27592

REMEDIAL SITE ASSESSMENT DECISION - EPA REGION IV

Site Name: Allen Ready Mix **EPA ID#:** TND 980838825

Alias Site Names: _____

#27592

City: Memphis **County or Parish:** Shelby **State:** TN

Refer to Report Dated: 09/30/93 **Report type:** SIP

Report developed by: Halliburton NUS for B&V

DECISION:

|X| **1. Further Remedial Site Assessment under CERCLA (Superfund) is not required because:**

|X| 1a. Site does not qualify for further remedial site assessment under CERCLA (Site Evaluation Accomplished - SEA)

| | 1b. Site may qualify for further action, but is deferred to: | | RCRA | | NRC

| | **2. Further Assessment Needed Under CERCLA:** 2a. (optional) Priority: | | Higher | | Lower

2b. Activity Type: | | PA | | ESI | | SI | | HRS evaluation

| | Other: _____

DISCUSSION/RATIONALE:

No substantial concentrations of waste on site. Surficial groundwater flows to the Wolf River and the J-C confining layer is approximately 200 feet thick.

Report Reviewed and Approved by: David G. Williams Signature: _____ Date: 09/20/93

Site Decision Made by: David G. Williams Signature: _____ Date: 09/20/93

EPA Form # 9100-3

B&V WASTE SCIENCE AND TECHNOLOGY CORP.
1117 Perimeter Center West, Suite W-[illegible], Atlanta, Georgia 30338, (404) 392-9227, Fax. (404) 392-9289

09/30/93

U.S. EPA
Site Inspection Prioritization
W.A. No. 12

BVWST Project 52000.010
BVWST File C.4
August 26, 1993

WPB/SAS
RECEIVED
AUG 30 1993
EPA - REGION IV
ATLANTA, GA

Mr. Narindar Kumar
Acting Chief, Site Assessment Section
U.S. Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Subject: Final SIP Report
Allen Ready-Mix Concrete Co.
Memphis, Tennessee
EPA ID No. TND980838825

Dear Mr. Kumar:

Please find attached the final Site Inspection Prioritization report for the Allen Ready-Mix Concrete Company site, located in Memphis, Shelby County, Tennessee. If you have any questions concerning this document, please give me a call.

Sincerely,

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

Hubert Wieland
Project Manager

Enclosure

cc: Keith Mills, EPA CO
Doug Thompson, EPA PO
Earl Bozeman, EPA WAM

FINAL
SITE INSPECTION PRIORITIZATION
REPORT
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, SHELBY COUNTY, TENNESSEE

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FINAL

Site Inspection Prioritization Report

Allen Ready-Mix Concrete Company
Memphis, Shelby County, Tennessee
EPA ID No. TND980838825
WasteLAN No. 04020

Prepared Under
Contract No. 68-W9-0055
For The
U.S. Environmental Protection Agency

Prepared By:
Halliburton NUS for B&V Waste
Science & Technology, Corp.
BVWST Project No. 52012.097

AUGUST 6, 1993

Prepared By	Reviewed By	Approved By
Teresa R. Sawyer HNUS Site Manager	Jancie S. Hatcher BVWST Technical Reviewer	Hubert Wieland BVWST Project Manager

SITE ASSESSMENT
Final Site Inspection Prioritization
Allen Ready-Mix Concrete Company
Memphis, Shelby County, Tennessee

EPA ID No. TND980838825

WasteLAN No. 04020

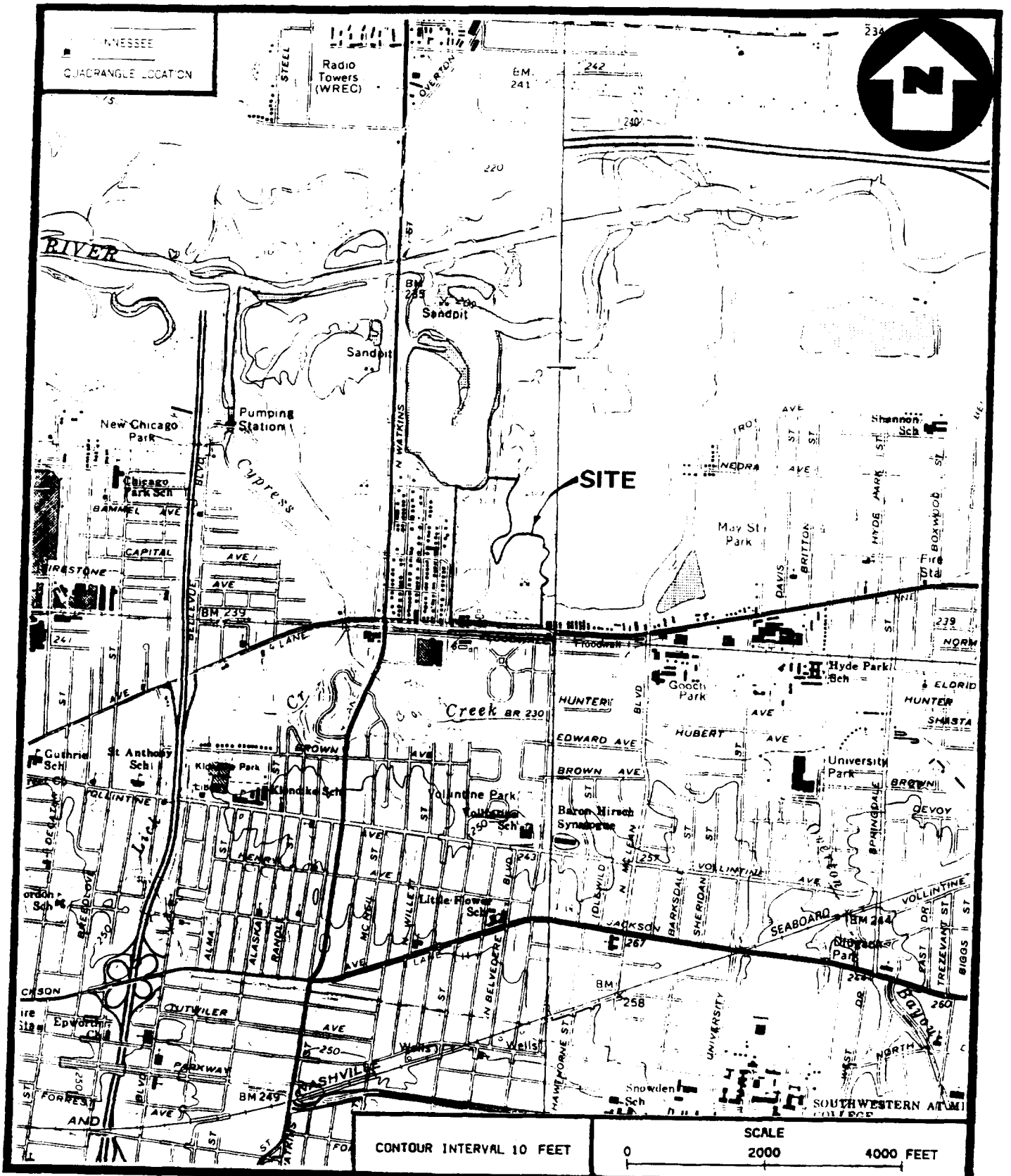
1.0 Introduction

HALLIBURTON NUS was tasked by BVWST for the U.S. EPA to conduct a Site Investigation Prioritization (SIP) for Allen Ready-Mix Concrete Company in Memphis, Shelby County, Tennessee. This study was performed under the authorization of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and the Superfund Amendments Reauthorization Act of 1986 (SARA).

The SIP will update the Site Investigation (SI) for Allen Ready-Mix Concrete Company conducted by the Tennessee Department of Health and Environment (TDHE), presently named Tennessee Department of Environment and Conservation (TDEC), and an offsite reconnaissance performed by HALLIBURTON NUS Environmental Corporation on January 13, 1993, by utilizing the Hazard Ranking System (HRS). Sources of information used during the evaluation include U.S. EPA CERCLA file material and available state information from the Memphis Superfund Office. No further information was obtained regarding the site status from the U.S. EPA Region IV Environmental Services Division (ESD) or the Region IV Toxic Substances Control Act (TSCA) office. The SIP will quantify the threats posed by the site and provide sufficient documentation in order to decide on the appropriate future course of action.

2.0 Site Description and History

The Allen Ready-Mix Concrete Company (Allen Ready-Mix) was located at 1572 Chelsea Avenue in Memphis, Shelby County, Tennessee. The original property owned by Allen Ready-Mix has since been subdivided, and the area of concern was purchased by Permacon Block and Brick Company prior to December 1985 (Ref. 1). The property is currently being operated by Wilson Concrete Products and is located at 1576 Chelsea Avenue in Memphis (Ref. 2, p. 2). Maps obtained from the county tax assessor's office indicate that the property is presently owned by Permacon, Inc. (Ref. 3). The estimated size of the present facility is 6.8 acres (Ref. 3). This was estimated using county tax maps for the present facility. Figures in the file material indicate that Allen Ready-Mix may have occupied a



BASE MAP IS A PORTION OF THE U.S.G.S. 7.5 MINUTE QUADRANGLE MAPS NW MEMPHIS.TN.–AR., 1973, NE MEMPHIS, TN., 1983, SW MEMPHIS, TN.–AR., 1973 & SE MEMPHIS, TN., 1983.

FIGURE 1

SITE LOCATION MAP

ALLEN READY – MIX CONCRETE COMPANY
MEMPHIS, SHELBY COUNTY, TENNESSEE

HALLIBURTON NUS
Environmental Corporation

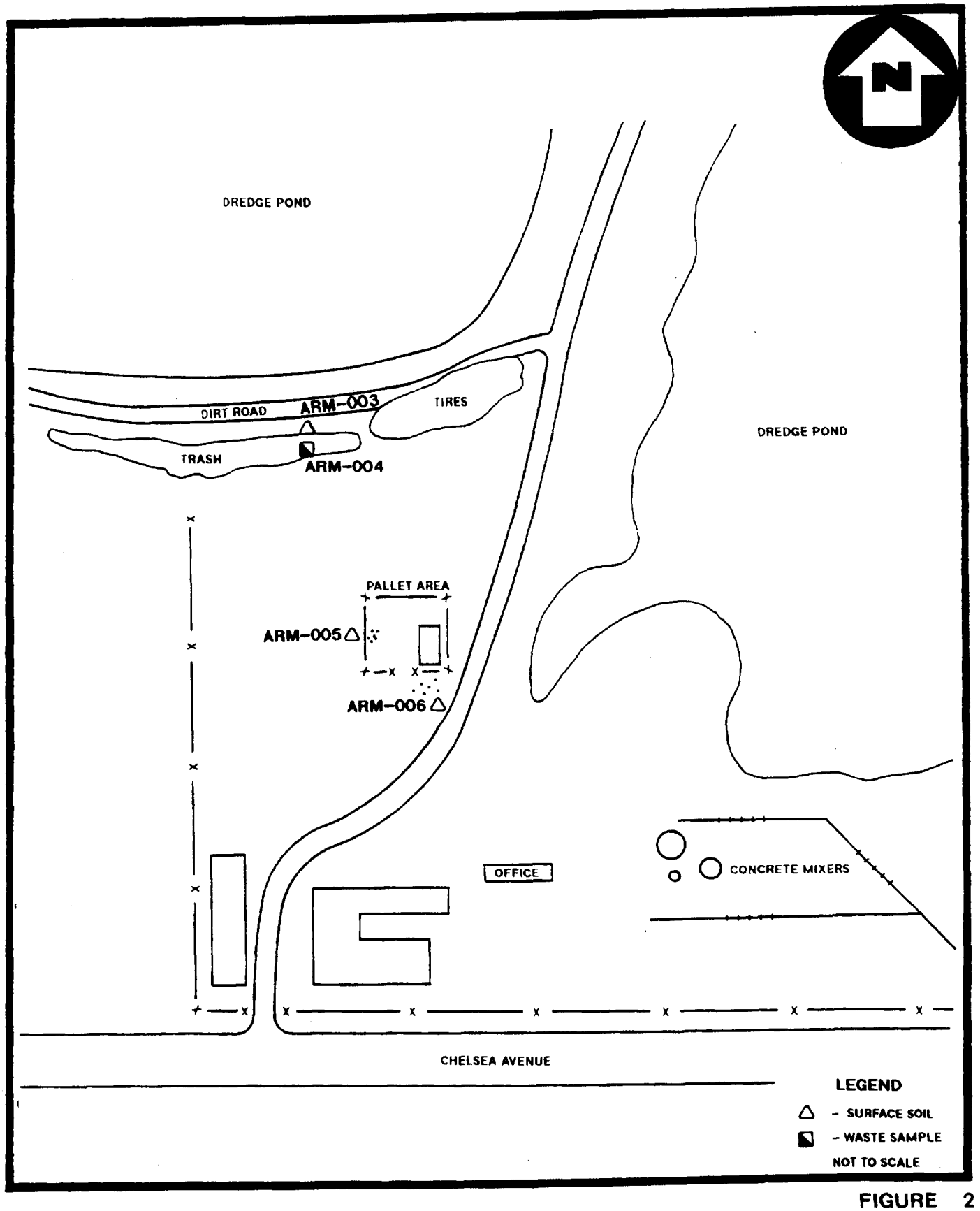


FIGURE 2

SITE LAYOUT & SAMPLE LOCATION MAP

ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, SHELBY COUNTY, TENNESSEE

HALLIBURTON NUS
Environmental Corporation

larger tract, but the exact size is unknown. The geographical coordinates are 35°10'23.5" North latitude and 90°00'13" West longitude (Ref. 4). The site location and layout are shown on Figures 1 and 2, respectively.

