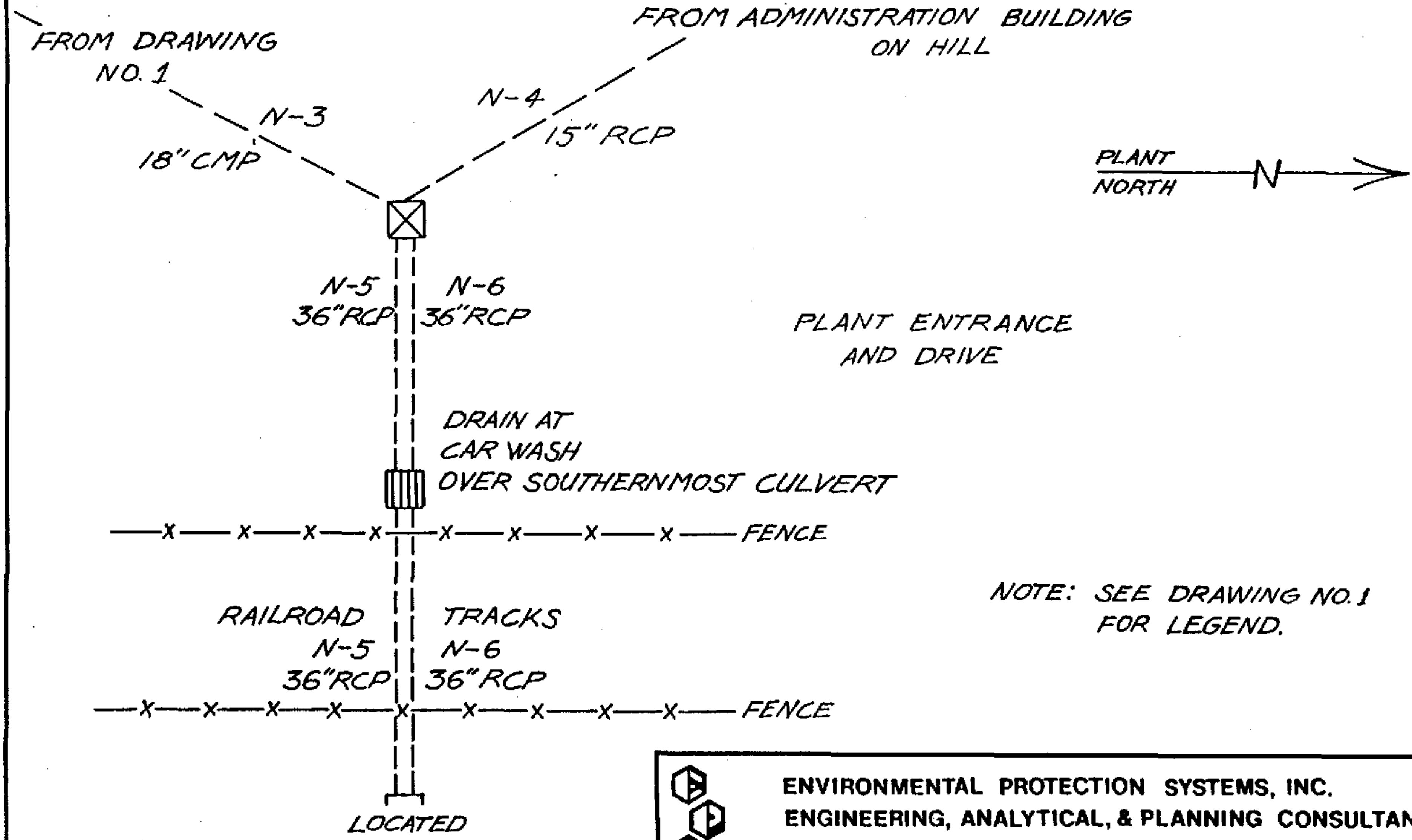
TABLE

TABLE
STORMWATER DIVERSION PIPE: MATERIAL AND DIAMETER
NORTH PLANT
VERTAC CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

Reference: Drawings Nos. 1 and 2

Line No.	Pipe Material	Diameter (inches)	Dry Weather Notes (11/21-22/85)
N-1	Reinforced Concrete	15	Flowing 1 inch deep
N-2	Reinforced Concrete	15	Flowing 1 inch deep
N-3	Corrugated Metal	18	Flowing 1 inch deep
N-4	Reinforced Concrete	15	Dry
N-5	Reinforced Concrete	36	Dry
N-6	Reinforced Concrete	36	Flowing 1 inch deep
W-1	Carbon Steel	10	Dry
W-2	Carbon Steel	10	Flowing 1 inch deep
W-3	Corrugated Metal	10	Flowing 1 inch deep
W-4	Stainless Steel	6	Dry
W-5	Reinforced Concrete	15	Dry
W-6	Corrugated Metal	12	Dry
S-1	Reinforced Concrete	30	Dry
S-2	Corrugated Plastic	24	Dry
S-3	Reinforced Concrete	15	Apparently abandoned
S-4	Reinforced Concrete	20	Flowing 2 inches deep
S-5	Reinforced Concrete	18	Standing 3 inches deep
S-6	Corrugated Plastic	20	Standing 1 inch deep
S-7	Reinforced Concrete	36	Standing 2 inches deep
S-8	Reinforced Concrete	36	Standing 2 inches deep
S-9	Reinforced Concrete	24	Standing 1 inch deep
E-1	Corrugated Metal	12	Confirmed abandoned

DRAWINGS



ENVIRONMENTAL PROTECTION SYSTEMS, INC.
ENGINEERING, ANALYTICAL, & PLANNING CONSULTANTS
JACKSON, MS PENSACOLA, FL MOBILE, AL

PROJECT TITLE: VERTAC SEWER SYSTEM MAP	
SCALE: 1" = 40'	DRAWN BY: SJA
DATE: 12-13-85	APPROVED BY: JED
PROJECT NO.: 1.85.7953.02	DRAWING NO.: 2

A PLANT EVALUATION AND INVESTIGATION OF THE PROCESS AREA SEWERS AND SURFACE WATER DRAINAGE FOR VERTAC CHEMICAL CORPORATION SOUTH PLANT VICKSBURG, MISSISSIPPI

Report No. 1.86.7954.01
March, 1986

ENVIRONMENTAL PROTECTION SYSTEMS, INC.
Engineers & Scientists
Jackson, Mississippi
Pensacola, Florida
Mobile, Alabama

A PLANT EVALUATION AND INVESTIGATION

OF

THE PROCESS AREA SEWERS AND SURFACE WATER DRAINAGE

FOR

VERTAC CHEMICAL CORPORATION
SOUTH PLANT
VICKSBURG, MISSISSIPPI

Prepared by

Environmental Protection Systems, Inc.
Jackson, Mississippi
Pensacola, Florida
Mobile, Alabama

Report No. 1.86.7954.01
March, 1986

TABLE OF CONTENTS

1.0 INTRODUCTION

Vertac Chemical Corporation operates an agricultural chemical complex in Vicksburg, Mississippi. The operation complex is divided into North Plant and South Plant operations. The South Plant operation, which is the subject of this report, manufactures nitric acid, and technical pesticides (Dinoseb and MSMA). The plant has changed ownership several times since its inception; thus drawings of the process area sewers and surface water drainage system are out of date. Vertac Chemical Corporation, desiring to update its process area sewers and surface water drainage system drawing and to gather data for the purposes of understanding surface water runoff in the process areas, contracted Environmental Protection Systems, Inc. (EPS), to assist in this work.

2.0 SCOPE OF SERVICES

EPS has conducted Phase 3, the process area Confirmatory Phase of this surface water drainage system inventory. The purpose of Phase 3 was to identify all areas which contribute either process water or stormwater runoff to the plant's process sewer system that is routed to the plant neutralization and impoundment pond. From the investigation, the working map prepared in Phase 1, the Investigatory Phase, was used to develop a map of the drainage system in the process areas (See Drawing). In addition, elevation contour lines have been shown in one area where surface water flows were not obvious. A narrative description of the drainage system is included and, when observed, pipe materials and diameters are noted in the report (See Table). Dry weather flows were noted for drainage lines, when observed. Fifty dye tests were conducted between February 18 and March 7, 1986, and elevation readings were taken on February 20, 1986.

3.0 NARRATIVE DESCRIPTION OF DRAINAGE AREA

For the purposes of this report, the Vertac Chemical Corporation, South Plant, has been subdivided into three areas.

1. The Dinitro processing area and adjacent railroad track yard
2. The Drumming Building and adjacent abandoned process areas, constituting the central block of the South Plant
3. The Nitric Acid area including Ammonia Storage and the Cooling Tower

The following sections contain descriptions of these three South Plant areas which contribute stormwater runoff and process drainage to the plant neutralization and impoundment pond. A brief description of the main sewer lines collecting water from these three areas completes the drainage picture.

3.1 Dinitro Processing Area Sewer

The source of most stormwater in this relatively flat area is direct rainfall into the area. Some stormwater flows down the steep shoulder separating the Dinitro area from the upper part of the South Plant. The principal drainage lines flow north and south between railroad tracks, in the area between the Dinitro processing plant and the tank farm at the foot of the shoulder.

Immediately south of two red tanks and between the tank farm and the shoulder is a small drain. This drain is connected by a 6-inch line (DS-1) to a drain between the railroad tracks east of the tank farm. This second drain is approximately 35 feet north of the track switch adjacent to the south end of tank farm. An 8-inch line (DS-2) connects this drain to a third one in the track area from which the sewer line turns north. An 8-inch line traveling east from this third drain is apparently plugged. A 10-inch line (DS-3) connects this third drain and the next drain to the north. Six-inch lines entering this latter drain from the east and west are apparently plugged. A 10-inch line (DS-4) connects the drain with a sump to the north. Behind the tank farm is another small drain just north of the Versene tank, which is connected by a 6-inch line (DS-7) to a drain just east of the tank farm. This drain is approximately 20 feet east of the wall adjacent to the Versene tank. A 6-inch line exits this drain to the east (DS-8) and apparently connects to the (DS-4). Water entering the sump in the railroad track area is pumped to a larger sump adjacent to the Dinitro process plant which diverts water to the impoundment pond. At the north end of this sewer system is a drain located between railroad tracks east of the tank labeled TEOA. A 6-inch line entering this drain has an unknown origin. The 10-inch line to the south (DS-6) connects to a drain just north of the sump located in the track area. Just south of a transformer, located between tanks, is a small drain which drains eastward through a 6-inch line (DS-9) to a drain in the track area which is further connected by a 6-inch line (DS-10) to DS-6. The drain at the south end of (DS-6) is connected to the sump by (DS-5). Dye tests verified that water entering any drain in this system ends up in the impoundment pond; however, the exact connection of this system to the main sewer line entering the pond is unclear.

There is another drain in this area located at the very north end of the tank farm. Dye poured into this drain showed up in the impoundment pond; however, its route is not clear.

At the north end of the Dinitro process area is a sump located under a railroad track. This sump clearly has an 8-inch line leaving it. Dye poured into the sump showed up at the impoundment pond; however, its route is also unclear.

3.2 Sewers in the Central Block of the South Plant

This area includes the abandoned boiler area, the compressor building, the old ammonia processing area, the caustic storage, and the drumming building. Principal sewers are located along the roadway defining the central block and down the west side of the center street.

Six round drains are located inside the abandoned boiler area. Dye poured into these drains showed up in the west ditch via the 24-inch clay pipe (WR-16). Three small square drains between the boiler area and the south road are connected to the sewer running along the south road. Dye poured into these three drains showed up in collection boxes along the south road sewer but also in the west ditch via WR-16. This means that the western drain on the south road sewer is connected to WR-16.

In the area adjacent to the compressor building, there are 5 drains which are plugged up with debris. Stormwater falling in this area collects in depressions associated with these drains until it evaporates.

Looking at the drains along the south road, the westernmost drain is connected to (WR-16) by CS-1. Going eastward along the road, CS-2 connects this drain to the next one. The 12-inch line (CS-3) connects the latter drain to the collection box located on the northwest corner of the intersection of the south street with the center street. This collection box feeds water across the street through a 12-inch line (CS-4), receiving water from CS-3 and also from a set of drains channeling water southward along the center street (CS-5), (CS-6), (CS-7), and (CS-8). At the northeast corner of the same intersection is a collection box which receives water from a drain to the north via CS-9. This collection box routes stormwater via a 15-inch line (CS-10). The next collection box in the system receives water from the cooling tower and storage area located south of the south road.

Line X-1 is an 8-inch carbon steel line which diverts water from the storage area to the south road. Line X-2 is a culvert in front of the cooling tower which is plugged up and which connects to a drain (also plugged up) and ultimately, via a 6-inch line (X-3), connects to a drain where it joins water received via line X-1. This confluence is routed under the street in a 12-inch cast iron line (X-4) to the previously mentioned collection box located at the east end of CS-10. The 15-inch line (CS-11) diverts all this water to the collection box located at the northwest corner of the intersection of the south road and the east road. From this corner all the water travels northward through various drains and collection boxes to the northeast corner of the block via CS-12, CS-13, and CS-15. A drain located under the west end of the caustic tanks connects to this system via CS-14.

The center street is drained northward via lines labelled CS-16 through CS-22 to a collection box located at the north end of the block. This collection box is connected under the north street to the main sewer line by a 10-inch clay pipe (CS-23). CS-24 connects an 18-inch clay process drain to the collection box at the northeast corner of the central block. This collection box is connected under the street to the main sewer line by CS-25.

3.3 Nitric-Acid Area Sewers

In the new nitric acid plant, there is an 8-inch PVC ground drain (NS-1) connected to the main sewer line. A 2-inch PVC drain originates at the sink inside the control room in this plant. A 3-inch carbon steel line originates under the plant boiler and carries blowdown to the main sewer. Ground drains located at the southwest corner of the old nitric acid plant are connected to the main sewer. Dye poured into these drains showed up in the main sewer via the collection box across the street from the office building. An old sewer originating in the Perkins plant and traveling east between the old nitric acid plant and the cooling tower has a drain next to a compressor. Dye poured into this drain showed up in the ditch along the plant road. The sewer is apparently connected to an underground north-south sewer at the foot of the shoulder, but there is also an apparent leak in the east-west line of the sewer in the vicinity of the road ditch. Drains at the cooling tower are connected to the sewer system located at the foot of the shoulder.

3.4 Main Sewer Line

A common sewer line receives water from all the previously described area sewers and diverts it to the impoundment pond. This sewer runs last from the office building to the pond and has a cross-connecting line running north-south along the foot of the shoulder dividing the upper plant area from the railroad tracks. The east-west section consists of lines MS-1 through MS-6 and the north-south section consists of lines MS-7 through MS-11.

TABLE
PROCESS AREA DRAINAGE PIPE: MATERIAL AND DIAMETER
SOUTH PLANT
VERTAC CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

Reference: Process Area Sewer Map

Line No.	Pipe Material	Diameter (Inches)	Dry Weather Notes (2/18-3/7/86)
DS-1	Cast Iron	6	Flowing 2 inches deep.
DS-2	Cast Iron	8	Flowing
DS-3	Cast Iron	10	Flowing
DS-4	Cast Iron	10	Flowing
DS-5	Unknown	Unknown	Not Observed
DS-6	Cast Iron	10	Dry at North End
DS-7	Cast Iron	6	Flowing
DS-8	Cast Iron	6	Flowing
DS-9	Cast Iron	6	Flowing
DS-10	Cast Iron	6	Flowing
CS-1	Unknown	Unknown	Not observed. Flow during dye test.
CS-2	Unknown	8	Stagnant
CS-3	Vitrified Clay	12	Stagnant
CS-4	Vitrified Clay	12	Stagnant
CS-5	Vitrified Clay	8	Stagnant
CS-6	Carbon Steel	8	Stagnant
CS-7	Carbon Steel	8	Stagnant
CS-8	Cast Iron	4	Dry
CS-9	Vitrified Clay	8	Flowing
CS-10	Vitrified Clay	15	Flowing 2 inches deep
CS-11	Vitrified Clay	15	Flowing 2 inches deep
CS-12	Reinforced Concrete	18	Flowing 2 inches deep
CS-13	Reinforced Concrete	24	Flowing 2 inches deep
CS-14	Vitrified Clay	12	Flowing
CS-15	Vitrified Clay	15	Flowing 3 inches deep
CS-16	Cast Iron	4	Dry
CS-17	Reinforced Concrete	12	Stagnant
CS-18	Reinforced Concrete	12	Flowing 1 inch deep
CS-19	Cast Iron	4	Dry
CS-20	Vitrified Clay	12	Flowing 1 inch deep
CS-21	Vitrified Clay	8	Dry
CS-22	Vitrified Clay	12	Flowing 2 inches deep
CS-23	Vitrified Clay	10	Flowing 4 inches deep
CS-24	Vitrified Clay	18	Flowing half-full
CS-25	Unknown	Unknown	Flowing
NS-1	Plastic-PVC	8	Dry
MS-1	Vitrified Clay	15	Flowing
MS-2	Unknown	Unknown	Flowing
MS-3	Unknown	Unknown	Flowing

TABLE
PROCESS AREA DRAINAGE PIPE: MATERIAL AND DIAMETER
SOUTH PLANT
VERTAC CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI
(CONTINUED)

Reference: Process Area Sewer Map

Line No.	Pipe Material	Diameter (Inches)	Dry Weather Notes (2/18-3/7/86)
MS-4	Unknown	Unknown	Flowing
MS-5	Unknown	Unknown	Flowing
MS-6	Plastic-FRP	24	Flowing 3/4 full
MS-7	Unknown	Unknown	Not observed
MS-8	Unknown	Unknown	Not observed
MS-9	Unknown	Unknown	Flowing
MS-10	Vitrified Clay	10	Flowing 4 inches deep
MS-11	Vitrified Clay	10	Flowing 4 inches deep
X-1	Carbon Steel	8	Dry
X-2	Carbon Steel	6	Dry
X-3	Carbon Steel	6	Dry
X-4	Cast Iron	12	Dry

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

RECEIVED
JAN - 2 1990
Dept. of Environmental Quality
Bureau of Pollution Control

DEC 21 1989

4WD-RCRA

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Steven T. Boswell
Director of Environmental Affairs
Cedar Chemical Corporation
P.O. Box 3
Vicksburg, Mississippi 39181

RE: Cedar Chemical Corporation
Vicksburg Facility
EPA ID NO: MSD 990 714 081

Dear Mr. Boswell:

Enclosed please find the United States Environmental Protection Agency's (EPA's) Determination of Release for the referenced facility. This determination is made pursuant to Section 3008(h) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6928(h).

If you have any questions regarding the determinations, please contact Zylpha K. Pryor, Assistant Regional Counsel, at (404) 347-2641.

Sincerely yours,

Patrick M. Tobin

Patrick M. Tobin, Director
Waste Management Division

Enclosure

cc: [redacted]

Ref. 4e

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IV
345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

IN THE MATTER OF:	)	Resource Conservation and Recovery Act
	)	Section 3008(h)
Cedar Chemical Corporation	)	42 U.S.C. Section 6928(h)
(fka: Vertac Chemical Corp)	)	
Vicksburg, Mississippi	)	
	)	
EPA ID No: MSD 990 714 081	)	

DETERMINATION OF RELEASE

Pursuant to the authority of Section 3008(h) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6928(h), as duly delegated, the Director of the Waste Management Division, Region IV, United States Environmental Protection Agency (EPA), makes the following Findings of Fact, Conclusions of Law, and Determinations.

SCOPE

This Determination is not intended to document all releases which have occurred at the facility. Releases not documented herein may require corrective action under any authority invoked pursuant to this determination, or under any other authority which the Administrator or his delegate deems necessary.

I
FINDINGS OF FACT

The Director of the Waste Management Division, Region IV, EPA, finds that:

1. Cedar Chemical Corporation (CCC) is a corporation doing business in the State of Mississippi.

2. CCC owns and has operated a hazardous waste management facility located on Rifle Range Road, Warren County, Vicksburg, Mississippi.

CCC has generated, treated, stored and disposed of hazardous waste and hazardous waste constituents at the Vicksburg facility. Those wastes include specifically, wastes associated with the manufacture of toxaphene (K098 and K041), dinoseb (P020) and monosodium methane arsenate (K031).

- K098 is untreated process wastewater from the production of toxaphene.

- K041 is wastewater treatment sludge from the production of toxaphene.

- P020 is discarded commercial chemical product, dinoseb.

- K031 is by-product salts from the production of MSMA.

3. In addition to the manufacture of those materials generating hazardous wastes, CCC manufactured other organic chemicals which may be associated with hazardous constituents. These include: methyl parathion, atrazene, dimethyl urea, isopropyl amine, dinitro-ortho-creosol, and cyanazene.

4. Pursuant to Section 3010 of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6930, CCC (as Vertac) submitted its notification of hazardous waste activity on June 23, 1980. On November 18, 1980, CCC submitted Part A of its hazardous waste permit application.

5. Having timely submitted the required notification and Part A permit application, CCC achieved interim status for its Vicksburg Facility under Section 3005(e) of RCRA, 42 U.S.C. 6925(e).

* 6. On July 27, 1989, EPA inspected the landfill at CCC. The inspectors noted a yellow discoloration on the surface of the landfill, and within the erosion channels that ran down the east, west, and northwest sides of the landfill. It also appeared that the leachate may have been coming from the northwest side of the landfill and going into the drainage ditch. A pesticide odor was present.

7. The hazardous waste container storage area was also inspected by EPA on July 27, 1981. The inspectors reported that approximately 700 drums were present in this area, sitting on and off a concrete pad. A number of drums containing carbon were rusted through; some were oozing dark liquid. Many of the drums were in an advanced state of deterioration.

* 8. On October 28, 1981, EPA inspected CCC and sampled drainage from the landfill. The inspectors noted that surface runoff from the landfill drained in three directions: (1) east into the surface impoundment, (2) south into Hatcher Bayou, and (3) west into a small valley.

✗ 9. The sediment sample collected from the east corner of the landfill contained several organic compounds: cyanazine (21 mg/kg), atrazine (84 mg/kg), toxaphene (13 mg/kg), and Arochlor - 1254 (PCB, 7 mg/kg). These organic compounds were not detected in the upstream sediment sample from Stouts Bayou. Cyanide (0.68 ug/kg) was also measured in this sediment sample and not in the upstream sediment sample from Stouts Bayou. Other chemicals detected included barium, chromium, lead, and mercury (see Table 1).

✗ 10. The sediment sample collected from the small valley west of the landfill contained atrazine (18 mg/kg) and toxaphene (65 mg/kg). Cyanide (0.58 mg/kg) was also detected in this sediment sample. Other chemicals detected included barium, chloroform, chromium, and lead (see Table 1).

* 11. In February 1983, a portion of the south levee containing CCC's surface impoundment failed, resulting in the release of approximately 700,000 gallons of liquid to the adjacent bayous.

12. On October 31, 1983, CCC sampled groundwater monitoring wells. Analyses of these samples indicated the presence of dinoseb in well MW-1 (117 ug/L) and atrazine in wells MW-1, MW-2, MW-6, MW-7 and MW-8 (see Table 2).

13. On November 9, 1983, the Mississippi Bureau of Pollution Control (MBPC) sampled wells MW-1, MW-4, MW-5, MW-6, MW-7, and MW-8. Analyses of these samples indicated 1,200 ug/L of dinoseb in well MW-1. Atrazine was detected in wells MW-1 (80 ug/L), MW-2 (10 ug/L), MW-5 (10 ug/L), MW-6 (100 ug/L), and MW-8 (110 ug/L).

14. In November 1983, CCC reported a statistically significant increase in total organic halides and specific conductance in well MW-1 when compared to the background MW-4.

15. On January 24, 1984, MBPC notified CCC of possible groundwater contamination at the Vicksburg Facility.

16. On December 14, 1984, MBPC sampled MW-1 and MW-8. Organic compounds detected in MW-1 included dinoseb (1000 ug/L) and trichloroethene (15 ug/L). Organic compounds detected in MW-8 included 2,5-diethytetra-hydrofuran (60 ug/L) and atrazine (60 ug/L) (see Table 2).

17. From May 23, 1985, through June 10, 1985, CCC sampled wells MW-1 through MW-8 and analyzed the samples for Appendix VIII constituents. The results of the analyses indicated the following (see Table 2):

Concentrations of several chemicals were detected in well MW-1 and not detected in background well MW-4: chromium (30 ug/L), chloroform (10.6 ug/L), cyanide (total - 72 ug/L), dinoseb (1130 ug/L), nickel (30 ug/L), pentachlorophenol (34 ug/L), and trichloroethene (19.5 ug/L).

TABLE 1

SITE FIELD INVESTIGATION -- OCTOBER 28, 1981
SUMMARY OF REPORTED DATA

Constituent	Soil/Sediment Concentration (mg/kg) VL-002 Erosional Area East Corner	VL-003 Erosional Area West Corner	SBU-001 Stouts Bayou Upstream-Control
Arochlor-1254 (PCB)	7.	ND[a]	ND
Atrazine	84.	18.	ND
Barium	213.	211.	64.
Chloroform	ND	0.010	ND
Chromium	30.	22.	ND
Cyanazine	21.	<7.6[b]	--[c]
Cyanide	0.86	0.58	ND
Dinoseb	ND	<15.	ND
Lead	20.	20.	ND
Mercury	0.12	ND	ND
Toxaphene	13.	65.	ND

Notes:

Data reproduced from U.S. Environmental Protection Agency, January 26, 1982. Report: Hazardous Waste Site Investigation, January 22, 1982, Vertac Chemical Corporation, Vicksburg, Mississippi.

a ND indicates that the compound was analyzed for but not detected.

b The less than symbol indicates that the compound was detected by GC/MS at a concentration less than the minimum quantifiable level (MQL). The number indicates the MQL.

c The double hyphen indicates that the compound was not reported by the laboratory.

TABLE 2

SUMMARY OF ANALYSES OF WATER SAMPLES FROM MONITORING WELLS MW-1 THROUGH MW-8

Sheet 1 of 3

Constituent	Concentration (ug/L) and Well Number							
	1	2	3	4	5	6	7	8
** Sampled by Respondent on October 31, 1983[a]								
Atrazine x 10^3	62.6	22.4	--[f]	--	NR[g]	75.0	4.5	191
Dinoseb	117.	<25	--	--	NR	<25	<25	<25
Toxaphene	<0.3	<0.3	--	--	NR	<0.3	<0.3	<0.3
** Sampled by MBPC on November 9, 1983[b]								
2-Bromo-cyclo-hexanol	5.	--	--	ND[h]	ND	ND	ND	ND
Atrazine	ND	--	--	ND	ND	20.	ND	150.
Dinoseb	1200.	--	--	ND	ND	ND	ND	ND
** Sampled by Respondent in November 1983[c]								
Atrazine	80.[i]	10.	--	--	10.	100.	<10	110.
Dinoseb	<25	<25	--	--	<25	<25	<25	<25
Toxaphene	<5	<5	--	--	<5	<5	<5	<5
Total organic halide[j]	0.22	0.11	--	NR	0.046	0.054	0.044	0.014
Specific conductance (umhos)[j]	3988.	1022.	--	NR	1448.	1491.	778.	1095.
** Sampled by MBPC on December 14, 1984[d]								
2-Bromo-cyclo-hexanol	100.	--	--	--	--	--	--	ND
2,5-Diethyl-tetrahydro-furan	ND	--	--	--	--	--	--	200.
Atrazine	ND	--	--	--	--	--	--	60.
Diethyl phthalate	140.	--	--	--	--	--	--	ND
Dinoseb	1000.	--	--	--	--	--	--	ND
Pentachloro-phenol	50.	--	--	--	--	--	--	ND
Trichloroethene	15.	--	--	--	--	--	--	ND

TABLE 2

SUMMARY OF ANALYSES OF WATER SAMPLES FROM MONITORING WELLS MW-1 THROUGH MW-8

Sheet 2 of 3

Constituent	Concentration (ug/L) and Well Number							
	1	2	3	4	5	6	7	8
** Sampled by Respondent in May and June 1985[e]								
Aroclor-1254	<1.0	<1.0	<1	<1.0	1.1	<1	<1	<1.0
Arsenic	<10	<10	<10	<10	19.	15.	30.	80.
Barium	302.	243.	360.	253.	614.	915.	400.	600.
Chloroform	10.6	<10	<1.6	<10	<1.6	<1.6	<1.6	<10
Chromium	30.	<30	<20	<30	<20	<20	<20	<30
Cyanide, Total	72.	<25	<25	<25	<25	120.	<25	<25
Copper	<10	<10	<10	<10	<10	20.	<10	<10
Dinoseb	1130	<25	<10	<25	<10	<10	<10	<25
Mercury	<0.2	<0.2	<0.2	<0.2	0.2	0.2	<0.2	<0.2
Nickel	30.	<20	<20	<20	<20	<20	<20	<20
Pentachlorophenol	34	<25	<3.6	<25	<3.6	<3.6	<3.6	<25
Trichloroethene	19.5	<10	<1.9	<10	<1.9	<2.8	<1.9	<10

Notes:

a Data reproduced from Dick Karkkainen, Vertac Chemical Corporation, January 13, 1984. Analytical Results for Ground-Water Sampling of Well Numbers 1, 2, 5, 6, 7, and 8, Taken in November 1983 at the Vicksburg Plant. Letter to Charles Estes, MDNR.

b Data reproduced from James P. Minyard, Jr., Mississippi State Chemical Laboratory, December 16, 1983. Analytical Results for Vertac Well Water Samples Taken November 9, 1983.

c Data reproduced from Dick Karkkainen, Vertac Chemical Corporation, March 9, 1984. Analytical Results for Ground-Water Sampling at the Vicksburg Plant. Letter to Chuck Estes, MDNR.

d Data reproduced from Mississippi State Chemical Laboratory, Mississippi State University, February 18, 1985. Analytical Results of Ground-Water Samples from Vertac Chemical Wells #1 and #8.

e Data reproduced from John G. Hill, Vertac Chemical Corporation, September 4, 1985. Appendix VIII Analytical Results for Ground-Water Monitoring Wells at the Vicksburg Plant. Letter to Charles Estes, MDNR.

TABLE 2

SUMMARY OF ANALYSES OF WATER SAMPLES FROM MONITORING WELLS MW-1 THROUGH MW-8

Sheet 3 of 3

Notes (Continued):

f --; A hyphen indicates that the well was not sampled

g NR - not reported. These wells were reported to be sampled, but the data were not reported.

h ND - not detected.

i This value is semi-quantitative because of interference peak.

j These values are the results of averaging four measurements.

Barium was detected in all wells. Wells MW-5 and MW-8 showed barium concentrations twice as high as background, and well MW-6 showed barium three times higher than background.

Arsenic was detected in wells MW-5 (19 ug/L), MW-6 (15 ug/L), MW-7 (30 ug/L), and MW-8 (80 ug/L).

Cyanide was detected in well MW-1 (total - 72 ug/L) and well MW-6 (120 ug/L).

18. On several occasions in 1985, 1986, and 1987, dinoseb was detected in these wells ranging from 1130 ug/L in MW-15 on February 6, 1987, to 265 ug/L in well MW-1A on July 28, 1987 (see Table 3).

* 19. On August 20, 1985, EPA conducted a Preliminary Assessment/Site Investigation (PA/SI) at the Facility. The report stated that prior to and after closure of the inactive landfill several contaminated seeps or run-off streams were observed near Hennesseys Bayou.

* 20. On November 22, 1985, EPA conducted a loss of interim status inspection to verify that CCC was no longer placing hazardous waste in the surface impoundment at the south plant.

21. On August 6, 1986, EPA inspected the container storage area and adjacent returned product storage area at CCC. During the inspection, EPA noted that both areas had large spills on the ground. Floor drains and sumps in the container storage area were overflowing with waste-contaminated rain water. Spills were apparent by the presence of yellow and black stained areas on the ground.

22. During the August 6, 1986, there were 28 30-gallon drums of monosodium methane arsenate (MSMA) and 60 to 200 other drums of various sizes (55 - 75 gallons) containing dinoseb, MSMA, and other wastes. Many of the drums of dinoseb were leaking.

* 23. On September 3, 1986, MBPC conducted sampling to determine if hazardous wastes were entering the surface impoundment through spills from process areas. Dinoseb, atrazine and several metals were present in most of the samples. A summary of the results is presented in Table 4 and discussed below:

The highest concentrations of dinoseb were found in sediment at the returned product storage area (330,000 mg/L) and the sediment in cell 1 of the surface impoundment (13,000 mg/L). Dinoseb was also detected in the water samples taken from: (1) the sump below the dinoseb drumming area (260 mg/L), (2) the sump northwest of the dinoseb plant (300 mg/L), (3) the sump near the returned product storage area (130 mg/L), and (4) the influent pipe to the surface impoundment (8 mg/L).

TABLE 3

ANALYSES OF WATER FROM SEVERAL WELLS FOR DINOSEB

Date	Dinoseb Concentration (ug/L) MW-1	MW-1A	MW-9	MW-15
October 15, 1985[a]	370.	--*	--	--
December 6, 1985[a]	600.	--	125.	--
March 5, 1986[b]	940.	--	<40	--
July 28, 1986[c]	--	265.	--	--
July 29, 1986[c]	--	380.	--	--
February 6, 1987[d]	--	290.	<40	1130.

Notes:

a Data reproduced from IT Corporation, January 8, 1986. Final Report, Groundwater Assessment Program, Prepared for Vertac Chemical Corporation, Vicksburg, Mississippi, IT Corporation Project No. 846545-02.

b Data reproduced from John G. Hill, Environmental Engineer, Vertac Chemical Corporation, March 12, 1986. Letter to Jack McCord, Mississippi Department of Natural Resources, Bureau of Pollution Control, Industrial Wastewater Section. Subject: Latest Analytical Results.

c Data reproduced from John G. Hill, Environmental Engineer, Vertac Chemical Corporation, August 4, 1986. Letter to Jack McCord, Mississippi Department of Natural Resources, Bureau of Pollution Control, Industrial Wastewater Section. Subject: Analytical results of groundwater samples from monitoring well MW-1A.

d Data reproduced from John G. Hill, Cedar Chemical Corporation, February 16, 1987. Letter to Jack McCord, Mississippi Department of Natural Resources, Bureau of Pollution Control, Industrial Wastewater Section. Subject: Commission Order No. 1046-86.

* A double hyphen (--) represents wells not sampled, data not reported, or not detectable

TABLE 4

SUMMARY OF RESULTS OF DINOSEB FLOW STUDY

Sample Location ID Letter[a]	Sample Type/Location[b]	Dinoseb	Atrazine	Total Chromium	Total Arsenic	Total Lead	Barium	Cadmium	Selenium
A	Water; Influent pipe to surface impoundment	8.	0.03	0.03	0.29	0.008	0.04	0.02	<0.003
B	Sludge; SI Cell No. 1	13,000.	5.	123.	362.	142.	64.2	1.90	2.58
C	Water; SI Cell No. 2	6.	0.03	0.05	0.74	0.01	0.06	0.01	0.05
C	Sludge; SI Cell No. 2	5.8	2.6	10.2	21.	5.3	49.3	1.20	0.50
D	Water; sump at returned product storage area	130.	15.	0.03	2.47	0.05	0.02	0.02	0.01
E	Water; sump below dinoseb drumming area	260.	0.2	108.	0.68	2.9	0.97	0.03	0.11
F	Sediment; returned product storage area	330,000.	ND[c]	47.1	44.3	16.7	78.5	5.5	4.06
G	Soil; northwest of dinoseb plant	96.	ND	40.1	27.8	170.	71.5	3.0	1.27
H	Water; sump northwest of dinoseb plant	300.	0.01	<0.3	0.02	0.02	0.05	0.01	<0.03

Notes:

Data reproduced from Jack McCord, MDNR, September 22, 1986. Memorandum to file. Subject: September 3, 1986 sampling trip to Vicksburg Chemical.

a Sample location identification letters are used in Figure 6.

b Concentrations of chemicals in water are reported in mg/L. Concentrations of chemicals in soil or sludge are reported in mg/kg.

c ND -- not detected.

Atrazine, arsenic, chromium, and lead concentrations of 5, 362, 123, and 142 mg/L, respectively, were detected in the surface impoundment sludge.

Concentrations of 15, 2.47, 0.03, and 0.05 mg/L, respectively, were detected in the sump water near the returned product area.

Concentrations of 0.2, 0.68, 108, and 2.9 mg/L, respectively, were detected in the sump water below the dinoseb drumming area.

Concentrations of 44.3, 47.1, and 16.7 mg/L, respectively, of arsenic, chromium, and lead were detected in the sediment at the returned product area and concentrations of 27.8, 40.1, and 170 mg/L, respectively, were detected in the soil northwest of the dinoseb plant.

* 24. On October 31, 1986, MBPC conducted a sampling investigation in CCC's surface impoundment. Eleven composite samples were collected and analyzed. The highest concentration of contaminants was found at depths of two to four feet. Contaminants found include arsenic ranging from 7.1 to 216 mg/kg, atrazine from 5 to 78,000 mg/kg, Arochlor - 1254 (PCB - 1254) from non-detectable to 58.4 mg/kg, Dinoseb from 3.7 to 5910 mg/kg, and toxaphene from non-detectable to 2320 mg/kg (see Table 5).