The average annual precipitation for Memphis is 50 inches, and the mean annual lake pan evaporation is 40 inches, yielding a net annual precipitation of 10 inches (Ref. 5, pp. 43, 63). The 2-year, 24-hour rainfall for the area is 4 inches (Ref. 6, p. 95).

The U..S. EPA conducted a preliminary site inspection at the Allen Ready-Mix site in May 1980 and recommended a Hazardous Waste Site Inspection (HWSI) (Ref. 7). A total of 49 drums were observed at the facility. There were 25 unlabeled, rusted drums which contained a black, oily liquid. A total of 11 drums were observed on a concrete pad, and eight drums were in a fenced enclosure. A total of five drums were out in the open. None of the drums were covered (Ref. 7, p. 2). The HWSI was conducted on March 18, 1981 by the U.S. EPA, and a more in-depth site description was provided in the subsequent report. There were two large dredge ponds north of the property which flowed into the Wolf River. It was noted that large amounts of concrete were disposed of between the two ponds. There was also some trash and several old concrete mixer drums disposed of in this area. An unreported number of crushed, 55-gallon drums were also observed in this area and appeared to have contained discarded fuel and/or lubricants (Ref. 8, p. 2).

A dirt road that runs along the northwest pond was strewn with trash, and the remains of several fiber drums containing red, sandy-looking material were observed in this area. There was also a large pile of tires near the southeast corner of the pond (Ref. 8, p. 2).

Several unlabeled, 55-gallon drums were stored in a fenced area northwest of the concrete mixers. Additional drums were stored outside the fence near the southeast corner of the fenced area. This area was described by Mr. Fred Richardson, Manager, Allen Ready-Mix Concrete Co., as a pallet building and repair area which is no longer used. Mr. Richardson said that he did not know what was in the drums. The only other 55-gallon drums observed on the site were stored on a concrete pad and appeared to contain fuels and/or lubricants (Ref. 8, p. 2).

Four samples were collected during the HWSI: three surface soil samples and one waste sample. Two soil samples were collected downgradient from the pallet area, and the third soil sample was collected downgradient from the remains of the fiber drums. The waste sample was collected from the red, sandy-looking material in the fiber drums (Ref. 8, p. 2). The data summary is given in Table 1, and the sample locations are shown on Figure 1.

TABLE 1

DATA SUMMARY
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, SHELBY COUNTY, TENNESSEE

EXTRACTABLE ORGANIC COMPOUNDS (GC/MS) (ug/kg)	SOIL			WASTE
	ARM-005 West Side Pallet Area	ARM-006 Southeast Corner Pallet Area	ARM-003 North of Drums Near Dredge Pond	ARM-004 Residual from Drums Near Dredge Pond
Dieldrin [1]	ND	ND	45	
P,P'-DDT [1]	ND	ND	27	ND
P,P'-DDE [1]	ND	ND	15	ND
P,P'-DDD [1]	ND	ND	20	ND
Endrin [1]	ND	ND	19	ND
Heptachlor [1]	ND	2.5	3.9	ND
Gamma chlordane	31	9.8	50	ND
Alpha chlordane	26	7.2	ND	ND

ND - None detected at or above the minimum detection limit (MDL). The MDLs vary from sample to sample and from parameter to parameter, see analytical data sheets (Appendix A) for exact values.

All concentrations are calculated on a dry weight basis.

1 - Compound/element is on the NRDC list of priority pollutants.

The soil samples collected near the pallet area contained traces (less than quantifiable concentrations of several polynuclear aromatic hydrocarbons. A large number of organic acids (maximum concentration 14,000 ug/kg hexadecanoic acid), cyclodiene pesticide-related materials (maximum concentration 31 ug/kg gamma chlordane), and a petroleum-type product were also detected in these samples. Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (Ref. 8, p. 3).

The soil sample collected near the dredge pond contained traces (<4,000 ug/kg) of several polynuclear aromatic hydrocarbons, a trace (<5,000 ug/kg) of a methyl ester of methyl pentadecanoic acid, and several pesticide-related materials (maximum concentration 50 ug/kg gamma chlordane). Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (Ref. 8, p. 3).

The sample of red, sandy-looking material collected from the remains of the deteriorated fiber drums contained several fatty acids (maximum concentration 67,000 ug/kg octadecanoic acid), alcohols (maximum concentration 38,000 ug/kg methylene biphenol), and aldehydes (maximum concentration 4,500 ug/kg hydroxybenzaldehyde). No pesticide-related materials were detected in this sample. Metals concentrations were at or below the concentrations detected in the soil samples collected during the investigation (Ref. 8, p. 3).

An offsite reconnaissance was conducted at this facility on January 13, 1993. As previously stated, the site is currently being operated by Wilson Concrete Products. Various piles of concrete blocks were observed strewn about the site. There were no drums observed on the site (Ref. 2, p. 3).

3.0 Groundwater Pathway

3.1 Hydrogeologic Setting

The Allen Ready-Mix facility is situated near the border between the Gulf Coastal Plain and the Mississippi Alluvial Plain physiographic provinces. The Gulf Coastal Plain is characterized by gently rolling to steep topography which is dissected by flat-lying alluvial plains along streams which drain the region. The Mississippi Alluvial Plain is characterized by flat, low-lying regions near the Mississippi River (Ref. 9, p. 5). The facility lies in an upland 0.75 mile south of the Wolf River and 2.5 miles east of the Mississippi River. The land surface in the vicinity of the site ranges from 200 to 330 feet above mean sea level (amsl). The site is at 210 feet amsl (Ref. 4).

The Memphis area is located in the north-central portion of the Mississippi embayment, a broad structural trough or syncline that plunges south along an axis that parallels the Mississippi River (Ref. 9, p. 6). About 3,000 feet of unconsolidated clastic debris has been deposited since the beginning of the Cretaceous Period (Refs. 9, p. 6; 8, p. 1). Geologic formations in the Memphis area dip and thicken westward toward the axis of the syncline. These formations consist predominantly of clay, silt, sand, and gravel deposited in marine, lagoon, or fluvial environments. During Pleistocene glaciation, the landscape was covered by a thick layer of loess which makes up the present land surface (Ref. 9, p. 6).

The stratigraphy discussed in this section is based on previous investigations, available published cross sections, published well log data, and the Shelby County Soil Survey. This literature indicates that the following units exist, beneath the facility, in descending order: 5 feet of soil, 78 feet of loess and fluvial deposits, 210 feet of the Jackson-Upper Claiborne confining clay unit, 400 feet of the Memphis Sand, 200 feet of the Flour Island confining unit, and 250 feet of the Fort Pillow Sand (Ref. 9, p. 8, Plates 1 & 4, Table 2; 11, Sheet 49, pp. 17, 22). These thicknesses are approximate.

The soil beneath the facility was of the Grenada, Loring, and Memphis association before grading. This land has been graded for development. After grading, the slope is between 1 and 5 percent. The soil is silty in texture and brown in color. The undisturbed Grenada soils are generally well-drained and have formed in areas where the loess is at least 4 feet thick (Ref. 11, p. 22).

The Allen Ready-Mix site, located on a flat-lying alluvial plain, east of the confluence of Cypress Creek and the Wolf River, east of the Mississippi River, is directly underlain by loess and fluvial deposits. The Gulf Coastal Plain was blanketed by a 20- to 50-foot-thick deposit of loess during Pleistocene glaciation. Loess consists of wind-blown silt, silty clay, clay, and minor sand. The loess deposits tend to retard downward migration of water which provides recharge to lower units (Ref. 9, pp. 6-8). Pleistocene fluvial deposits generally underlie the loess in upland areas including the area surrounding Allen Ready-Mix. The fluvial deposits are older Mississippi River terrace deposits which were deposited in present day uplands and have since been blanketed by a thick layer of loess. Regional fluvial deposits range from 0 to 100 feet in thickness. Thicknesses vary because of the erosional surface at both the top and base of the unit. Fluvial deposits consist primarily of unconsolidated sand, gravel, and minor clay lenses (Ref. 9, p. 7). Quite often, the sand and gravel are cemented with iron oxide that forms thin layers of sandstone or conglomerate in the lower sections of the fluvial unit (Ref. 9, p. 7). The combined fluvial/loess thickness is approximately 78 feet in the vicinity of the facility (Ref. 9, Table 2).

The Eocene Jackson-Upper Claiborne clay unit underlies the loess and fluvial deposits. This unit is comprised of the Jackson Formation and the upper part of the Claiborne Group, which includes the Cockfield and Cook Mountain formations (Ref. 9, pp. 6-8). The Jackson Formation generally consists of fine sand or sandy clay. The Cockfield Formation consists of interfingering fine sand, silt, clay, and local lenses of lignite. The Cook Mountain Formation consists of clay and local sand lenses. These formations have been grouped together as the "Jackson-Upper Claiborne unit", and they act as one hydrogeologic confining unit which prevents groundwater in the surficial deposits from migrating downward into the Memphis Sand (Ref. 9, pp. 6-8). The estimated hydraulic conductivity of the Jackson-Upper Claiborne confining unit is 1.0×10^{-7} to 1.0×10^{-5}cm/sec (Refs. 12, p. 29; 13). The Jackson Formation occurs only beneath the higher hills and ridges in the north Memphis area; therefore, the confining unit consists predominantly of the Cockfield and Cook Mountain formations (Ref. 9, pp. 6-8). Due to lithologic similarities, the Jackson, Cockfield, and Cook Mountain formations cannot be differentiated in the subsurface of the Memphis area including the subsurface beneath the site. The thickness of the Jackson-Upper Claiborne confining unit is variable. In the vicinity of the site, the thickness is approximately 230 feet; however, the unit is discontinuous, thin, and possibly absent in other areas of Memphis (Ref. 9, pp. 6-9, Plate 1).

The Eocene Memphis Sand, also called the "500-foot" sand by some authors, underlies the Jackson-Upper Claiborne confining unit and exists beneath the entire Memphis area. The Memphis Sand consists of a thick body of sand, that includes subordinate lenses of clay, silt, and lignite at various horizons, and ranges in thickness from about 500 to 900 feet. Beneath the facility, the sand is estimated to be approximately 700 to 800 feet thick. The Memphis Sand is thickest in the southwest and thins to the northeast. The top of the Memphis Sand unit, beneath the facility, is approximately 313 feet below land surface (bls) (Ref. 9, Tables 1 & 2).

The Paleocene Flour Island Formation underlies the Memphis Sand. This formation is the uppermost unit of the Wilcox Group and consists primarily of silty clays and sandy silts. The Flour Island Formation acts as a lower confining unit for the Memphis Sand and ranges from 200 to 395 feet thick (Refs. 9, p. 8; 8, pp. 10, 11). In the vicinity of the facility, the Flour Island is approximately 1,000 feet bls (Ref. 9, p. 8).

The middle sand unit of the Paleocene Wilcox Group, the Fort Pillow Sand, underlies the Flour Island Formation. This sand ranges from fine sandy textures to coarse sand and ranges in thickness from 150 to 300 feet in the Memphis area (Refs. 9, p. 8; 8, p. 10).

Formations beneath the site, which are capable of yielding potable water to wells include: the loess and fluvial deposits, the Memphis Sand and the Fort Pillow Sand. The surficial aquifer consists of the

saturated portions of the loess and fluvial deposits. The altitude of the water table in the surficial aquifer is about 210 feet amsl, or 30 feet bls (Ref. 9, Plate 2). The estimated hydraulic conductivity of the surficial aquifer ranges from 1.0×10^{-3} to 1.0×10^{-2} cm/sec (Ref. 12, p. 29). In the areas of Memphis, the surficial aquifer is capable of yielding up to 50 gallons per minute (gpm) (Ref. 9, Plate 2). This aquifer is undoubtedly tapped for domestic supplies in rural areas; however, records of these wells do not exist. In Memphis, all residents have access to public supply water (Ref. 14).

The primary source of groundwater in the Memphis area is the Memphis Sand aquifer. The Memphis Sand is confined above by the Jackson-Upper Claiborne and below by the Flour Island confining units. The elevation of the potentiometric surface for the Memphis Sand in the vicinity of the site is approximately 125 feet amsl, or 115 feet bls (Ref. 9, Plate 3). The hydraulic conductivity of the Memphis Sand is about 1.0×10^{-2} cm/sec (Ref. 12, p. 29). Recharge to the Memphis Sand aquifer occurs predominantly through infiltration of precipitation in outcrop areas 30 to 60 miles east of Memphis. Seepage from the overlying surficial aquifer and the Mississippi River also contributes to the recharge of the Memphis Sand. Recently, contamination of the Memphis Sand has been detected in the Memphis region (Ref. 9, pp. 34-37).

Underlying the Flour Island Formation is the Fort Pillow Sand. This unit is the second principal aquifer, and it supplies about 10 percent of water used in the Memphis area. Hydraulic conductivity of the Fort Pillow is about 1.0×10^{-2} cm/sec (Ref. 10, p. 47).

The U.S. Geological Survey Water Resources Investigation Report 90-4092, Hydrogeology and Preliminary Assessment of the Potential for Contamination of the Memphis Aquifer in the Memphis Area, Tennessee, discusses the hydrogeology of the Memphis area and outlines the Jackson-Upper Claiborne confining unit (Ref. 9, Table 2). The top of the confining unit is indicated beneath Allen Ready-Mix at approximately 78 feet bls with a thickness of approximately 230 feet (Ref. 9, Table 2). Parks (1990) states that in the Memphis region, the Jackson-Upper Claiborne confining unit is locally thin and locally absent and may contain sand windows that could provide pathways for contaminants to reach the Memphis Sand aquifer. Evidence which documents the downward migration of groundwater from the surficial water-table aquifer to the Memphis Sand aquifer includes (Ref. 9, pp. 1, 2, 34-37):

- Confining layer absence (locally)

- Hydraulic head differences between the water-table aquifer and the Memphis Sand aquifer

- Local water table surface depressions
- Long-term declines and reduced seasonal fluctuations in water-table observation wells
- Carbon-14 and tritium concentrations present in the Memphis Sand aquifer indicating recent leakage occurring
- Water-quality anomalies in the Memphis Sand aquifer indicating downward leakage
- Volatile organic compounds present in the Memphis Sand aquifer

The fact that volatile organic compounds have been detected in samples from the Allen Wellfield, approximately 4.25 miles southwest of the facility, indicates that the Memphis aquifer is vulnerable to contamination. The migration pathway for the contaminants has not been established. Local absence of the Jackson-Upper Claiborne confining unit and improperly cased wells are the most likely conduits (Ref. 9, pp. 34-37).

The facility lies within the radius of influence of the Mallory Wellfield wells, which pump water from the Memphis Sand (Refs. 4; 15; 16, pp. 24, 25). Heavy pumping of the wellfield has caused a large cone of depression in the Memphis Sand aquifer (Ref. 9, Plates 1, 3). Therefore, any contamination that may occur in the surficial aquifer, beneath the facility, could be drawn into the Memphis Sand aquifer and eventually into the associated water supply wells provided that a hydraulic connection between the surficial and Memphis Sand aquifers exists.

3.2 Groundwater Pathway Targets

Groundwater is the sole source for drinking water in the Memphis area and is provided by the Memphis Light, Gas, and Water Division (MLGW), a blended municipal water system (Refs. 15, 16). The system has 206,652 connections serving approximately 547,628 people (number of connections x 2.65 persons per household) (Refs. 15, 17). The system draws water from a total of 161 wells located in 10 wellfields (Ref. 16, p. 4). The Mallory Wellfield is the only MLGW wellfields located within a 4-mile radius of the ICG facility (Refs. 4; 16, p. 3). The Mallory Wellfield, located approximately 1 mile south of the facility, has 19 wells screened in the Memphis Sand, six wells screened in the Fort Pillow Sand, and serves an estimated 85,025 people (Refs. 16, pp. 4, 24, 25). However, since the entire MLGW system is blended, the wellfields may potentially serve more than the listed number of persons. The previously detected contamination in wells in the Allen Wellfield indicates the presence of a downward migration pathway for contaminants to enter the Memphis Sand from the surficial

aquifer, allowing aquifer interconnection to be assumed for the nearby vicinity (Ref. 9, pp. 34-37). The direction of groundwater flow in the surficial aquifer is to the north toward the Wolf River and in the Memphis Sand toward the south and the Mallory Wellfield (Ref. 9, plates 2, 3). The closest known drinking water well is a Mallory Wellfield well located approximately 1 mile south of Allen Ready-Mix (Refs. 4; 16, p. 24). The exact number of private wells in the area is unknown (Ref. 14). However, all residents within a 4-mile radius of the site have access to municipal drinking water (Ref. 16).

4.0 Surface Water Pathway

4.1 Hydrologic Setting

Surface water runoff from the Allen Ready-Mix facility flows north into the dredge ponds which empty into the Wolf River. The Wolf River then flows approximately 3 miles east, where it intersects with the Mississippi River which flows southwest to complete the 15-mile surface water pathway (Ref. 4). The Wolf River has an average flowrate of 1,023 cfs, and the Mississippi River has an average flowrate of 580,000 cfs (Ref. 18, pp. 2, 4).

4.2 Surface Water Targets

There are no drinking water intakes nor irrigation intakes along the extended surface water pathway (Refs. 19, 20). In addition, there were no wetlands identified along the extended surface water pathway, nor within a 0.5-mile radius of the site (Ref. 21). The majority of the Allen Ready-Mix facility is located within a 100-year flood plain (Ref. 22).

The blue sucker (Cycleptus elongatus) is a state-threatened fish species which is present in both the Wolf River and the Mississippi River (Ref. 22). Although commercial fishing has not occurred in the Mississippi River or its tributaries (the Wolf River being one) since 1985, due to a fishing ban imposed by the Tennessee Wildlife Resources Agency, recreational fishing still takes place (Refs. 24, 25). The official fishing ban on the Mississippi River is for the Tennessee side of the river only, as Arkansas has not participated in the ban. Thus, commercial fishing may occur on the Arkansas side of the Mississippi River (Ref. 24). The state of Mississippi has never had a ban on commercial fishing, nor do they post any warning signs (Ref. 26). In addition, the Mississippi River and the Wolf River are used for recreational activities such as boating, swimming, and water skiing (Ref. 25).

5.0 Soil and Air Exposure Pathways

5.1 Physical Conditions

The Allen Ready-Mix facility is located within a heavily populated area surrounded by residential areas and light industry (Refs. 2, p. 2; 4). The facility is currently active; therefore, the nearest individuals are the onsite workers. The number of workers is unknown, but an estimate of 10 was made during the site reconnaissance (Ref. 2, p. 4). The facility is fenced, and there are three buildings on site (Ref. 2, p. 3). There are nine residences within 200 feet of the site but no schools or day-care centers (Refs. 2, p. 4; 4). The closest school is approximately 0.75 mile southeast of the facility (Ref. 4).

5.2 Soil and Air Targets

There are approximately 12,734 people located within 1 mile of the site, 42,861 people located within 1 to 2 miles of the site, 57,486 people located within 2 to 3 miles of the site, and 72,258 people located within 3 to 4 miles of the site. This corresponds to a total population of approximately 185,339 people within a 4-mile radius of the site (Ref. 27). A house count identified 63 residences within 0.25 mile of the facility (Ref. 2, p. 4).

The sensitive environments found within a 4-mile radius include the habitats of three state-designated endangered or threatened species. The endangered Mississippi kite (Ictinia mississippiensis) is present in the Cypress Creek located approximately 2.5 miles to the southeast and also in Overton Park located 2 miles south of the facility. The threatened goldenseal plant (Hydrastis canadensis) is also located in Overton Park (Refs. 4, 23).

6.0 Conclusions and Recommendations

The Allen Ready-Mix Concrete Company was evaluated to assess the threat posed to human health and the environment and to determine the need for additional investigation. The Allen Ready-Mix facility is located within the 100-year flood plain and the blue sucker (Cycleptus elongatus) is a state-threatened species which is present in both the Wolf River and the Mississippi River. Also, recreational fishing and activities take place on these rivers.

There are several significant factors concerning the surface water pathway. The surficial groundwater aquifer (loess and fluvial deposits) is the most vulnerable to contamination due to infiltration from the land surface. The surficial groundwater beneath the site flows north toward the

Wolf River. Therefore, contaminants introduced into the surficial aquifer would most likely follow this route.

Due to the Jackson-Upper Claiborne confining unit's thickness in the area, the unit would generally prevent contaminants from migrating into the Memphis Sand aquifer. However, this confining unit is laterally discontinuous throughout the Memphis area. The nearest known zones where the confining unit is thin or absent are approximately 4.2 miles southwest of Allen Ready-Mix.

The Fort Pillow Sand is not threatened by surface contamination due to its depth and the presence of several substantial confining units between it and the surface.

The soil and air pathways are not of great concern at this facility because the site is fenced and not easily accessible. There are nine residences within 200 feet of the site but no schools or day-care centers. From the information gathered in the study of Allen Ready-Mix, it is recommended that no further action be taken for the site.

REFERENCES

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2. HALLIBURTON NUS Environmental Corporation Field Logbook No. A0037 for Allen Ready-Mix Concrete. Documentation of site reconnaissance, January 13, 1993.

3. Shelby County Tax Assessor's Office, Parcel Map, Sheet No. BC-12, 1962. Revised March 6, 1990 (city of Memphis and Shelby County).

4. U.S. Geological Survey, 7.5 minute series Topographic Quadrangle Maps of Tennessee: Northwest Memphis, TN-ARK, 1965 (Photorevised 1983), Northeast Memphis, TN, 1965 (PR 1983), Southwest Memphis, TN-ARK, 1965 (PR 1973), Southeast Memphis, TN, 1965 (PR 1983); scale 1:24,000.

5. U.S. Department of Commerce, Climatic Atlas of the United States (Washington, D.C., GPO, 1983).

6. U.S. Department of Commerce, Rainfall Frequency Atlas of the United States, Technical Paper Number 40 (Washington, D.C., GPO, 1961).

7. Shirley Dunn, TDH&E, SWMD, Potential Hazardous Waste Site Preliminary Assessment, Allen Ready-Mix Concrete, Memphis, Shelby County, Tennessee, August 26, 1985.

8. James H. Finger, Director, Surveillance and Analysis, U.S. EPA, Report, Hazardous Waste Site Investigation, Allen Ready-Mix Concrete Company, Memphis, Shelby County, Tennessee, July 10, 1981.

9. William S. Parks, Hydrogeology and Preliminary Assessment of the Potential for Contamination of the Memphis Aquifer in the Memphis Area, Tennessee, U.S. Geological Survey Water Resources Investigations Report 90-4092 (Memphis, Tennessee, 1990).

10. J.H. Criner, P-C.P. Sun, and D.J. Nyman, Hydrology of Aquifer Systems in the Memphis Area, Tennessee, U.S. Geological Survey Water Supply Paper 1779 (Memphis, Tennessee, 1964).

11. U.S. Department of Agriculture, Soil Survey Shelby County,Tennessee, revised February 1989, pp. 17, 22, Plate 41.

12. Cherry, John A. and Freeze, R. Allen, Groundwater (Englewood Cliffs, N.J.: Prentice Hall, 1979).

13. Dr. William S. Parks, U.S.G.S., telephone conversation with Carter Helm, BVWST, March 3, 1992. Subject: Site-specific geology and confining layer information.

14. Barry Moore, Shelby County Health Department, telephone conversation with Jancie Hatcher, BVWST, October 21, 1991. Subject: Private wells in Memphis.

15. James Webb, Manager, Memphis Light, Gas, and Water Division, letter to Robert Morris, Environmental Engineer, U.S. Environmental Protection Agency, November 20, 1990. Subject: The number of connections served by Memphis Light, Gas, and Water Division.

16. Fred Von Hofe, Water Research Engineer, Memphis Light, Gas, and Water Division, letter to Charlie Stevens, U.S. Environmental Protection Agency, November 5, 1990. Subject. Memphis Light, Gas, and Water Division water production 1990.

17. 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).

18. Dewey L. Jones, Department of the Army, Memphis District, Corps of Engineers, letter and attachments to Laura J. Morrisson, BVWST, April 1, 1992. Subject: Discharge data for rivers in the Memphis area.

19. Jerry Collins, Department of Memphis Public Works, telephone conversation with Laura Morrisson, BVWST, October 18, 1991. Subject: Surface water intakes on the Mississippi River.

20. Troy Taylor, Shelby County Soil Conversation Service, telephone conversation with Jancie Hatcher, BVWST, February 7, 1992. Subject: Irrigation areas in Shelby County.

21. Tennessee Wildlife Resources Agency, Shelby County Wetland Map, 1991.

22. Federal Emergency Management Agency (FEMA), National Flood Insurance Program, Flood Insurance Rate Map, Community Panel number 4701770035B, City of Memphis, Tennessee, effective date, December 1, 1982.

23. Tennessee Department of Conservation, Division of Ecological Services, List of Rare and Endangered Species, computer database printout keyed to U.S. Geology Survey 7.5 minute topographic quadrangles: Northwest Memphis and Northeast Memphis, Tennessee, Printout date December 16, 1992.

24. John Condor, Wildlife Resources Agency, telephone conversation with Laura Morrisson, BVWST, December 23, 1991. Subject: Recreational fishing on the Mississippi River.

25. John Rayfield, Tennessee Wildlife Resource Agency, Shelby County office, telephone conversation with Paul Delphos, BVWST, July 1, 1992. Subject: Fishing and recreation on Memphis area water bodies.

26. Ron Garovelli, Chief of Fisheries, Mississippi Wildlife and Fisheries, telephone conversation with Laura Morrisson, BVWST, February 11, 1992. Subject: Fishing ban on the Mississippi River.

27. U.S. Environmental Protection Agency, Graphical Exposure Modeling System (GEMS) Data Base. Compiled from U.S. Bureau of the Census data (1983).

CONFIDENTIAL
HAZARD RANKING SYSTEM PRELIMINARY SCORE
FOR
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, SHELBY COUNTY, TENNESSEE

This preliminary score was calculated using the draft SI worksheets. All four pathways are evaluated.

The following score reflects a hazardous waste quantity of 10, as the area of suspected contaminated soil is 1.0 acre. A total of 50 drums which contained unknown substances were also present on site. Analytical data from the sampling investigation indicated the presence of dieldrin, DDT, DDE, DDD, chlordane, endrin, and heptachlor. However, these contaminants did not show a pattern that would indicate that these were used widely at this facility. In addition, no background sample was collected.