25. On February 19, 1987, EPA inspected CCC and noted two inches of standing yellow liquid in the dinoseb production area. At two locations, the liquids had apparently overtopped the production area berm and were running into a catch basin. Previously, the catch basin had drained to the surface impoundment.

26. In February 1987, EPA conducted a sampling investigation at CCC. Groundwater samples, streamwater samples, sediment samples and soil samples were all taken. Numerous chemical compounds were detected in these samples.

Samples from monitoring well MW-1 showed eleven organic compounds, including: tetrachlorophenol (2ug/L), dinoseb (562 ug/L), atrazine (26 ug/L), trichloroethene (8.5 ug/L) and pentachlorophenol (68 ug/L) (see Table 6).

Five organic compounds were detected in well MW-8 including: cyanazine (0.82 ug/L), and atrazine (63 ug/L) (see Table 6).

Two organic compounds were detected in MW-2: phenol and petroleum products (see Table 6).

Three organic compounds were detected in MW-6: cyanazine, atrazine and petroleum products (see Table 6).

TABLE 5

SUMMARY OF RESULTS OF SURFACE IMPOUNDMENT SEDIMENT STUDY (MG/KG)

Composite Samples Sample Numbers	Arsenic	Atrazine	Aroclor 1254	Dinoseb	Toxaphene	Others	
** 0 to 2 feet							
1, 1A	114.	8,000.	ND[a]	1,600.	17.5	4-Nitrophenol	70.
2, 5	216.	2,000.	ND	160.	18.1	---	
3, 4	108.	360.	ND	620.	1.8	4-Nitrophenol	30.
6, 7, 8	93.5	220.	ND	15.	1.2	4-Nitrophenol	Trace
9, 10, 11, 12	29.2	13.	ND	11.	ND	---	
13, 14	41.	230.	ND	10.	ND	---	
15, 16	57.8	1,500.	ND	4.	ND	---	
17, 18	16.9	1,000.	51.9	6.	22.	4-Nitrophenol	Trace
						Pentachlorophenol	1.2
19, 20	46.2	300.	4.7	92.	29.	---	
21, 22, 24	50.3	5.	9.2	60.	4.6	---	
23, 25	96.5	--	33.8	--	42.9	---	
** 2 to 4 feet							
1, 1A	143.	3,900.	ND	5,910.	2,320.	Methyl Parathion	400.
2, 5	66.9	78,000.	ND	330.	541.	---	
3, 4	40.1	30,000.	ND	1,100.	381.	4-Nitrophenol	80.
6, 7, 8	7.9	15,000.	ND	25.	6.3	2,4-Dinitrophenol	Trace
						4-Nitrophenol	Trace
** 4 to 6 feet							
1, 1A	43.8	21,000.	ND	64.	536.	1,2-Dichlorobenzene	20.
						Methyl Parathion	400.
2, 5	7.1	3,000.	58.4	40.	223.	---	
3, 4	14.5	9,000.	ND	770.	680.	---	
6, 7, 8	9.0	8,000.	37.1	170.	322.	---	

Notes:

Data reproduced from Reproduced from Mississippi State Chemical Laboratory, Mississippi State University, November 18, 1986. Analytical Results of 19 Sediment Samples from Vicksburg Chemical Company.

a ND - Not detected.

TABLE 6

GROUND-WATER DATA - SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (ug/L)	MW-1	MW-2	MW-4[a]	MW-6	MW-8	P-01[b]
Aluminum	1900.	26,000.	3,000.	6,600.	920.	1,100.
Arsenic	--	--	--	--	67.	140.
Barium	270.	450.	250.	600.	470.	37.
Chromium	38.	64.	--	11.	--	75.
Nickel	22.	--	--	--	--	--
Strontium	760.	560.	250.	610.	350.	85.
Zinc	--	91.	16.	21.	--	13.
Cyanide	--	NA	--	8.	--	--
Atrazine	26.	--	--	3.9	63.	29.
Bromacil	3JN	--	--	--	--	--
Bromodichloromethane	--	--	--	--	--	6.7
Carbon tetrachloride	--	--	--	--	--	70.
Chlorobis(methylethyl)-triazinediamine	--	--	--	--	3JN	--
Chloroform	2.8J	--	--	--	--	42.
Cyanazine	6.6J	--	--	1.2	0.82	1.3
Dibromochloromethane	--	--	--	--	--	4.2J
Dinoseb	562.	--	--	--	--	200JN
Methyl parathion	--	--	--	--	--	0.011J
Phenol	--	1.0J	--	--	--	--
Pentachlorophenol	68.	--	--	--	--	--
Petroleum product	N	N	--	N	N	--
Tetrachlorophenol	2JN	--	--	--	--	--
Trichloroethene	8.5	--	--	--	--	4.2J
Vinyl chloride	--	--	--	--	2.5J	--

Notes:

Data reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

a Upgradient well, used for comparison to wells downgradient of waste management units.

b Sample of influent liquid into surface impoundment.

-- Material was analyzed for but not detected.

J -- Estimated value.

N -- Presumptive evidence of presence of material.

NA -- Not analyzed

Soil sample CC-01 contained organic compounds including: toxaphene (6700 ug/kg), cyanazine (6000 ug/kg) and atrazine (100,000 ug/kg). Ten polynuclear aromatic hydrocarbons (PAH total - 33,890 ug/kg) and arsenic (53 mg/kg) were also detected (see Table 7).

Soil sample CC-02 contained the following organic compounds: atrazine (5000 ug/kg), cyanazine (240 ug/kg), and toxaphene (3700 ug/kg) (see Table 7).

Soil sample CC-03 contained organic compounds including: atrazine (5400 ug/kg), and cyanizine (30 ug/kg). Ten PAH compounds were also identified in the soil (total PAH - 11,920 ug/kg). Metals detected included arsenic (19 mg/kg) and mercury (0.1 mg/kg) (See Table 7).

Soil sample CC-04 contained organic compounds including: atrazine (4000 ug/kg), dinoseb (640,000 ug/kg) and eight PAH compounds (total PAH - 18,900 ug/kg) (see Table 7).

Soil sample CC-05 contained organic compounds including: atrazine (32 ug/kg), dinoseb (12,000 ug/kg), and toxaphene (47,000 ug/kg). PAH compounds found totalled 3100 ug/kg (see Table 7).

Soil sample CC-06 contained organic compounds including: atrazine (25 ug/kg) and Arochlor - 1254 (200 ug/kg). Metals were also detected including: arsenic (10 mg/kg) and mercury (0.25 mg/kg) (see Table 7).

Water sample A-3 and sediment sample A-3S contained numerous organic compounds including: atrazine (0.64 ug/L) and Arochlor - 1254 (3 ug/L) (see Table 8 and 9).

Water sample A-2 contained atrazine (0.18 ug/L), and diethyltetrahydrofuran (7 ug/L) and sediment sample A-2S contained Arochlor -1254 (3700 ug/kg) (see Table 8 and 9).

Water sample E-1 contained arsenic (89 ug/L), atrazine (26 ug/L), cyanasine (6.8 ug/L), dinoseb (4.6 ug/L) and trichloroethene (11 ug/L). Sediment sample E-1S contained arsenic (44 ug/kg), atrazine (970 ug/kg), pyrene (600 ug/kg), Arochlor - 1254 (7400 ug/kg) and toxaphene (56,000 ug/kg) (see Table 8 and 9).

Additional compounds were found in water and sediment samples as shown in Table 8 and 9.

27. In February 1989, EPA again conducted a sampling investigation at CCC. The investigation included groundwater and soil samples. Generally the samples again showed contamination with organics and metals (see Tables 10 and 11).

TABLE 7

SOIL DATA - SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (mg/kg)	CC-01	CC-02	CC-03	CC-04	CC-05	CC-06
Aluminum	6,000	4,500	11,000	7,200	8,800	6,200
Arsenic	53	550	19	18	27	10J
Barium	100	72	150	100	140	210
Chromium	44	14	27	37	18	12
Mercury	--	--	0.1	--	--	0.25
Strontium	34	190	35	39	35	48
Zinc	53	130	65	75	94	35
(ug/kg)						
Atrazine	100,000JN	5,000	5,400	4,000	32J	25J
Cyanazine	6000JN	240	30J	--	--	--
Dinoseb	--	--	--	640,000	12,000	--
Heptachlor epoxide	38	--	--	--	--	--
Methyl ethyl ketone	--	--	--	23J	--	--
Arochlor-1254	--	--	710	--	--	200
Propazine	7,000JN	--	3,000JN	--	--	--
Toluene	--	--	--	3.8J	--	--
Toxaphene	6,700	3,700	--	--	47,000	--
Total PAHs	33,890	--	11,920	18,900	3,100	--
Total xylenes	--	--	--	2.8J	--	--

Notes:

Data reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

J = Estimated value.

N = Presumptive evidence of presence of material.

TABLE 8

STREAM WATER DATA - SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (ug/L)	A-1	A-2	A-3	B-1	B-2	C-1	D-1	E-1
Aluminum	260	370	1,100	440	780	3,900	2,900	420
Arsenic	--	--	--	--	--	--	--	89
Barium	80	120	220	170	170	170	160	170
Cyanide	6	--	--	--	--	--	--	--
Atrazine	--	0.18N	0.64JN	--	--	0.20N	0.28N	26A
Bromocyclohexene	--	--	1JN	--	--	--	--	--
Bromodichloromethane	3.3J	1.7J	1J	--	11	--	--	--
Carbon tetrachloride	--	--	--	--	--	--	1.3J	--
Chloroform	5.1	4.9J	16	--	14	--	2J	--
Chlorocyclohexanol	--	--	5JN	--	--	--	--	--
Chlorobis(methylethyl)-triazinediamine	--	--	--	--	--	--	--	3JN
Cyanazine	--	--	--	--	--	--	--	6.8A
Dibromochloromethane	2.7J	1.2J	--	--	--	--	--	--
Dichlorocyclohexane	--	--	70J	--	--	--	--	--
Diethyltetra-hydrofuran	--	7JN	10JN	--	--	--	--	--
Dihydroindolone	--	--	4JN	--	--	--	--	--
Dinoseb	--	--	--	--	--	--	--	4.6AN
Heptanol	--	--	8JN	--	--	--	--	--
Nitrosomorpholine	--	--	1JN	--	--	--	--	--
Arochlor-1254	--	--	3.0	--	--	--	--	--
Trichloroethane	--	--	--	--	--	--	--	11
Tri(butoxyethanol)-phosphate	--	--	--	3JN	5JN	--	--	--
Toluene	0.8J	--	--	--	--	--	--	--
Three unidentified compounds	--	--	70J	--	--	--	--	--

Notes:

Data reproduced from U.S. Environmental Protection Agency, February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

A = Average value.

J = Estimated value.

N = Presumptive evidence of presence of material.

TABLE 9

STREAM SEDIMENT DATA - SUMMARY OF HAZARDOUS CONSTITUENTS FEBRUARY 1987

Parameter (mg/kg)	A-1s	A-2s	A-3s	B-1s	B-2s	C-1s	D-1s	E-1s
Aluminum	7,400	11,000	4,500	5,500	8,400	13,000	11,000	5,000
Arsenic	--	9.2	--	--	--	6.0	6.9	44
Barium	120	260	220	120	130	62	170	96
Chromium	13	22	97	17	14	12	17	71
Nickel	11	21	14	8.4	13	7.0	16	9.6
Lead	14	20	13	46	21	11	15	8.8
Mercury	--	0.12	--	--	--	--	--	--
Strontium	33	24	84	51	28	19	29	35
Zinc	66	78	35	51	62	19	52	41
ug/kg								
Atrazine	--	--	--	--	--	--	--	970
Chloroform	--	--	8.4	--	--	--	--	--
Chrysene	1,300J	--	--	--	--	--	--	--
Fluoranthene	1,300J	--	--	--	--	--	--	--
PCB-1254	--	3,700	--	--	--	--	--	7,400
Pyrene	1,400J	--	--	--	--	--	--	660J
Toluene	--	--	--	--	38	--	--	--
Total unidentified alkylhydrocarbons	--	--	--	--	200J	--	--	--

Notes:

Data reproduced from U.S. Environmental Protection Agency February 1987. RCRA Environmental Investigation, Cedar Chemical Company, Vicksburg, Mississippi.

A = Average value.

J = Estimated value.

N = Presumptive evidence of presence of material.

Cyanide was detected in well MW-6 at a concentration of 0.006 mg/L.

Atrazine, cyanazine, and propazine was detected in MW-6 at concentrations of 17 ug/L, 47 ug/L and 2.6 ug/L, respectively.

Cyanide was present in samples CC-3 at a concentration of 01.14 mg/kg and CC-4 at a concentration of 58.0 mg/kg.

Dinoseb at a concentration of 15 ug/kg was detected in the background soil sample. It was also present in the other four samples collected at concentrations ranging from 96 ug/kg to 380,000 ug/kg in samples CC-2 and CC-4, respectively.

From one to six additional pesticide/PCB compounds were detected in these four samples. These ranged in concentration from 53 ug/kg for heptachlor epoxide in sample CC-1 to 140,000 ug/kg for toxaphene in sample CC-4.

One extractable organic compound (EOC) was detected in one well sample. Thirteen EOCs were detected in one soil sample and two to four in the rest. One EOC, (methylpropyl)dinitrophenol, was found at high concentrations in three of the five soil samples.

II
CONCLUSIONS OF LAW

Based on the Findings of Fact set out above, the Director of the Waste Management Division, Region IV, EPA, concludes that:

1. Cedar Chemical Corporation (CCC) is a person within the meaning of Section 1004 (15) of RCRA, 42 U.S.C. Section 6903 (15).

2. CCC is an owner and operator of the Vicksburg facility.

3. The Vicksburg facility was authorized to operate under Section 3005(e) of RCRA, 42 U.S.C. Section 6925(e).

4. Certain wastes and waste constituents found at the CCC Facility are hazardous wastes and constituents thereof, as defined by Section 1004 (5) of RCRA, 42 U.S.C. Section 6921, and 40 C.F.R. Part 261.

III
DETERMINATIONS

Based on the Findings of Fact and Conclusions of Law set out above, the Director of the Waste Management Division, Region IV, EPA determines that:

1. There is or has been a release of hazardous wastes and/or hazardous constituents into the environment from the CCC Facility.

TABLE 10

ANALYTCAL DATA SUMMARY (GROUND WATER)
CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI
FEBRUARY 1989

	CC-TB TRIP BLANK 02/01/89 1610	MW-4 UPGRADNT WELL 01/31/89 1230	MW-16 NEW WELL 01/31/89 1545	MW-6 DOWNGRAD WELL 02/01/89 0930	MW-7 DOWNGRAD WELL 02/01/89 1000	MW-2 DOWNGRAD WELL 02/01/89 1540
INORGANIC ELEMENTS	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
CALCIUM	--	97	74	220	100	150
IRON	--	0.59	3.8	3.9	3.4	3.8
MAGNESIUM	--	43	29	120	46	63
SODIUM	--	15	12	28	16	28
	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ALUMINUM	--	620	410	3200	1300	2600
BARIUM	--	210	320	420	290	260
CHROMIUM	--	--	--	10	--	--
COBALT	--	--	--	19	--	--
MANGANESE	--	340	190	340	1100	480
STRONTIUM	--	230	270	490	310	460
TITANIUM	--	30	17	130	48	130
ZINC	--	13	20	22	15	36
GENERAL INORGANIC PARAMETERS	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
CYANIDE	--	--	--	.006	--	--
PESTICIDE/PCB COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
ATRAZINE	--	--	--	17C	--	--
CYANAZINE	--	--	--	47C	--	--
DINOSEB (DNBP)	--	--	--	1.2	1.2	--
PROPAZINE	--	--	--	2.6C	--	--
EXTRACTABLE ORGANIC COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
CHLOROBIS(METHYLETHYL)TRIAZINEDIAMINE	--	--	--	2JN	--	--
PURGEABLE ORGANIC COMPOUNDS	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
1,1,1-TRICHLOROETHANE	--	--	--	--	0.60J	--
CIS-1,2-DICHLOROETHENE	--	--	--	--	--	3.6J
TRICHLOROETHENE(TRICHLOROETHYLENE)	--	--	--	--	--	1.1J

FOOTNOTES

- NA - NOT ANALYZED
- J - ESTIMATED VALUE
- N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
- -- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED
- C - CONFIRMED BY GC/MS

TABLE 11

ANALYTICAL DATA SUMMARY (SOIL)
CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI
FEBRUARY 1989

	CC-BG BACKGND SOIL 02/01/89 1300	CC-1 S. END OF PLANT 02/01/89 1310	CC-2 S.E. END IMPOUND 02/01/89 1355	CC-3 S.E. END LANDFILL 02/01/89 1420	CC-4 SW OF MW-10 02/01/89 1500
INORGANIC ELEMENTS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
ALUMINUM	19000	8200	7800	12000	7100
ARSENIC	--	13	--	--	7.2
BARIUM	140	96	120	120	110
CALCIUM	1700	31000	30000	28000	31000
CHROMIUM	18	22	12	16	36
COBALT	6.7	3.5	4.3	6.2	2.9
COPPER	17	14	12	13	26
IRON	24000	20000	13000	16000	16000
LEAD	--	--	17	14	49
MAGNESIUM	3400	14000	15000	13000	8200
MANGANESE	730	420	460	530	220
MERCURY	--	--	--	--	0.56
MOLYBDENUM	--	--	--	--	2.5
NICKEL	19	12	12	15	13
POTASSIUM	1900	1100	1100	1400	910
SODIUM	--	--	870	380	270
STRONTIUM	22	28	32	29	32
TITANIUM	510	240	360	280	300
VANADIUM	44	22	22	28	19
YTTRIUM	11	8.2	9.0	11	6.9
ZINC	69	43	59	43	82
GENERAL INORGANIC PARAMETERS	MG/KG	MG/KG	MG/KG	MG/KG	MG/KG
CYANIDE	--	--	--	0.14	58.0A
PESTICIDE/PCB COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
ATRAZINE	--	680J	200JN	100J	6800J
DIELDRIN	--	--	--	--	530J
DINOSEB (DNBP)	15	230000	96	57000	380000
ENDRIN	--	--	--	--	1500J
ENDRIN KETONE	--	--	--	--	430
HEPTACHLOR EPOXIDE	--	53	--	--	--
METHYL PARATHION	--	1300	--	--	820J
TOXAPHENE	--	48000	--	--	140000JN
EXTRACTABLE ORGANIC COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
4-NITROPHENOL	--	920J	--	--	--
BENZO(B AND/OR K)FLUORANTHENE	--	290J	--	--	--
BENZO(GHI)PERYLENE	--	100J	--	--	--
CHRYSENE	--	180J	--	--	--
FLUORANTHENE	--	310J	--	--	--
HEXACHLOROBENZENE (HCB)	--	140J	--	--	--
PHENANTHRENE	--	190J	--	--	--
PYRENE	--	260J	--	--	--
(METHYLPROPYL)DINITROPHENOL	500JN	400000JN	200000JN	200JN	6E7JN
1 UNIDENTIFIED COMPOUND	--	--	--	--	200000J
2 UNIDENTIFIED COMPOUNDS	--	10000J	--	--	--
BUTYLDINITROANISOLE	--	10000JN	--	--	--
DIMETHYLHEPTANONE	--	--	600JN	800JN	--
HEXADECANOIC ACID	400JN	300JN	800JN	800JN	--
METHOXYNITROBENZENE	--	800JN	--	--	--
OCTANOIC ACID	--	--	300JN	200JN	--
PURGEABLE ORGANIC COMPOUNDS	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
ACETONE	--	--	--	--	330J
METHYL ETHYL KETONE	--	--	--	--	94J
O-XYLENE	--	--	--	--	9.9J
FOUR UNIDENTIFIED COMPOUNDS	--	--	--	300JN	--
TRIMETHYLBENZENE	--	--	--	--	30JN

FOOTNOTES
- A - AVERAGE VALUE
- NA - NOT ANALYZED
- J - ESTIMATED VALUE
- N - PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
- -- - MATERIAL WAS ANALYZED FOR BUT NOT DETECTED

2. Corrective action will be required to protect human health and the environment.

Patrick M Tobin

Patrick M. Tobin, Director
Waste Management Division
United States Environmental
Protection Agency
Region IV

10-16-89

Date

Sav

CHARLES W. METCALF, 1840-1924
WILLIAM P. METCALF, 1872-1940
JOHN W. APPERSON, 1896-1985

CHARLES METCALF CRUMP
JERRE G. DUZANE
JOHN B. MAXWELL, JR.
ALLEN T. MALONE
PHILIP G. KAMINSKY
ROBERT L. DINKELSPIEL
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December 22, 1992

RECEIVED
DEC 28 1992
Dept. of Environmental Quality
Office of Pollution Control

Ms. Karen S. Dworkin
Environmental Enforcement Section
Land & Natural Resources Division
U. S. Department of Justice
P. O. Box 7611 Ben Franklin Station
Washington, D. C. 20530

Zlypha K. Pryor, Esq.
Associate Regional Counsel
U. S. Environmental Protection Agency
Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Re: Consent Decree
<u>United States of America v. Cedar Chemical Corporation</u>, Case No. W92-0008
In the United States District for the Southern District of Mississippi

Dear Counsel:

As confirmed by telephone this week, the Directors of Cedar Chemical Corporation have decided to incorporate Cedar's Vicksburg Chemical Division. When the reorganization is complete, Vicksburg Chemical Company will operate the Vicksburg Plant as a wholly-owned subsidiary of Cedar Chemical Corporation. Cedar, of course, will continue to be responsible for carrying out the provisions of the Consent Decree, although its subsidiary, Vicksburg Chemical Company, and its employees will be directly involved in that effort.

The requirements of the Consent Decree contained in Article III and Article XV with respect to Cedar's conveyance of the Vicksburg Chemical Plant to Vicksburg Chemical Company have been complied with as evidenced by the enclosed copy of Cedar's letter to Vicksburg Chemical Company's Vice President and Plant Manager.

Ref. 4f

Cedar's Mississippi counsel, Bill Smith, with the firm of Brunini, Grantham, Grower & Hewes, is assisting the Company in obtaining assignment of all of Cedar's environmental permits incident to operations at the Vicksburg Plant to Vicksburg Chemical Company, effective on the day transfer of the assets of Cedar's Vicksburg Chemical Division to Vicksburg Chemical Company shall become effective. The conveyances intended to be effective as of January 1, 1993, subject, however, to subsequent approval of the assignment of Cedar's environmental and operating permits to Vicksburg Chemical Company and subject to recording of the Special Warranty Deed conveying title to the Plant to Vicksburg Chemical Company.

Copies of this letter and the enclosure are being forwarded to persons listed below who are designated to receive notices under the Consent Decree. If either of you has any additional question regarding these matters, please let me know promptly.

Sincerely yours,

Allen T. Malone

ATM:jw

cc: John Dickinson, Chief
Waste Compliance Section
RCRA and FF Branch
U.S. EPA - Region IV
345 Courtland Street, N.E.
Atlanta, Georgia 30365

cc: Chief, Environmental Enforcement Section
Land & Natural Resources Division
U. S. Department of Justice
P. O. Box 7611
Ben Franklin Station
Washington, D. C. 20044

cc: Mr. Sam Mabry, Chief
Hazardous Waste Division
Bureau of Pollution Control
Mississippi Department of
Environmental Quality
P. O. Box 10385
Jackson, Mississippi 39209-0835

CEDAR CHEMICAL CORPORATION

24th Floor • 5100 Poplar Avenue • Memphis, TN 38137 • 901-685-5348

December 22, 1992

Mr. John Miles
Vice President and Plant Manager
Vicksburg Chemical Company
P. O. Box 3
Rifle Range Road
Vicksburg, Mississippi 39180

Re: Consent Decree - United States of America v. Cedar Chemical Corporation No. W92-008, In the United States District Court for the Southern District of Mississippi

Dear John:

In connection with the implementation of the Reorganization Agreement between Cedar Chemical Corporation and its wholly-owned subsidiary, Vicksburg Chemical Company, and particularly in connection with Cedar's intent to convey title to the Plant, property and equipment comprising Cedar's Vicksburg Chemical Division to Vicksburg Chemical Company, this letter is to confirm certain matters required by the above-referenced Consent Decree (the "Consent Decree").

First, pursuant to Article III.D of the Consent Decree, this will confirm that Vicksburg Chemical Company has been given notice of the existance and terms of the Consent Decree. While it is understood that Cedar Chemical Corporation will continue to be liable for the performance of its obligations under the Consent Decree, Vicksburg Chemical Company has assumed those obligations and shall be responsible for carrying them out.

Second, pursuant to Article XV.C of the Consent Decree, this will confirm Vicksburg Chemical Company's agreement to allow employees, contractors and duly designated representatives of the U. S. Environmental Protection Agency and the Mississippi Department of Environmental Quality (as well as Cedar Chemical Corporation) access to the property and facilities identified in the Consent Decree, as required in accordance with the provisions of Article XV of the Consent Decree.

Your signature below will acknowledge and confirm the understandings expressed in this letter. Duplicate copies of this letter are being furnished to representatives and counsel for the U.S. Environmental Protection Agency and the Mississippi Department of Environmental Quality.

Sincerely yours,

John C. Bumpers
Executive Vice President
Finance/Administration

JCB:jw

AGREED TO:

____
John Miles, Vice President
and Plant Manager
Vicksburg Chemical Company

VERTAC CHEMICAL CORPORATION
24th Floor • 5100 Poplar • Memphis, TN 38137 • 901-767-6851 TELEX 53927

AGRONOMIC USE OF

THE NEUTRALIZED SPENT ACID SOLUTION

A PROPOSAL

I. BACKGROUND OF THE PROJECT

As a component to the manufacture of 2-sec-butyl-4,6-dinitrophenol (DNBP), two water washes are performed. This process wash water constitutes what is known as the Spent Acid Solution (SAS). For each pound of DNBP produced, 0.4 gallon of waste water is generated. At present, approximately 4.5 million gallons of this SAS is generated annually.

After the second water wash, the waste water is ammoniated with liquid ammonia and the Neutralized Spent Acid Solution (NSAS) is stored in holding tanks.

Currently there are two methods being utilized to dispose of this waste water. In the first method, under an approved NPDES permit, a small portion of the waste water is filtered through charcoal beds and then is disposed of directly into the Mississippi River. In the second method, the solution is transported to Oklahoma for approved deep well injection.

Analysis of the NSAS showed the solution contained approximately 3.5% nitrogen (as NO_3^- and NH_4^+) and 2.7% sulfur (as $SO_4^=$). These fertilizer components are beneficial for growing crops. The NSAS was analyzed for the acid and base neutral priority pollutants by standard EPA GC/MS Priority Pollutant Methods (EPA 8270) at the Mississippi State Chemical Laboratory. The only listed pollutant detected was 2,4-dinitrophenol at 20 ppm. Confirmed analysis revealed 2-methylbutyric acid at 1400 ppm and DNBP at 210 ppm.

A review of RECRA, Subpart C, Section 261.6 and Subpart D, 261.30, 261.32 and 261.33 for trace quantities of wastes confirms the level of DNBP constitutes no hazard. Under 261.33 (d) we note, "a manufacturing process waste that contains any of the substances listed in paragraphs (e) or (f) is not considered a hazardous waste - under certain conditions." The paragraph (e) referred to contains DNBP.

In order to completely minimize any environmental concerns regarding the use of the NSAS, Vertac investigated procedures necesssary to remove the 2,4-dinitrophenol and DNBP to levels below 1.0 ppm. Satisfactory filtering procedures are now in place which will remove 2,4-dinitrophenol and DNBP to levels below 1.0

Ref. 49

ppm. Samples of the filtered NSAS (FNSAS) from these new procedures have been sent to the Mississippi State Chemical Laboratory where these levels were confirmed to be below the sensitivity of the method for 2,4-dinitrophenol (0.05 ppm) and near the sensitivity of the method for DNBP, 0.04 ppm (the sensitivity of the method for DNBP is 0.03 ppm).

Our proposal as described below is to use this Filtered Neutralized Spent Acid Solution on field crops under very tight controls and restrictions.

~~A proposed label which will accompany each bulk shipment~~ is N/A ~~attached~~.

II. VERTAC PROPOSAL

A. USES

Through various research studies (both controlled field research and laboratory analysis), Vertac Chemical Corporation has demonstrated that the solution can be applied to agronomic crops as a supplemental source of nitrogen and sulfur. The following information contains some of the general parameters that will be used when the FNSAS is transported and applied to field crops.

There are five agronomic/cropping systems that have been selected for major application of the FNSAS (these are: corn, cotton, soybeans, pastures, wheat and other small grains). Applications to corn, cotton and soybeans will be primarily preplant and/or sidedress. The pasture and wheat/small grains will be topical broadcast. Within these cropping systems, there are various intervals within the growing season that the FNSAS will be applied:

Cotton
1. Late fall (Nov.-Dec.) as a fall applied preplant
2. Early spring (March-May) as a spring preplant
3. Mid summer (May-June) side dress as a directed dribble

Corn
1. Fall and winter (Oct.-Feb.) as a preplant
2. Spring (March-April) as a spring preplant
3. Late spring (April-June) side dress as a directed dribble

Soybeans
1. Late spring (April-June) as a preplant
2. Summer (June-July) as a preplant for double crop beans following wheat

Wheat	1.	Late fall (Oct.-Dec.) as an early tiller application
	2.	Early spring (March) during early growth and shoot formation
Pasture	1.	Anytime of the year with fall and spring being the primary treatment periods. If pastureland is being cut for hay, could have treatments approximately 45 days apart between cuttings and up three treatments per growing season.

B. USERS

To ensure that the FNSAS is applied correctly, Vertac has conducted a series of meetings with various growers and application personnel who will be handling and applying the FNSAS. Each participant (including the grower) has been or will be informed on the correct manner of utilizing the FNSAS for maximum benefit of the nutrient content.

Mr. Eddie Smith of Vicksburg, MS is currently being considered as the primary person who will transport and apply the FNSAS to various grower's fields. Mr. Smith has the necessary equipment, background, expertise and personnel to safely and correctly transport and apply the FNSAS.

The following list of growers (all with farms within 15 miles of the Vertac Plant in Vicksburg, MS) have been individually contacted, and have confirmed their desire to have the FNSAS applied to specific crops and acreages, etc:

Mr. Jim Howard
500 acres of common bermudagrass pasture that is cut and baled for hay. Apply FNSAS beginning in early March and two additional treatments approximately 45 days apart.

Mr. Ken Whittington
50 acres of common bermudagrass pasture that will be used primarily for grazing. Apply in early March and keep cattle off treated areas until rainfall. Retreat in fall.

Mr. Luther Barbee
120 acres of common bermudagrass pasture. Same general parameters as Mr. Whittington.

Mr. Eddie Smith
750 acres of winter wheat. Apply FNSAS solution in early March.
1200 acres of field corn. Apply FNSAS in early April as a preplant incorporated treatment.
700 acres of soybeans. Apply FNSAS in early May as a preplant incorporated treatment.

Mr. Lee Pennybaker
1500 acres of cotton. Apply FNSAS in late March as preplant incorporated treatment.

Mr. J. O. Smith
320 acres of common bermudagrass pasture. Same parameters as Mr. Whittington.

Mr. Glen Jones
100 acres of field corn. Apply FNSAS in early April as a preplant incorporated treatment. May retreat in mid season as a post directed dribble.

Mr. Billy Hackler
50 acres of common bermudagrass pasture. Same parameters as Mr. Whittington.

Mr. Jim Berryman
160 acres of common bermudagrass pasture. Same parameters as Mr. Whittington.

Mr. Richard Templeton
250 acres of common bermudagrass pasture. Same parameters as Mr. Whittington. Will retreat in the fall.

Mr. Tommy Middleton
45 acres of common bermudagrass. Treat with two applications. One spring and one fall applied.
250 acres corn. Apply FNSAS as spring preplant and incorporate.

In addition to the above individuals there have been several other area cotton, soybean and pasture/wheat growers that are very interested in utilizing the FNSAS. Their estimated acreages total approximately 2500 acres.

C. APPLICATION EQUIPMENT

Transport Trucks

Currently, the NSAS is transported from the plant to the deep well injection site in tanker trucks with 5,000 gallon stainless steel tank cars. These trucks are widely used in transporting chemical solutions within all aspects of the chemical industry.

In the proposed transport of the FNSAS from the Vicksburg plant to the various application sites within Warren County, MS, similar transports will be used. Two 5,000 gallon tankers will be solely dedicated for this purpose. It will be necessary to utilize two rigs in order to keep an uninterrupted supply of FNSAS at the application sites. While one transport is at the application site, the other will be in transit to the plant to be filled and then returned to the field. As the other truck becomes empty, it applicator spray tanks during the loading process. This will filter any debris (rust, leaves, etc.) that may be in the FNSAS. By filtering the solution, the possibility of stopping up the spray boom would be eliminated. The personnel involved in transporting and applying the FNSAS will be trained and knowledgeable in all aspects of agrochemical application. They will be required to be certified private applicators within the State of Mississippi.

E. HANDLING PRECAUTIONS

As with any agrochemical application, persons involved in the handling, transport and application of FNSAS will use normal safety practices.

Analysis of the FNSAS shows the material has a pH between 8.6-9.2. This alkaline pH, due to the presence of aqua ammonia could cause a mild skin irritation if the FNSAS is allowed to come into contact with the skin for a prolonged period of time. All personnel handling the FNSAS will be and required to thoroughly wash exposed skin areas immediately after such exposure.

F. DISCLAIMER

The filtered Neutralized Spent Acid Solution is being provided to farmers under a strict set of limitations and guidelines. Through research studies, Vertac has shown that the FNSAS may be used as an additional source of nitrogen and sulfur to agronomic crops and pastures. It should be kept in mind that the nutrient content of the FNSAS is low. It contains approximately 3.5% nitrogen (in both the NO_3^- and NH_4^+ forms) and approximately 2.7% sulfur (in the $SO_4^=$form). In addition to FNSAS Applications, soil analysis and proper application of N-P-K and trace elements are recommended as part of the basic crop production program.

swill return to the Vicksburg plant for the repeat loading process.

The transport trucks will be equipped with appropriate dedicated hoses, valves, pumps, etc. to ensure complete containment of the FNSAS during loading, transporting and the unloading process.

Once the transport truck has arrived at the application site, and is ready to unload, a discharge pump will be used for pumping the FNSAS into the applicator rig.

Application Sprayers

Two high volume sprayer units will be utilized in applying the FNSAS to fields. These units will be modified to deliver rates between 150 and 250 gallons per acre. The application sprayers will have a 1,500 gallon stainless steel tank, a 3 inch positive displacement Roper pump, and will be designed with application booms that will be 40 feet in length fully extended. A total of 3 T junctions will be tapped into the booms (one for each wing of the boom and one in the center) to ensure even pressure and application rates.

The sprayers will have wide floatation tires to keep subsoil compaction and tire tracks at a minimum within the treated fields.

The spray booms will be made of one inch diameter carbon steel and will have 1/4 inch holes drilled every three inches apart. This design will allow a uniform placement of the FNSAS. Each section of the boom will have a cutoff valve that will be turned off when the sprayer is making turns at the end of the field or when the sprayer is not in use. The sprayers will be equipped with foam marking devices on each end of the spray boom and these will be used during all applications. This will ensure even, uniform applications throughout the field.

The spray units will be be solely used for applications of the FNSAS and will not be used for application of any other agrichemicals.

D. HANDLING AND STORAGE

The NSAS is currently stored in a 1.5 million gallon storage tank at the Vertac Vicksburg plant. To load, the NSAS will be pumped from the storage tank through the processing unit (filters) and then directly into the transports. Personnel are required to wear safety goggles, gloves and suitable clothing to prevent accidental exposure to the skin. The same precautions will be utilized when the FNSAS is being transported and applied to field sites.

No modifications will be needed at the Vicksburg plant regarding the storage or filling of transport trucks with the FNSAS, except that a filtering screen (20-30 mesh) will be placed on top of the

DATE: 01/06/94

VERTEC CHEMICAL SITE WARREN CO.

LOCAL WELL NUMBER	LAND-NET LOCATION	LATITUDE (DEGREES)	LONGITUDE (DEGREES)	PRIMARY USE OF WATER	DEPTH OF WELL (FEET)	TOP OF OPEN INTERVAL (FEET)	BOTTOM OF OPEN INTERVAL (FEET)	DISCHARGE (GPM)	AQUIFER CODE	WATER LEVEL (FEET)	DATE WATER LEVEL MEASURED
~~J031 SAM P NEWMAN~~	~~----S15T16NR03E~~	~~322110~~	~~905645~~	~~H~~	~~75.0~~	~~70.00~~		~~15.00~~			
~~K018 BEULOW~~	~~SWNWS19T16NR05E~~	~~322105~~	~~905065~~	~~H~~					~~--~~	~~20.00~~	~~09-01-68~~
M002 MUNICIPAL AIRPORT	NWNES37T15NR03E	321415	0905539	H	960	--	--	--	124CCKF	4.00	03-01-63
~~M005 SOU TRAILER~~	~~----S20T15NR03E~~	~~321520~~	~~905515~~	~~U~~							
~~M006 USCE~~	~~NWNES13T15NR03E~~	~~321742~~	~~905211~~								
~~M007 USCE WGC 2~~	~~NWNES13T15NR03E~~	~~321743~~	~~905212~~	~~U~~							
M018 JACK B SMITH	----S12T15NR03E	321715	905300	H	165	159.00	--	7.00	122CTHL	28.00	02-01-74
~~M021 FISHER FERRY W DST~~	~~----S42T15NR03E~~	~~321407~~	~~905142~~								
M022 GEORGE LEE	SWSWS12T15NR03E	321711	905324	H	70.0	50.00	70.00	8.00	122CTHL	50.00	03-17-81
M023 USCE WES	NENES13T15NR03E	321742	905139	H	284	207.00	217.00	10.00	123FRHL	109.00	08-13-82
~~M024 USCE WATERWAYS~~	~~NENES13T15NR03E~~	~~321744~~	~~0905141~~			222.00	232.00	--	--		
~~N015 KIRBY DAILY~~	~~----S29T15NR04E~~	~~321425~~	~~905020~~	~~H~~	~~133~~	~~128.00~~	~~--~~	~~3.00~~	~~--~~	~~100.00~~	~~12-01-68~~
N020 H H WILKS	----S06T15NR04E	321810	905110	S	128	122.00	--	--	--	32.00	10-01-60
N021 R M TOMPKINS	----S07T15NR04E	321729	905103	H	110	105.00	--	12.00	122CTHL	40.00	04-01-72
~~N028 FISHER FERRY W DST~~	~~NENWS29T15NR04E~~	~~321524~~	~~905001~~								

Ref. 5

AQUIFER CODE EXPLANATION

112MRVA	Mississippi River alluvial aquifer
121CRNL	Citronelle Formation
121GRMF	Graham Ferry Formation
122MOCN	Miocene Series, undifferentiated
122PCGL	Pascagoula Formation
122HBRG	Hattiesburg Formation
122CTHL	Catahoula Formation
122CTHLU	Catahoula Formation, Upper
122CTHLM	Catahoula Formation, Middle
122CTHLL	Catahoula Formation, Lower
123WSBR	Waynesboro Sand
123VKBG	Vicksburg Group
123FRHL	Forest Hill Sand
124CCKF	Cockfield Formation
124SPRT	Sparta Sand
124TLLT	Tallahatta Formation
124MUWX	Meridian-Upper Wilcox aquifer
124TSCM	Tuscahoma Formation
124WLCXM	Middle Wilcox aquifer
124WLCXL	Lower Wilcox aquifer
211RPLY	Ripley Formation
211COFF	Coffee Sand
211EUTW	Eutaw Formation
211MCSN	McShan Formation
211GORD	Gordo Formation
211MSSV	Massive Sand
300PLZC	Paleozoic rocks

A - Air conditioning
B - Bottling
C - Commercial
D - Dewater
E - Power
F - Fire
H - Domestic

I - Irrigation
J - Industrial (cooling)
K - Mining
M - Medicinal
N - Industrial
P - Public supply
Q - Aquaculture

R - Recreation
S - Stock
T - Institutional
U - Unused
Y - Desalination
Z - Other (explain in remarks)

Ref. 5

Data Sheet Report Summary
Mississippi State Department of Health
Division of Water Supply

PWS ID	Name of System	Wells	Connections	Consecutive
** County Code: 74 Walthall County				
0740001	DEXTER WATER ASSOCIATION	1	98	N
0740002	IMPROVE WATER ASSOCIATION	2	575	N
0740004	LEXIE WATER ASSOCIATION, INC	2	800	N
0740005	TOWN OF TYLERTOWN	3	900	N
0740070	MAGEE'S CREEK W/A-SOUTH	0	213	Y
0740076	MAGEE'S CREEK W/A-NORTH	3	1494	N
** County Code: 75 Warren County				
0750002	CULKEN WATER DIST	0	1974	Y
0750003	EAGLE LAKE WATER DISTRICT	2	380	N
0750004	FISHER FERRY WATER DISTRICT	3	1264	N
0750005	HILLDALE WATER DISTRICT	5	1306	N
0750007	KING'S WATER CLUB # 1	0	485	Y
0750010	CITY OF VICKSBURG	11	9006	N
0750011	YOKENA-JEFF DAVIS WATER DEPT	0	640	Y
0750019	WARRENTON HEIGHTS UTL CO	0	366	Y
0750020	RIVERIA HEIGHTS UTIL CO INC	0	58	N
** County Code: 76 Washington County				
0760001	TOWN OF ARCOLA	1	260	N
0760002	ELIZABETH WATER ASSOCIATION	1	84	N
0760003	GLEN ALLAN WATER ASSOCIATION	2	192	N
0760004	CITY OF GREENVILLE	10	15586	N
0760005	CITY OF HOLLANDALE	2	1224	N
0760006	CITY OF LELAND WTR & LIGHT	3	2500	N
0760007	TOWN OF METCALFE	2	370	N
0760008	RIVERSIDE DEV ASSN, INC	1	112	N
0760009	SWIFTWATER DEV ASSN, INC	2	140	N
0760010	WINTERVILLE WATER ASSOCIATION	1	63	N
0760014	CITY OF GREENVILLE-AIR BASE	2	50	N
0760015	NICHOLSON MOBILE HOME PARK	1	32	N
0760016	HIGHLAND TRAILER PARK, INC.	1	82	N
0760017	DELTA VILLAGE	2	200	N
0760018	BOWMANOR WATER ASSOCIATION	1	31	N
0760019	FOREST ACRES WATER WELL	1	32	N
0760020	CARLTON TRAILER PARK	1	22	N
0760022	GLASSCO TRAILER PARK	1	25	N
0760025	CUMMINGS TRAILER PARK	2	42	N
0760026	WAYSIDE WATER ASSOCIATION	1	120	N
0760027	FREEDOM VILLAGE, INC	1	14	N
0760029	MULLEN TRAILER PARK	1	48	N
0760030	CITY OF GREENVILLE-SMITH	1	13	N
0760032	MEADOW WOOD WATER ASSOC INC	1	10	N
0760034	GOLDING ACRES WATER ASSN	2	31	N
0760071	STONEVILLE PEDIGREED SEED CO	1	19	N
0760074	LAKE JACKSON WATER ASSN	1	222	N

Ref. 6

Table 6. Household, Family, and Group Quarters Characteristics: 1990

[For definitions of terms and meanings of symbols, see text]

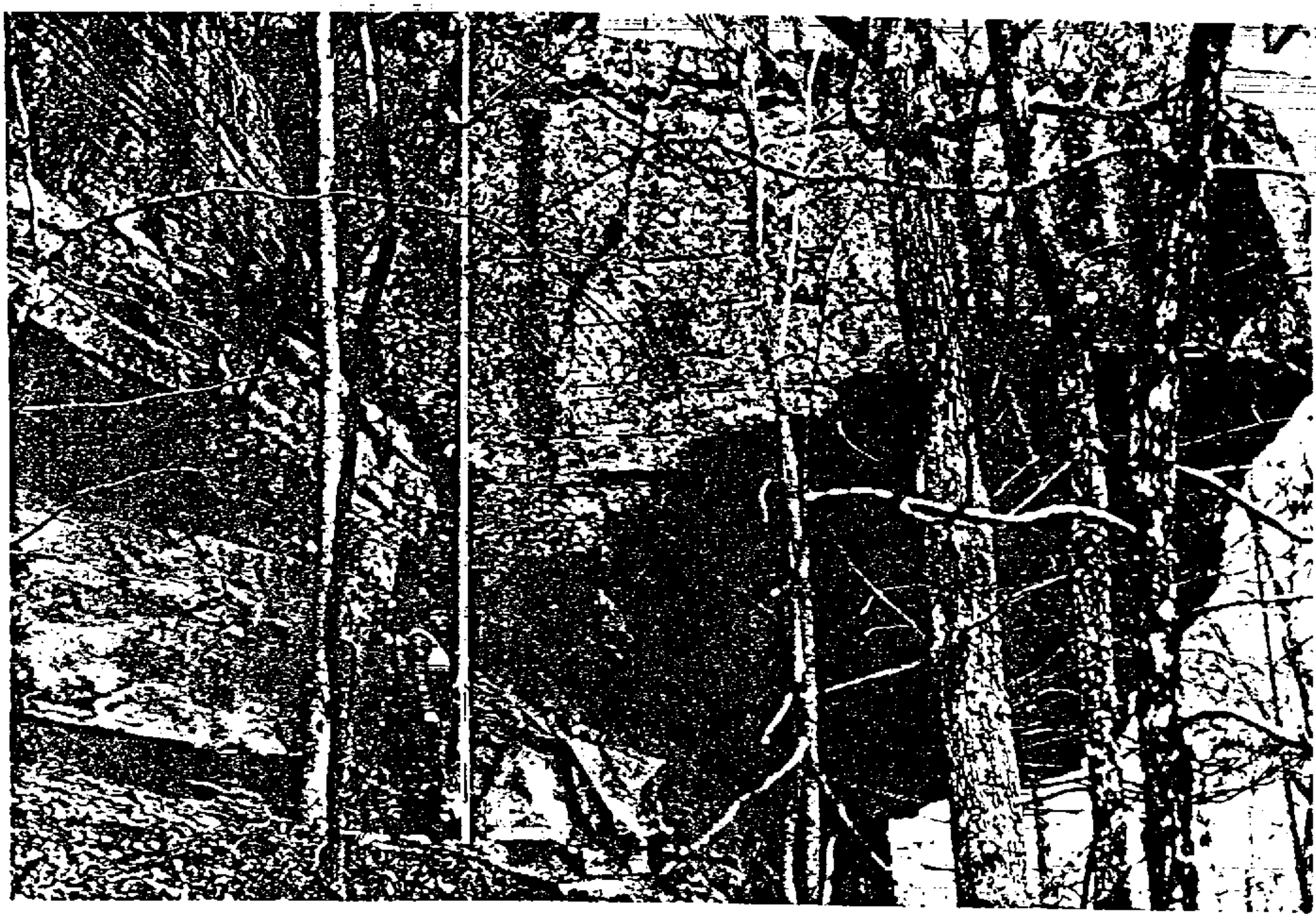
State County Place and [In Selected States] County Subdivision	Persons per—	
	Household	Family
The State	2.75	3.27
COUNTY		
Adams County	2.64	3.18
Alcorn County	2.52	3.02
Amite County	2.76	3.30
Attala County	2.63	3.20
Benton County	2.82	3.32
Bolivar County	3.02	3.64
Calhoun County	2.60	3.10
Carroll County	2.75	3.24
Chickasaw County	2.77	3.28
Choctaw County	2.76	3.26
Claiborne County	2.82	3.49
Clarke County	2.71	3.20
Clay County	2.83	3.37
Coahoma County	2.93	3.60
Copiah County	2.83	3.36
Covington County	2.84	3.35
DeSoto County	2.91	3.23
Forrest County	2.54	3.15
Franklin County	2.69	3.22
George County	2.86	3.26
Greene County	2.93	3.35
Grenada County	2.75	3.28
Hancock County	2.64	3.11
Harrison County	2.65	3.17
Hinds County	2.70	3.29
Holmes County	2.97	3.61
Humphreys County	3.07	3.67
Issaquena County	3.02	3.57
Itawamba County	2.59	3.02
Jackson County	2.82	3.25
Jasper County	2.86	3.34
Jefferson County	3.07	3.67
Jefferson Davis County	2.91	3.43
Jones County	2.69	3.17
Kemper County	2.77	3.37
Lafayette County	2.47	3.09
Lamar County	2.78	3.21
Lauderdale County	2.59	3.15
Lawrence County	2.74	3.28
Leake County	2.69	3.22
Lee County	2.65	3.14
Leflore County	2.82	3.47
Lincoln County	2.68	3.20
Lowndes County	2.71	3.23
Madison County	2.74	3.34
Marion County	2.75	3.27
Marshall County	2.93	3.41
Monroe County	2.72	3.22
Montgomery County	2.70	3.25
Neshoba County	2.77	3.22
Newton County	2.68	3.15
Noxubee County	3.04	3.65
Oktibbeha County	2.58	3.18
Panola County	2.91	3.44
Pearl River County	2.77	3.21
Perry County	2.84	3.32
Pike County	2.70	3.27
Pontotoc County	2.65	3.11
Prentiss County	2.63	3.09
Quitman County	2.96	3.58
Rankin County	2.82	3.21
Scott County	2.82	3.31
Sharkey County	3.36	3.92
Simpson County	2.78	3.28
Smith County	2.78	3.25
Stone County	2.78	3.25
Sunflower County	3.06	3.71
Tallahatchie County	3.01	3.60
Tate County	2.92	3.35
Tippah County	2.68	3.14
Tishomingo County	2.48	2.93
Tunica County	3.22	3.84
Union County	2.62	3.09
Walthall County	2.80	3.30
Warren County	2.72	3.28
Washington County	2.90	3.54
Wayne County	2.83	3.31
Webster County	2.63	3.17
Wilkinson County	2.85	3.39
Winston County	2.73	3.27
Yalobusha County	2.59	3.20
Yazoo County	2.96	3.45

U.S. Department of Commerce, Proof Copy of table generated for 1990, CPH-1: Summary population and housing characteristics, issued by Bureau of Census (April 1991). 1 page.

Ref. 7

TISHOMINGO COUNTY GEOLOGY AND MINERAL RESOURCES

Robert K. Merrill
Delbert E. Gann
Stephen P. Jennings



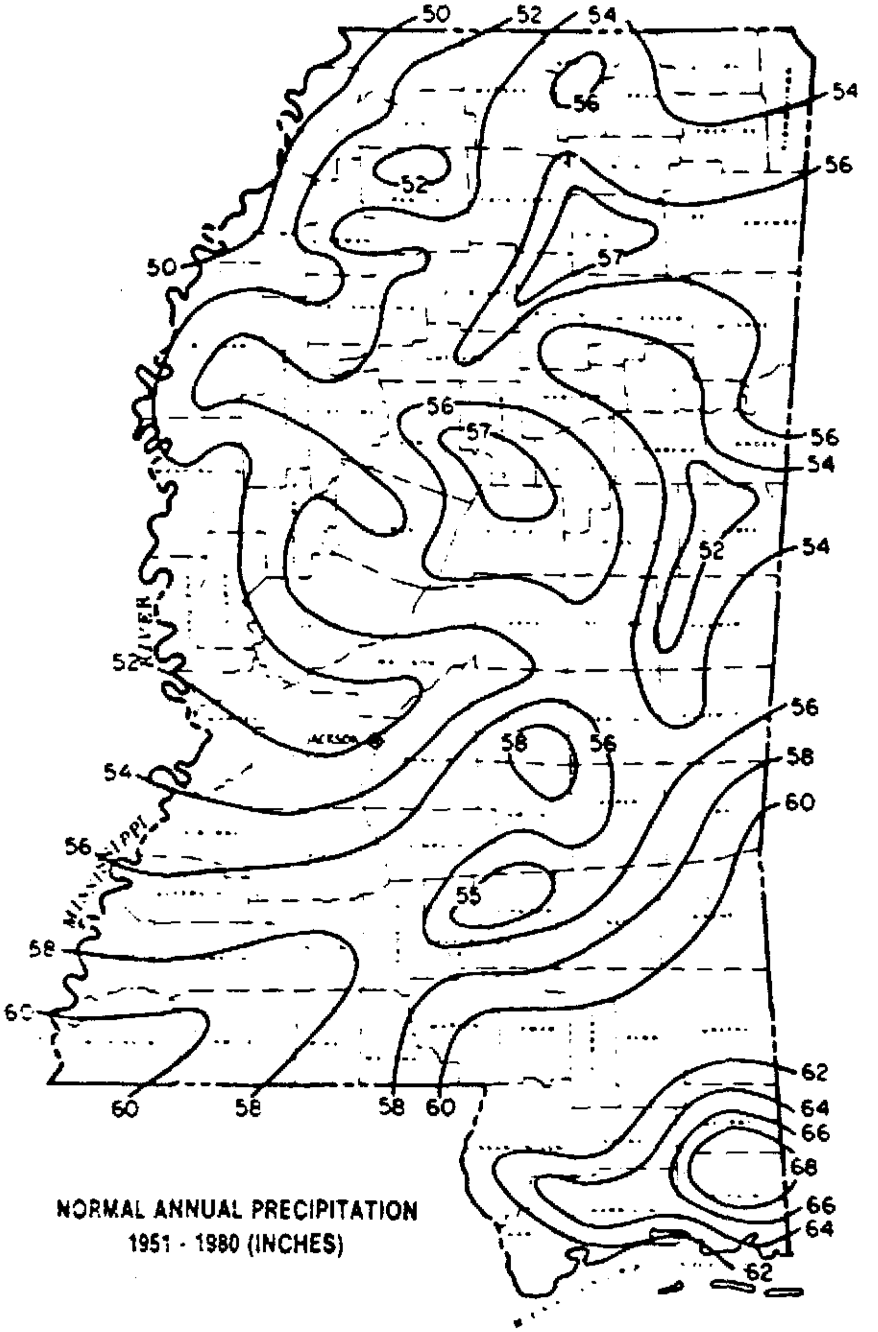
BULLETIN 127

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF GEOLOGY

CONRAD A. GAZZIER
Bureau Director

Jackson, Mississippi
1988

Ref. 8



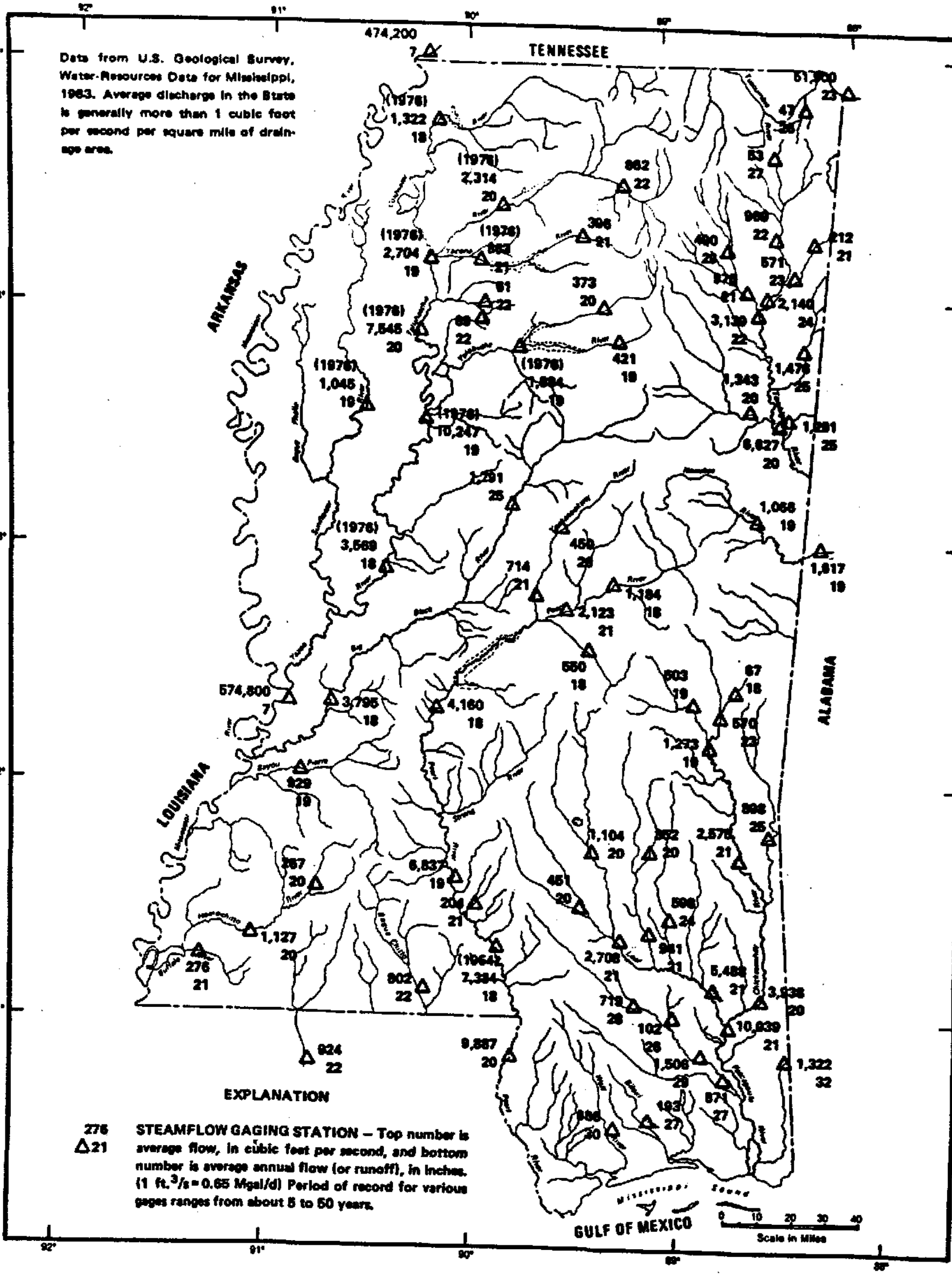
- Mean annual precipitation in inches. From U. S. Weather Bureau, Jackson, Mississippi. Based on the 30-year period 1951-1980.

SOURCES FOR WATER SUPPLIES IN MISSISSIPPI

by B. E. Wasson
Hydrologist
U.S. Geological Survey

A COOPERATIVE STUDY SPONSORED BY THE
U. S. GEOLOGICAL SURVEY
and the
Mississippi Research and Development Center
JACKSON, MISSISSIPPI
REVISED 1986

Ref. 9



· Average flow at selected streamgaging sites in cubic feet per second and in inches per year for periods of record through 1983 water year. (If end of record for station is earlier than 1983, the date is shown in parentheses.)

TECHNICAL PAPER NO. 40

RAINFALL FREQUENCY ATLAS OF THE UNITED STATES

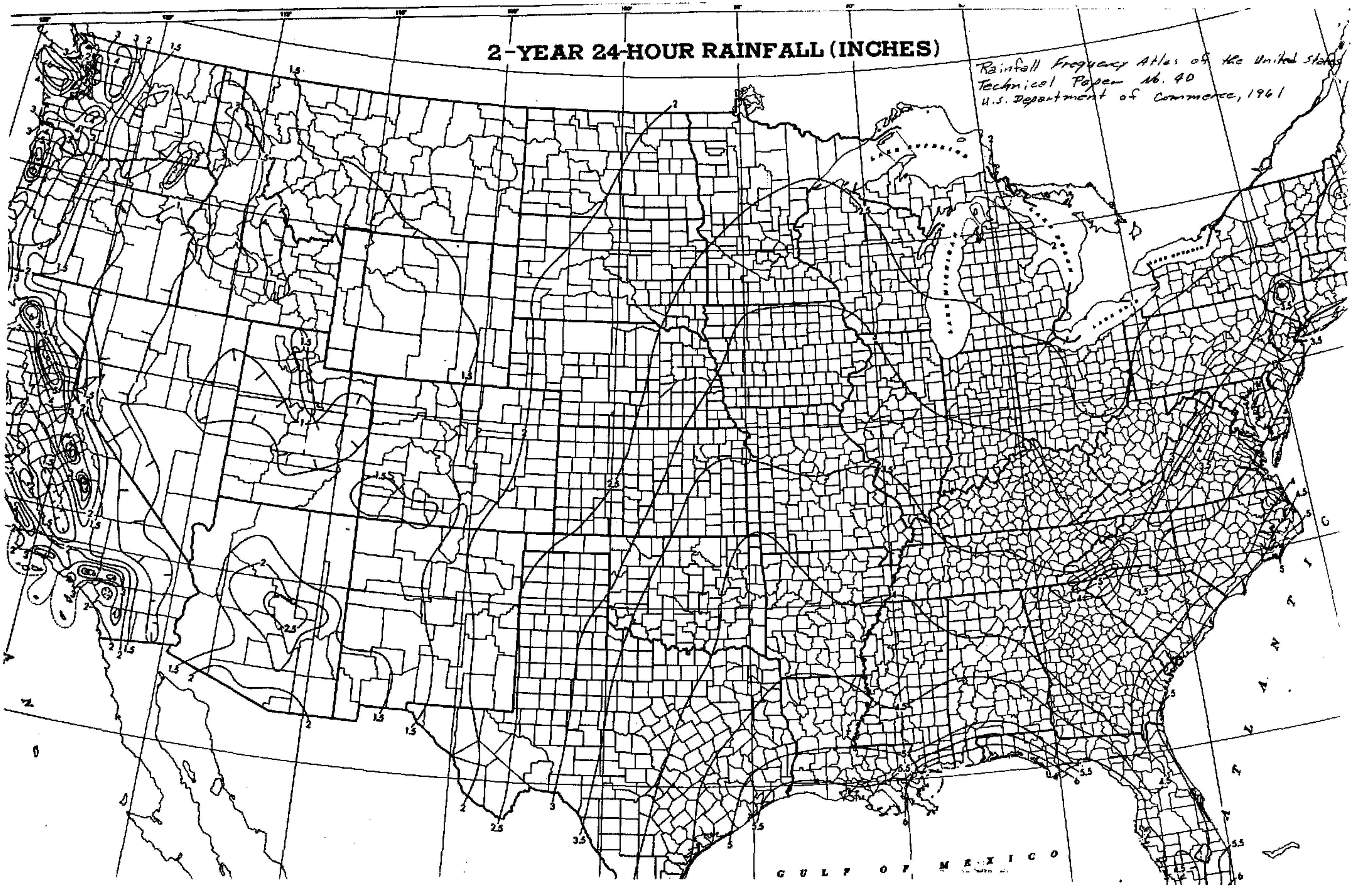
for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years

Prepared by
DAVID M. HERSHFIELD
Cooperative Studies Section, Hydrologic Services Division
for
Engineering Division, Soil Conservation Service
U.S. Department of Agriculture

Ref. 10

2-YEAR 24-HOUR RAINFALL (INCHES)

Rainfall Frequency Atlas of the United States
Technical Paper No. 40
U.S. Department of Commerce, 1961



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

COUNTY OF
WARREN,
MISSISSIPPI
(UNINCORPORATED AREAS)

PANEL 200 OF 275

COMMUNITY-PANEL NUMBER
280198 0200 B

EFFECTIVE DATE:
NOVEMBER 15, 1979

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Ref. 11

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD

ZONE A	No base flood elevations determined.
ZONE AE	Base flood elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE A99	To be protected from 100-year flood by Federal flood protection system under construction; no base elevations determined.
ZONE V	Coastal flood with velocity hazard (wave action); no base flood elevations determined.
ZONE VE	Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X	Areas of 500-year flood; areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100-year flood.

OTHER AREAS

ZONE X	Areas determined to be outside 500-year flood plain.
ZONE D	Areas in which flood hazards are undetermined.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

~513~	Base Flood Elevation Line; Elevation in Feet*
(D)	Cross Section Line
(EL 987)	Base Flood Elevation in Feet Where Uniform Within Zone*
RM7 X	Elevation Reference Mark
•MI.5	River Mile

renced to the National Geodetic Vertical Datum of 1929

NOTES

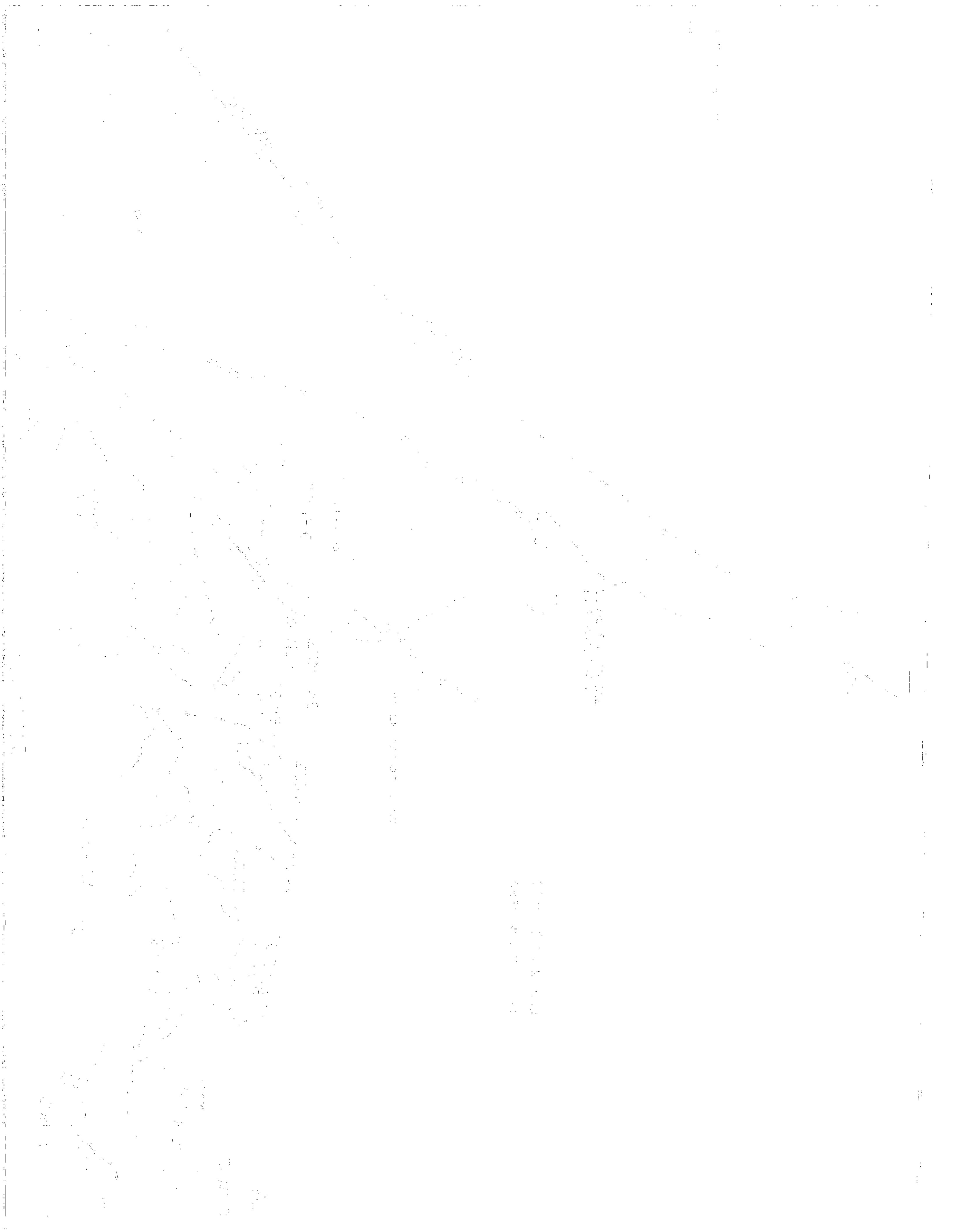
ɪp is for use in administering the National Flood Insurance n; it does not necessarily identify all areas subject to flooding, larly from local drainage sources of small size, or all etric features outside Special Flood Hazard Areas.

areas not in the Special Flood Hazard Areas may be ed by flood control structures.

aries of the floodways were computed at cross sections and lated between cross sections. The floodways were based on lic considerations with regard to requirements of the Federal ncy Management Agency.

ay widths in some areas may be too narrow to show to scale. o Floodway Data Table where floodway width is shown at ch.

l base flood elevations apply only landward of the shoreline.



Ref. 12

Gullied land and Swamp are miscellaneous land types and do not belong to a soil series but, nevertheless, are listed in alphabetic order along with the soil series.

Following the name of each mapping unit, there is a symbol in parentheses. This symbol identifies the mapping unit on the detailed soil map. Listed at the end of each description of a mapping unit are the capability unit and the woodland suitability group in which the mapping unit has been placed. The page on which each capability unit and woodland group is described can be found readily by referring to the "Guide to Mapping Units, Capability Units, and Woodland Suitability Groups" at the back of the report.

Soil scientists, engineers, students, and others who want detailed descriptions of soil series should turn to the section "Genesis, Morphology, and Classification of Soils." Many terms used in the soil descriptions and other sections of the report are defined in the Glossary.

Adler Series

The Adler series consists of nearly level, moderately well drained soils that formed in alluvium washed from the loessal uplands. These soils occur as small to fairly large areas in a band adjacent to the loessal bluff and in most of the stream valleys of the uplands. The natural vegetation was mostly hardwoods. The common trees were oak, cottonwood, sweetgum, sycamore, and yellow-poplar. The understory consisted chiefly of roughleaf dogwood, American holly, low shrubs, and vines.

The surface layer is brown silt loam, and the subsoil is brown to dark-brown silt loam. Natural fertility is moderate to high, the organic-matter content is low, and the reaction is mildly alkaline.

These soils are associated with the Wakeland, Collins, and Falaya soils. They are better drained than the Wakeland and Falaya soils. They are less acid than the Collins soils but have similar drainage.

The Adler soils are well suited to a wide range of crops and pasture plants. Most of the acreage is now in cultivated crops or in pasture.

Adler silt loam (Ad).—This is a moderately well drained, friable, mildly alkaline soil that is subject to overflow. Major horizons in profile:

0 to 8 inches, brown, friable silt loam.
8 to 26 inches, brown to dark-brown, friable silt loam.
26 to 42 inches, mottled grayish-brown, brown, and yellowish-brown silt loam.

The color of the surface layer ranges from grayish brown to brown, and that of the subsurface layer, from brown to dark brown. The depth to mottling ranges from 18 to 30 inches.

Small areas of Wakeland silt loam and Morganfield silt loam are included in the areas mapped.

Adler silt loam is moderate to high in natural fertility, is low in organic-matter content, and ranges from slightly acid to mildly alkaline. It has a thick root zone. The surface layer is fairly easy to keep in good tilth but tends to crust. Movement of water into and through this soil is moderate, and the available moisture capacity is high.

This is one of the most productive soils in the county. It is well suited to a wide range of plants. It is subject to frequent overflow of short duration. Streambank caving and overfalls are common problems. Most of the

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Acres	Percent	Soil	Acres	Percent
Adler silt loam	22, 030	6. 1	Memphis and Loring silt loams, 0 to 2 percent slopes	320	0. 1
Adler and Morganfield silt loams, local alluvium	2, 480	. 7	Memphis and Loring silt loams, 2 to 5 percent slopes	505	. 1
Alligator clay	2, 410	. 7	Memphis and Loring silt loams, 2 to 5 percent slopes, eroded	3, 690	1. 0
Bowdre silty clay	775	. 2	Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded	2, 605	. 7
Calloway silt loam	950	. 3	Memphis and Loring silt loams, 5 to 8 percent slopes, eroded	1, 170	. 3
Collins silt loam	830	. 2	Memphis and Loring silt loams, 5 to 8 percent slopes, severely eroded	8, 140	2. 2
Collins silt loam, local alluvium	700	. 2	Memphis and Natchez silt loams, 8 to 12 percent slopes, severely eroded	4, 155	1. 1
Commerce silt loam	3, 135	. 9	Memphis and Natchez silt loams, 12 to 17 percent slopes, severely eroded	3, 475	1. 0
Commerce silty clay loam	8, 480	2. 3	Memphis and Natchez silt loams, 17 to 40 percent slopes, eroded	95, 260	26. 3
Commerce very fine sandy loam	11, 925	3. 3	Morganfield silt loam	180	. 1
Commerce, Robinsonville, and Crevasse soils	43, 080	11. 9	Robinsonville loam	400	. 1
Crevasse fine sandy loam	1, 315	. 4	Sharkey clay	12, 810	3. 5
Dowling clay	7, 345	2. 0	Sharkey, Tunica, and Dowling clays	41, 075	11. 3
Falaya silt loam	11, 340	3. 1	Silty land, rolling	1, 500	. 4
Falaya silt loam, local alluvium	2, 970	. 8	Silty land, steep	2, 310	. 6
Grenada silt loam, 0 to 2 percent slopes	615	. 2	Swamp	880	. 2
Grenada silt loam, 2 to 5 percent slopes	395	. 1	Tunica silty clay	4, 610	1. 3
Grenada silt loam, 2 to 5 percent slopes, eroded	425	. 1	Wakeland silt loam	6, 705	1. 9
Grenada silt loam, 5 to 8 percent slopes, severely eroded	215	. 1	Wakeland silt loam, local alluvium	1, 680	. 5
Gullied land	24, 095	6. 7	Waverly and Falaya silt loams	9, 150	2. 5
Henry silt loam	400	. 1			
Memphis silt loam, 0 to 2 percent slopes	2, 790	. 8			
Memphis silt loam, 2 to 5 percent slopes	1, 115	. 3			
Memphis silt loam, 2 to 5 percent slopes, eroded	2, 260	. 6			
Memphis silt loam, 2 to 5 percent slopes, severely eroded	930	. 3			
Memphis silt loam, 5 to 8 percent slopes, eroded	700	. 2			
Memphis silt loam, 5 to 8 percent slopes, severely eroded	7, 915	2. 2	Total	362, 240	100. 0

acreage is in cultivated crops or in pasture, but some of the small areas that are not easily reached are in hardwood forest. (Capability unit IIw-3; woodland suitability group 1.)

Adler and Morganfield silt loams, local alluvium (Am).—Because of their similarity and the mixed pattern of occurrence, it was impractical to map these soils separately. Both soils formed in local loessal alluvium. The Adler soil is moderately well drained, and the Morganfield soil is well drained. Both occur on foot slopes and along and at the head of small drainageways. Some areas consist entirely of Adler soils, and some of Morganfield soils, but most areas include some of both.