There were no groundwater samples collected at this facility; therefore, this pathway had to be scored on a potential to release only. The groundwater pathway was evaluated with the Memphis Sand as the aquifer of concern, due to the presence of local areas where the Jackson-Upper Claiborne confining unit is thin or absent. There are approximately 64,619 people using groundwater from 19 wells in the Mallory Wellfield within 4 miles of the facility. A total of 18 wells are located between 1 and 2 miles of the site, and 1 well is located between 2 and 3 miles of the site.

The surface water pathway is of minimal concern and reflected a small score. There are no drinking water intakes or irrigation intakes along the surface water pathway. The site, however, is located in the 100-year flood plain of the Wolf River. The Wolf and Mississippi rivers were identified as fisheries, but with flowrates greater than 1,000 cubic feet per second. One state-threatened fish species was identified along the surface water pathway, but no wetlands or other sensitive environments are present.

The soil and air pathways are also of little concern. The site is fenced as an estimated 10 workers are present at the facility. Nine residences were identified within 200 feet of the site, but there were no schools or day-care centers identified. A house count identified 63 residences within 0.25 mile of the facility, and population within 1 mile is estimated at 42,861. The total estimated population within 4 miles is 185,339 people. Three state designated endangered or threatened species were identified in the 4-mile radius. They are all located at greater than 2 miles from the facility.

Due to the relatively few targets associated with the site, and the distance of the municipal wells from the site, no further action is recc mmended for Allen Ready-Mix Concrete.

S_{gw} = 6.13

S_{sw} = 0.005

S_{so} = 0.67

S_a = 2.08

OVERALL SCORE = 3.25

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

GROUND WATER MIGRATION PATHWAY SCORESHEET

FACTOR CATEGORIES AND FACTORS

	Likelihood of Release to an Aquifer	Maximum Value	Value Assigned	
1.	Observed Release	550	0	
2.	Potential to Release			
	2a. Containment	10	-	
	2b. Net Precipitation	10	-	
	2c. Depth to Aquifer	5	-	
	2d. Travel Time	35	-	
	2e. Potential to Release [lines 2a x (2b + 2c + 2d)]	500	500	
3.	Likelihood of Release (higher of lines 1 or 2e)	550		500
	Waste Characteristics			
4.	Toxicity/Mobility	a	.02	
5.	Hazardous Waste Quantity	a	10	
6.	Waste Characteristics	100		1
	Targets			
7.	Nearest Well	50	5	
8.	Population			
	8a. Level I Concentrations	b	0	
	8b. Level II Concentrations	b	0	
	8c. Potential Contamination	b	1,006	
	8d. Population (lines 8a + 8b + 8c)	b	1,006	
9.	Resources	5	5	
10.	Wellhead Protection Area	20	0	
11.	Targets (lines 7 + 8d + 9 + 10)	b		1,011
	Ground Water Migration Score for an Aquifer			
12.	Aquifer Score [(lines 3 x 6 x 11)/82,500][c]	100		6.13
	Ground Water Migration Pathway Score			
13.	Pathway Score (S_{GW}), (highest value from line 12 for all aquifers evaluated) ***	100		6.13

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c Do not round to the nearest integer.

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET

	Factor Categories and Factors	Maximum Value	Value Assigned	
DRINKING WATER THREAT				
	Likelihood of Release			
1.	Observed Release	550	0	
2.	Potential Release by Overland Flow			
	2a. Containment	10	-	
	2b. Runoff	25	-	
	2c. Distance to Surface Water	25	-	
	2d. Potential to Release by Overland Flow [lines 2a x (2b + 2c)]	500	500	
3.	Potential to Release by Flood			
	3a. Containment (Flood)	10	-	
	3b. Flood Frequency	50	-	
	3c. Potential to Release by Flood (lines 3a x 3b)	500	-	
4.	Potential to Release (lines 2d + 3c, subject to a maximum of 500)	500	500	
5.	Likelihood to Release (higher of lines 1 and 4)	550		500
	Waste Characteristics			
6.	Toxicity/Persistence	a	10,000	
7.	Hazardous Waste Quantity	a	10	
8.	Waste Characteristics	100		18
	Targets			
9.	Nearest Intake	50	0	
10.	Population			
	10a. Level I Concentrations	b	0	
	10b. Level II Concentrations	b	0	
	10c. Potential Contamination	b	0	
	10d. Population (lines 10a + 10b + 10c)	b	0	
11.	Resources	5	0	
12.	Targets (lines 9 + 10d + 11)	b		0
	Drinking Water Threat Score			
13.	Drinking Water Threat Score ([lines 5 x 8 x 12]/82,500, subject to a maximum of 100)	100		0

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c Do not round to nearest integer.

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

SURFACE WATER, OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (continued)

	Factor Categories and Factors	Maximum Value	Value Assigned	
HUMAN FOOD CHAIN THREAT				
	Likelihood of Release			
14.	Likelihood of Release (same value as line 5)	550		500
	Waste Characteristics			
15.	Toxicity/Persistence/Bioaccumulation	a	5×10^8	
16.	Hazardous Waste Quantity	a	10	
17.	Waste Characteristics	1,000		100
	Targets			
18.	Food Chain Individual	50	0	
19.	Population			
	19a. Level I Concentrations	b	0	
	19b. Level II Concentrations	b	0	
	19c. Potential Human Food Chain Contamination	b	0	
	19c. Population (lines 19a + 19b + 19c)	b	0	
20.	Targets (lines 18 + 19d)			0
	Human Food Chain Threat Score			
21.	Human Food Chain Threat Score ([lines 14 x 17 x 20]/82,500, subject to a maximum of 100)	100		0
ENVIRONMENTAL THREAT				
	Likelihood of Release			
22.	Likelihood of Release (same value as line 5)	550		500
	Waste Characteristics			
23.	Ecosystem Toxicity/Persistence/Bioaccumulation	a	5×10^8	
24.	Hazardous Waste Quantity	a	10	
25.	Waste Characteristics	1,000		100
26.	Sensitive Environments			
	26a. Level I Concentrations	b	0	
	26b. Level II Concentrations	b	0	
	26c. Potential Contamination	b	0.005	
	26d. Sensitive Environments (lines 26a + 26b + 26c)	b	0.005	

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c Do not round to nearest integer.

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

SURFACE WATER, OVERLAND/FLOOD MIGRATION COMPONENT SCORESHEET (concluded)

	Factor Categories and Factors	Maximum Value	Value Assigned
	Targets		
27.	Targets (value from line 26d)		0.005
	Environmental Threat Score		
28.	Environmental Threat Score ([lines 22 x 25 x 27]/82,500, subject to a maximum of 60)	60	0.005
	SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE FOR A WATERSHED		
29.	Watershed Score[c] (lines 13 + 21 + 28, subject to a maximum of 100)	100	.005
	SURFACE WATER OVERLAND/FLOOD MIGRATION COMPONENT SCORE		
30.	Component Score (S_{OF})[c] (Highest score from line 29 for all watersheds evaluated, subject to a maximum of 100)	100	.005

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c Do not round to the nearest integer.

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

SOIL EXPOSURE PATHWAY SCORESHEET

	Factor Categories and Factors	Maximum Value	Value Assigned	
RESIDENT POPULATION THREAT				
	Likelihood of Exposure			
1.	Likelihood of Exposure	550		550
	Waste Characteristics			
2.	Toxicity	a	10,000	
3.	Hazardous Waste Quantity	a	10	
4.	Waste Characteristics	100		18
	Targets			
5.	Resident Individual	50	0	
6.	Resident Population			
	6a. Level I Concentrations	b	0	
	6b. Level II Concentrations	b	0	
	6c. Resident Population (lines 6a + 6b)	b	0	
7.	Workers	15	5	
8.	Resources	5	0	
9.	Terrestrial Sensitive Environments	c	0	
10.	Targets (lines 5 + 6c + 7 + 8 + 9)	b		5
	Resident Population Threat Score			
11.	Resident Population Threat (Lines 1 x 4 x 10)/82,500	b		0.6
NEARBY POPULATION THREAT				
	Likelihood of Exposure			
12.	Attractiveness/Accessibility	100	5	
13.	Area of Contamination	100	80	
14.	Likelihood of Exposure	500		25
	Waste Characteristics			
15.	Toxicity	a	10,000	
16.	Hazardous Waste Quantity	a	10	
17.	Waste Characteristics	100		18

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c Do not round to the nearest integer.

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

SOIL EXPOSURE PATHWAY SCORESHEET
(concluded)

Factor Categories and Factors		Maximum Value	Value Assigned	
	Targets			
18.	Nearby Individual	1	0	
19.	Population Within 1 Mile	b	13.5	
20.	Targets (lines 18 + 19)	b		13.5
	Nearby Population Threat Score			
21.	Nearby Population Threat (lines 14 x 17 x 20)	b		0.07
SOIL EXPOSURE PATHWAY SCORE			Nearby Population Threat: (Default Value)	2
22.	Soil Exposure Pathway Score[d] (S_s), (lines [11 + 21], subject to a maximum of 100)	100		0.67

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c No specific maximum value applies to the factor. However, pathway score based solely on sensitive environments is limited to maximum of 60.

d Do not round to the nearest integer.

Site Name: Allen Ready-Mix Concrete Company

Location: Memphis, Shelby County, Tennessee

AIR MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors

	Likelihood of Release	Maximum Value	Value Assigned	
1.	Observed Release	550	0	
2.	Potential to Release			
	2a. Gas Potential to Release	500	500	
	2b. Particulate Potential to Release	500	-	
	2c. Potential to Release (higher of lines 2a and 2b)	500	500	
3.	Likelihood of Release (higher of lines 1 and 2c)	a		500
	Waste Characteristics			
4.	Toxicity/Mobility	a	20	
5.	Hazardous Waste Quantity	a	10	
6.	Waste Characteristics	100		3
	Targets			
7.	Nearest Individual	50	20	
8.	Population			
	8a. Level I Concentrations	b	0	
	8b. Level II Concentrations	b	0	
	8c. Potential Contamination	b	94.3	
	8d. Population (lines 8a + 8b + 8c)	b	94.3	
9.	Resources	5	0	
10.	Sensitive Environments			
	10a. Actual Contamination	c	0	
	10b. Potential Contamination	c	0.062	
	10c. Sensitive Environments (lines 10a + 10b)	c	0.062	
11.	Targets (lines 7 + 8d + 9 + 10c)	b		114.362
	Air Migration Pathway Score			
12.	Pathway Score (S_a) [(Lines 3 x 6 x 11)/82,500][d]	100		2.08

a Maximum value applies to waste characteristics category.

b Maximum value not applicable.

c No specific maximum value applies to the factor. However, pathway score based solely on sensitive environments is limited to maximum of 60.

d Do not round to the nearest integer.

APPENDIX C

SITE INSPECTION WORKSHEETS

This appendix consists of worksheets that can be used to generate an SI site score. Completion of these worksheets is not required, but the SI investigator must evaluate an SI score, either by these worksheets, *PREscore*, or other Regional scoring tools.

The worksheets consist of instructions and data tables to be filled in with scores from HRS reference tables. The data tables may also call for Data Type and References.

DATA TYPE: The Data Type columns should be filled in with an **H**, **Q**, or **+** if the data are HRS quality and well documented. The Data Type column should be filled in with an **E**, **X**, or **-** if the data represent estimates, approximations, or are not fully documented. This type identifies data gaps for the expanded SI to investigate.

REFERENCES: The Reference columns should be filled in with coded reference numbers. The numbered reference list should be attached or the numbering should be cross-referenced to the SI Narrative Report.

The SI investigator will need the current Superfund Chemical Data Matrix (SCDM) OSWER Directive 9345.1-13 (revised semi-annually) to complete these worksheets.

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SITE INSPECTION WORKSHEETS

CERCLIS IDENTIFICATION NUMBER
TND 980838825

SITE LOCATION			
SITE NAME: LEGAL, COMMON, OR DESCRIPTIVE NAME OF SITE Aller Ready-Mix Concrete Company			
STREET ADDRESS, ROUTE, OR SPECIFIC LOCATION IDENTIFIER 1576 Chelsea Avenue			
CITY Memphis	STATE TN	ZIP CODE	TELEPHONE ( )
COORDINATES: LATITUDE and LONGITUDE 35° 10' 23.5" 90° 00' 13.0"	TOWNSHIP, RANGE, AND SECTION		

OWNER/OPERATOR IDENTIFICATION					
OWNER Permacon, Inc			OPERATOR Wilson Concrete Products		
OWNER ADDRESS Same as above			OPERATOR ADDRESS 1576 Chelsea Avenue		
CITY			CITY Memphis		
STATE	ZIP CODE	TELEPHONE ( )	STATE TN	ZIP CODE	TELEPHONE ( )

SITE EVALUATION		
AGENCY/ORGANIZATION Halliburton NUS		
INVESTIGATOR Teresa Sawyer		
CONTACT David Williams - EPA Region IV		
ADDRESS 2075 F West Park Court		
CITY Stone Mountain	STATE Ga	ZIP CODE 30087
TELEPHONE (404) 413-0965		

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Site Descripti
operational histo
active or inactive
activities that ha
alleged. Identify
other investigati

e and its
size of property,
age, or disposal
nented or
the PA and

The Allen Ready-Mix Concrete Company (Allen Ready-Mix) was located at 1572 Chelsea Avenue in Memphis, Shelby County, Tennessee. The original property owned by Allen Ready-Mix has since been subdivided, and the area of concern was purchased by Permacon Block and Brick Company prior to December 1985 (Ref. 1). The property is currently being operated by Wilson Concrete Products and is located at 1576 Chelsea Avenue in Memphis (Ref. 2). Maps obtained from the county tax assessor's office indicate that the property is presently owned by Permacon, Inc. (Ref. 3). The estimated size of the facility is 6.8 acres (Ref. 3). The geographical coordinates are 35°10'23.5" N latitude and 90°00'13" W longitude (Ref. 4). The site location and layout are shown on Figures 1 and 2, respectively.