The major horizons of the Adler soils are like the ones described for Adler silt loam, except that the depth to mottling ranges from 24 to 30 inches. Major horizons in profile of Morganfield silt loam:

0 to 6 inches, brown silt loam.
6 to 40 inches, dark-brown to dark yellowish-brown silt loam or silt.
40 to 50 inches, brown to dark-brown silt loam.

The color of the surface layer ranges from dark grayish brown to dark brown. The texture of the entire profile ranges from silt loam to silt. Gray mottles occur below a depth of 30 inches in places.

These soils are moderately high or high in natural fertility, are low in organic-matter content, and range from slightly acid to mildly alkaline in reaction. They have a thick root zone and are easy to work but tend to crust when bare. Movement of water into and through these soils is moderate, and the available moisture capacity is high.

These soils are some of the most productive in the county, and they are well suited to a wide range of plants. Nearly all of the acreage is in cultivated crops or in pasture. (Capability unit IIw-3; woodland suitability group 1.)

Alligator Series

The Alligator series consists of nearly level to level, poorly drained, clayey soils in slack-water areas. These soils formed in fine-textured alluvium deposited by the Mississippi River and its tributaries. They occur as broad areas along the Yazoo River. Much of the area is wooded. The common commercial trees are green ash, eastern cottonwood, red maple, sweetgum, and oaks of various species. The understory consists chiefly of swamp-privet, planertree, low bushes, and vines.

The surface layer is dark-brown clay, and the subsoil is gray clay mottled with yellow and brown.

These soils occur with the Commerce, Wakeland, Dowling, and Sharkey soils. They are finer textured than the Commerce and Wakelands soils and less well drained. They are lighter gray than the Sharkey soils, and they are better drained than the Dowling soils, which occupy the depressions.

Poor drainage and dense plastic clay limit the suitability of these soils for cultivation.

Alligator clay (Ar).—This is a poorly drained soil in the slack-water area. Major horizons in profile:

0 to 4 inches, dark-brown, plastic clay.
4 to 30 inches, gray, plastic clay mottled with strong brown and yellowish brown.
30 to 46 inches, gray to light-gray, massive, plastic clay mottled with yellowish brown.

The color of the surface layer ranges from dark gray to light gray, and the texture is clay or silty clay.

Small areas of Dowling and Sharkey soils are included in the areas mapped.

Alligator clay is strongly acid. It is high in natural fertility. The surface layer has poor tilth and is low in organic-matter content. The slowly permeable surface layer and subsoil are very sticky when wet, and they harden and crack when dry.

This soil is suited to permanent pasture, soybeans, small grain, and hardwoods. Cultivation is feasible within only a narrow range of moisture content. The rate of infiltration and the internal water movement are slow. Removing surface water is a problem. A considerable acreage is open and is used as pasture, and the rest is in hardwood forest. (Capability unit IIIw-3; woodland suitability group 2.)

Bowdre Series

The Bowdre series consists of nearly level, moderately well drained, clayey soils that formed in fine-textured sediments over medium-textured material, both deposited by the Mississippi River and its tributaries. These soils occur as small areas on the Mississippi alluvial plain in the western part of the county. The natural vegetation consisted of sweetgum, eastern cottonwood, hackberry, and oaks of various species. The understory consisted of swamp-privet, planertree, low shrubs, and vines.

The surface layer and the upper part of the subsoil are dark grayish-brown silty clay. Brown fine sandy loam mottled with grayish brown occurs about 15 inches beneath the surface. Natural fertility is high, organic-matter content is low, and reaction is slightly acid to mildly alkaline.

These soils are associated with the Tunica, Sharkey, Dowling, and Commerce soils on level areas adjacent to natural levees. The Bowdre soils differ from the Sharkey and Tunica soils in being underlain at a depth of less than 20 inches by friable material. They are finer textured in the upper part of the profile than the Commerce soils. They are better drained than the Dowling soils, which are in depressions.

The Bowdre soils are suited to most of the commonly grown crops. About 80 percent of the acreage is now cultivated or used as pasture. The total acreage is small.

Bowdre silty clay (Bo).—This is a moderately well drained soil on the Mississippi alluvial plain. Major horizons in profile:

0 to 6 inches, very dark grayish-brown silty clay.
6 to 18 inches, very dark grayish-brown silty clay mottled with strong brown.
18 to 40 inches, brown to dark grayish-brown, friable fine sandy loam to loamy fine sand mottled with grayish brown.

The upper two layers of fine-textured sediments range from 10 to 20 inches in thickness. Their texture ranges from silty clay to clay. Beneath the fine-textured sediments, the texture ranges from fine sandy loam to loamy sand. Thin strata of sandy loam, silt, and clay of various colors occur in places.

Small areas of Tunica and Commerce soils are included in the areas mapped.

Bowdre silty clay is slightly acid to mildly alkaline, high in natural fertility, and low in organic-matter content. The surface layer has poor tilth. Both the surface the Natchez soils, which are moderately alkaline in the lower part. The Memphis soils have a subsoil of silty clay loam, and the Natchez soils have a subsoil of silt loam. The Memphis soils are better drained and have a deeper root zone than the Loring, Grenada, Calloway, and Henry soils, all of which have a fragipan.

Memphis soils are well suited to most of the commonly grown crops. Most of their acreage now is cultivated or is used as pasture.

Memphis silt loam, 2 to 5 percent slopes, eroded (MeB2).—This is a well-drained soil on the uplands. Major horizons in profile:

0 to 3 inches, dark grayish-brown, friable silt loam.
3 to 9 inches, brown to dark-brown, friable silt loam.
9 to 31 inches, brown to dark-brown, friable silty clay loam.
31 to 67 inches, brown to dark-brown, friable silt loam.

The color of the surface layer ranges from dark yellowish brown to dark grayish brown or brown. The texture of the subsoil ranges from silty clay loam to silt loam.

Small areas of Loring and Grenada soils are included in the areas mapped.

This soil has a thick root zone. The reaction of this soil is strongly acid, the natural fertility is moderate, and the organic-matter content is low. The surface layer is fairly easy to keep in good tilth but will crust when bare. The movement of water into the soil is fairly slow, but internal movement is moderate. Enough moisture is available to meet the needs of most plants.

This soil responds well to fertilizer. If well managed, it is well suited to a wide range of cultivated crops. When cultivated, it is moderately susceptible to erosion. The total acreage is small. (Capability unit IIe–1; woodland suitability group 12.)

Memphis silt loam, 0 to 2 percent slopes (MeA).—The surface layer of this soil is 2 to 4 inches thicker than that of Memphis silt loam, 2 to 5 percent slopes, eroded. Small areas of Loring and Grenada soils are included in the areas mapped.

This nearly level soil has good internal drainage, slow infiltration, and high available moisture capacity. The root zone is thick. Natural fertility is moderate. Surface runoff is slow; thus, the hazard of erosion is only slight.

This soil responds well to fertilizer and is suited to many kinds of crops. Because of slow surface runoff and slow infiltration, graded rows are needed to remove excess surface water during wet periods. The total acreage is small, and all of it is in cultivated crops or in pasture. (Capability unit I–1; woodland suitability group 12.)

Memphis silt loam, 2 to 5 percent slopes (MeB).—The surface layer of this soil is 2 to 4 inches thicker than that of Memphis silt loam, 2 to 5 percent slopes, eroded. Small areas of Loring and Grenada silt loams are included in the areas mapped.

This soil is suited to a wide range of crops but is moderately susceptible to erosion. It is used for cultivated crops and pasture. The acreage is small. (Capability unit IIe–1; woodland suitability group 12.)

Memphis silt loam, 2 to 5 percent slopes, severely eroded (MeB3).—The surface layer of this soil is 2 to 4 inches thinner than that of Memphis silt loam, 2 to 5 percent slopes, eroded. The plow layer ordinarily extends into the subsoil. A few shallow gullies have formed. The present plow layer is predominantly brown to dark-brown heavy silt loam. Small areas of Loring and Grenada soils are included in the areas mapped.

This soil is suited to a wide range of crops, but if it is cultivated, careful management is required for control of erosion. The total acreage is small. Most of it is in cultivated crops and permanent pasture. (Capability unit IIIe–1; woodland suitability group 12.)

Memphis silt loam, 5 to 8 percent slopes, eroded (MeC2).—This soil is suited to a wide range of crops, but the erosion hazard is moderate to severe in cultivated areas. The total acreage is small, and most of it is in pasture. (Capability unit IIIe–1; woodland suitability group 12.)

Memphis silt loam, 5 to 8 percent slopes, severely eroded (MeC3).—The surface layer of this soil is 2 to 4 inches thinner than that of Memphis silt loam, 2 to 5 percent slopes, eroded. It is predominantly brown to dark-brown heavy silt loam. A few shallow gullies have formed. Small areas of Loring silt loam are included in the areas mapped.

Memphis silt loam, 5 to 8 percent slopes, severely eroded, is suited to a wide range of crops. It is moderately to highly susceptible to erosion, and if it is cultivated, very careful management is required. Most of the acreage is cultivated. (Capability unit IIIe–1; woodland suitability group 12.)

Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded (MlB3).—Because of the similarity of the soils and the mixed pattern of occurrence, it was impractical to map these soils separately. These soils are eroded to the extent that the plow layer consists of a mixture of the original surface layer and the upper part of the subsoil. There are a few shallow gullies. The present surface layer is predominantly brown to dark-brown heavy silt loam. The Memphis soil makes up about 60 percent of the unit. Some areas consist entirely of Loring soils, and some entirely of Memphis soils, but most areas include some of both.

Major horizons in profile of Memphis silt loam:

0 to 3 inches, brown to dark-brown, friable heavy silt loam.
3 to 28 inches, brown to dark-brown, friable and slightly plastic silty clay loam.
28 to 46 inches +, brown to dark-brown, friable silt loam.

The texture of the Memphis surface layer ranges from silt loam to silty clay loam. The texture of the subsoil ranges from heavy silt loam to silty clay loam.

Major horizons in profile of Loring silt loam:

0 to 3 inches, brown to dark-brown, friable heavy silt loam.
3 to 30 inches, brown to dark-brown, friable and slightly plastic silty clay loam.
30 to 46 inches +, brown to dark-brown silt loam; compact and brittle in place, friable when disturbed (weak fragipan).

The texture of the Loring surface layer ranges from silt loam to silty clay loam. The texture of the subsoil ranges from heavy silt loam to silty clay loam. The depth to the fragipan varies between 26 and 36 inches.

The Loring soil is moderately well drained to well drained and the Memphis soil is well drained.

These soils can be worked fairly easily, and they have a thick root zone. The movement of water into the soils is slow, but the internal movement is moderate. The available water capacity is high. The organic-matter content is low, the natural fertility is moderate, and the reaction is medium to strongly acid.

These soils are suited to a wide range of crops, but if cultivated they require careful management for control of erosion. The total acreage is small. Most of it is in pasture and row crops. (Capability unit IIIe-1; woodland suitability group 12.)

Memphis and Loring silt loams, 0 to 2 percent slopes (MIA).—The surface layer of the soils in this unit is 3 to 6 inches thicker than that of Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded. Surface runoff is slow. Consequently, the hazard of erosion is less than on the stronger slopes.

Internal drainage is good, infiltration is slow, and the water-holding capacity is high. The root zone is thick. Natural fertility is moderate.

These soils respond well to fertilizer and are suited to many kinds of crops. Crop rows should have a slight grade so that surface water will run off during wet periods. The total acreage is small, and all of it is in cultivated crops or in pasture. (Capability unit I-1; woodland suitability group 12.)

Memphis and Loring silt loams, 2 to 5 percent slopes (MIB).—The surface layer of the soils in this unit is 3 to 6 inches thicker than that of Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded. Small areas of Grenada silt loam are included in the areas mapped.

These soils are suited to a wide range of crops but are moderately susceptible to erosion. They are used for cultivated crops and as pasture. The acreage is small. (Capability unit IIe-1; woodland suitability group 12.)

Memphis and Loring silt loams, 2 to 5 percent slopes, eroded (MIB2).—The surface layer of the soils in this unit is 2 to 4 inches thicker than that of Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded. In a few areas the plow layer extends into the subsoil. Small areas of Grenada soils are included in the areas mapped.

These soils are suited to a wide range of crops, but if they are cultivated, careful management is required for control of erosion. The total acreage is fairly small. Most of it is in crops and permanent pasture. (Capability unit IIe-1; woodland suitability group 12.)

Memphis and Loring silt loams, 5 to 8 percent slopes, eroded (MIC2).—The surface layer of the soils in this unit is 2 to 4 inches thicker than that of Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded.

These soils are suited to a wide range of crops but are moderately to highly susceptible to erosion. The acreage is small, and most of it is in pasture. (Capabilility unit IIIe-1; woodland suitability group 12.)

Memphis and Loring silt loams, 5 to 8 percent slopes, severely eroded (MIC3).—These soils are suited to a wide range of crops. They are moderately to highly susceptible to erosion, and if they are cultivated, very careful management is required. The total acreage is fairly small, and most of it is in pasture. (Capability unit IIIe-1; woodland suitability group 12.)

Memphis and Natchez silt loams, 17 to 40 percent slopes, eroded (MnF2).—Because of the similarity of these soils and the mixed pattern of their occurrence, it was impractical to map them separately. Erosion is generally moderate. Most areas have lost between 25 and 75 percent of the original surface layer. Some small areas have most of the original surface layer, but other areas are eroded to the extent that the present surface layer consists largely of material from the upper part of the subsoil. Shallow gullies are fairly common, and deep ones have formed in some places.

The Memphis soils, which make up about 70 percent of this unit, are on narrow ridgetops and the upper part of the slopes. The Natchez soils are on the middle and lower parts of the slopes. Most areas include some of both soils.

Major horizons in profile of Memphis silt loam:

0 to 3 inches, dark-brown, friable silt loam.
3 to 35 inches, brown to dark-brown, friable light silty clay loam to silt loam.
35 to 60 inches, brown to dark-brown, friable silt loam.

The surface layer ranges from brown to dark brown in color and from silt loam to heavy silt loam in texture.

Major horizons in profile of Natchez silt loam:

0 to 2 inches, mixed dark grayish-brown and dark yellowish-brown, friable silt loam; strongly acid.
2 to 26 inches, brown to dark-brown, friable silt loam; strongly acid.
26 to 72 inches, brown to dark-brown, friable silt loam; moderately alkaline.

Water moves into these soils slowly, but the internal movement of water is medium. The available water capacity is high. Natural fertility is moderate. The root zone is deep.

Because of the steep slopes and a severe erosion hazard, these soils are not suited to row crops. Much of the acreage has been cropped in the past, but most of it is now in hardwoods. The total acreage is large. (Capability unit VIIe-1; woodland suitability group 10.)

Memphis and Natchez silt loams, 8 to 12 percent slopes, severely eroded (MnD3).—These soils are eroded to the extent that the present surface layer consists largely of the upper part of the subsoil. Shallow gullies are common, and deep ones have formed in some places.

These soils respond well to fertilizer. Because of the hazard of erosion, they are only fairly well suited to cultivation. A water-disposal system that includes graded rows and vegetated waterways is needed to control runoff. The total acreage is small. Most of it is in trees and pasture, and a small part is in row crops. (Capability unit IVe-1; woodland suitability group 10.)

Memphis and Natchez silt loams, 12 to 17 percent slopes, severely eroded (MnE3).—These soils have slower runoff than Memphis and Natchez silt loams, 17 to 40 percent slopes, eroded. They are eroded to the extent that the present surface layer consists largely of material from the upper part of the subsoil. Shallow gullies are common, and deep ones have formed in some places.

Because of the severe erosion hazard, these soils are not suited to row crops. They need to be kept in perennial vegetation. Much of the acreage has been cropped in the past, but most of it is now in hardwoods. (Capability unit VIe-1; woodland suitability group 10.)

Morganfield Series

The Morganfield series consists of friable, well-drained soils formed in loessal alluvium. These soils occur as small areas on the flood plains of a few of the local streams. The natural vegetation consisted mostly of hardwoods. The common trees were oak, sweetgum, sycamore, and yellow-poplar. The understory consisted chiefly of cane, American holly, shrubs, vines, and grasses.

SOIL LEGEND

The first capital letter is the initial one of the soil name. A second capital letter, A, B, C, D E, or F, shows the slope. Symbols for nearly level soils, such as Adler silt loam, do not contain a slope letter. Neither does the symbol for a land type that has a considerable range in slope - Gullied land. The number 2 or 3 in a symbol indicates that the soil is eroded or severely eroded.

SYMBOL	NAME
Ad	Adler silt loam
Am	Adler and Morganfield silt loams, local alluvium
Ar	Alligator clay
Bo	Bowdre silty clay
Ca	Calloway silt loam
Cl	Collins silt loam
Cm	Collins silt loam, local alluvium
Cn	Commerce silt loam
Co	Commerce silty clay loam
Cp	Commerce very fine sandy loam
Crc	Commerce, Robinsonville, and Crevasse soils
Cy	Crevasse fine sandy loam
Do	Dowling clay
Fa	Falaya silt loam
Fl	Falaya silt loam, local alluvium
GrA	Grenada silt loam, 0 to 2 percent slopes
GrB	Grenada silt loam, 2 to 5 percent slopes
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded
Gu	Gullied land
Hn	Henry silt loam
MeA	Memphis silt loam, 0 to 2 percent slopes
MeB	Memphis silt loam, 2 to 5 percent slopes
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
MeB3	Memphis silt loam, 2 to 5 percent slopes, severely eroded
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded
MeC3	Memphis silt loam, 5 to 8 percent slopes, severely eroded
MlA	Memphis and Loring silt loams, 0 to 2 percent slopes
MlB	Memphis and Loring silt loams, 2 to 5 percent slopes
MlB2	Memphis and Loring silt loams, 2 to 5 percent slopes, eroded
MlB3	Memphis and Loring silt loams, 2 to 5 percent slopes, severely eroded
MlC2	Memphis and Loring silt loams, 5 to 8 percent slopes, eroded
MlC3	Memphis and Loring silt loams, 5 to 8 percent slopes, severely eroded
MnD3	Memphis and Natchez silt loams, 8 to 12 percent slopes, severely eroded
MnE3	Memphis and Natchez silt loams, 12 to 17 percent slopes, severely eroded
MnF2	Memphis and Natchez silt loams, 17 to 40 percent slopes, eroded
Mr	Morganfield silt loam
Ro	Robinsonville loam
Sc	Sharkey clay
Sat	Sharkey, Tunica, and Dowling clays
SsC	Silty land, rolling
SsF	Silty land, steep
Sw	Swamp
Tu	Tunica silty clay
Wa	Wakeland silt loam
Wd	Wakeland silt loam, local alluvium
Wf	Waverly and Falaya silt loams

WORKS AN

Highways and roads

Dual

Good motor

Poor motor

Trail

Highway markers

National Interstate

U. S.

State

Railroads

Single track

Multiple track

Abandoned

Bridges and crossings

Road

Trail, foot

Railroad

Ferries

Ford

Grade

R. R. over

R. R. under

Tunnel

Buildings

School

Church

Summer or winter cottag

Borrow pit

Mine dump

Pits, gravel or other

Power lines

Pipe lines

Cemeteries

Dams

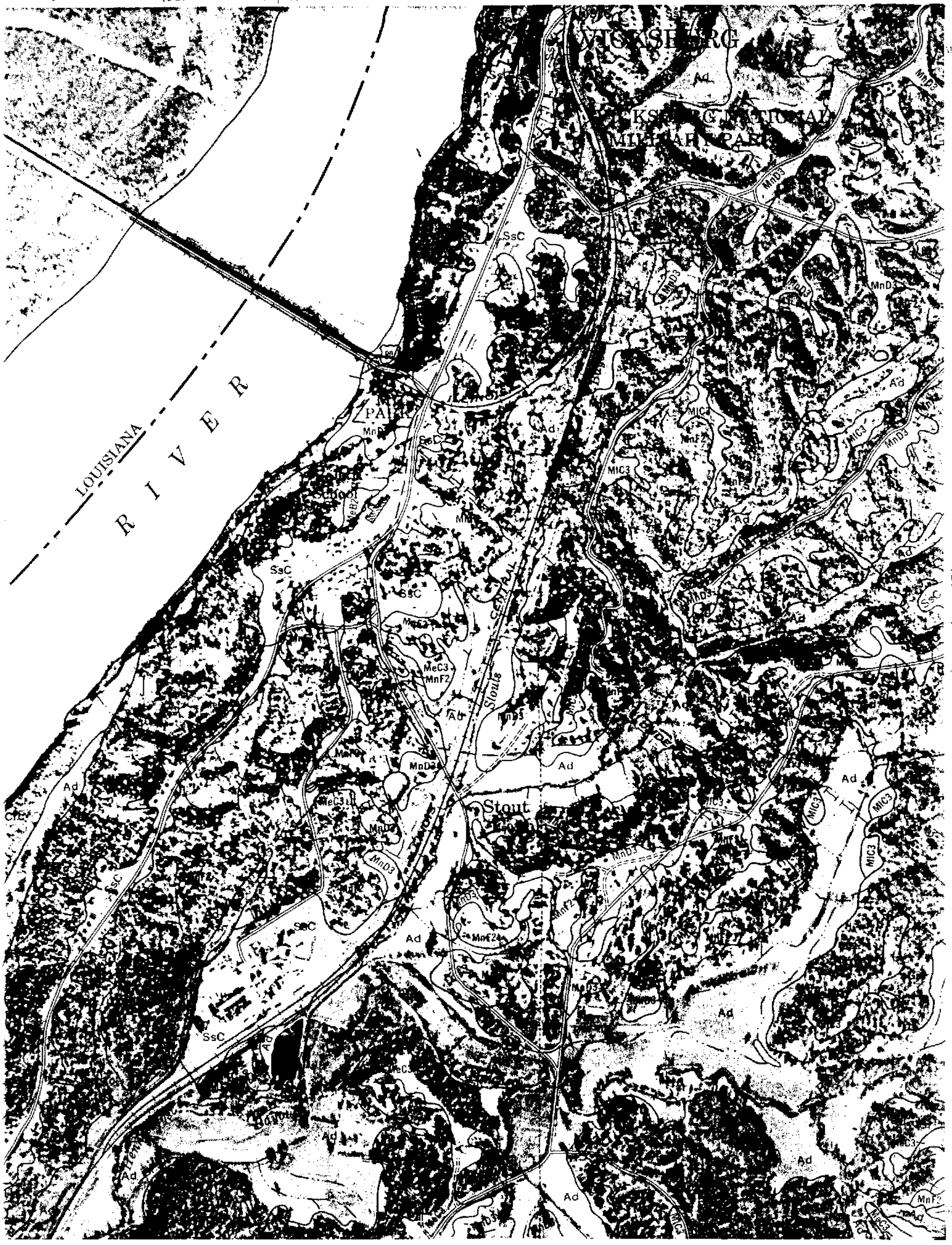
Levees

Tanks

Cotton gin

Sawmill

(Joins sheet 50) | (Joins sheet 51)



(Joins sheet 57)

1:15 840

ENDANGERED AND THREATENED SPECIES

U.S. FISH AND WILDLIFE SERVICE

REGION 4 - ATLANTA

Ref. 13

Federally Listed Species by State

MISSISSIPPI

(E=Endangered; T=Threatened; CH=Critical Habitat determined)

Mammals	General Distribution
Panther, Florida (*Felis concolor coryi*) - E	Entire state
Whale, right (*Eubalaena glacialis*) - E	Coastal waters
Whale, finback (*Balaenoptera physalus*) - E	Coastal waters
Whale, humpback (*Megaptera novaeangliae*) - E	Coastal waters
Whale, sei (*Balaenoptera borealis*) - E	Coastal waters
Whale, sperm (*Physeter catodon*) - E	Coastal waters

Birds	
Crane, Mississippi sandhill (*Grus canadensis pulla*) - E,CH	Southern Jackson County
Eagle, bald (*Haliaeetus leucocephalus*) - E	Entire state
Falcon, Arctic peregrine (*Falco peregrinus tundrius*) - T	Entire state
Pelican, brown (*Pelecanus occidentalis*) - E	Coast
Plover, piping (*Charadrius melodus*) - T	Coast
Tern, least (*Sterna antillarum*); interior population - E	Mississippi River
Warbler, Bachman's (*Vermivora bachmanii*) - E	Entire state
Woodpecker, ivory-billed (*Campephilus principalis*) - E	West, South, East Central
Woodpecker, red-cockaded (*Picoides* (=*Dendrocopos*) *borealis*) - E	Entire state

Reptiles	
Alligator, American (*Alligator mississippiensis*) - T (S/A)*	South and West
Snake, eastern indigo (*Drymarchon corais couperi*) - T	South
Tortoise, gopher (*Gopherus polyphemus*) - T	Lower Gulf Coastal Plain (14 counties)
Turtle, Kemp's (Atlantic) ridley (*Lepidochelys kempii*) - E	Coastal waters
Turtle, green (*Chelonia mydas*) - T	Coastal waters

MISSISSIPPI (cont'd)

	General Distribution
Turtle, hawksbill (*Eretmochelys imbricata*) - E	Coastal waters
Turtle, loggerhead (*Caretta caretta*) - T	Coastal waters
Turtle, ringed sawback (*Graptemys oculifera*) - T	Pearl River

Fishes

Darter, bayou (*Etheostoma rubrum*) - T	Bayou Pierre drainage

Mollusks

Mussel, Curtus' (*Pleurobema curtum*) - E	East Fork Tombigbee River
Mussel, Judge Tait's (*Pleurobema taitianum*) - E	East Fork Tombigbee River and Buttahatchie River
Mussel, penitent (*Epioblasma* [=*Dysnomia*] *penita*) - E	East Fork Tombigbee River.

Plants

Lindera melissifolia (Pondberry) - E	Sharkey and Sunflower Counties

*Alligators are biologically neither endangered nor threatened. For law enforcement purposes they are classified as "Threatened due to Similarity of Appearance." Alligator hunting is regulated in accordance with State law.

U.S. Fish and Wildlife Service
Vicksburg Office

SPECIES LIST BY COUNTY

E - Endangered Species
T - Threatened Species
P - Proposed Species
C - Candidate Species
CA - Conservation Agreement
CH - Critical Habitat

MISSISSIPPI

Amite	E - Red-cockaded woodpecker (*Picoides borealis*)
Bolivar	E - Pondberry
Claiborne	T - Bayou darter (*Etheostoma rubrum*)
Clark	C - Yellowblotched sawback - *Graptemys flavimaculata*
Copiah	T - Bayou darter (*Etheostoma rubrum*) T - Ringed sawback turtle (*Graptemys oculifera*)
Covington	T - Gopher tortoise (*Gopherus polyphemus*)
Forrest	E - Red-cockaded woodpecker (*Picoides borealis*) T - Gopher tortoise (*Gopherus polyphemus*) C - Yellowblotched sawback - *Graptemys flavimaculata*
Franklin	E - Red-cockaded woodpecker (*Picoides borealis*)
George	E - Red-cockaded woodpecker (*Picoides borealis*) T - Gopher tortoise (*Gopherus polyphemus*) C - Maureen's symnocthebius minute moss beetle C - Yellowblotched sawback - *Graptemys flavimaculata*
Greene	E - Red-cockaded woodpecker (*Picoides borealis*) T - Gopher tortoise (*Gopherus polyphemus*) C - Yellowblotched sawback - *Graptemys flavimaculata*
Hancock	E - Brown pelican (*Pelecanus occidentalis*) T - Gopher tortoise (*Gopherus polyphemus*)
Harrison	E - Red-cockaded woodpecker (*Picoides borealis*) E - Bald eagle (*Haliaeetus leucocephalus*) E - Eastern indigo snake (*Drymarchon corais couperi*) E - Brown pelican (*Pelecanus occidentalis*) T - Gopher tortoise (*Gopherus polyphemus*)
Hinds	T - Bayou darter (*Etheostoma rubrum*) T - Ringed sawback turtle (*Graptemys oculifera*)
Itawamba	E - Curtus' mussel (*Pleurobema curtum*) E - Penitent shell mussel (*Epioblasma penita*) E - Judge Tait's mussel (*Pleurobema taitianum*) C - Southern clubshell *Pleurobema decisum*
Jackson	E - Brown pelican (*Pelecanus occidentalis*) E - Red-cockaded woodpecker (*Picoides borealis*) E - Mississippi sandhill crane (CH) (*Grus canadensis pulla*) T - Gopher tortoise (*Gopherus polyphemus*) C - Yellowblotched sawback - *Graptemys flavimaculata*

Jasper	E - Red-cockaded woodpecker (*Picoides borealis*)
Jones	E - Red-cockaded woodpecker (*Picoides borealis*) T - Gopher tortoise (*Gopherus polyphemus*) C - Yellowblotched sawback - *Graptemys flavimaculata*
Lawrence	T - Ringed sawback turtle (*Graptemys oculifera*)
Lamar	T - Gopher tortoise (*Gopherus polyphemus*)
Leake	T - Ringed sawback turtle (*Graptemys oculifera*)
Lowndes	E - Judge Tait's mussel (*Pleurobema taitianum*) E - Penitent shell mussel (*Pleurobema penita*)
Madison	T - Ringed sawback turtle (*Graptemys oculifera*)
Marion	T - Ringed sawback turtle (*Graptemys oculifera*) T - Gopher tortoise (*Gopherus polyphemus*)
Monroe	E - Curtus' mussel (*Pleurobema curtum*) E - Penitent shell mussel (*Epioblasma penita*) E - Judge Tait's mussel (*Pleurobema taitianum*) C - Southern clubshell *Pleurobema decisum*
Neshoba	T - Ringed sawback turtle (*Graptemys oculifera*)
Noxubee	E - Red-cockaded woodpecker (*Picoides borealis*)
Oktibbeha	E - Red-cockaded woodpecker (*Picoides borealis*)
Pearl River	T - Ringed sawback turtle (*Graptemys oculifera*) T - Gopher tortoise (*Gopherus polyphemus*)
Perry	E - Red-cockaded woodpecker (*Picoides borealis*) T - Gopher tortoise (*Gopherus polyphemus*) C - Yellowblotched sawback - *Graptemys flavimaculata*
Rankin	T - Ringed sawback turtle (*Graptemys oculifera*)
Scott	E - Red-cockaded woodpecker (*Picoides borealis*) T - Ringed sawback turtle (*Graptemys oculifera*)
Simpson	T - Ringed sawback turtle (*Graptemys oculifera*)
Smith	E - Red-cockaded woodpecker (*Picoides borealis*)
Stone	E - Red-cockaded woodpecker (*Picoides borealis*) E - Eastern indigo snake (*Drymarchon corais couperi*) T - Gopher tortoise (*Gopherus polyphemus*)
Sharkey	E - Pondberry (*Lindera melissifolia*)
Sunflower	E - Pondberry (*Lindera melissifolia*)

Wayne	E - Red-cockaded woodpecker (Picoides borealis) T - Gopher tortoise (Gopherus polyphemus) C - Yellowblotched sawback - Graptemys flavimaculata
Wilkinson	E - Red-cockaded woodpecker (Picoides borealis)
Winston	E - Red-cockaded woodpecker (Picoides borealis)

ENDANGERED SPECIES OF MISSISSIPPI 1988

MUSSELS:	Federal Status
Black Clubshell (Pleurobema curtum)	*Endangered*
Southern Combshell (Epioblasma penita)	*Endangered*
Southern Pink Pigtoe (Pleurobema taitianum)	*Endangered*
Southern Round Pigtoe (Pleurobema marshalli)	*Endangered*
Stirrupshell (Quadrula stapes)	*Endangered*
FISH:	
Southern Redbelly Dace[1] (Phoxinus erythrogaster)	*None*
Bayou Darter (Etheostoma rubrum)	*Threatened*
Crystal Darter (Ammocrypta asprella)	*C2*[a]
Frecklebelly Madtom (Noturus munitus)	*C2*
Atlantic Sturgeon (Acipenser oxyrhynchus)	*C2*
Alabama Shovelnose Sturgeon (Scaphirhynchus)	*C1*[b]
AMPHIBIANS:	
Cave Salamander (Eurycea lucifuga)	*None*
Green Salamander (Aneides aeneus)	*C2*
Spring Salamander (Gyrinophilus porphyriticus)	*None*
REPTILES:	
Black Pine Snake (Pituophis melanoleucus lodingi)	*C2*
Eastern Indigo Snake (Drymarchon corais couperi)	*Threatened*
Rainbow Snake (Farancia erytrogramma)	*None*
Southern Hognose Snake (Heterodon simus)	*None*
Gopher Tortoise (Gopherus polyphemus)	*Threatened*
Green Turtle (Chelonia mydas)	*Threatened*
Loggerhead Turtle (Caretta caretta)	*Threatened*
Atlantic Ridley (Lepidochelys kempi)	*Endangered*
Hawksbill Turtle (Eretmochelys imbricata)	*Endangered*
Leatherback Turtle (Dermochelys coriacea)	*Endangered*
Black-knobbed Sawback (Graptemys nigrinoda)	*None*
Ringed Sawback (Graptemys oculifera)	*Threatened*
Yellow-blotched Sawback (Graptemys flavimaculata)	*None*
BIRDS:	
Mississippi Sandhill Crane (Grus canadensis pulla)	*Endangered*
Bald Eagle (Haliaeetus leucocephalus)	*Endangered*
Peregrine Falcon (Falco peregrinus)	*Endangered*
Brown Pelican (Pelecanus occidentalis)	*Endangered*
Piping Plover (Charadrius melodus)	*Threatened*
Snowy Plover (Charadrius alexandrinus)	*C2*
Wood Stork (Mycteria americana)	*None*

Ref. 14

Least Tern[2] (Sterna antillarum)	*Endangered*
Bachman's Warbler (Vermivora bachmanii)	*Endangered*
Ivory-billed Woodpecker (Campephilus principalis)	*Endangered*
Red-cockaded Woodpecker (Picoides borealis)	*Endangered*
Bewick's Wren (Thryomanes bewickii)	*None*

MAMMALS:

Gray Bat (Myotis grisescens)	*Endangered*
Indiana Bat (Myotis sodalis)	*Endangered*
Black Bear (Ursus americanus)	*None*
West Indian Manatee (Trichechus manatus)	*Endangered*
Florida Panther (Felis concolor coryi)	*Endangered*
Whales, Order Cetacea, excluding Family Delphinidae	

[a] Candidate, Category 2
[b] Candidate, Category 1
[1] West Mississippi disjunct population
[2] Interior population nesting along Mississippi River

Additional information may be obtained from:
Mississippi Department of Wildlife Conservation
Museum of Natural Science
111 North Jefferson Street
Jackson, Mississippi 39201-2897

Endangered Species of Mississippi
Mississippi Department of Wildlife Conservation
Museum of Natural Science
111 North Jefferson Street
Jackson, MS 39201

Funded in part by:
National Science Foundation and
Endangered Species Act of 1973
(PL93-205) Federal Aid Project E-1

67515

U.S. DEPARTMENT OF COMMERCE
FREDERICK H. MUELLER, *Secretary*

WEATHER BUREAU
F. W. REICHELDERFER, *Chief*

TECHNICAL PAPER NO. 37

Evaporation Maps for the United States

M. A. KOHLER, T. J. NORDENSON, and D. R. BAKER
Hydrologic Services Division

WASHINGTON, D.C.
1959

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. - Price 65 cents

Ref. 15

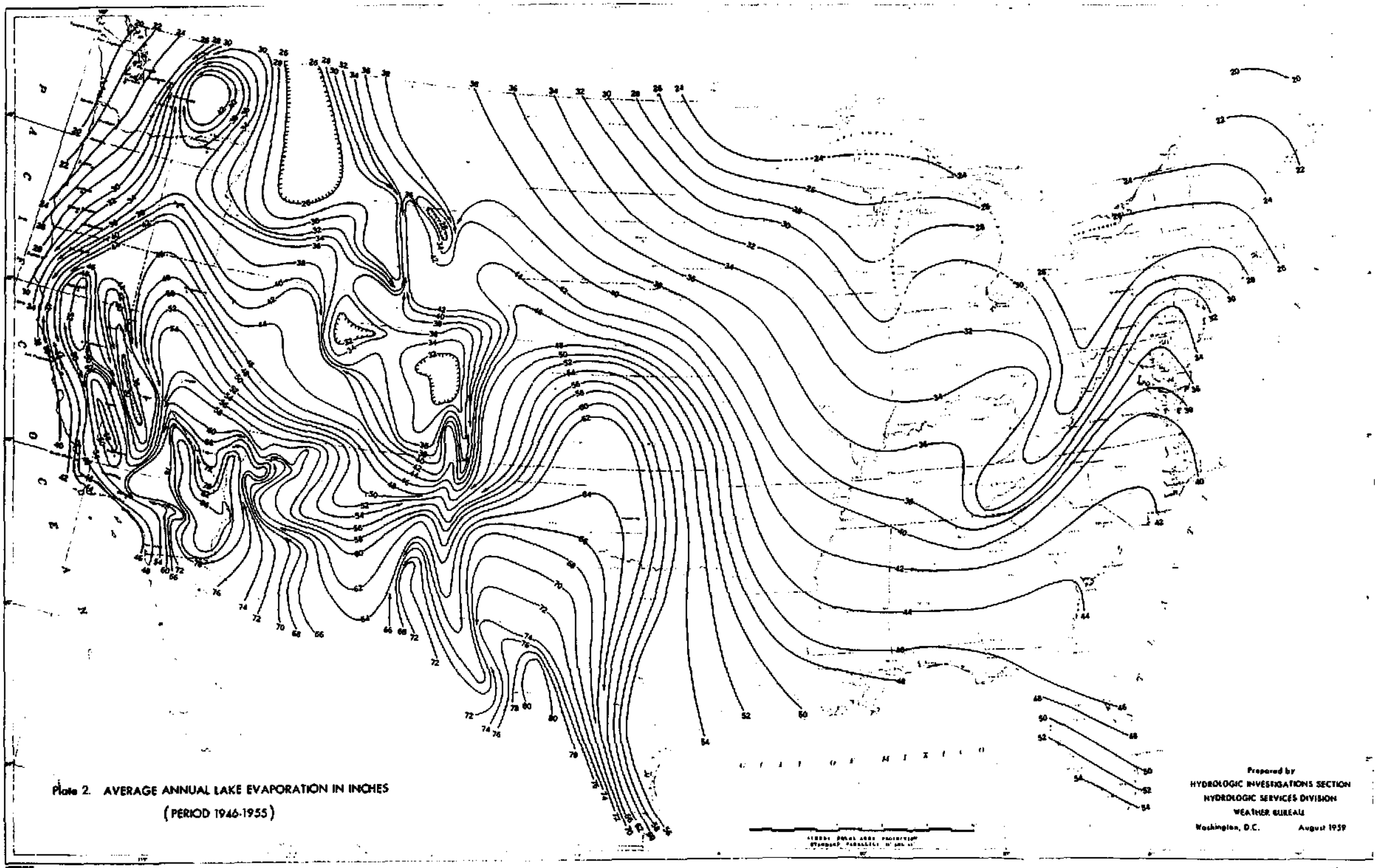


Plate 2. AVERAGE ANNUAL LAKE EVAPORATION IN INCHES
(PERIOD 1946-1955)

Prepared by
HYDROLOGIC INVESTIGATIONS SECTION
HYDROLOGIC SERVICES DIVISION
WEATHER BUREAU
Washington, D.C. August 1959

Plate 2.

525189 O-59 (Face Blank p. 14) No. 2

Please print or type in the unshaded areas only
(fill—in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 158-R0175

FORM 1 GENERAL — EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
GENERAL INFORMATION
Consolidated Permits Program
(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER
F M S D 9 9 0 7 1 4 0 8 1 D

LABEL ITEMS

I. EPA I.D. NUMBER — MSD990714081
III. FACILITY NAME — VERTAC CHEMICAL
V. FACILITY MAILING ADDRESS — RIFLE RANGE RD. VICKSBURG, MS
PLEASE PLACE LABEL IN THIS SPACE
VI. FACILITY LOCATION — RIFLE RANGE RD. VICKSBURG, MS. 39180

GENERAL INSTRUCTIONS
If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill—in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill—in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold—faced terms.

SPECIFIC QUESTIONS	YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X	
B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)	X		X
D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X		
F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X	
H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	
J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP VERTAC CHEMICAL CORP. VICKSBURG, MS. PLANT

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 AHLERS, FRED, PLANT MANAGER	601 636 1231

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX
3 P. O. BOX 3

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 VICKSBURG,	MS	39180

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER
5 RIFLE RANGE ROAD

B. COUNTY NAME
WARREN

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 VICKSBURG	MS	39180	

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
7 2865	(specify) Organics	7 2816	(specify) Inorganics
C. THIRD		**D. FOURTH**	
7	(specify)	7	(specify)

VIII. OPERATOR INFORMATION

A. NAME: 8 VERTAC CHICAL CORPORATION

B. Is the name listed in Item VIII-A also the owner? ☒ YES ☐ NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

P (specify)

D. PHONE (area code & no.): A 901 767 6851

E. STREET OR P.O. BOX: SUITE 2414 5100 POPLAR AVE.

F. CITY OR TOWN	G. STATE	H. ZIP CODE
8 MEMPHIS	TN	3813[illegible]

IX. INDIAN LAND

Is the facility located on Indian lands? ☐ YES ☒ NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	D. PSD (Air Emissions from Proposed Sources)	
9 N MS0027995	9 P	
B. UIC (Underground Injection of Fluids)	**E. OTHER (specify)**	
9 U	9	(specify) Air application including emissions survey submitted to state.
C. RCRA (Hazardous Wastes)	**E. OTHER (specify)**	
9 R	9	(specify)

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

PRODUCTION OF: (1) Pesticides (Dinobutyl Phenol & Toxaphene)

(2) Potassium Nitrate

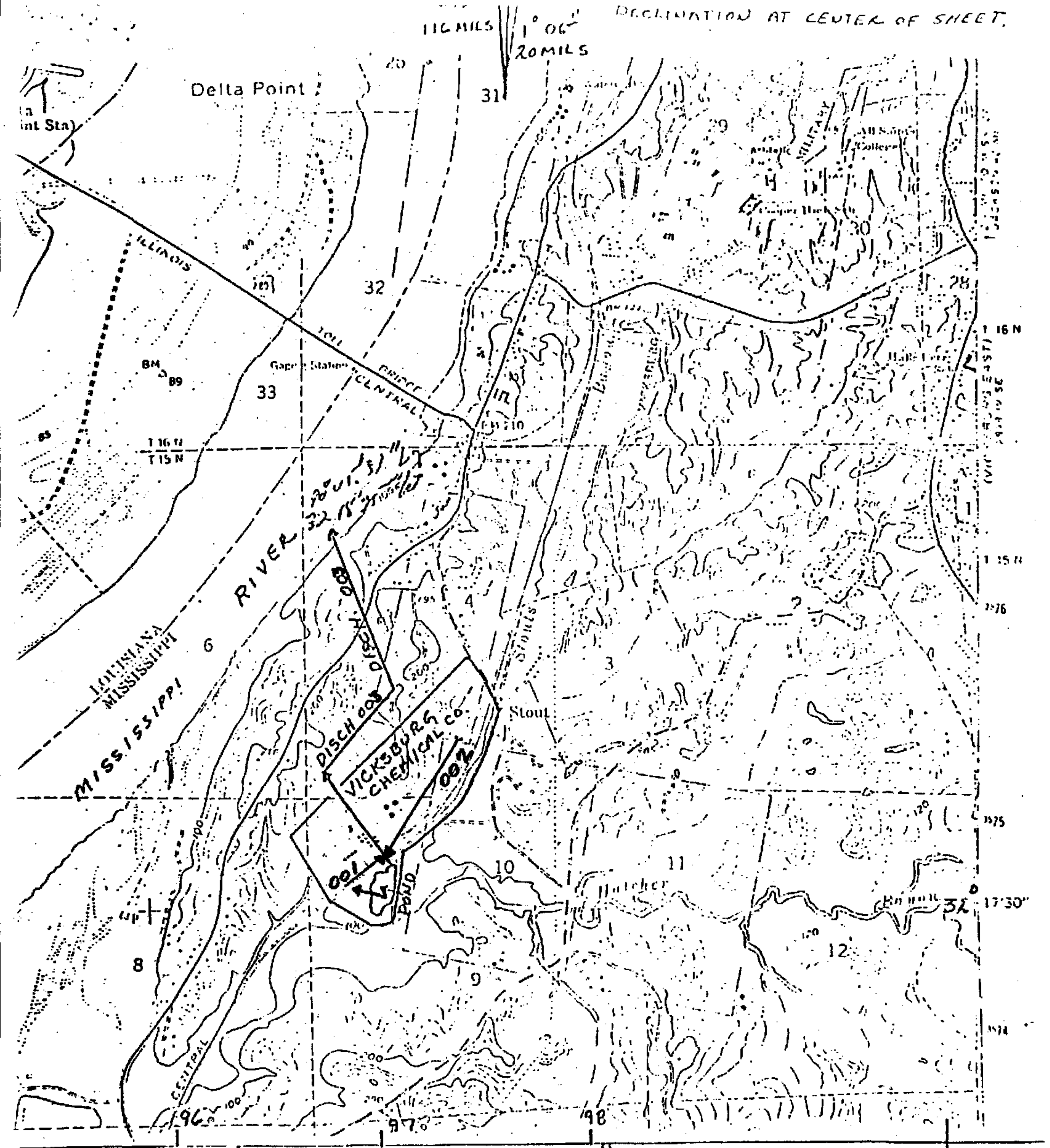
XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
R. A. Guidi, Vice President	[signature]	6-26-81

COMMENTS FOR OFFICIAL USE ONLY

C



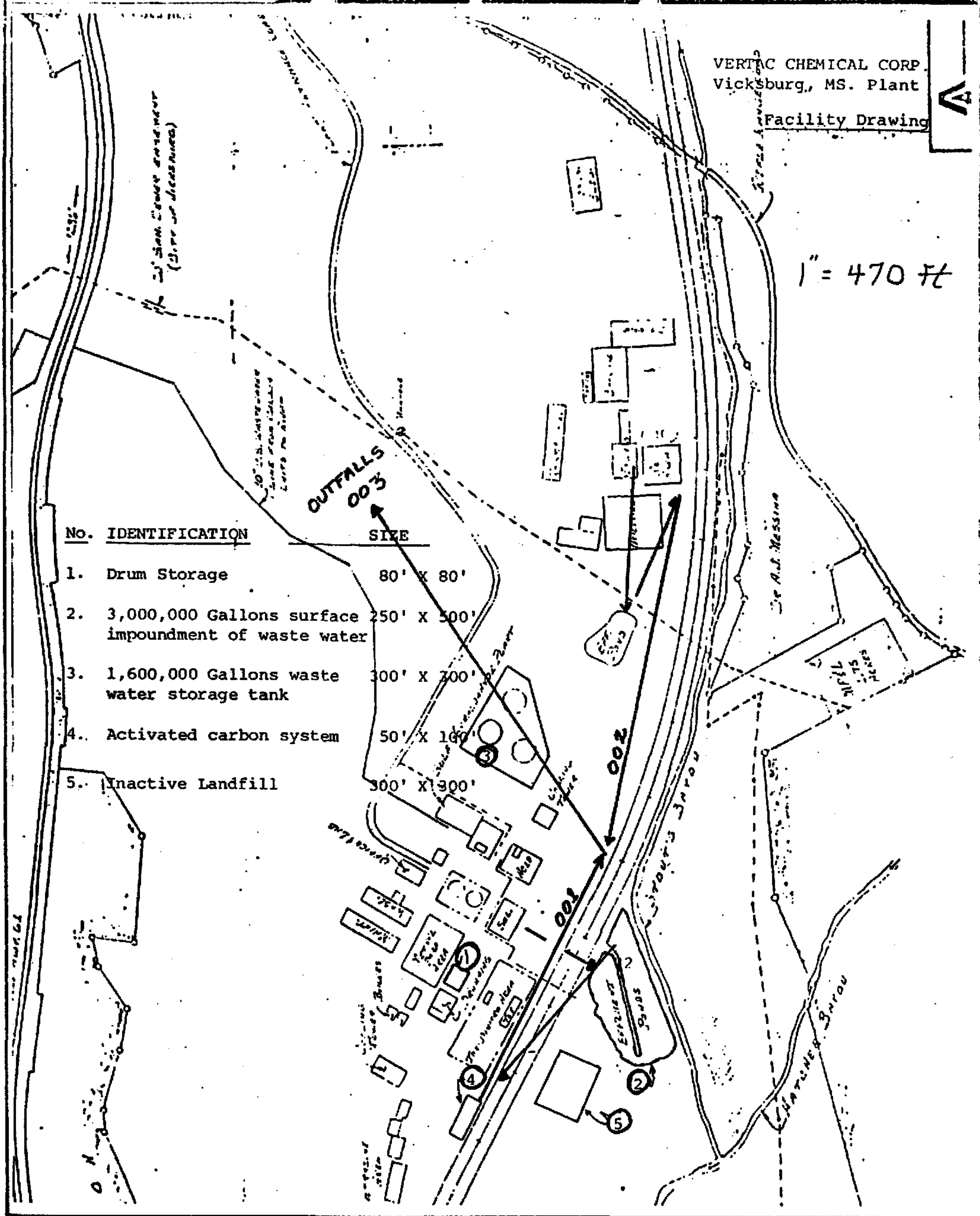
55'

SCALE 1: 24000

90°52'30"

LOCATION MAP
FROM U.S. GEOLOGICAL SURVEY
MAP. 1972
VICKSBURG CHEMICAL CO.
VICKSBURG, WARREN, MISS.

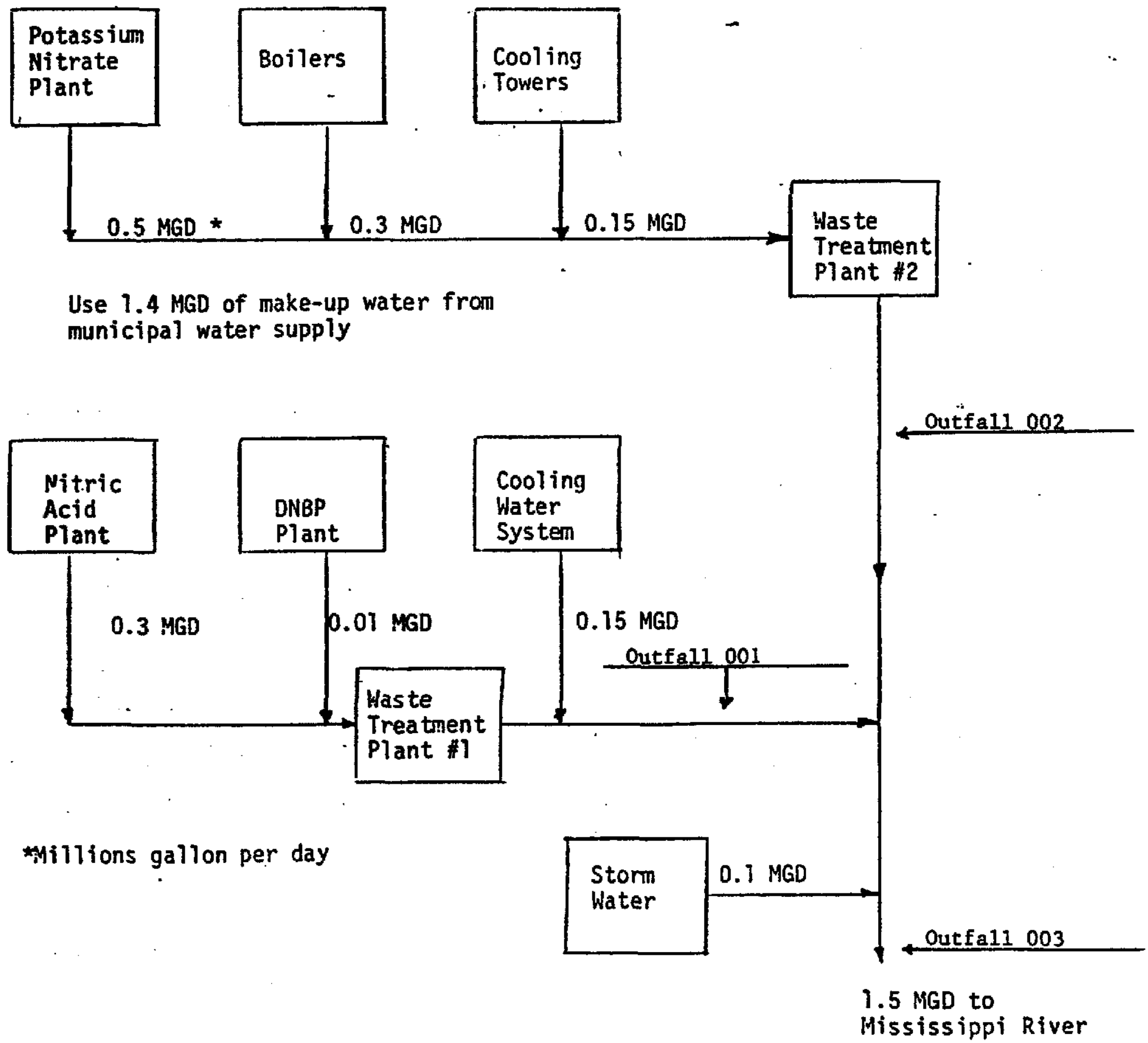
CILITY DRAWING



EPA Form 3510-3 (6-80)

SCHEMATIC OF WATER FLOW

VERTAC CHEMICAL CORPORATION
P. O. BOX 3
VICKSBURG, MS. 39180



*Millions gallon per day

Please print or type in the unshaded areas only.

I.D. NUMBER (copy from Item 1 of Form 1)
Ms. 990714081

Form Approved OMB No. 158-R0173

FORM 2C NPDES

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY
APPLICATION FOR PERMIT TO DISCHARGE WASTEWATER
EXISTING MANUFACTURING, COMMERCIAL, MINING AND SILVICULTURAL OPERATIONS
Consolidated Permits Program

I. OUTFALL LOCATION

For each outfall, list the latitude and longitude of its location to the nearest 15 seconds and the name of the receiving water.

A. OUTFALL NUMBER (list)	B. LATITUDE 1. DEG.	2. MIN.	3. SEC.	C. LONGITUDE 1. DEG.	2. MIN.	3. SEC.	D. RECEIVING WATER (name)
001	32	18	25	90	05	31	(ENTERS OUTFALL 003)
002	32	18	25	90	05	31	(ENTERS OUTFALL 003)
003	32	18	25	90	05	31	MISSISSIPPI RIVER

II. FLOWS, SOURCES OF POLLUTION, AND TREATMENT TECHNOLOGIES

A. Attach a line drawing showing the water flow through the facility. Indicate sources of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item B. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined *(e.g., for certain mining activities)*, provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

B. For each outfall, provide a description of: (1) All operations contributing wastewater to the effluent, including process wastewater, sanitary wastewater, cooling water, and storm water runoff; (2) The average flow contributed by each operation; and (3) The treatment received by the wastewater. Continue on additional sheets if necessary.

1. OUTFALL NO. (list)	2. OPERATION(S) CONTRIBUTING FLOW a. OPERATION (list)	b. AVERAGE FLOW (include units)	3. TREATMENT a. DESCRIPTION	b. LIST CODES FROM TABLE 2C-1	
001	NITRIC ACID PLANT	0.3*	pH ADJUSTMENT, CARBON ADSORPTION	2K	2A
	DNBP PLANT	0.005	" "	2K	2A
	TOXAPHENE PLANT	0.005	" "	2K	2A
	COOLING WATER SYSTEM	0.15	" "	2K	2A
002	POTASSIUM NITRATE	0.5	pH ADJUSTMENT	2K	
	BOILER BLOW DOWN	0.3	"	2K	
	COOLING TOWER WATER	0.15	"	2K	
003	NITRIC ACID PLANT	0.3	pH ADJUSTMENT, CARBON ADSORPTION	2K	2A
	DNBP PLANT	0.005	" "		
	TOXAPHENE PLANT	0.005	" "		
	COOLING WATER SYSTEM	0.15	" "		
	POTASSIUM NITRATE	0.5	pH ADJUSTMENT	2K	
	BOILER BLOW DOWN	0.3	" "	2K	
	COOLING TOWER WATER	0.15	" "	2K	
	STORM WATER	0.1	NONE		
	*=MILLION GALLONS PER DAY				

OFFICIAL USE ONLY (effluent guidelines sub-categories)

CONTINUED FROM THE FRONT

C. Except for storm runoff, leaks, or spills, are any of the discharges described in Items II-A or B intermittent or seasonal?

[X] YES *(complete the following table)* [ ] NO *(go to Section III)*

1. OUTFALL NUMBER *(list)*	2. OPERATION(s) CONTRIBUTING FLOW *(list)*	3. FREQUENCY a. DAYS PER WEEK *(specify average)*	3. FREQUENCY b. MONTHS PER YEAR *(specify average)*	4. FLOW a. FLOW RATE *(in mgd)* 1. LONG TERM AVERAGE	4. FLOW a. FLOW RATE *(in mgd)* 2. MAXIMUM DAILY	4. FLOW b. TOTAL VOLUME *(specify with units)* 1. LONG TERM AVERAGE	4. FLOW b. TOTAL VOLUME *(specify with units)* 2. MAXIMUM DAILY	4. FLOW c. DURATION *(in days)*
001	DINITROPHENOL PLANT	7	6					
001	TOXAPHENE PLANT	7	6					

III. MAXIMUM PRODUCTION

A. Does an effluent guideline limitation promulgated by EPA under Section 304 of the Clean Water Act apply to your facility?

[X] YES *(complete Item III-B)* [ ] NO *(to to Section IV)*

B. Are the limitations in the applicable effluent guideline expressed in terms of production *(or other measure of operation)*?

[X] YES *(complete Item III-C)* [ ] NO *(go to Section IV)*

C. If you answered "Yes" to Item III-B, list the quantity which represents an actual measurement of your maximum level of production, expressed in the terms and units used in the applicable effluent guideline, and indicate the affected outfalls.

1. MAXIMUM QUANTITY a. QUANTITY PER DAY	b. UNITS OF MEASURE	c. OPERATION, PRODUCT, MATERIAL, ETC. *(specify)*	2. AFFECTED OUTFALLS *(list outfall numbers)*
25,000	LBS	DINITROBUTYL PHENOL (DNBP)	001, 003
500,000	LBS	NITRIC ACID	001, 003
600,000	LBS	POTASSIUM NITRATE	002, 003
58,300	LBS	TOXAPHENE	001, 003

IV. IMPROVEMENTS

A. Are you now required by any Federal, State or local authority to meet any implementation schedule for the construction, upgrading or operation of wastewater treatment equipment or practices or any other environmental programs which may affect the discharges described in this application? This includes, but is not limited to, permit conditions, administrative or enforcement orders, enforcement compliance schedule letters, stipulations, court orders, and grant or loan conditions.

[ ] YES *(complete the following table)* [X] NO *(go to Item IV-B)*

1. IDENTIFICATION OF CONDITION, AGREEMENT, ETC.	2. AFFECTED OUTFALLS a. NO.	2. AFFECTED OUTFALLS b. SOURCE OF DISCHARGE	3. BRIEF DESCRIPTION OF PROJECT	4. FINAL COMPLIANCE DATE a. REQUIRED	4. FINAL COMPLIANCE DATE b. PROJECTED

B. OPTIONAL: You may attach additional sheets describing any additional water pollution control programs *(or other environmental projects which may affect your discharges)* you now have underway or which you plan. Indicate whether each program is now underway or planned, and indicate your actual or planned schedules for construction. [ ] MARK "X" IF DESCRIPTION OF ADDITIONAL CONTROL PROGRAMS IS ATTACHED

CONTINUE ON PAGE 3

CONTINUED FROM PAGE 2

EPA I.D. NUMBER (copy from Item 1 of Form 1): MS 990714081

Form Approved OMB No. 158-R0173

V. INTAKE AND EFFLUENT CHARACTERISTICS

A, B, & C: See instructions before proceeding – Complete one set of tables for each outfall – Annotate the outfall number in the space provided.
NOTE: Tables V-A, V-B, and V-C are included on separate sheets numbered V-1 through V-9.

D. Use the space below to list any of the pollutants listed in Table 2c-3 of the instructions, which you know or have reason to believe is discharged or may be discharged from any outfall. For every pollutant you list, briefly describe the reasons you believe it to be present and report any analytical data in your possession.

1. POLLUTANT	2. SOURCE	1. POLLUTANT	2. SOURCE
	NONE ARE KNOWN OR BELIEVED TO BE PRESENT.		

VI. POTENTIAL DISCHARGES NOT COVERED BY ANALYSIS

A. Is any pollutant listed in Item V-C a substance or a component of a substance which you do or expect that you will over the next 5 years use or manufacture as an intermediate or final product or byproduct?

☐ YES (list all such pollutants below) ☒ NO (go to Item VI-B)

NO NEW PRODUCTS ARE KNOWN TO CONTAIN ANY OF THE SUBSTANCES LISTED IN ITEM V.C.

B. Are your operations such that your raw materials, processes, or products can reasonably be expected to vary so that your discharges of pollutants may during the next 5 years exceed two times the maximum values reported in Item V?

☐ YES (complete Item VI-C below) ☒ NO (go to Section VII)

C. If you answered "Yes" to Item VI-B, explain below and describe in detail the sources and expected levels of such pollutants which you anticipate will be discharged from each outfall over the next 5 years, to the best of your ability at this time. Continue on additional sheets if you need more space.

CONTINUED FROM THE FRONT

VII. BIOLOGICAL TOXICITY TESTING DATA

Do you have any knowledge or reason to believe that any biological test for acute or chronic toxicity has been made on any of your discharges or on a receiving water in relation to your discharge within the last 3 years?

[X] YES *(identify the test(s) and describe their purposes below)* [ ] NO *(go to Section VIII)*

A STATIC BIOASSAY WAS PERFORMED TO DETERMINE THE 96 HOUR LETHAL CONCENTRATION (LC_{50})

VIII. CONTRACT ANALYSIS INFORMATION

Were any of the analyses reported in Item V performed by a contract laboratory or consulting firm?

[X] YES *(list the name, address, and telephone number of, and pollutants analyzed by, each such laboratory or firm below)* [ ] NO *(go to Section IX)*

A. NAME	B. ADDRESS	C. TELEPHONE *(area code & no.)*	D. POLLUTANTS ANALYZED *(list)*
ENVIRONMENTAL PROTECTION SYSTEMS	P. O. BOX 20382 JACKSON, MS. 39209	(601) 922-8242	ALL THE PRIORTY POLLUTANTS

IX. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE *(type or print)*	B. PHONE NO. *(area code & no.)*
R. A. Guidi, Vice President	901-767-6851
C. SIGNATURE	**D. DATE SIGNED**
[signature]	6-26-81

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SEE INSTRUCTIONS.

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*
MSD990714081

Form Approved OMB No. 158-R0173

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)*

OUTFALL NO. 001

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT							3. UNITS *(specify if blank)*		4. INTAKE *(optional)*		
	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Biochemical Oxygen Demand *(BOD)*	36	239	16.6	122	11.1	74.5	10	PPM	LBS			
b. Chemical Oxygen Demand *(COD)*	284	1878	47.6	349.9	70.6	530	14	"	"			
c. Total Organic Carbon *(TOC)*	301	3493	41.3	448	NOT AVAILABLE		1	"	"			
d. Total Suspended Solids *(TSS)*	110	440.8	25.4	102.9	11.8	69.8	7	"	"			
e. Ammonia *(as N)*	220	2577	71.7	783	NOT AVAILABLE		7	"	"			
f. Flow	VALUE 3.0		VALUE 1.3		VALUE 0.8578		1	MGD		VALUE		
g. Temperature *(winter)*	VALUE 26		VALUE 26		VALUE 17		–	°C		VALUE		
h. Temperature *(summer)*	VALUE 33		VALUE 33		VALUE 26		–	°C		VALUE		
i. pH	MINIMUM 6.0	MAXIMUM 9.0	MINIMUM 6.1	MAXIMUM 9.0			–	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2-a for any pollutant, you must provide the results of at least one analysis for that pollutant. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. *(if available)*	2. MARK 'X'		3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE *(if available)*		c. LONG TERM AVRG. VALUE *(if available)*		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
a. Bromide (24959-67-9)		x												
b. Chlorine, Total Residual	x		20	89	NOT AVAILABLE		NOT AVAILABLE		1	mg/L	LBS			
c. Color	x		2 50	–	"	"	"	"	1	PCU	–			
d. Fecal Coliform		x												
e. Fluoride (16984-48-8)	x		< 0.01	< 0.05	"	"	"	"	1	mg/L	LBS			
f. Nitrate–Nitrite *(as N)*	x		770	6797	224	1000	224	1877	240	mg/L	LBS			

CONTINUE ON REVERSE

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK 'X'		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)	x		4.2	19	NOT AVAILABLE		NOT AVAILABLE		1	mg/L	LBS			
h. Oil and Grease	x		< 0.1	< 0.5	"	"	"	"	1	"	"			
i. Phosphorus (as P), Total (7723-14-0)	x		< 0.1	< 0.7	"	"	"	"	1	"	"			
j. Radioactivity														
(1) Alpha, Total		x												
(2) Beta, Total		x												
(3) Radium, Total		x												
(4) Radium 226, Total		x												
k. Sulfate (as SO_4) (14808-79-8)	x		184	822	"	"	"	"	1	mg/L	LBS			
l. Sulfide (as S)		x												
m. Sulfite (as SO_3) (14265-45-3)	x		8.22	36.7	"	"	"	"	1	mg/L	LBS			
n. Surfactants	x		1.12	5.0	"	"	"	"	1	"	"			
o. Aluminum, Total (7429-90-5)	x		< 0.008	< 0.04	"	"	"	"	1	"	"			
p. Barium, Total (7440-39-3)	x		< 0.1	< 0.44	"	"	"	"	1	"	"			
q. Boron, Total (7440-42-8)	x		0.14	0.62	"	"	"	"	1	"	"			
r. Cobalt, Total (7440-48-4)	x		< 0.09	< 0.44	"	"	"	"	1	"	"			
s. Iron, Total (7439-89-6)	x		3.63	16.2	"	"	"	"	1	"	"			
t. Magnesium, Total (7439-95-4)	x		0.22	0.98	"	"	"	"	1	"	"			
u. Molybdenum, Total (7439-98-7)	x		0.04	0.18	"	"	"	"	1	"	"			
v. Manganese, Total (7439-96-5)		x												
w. Tin, Total (7440-31-5)	x		0.09	0.44	"	"	"	"	1	"	"			
x. Titanium, Total (7440-32-6)	x		< 0.04	< 0.18	"	"	"	"	1	"	"			

CONTINUE ON PAGE V-3

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SEE INSTRUCTIONS.

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*: MSD990714081

Form Approved OMB No. 158-R0173

OUTFALL NO. 002

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)*

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT: a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	3. UNITS *(specify if blank)* a. CONCENTRATION	b. MASS	4. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Biochemical Oxygen Demand *(BOD)*	0 (interference)	0	98.5	252	30	60.3	12	PPM	LBS			
b. Chemical Oxygen Demand *(COD)*	0 (interference)	0	296	635	181	351	12	PPM	LBS			
c. Total Organic Carbon *(TOC)*	137.4	357	NOT AVAILABLE		NOT AVAILABLE		1	PPM	LBS			
d. Total Suspended Solids *(TSS)*	172	250	172	250	71.7	142	12	PPM	LMS			
e. Ammonia *(as N)*	0	0	0	0	0	0	1	PPM	LBS			
f. Flow	VALUE o.7701		VALUE 2.7		VALUE 0.3633		–	–	MGD	VALUE		
g. Temperature *(winter)*	VALUE 24		VALUE 20		VALUE NOT AVAILABLE		–	°C		VALUE		
h. Temperature *(summer)*	VALUE 33		VALUE 33		VALUE NOT AVAILABLE		–	°C		VALUE		
i. pH	MINIMUM 2.0	MAXIMUM 9.7	MINIMUM 6.6	MAXIMUM 9.0			–	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2-a for any pollutant, you must provide the results of at least one analysis for that pollutant. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. *(if available)*	2. MARK 'X' a. BELIEVED PRESENT	b. BELIEVED ABSENT	3. EFFLUENT: a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Bromide (24959-67-9)	x		∠ 0.01	∠0.026	NOT AVAILABLE		NOT AVAILABLE		1	mg/L	LBS.			
b. Chlorine, Total Residual	x		.4	.9	2.1	5.4	"	"	1	"	"			
c. Color	x		20	–	NOT AVAILABLE		NOT AVAILABLE		1	PCU	–			
d. Fecal Coliform		x												
e. Fluoride (16984-48-8)	x		∠ 0.01	∠0.026	"	"	"	"	1	mg/L	LBS.			
f. Nitrate–Nitrite *(as N)*	x		2525	10239	1957	7750	575	4308	240	mg/L	LBS.			

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK 'X'		3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. BELIEVED PRESENT	b. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
			(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
g. Nitrogen, Total Organic (as N)		x			NOT AVAILABLE		NOT AVAILABLE							
h. Oil and Grease	x		< 0.1	< 0.26	"	"	"	"	1	mg/L	LBS.			
i. Phosphorus (as P), Total (7723-14-0)		x												
j. Radioactivity														
(1) Alpha, Total		x												
(2) Beta, Total		x												
(3) Radium, Total		x												
(4) Radium 226, Total		x												
k. Sulfate (as SO_4) (14808-79-8)	x		53.6	140	"	"	"	"	1	mg/L	LBS.			
l. Sulfide (as S)		x												
m. Sulfite (as SO_3) (14265-45-3)	x		2.22	5.8	"	"	"	"	1	mg/L	LBS.			
n. Surfactants	x		1.07	2.8	"	"	"	"	1	"	"			
o. Aluminum, Total (7429-90-5)	x		< 0.008	< 0.02	"	"	"	"	1	"	"			
p. Barium, Total (7440-39-3)	x		< 0.01	< 0.03	"	"	"	"	1	"	"			
q. Boron, Total (7440-42-8)	x		0.14	0.37	"	"	"	"	1	"	"			
r. Cobalt, Total (7440-48-4)	x		< 0.09	< 0.26	"	"	"	"	1	"	"			
s. Iron, Total (7439-89-6)	x		3.8	10.0	"	"	"	"	1	"	"			
t. Magnesium, Total (7439-95-4)	x		0.22	0.58	"	"	"	"	1	"	"			
u. Molybdenum, Total (7439-98-7)	x		0.038	0.10	"	"	"	"	1	"	"			
v. Manganese, Total (7439-96-5)		x												
w. Tin, Total (7440-31-5)	x		0.09	0.26	"	"	"	"	1	mg/L	LBS.			
x. Titanium, Total (7440-32-6)	x		< 0.04	< 0.10	"	"	"	"	1	"	"			

CONTINUE ON PAGE V-3

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Form Approved OMB No. 158-R0173

OUTFALL NO. 003

V. INTAKE AND EFFLUENT CHARACTERISTICS *(continued from page 3 of Form 2-C)*

003

PART A - You must provide the results of at least one analysis for every pollutant in this table. Complete one table for each outfall. See instructions for additional details.

1. POLLUTANT	2. EFFLUENT: a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	3. UNITS *(specify if blank)* a. CONCENTRATION	b. MASS	4. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Biochemical Oxygen Demand *(BOD)*	36	239	16.6	122	NOT AVAILABLE		18	PPM	LBS.			
b. Chemical Oxygen Demand *(COD)*	206	1828	58	427	"	"	12	"	"			
c. Total Organic Carbon *(TOC)*	301	3493	119	872	"	"	18	"	"			
d. Total Suspended Solids *(TSS)*	22	257	14.8	113	"	"	18	"	"			
e. Ammonia *(as N)*	220	2577	41.8	296	"	"	12	"	"			
f. Flow	VALUE 4.2		VALUE 2.1		VALUE 1.050		–	–	M.G.D.	VALUE		
g. Temperature *(winter)*	VALUE 14.4		VALUE 8.9		VALUE NOT AVAILABLE		–	°C		VALUE		
h. Temperature *(summer)*	VALUE 33.9		VALUE 24.9		VALUE NOT AVAILABLE		–	°C		VALUE		
i. pH	MINIMUM 6.1	MAXIMUM 9.0	MINIMUM 2.5	MAXIMUM 10.2			–	STANDARD UNITS				

PART B - Mark "X" in column 2-a for each pollutant you know or have reason to believe is present. Mark "X" in column 2-b for each pollutant you believe to be absent. If you mark column 2-a for any pollutant, you must provide the results of at least one analysis for that pollutant. Complete one table for each outfall. See the instructions for additional details and requirements.