U.S. EPA conducted a preliminary site inspection at the Allen Ready-Mix site in May 1980 and recommended a Hazardous Waste Site Inspection (HWSI). A total of 49 drums were observed at the facility. There were 25 unlabeled, rusted drums which contained a black, oily liquid. A total of 11 drums were observed on a concrete pad, and eight drums were in a fenced enclosure. A total of five drums were out in the open. None of the drums were covered (Ref. 5). The HWSI was conducted on March 18, 1981 by the U.S. EPA, and a more in-depth site description was provided in the subsequent report. There were two large dredge ponds north of the property which flowed into the Wolf River. It was noted that large amounts of concrete were disposed of between the two ponds. There was also some trash and several old concrete mixer drums disposed of in this area. An unreported number of crushed 55-gallon drums were also observed in this area and appeared to have contained discarded fuel and/or lubricants (Ref. 6).

A dirt road that runs along the northwest pond was strewn with trash, and the remains of several fiber drums containing red, sandy-looking material were observed in this area. There was also a large pile of tires near the southeast corner of the pond (Ref. 6).

Several unlabeled 55-gallon drums were stored in a fenced area northwest of the concrete mixers. Additional drums were stored outside the fence near the southeast corner of the fenced area. This area was described by Mr. Fred Richardson, Manager, Allen Ready-Mix Concrete Co., as a pallet building and repair area which is no longer used. Mr. Richardson said that he did not know what was in the drums. The only other 55-gallon drums observed on the site were stored on a concrete pad and appeared to contain fuels and/or lubricants (Ref. 6).

Four samples were collected during the HWSI: three surface soil samples, and one waste sample. Two soil samples were collected downgradient from the pallet area, and the third soil sample was collected downgradient from the remains of the fiber drums. The waste sample was collected from the red, sandy-looking material in the fiber drums (Ref. 6).

The soil samples collected near the pallet area contained traces (less than quantifiable concentrations of several polynuclear aromatic hydrocarbons. A large number of organic acids (maximum concentration 14,000 ug/kg hexadecanoic acid), cyclodiene pesticide-related materials (maximum concentration 31 ug/kg gamma chlordane), and a petroleum-type product were also detected in these samples. Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (Ref. 6).

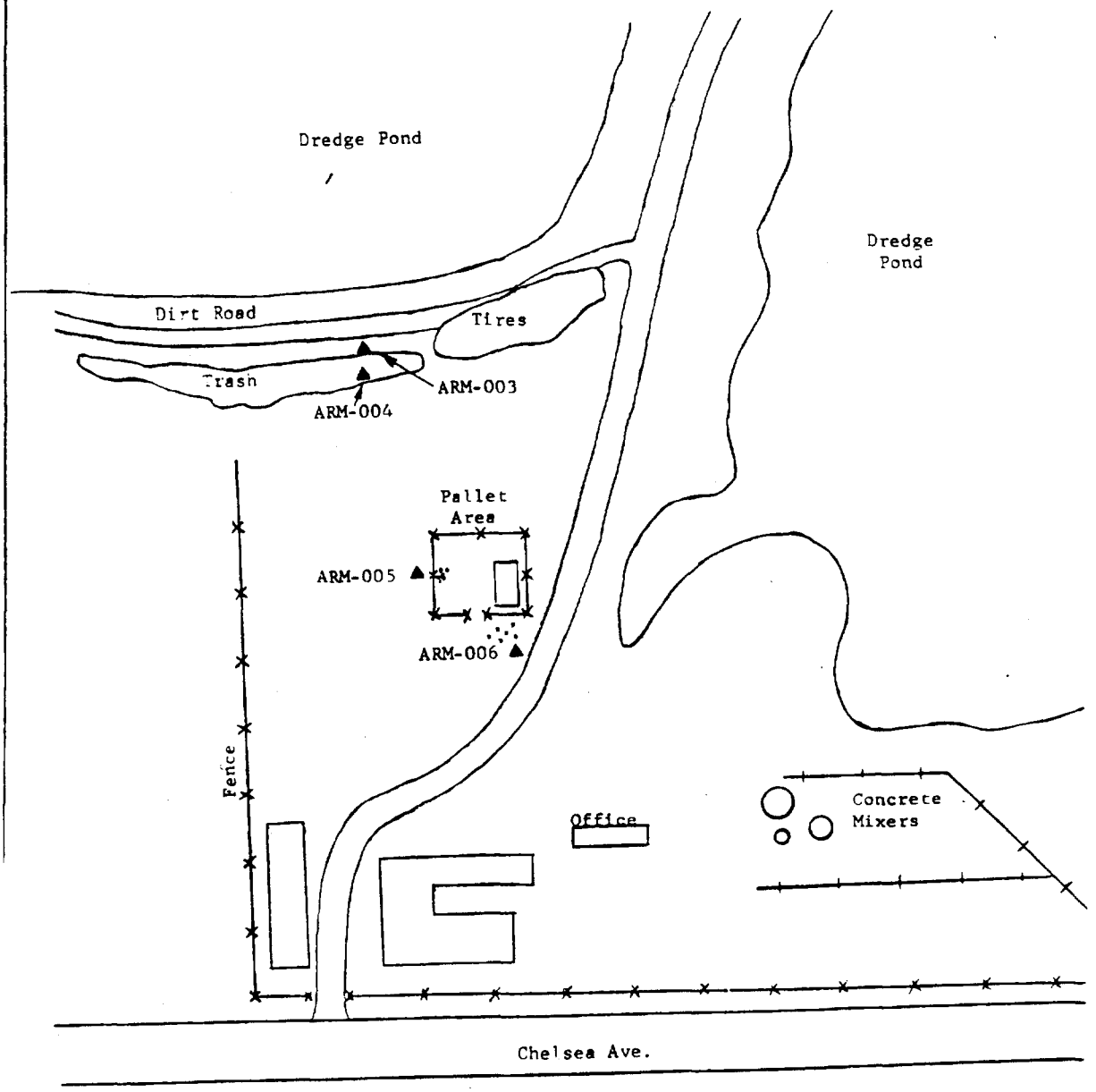
The soil sample collected near the dredge pond contained traces (<4,000 ug/kg) of several polynuclear aromatic hydrocarbons, a trace (<5,000 ug/kg) of a methyl ester of methyl pentadecanoic acid, and several pesticide-related materials (maximum concentration 50 ug/kg gamma chlordane. Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (Ref. 6).

The sample of red, sandy-looking material collected from the remains of the deteriorated fiber drums contained several fatty acids (maximum concentration 67,000 ug/kg octadecanoic acid), alcohols (maximum concentration 38,000 ug/kg methylene biphenol), and aldehydes (maximum concentration 4,500 ug/kg hydroxybenzaldehyde. No pesticide-related materials were detected in this sample. Metals concentrations were at or below the concentrations detected in the soil samples collected during the investigation (Ref. 6).

A site reconnaissance was conducted at this facility on January 13, 1993. As previously stated, the site is currently being operated by Wilson Concrete Products. Various piles of concrete blocks were observed strewn about the site. There were no drums observed on the site (Ref. 2).

GENERAL INFORMATION (continued)

Site Sketch: Provide a sketch of the site. Indicate all pertinent features of the site and nearby environments including: sources of wastes, areas of visible and buried wastes, buildings, residences, access roads, parking areas, fences, fields, drainage patterns, water bodies, vegetation, wells, sensitive environments, and other features.



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GENERAL INFORMATION (continued)

Source Descriptions: Describe all sources at the site. Identify source type and relate to waste disposal operations. Provide source dimensions and the best available waste quantity information. Describe the condition of sources and all containment structures. Cite references.

SOURCE TYPES

Landfill: A man-made (by excavation or construction) or natural hole in the ground into which wastes have come to be disposed by backfilling, or by contemporaneous soil deposition with waste disposal.

Surface Impoundment: A natural topographic depression, man-made excavation, or diked area, primarily formed from earthen materials (lined or unlined) designed to hold an accumulation of liquid wastes, wastes containing free liquids, or sludges not backfilled or otherwise covered; depression may be wet with exposed liquid or dry if deposited liquid has evaporated, volatilized or leached; structures that may be described as lagoon, pond, aeration pit, settling pond, tailings pond, sludge pit; also a surface impoundment that has been covered with soil after the final deposition of waste materials (i.e., buried or backfilled).

Drums: A portable container designed to hold a standard 55-gallon volume of wastes.

Tanks and Non-Drum Containers: Any device other than drums designed to contain an accumulation of waste that provides structural support and is constructed primarily of fabricated materials (such as wood, concrete, steel, or plastic); any portable or mobile device in which waste is stored or otherwise handled.

Contaminated Soil: An area or volume of soil onto which hazardous substances have been spilled, spread, disposed, or deposited.

Pile: Any non-containerized accumulation above the ground surface of solid, non-flowing wastes; includes open dumps. Some types of waste piles are:

- Chemical Waste Pile: A pile consisting primarily of discarded chemical products, by-products, radioactive wastes, or used or unused feedstocks.
- Scrap Metal or Junk Pile: A pile consisting primarily of scrap metal or discarded durable goods (such as appliances, automobiles, auto parts, batteries, etc.) composed of materials containing hazardous substances.
- Tailings Pile: A pile consisting primarily of any combination of overburden from a mining operation and tailings from a mineral mining, beneficiation, or processing operation.
- Trash Pile: A pile consisting primarily of paper, garbage, or discarded non-durable goods containing hazardous substances.

Land Treatment: Landfarming or other land treatment method of waste management in which liquid wastes or sludges are spread over land and tilled, or liquids are injected at shallow depths into soils.

Other: Sources not in categories listed above.

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GENERAL INFORMATION (continued)

Source Description: Include description of containment per pathway for ground water (see HRS Table 3-2), surface water (see HRS Table 4-2), and air (see HRS Tables 6-3 and 6-9).

① approximately 50 drums

② contaminated soil acres

Hazardous Waste Quantity (HWQ) Calculation: SI Tables 1 and 2 (See HRS Tables 2-5, 2-6, and 5-2)

① 50 drums ÷ 10 = 5

② Contaminated soil 1.0 ÷ 0.78 = 1.28

WC = [illegible]

Attach additional pages, if necessary

HWQ = 10

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SI TABLE 1: HAZARDOUS WASTE QUANTITY (HWQ) SCORES FOR SINGLE SOURCE SITES AND FORMULAS FOR MULTIPLE SOURCE SITES

		Single Source Sites (assigned HWQ scores)	
(Column 1) TIER	(Column 2) Source Type	(Column 3) HWQ = 10	(Column 4) HWQ = 100
A Hazardous Constituent Quantity	N/A	HWQ = 1 if Hazardous Constituent Quantity data are complete HWQ = 10 if Hazardous Constituent Quantity data are not complete	>100 to 10,000 lbs
B Wastestream	N/A	≤ 500,000 lb.	>500,000 to 50 million lbs
C Volume	Landfill	≤ 6.75 million ft^3 ≤ 250,000 yd^3	>6.75 million to 675 million ft^3 >250,000 to 25 million yd^3
	Surface impoundment	≤6,750 ft^3 ≤250 yd^3	>6,750 to 675,000 ft^3 >250 to 25,000 yd^3
	Drums	≤1,000 drums	>1,000 to 100,000 drums
	Tanks and non-drum containers	≤50,000 gallons	>50,000 to 5 million gallons
	Contaminated soil	≤6.75 million ft^3 ≤250,000 yd^3	>6.75 million to 675 million ft^3 >250,000 to 25 million yd^3
	Pile	≤6,750 ft3 ≤250 yd3	>6,750 to 675,000 ft^3 >250 to 25,000 yd^3
	Other	≤6,750 ft^3 ≤250 yd^3	>6,750 to 675,000 ft^3 >250 to 25,000 yd^3
D Area	Landfill	≤340,000 ft^3 ≤7.8 acres	>340,000 to 34 million ft^2 >7.8 to 780 acres
	Surface impoundment	≤1,300 ft^3 ≤0.029 acres	>1,300 to 130,000 ft^2 >0.029 to 2.9 acres
	Contaminated soil	≤3.4 million ft^3 ≤0.029 acres	> 3.4 million to 340 million ft^2 > 78 to 7,800 acres
	Pile	≤1,300 ft^3 ≤0.029 acres	>1,300 to 130,000 ft^2 >0.029 to 2.9 acres
	Land treatment	≤27,000 ft^3 ≤0.62 acres	>27,000 to 2.7 million ft^2 >0.62 to 62 acres

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TABLE 1 (CONTINUED)