1. POLLUTANT AND CAS NO. *(if available)*	2. MARK 'X' a. BELIEVED PRESENT	b. BELIEVED ABSENT	3. EFFLUENT: a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE *(optional)* a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
a. Bromide (24959-67-9)	x		< 0.01	< 0.08	NOT AVAILABLE		NOT AVAILABLE		1	mg/L	LBS			
b. Chlorine, Total Residual	x		20	141.6	"	"	"	"	1	"	"			
c. Color	x		5	–	"	"	"	"	1	PCU	–			
d. Fecal Coliform		x												
e. Fluoride (16984-48-8)	x		< .01	< 0.08	"	"	"	"	1	mg/L	LBS			
f. Nitrate–Nitrite *(as N)*	x		2780	23,959	1916	4549	907	5094	110	mg/L	LBS			

ITEM V-B CONTINUED FROM FRONT

1. POLLUTANT AND CAS NO. (if available)	2. MARK 'X': a. BELIEVED PRESENT	2. MARK 'X': b. BELIEVED ABSENT	3. EFFLUENT: a. MAXIMUM DAILY VALUE (1) CONCENTRATION	3. EFFLUENT: a. MAXIMUM DAILY VALUE (2) MASS	3. EFFLUENT: b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	3. EFFLUENT: b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	3. EFFLUENT: c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	3. EFFLUENT: c. LONG TERM AVRG. VALUE (if available) (2) MASS	3. EFFLUENT: d. NO. OF ANALYSES	4. UNITS: a. CONCENTRATION	4. UNITS: b. MASS	5. INTAKE (optional): a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	5. INTAKE (optional): a. LONG TERM AVERAGE VALUE (2) MASS	5. INTAKE (optional): b. NO. OF ANALYSES
g. Nitrogen, Total Organic (as N)	x		< 0.1	< 0.7	NOT AVAILABLE		NOT AVAILABLE		1	PPM	LBS			
h. Oil and Grease	x		< 0.1	< 0.7	"	"	"	"	1	"	"			
i. Phosphorus (as P), Total (7723-14-0)	x		< 0.1	< 0.7	"	"	"	"	1	"	"			
j. Radioactivity														
(1) Alpha, Total		x												
(2) Beta, Total		x												
(3) Radium, Total		x												
(4) Radium 226, Total		x												
k. Sulfate (as SO_4) (14808-79-8)	x		144.4	1022	"	"	"	"	1	PPM	LBS			
l. Sulfide (as S)	x		< 0.06	< .42	"	"	"	"	1	"	"			
m. Sulfite (as SO_3) (14265-45-3)	x		6.0	42.48	"	"	"	"	1	"	"			
n. Surfactants	x		1.1	7.78	"	"	"	"	1	"	"			
o. Aluminum, Total (7429-90-5)	x		< 0.008	< 0.06	"	"	"	"	1	"	"			
p. Barium, Total (7440-39-3)	x		< 0.1	< 0.7	"	"	"	"	1	"	"			
q. Boron, Total (7440-42-8)	x		0.14	0.99	"	"	"	"	1	"	"			
r. Cobalt, Total (7440-48-4)	x		< 0.01	< 0.07	"	"	"	"	1	"	"			
s. Iron, Total (7439-89-6)	x		3.7	26.2	"	"	"	"	1	"	"			
t. Magnesium, Total (7439-95-4)	x		0.22	1.56	"	"	"	"	1	"	"			
u. Molybdenum, Total (7439-98-7)	x		0.04	0.28	"	"	"	"	1	"	"			
v. Manganese, Total (7439-96-5)		x												
w. Tin, Total (7440-31-5)	x		0.1	0.7	"	"	"	"	1	PPM	LBS			
x. Titanium, Total (7440-32-6)	x		< 0.04	< 0.28	"	"	"	"	1	"	"			

CONTINUE ON PAGE V-3

CONTINUED FROM PAGE 3 OF FORM 2-C

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*	OUTFALL NUMBER
MSD990714081	003

Form Approved OMB No. 158 R0173

PART C - If you are a primary industry and this outfall contains process wastewater, refer to Table 2c-2 in the instructions to determine which of the GC/MS fractions you must test for. Mark "X" in column 2-a for all such GC/MS fractions that apply to your industry and for ALL toxic metals, cyanides, and total phenols. If you are not required to mark column 2-a *(secondary industries, non-process wastewater outfalls, and non-required GC/MS fractions)*, mark "X" in column 2-b for each pollutant you know or have reason to believe is present. Mark "X" in column 2-c for each pollutant you believe to be absent. If you mark either columns 2-a or 2-b for any pollutant, you must provide the results of at least one analysis for that pollutant. Note that there are seven pages to this part; please review each carefully. Complete one table *(all seven pages)* for each outfall. See instructions for additional details and requirements.

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION	b. (2) MASS	c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION	c. (2) MASS	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	a. (2) MASS	b. NO. OF ANALYSES
METALS, CYANIDE, AND TOTAL PHENOLS															
1M. Antimony, Total (7440-36-0)	x			< 0.01	< 0.07	Not available		Not available		1	mg/L	LBS			
2M. Arsenic, Total (7440-38-2)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
3M. Beryllium, Total, 7440-41-7)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
4M. Cadmium, Total (7440-43-9)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
5M. Chromium, Total (7440-47-3)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
6M. Copper, Total (7550-50-8)	x			0.22	1.56	"	"	"	"	1	"	"			
7M. Lead, Total (7439-92-1)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
8M. Mercury, Total (7439-97-6)	x			< 0.002	< 0.014	"	"	"	"	1	"	"			
9M. Nickel, Total (7440-02-0)	x			0.36	2.25	"	"	"	"	1	"	"			
10M. Selenium, Total (7782-49-2)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
11M. Silver, Total (7440-22-4)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
12M. Thallium, Total (7440-28-0)	x			< 0.01	< 0.07	"	"	"	"	1	"	"			
13M. Zinc, Total (7440-66-6)	X			0.14	0.99	"	"	"	"	1	"	"			
14M. Cyanide, Total (57-12-5)	X			< 0.01	< 0.07	"	"	"	"	1	"	"			
15M. Phenols, Total	X			< 0.01	< 0.07	"	"	"	"	1	"	"			
DIOXIN															
2,3,7,8-Tetrachlorodibenzo-P-Dioxin (1764-01-6)			X	DESCRIBE RESULTS											

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – VOLATILE COMPOUNDS															
1V. Acrolein (107-02-8)	x			< 100	< 0.7	(NOTE: THE MAXIMUM DAILY VALUE FOR				1	ug/L	LBS			
2V. Acrylonitrile (107-13-1)	x			< 100	< 0.7	CONCENTRATION IS THE MINIMUM DETECTION				1	"	"			
3V. Benzene (71-43-2)	x			< 10	< 0.07	LIMIT. THE MASS REPORTED IS BASED				1	"	"			
4V. Bis (Chloromethyl) Ether (542-88-1)	x			"	"	ON THE MINIMUM DETECTION LIMITS.)				1	"	"			
5V. Bromoform (75-25-2)	x			"	"	NONE OF THE ABOVE ARE AVAILABLE				1	"	"			
6V. Carbon Tetrachloride (56-23-5)	x			"	"	NOT AVAILABLE		NOT AVAILABLE		1	"	"			
7V. Chlorobenzene (108-90-7)	x			"	"	"	"	"	"	1	"	"			
8V. Chlorodibromomethane (124-48-1)	x			"	"	"	"	"	"	1	"	"			
9V. Chloroethane (75-00-3)	x			"	"	"	"	"	"	1	"	"			
10V. 2-Chloroethylvinyl Ether (110-75-8)	x			"	"	"	"	"	"	1	"	"			
11V. Chloroform (67-66-3)	x			"	"	"	"	"	"	1	"	"			
12V. Dichlorobromomethane (75-27-4)	x			"	"	"	"	"	"	1	"	"			
13V. Dichlorodifluoromethane (75-71-8)	x			"	"	"	"	"	"	1	"	"			
14V. 1,1-Dichloroethane (75-34-3)	x			"	"	"	"	"	"	1	"	"			
15V. 1,2-Dichloroethane (107-06-2)	x			"	"	"	"	"	"	1	"	"			
16V. 1,1-Dichloroethylene (75-35-4)	x			"	"	"	"	"	"	1	"	"			
17V. 1,2-Dichloropropane (78-87-5)	x			"	"	"	"	"	"	1	"	"			
18V. 1,2-Dichloropropylene (542-75-6)	x			"	"	"	"	"	"	1	"	"			
19V. Ethylbenzene (100-41-4)	x			"	"	"	"	"	"	1	"	"			
20V. Methyl Bromide (74-83-9)	x			"	"	"	"	"	"	1	"	"			
21V. Methyl Chloride (74-87-3)	x			"	"	"	"	"	"	1	"	"			

CONTINUE ON PAGE V-5

CONTINUED FROM PAGE V-4

EPA I.D. NUMBER (copy from Item 1 of Form 1): MSD990714081

OUTFALL NUMBER: 003

Form Approved OMB No. 158-R0173

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION — VOLATILE COMPOUNDS (continued)															
22V. Methylene Chloride (75-09-2)	x			< 10	< 0.07	NOT AVAILABLE		NOT AVAILABLE		1	ug/L	LBS			
23V. 1,1,2,2-Tetrachloroethane (79-34-5)	x			"	"	"	"	"	"	1	"	"			
24V. Tetrachloroethylene (127-18-4)	x			"	"	"	"	"	"	1	"	"			
25V. Toluene (108-88-3)	x			"	"	"	"	"	"	1	"	"			
26V. 1,2-Trans-Dichloroethylene (156-60-5)	x			"	"	"	"	"	"	1	"	"			
27V. 1,1,1-Trichloroethane (71-55-6)	x			"	"	"	"	"	"	1	"	"			
28V. 1,1,2-Trichloroethane (79-00-5)	x			"	"	"	"	"	"	1	"	"			
29V. Trichloroethylene (79-01-6)	x			"	"	"	"	"	"	1	"	"			
30V. Trichlorofluoromethane (75-69-4)	x			"	"	"	"	"	"	1	"	"			
31V. Vinyl Chloride (75-01-4)	x			"	"	"	"	"	"	1	"	"			
GC/MS FRACTION — ACID COMPOUNDS															
1A. 2-Chlorophenol (95-57-8)	x			< 25	< 0.18	"	"	"	"	1	ug/L	LBS			
2A. 2,4-Dichlorophenol (120-83-2)	x			"	"	"	"	"	"	1	"	"			
3A. 2,4-Dimethylphenol (105-67-9)	x			"	"	"	"	"	"	1	"	"			
4A. 4,6-Dinitro-O-Cresol (534-52-1)	x			< 250	< 1.8	"	"	"	"	1	"	"			
5A. 2,4-Dinitrophenol (51-28-5)	x			< 25	< 0.18	"	"	"	"	1	"	"			
6A. 2-Nitrophenol (88-75-5)	x			"	"	"	"	"	"	1	"	"			
7A. 4-Nitrophenol (100-02-7)	x			"	"	"	"	"	"	1	"	"			
8A. P-Chloro-M-Cresol (59-50-7)	x			"	"	"	"	"	"	1	"	"			
9A. Pentachlorophenol (87-86-5)	x			"	"	"	"	"	"	1	"	"			
10A. Phenol (108-95-2)	x			"	"	"	"	"	"	1	"	"			
11A. 2,4,6-Trichlorophenol (88-06-2)	x			"	"	"	"	"	"	1	"	"			

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK "X"			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (if available) (2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (if available) (2) MASS	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	a. LONG TERM AVERAGE VALUE (2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS															
1B. Acenaphthene (83-32-9)	x			≤ 10	≤ 0.07	NOT AVAILABLE		NOT AVAILABLE		1	ug/L	LBS			
2B. Acenaphtylene (208-96-8)	x			"	"	"	"	"	"	1	"	"			
3B. Anthracene (120-12-7)	x			"	"	"	"	"	"	1	"	"			
4B. Benzidine (92-87-5)	x			"	"	"	"	"	"	1	"	"			
5B. Benzo (a) Anthracene (56-55-3)	x			"	"	"	"	"	"	1	"	"			
6B. Benzo (a) Pyrene (50-32-8)	x			"	"	"	"	"	"	1	"	"			
7B. 3,4-Benzo-fluoranthene (205-99-2)	x			"	"	"	"	"	"	1	"	"			
8B. Benzo (ghi) Perylene (191-24-2)	x			≤ 25	≤ 1.8	"	"	"	"	1	"	"			
9B. Benzo (k) Fluoranthene (207-08-9)	x			≤ 10	≤ 0.07	"	"	"	"	1	"	"			
10B. Bis (2-Chloro-ethoxy) Methane (111-91-1)	x			"	"	"	"	"	"	1	"	"			
11B. Bis (2-Chloro-ethyl) Ether (111-44-4)	x			"	"	"	"	"	"	1	"	"			
12B. Bis (2-Chloro-isopropyl) Ether (39638-32-9)	x			"	"	"	"	"	"	1	"	"			
13B. Bis (2-Ethyl-hexyl) Phthalate (117-81-7)	x			"	"	"	"	"	"	1	"	"			
14B. 4-Bromo-phenyl Phenyl Ether (101-55-3)	x			"	"	"	"	"	"	1	"	"			
15B. Butyl Benzyl Phthalate (85-68-7)	x			"	"	"	"	"	"	1	"	"			
16B. 2-Chloro-naphthalene (91-58-7)	x			"	"	"	"	"	"	1	"	"			
17B. 4-Chloro-phenyl Phenyl Ether (7005-72-3)	x			"	"	"	"	"	"	1	"	"			
18B. Chrysene (218-01-9)	x			"	"	"	"	"	"	1	"	"			
19B. Dibenzo (a,h) Anthracene (53-70-3)	x			≤ 25	≤ 0.18	"	"	"	"	1	"	"			
20B. 1,2-Dichloro-benzene (95-50-1)	x			"	"	"	"	"	"	1	"	"			
21B. 1,3-Dichloro-benzene (541-73-1)	x			"	"	"	"	"	"	1	"	"			

CONTINUE ON PAGE V-7

CONTINUED FROM PAGE V-6

EPA I.D. NUMBER (copy from Item 1 of Form 1): MSD990714081 | OUTFALL NUMBER: 003

Form Approved OMB No. 158-R0173

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X' a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	3. EFFLUENT a. MAXIMUM DAILY VALUE (1) CONCENTRATION	(2) MASS	b. MAXIMUM 30 DAY VALUE (if available) (1) CONCENTRATION	(2) MASS	c. LONG TERM AVRG. VALUE (if available) (1) CONCENTRATION	(2) MASS	d. NO. OF ANALYSES	4. UNITS a. CONCENTRATION	b. MASS	5. INTAKE (optional) a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	(2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION – BASE/NEUTRAL COMPOUNDS (continued)															
22B. 1,4-Dichlorobenzene (106-46-7)	x			< 10	< 0.07	NOT AVAILABLE		NOT AVAILABLE		1	ug/L	LBS			
23B. 3,3'-Dichlorobenzidine (91-94-1)	x			"	"	"	"	"	"	1	"	"			
24B. Diethyl Phthalate (84-66-2)	x			"	"	"	"	"	"	1	"	"			
25B. Dimethyl Phthalate (131-11-3)	x			"	"	"	"	"	"	1	"	"			
26B. Di-N-Butyl Phthalate (84-74-2)	x			"	"	"	"	"	"	1	"	"			
27B. 2,4-Dinitrotoluene (121-14-2)	x			"	"	"	"	"	"	1	"	"			
28B. 2,6-Dinitrotoluene (606-20-2)	x			"	"	"	"	"	"	1	"	"			
29B. Di-N-Octyl Phthalate (117-84-0)	x			"	"	"	"	"	"	1	"	"			
30B. 1,2-Diphenylhydrazine (as Azobenzene) (122-66-7)	x			"	"	"	"	"	"	1	"	"			
31B. Fluoranthene (206-44-0)	x			"	"	"	"	"	"	1	"	"			
32B. Fluorene (86-73-7)	x			"	"	"	"	"	"	1	"	"			
33B. Hexachlorobenzene (118-71-1)	x			"	"	"	"	"	"	1	"	"			
34B. Hexachlorobutadiene (87-68-3)	x			"	"	"	"	"	"	1	"	"			
35B. Hexachlorocyclopentadiene (77-47-4)	x			"	"	"	"	"	"	1	"	"			
36B. Hexachloroethane (67-72-1)	x			"	"	"	"	"	"	1	"	"			
37B. Indeno (1,2,3-cd) Pyrene (193-39-5)	x			"	"	"	"	"	"	1	"	"			
38B. Isophorone (78-59-1)	x			"	"	"	"	"	"	1	"	"			
39B. Naphthalene (91-20-3)	x			"	"	"	"	"	"	1	"	"			
40B. Nitrobenzene (98-95-3)	x			"	"	"	"	"	"	1	"	"			
41B. N-Nitrosodimethylamine (62-75-9)	x			"	"	"	"	"	"	1	"	"			
42B. N-Nitrosodi-N-Propylamine (621-64-7)	x			" "	"	"	"	"	"	1	"	"			

CONTINUED FROM THE FRONT

1. POLLUTANT AND CAS NUMBER (if available)	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE (optional)		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE		b. MAXIMUM 30 DAY VALUE (if available)		c. LONG TERM AVRG. VALUE (if available)		d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE		b. NO. OF ANALYSES
				(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS	(1) CONCENTRATION	(2) MASS				(1) CONCENTRATION	(2) MASS	
GC/MS FRACTION — BASE/NEUTRAL COMPOUNDS (continued)															
43B. N-Nitro-sodiphenylamine (86-30-6)	x			< 10	<0.07	NOT AVAILABLE		NOT AVAILABLE		1	mg/L	LBS			
44B. Phenanthrene (85-01-8)	x			"	"	"	"	"	"	1	"	"			
45B. Pyrene (129-00-0)	X			"	"	"	"	"	"	1	"	"			
46B. 1,2,4 - Tri-chlorobenzene (120-82-1)	X			"	"	"	"	"	"	1	"	"			
GC/MS FRACTION — PESTICIDES															
1P. Aldrin (309-00-2)	x			< 10	<0.07	"	"	"	"	1	"	"			
2P. α-BHC (319-84-6)	x			"	"	"	"	"	"	1	"	"			
3P. β-BHC (319-85-7)	x			"	"	"	"	"	"	1	"	"			
4P. γ-BHC (58-89-9)	x			"	"	"	"	"	"	1	"	"			
5P. δ-BHC (319-86-8)	x			"	"	"	"	"	"	1	"	"			
6P. Chlordane (57-74-9)	x			< 50	<3.5	"	"	"	"	1	"	"			
7P. 4,4'-DDT (50-29-3)	x			< 10	<0.07	"	"	"	"	1	"	"			
8P. 4,4'-DDE (72-55-9)	x			"	"	"	"	"	"	1	"	"			
9P. 4,4'-DDD (72-54-8)	x			"	"	"	"	"	"	1	"	"			
10P. Dieldrin (60-57-1)	x			"	"	"	"	"	"	1	"	"			
11P. α-Endosulfan (115-29-7)	x			"	"	"	"	"	"	1	"	"			
12P. β-Endosulfan (115-29-7)	x			"	"	"	"	"	"	1	"	"			
13P. Endosulfan Sulfate (1031-07-8)	x			"	"	"	"	"	"	1	"	"			
14P. Endrin (72-20-8)	x			"	"	"	"	"	"	1	"	"			
15P. Endrin Aldehyde (7421-93-4)	x			"	"	"	"	"	"	1	"	"			
16P. Heptachlor (76-44-8)	x			"	"	"	"	"	"	1	"	"			

CONTINUE ON PAGE V-9

CONTINUED FROM PAGE V-8

EPA I.D. NUMBER *(copy from Item 1 of Form 1)*: MSD990714081

OUTFALL NUMBER: 003

Form Approved OMB No. 158-R0173

1. POLLUTANT AND CAS NUMBER *(if available)*	2. MARK 'X'			3. EFFLUENT							4. UNITS		5. INTAKE *(optional)*		
	a. TESTING REQUIRED	b. BELIEVED PRESENT	c. BELIEVED ABSENT	a. MAXIMUM DAILY VALUE (1) CONCENTRATION	a. MAXIMUM DAILY VALUE (2) MASS	b. MAXIMUM 30 DAY VALUE *(if available)* (1) CONCENTRATION	b. MAXIMUM 30 DAY VALUE (2) MASS	c. LONG TERM AVRG. VALUE *(if available)* (1) CONCENTRATION	c. LONG TERM AVRG. VALUE (2) MASS	d. NO. OF ANALYSES	a. CONCENTRATION	b. MASS	a. LONG TERM AVERAGE VALUE (1) CONCENTRATION	a. LONG TERM AVERAGE VALUE (2) MASS	b. NO. OF ANALYSES
GC/MS FRACTION — PESTICIDES *(continued)*															
17P. Heptachlor Epoxide (1024-57-3)	x			< 10	< 0.07	NOT AVAILABLE		NOT AVAILABLE		1	ug/L	LBS			
18P. PCB-1242 (53469-21-9)	x			< 50	< 3.5	"	"	"	"	1	"	"			
19P. PCB-1254 (11097-69-1)	x			"	"	"	"	"	"	1	"	"			
20P. PCB-1221 (11[illegible]28-2)	x			"	"	"	"	"	"	1	"	"			
21P. PCB-1232 (11141-16-5)	x			"	"	"	"	"	"	1	"	"			
22P. PCB-1248 (12672-29-6)	x			"	"	"	"	"	"	1	"	"			
23P. PCB-1260 (11096-82-5)	x			"	"	"	"	"	"	1	"	"			
24P. PCB-1016 (12674-11-2)	x			"	"	"	"	"	"	1	"	"			
25P. Toxaphene (8001-35-2)	x			"	"	"	"	"	"	1	"	"			

ENVIRONMENTAL PROTECTION SYSTEMS, INC.
P.O. Box 20382/Jackson, MS 39209/601-922-8242

PRIORITY POLLUTANT ANALYSIS

VOLATILE ORGANICS ANALYSIS

Compounds	Minimum Detection Limits(μg/l)
Acrolein	100
Acrylonitrile	100
Benzene	10
Bis(Chloromethyl)Ether	10
Bromoform	10
Carbon Tetrachloride	10
Chlorobenzene	10
Chlorodibromomethane	10
Chloroethane	10
2-Chloroethylvinyl Ether	10
Chloroform	10
Dichlorobromomethane	10
Dichlorodifluoromethane	10
1,1-Dichloroethane	10
1,2-Dichloroethane	10
1,1-Dichloroethylene	10
1,2-Dichloropropane	10
1,2-Dichloropropylene	10
Ethylbenzene	10
Methyl Bromide	10
Methyl Chloride	10
Methylene Chloride	10
1,1,2,2-Tetrachloroethane	10
Tetrachloroethylene	10
Toluene	10
1,2-Trans-Dichloroethylene	10

PRIORITY POLLUTANT ANALYSIS

VOLATILE ORGANICS ANALYSIS

Compounds	Minimum Detection Limits(µg/l)
1,1,1-Trichloroethane	10
1,1,2-Trichloroethane	10
Trichloroethylene	10
Trichlorofluoromethane	10
Vinyl Chloride	10

ENVIRONMENTAL PROTECTION SYSTEMS, INC.
P.O. Box 20382/Jackson, MS 39209/601-922-8242

PRIORITY POLLUTANT ANALYSIS

BASE/NEUTRAL EXTRACTABLES

Compounds	Minimum Detection Limits(µg/l)
Acenaphthene	10
Acenaphtylene	10
Anthracene	10
Benzidine	10
Benao(a)Anthracene	10
Benzo(a)Pyrene	10
3,4-Benzofluoranthene	10
Benzo(ghi)Perylene	25
Benzo(k)Fluoranthene	10
Bis(2-Chloroethoxy)Methane	10
Bis(2-Chloroethyl)Ether	10
Bis(2-Chloroisopropyl)Ether	10
Bis(2-Ethylhexyl)Phthalate	10
4-Bromophenyl Phenyl Ether	10
Butyl Benzyl Phthalate	10
2-Chloronaphthalene	10
4-Chlorophenyl Phenyl Ether	10
Crysene	10
Dibenzo(a,h)Anthracene	25
1,2-Dichlorobenzene	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
3,3'-Dichlorobenzidine	10
Diethyl Phthalate	10
Dimethyl Phthalate	10
Di-N-Butyl Phthlate	10

ENVIRONMENTAL PROTECTION SYSTEMS, INC.
P.O. Box 20382/Jackson, MS 39209/601-922-8242

PRIORITY POLLUTANT ANALYSIS

BASE/NEUTRAL EXTRACTABLES

Compounds	Minimum Detection Limits(μg/l)
2,4-Dinitrotoluene	10
2,6-Dinitrotoluene	10
Di-N-Octyl Phthalate	10
1,2-Diphenylhydrazine	10
Fluoranthene	10
Fluorene	10
Hexachlorobenzene	10
Hexachlorobutadiene	10
Hexachlorocyclopentadiene	10
Hexachloroethane	10
Indeno(1,2,3-cd)Pyrene	10
Isophorone	10
Naphthalene	10
Nitrobenzene	10
N-Nitrosodimethylamine	10
N-Nitrosodi-N-Propylamine	10
N-Nitrosodiphenylamine	10
Phenanthrene	10
Pyrene	10
1,2,4-Trichlorobenzene	10

ENVIRONMENTAL PROTECTION SYSTEMS, INC.
P.O. Box 20382/Jackson, MS 39209/601-922-8242

PRIORITY POLLUTANT ANALYSIS

PESTICIDES/PCB's

Compounds	Minimum Detection Limits(μg/l)
Aldrin	10
α-BHC	10
β-BHC	10
γ-BHC	10
δ-BHC	10
Chlordane	50
4,4'-DDT	10
4,4'-DDE	10
4,4'-DDD	10
Dieldrin	10
α-Endosulfan	10
β-Endosulfan	10
Endosulfan Sulfate	10
Endrin	10
Endrin Aldehyde	10
Heptachlor	10
Heptachlor Epoxide	10
PCB-1242	50
PCB-1254	50
PCB-1221	50
PCB-1232	50
PCB-1248	50
PCB-1260	50
PCB-1016	50
Toxaphene	50

ENVIRONMENTAL PROTECTION SYSTEMS, INC
P.O. Box 20382/Jackson, MS 39209/601-922-8242

PRIORITY POLLUTANT ANALYSIS

ACID EXTRACTABLE ANALYSIS

Compounds	Minimum Detection Limits (µg/l)
2-Chlorophenol	25
2,4-Dichlorophenol	25
2,4-Dimethylphenol	25
4,6-Dinitro-O-Cresol	250
2,4-Dinitrophenol	250
2-Nitrophenol	25
4-Nitrophenol	25
P-Chloro-M-Cresol	25
Pentachlorophenol	25
Phenol	25
2,4,6-Trichlorophenol	25

PUBLIC NOTICE

Mississippi Pollution Control
Permit Board
P. O. Box 10385
Jackson, Mississippi 39209
(601) 961-5171

Public Notice No. 81-MS0045 October 30, 1981

NOTICE OF REISSUANCE OF NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

South Mississippi Electric Power Association, R. D. Morrow Generating Plant, Purvis, Mississippi, has applied for an NPDES Permit, Application Number MS0028258 to discharge treated wastewater into Black Creek. The applicant's operation is producing electricity. One existing discharge is described in the application.

Vertac Chemical Corporation, P. O. Box 3, Vicksburg, Mississippi, has applied for reissuance of NPDES Permit No. MS0027995. The applicant manufactures organic and inorganic chemicals, including dinitrobutylphenol (Dinoseb), toxaphene, nitric acid, and potassium nitrate. One discharge to the Mississippi River is described in the application.

On the basis of preliminary staff review of the Mississippi Air and Water Pollution Control Law (Sections 49-17-1 et seq., Mississippi Code of 1972), and other lawful standards and regulations, and under authority granted pursuant to Section 402(b) of the Federal Water Pollution Control Act, the Mississippi Pollution Control Permit Board proposes to reissue a permit to discharge wastewater subject to specific pollutant limitations and special conditions. These proposed determinations are tentative.

Persons wishing to comment upon or object to the proposed determinations are invited to submit same in writing to the Permit Board address above, no later than November 30, 1981. All comments received prior to that date will be considered in the formulation of final determinations regarding the application. The permit application number should be placed on the envelope next to the above address and also at the top of the first page of comments. A public hearing may be held where the Permit Board finds a significant degree of public interest in a proposed permit or group of permits.

A fact sheet containing details about the application and the proposed determination, a sketch showing the exact location of the discharge and additional information on hearing procedure is available by writing or calling the Permit Board. A copy of the draft permit is also available from the Permit Board. The application, comments received, and other information are available for review and copying at 2380 Highway 80 West, Jackson, Mississippi, between the hours of 8:00 a.m. and 5:00 p.m., Monday through Friday.

Please bring the foregoing to the attention of persons whom you know will be interested.

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MISSISSIPPI POLLUTION CONTROL PERMIT BOARD

AGENDA - WATER DIVISION

October 13, 1981

DOMESTIC - NEW SOURCES TO PUBLIC NOTICE

Mississippi Highway Dept. Truck Scale East I-10	Jackson County
Mississippi Highway Dept. Welcome Center I-10	Jackson County
Van Cleve School	Jackson County
East Central School	Jackson County

MUNICIPAL - FOR DISCUSSION

City of Jackson (WTP)	Hinds County

INDUSTRIAL - NEW SOURCES TO PUBLIC NOTICE

Mid-Valley Pipeline	MS0038059	Leflore County
Mid-Valley Pipeline	MS0038041	Lafayette County
Mid-Valley Pipeline	MS0038067	Issaquena County
Peavy Electronics	MS0036811	Lauderdale County
Biloxi Shrimp Exchange	MS0038024	Harrison County
Davis Bros. Country Meats	MS0037768	Clay County
Paul's Meat Service	MS0026395	Winston County

INDUSTRIAL - REISSUANCES TO PUBLIC NOTICE

Vertac Chemical Corporation	MS0027995	Warren County

INDUSTRIAL - MODIFICATION

Exxon-Hubfield	MS0035513	Marion County

STATE OPERATING PERMITS

Ardell Stockstill & Sons Grade A Dairy	MPC #81-013	Hancock County
APAC-Miss, Inc. (Meek's Gravel Pit)	MPC #81-072	Lowndes County
APAC-Miss, Inc. (Bowlin Gravel Pit)	MPC #81-073	Lowndes County
David Lofton Swine Facility	MPC #81-068	Newton County

FACT SHEET

APPLICATION FOR
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT TO DISCHARGE WASTEWATER TO WATERS
OF THE STATE OF MISSISSIPPI

Application No. MS0027995 Date ________________

1. SYNOPSIS OF APPLICATION

   a. Name and Address of Applicant

      Vertac Chemical Corporation
      P. O. Box 3
      Vicksburg, Mississippi 39180

   b. Description of Applicant's Operation

      Manufactures organic and inorganic chemicals, including dinitrobutylphenol (Dinoseb), nitric acid, potassium nitrate, and toxaphene.

   c. Production Capacity of Facility

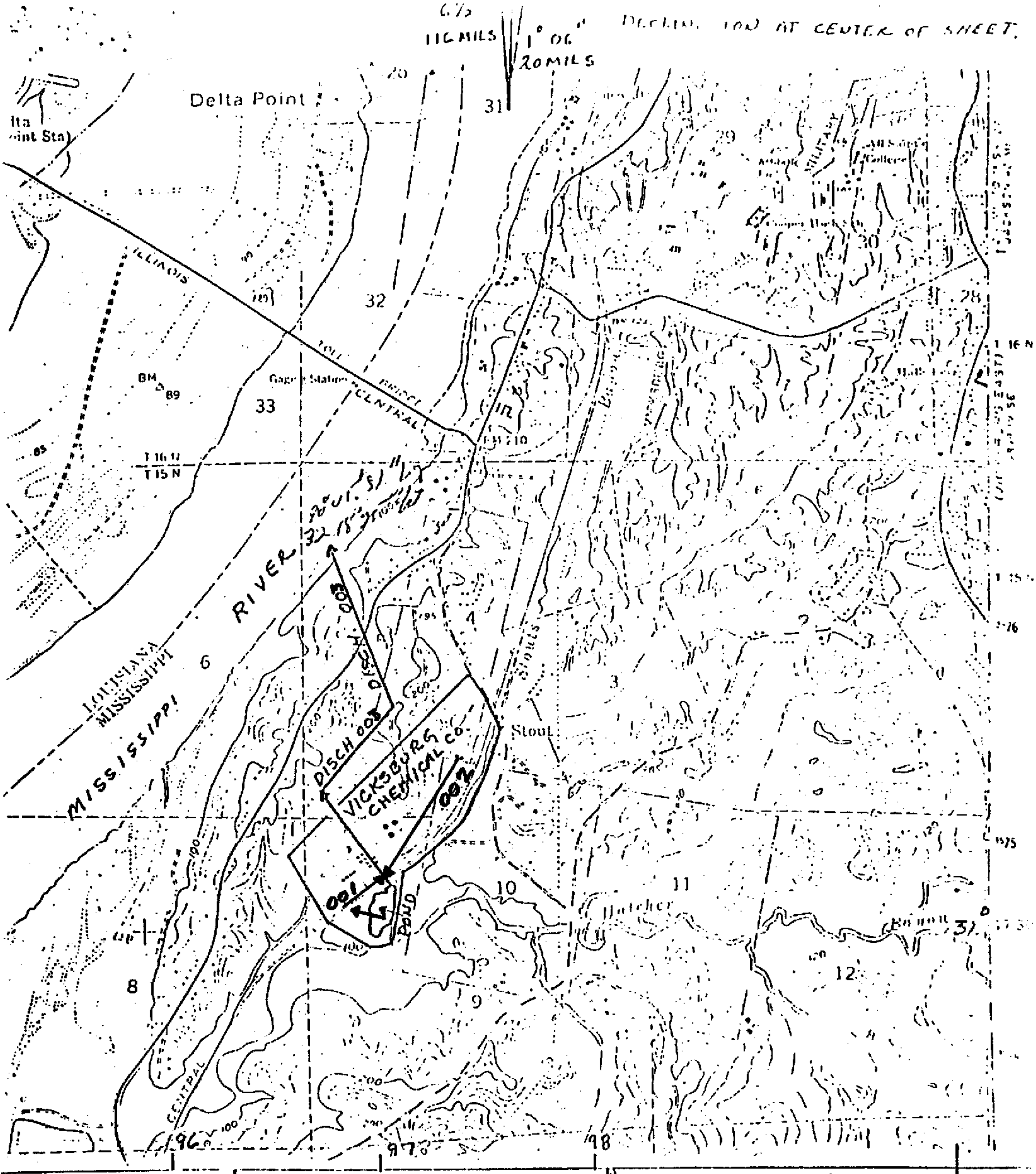
Dinitrobutylphenol	25,000 lbs/day
Nitric Acid	500,000 lbs/day
Potassium Nitrate	600,000 lbs/day
Toxaphene	58,300 lbs/day

83,300 lbs/day

83.3 × 9 =

   d. Description of Existing Pollution Abatement Facilities

      Wastewater from the potassium nitrate process is neutralized; all other contaminated waste streams are treated by activated carbon adsorption.



55'

SCALE 1: 24000

90° 52' 30"

LOCATION MAP
FROM U.S. GEOLOGICAL SURVEY
MAP. 1972
VICKSBURG CHEMICAL CO.
VICKSBURG, WARREN, MISS.

e. Applicant's Receiving Waters

Mississippi River.

f. Description of Discharges

Outfall Serial No. 001:

This wastewater is generated primarily in the pesticide and nitric acid production area (South Plant) and consists of a process wastewater associated with the production of toxaphene and DNBP, cooling water, and stormwater runoff. Periodically, when pH limits are exceeded in Outfall 002, wastewater from this Outfall 002 is routed to Outfall 001 for equalization and neutralization. Primary pollutants present in Outfall 001 are COD, NH_3, total chlorine residual, nitrates, toxaphene, DNBP.

Outfall Serial No. 002:

This wastewater is generated in the potassium nitrate fertilizer production area (North Plant) and consists of process wastewater, boiler blowdown, cooling water, and stormwater runoff. Primary pollutants present in this wastewater include nitrates lost from the production process.

Outfall Serial No. 003:

This is a combination of Outfalls 001 and 002 (total plant wastewater discharge).

2. PROPOSED EFFLUENT LIMITATIONS

Discharge Serial No. 001 - South Plant*

	lbs/Day		Other Units	
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.
Flow	-	-	-	-
COD	750	1083	-	-
BOD_5	133	616	-	-
Suspended Solids	150	508	-	-
Dinitrobutylphenol	3.0	6.0	0.4 mg/1	0.8 mg/1
Toxaphene	0.1	0.58	0.0015 mg/1	0.0075 mg/1

pH Range - 6.9

*This outfall shall include all process waste from the pesticide production area, cooling water, boiler blowdown, surface rainfall runoff, and other extraneous water from the South Plant. Any of the above waste streams which are considered as non-contaminated may by-pass the waste treatment facilities, but must be included at the point of monitoring.

BASIS FOR LIMITATIONS: Dinitrobutylphenol (DNBP) and toxaphene are pesticides covered under 40 CFR 455.22 (Best Practicable Treatment), promulgated on April 25, 1978, and amended on September 29, 1978. Toxaphene is also covered under 40 CFR 129.103 (Toxic Pollutant Effluent Standards), promulgated on January 12, 1977.

Pollutant	Production (lbs/day)	BPT/1 (lbs/1000 lbs of product)		Permit Limit (lbs/day)		Toxic Standards (mg/1)	
		Avg.	Max.	Avg.	Max.	Avg.	Max.
Toxaphene	58,300	0.0018	0.01	0.10	0.58	0.0015/2	0.0075/2
DNBP	25,000	N/A	N/A	3.0	6.0	0.4/3	0.8/3
COD	83,300/4	9.0	13.0	750	1083	N/A	N/A
BOD_5	83,300/4	1.6	7.4	133	616	N/A	N/A
Suspended Solids	83,300/4	1.8	6.1	150	508	N/A	N/A

/1 Based upon 40 CFR 455.22

/2 Based upon 40 CFR 129.103

/3 Specific pesticide limits for DNBP are not required under 40 CFR 455.22. The limitations are based upon the degree of technology demonstrated by the permittee. The daily average limitation of 0.4 mg/1 is less than the 96-hour LC_{50} of several species of fish (average of all toxicity data is 0.56 mg/1). Mass limitations are based upon 0.9 MGD.

/4 Based upon total pesticide production from the toxaphene and DNBP units.

Discharge Serial Number 002 - North Plant*

	Daily Average	Daily Maximum
Flow	-	-
Nitrate (as N)	6000 lbs/day	12,000 lbs/day

*This outfall shall include all process wastes from the potassium nitrate production area, cooling water, boiler blowdown, surface rainfall runoff, and other extraneous water.

BASIS FOR LIMITATION: There are no guidelines for the potassium nitrate industry. It has been shown that the ammonium nitrate guidelines are not applicable and that there is no practicable end-of-pipe treatment for this wastewater. The above limitations are based upon a combination of best engineering judgement and the degree of technology previously demonstrated by the permittee.

Discharge Serial Number 003 - Total Plant Effluent

	Daily Average	Daily Maximum
Flow	-	-
Nitrate (as N)	6310 lbs/day	12,620 lbs/day

pH Range -16.9

BASIS FOR LIMITATION: The additional 310 lbs/day allowable nitrate (as N) as a daily average is credited due to the DNBP production process, in which ammonia is used to neutralize spent nitric acid, forming ammonium nitrate. Concentrations of nitrate in the DNBP wastewater is estimated at 0.5% in 200,000 gallons/month (specific gravity = 1.095).

3. MONITORING REQUIREMENTS

The applicant will be required to monitor regularly for flow and those parameters limited in Section 2 above with sufficient frequency to ensure compliance with the permit conditions. Frequency, methods of sampling, and reporting dates will be specified in the final permit. Biological monitoring requirements are detailed in Part III.B. of the Permit and Section 5(4) of this fact sheet.

4. PROPOSED COMPLIANCE SCHEDULE FOR ATTAINING EFFLUENT LIMITATIONS

The effluent limitations shall be attained upon issuance of the permit.

5. PROPOSED SPECIAL CONDITIONS WHICH WILL HAVE A SIGNIFICANT IMPACT ON THE DISCHARGE

(1) There shall be no discharge of process wastewater from the nitric acid plant.

(2) In addition to the specific conditions of this permit, the permittee shall comply with all applicable conditions of 40 CFR 122.7 and 40 CFR 122.61.

(3) REOPENER CLAUSE

This permit shall be modified, al alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2)(C), and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

(a) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

(b) Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

(4) BIOASSAY REQUIREMENTS

The Water Quality Standards of Mississippi require that all waters be free from substances in concentrations or combinations which are harmful to humans, animals, or aquatic life (State of Mississippi, Water Quality Criteria for Intrastate, Interstate and Coastal Waters, Section II.4. Minimum Conditions Applicable to All Waters, p. 3, adopted Nov. 12, 1974). In accordance with such requirements, the permittee shall conduct the following biological testing program:

(1) The permittee shall conduct bioassay tests quarterly as described in EPA-600/4-78-012 to determine the 96-hour LC-50 concentration of Outfall 003.

(2) Concurrent with the above bioassay tests, the permittee shall conduct and report analysis of nitrates, chlorides, total dissolved solids, NH_3-N, total residual chlorine, free available chlorine, toxaphene, and DNBP present in Outfall 003. Flow rate shall also be reported.

(3) Also concurrent with the above tests, the permittee shall conduct 24-hour static bioassays at 3 scattered points within the Mississippi River, all at approximately 25 feet from the permittee's outfall discharge point. Should any of the 24-hour static tests result in less than 90% survival of test organisms, the permittee shall repeat the tests at a 50 foot radius and shall continue at 25 foot intervals until no more toxicity is determined. The approximate location of each sampling point within the river shall be recorded such that isopleths of toxicity can be drawn onto a map. As specified in Paragraph B(2) above, chemical analysis of the river water shall be conducted and reported at each sample point.

(4) In conducting all of the above bioassay tests, the permittee must use one of the following organisms:

a. Pimephales promelas (fathead minnow)
b. Daphnia pulex (water flea)
c. Daphnia magna (water flea)

(5) The results of all testing required by this paragraph shall be submitted with the quarterly Discharge Monitoring Report required in Part I.C.2. of this permit.

6. WATER QUALITY STANDARDS AND EFFLUENT STANDARDS APPLIED TO THE DISCHARGE

The receiving stream is the Mississippi River, classified as fish and wildlife and effluent limited. Effluent standards applicable include 40 CFR 455.22 (BPTEA for pesticide chemicals manufacturing) 40 CFR 129.103 (Toxic pollutant effluent standards).

7. PROCEDURES FOR THE FORMULATION OF FINAL DETERMINATIONS

a. Comment Period

The Mississippi Bureau of Pollution Control Permit Board proposes to issue an NPDES permit to this applicant subject to the effluent limitations and special conditions outlined above. These determinations are tentative.

Interested persons are invited to submit written comments on the permit application or on the Permit Board's proposed determinations to the following address:

Mississippi Department of Natural Resources
Bureau of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209

All comments received prior to ________________ will be considered in the formulation of final determinations with regard to this application.

b. Public Hearing

The Permit Board may hold a public hearing if there is a significant degree of public interest in a proposed permit or group of permits. Public notice of such a hearing will be circulated in newspapers in the geographical area of the discharge and to those on the agency's mailing list at least thirty days prior to the hearing.

Following the public hearing, the Permit Board may make such modifications in the terms and conditions of the proposed permits as may be appropriate and shall issue or deny the permit. Notice of issuance or denial will be circulated to those who participated in the hearing and to appropriate persons on the mailing list.

c. Issuance of the Permit When No Public Hearing is Held

If no public hearing is held, and, after review of the comments received, the Permit Board's determinations are substantially unchanged, the permit will be issued and become effective immediately.

If no public hearing is held, but there have been substantial changes, public notice of the Permit Board's revised determinations will be made. Following a 30-day comment period, the permit will be issued and become effective immediately, unless a public hearing is granted.

STATE OF MISSISSIPPI
DEPARTMENT OF ENVIRONMENTAL QUALITY
JAMES I. PALMER, JR.
EXECUTIVE DIRECTOR

December 22, 1993

CERTIFIED MAIL NO. P 300 838 831

Mr. Steven Boswell
Vicksburg Chemical Company
P.O. Box 821003
Vicksburg, Mississippi 39182

Dear Mr. Boswell:

Re: NPDES Permit No. MS0027995

The above referenced NPDES Permit has been modified as follows:

The description of Outfall 102 has been changed to allow for the addition of the sodium hypochlorite bleach plant and the mixed fertilizer blending plant on page 3 of 16.

Enclosed is a copy of the revised permit page which should be inserted into your NPDES Permit.

Any appeal of this permit action must be made within the 30-day period provided for in Section 49-17-29(4)(b) Mississippi Code of 1972.

Very truly yours,

J. B.

Jerry Beasley
Industrial Wastewater Control Branch

JB:ap
Enclosures
cc: Mr. Roosevelt Childress, EPA (w/enclosure)
CRO (w/enclosure)

FILE COPY

PUBLIC NOTICE

Mississippi Environmental Quality Permit Board
P. O. Box 10385
Jackson, MS 39209
Telephone No. (601) 961-5171

November 1, 1993

Vicksburg Chemical Company, 4280 Rifle Range Road, Vicksburg, Mississippi 39182 has applied to the Mississippi Environmental Quality Permit Board for the modification of an NPDES Permit to discharge wastewater from a proposed sodium hypochlorite bleach plant into the Mississippi River. The applicant's operation is the manufacture of nitric acid and potassium nitrate. One discharge is described in the application.

The environmental impact of this project has been evaluated and the staff of the Permit Board believes that, with proper environmental constraints and limitations on the applicant, this project will operate within all State and Federal environmental laws and standards. Therefore, the staff of the Board has preliminarily decided, based on available information, to recommend to the Board that a permit be issued containing numerous environmental regulatory constraints specifically stated in the draft permit. However, before proceeding further with the staff evaluation, public comments are being solicited. The staff recommendation to the Board, as well as the Board decision, will be made only after a thorough consideration of all public comments.

Persons wishing to comment upon or object to the proposed determinations are invited to submit comments in writing to Jerry Cain at the Permit Board's address shown above, no later than November 30, 1993. All comments received by that date will be considered in the formulation of final determinations regarding the application. A public hearing will be held if the Permit Board finds a significant degree of public interest in the proposed permit.

Additional details about the application and the proposed determination, a sketch showing the location of the discharge, and a copy of the draft permit are available by writing or calling Jerry Beasley at the Permit Board's address and telephone number shown above. Also, this and other information is available for review and copying during normal business hours at the Southport Center Building located at 2380 Highway 80 West, Jackson, MS.

Please bring the foregoing to the attention of persons whom you know will be interested.

DRAFT

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning July 9, 1991, and lasting until July 8, 1996, the permittee is authorized to discharge from outfall(s) serial number(s) 102 (Potassium Nitrate Plant and Sodium Hypochlorite Bleach Plant, Internal Outfall Discharging to Outfall 003)*.

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)		Measurement	Sample
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.	Frequency	Type
Flow-M^3/day (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Nitrate	2313(5100)	4625(10200)	N/A	N/A	Twice/Week	24-Hr. Composite

*This outfall shall include all process wastes from the potassium nitrate production area, cooling water, boiler blowdown, and surface runoff from other extraneous water. It shall also include discharges such as spills, leaks, and equipment washing from the sodium hypochlorite bleach plant. No wastewater discharges shall be allowed from the mixed fertilizer blending plant.

2. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): the nearest accessible point prior to mixing with any other wastewater or the receiving stream.

FACT SHEET

APPLICATION FOR
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT TO DISCHARGE WASTEWATER TO WATERS
OF THE STATE OF MISSISSIPPI

Application No.: MS0027995 (Modification) Date: October 29, 1993

1. SYNOPSIS OF APPLICATION

   a. Name and Address of Applicant

      Vicksburg Chemical Company
      P.O. Box 821003
      Vicksburg, Mississippi 39182
      Contact: Mr. Steven Boswell
      (601) 636-1231

   b. Description of Applicant's Operation

      Facility is proposing the addition of a sodium hypochlorite bleach plant and a mixed fertilizer blending plant.

   c. Production Capacity of Facility

      Unknown at this time - Facilities have not been constructed yet.

   d. Description of Existing Pollution Abatement Facilities

      See attached permit rationale.

   e. Applicant's Receiving Waters

      Mississippi River.

   f. Description of Discharges

      See attached permit rationale.

2. PROPOSED EFFLUENT LIMITATIONS

   See attached draft permit modification.

3. MONITORING REQUIREMENTS

   The applicant will be required to monitor regularly for flow and those parameters limited in Section 2 above with sufficient frequency to ensure compliance with the permit conditions. Frequency, methods of sampling, and reporting dates will be specified in the final permit.

4. PROPOSED COMPLIANCE SCHEDULE FOR ATTAINING EFFLUENT LIMITATIONS

N/A

5. PROPOSED CONDITIONS OF APPLICABILITY AND OTHER REQUIREMENTS

N/A

6. WATER QUALITY STANDARDS AND EFFLUENT STANDARDS APPLIED TO THE DISCHARGE

See attached permit rationale.

7. PROCEDURES FOR THE FORMULATION OF FINAL DETERMINATIONS

a. Comment Period

The Mississippi Office of Pollution Control Permit Board proposes to issue an NPDES permit to this applicant subject to the effluent limitations and special conditions outlined above. These determinations are tentative.

Interested persons are invited to submit written comments on the permit application or on the Permit Board's proposed determinations to the following address:

Mississippi Department of Environmental Quality
Office of Pollution Control
P. O. Box 10385
Jackson, Mississippi 39209

Additional details about the application and the proposed determination, a sketch showing the location of the discharge, and a copy of the draft permit are available by writing Jerry Cain at the Permit Board's address or calling Jerry Beasley at 961-5171.

All comments received prior to November 30, 1993, will be considered in the formulation of final determinations with regard to this application.

b. Public Hearing

The Permit Board may hold a public hearing if there is a significant degree of public interest in a proposed permit or group of permits. Public notice of such a hearing will be circulated in newspapers in the geographical area of the discharge and to those on the agency's mailing list at least 30 days prior to the hearing.

Following the public hearing, the Permit Board may take such modifications in the terms and conditions of the proposed permits as may be appropriate and shall issue or deny the permit. Notice of issuance or denial will be circulated to those who participated in the hearing and to appropriate persons on the mailing list.

c. Issuance of the Permit When No Public Hearing is Held

If no public hearing is held, and, after review of the comments received, the Permit Board's determinations are substantially unchanged, the permit will be issued and become effective immediately.

If no public hearing is held, but there have been substantial changes, public notice of the Permit Board's revised determinations will be made. Following a 30-day comment period, the permit will be issued and become effective immediately, unless a public hearing is granted.

Permit Modification Rationale
Vicksburg Chemical Company
Vicksburg/Warren County
NPDES Permit No. MS0027995
October 29, 1993

I. Nature of Business: Facility is proposing the addition of a sodium hypochlorite bleach plant and a mixed fertilizer blending plant.

II. Type of Wastewater: Wastewater discharges such as spills, leaks, and equipment washing from the sodium hypochlorite bleach plant.

III. Applicable EPA Categorical Guidelines: 40 CFR 418 - Fertilizer Manufacturing Point Source Category, Subpart G - Mixed and Blend Fertilizer Production Subcategory. No guidelines are available for the sodium hypochlorite bleach plant.

IV. Type of Wastewater Treatment: Wastewater from the sodium hypochlorite bleach plant shall discharge to Outfall 102. No wastewater shall be discharged from the mixed fertilizer blending plant.

V. Reason for Modification: The description of Outfall 102 shall be changed to allow the discharge from the new sodium hypochlorite bleach plants. Numerical limitations shall remain the same since there should be little impact to the water quality from the proposed discharges to this outfall.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning **July 9, 1991**, and lasting until **July 8, 1996**, the permittee is authorized to discharge from outfall(s) serial number(s) 102 **(Potassium Nitrate Plant, Internal Outfall Discharging to Outfall 003)***.

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)		Measurement	Sample
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.	Frequency	Type
Flow-M^3/day (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Nitrate	2313(5100)	4625(10200)	N/A	N/A	Twice/Week	24-Hr. Composite

*This outfall shall include all process wastes from the potassium nitrate production area, cooling water, boiler blowdown, and surface runoff from other extraneous water.

2. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): **the nearest accessible point prior to mixing with any other wastewater or the receiving stream.**

All items passed GWC

PERMIT BOARD AGENDA
OFFICE OF POLLUTION CONTROL
SURFACE WATER QUALITY DIVISION
February 9, 1993
Page -2-

MUNICIPAL - NPDES PERMIT REISSUANCES

City of Durant	Holmes County	MS0026913
Town of French Camp	Choctaw County	MS0044075
Town of Shaw	Bolivar County	MS0024953
City of Corinth	Alcorn County	MS0021652
City of Aberdeen (East)	Monroe County	MS0024783
City of Natchez	Adams County	MS0024252
Town of Winstonville	Bolivar County	MS0026450

MUNICIPAL - NPDES PERMIT MODIFICATIONS

City of McComb (East)	Pike County	MS0025526
City of Hazlehurst	Copiah County	MS0023884
City of Picayune	Pearl River County	MS0042161

MUNICIPAL - STATE OPERATING PERMIT REISSUANCE

Town of Oakland	Yalobusha County	OPC 80-024

INDUSTRIAL - NPDES PERMIT REISSUANCE

Havard's Slaughterhouse	George County	MS0037281

INDUSTRIAL - NPDES PERMIT MODIFICATIONS

City of Vicksburg Water Treatment Plant	Warren County	MS0046949
Cedar Chemical Corporation	Warren County	MS0027995

name change to Cedar Chemical Co.

State of Mississippi
Water Pollution Control
PERMIT

TO DISCHARGE WASTEWATER IN ACCORDANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

THIS CERTIFIES THAT

Vertac Chemical Corporation
Vicksburg, Mississippi

has been granted permission to discharge wastewater into Mississippi River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof. This permit is issued in accordance with the provisions of the Mississippi Air and Water Pollution Control Law (Section 49-17-1 et seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder, and under authority granted pursuant to Section 402 (b) of the Federal Water Pollution Control Act.

Issued this ______ day of ____________, 19____.

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF POLLUTION CONTROL PERMIT BOARD

Charles H. Chisolm, P. E., Director

Expires 30th day of June, 19 86.

Permit No. MS0027995

Application No. MS0027995

MPC 3-74

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning date of issuance and lasting until June 30, 1986, the permittee is authorized to discharge from Outfall Serial Number 001 (South Plant)*.
Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day (lbs/day)		Other Units (Specify)		Measurement Frequency	Sample Type
	Daily Avg.	Daily Max	Daily Avg.	Daily Max.		
Flow – M^3Day (MGD)	-	-	-	-	Continuous	Recorder
COD	341(750)	492(1083)	-	-	2/Week	24-Hour Composite
BOD_5	61(133)	280(616)	-	-	2/Week	24-Hour Composite
TSS	68(150)	231(508)	-	-	2/Week	24-Hour Composite
DNBP	1.4(3.0)	2.7(6.0)	0.4 mg/l	0.8 mg/l	2/Week	24-Hour Composite
Toxaphene	0.05(0.1)	0.27(0.58)	0.0015 mg/l	0.0075 mg/l	2/Week	24-Hour Composite

2. The pH shall not be less than N/A standard units nor greater than N/A standard units and shall be monitored N/A

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at the nearest accessible point following treatment, but prior to actual mixing with any other wastewater or the receiving stream.

*This outfall shall include all process wastes from the pesticide production area, cooling water, boiler blowdown, surface rainfall runoff and other extraneous water from the South Plant. Any of the above waste streams which are considered as non-contaminated may by-pass the waste treatment facilities but must be included at the point of monitoring.

I-1

PART I

Permit No. MS0027995

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning date of issuance and lasting until June 30, 1986, the permittee is authorized to discharge from Outfall Serial Number 002 (North Plant)*.
Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day Daily Avg.	(lbs/day) Daily Max	Other Units (Specify) Daily Avg.	Other Units (Specify) Daily Max.	Measurement Frequency	Sample Type
Flow – M^3Day (MGD)	-	-	-	-	Continuous	Recorder
Nitrate Nitrogen	2727(6000)	5455(12,000)	-	-	2/Week	24-Hour Composite

2. The pH shall not be less than N/A standard units nor greater than N/A standard units and shall be monitored N/A

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at the nearest accessible point prior to mixing with any other wastewater or the receiving stream.

*This outfall shall include all process wastes from the potassium nitrate production area, cooling water, boiler blowdown, surface rainfall runoff and other extraneous water.

I-1

PART I

Permit No. MS0027995

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning date of issuance and lasting until June 30, 1986, the permittee is authorized to discharge from Outfall Serial Number 003 (Total Plant Effluent).
Such discharges shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations				Monitoring Requirements	
	kg/day (lbs/day) Daily Avg.	kg/day (lbs/day) Daily Max	Other Units (Specify) Daily Avg.	Other Units (Specify) Daily Max.	Measurement Frequency	Sample Type
Flow – M^3Day (MGD)	–	–	–	–	Continuous	Recorder
Nitrates (as N)	2868(6310)	5736(12,620)	–	–	2/Week	24-Hour Composite
Temperature	–	–	–	35°C (95°F)	2/Week	Grab
Total Residual Chlorine	–	–	–	–	2/Week	24-Hour Composite
Free Available Chlorine	–	–	–	–	2/Week	24-Hour Composite
NH_3-N	–	–	–	–	2/Week	24-Hour Composite

2. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored twice per week with a grab sample.

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): at the nearest accessible point following the mixing of 001 and 002 outfall streams, but prior to actual mixing with the receiving stream.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

On or before June 30, 1982, the permittee shall submit a report describing the sources and quantities of NH_3-N, free available chlorine and total residual chlorine present in Outfall 003. Such report shall be based upon a sampling program throughout the plant, including bi-weekly analysis of the above-mentioned parameters in Outfall 003. This report shall also make conclusions and recommendations for reducing these pollutants through process modifications and/or additional wastewater treatment. (Note: Levels of reduction, if found to be necessary, will be determined by Bureau staff after the submittal of this report. Page 17777 of the Federal Register, April 25, 1978, recommends that ammonia be controlled on a case-by-case basis when issuing NPDES permits.)

2. No later than 10 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

C. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

Monitoring results obtained during the previous 3 months shall be summarized for each month and reported on a Discharge Monitoring Report Form (EPA No. 3320-1), postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on 1/28/82 . Signed copies of these, and all other reports required herein, shall be submitted to the Mississippi Department of Natural Resources Bureau of Pollution Control Permit Board at the following address:

MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES
BUREAU OF POLLUTION CONTROL PERMIT BOARD
P. O. Box 10385
Jackson, Mississippi 39209

3. Definitions

a. The "daily average" discharge means the total discharge by weight during a calendar month divided by the number of days in the month that the production or commercial facility was operating. Where less than daily sampling is required by this permit, the daily average discharge shall be determined by the summation of all the measured daily discharges by weight divided by the number of days during the calendar month when the measurements were made.

b. The "daily maximum" discharge means the total discharge by weight during any calendar day.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulation published pursuant to Section 304(g) of the Federal Water Pollution Control Act, as amended.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. **The person(s) who performed the analyses;**

d. **The analytical techniques or methods used; and**

e. **The results of all required analyses.**

6. **Records Retention**

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a maximum of three (3) years, or longer if requested by the Permit Board.

PART II

A. MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application, or if such changes will not violate the effuent limitations specified in this permit, by notice to the Mississippi Air and Water Pollution Control Permit Board of such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any effluent limitation specified in this permit, the permittee shall provide the Mississippi Air and Water Pollution Control Permit Board with the following information, in writing, within five (5) days of becoming aware of such conditions:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to State waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. Bypassing

Any diversion from or bypass of wastewater collection and treatment facilities is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effuent limitations and prohibitions of this permit. The permittee shall notify the Mississippi Air and Water Pollution Control Permit Board in writing of each such diversion or bypass within 72 hours of the diversion or bypass and shall submit a plan to prevent recurrence of the bypass diversion within 30 days of the date of the incident.

6. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering State waters.

7. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. In accordance with the Schedule of Compliance contained in Part I, provide an alternate power source sufficient to operate the wastewater collection and treatment facilities;

or, if such alternate power source is not in existence, and no date for its implementation appears in Part I,

b. Provide a method whereby the effluent limitations contained in Part I shall be met upon the reduction, loss, or failure of the primary source of power to the wastewater collection and treatment facilities.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Mississippi Air and Water Pollution Control Commission and the Regional Administrator of the U. S. Environmental Protection Agency and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Mississippi Air and Water Pollution Control Permit Board.

3. Availability of Records

Except for data determined to be confidential under the Mississippi Air and Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of the Mississippi Air and Water Pollution Control Commission.

4. Permit Modification

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that required either a temporary or permanent reduction or elimination of the authorized discharge.

5. Toxic Pollutants

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Federal Water Pollution Control Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. Civil and Criminal Liability

Except as provided in permit conditions on "Bypassing" (Part II, A-5), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Federal Water Pollution Control Act and applicable provisions of the Mississippi Air and Water Pollution Control Law pertaining to spills of oil and hazardous materials.

8. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

9. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstance, and the remainder of this permit, shall not be affected thereby.

10. Expiration of Permit

Permittee shall not discharge after the expiration date. In order to receive authorization to discharge beyond the expiration date, the permittee shall submit such information, forms, and fees as are required by the agency authorized to issue permits no later than 180 days prior to the expiration date.

PART III

A. OTHER REQUIREMENTS

This permit shall be modified, or alternatively, revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under sections 301(b)(2)(C), and (D), 304(b)(2), and 307(a)(2) of the Clean Water Act, if the effluent standard or limitation so issued or approved:

(1) Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

(2) Controls any pollutant not limited in the permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of the Act then applicable.

B. BIOASSAY REQUIREMENTS

The Water Quality Standards of Mississippi require that all waters be free from substances in concentrations or combinations which are harmful to humans, animals, or aquatic life (State of Mississippi, Water Quality Criteria for Intrastate, Interstate and Coastal Waters, Section II.4. Minimum Conditions Applicable to All Waters, p. 3, adopted Nov. 12, 1974). In accordance with such requirements, the permittee shall conduct the following biological testing program:

(1) The permittee shall conduct bioassay tests quarterly as described in EPA-600/4-78-012 to determine the 96-hour LC-50 concentration of Outfall 003.

(2) Concurrent with the above bioassay tests, the permittee shall conduct and report analysis of nitrates, chlorides, total dissolved solids, NH_3-N, total residual chlorine, free available chlorine, toxaphene, and DNBP present in Outfall 003. Flow rate shall also be reported.

(3) Also concurrent with the above tests, the permittee shall conduct 24-hour static bioassays at 3 scattered points within the Mississippi River, all at approximately 25 feet from the permittee's outfall discharge point. Should any of the 24-hour static tests result in less than 90% survival of test organisms, the permittee shall repeat the tests at a 50 foot radius and shall continue at 25 foot intervals until no more toxicity is determined. The approximate location of each sampling point within the river shall be recorded such that isopleths of toxicity can be drawn onto a map. As specified in Paragraph B(2) above, chemical analysis of the river water shall be conducted and reported at each sample point.

(4) In conducting all of the above bioassay tests, the permittee must use one of the following organisms:

a. Pimephales promelas (fathead minnow)
b. Daphnia pulex (water flea)
c. Daphnia magna (water flea)

(5) The results of all testing required by this paragraph shall be submitted with the quarterly Discharge Monitoring Report required in Part I.C.2. of this permit.

C. OTHER REQUIREMENTS

1. In addition to the specific conditions of this permit, the permittee shall comply with all applicable conditions of 40 CFR 122.7 and 40 CFR 122.61.

2. There shall be no discharge of process wastewater from the nitric acid plant.

FILE COPY

State of Mississippi
Water Pollution Control
PERMIT

TO DISCHARGE WASTEWATER IN ACCORDANCE WITH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

THIS CERTIFIES THAT

VICKSBURG CHEMICAL COMPANY
VICKSBURG, MISSISSIPPI

has been granted permission to discharge wastewater into

Mississippi River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof. This permit is issued in accordance with the provisions of the Mississippi Water Pollution Control Law (Section 49-17-1 et seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder, and under authority granted pursuant to Section 402(b) of the Federal Water Pollution Control Act.

MISSISSIPPI ENVIRONMENTAL QUALITY PERMIT BOARD

ORIGINAL SIGNED BY
CHARLES CHISOLM

HEAD, OFFICE OF POLLUTION CONTROL
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Issued: July 9, 1991

Permit No. MS0027995

Expires: July 8, 1996

Modified: February 9, 1993

Ref. 16

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning July 9, 1991, and lasting until July 8, 1996, the permittee is authorized to discharge from outfall(s) serial number(s) 101 (Nitric Acid Plant, Internal Outfall Discharging to Outfall 003)*.

Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)		Measurement Frequency	Sample Type
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.		
Flow-M^3/day (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Chemical Oxygen Demand	341(750)	492(1083)	N/A	N/A	Twice/Week	24-Hr. Composite
Biochemical Oxygen Demand (5-Day)	61(133)	280(616)	N/A	N/A	Twice/Week	24-Hr. Composite
Total Suspended Solids	68(150)	231(508)	N/A	N/A	Twice/Week	24-Hr. Composite
DNBP	1.4(3.0)	2.7(6.0)	0.4 mg/l	0.8 mg/l	Twice/Week	24-Hr. Composite**
Toxaphene	0.005(0.1)	0.27(0.58)	0.0015 mg/l	0.0075 mg/l	Once/Quarter	24-Hr. Composite

*This outfall shall include all runoff from soil contaminated with organic chemicals as a result of the past production of pesticides and wastestreams from the nitric acid plant.

**The composite sampler used to collect the DNBP sample shall be of a type that the parts which come in contact with the sample shall be made of teflon, stainless steel or glass.

2. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): the nearest accessible point following treatment but prior to actual mixing with any other wastewater or the receiving stream.

PART I

FILE COPY

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning July 9, 1991, and lasting until July 8, 1996, the permittee is authorized to discharge from outfall(s) serial number(s) 102 (Potassium Nitrate Plant and Sodium Hypochlorite Bleach Plant, Internal Outfall Discharging to Outfall 003)*.

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)		Measurement	Sample
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.	Frequency	Type
Flow-M^3/day (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Nitrate	2313(5100)	4625(10200)	N/A	N/A	Twice/Week	24-Hr. Composite

   *This outfall shall include all process wastes from the potassium nitrate production area, cooling water, boiler blowdown, and surface runoff from other extraneous water. It shall also include discharges such as spills, leaks, and equipment washing from the sodium hypochlorite bleach plant. No wastewater discharges shall be allowed from the mixed fertilizer blending plant.

2. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): the nearest accessible point prior to mixing with any other wastewater or the receiving stream.

PART I

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. During the period beginning July 9, 1991, and lasting until July 8, 1996, the permittee is authorized to discharge from outfall(s) serial number(s) 003 (Total Plant Effluent).

   Such discharges shall be limited and monitored by the permittee as specified below:

PARAMETER	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
	kg/day (lbs/day)		Other Units (Specify)		Measurement Frequency	Sample Type
	Daily Avg.	Daily Max.	Daily Avg.	Daily Max.		
Flow-M^3/day (MGD)	Report	Report	N/A	N/A	Continuous	Recorder
Nitrate (N)	2598(5730)	4865(10727)	N/A	N/A	Twice/Week	24-Hr. Composite

2. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored twice per week .

3. There shall be no discharge of floating solids or visible foam in other than trace amounts.

4. The discharge shall not cause the occurrence of a visible sheen on the surface of the receiving waters.

5. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s): the nearest accessible point following the mixing of 001 and 002 outfall streams, but prior to mixing with the receiving stream.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharge in accordance with the following schedule:

   Upon issuance of permit.

2. No later than 10 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

C. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

Monitoring results obtained during the previous month shall be summarized and reported on a Discharge Monitoring Report Form (EPA No. 3320-1) **POSTMARKED NO LATER THAN THE 28TH DAY OF THE MONTH FOLLOWING THE COMPLETED REPORTING PERIOD. THE FIRST REPORT IS DUE ON SEPTEMBER 28, 1991.** Copies of these, and all other reports required herein, shall be signed in accordance with Sections 6 and 7 of the Mississippi Wastewater Permit Regulations, and shall be submitted to the Mississippi Environmental Quality Permit Board at the following address.

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY
OFFICE OF POLLUTION CONTROL
P. O. Box 10385
Jackson, Mississippi 39289-0385

3. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(h) of the Federal Water Pollution Control Act, as amended.

4. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

(a) The exact place, date, and time of sampling;
(b) The dates the analyses were performed;
(c) The person(s) who performed the analyses;
(d) The analytical techniques or methods used; and
(e) The results of all required analyses.

5. Records Retention

(a) All records and information resulting from the monitoring activities required by this permit (including all records of; analyses performed; calibration and maintenance of instrumentation; and recording from continuous monitoring instrumentation) shall be retained for a minimum of three (3) years, or longer if requested by the Permit Board.

(b) The permittee shall furnish to the Permit Board, upon request, copies of records required to be kept by this permit.

6. Definitions

(a) The "monthly average" (applicable to municipal and domestic permits), other than for fecal coliform bacteria, is the arithmetic mean of all samples collected in a one-month period. The monthly average for fecal coliform bacteria is the geometric mean of all samples collected in a one-month period. In computing the geometric mean, one (1) shall be substituted for sample results of zero.

(b) The "weekly average" (applicable to municipal permits), other than for fecal coliform bacteria, is the arithmetic mean of all the samples collected during a one-week period. The weekly average for fecal coliform bacteria is the geometric mean of all samples collected during a one-week period. In computing the geometric mean, one (1) shall be substituted for sample results of zero. For self-monitoring purposes the value to be reported is the single highest weekly average computed during a one-month period.

(c) The "daily average" (applicable to industrial permits), other than for fecal coliform bacteria, is the arithmetic mean of all samples collected in a one-month period. The daily average for fecal coliform bacteria is the geometric mean of all samples collected in a one-month period. In computing the geometric mean, the value one (1) shall be substituted for sample results of zero.

(d) The "daily maximum" (applicable to industrial and domestic permits), is the highest value recorded of any sample collected on any single day of the calendar month.

PART II

A. MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application. If such changes will not violate the effluent limitations specified in this permit, and upon written notice (in lieu of a new NPDES application) to the Mississippi Environmental Quality Permit Board, the permit may be modified to specify and limit any pollutants not previously limited.

2. Duty to Comply 40 CFR 122.41(a)

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, renovation and reissuance, or modification; or for denial of a permit renewal application.

3. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any provision specified in this permit, the permittee shall notify the Mississippi Environmental Quality Permit Board orally within 24 hours of becoming aware of such conditions. A written report shall also be provided within five (5) days of such time and shall contain the following information:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

4. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

5. Adverse Impact

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

6. Bypassing

Any diversion from or bypass of wastewater collection and treatment facilities is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit.

The permittee shall notify the Mississippi Environmental Quality Permit Board orally of each such diversion or bypass within 24 hours of the diversion or bypass, or if the need for the bypass is known in advance, it shall submit prior notice, if possible, at least ten (10) days before the date of the bypass.

7. Upsets 40 CFR 122.41(n)

a. Definition. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph (c) of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;

(2) The permitted facility was at the time being properly operated; and

(3) The permittee submitted notice of the upset as required in 40 CFR 122.41 (L)(6)(ii)(B) (24 hour notice of noncompliance).

(4) The permittee complied with any remedial measures required under 40 CFR 122.41 (d) (duty to mitigate).

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

8. Removed Substances

Solids, sludges, filter backwash, or other residuals removed in the course of treatment or control of wastewater shall be disposed of in a manner such as to prevent such materials from entering State waters and in a manner consistent with the Mississippi Solid Waste Disposal Act and the Federal Resource Conservation and Recovery Act.

9. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. In accordance with the Schedule of Compliance contained in Part I, provide an alternate power source sufficient to operate the wastewater collection and treatment facilities, or, if such alternate power source is not in existence, and no date for its implementation appears in Part I;

b. Provide a method whereby the effluent limitations contained in Part I shall be met upon the reduction, loss, or failure of the primary source of power to the wastewater collection and treatment facilities.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Mississippi Environmental Quality Permit Board and the Regional Administrator of the U. S. Environmental Protection Agency and/or their authorized representatives, upon the presentation of credentials.

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. Transfer of Ownership or Control

This permit is not transferable to any person except after proper notice. In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the Mississippi Environmental Quality Permit Board at least thirty (30) days in advance of the proposed transfer date. The notice should include a written agreement between the existing and new permittees containing a specific date for the transfer of permit responsibility, coverage, and liability.

3. Signatory Requirements 40 CFR 122.41(k)

All applications, reports, or information submitted to the Permit Board shall be signed and certified.

a. All permit applications shall be signed as follows:

(1) For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (1) a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy - or decision-making function for the corporation, or (2) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding 25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

(2) For a partnership or sole proprietorship: by a general partner or the proprietor, representatively; or

(3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

b. All reports required by the permit and other information requested by the Permit Board shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) The written authorization is submitted to the Permit Board.

c. Changes to authorization. If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Permit Board prior to or together with any reports, information, or applications.

d. Certification. Any person signing a document under paragraphs (a) or (b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under the direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

4. Availability of Records

Except for data determined to be confidential under the Mississippi Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the office of the Mississippi Department of Environmental Quality Office of Pollution Control.

5. Permit Modification

a. The permittee shall furnish to the Permit Board within a reasonable time any relevant information which the Permit Board may request to determine whether cause exists for modifying, revolving and reissuing, or terminating the permit, or to determine compliance with the permit.

b. Upon sufficient cause this permit may be modified, revoked, reissued, or terminated during its term.

c. The filing of a request by the permittee for a permit modification, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

6. Toxic Pollutants

The permittee shall comply with any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) established under Section 307(a) of the Federal Water Pollution Control Act.

7. Toxic Pollutants Notification Requirements

The permittee shall comply with the applicable provisions of 40 CFR 122.42.

8. Civil and Criminal Liability

a. Any person who violates a term, condition or schedule of compliance contained within this permit or the Mississippi Water Pollution Control Law is subject to the actions defined by law.

b. Except as provided in permit conditions on "Bypassing" and "Upsets" (Part II, A-6 and 7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

c. It shall not be the defense of the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

9. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under Section 311 of the Federal Water Pollution Control Act and applicable provisions of the Mississippi Water Pollution Control Law pertaining to spills of oil and hazardous materials.

10. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State, or local laws or regulations.

11. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstance, and the remainder of this permit, shall not be affected thereby.

12. Expiration of Permit

The permittee shall not discharge after the expiration date of this permit unless he has submitted a completed application for reissuance no later than 180 days prior to the expiration date. The Head of the Office of Pollution Control may grant permission to submit an application later than this, but no later than the expiration date of the permit.

PART III

A. REOPENER CLAUSE

This permit shall be modified, or alternately, revoked and reissued, to comply with any applicable effluent standard, limitation or stormwater regulation issued or approved under Section 301(b)(2)(C), and (D), 304(b)(2), 307(a)(2) and 402(p) of the Federal Water Pollution Control Act if the effluent standard, limitation or regulation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or

2. Controls any pollutant not limited in the permit.

B. CLOSURE REQUIREMENTS

Should the permittee decide to permanently close and abandon the premises upon which it operates, it shall so notify the Permit Board no later than 90 days prior to doing so. Accompanying this notification shall be a closure plan which describes how and when all manufactured products, by-products, raw materials, stored chemicals, and solid and liquid waste will be removed from the premises such that they will present no potential environmental hazard to the area. Abandonment of the site without providing proper notification as required herein, or without completing all aspects of the closure plan, will constitute a violation of this permit and may result in penalties of up to $25,000.