Single Source Sites (assigned HWQ scores)		Multiple Source Sites		
(Column 5) HWQ = 10,000	(Column 6) HWQ = 1,000,000	(Column 7) Divisors for Assigning Source WQ Values	(Column 2) Source Type	(Column 1) TIER
>10,000 to 1 million lbs	> 1 million lbs	lbs ÷ 1	N/A	A Hazardous Constituent Quantity
>50 million to 5 billion lbs	> 5 billion lbs	lbs ÷ 5,000	N/A	B Wastestream
>675 million to 67.5 billion ft^3 >25 million to 2.5 billion yd^3	> 67.5 billion ft^3 > 2.5 billion yd^3	ft^3 ÷ 67,500 yd^3 ÷ 2,500	Landfill	C Volume
>675,000 to 67.5 million ft^3 >25,000 to 2.5 million yd^3	> 67.5 million ft^3 > 2.5 million yd^3	ft^3 ÷ 67.5 yd^3 ÷ 2.5	Surface Impoundment	
>100,000 to 10 million drums	> 10 million drums	drums ÷ 10	Drums	
>5 million to 500 million gallons	> 500 million gallons	gallons ÷ 500	Tanks and non-drum containers	
>675 million to 67.5 billion ft^3 >25 million to 2.5 billion yd^3	> 67.5 billion ft^3 > 2.5 billion yd^3	ft^3 ÷ 67,500 yd^3 ÷ 2,500	Contaminated Soil	
>675,000 to 67.5 million ft^3 >25,000 to 2.5 million yd^3	> 67.5 million ft^3 > 2.5 million yd^3	ft^3 ÷ 67.5 yd^3 ÷ 2.5	Pile	
>675,000 to 67.5 million ft^3 >25,000 to 2.5 million yd^3	> 67.5 million ft^3 > 2.5 million yd^3	ft^3 ÷ 67.5 yd^3 ÷ 2.5	Other	
>34 million to 3.4 billion ft^2 >780 to 78,000 acres	> 3.4 billion ft^2 >78,000 acres	ft^2 ÷ 3,400 acres ÷ 0.078	Landfill	D Area
>130,000 to 13 million ft^2 >2.9 to 290 acres	> 13 million ft^2 > 290 acres	ft^2 ÷ 13 acres ÷ 0.00029	Surface Impoundment	
> 340 million to 34 billion ft^2 > 7,800 to 780,000 acres	> 34 billion ft^2 > 780,000 acres	ft^2 ÷ 34,000 acres ÷ 0.78	Contaminated Soil	
> 130,000 to 13 million ft^2 > 2.9 to 290 acres	> 13 million ft^2 > 290 acres	ft^2 ÷ 13 acres ÷ 0.00029	Pile	
>2.7 million to 270 million ft^2 >62 to 6,200 acres	> 270 million ft^2 > 6,200 acres	ft^2 ÷ 270 acres ÷ 0.0062	Land Treatment	

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HAZARDOUS WASTE QUANTITY (HWQ) CALCULATION

For each migration pathway, evaluate HWQ associated with sources that are available (i.e., incompletely contained) to migrate to that pathway. (Note: If *Actual Contamination Targets* exist for ground water, surface water, or air migration pathways, assign the calculated HWQ score or 100, whichever is greater, as the HWQ score for that pathway.) For each source, evaluate HWQ for one or more of the four tiers (SI Table 1; HRS Table 2-5) for which data exist: constituent quantity, wastestream quantity, source volume, and source area. Select the tier that gives the highest value as the source HWQ. Select the source volume HWQ rather than source area HWQ if data for both tiers are available.

Column 1 of SI Table 1 indicates the quantity tier. Column 2 lists source types for the four tiers. Columns 3, 4, 5, and 6 provide ranges of waste amount for sites with only one source, corresponding to HWQ scores at the tops of the columns. Column 7 provides formulas to obtain source waste quantity values at sites with multiple sources.

1. Identify each source type.
2. Examine all waste quantity data available for each source. Record constituent quantity and waste stream mass or volume. Record dimensions of each source.
3. Convert source measurements to appropriate units for each tier to be evaluated.
4. For each source, use the formulas in the last column of SI Table 1 to determine the waste quantity value for each tier that can be evaluated. Use the waste quantity value obtained from the highest tier as the quantity value for the source.
5. Sum the values assigned to each source to determine the total site waste quantity.
6. Assign HWQ score from SI Table 2 (HRS Table 2-6).

Note these exceptions to evaluate soil exposure pathway HWQ (see HRS Table 5-2):

- The divisor for the area (square feet) of a landfill is 34,000.
- The divisor for the area (square feet) of a pile is 34.
- Wet surface impoundments and tanks and non-drum containers are the only sources for which volume measurements are evaluated for the soil exposure pathway.

SI TABLE 2: HWQ SCORES FOR SITES

Site WQ Total	HWQ Score
> 0 to 100	10
> 100 to 10,000	100
> 10,000 to 1 million	10,000
> 1 million	1,000,000

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SI TABLE 3: WASTE CHARACTERIZATION WORKSHEET

Site Name: Allen Ready-Mix Concrete

References 6

Sources:

1. Drums
2. Contaminated Soil
3.
4.
5.
6.
7.
8.
9.

SOURCE	HAZARDOUS SUBSTANCE	TOXICITY	GROUND WATER PATHWAY		SURFACE WATER PATHWAY											
					OVERLAND/FLOOD MIGRATION							GROUND WATER TO SURFACE WATER				
			GW Mobility (HRS Table 3-8)	Tox/ Mobility Value (HRS Table 3-9)	Per (HRS Table 4-10 and 4-11)	Tox/Per Value (HRS Table 4-12)	Bioac Pot. (HRS Table 4-15)	Tox/ Pers/ Bioac Value (HRS Table 4-16)	Ecotox (HRS Table 4-19)	Ecotox/ Pers (HRS Table 4-20)	Ecotox/ Pers/ Bioacc Value (HRS Table 4-21)	Tox/ Mob/ Pers Value (HRS Table 4-26)	Tox/ Mob/ Pers/ Bioacc Value (HRS Table 4-26)	Ecotox/ Mob/ Pers Value (HRS Table 4-28)	Ecotox/ Mob/ Per/ Bioacc Value (HRS Table 4-28)	Air GAS Mobility
2	Dieldrin	10,000	2×10^{-7}	2×10^{-3}	1	10,000	50,000	5×10^{8}	10,000	10,000	5×10^{5}					0.002
2	DDT	1000	2×10^{-7}	2×10^{-9}	1	1000	50,000	5×10^{7}	10,000	10,000	5×10^{8}					0.002
2	DDE	100	2×10^{-7}	2×10^{-5}	1	100	50,000	5×10^{6}	10,000	10,000	5×10^{8}					0.002
2	DDD	100	2×10^{-7}	2×10^{-5}	1	100	50,000	5×10^{6}	10,000	10,000	5×10^{8}					0.002
2	Chlordane	10,000	2×10^{-7}	2×10^{-3}	1	10,000	50,000	5×10^{8}	10,000	10,000	5×10^{8}					0.002
2	Endrin	10,000	2×10^{-7}	2×10^{-3}	1	10,000	5,000	5×10^{7}	10,000	10,000	5×10^{8}					0.002
2	Heptchlor	1000	2×10^{-5}	2×10^{-2}	1	10,000	5,000	5×10^{7}	10,000	10,000	5×10^{8}					0.02

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Ground Water Observed Release Substances Summary Table

On SI Table 4, list the hazardous substances associated with the site detected in ground water samples for that aquifer. Include only those substances directly observed or with concentrations significantly greater than background levels. Obtain toxicity values from the Superfund Chemical Data Matrix (SCDM). Assign mobility a value of 1 for all observed release substances regardless of the aquifer being evaluated. For each substance, multiply the toxicity by the mobility to obtain the toxicity/mobility factor value; enter the highest toxicity/mobility value for the aquifer in the space provided.

Ground Water Actual Contamination Targets Summary Table

If there is an observed release at a drinking water well, enter each hazardous substance meeting the requirements for an observed release by well and sample ID on SI Table 5, and record the detected concentration. Obtain benchmark, cancer risk, and reference dose concentrations from SCDM. For MCL and MCLG benchmarks, determine the highest percentage of benchmark obtained for any substance. For cancer risk and reference dose, sum the percentages for the substances listed. If benchmark, cancer risk, or reference dose concentrations are not available for a particular substance, enter N/A for the percentage. If the highest benchmark percentage or the percentage sums calculated for cancer risk or reference dose equal or exceed 100%, evaluate the population using the well as Level I targets. If these percentages are less than 100% or all are N/A, evaluate the population using the well as Level II targets for that aquifer.

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SI TABLE 4: GROUND WATER OBSERVED RELEASE SUBSTANCES (BY AQUIFER)

Sample ID	Hazardous Substance	Bckgrd. Conc.	Toxicity/ Mobility	Reference
		Highest Toxicity/Mobility		

SI TABLE 5: GROUND WATER ACTUAL CONTAMINATION TARGETS

Well ID: _____ Level I _____ Level II _____ Population Served _____ References _____

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	Reference Dose	% of Reference Dose
			Highest Percent		Sum of Percents		Sum of Percents	

Well ID: _____ Level I _____ Level II _____ Population Served _____ References _____

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	Reference Dose	% of Reference Dose
			Highest Percent		Sum of Percents		Sum of Percents	

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GROUND WATER PATHWAY
GROUND WATER USE DESCRIPTION

Describe Ground Water Use within 4 Miles of the Site:
Describe generalized stratigraphy, aquifers, municipal and private wells

The aquifer of concern is the Memphis sand. The depth to water is 30 feet. There are no known private wells on the site area. The Mallory wellfield is the only known wellfield within 4 miles.

Show Calculations of Ground Water Drinking Water Populations for each Aquifer:
Provide apportionment calculations for blended supply systems.
County average number of persons per household: 2.65 Reference 14, 15, 16, 17

MLGW - 206,652 connections × 2.65 persons per household = 547,628

total # of wells = 161 547,628 ÷ 161 = 3,401 served per well

Mallory wellfield 25 wells, 19 are in Memphis Sand

1-2 mi : 18 wells × 3401 = 61,218
2-3 mi : 1 well × 3401 = 3401
64,619 ← # of persons served by wells within 4 miles

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GROUND WATER PATHWAY WORKSHEET

LIKELIHOOD OF RELEASE	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation supports a release to the aquifer, assign a score of 550. Record observed release substances on SI Table 4.			
2. POTENTIAL TO RELEASE: Depth to aquifer: 30 feet. If sampling data do not support a release to the aquifer, and the site is in karst terrain or the depth to aquifer is 70 feet or less, assign a score of 500; otherwise, assign a score of 340 Optionally, evaluate potential to release according to HRS Section 3.	500	H	7
LR =	500		

TARGETS			
Are any wells part of a blended system? Yes ✓ No ~~X~~ If yes, attach a page to show apportionment calculations.			
3. ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates that any target drinking water well for the aquifer has been exposed to a hazardous substance from the site, evaluate the factor score for the number of people served (SI Table 5). Level I: _____ people x 10 = _____ Level II: _____ people x 1 = _____ Total =	0	H	14, 15
4. POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water wells for the aquifer or overlying aquifers that are not exposed to a hazardous substance from the site; record the population for each distance category in SI Table 6a or 6b. Sum the population values and multiply by 0.1.	1006	H	15,16,17
5. NEAREST WELL: Assign a score of 50 for any Level I Actual Contamination Targets for the aquifer or overlying aquifer. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Targets exist, assign the Nearest Well score from SI Table 6a or 6b. If no drinking water wells exist within 4 miles, assign 0.	5	H	14,15,16
6. WELLHEAD PROTECTION AREA (WHPA): If any source lies within or above a WHPA for the aquifer, or if a ground water observed release has occurred within a WHPA, assign a score of 20; assign 5 if neither condition applies but a WHPA is within 4 miles; otherwise assign 0.	0	H	16
7. RESOURCES: Assign a score of 5 if one or more ground water resources applies; assign 0 if none applies. • Irrigation (5 acre minimum) of commercial food crops or commercial forage crops • Watering of commercial livestock • Ingredient in commercial food preparation • Supply for commercial aquaculture • Supply for a major or designated water recreation area, excluding drinking water use	5	H	20
Sum of Targets T=	1011		

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SI TABLE 6 (From HRS TABLE 3-12): VALUES FOR POTENTIAL CONTAMINATION GROUND WATER TARGET POPULATIONS

SI Table 6a: Other Than Karst Aquifers

Distance from Site	Pop.	Nearest Well (choose highest)	Population Served by Wells within Distance Category												Pop Value	Ref.
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,000 to 3,000,000		
0 to $\frac{1}{4}$ mile	0	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455		26
> $\frac{1}{4}$ to $\frac{1}{2}$ mile	0	18	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122	0	26
> $\frac{1}{4}$ to 1 mile	0	9	1	5	17	52	167	523	1,669	5,224	16,684	52,239	166,835	522,385	0	26
> 1 to 2 miles	61,218	5	0.7	3	10	30	94	294	939	2,939	9,385	29,384	93,845	293,842	9385	26
> 2 to 3 miles	3,401	3	0.5	2	7	21	68	212	678	2,122	6,778	21,222	67,777	212,219	678	26
>3 to 4 miles	0	2	0.3	1	4	13	42	131	417	1,306	4,171	13,060	41,709	130,596	0	26

Nearest Well = 5

Score = 10,063

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SI TABLE 6 (From HRS TABLE 3-12): VALUES FOR POTENTIAL CONTAMINATION GROUND WATER TARGET POPULATIONS (continued)

SI Table 6b: Karst Aquifers

Distance from Site	Pop.	Nearest Well (choose highest)	Population Served by Wells within Distance Category												Pop Value	Ref.
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,000 to 3,000,000		
0 to $\frac{1}{4}$ mile		20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455		
> $\frac{1}{4}$ to $\frac{1}{2}$ mile		20	2	11	33	102	324	1,013	3,233	10,122	32,325	101,213	323,243	1,012,122		
> $\frac{1}{2}$ to 1 mile		20	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227		
> 1 to 2 miles		20	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227		
> 2 to 3 miles		20	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227		
>3 to 4 miles		20	2	9	26	82	261	817	2,607	8,163	26,068	81,623	260,680	816,227		

Nearest Well = [ ] **Score =** [ ]

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GROUND WATER PATHWAY WORKSHEET (concluded)

WASTE CHARACTERISTICS	Score	Data Type	Does not Apply
8. If any Actual Contamination Targets exist for the aquifer or overlying aquifers, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if no Actual Contamination Targets exist, assign the hazardous waste quantity score calculated for sources available to migrate to groundwater.	10	H	
9. Assign the highest ground water toxicity/mobility value from SI Table 3 or 4.	.02	H	
10. Multiply the ground water toxicity/mobility and waste quantity scores. Assign the Waste Characteristics score from the table below: (from HRS Table 2-7)	1	H	
WC =	1		

Product	WC Score
0	0
>0 to <10	1
10 to <100	2
100 to <1,000	3
1,000 to < 10,000	6
10,000 to <1E + 05	10
1E + 05 to <1E + 06	18
1E + 06 to <1E + 07	32
1E + 07 to <1E + 08	56
1E + 08 or greater	100

Multiply LR by T and by WC. Divide the product by 82,500 to obtain the groundwater pathway score for each aquifer. Select the highest aquifer score. If the pathway score is greater than 100, assign 100.

GROUND WATER PATHWAY SCORE:

$$LR \times T \times WC = \frac{500 \times 1011 \times 1}{82{,}500}$$

6.13

(Maximum of 100)

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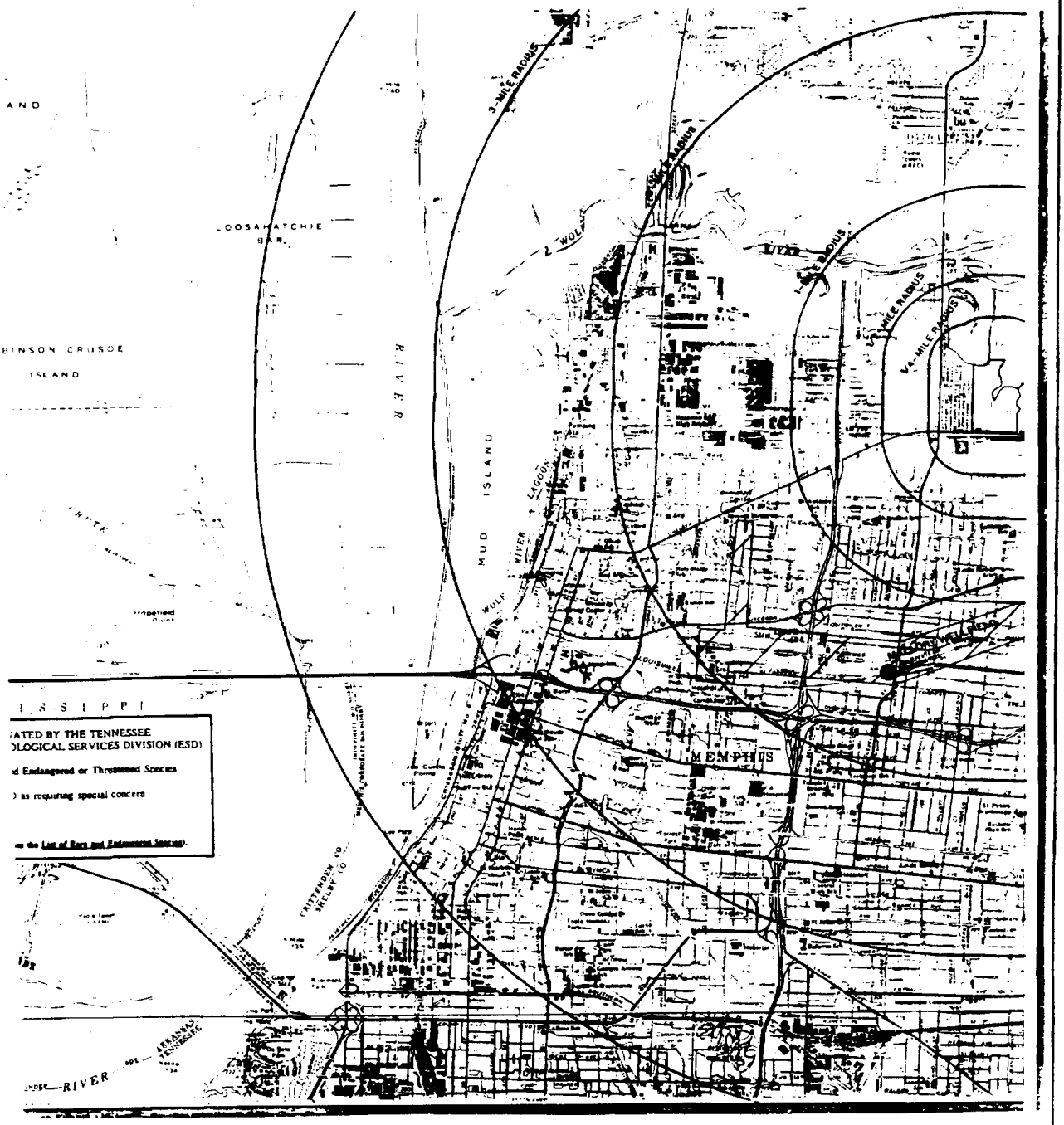
SURFACE WATER PATHWAY

Sketch of the Surface Water Migration Route:
Label all surface water bodies. Include runoff route and drainage direction, probable point of entry and 15-mile target distance limit. Mark sample locations, intakes, fisheries, and sensitive environments. Indicate flow directions and tidal influence. Indicate flow direction and rate.



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SURFACE WATER PATHWAY

Surface Water Observed Release Substances Summary Table

On SI Table 7, list the hazardous substances detected in surface water samples for the watershed, which can be attributed to the site. Include only those substances detected at concentration levels significantly above background levels or in observed releases by direct observation. Obtain toxicity, persistence, bioaccumulation potential, and ecotoxicity values from SCDM. Enter the highest toxicity/persistence, toxicity/persistence/bioaccumulation, and ecotoxicity/persistence/ecobioaccumulation values in the spaces provided.

- TP = Toxicity x Persistence
- TPB = TP x bioaccumulation
- ETPB = EP x bioaccumulation (EP = ecotoxicity* x persistence)

* EP is ecotoxicity/persistence

Drinking Water Actual Contamination Targets Summary Table

For an observed release at or beyond a drinking water intake, on SI Table 8 enter each hazardous substance by sample ID and the detected concentration. For surface water sediment samples detecting a hazardous substance at or beyond an intake, evaluate the intake as Level II contamination. Obtain benchmark, cancer risk, and reference dose concentrations for each substance from SCDM. For MCL and MCLG benchmarks, determine the highest percentage of benchmark obtained for any substance. For cancer risk and reference dose, sum the percentages of the substances listed. If benchmark, cancer risk, or reference dose concentrations are not available for a particular substance, enter N/A for the percentage. If the highest benchmark percentage or the percentage sums calculated for cancer risk or reference dose equal or exceed 100%, evaluate the population served by the intake as Level I targets. If the percentages are less than 100% or all are N/A, evaluate the population served by the intake as Level II targets.

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SI TABLE 7: SURFACE WATER OBSERVED RELEASE SUBSTANCES

Sample ID	Hazardous Substance	Bckgrd. Conc.	Toxicity/ Persistence	Toxicity/ Persis./ Bioaccum	Ecotoxicity/ Persis/ Ecobioaccum	Reference
		Highest Values				

SI TABLE 8: SURFACE WATER DRINKING WATER ACTUAL CONTAMINATION TARGETS

Intake ID: _____ Sample Type _____ Level I _____ Level II _____ Population Served _____ References _____

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	Rfd	% of Rfd
			Highest Percent		Sum of Percents		Sum of Percents	

Intake ID: _____ Sample Type _____ Level I _____ Level II _____ Population Served _____ References _____

Sample ID	Hazardous Substance	Conc. (µg/L)	Benchmark Conc. (MCL or MCLG)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	Rfd	% of Rfd
			Highest Percent		Sum of Percents		Sum of Percents	

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SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET

LIKELIHOOD OF RELEASE– OVERLAND/FLOOD MIGRATION	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation supports a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7.			
2. POTENTIAL TO RELEASE: Distance to surface water: 200 (feet) If sampling data do not support a release to surface water in the watershed, use the table below to assign a score from the table below based on distance to surface water and flood frequency.			
Optionally, evaluate surface potential to release according to HRS Section 4.1.2.1.2	500	M	4
LR =	500		

Distance to surface water <2500 feet	500
Distance to surface water >2500 feet, and:	
Site in annual or 10 yr floodplain	500
Site in 100-yr floodplain	400
Site in 500-yr floodplain	300
Site outside 500-yr floodplain	100

LIKELIHOOD OF RELEASE GROUND WATER TO SURFACE WATER MIGRATION	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation supports a release to surface water in the watershed, assign a score of 550. Record observed release substances on SI Table 7			
NOTE: Calculate ground water to surface water migration only for a surface water body that meets all of the following conditions:			
1) A portion of the surface water is within 1 mile of site sources having a containment factor greater than 0.			
2) No aquifer discontinuity is established between the source and the above portion of the surface water body.			
3) The top of the uppermost aquifer is at or above the bottom of the surface water			
Elevation of top of uppermost aquifer _____			
Elevation of bottom of surface water body _____			
2. POTENTIAL TO RELEASE: Use the ground water potential to release. Optionally, evaluate surface water potential to release according to HRS Section 3.1.2.			
LR =			

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SURFACE WATER PATHWAY
LIKELIHOOD OF RELEASE AND DRINKING WATER THREAT WORKSHEET (CONTINUED)

DRINKING WATER THREAT TARGETS	Score	Data Type	Refs
Record the water body type, flow, and number of people served by each drinking water intake within the target distance limit in the watershed. If there is no drinking water intake within the target distance limit, assign 0 to factors 3, 4, and 5. Intake Name / Water Body Type / Flow / People Served _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ Are any intakes part of a blended system? Yes _____ No _____ If yes, attach a page to show apportionment calculations. 3. ACTUAL CONTAMINATION TARGETS: If analytical evidence indicates a drinking water intake has been exposed to a hazardous substance from the site, list the intake name and evaluate the factor score for the drinking water population (SI Table 8). _____ , _____ Level I: _____ people x 10 = _____ Level II: _____ people x 1 = _____ **Total =**	0	H	19
4. POTENTIAL CONTAMINATION TARGETS: Determine the number of people served by drinking water intakes for the watershed that have not been exposed to a hazardous substance from the site. Assign the population values from SI Table 9. Sum the values and multiply by 0.1.	0	H	19
5. NEAREST INTAKE: Assign a score of 50 for any Level I Actual Contamination Drinking Water Targets for the watershed. Assign a score of 45 if there are Level II targets for the watershed, but no Level I targets. If no Actual Contamination Drinking Water Targets exist, assign a score for the intake nearest the PPE from SI Table 9. If no drinking water intakes exist, assign 0.	0	H	19
6. RESOURCES: Assign a score of 5 if one or more surface water resources applies; assign 0 if none applies. • Irrigation (5 acre minimum) of commercial food crops or commercial forage crops • Watering of commercial livestock • Ingredient in commercial food preparation • Major or designated water recreation area, excluding drinking water use	0	H	19
SUM OF TARGETS T=	0		

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SI Table 9 (From HRS Table 4-14): DILUTION-WEIGHTED POPULATION VALUES FOR POTENTIAL CONTAMINATION FOR SURFACE WATER MIGRATION PATHWAY

Type of Surface Water Body	Pop.	Nearest Intake	Number of people									Pop. Value
			0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,000	10,001 to 30,000	
Minimal Stream (<10 cfs)		20	0	4	17	53	164	522	1,633	5,214	16,325	
Small to moderate stream (10 to 100 cfs)		2	0	0.4	2	5	16	52	163	521	1,633	
Moderate to large stream (> 100 to 1,000 cfs)		0	0	0.04	0.2	0.5	2	5	16	52	163	
Large Stream to river (>1,000 to 10,000 cfs)		0	0	0.004	0.02	0.05	0.2	0.5	2	5	16	
Large River (> 10,000 to 100,000 cfs)		0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	16	
Very Large River (>100,000 cfs)		0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	
Shallow ocean zone or Great Lake (depth < 20 feet)		0	0	0	0.002	0.005	0.02	0.05	0.2	0.5	2	
Moderate ocean zone or Great Lake (Depth 20 to 200 feet)		0	0	0	0	0.001	0.002	0.005	0.02	0.05	0.2	
Deep ocean zone or Great Lake (depth > 200 feet)		0	0	0	0	0	0.001	0.003	0.008	0.03	0.08	
3 mile mixing zone in quiet flowing river (≥ 10 cfs)		10	0	2	9	26	82	261	817	2,607	8,163	

Nearest Intake = _____ Total = _____

References _____

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SURFACE WATER PATHWAY

Human Food Chain Actual Contamination Targets Summary Table

On SI Table 10, list the hazardous substances detected in sediment, aqueous, sessile benthic organism tissue, or fish tissue samples (taken from fish caught within the boundaries of the observed release) by sample ID and concentration. Evaluate fisheries within the boundaries of observed releases detected by sediment or aqueous samples as Level II, if at least one observed release substance has a bioaccumulation potential factor value of 500 or greater (see SI Table 7). Obtain benchmark, cancer risk, and reference dose concentrations from SCDM. For FFDAAL benchmarks, determine the highest percentage of benchmark obtained for any substances. For cancer risk and reference dose, sum the percentages for the substances is listed. If benchmark, cancer risk, or reference dose concentrations are not available for a particular substance, enter N/A for the percentage. If the highest benchmark percentage sums calculated for cancer risk or reference dose equal or exceed 100%, evaluate this portion of the fishery as subject to Level I concentrations. If the percentages are less than 100% or all are N/A, evaluate the fishery as a Level II target.