C. REQUIREMENTS REGARDING COOLING AND BOILER WATER ADDITIVES

Notification shall be made to the permitting authority in writing not later than sixty (60) days prior to initiating the addition of any chemical product to the cooling water and/or boiler water which is subject to discharge, other than those previously approved and/or used. Such notification should include, but not be limited to:

1. Name and composition of the proposed additive,
2. Proposed discharge concentration,
3. Dosage addition rates,
4. Frequency of use,
5. EPA registration, if applicable, and
6. Aquatic species toxicological data, if applicable.

Written approval must be received from the permitting authority prior to initiating use.

D. OTHER STANDARD CONDITIONS

1. Bioassay Requirements

The Water Quality Standards of Mississippi require that all waters be free from substances in concentrations or combinations which are harmful to humans, animals, or aquatic life (State of Mississippi, Water Quality Criteria for Intrastate, Interstate and Coastal Waters, Section II.4. Minimum Conditions Applicable to All Waters, p. 3, adopted Nov. 12, 1974). In accordance with such requirements, the permittee shall conduct the following biological testing program:

a. The permittee shall conduct bioassay tests semi-annually as described in EPA-600/4-78-012 to determine the 96-hour LC-50 concentration of Outfall 003.

b. Concurrent with the above bioassay tests, the permittee shall conduct and report analysis of nitrates, chlorides, total dissolved solids, NH_3-N, total residual chlorine, free available chlorine, toxaphene, and DNBP resent in Outfall 003. Flow rate shall also be reported.

c. Also concurrent with the above tests, the permittee shall conduct 24-hour static bioassays at 3 scattered points within the Mississippi River, all at approximately 25 feet from the permittee's outfall discharge point. Should any of the 24-hour static tests result in less than 90% survival of test organisms, the permittee shall repeat the tests at 50-foot radius and shall continue at 25-foot intervals until no more toxicity is determined. The approximate location of each sampling point within the river shall be recorded such that isopleths of toxicity can be drawn onto a map. As specified in Paragraph b. above, chemical analysis of the river water shall be conducted and reported at each sample point.

d. In conducting all of the above bioassay tests, the permittee must use one of the following organisms:

   i. Pimephales promelas (fathead minnow)
   ii. Daphnia pulex (water flea)
   iii. Daphnia magna (water flea)

e. The results of all testing required by this paragraph shall be submitted with the quarterly Discharge Monitoring Report required in Part I.C.2. of this permit.

2. In addition to the specific conditions of this permit, the permittee shall comply with all applicable conditions of 40 CFR 122.7 and 40 CFR 122.61.

3. There shall be no discharge of process wastewater from the nitric acid plant.

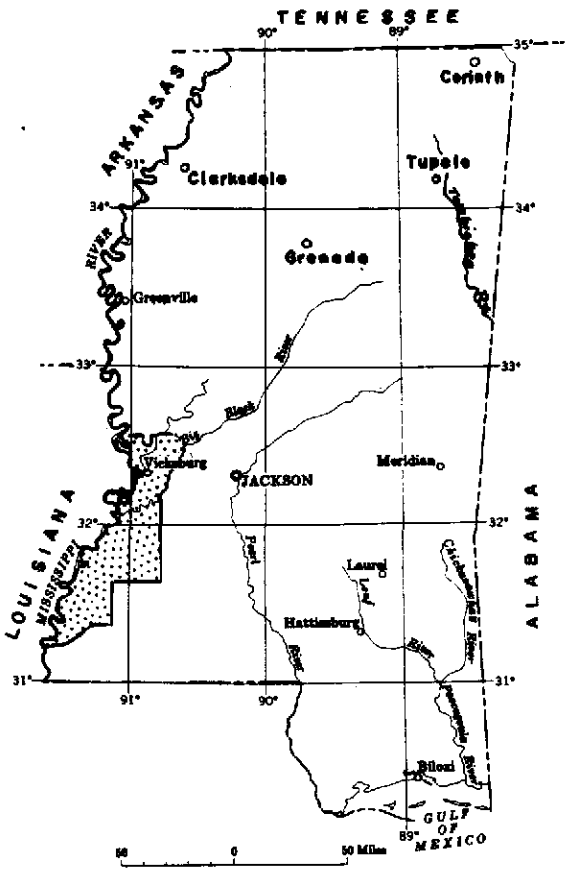
STATE OF MISSISSIPPI
INDUSTRIAL AND TECHNOLOGICAL RESEARCH COMMISSION
JACKSON

Available Water for Industry

in Adams, Claiborne, Jefferson, and Warren Counties, Mississippi.

by

J.A. Callahan, John Shelton,
D.E. Everett, and E.J. Harvey



Prepared cooperatively by the
Water Resources Division, U. S. Geological Survey
1964

Ref. 18

YAZOO RIVER WATER

Water supply intakes for the city of Vicksburg are located on the east bank of the Mississippi River near the mouth of the Yazoo River. Mixing of the waters of the Yazoo and Mississippi occurs at all stages but more Yazoo River water is used by the city because of the location of the intakes. During periods of high stages of the Yazoo River and corresponding low stages of the Mississippi River, the water used by the city of Vicksburg is almost exclusively Yazoo River water. During these periods, high turbidity in the Yazoo River creates a water treatment problem. Also, the color index for Yazoo River is greater at most stages. However, the overall quality of Yazoo River water is superior to that of the Mississippi River; Yazoo River water is less mineralized and softer.

SURFACE WATER

SOURCES AND DEVELOPMENT

In the project area, approximately 90 percent of the water used comes from the ground-water reservoirs. With the increasing demand for water, alternate sources of supply must be developed.

Some parts of the southwestern area have ample amounts of surface water which could be utilized. For instance, the town of Port Gibson in Claiborne County has a potential water supply in Little Bayou Pierre. This stream, which flows along the northern edge of the town, has an estimated minimum discharge of 12 cfs (cubic feet per second) or approximately 7.8 mgd (million gallons per day), which is many times the present (1963) usage of 0.44 mgd.

The use of water-storage structures on streams in the southwestern area may be limited by the large amount of sediment carried by the streams during periods of flood runoff. Before reservoir construction is contemplated in the area, the cost of water treatment facilities should be considered. Hardness, low pH, and color, in addition to excessive sediment, may be problems in some areas.

Before any surface-water development is undertaken in the southwestern area, consideration should be given to the use of water from the Mississippi River. A tremendous amount of water is available from this important source, and it should be utilized if economically feasible.

DESCRIPTION OF STREAMS IN AREA

The project area is drained by a network of streams that forms a dendritic drainage pattern (fig. 4). The overall drainage in the area is southwestward into the Mississippi River. Generally, the streams rising in the eastern part of the area are perennial and those rising in the Loess (Bluff) Hills are intermittent. The alluvial plain of the Mississippi River and its chief tributaries contains many oxbow lakes which occupy abandoned meanders of the rivers.

The principal streams of the area are all tributaries of the Mississippi River and include the Yazoo River, which flows through the Mississippi Delta and bounds the area on the north, and the Big Black River, Bayou Pierre, and the Homochitto River, which entered from the hills on the east.

Roughly, the northern one-third of the area is drained by the Big Black River, the central one-third by Bayou Pierre and Coles Creek, and the southern one-third by the Homochitto River. The Yazoo River drains a small part of northern Warren County.

MISSISSIPPI WATER LAW

In 1956 the Mississippi Legislature passed an act establishing a Board of Water Commissioners. The powers of the Board include the issuance of water permits, protection of existing water rights, and controlling the appropriation of additional available water in the future to insure the most advantageous use for agricultural, industrial, municipal, and recreational purposes.

The Mississippi water law declares that water in any water course, lake, or other natural water body of the State is public water and subject to appropriation in accordance with the provisions of the law. The law applies only to surface waters and should not be interpreted as affecting ground water or the rights of ground water users.

The Board of Water Commissioners has the authority to permit the appropriation of water of any stream only in excess of the established average minimum flow. The average minimum flow is defined in the Mississippi water law as follows: ". . . the average of the minimum daily flow occuring during each of the five (5) lowest years in the period of the preceeding twenty (20) consecutive years. Such determinations shall be based upon available streamflow data, supplemented, when available data are incomplete, by reasonable calculations." The Board may authorize any appropriator to use the established minimum flow upon written assurance that such water will be immediately returned to the stream in substantially the same amount.

Table 3 is a presentation of average minimum flows calculated for streams in the southwestern area. Data for the period 1938-57 were used for the determinations of the average minimum flows.

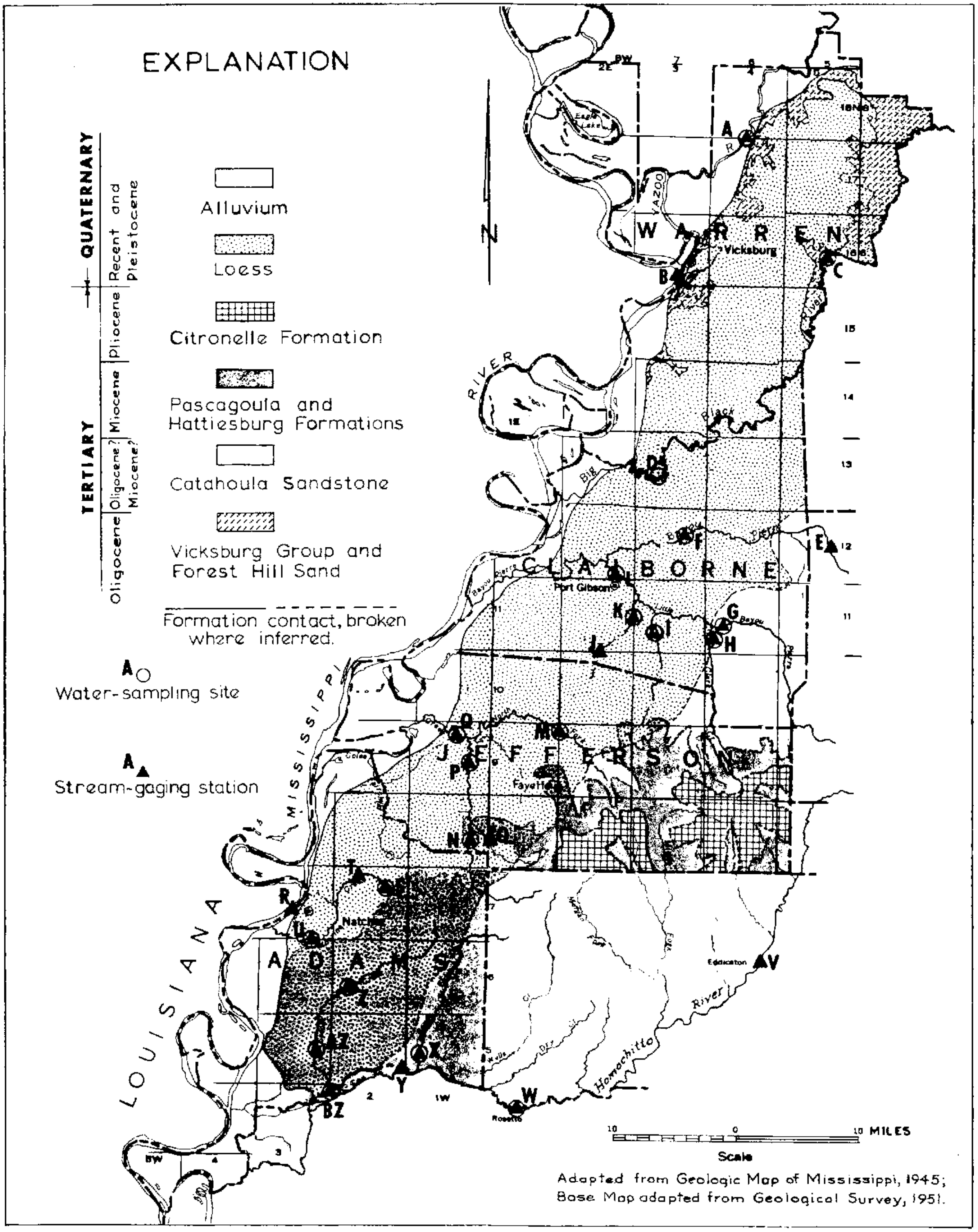


Figure 4. — Geologic map showing location of stream-gaging stations and water-sampling sites.

GROUND WATER

STRATIGRAPHIC AND STRUCTURAL RELATIONSHIPS

Geologic units of Tertiary and Quaternary age are all hydrologically important in the area. The oldest outcropping unit is the Forest Hill Sand of the Oligocene Series, which is exposed in stream channels in the uplands of Warren County. Beneath the Quaternary surface mantle of loess, sand, and gravel is the Miocene Series, which crops out in the uplands of southern Warren County and the area to the south.

Table 11. — Range in chemical and physical characteristics for the Mississippi River near St. Francisville, La. (1955-62)

All constituents expressed in parts per million except specific conductance (micromhos at 25°C) and temperature (°F).

	Maximum	Minimum
Silica	17	3.1
Calcium	51	22
Magnesium	15	3.9
Sodium	50	7.2
Potassium	4.1	1.7
Bicarbonate	169	64
Sulfate	81	22
Chloride	68	8.5
Fluoride	1.0	.0
Nitrate	6.8	.4
Dissolved solids	320	111
Hardness	185	75
Specific conductance	683	173
Water Temperature	87	34

The geologic sections (figs. 11 and 12) show tentative correlations of the Tertiary formations. The correlations are based on electrical and drillers' logs of oil tests and water wells and are considered approximate.

The dip of the formations is to the south at an average rate of 25 feet per mile. The dip is about 10 to 15 feet per mile across Warren and Claiborne Counties (fig. 11) and about 50 feet per mile across Jefferson and Adams Counties. A structure contour map of the base of the Yazoo Clay (fig. 13) shows a more uniform dip in Jefferson and Adams Counties than in Warren and Claiborne Counties where salt domes are more numerous. The strike and dip of the formations are altered in parts of the area owing to the presence of salt domes over which the formations are gently arched. Major faulting is uncommon in the Miocene, Oligocene, and upper Eocene sections.

Loess in thisknesses as great as 50 feet forms bluffs along the Mississippi River and masks older rocks. Toward the east the loess thins, and older units are exposed in stream channel and valley walls.

Sand and gravel of the Citronelle Formation of Pliocene age cap the hills in eastern Jefferson County. Deposits occurring at altitudes of 300 to 400 feet above mean sea level in eastern Adams County are thought to be of the same age. These deposits are the source of the base flow of streams draining the eastern part of the area.

The erosional surface on which the Citronelle rests descends toward the west from about 400 feet to 200 feet above sea level. About 6 miles east of the Mississippi River an erosional surface descends rapidly to an altitude of 35 to 50 feet msl at Natchez. On this surface in Natchez and vicinity a gravel bed immediately underlying the loess and distinctly younger than the Citronelle is exposed in some stream beds, deep road cuts, and banks along the river. In places, 40 to 90 feet of gravel has been logged in wells. This deposit is referred to as the Natchez Formation (Chamberlain and Salisbury, 1907, p. 386-388).

Alluvial deposits composed of fine-grained material at the top and coarse sand and gravel at the base fill the valley of the Mississippi River to depths greater than 150 feet. Records of borings (Fisk, 1944, pl. 4) made for the Mississippi River bridge at Natchez show the base of the alluvium to range from 50 to 140 feet below mean sea level. South of Natchez on the flood plain of the Mississippi River, at the mouth of St. Catherine Creek, the base of the alluvium is 100 feet below mean sea level and 6 miles farther south it is 200 feet below mean sea level. Apparently the lower part of the aquifer here is composed of sediments older than the Mississippi River alluvium, and this may account for the steep descent of the base of the aquifer.

OCCURRENCE OF GROUND WATER

The Claiborne Group of Eocene age is the oldest geologic unit containing potable water in Warren County. Principal aquifers in this group are the Sparta Sand and the Cockfield Formation. In northern Warren County, industrial and domestic wells are developed in these sands. South of Vicksburg two wells in the Cockfield are used sparingly. Depths of wells range from 800 to 1,700 feet. The Sparta Sand is about 900 feet thick and the top of the unit occurs at a depth of 1,300 to 1,800 feet below the upland surface in Warren County. The Cockfield Formation is 600 to 700 feet thick and the top of the unit occurs at a depth of 600 to 1,100 feet below the alluvial plain and 800 to 1,300 feet below the surface in the uplands.

The Forest Hill Sand of Oligocene age is covered except for small outcrops in northern Warren County. The formation is about 200 feet thick and supplies water to most domestic wells in Warren County. Several industrial wells, now destroyed, were developed in these sands at Vicksburg and were capable of yielding 100 to 200 gpm each.

The chief producing sands south of Vicksburg are in the Miocene Series. The Miocene beds crop out in Warren County and reach a thickness of 2,200 feet in Adams County. The maximum depth of fresh water in the Miocene is 1,600 to 1,700 feet in southern Adams County.

Terrace deposits of sand and gravel furnish supplies to some shallow domestic wells developed in them. The narrow belt of alluvium along the course of the Mississippi River has the greatest potential ground-water yield. However, its development in some places is limited by its small areal extent. The alluvium may be as much as 200 feet thick, with the basal part consisting of very coarse sand and gravel.

MOVEMENT AND STORAGE

Water-table conditions prevail in places in the valley alluvium and terrace deposits and in outcrop areas of the older formations. The water table generally is 50 to 100 feet below land surface in the hills but much shallower in the lowlands. The slope of the water table is toward the south except in places where it is disturbed by pumping from wells. Water does not rise in these wells as it does in deeper artesian wells.

Water in the Tertiary formations is confined and is therefore subject to artesian conditions. Water levels in wells stand above the aquifer, although they may be lower than the water table of shallow deposits in the same locality. The piezometric surface of artesian aquifers is above land surface in the alluvial valley, permitting the construction of flowing wells.

The rate of ground-water movement is dependent upon the slope of the piezometric surface and the permeability of the formation. Water-table and piezometric maps based on water-level measurements in wells were drawn to determine the direction of ground- water movement in the area and the extent of drawdown cones.

A piezometric map of the Sparta Sand (fig. 14) shows the water movement to be toward an area of lower water levels in northwestern Warern County and adjoining Issaquena County. All known Sparta wells are located on or at the edge of the Mississippi River alluvial plain. Water levels measured in these wells range from 3 to 42.5 feet above land surface.

The piezometric map does not extend far enough to the east or northeast to show the full effects of the large withdrawals of ground water at Jackson and Yazoo City. Studies in these areas indicate that part of the water which normally would have moved toward the northern part of Warren County is being withdrawn at Jackson. Since 1950, water levels in the Sparta Sand have declined about 8 feet in some wells in the lower part of the Delta, although there is little withdrawal from the Sparta in that area.

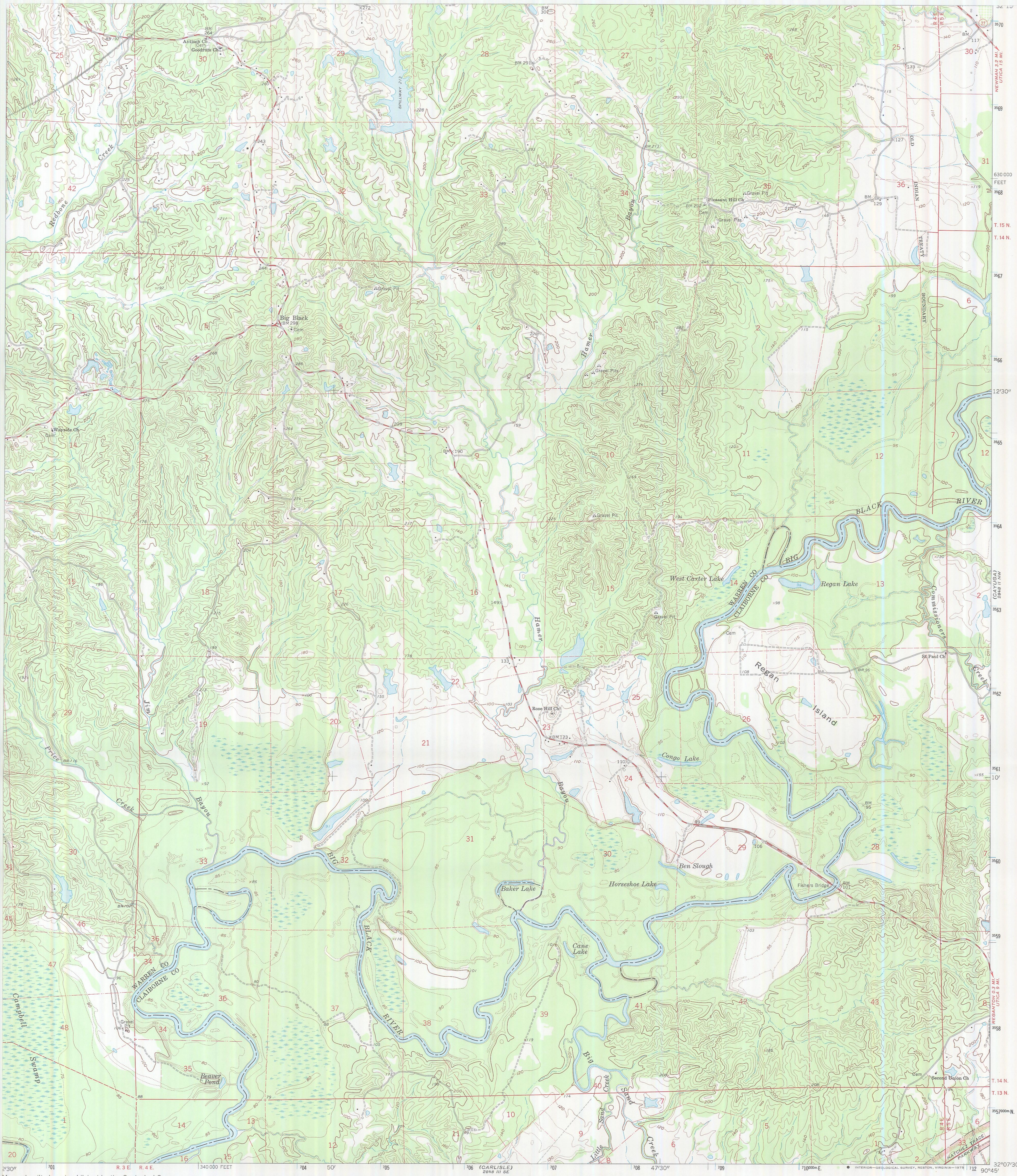
Water in the Cockfield Formation moves generally northwest toward discharging artesian wells located in the lower part of the Delta (fig. 15). Measured water levels range from 250 feet below land surface in the hills to 3 feet above land surface on the alluvial plain. As in the Sparta Sand, water movement is toward the lower part of the Delta. Water levels in the Cockfield Formation have declined about 20 feet in some wells since 1935.

Water in the Miocene aquifers generally moves from north to south, except in the areas of withdrawal where movement is toward discharging wells (fig. 16).

The interpretation of the piezometric surface is based on measurements made between April and August 1961 in wells of which some are no longer in existence. Although considerable difference exists in Natchez between the piezometric surfaces of the 400- and 600-foot sands, the piezometric surface of the 600-foot sand probably is about the same as that for the 400-foot sand in areas some distance from centers of pumping. Future work and additional control undoubtedly will change the contours somewhat on figure 16.

At Natchez, all municipal and industrial wells except those of the International Paper Company are screened in the 400- and 600-foot sands of the Miocene. Broad cones of depression have developed in the water surface of both sands owing to large withdrawals of water, the depths of the cones being dependent on the characteristics of the aquifers and quantity of water withdrawn from each (fig. 17).

Reported data indicate that water levels stood about the same for both aquifers prior to development of wells. Water-level declines in the 400-foot sand are greater than those in the 600-foot sand owing to the lower transmissibility of the 400-foot sand. Average declines in the 400-foot sand at different locations were: Natchez municipal water plant (Devereaux plant), 2.1 feet per year since 1939; Armstrong Tire and Rubber Company 0.7 mile east of the water plant, 4 feet per year since 1938; Johns-Manville plant 2.2 miles southeast of the municipal plant, 1.3 feet per year since 1946. The decline in the water



Mapped, edited, and published by the Geological Survey

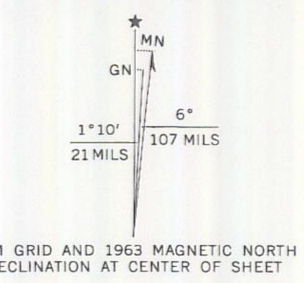
Control by USGS, USC&GS, and USCE

Topography by photogrammetric methods from aerial photographs taken 1960 and planetable surveys 1963

Polyconic projection. 1927 North American datum
10,000-foot grid based on Mississippi coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Map photoinspected 1973
No major culture or drainage change observed



UTM GRID AND 1963 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 ½ 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty
Medium-duty
Light-duty
Unimproved dirt
State Route

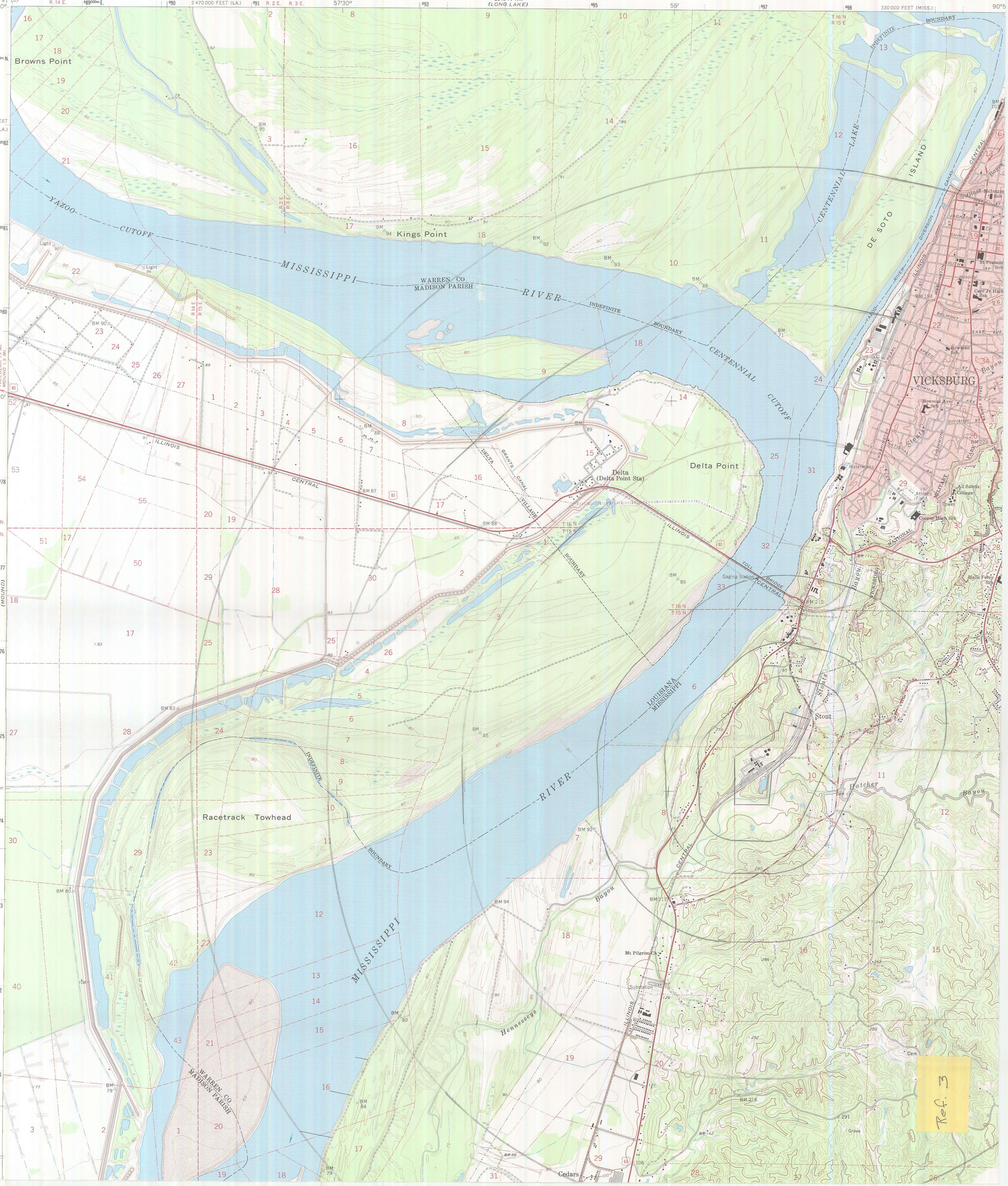
BIG BLACK, MISS.
NE/4 YOKENA 15' QUADRANGLE
N3207.5—W9045/7.5

1963
PHOTOINSPECTED 1973
AMS 2848 III NE—SERIES V843

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

0-1/4 - 40
1/4-1/2 - 72
1/2-1 - 71

VICKSBURG WEST QUADRANGLE
MISSISSIPPI—LOUISIANA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 VICKSBURG 15' QUADRANGLE



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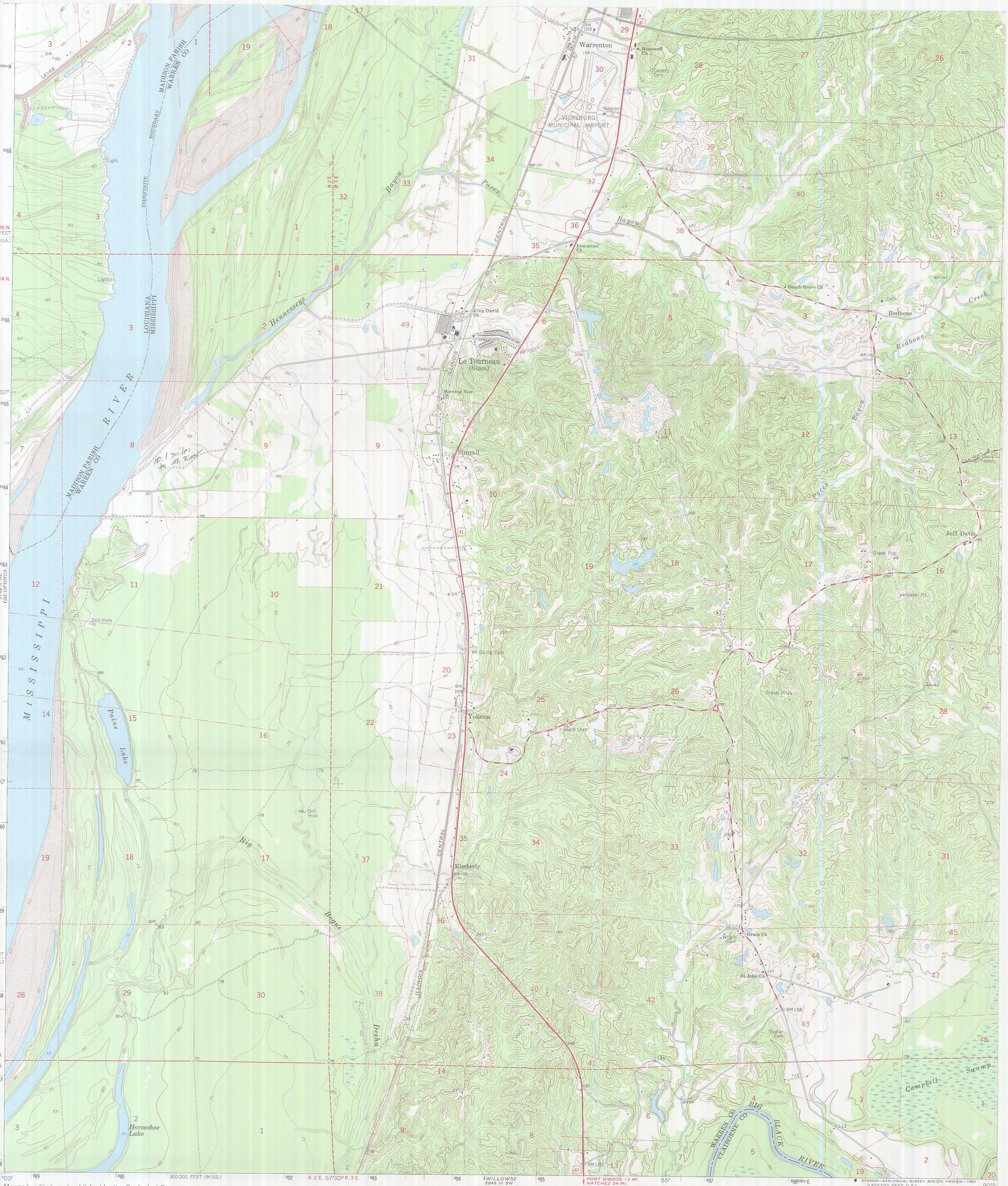

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography by photogrammetric methods from aerial photographs taken 1960 and planetable surveys 1963

Polyconic projection. 1927 North American datum
10,000-foot grids based on Mississippi coordinate system, west zone and Louisiana coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks, zone 15, shown in blue
To place on the predicted North American Datum 1983 move the projection lines 13 meters south and 10 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Map photoinspected 1973
No major culture or drainage changes observed

UTM GRID AND 1963 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND STATE OF LOUISIANA, DEPARTMENT OF PUBLIC WORKS, BATON ROUGE, LOUISIANA 70804
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

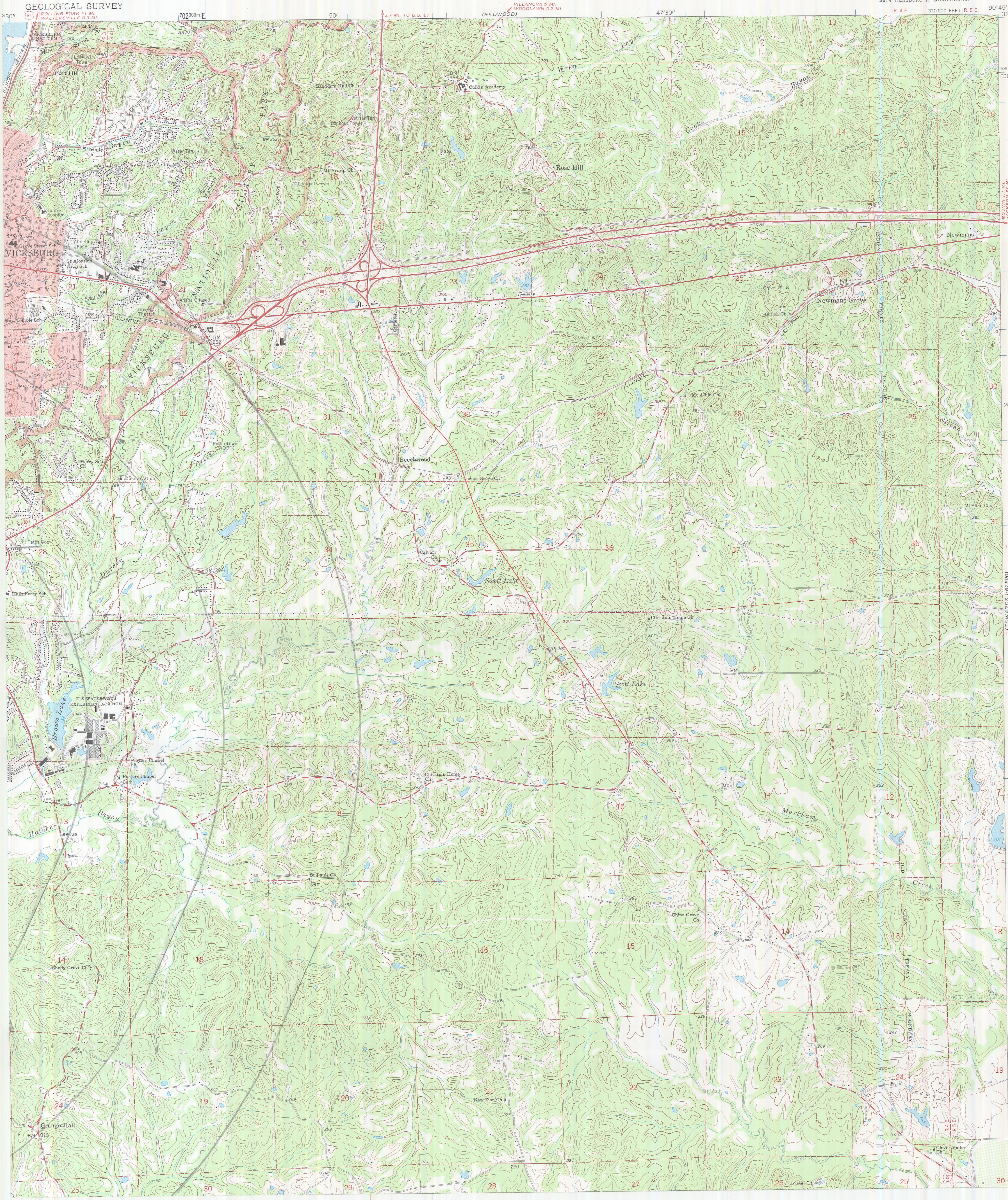
ROAD CLASSIFICATION
Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
U. S. Route

YOKENA, MISS.—LA.
NW/4 YOKENA 15' QUADRANGLE
N3207.5—W9052.5/7.5

1963
PHOTOINSPECTED 1973
AMS 2848 III NW—SERIES V843

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

VICKSBURG EAST QUADRANGLE
MISSISSIPPI—WARREN CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
SE/4 VICKSBURG 15' QUADRANGLE



VERTEC CHEMICAL SITE WARREN CO.