Sensitive Environment Actual Contamination Targets Summary Table

On SI Table 11, list each hazardous substance detected in aqueous or sediment samples at or beyond wetlands or a surface water sensitive environment by sample ID. Record the concentration. If contaminated sediments or tissues are detected at or beyond a sensitive environment, evaluate the sensitive environment as Level II. Obtain benchmark concentrations from SCDM. For AWOC/AALAC benchmarks, determine the highest percentage of benchmark of the substances detected in aqueous samples. If benchmark concentrations are not available for a particular substance, enter N/A for the percentage. If the highest benchmark percentage equals or exceeds 100%, evaluate that part of the sensitive environment subject to Level I concentrations. If the percentages are less than 100%, or all are N/A, evaluate the sensitive environment as Level II.

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SI TABLE 10: HUMAN FOOD CHAIN ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Fishery ID: _____ Sample Type _____ Level I _____ Level II _____ References _____

Sample ID	Hazardous Substance	Conc. (mg/kg)	Benchmark Concentration (FDAAL)	% of Benchmark	Cancer Risk Concentration.	% of Cancer Risk Concentration	Rfd	% of Rfd
			Highest Percent		Sum of Percents		Sum of Percents	

SI TABLE 11: SENSITIVE ENVIRONMENT ACTUAL CONTAMINATION TARGETS FOR WATERSHED

Environment ID: _____ Sample Type _____ Level I _____ Level II _____ Environment Value _____

Sample ID	Hazardous Substance	Conc.. (µg/L)	Benchmark Concentration (AWQC or AALAC)	% of Benchmark
			Highest Percent	

References _____

Environment ID: _____ Sample Type _____ Level I _____ Level II _____ Environment Value _____

Sample ID	Hazardous Substance	Conc.. (µg/L)	Benchmark Concentration (AWQC or AALAC)	% of Benchmark
			Highest Percent	

References _____

SURFACE WATER PATHWAY (continued)
HUMAN FOOD CHAIN THREAT WORKSHEET

HUMAN FOOD CHAIN THREAT TARGETS	Score	Data Type	Refs
Record the water body type and flow for each fishery within the target distance limit. If there is no fishery within the target distance limit, assign a score of 0 at the bottom of this page.			

Fishery Name	Water Body Type	Flow
Wolf River	River	1,023 cfs
Mississippi River	River	580,000 cfs
		cfs
		cfs
		cfs

FCI Value =

	Score	Data Type	Refs
7. ACTUAL CONTAMINATION FISHERIES: If analytical evidence indicates that a fishery has been exposed to a hazardous substance with a bioaccumulation factor greater than or equal to 500 (SI Table 10), assign a score of 50 if there is a Level I fishery. Assign 45 if there is a Level II fishery, but no Level I.	0	H	18
8. POTENTIAL CONTAMINATION FISHERIES: If there is a release of a substance with a bioaccumulation factor greater than or equal to 500 to a watershed containing fisheries within the target distance limit, but there are no Level I or Level II fisheries, assign a score of 20. If there is no observed release to the watershed, assign a value for potential contamination fisheries from the table below using the lowest flow at all fisheries within the target distance limit.	0	H	18

Lowest Flow	FCI Value
<10 cfs	20
10 to 100 cfs	2
>100 cfs, coastal tidal waters, oceans, or Great Lakes	0

SUM OF TARGETS T = 0

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SURFACE WATER PATHWAY (continued)
ENVIRONMENTAL THREAT WORKSHEET

When measuring length of wetlands that are located on both sides of a surface water body, sum both frontage lengths. For a sensitive environment that is more than one type, assign a value for each type. Multiply Level I environment values by 10.

ENVIRONMENTAL THREAT TARGETS

	Score	Data Type	Refs

Record the water body type and flow for each surface water sensitive environment within the target distance (see SI Table 12). If there is no sensitive environment within the target distance limit, assign a score of 0 at the bottom of the page.

Environment Name	Water Body Type	Flow
Wolf River	River	1,023 cfs
Mississippi River	River	580,000 cfs
		cfs
		cfs
		cfs

9. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: If sampling data or direct observation indicates any sensitive environment has been exposed to a hazardous substance from the site, record this information on SI Table 11, and assign a factor value for the environment (SI Tables 13 and 14).

Environment Name	Environment Type and Value (SI Tables 13 & 14)	Multiplier (10 for Level I, 1 for Level II)	Product
		x =	
		x =	
		x =	
		x =	
		Sum =	

Score: 0 | Data Type: H | Refs: 18

10. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS:

Flow	Dilution Weight (SI Table 12)	Environment Type and Value (SI Tables 13 & 14)	Pot. Cont.	Product
1,023 cfs	001 x	State designated threatened sp 50 x	0.1 =	0.005
580,000 cfs	00001 x	" " 50 x	0.1 =	5×10^{-5}
cfs	x	x	0.1 =	
cfs	x	x	0.1 =	
cfs	x	x	0.1 =	
			Sum =	

Score: 0.005 | Data Type: H | Refs: 22

T = 0.005

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SI TABLE 12 (HRS Table 4-13): SURFACE WATER DILUTION WEIGHTS

Type of Surface Water Body		Assigned Dilution Weight
Descriptor	**Flow Characteristics**	
Minimal stream	< 10 cfs	1
Small to moderate stream	10 to 100 cfs	0.1
Moderate to large stream	> 100 to 1,000 cfs	0.01
Large stream to river	> 1,000 to 10,000 cfs	0.001
Large river	> 10,000 to 100,000 cfs	0.0001
Very large river	> 100,000 cfs	0.00001
Coastal tidal waters	Flow not applicable; depth not applicable	0.001
Shallow ocean zone or Great Lake	Flow not applicable; depth less than 20 feet	0.001
Moderate depth ocean zone or Great Lake	Flow not applicable; depth 20 to 200 feet	0.0001
Deep ocean zone or Great Lake	Flow not applicable; Depth greater than 200 feet	0.000005
3-mile mixing zone in quiet flowing river	10 cfs or greater	0.5

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SI TABLE 13 (HRS TABLE 4-23): SURFACE WATER AND AIR SENSITIVE ENVIRONMENTS VALUES

SENSITIVE ENVIRONMENT	ASSIGNED VALUE
Critical habitat for Federally designated endangered or threatened species Marine Sanctuary National Park Designated Federal Wilderness Area Ecologically important areas identified under the Coastal Zone Wilderness Act Sensitive Areas identified under the National Estuary Program or Near Coastal Water Program of the Clean Water Act Critical Areas identified under the Clean Lakes Program of the Clean Water Act (subareas in lakes or entire small lakes) National Monument (air pathway only) National Seashore Recreation Area National Lakeshore Recreation Area	100
Habitat known to be used by Federally designated or proposed endangered or threatened species National Preserve National or State Wildlife Refuge Unit of Coastal Barrier Resources System Coastal Barrier (undeveloped) Federal land designated for the protection of natural ecosystems Administratively Proposed Federal Wilderness Area Spawning areas critical for the maintenance for fish/shellfish species within a river system, bay, or estuary Migratory pathways and feeding areas critical for the maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which the fish spend extended periods of time Terrestrial areas utilized by large or dense aggregations of vertebrate animals (semi-aquatic foragers) for breeding National river reach designated as recreational	75
Habitat known to be used by State designated endangered or threatened species Habitat known to be used by a species under review as to its Federal endangered or threatened status Coastal Barrier (partially developed) Federally designated Scenic or Wild River	50
State land designated for wildlife or game management State designated Scenic or Wild River State designated Natural Area Particular areas, relatively small in size, important to maintenance of unique biotic communities	25
State designated areas for the protection or maintenance of aquatic life under the Clean Water Act	5
Wetlands See SI Table 14 (Surface Water Pathway) or SI Table 23 (Air Pathway)	

SI TABLE 14 (HRS TABLE 4-24): SURFACE WATER WETLANDS FRONTAGE VALUES

Total Length of Wetlands	Assigned Value
Less than 0.1 mile	0
0.1 to 1 mile	25
Greater than 1 to 2 miles	50
Greater than 2 to 3 miles	75
Greater than 3 to 4 miles	100
Greater than 4 to 8 miles	150
Greater than 8 to 12 miles	250
Greater than 12 to 16	350
Greater than 16 to 20	450
Greater than 20 miles	500

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SURFACE WATER PATHWAY (concluded)
WASTE CHARACTERISTICS, THREAT, AND PATHWAY SCORE SUMMARY

WASTE CHARACTERISTICS — Score

14.	If an Actual Contamination Target (drinking water human food chain or environmental threat exists for the watershed, assign the calculated hazardous waste quantity score, or a score of 100, whichever is greater.	10
15.	Assign the highest value from SI Table 7 (observed release) or SI Table 3 (no observed release) for the hazardous substance waste characterization factors below. Multiply each by the surface water waste quantity score and determine the waste characteristics score for each threat.	WC Score (From Table) (Maximum of 100)

	Substance Value		HWQ		Product	WC Score (From Table) (Maximum of 100)
Drinking Water Threat Toxicity/Persistence	10 000	x	10	=	5×10^5	18
Food Chain Threat Toxicity/Persistence/ Bioaccumulation	5×10^8	x	10	=	5×10^9	100
Environmental Threat Ecotoxicity/Persistence/ Ecobioaccumulation	5×10^8	x	10	=	5×10^9	100

Product	WC Score
0	0
>0 to <10	1
10 to <100	2
100 to <1,000	3
1,000 to < 10,000	6
10,000 to <1E + 05	10
1E + 05 to <1E + 06	18
1E + 06 to <1E + 07	32
1E + 07 to <1E + 08	56
1E + 08 to <1E + 09	100
1E + 09 or greater	1000

SURFACE WATER PATHWAY THREAT SCORES

Threat	Likelihood of Release (LR) Score	Targets (T) Score	Pathway Waste Characteristics (WC) Score (determined above)	Threat Score $LR \times T \times WC = \frac{}{82,500}$
Drinking Water	500	0	18	(maximum of 100) 0
Human Food Chain	500	0	100	(maximum of 100) 0
Environmental	500	0.005	100	(maximum of 60) 0.003

SURFACE WATER PATHWAY SCORE (Drinking Water Threat + Human Food Chain Threat + Environmental Threat) — (maximum of 100): 0.003

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SOIL EXPOSURE PATHWAY

If there is no observed contamination (e.g., ground water plume with no known surface source), do not evaluate the soil exposure pathway. Discuss evidence for no soil exposure pathway.

Soil Exposure Resident Population Targets Summary

If there is an area of observed contamination on the property and within 200 feet of a residence, school, or day care center, enter on Table 15 each hazardous substance by sample ID. Record the detected concentration. Obtain cancer risk, and reference dose concentrations from SDCM. Sum the cancer risk and reference dose percentages for the substances listed. If cancer risk or reference dose concentrations are not available for a particular substance, enter N/A for the percentage. If the percentage sums calculated for cancer risk or reference dose equal or exceed 100%, evaluate the residents and students as Level I. If both percentages are less than 100% or all are N/A, evaluate the targets as Level II.

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SI TABLE 15: SOIL EXPOSURE RESIDENT POPULATION TARGETS

Residence ID: _____ Level I _____ Level II _____ Population _____

Sample ID	Hazardous Substance	Conc. (mg/kg)	Cancer Risk Concentration	% of Cancer Risk Conc.	RfD	% of RfD	Toxicity Value	References
			Highest Percent		Sum of Percents		Sum of Percents	

Residence ID: _____ Level I _____ Level II _____ Population _____

Sample ID	Hazardous Substance	Conc. (mg/kg)	Cancer Risk Concentration	% of Cancer Risk Conc.	RfD	% of RfD	Toxicity Value	References
			Highest Percent		Sum of Percents		Sum of Percents	

Residence ID: _____ Level I _____ Level II _____ Population _____

Sample ID	Hazardous Substance	Conc. (mg/kg)	Cancer Risk Concentration	% of Cancer Risk Conc.	RfD	% of RfD	Toxicity Value	References
			Highest Percent		Sum of Percents		Sum of Percents	

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SOIL EXPOSURE PATHWAY WORKSHEET
RESIDENT POPULATION THREAT

LIKELIHOOD OF EXPOSURE	Score	Data Type	Refs
1. OBSERVED CONTAMINATION: If evidence indicates presence of observed contamination (depth of 2 feet or less), assign a score of 550; otherwise, assign a 0. Note that a likelihood of exposure score of 0 results in a soil exposure pathway score of 0	550	~~S~~	6
LE =	550		

TARGETS

2. RESIDENT POPULATION: Determine the number of people occupying residences or attending school or day care on or within 200 feet of areas of observed contamination (SI Table 16 and HRS section 5.1.3). Level I: _____ people x 10 = _____ Level II: _____ people x 1 = _____ Sum =	0	H	2
3. RESIDENT INDIVIDUAL: Assign a score of 50 if any Level I resident population exists. Assign a score of 45 if there are Level II targets but no Level I targets. If no resident population exists, assign 0 (HRS Section 5.1.3).	0	H	2
4. WORKERS: Assign a score from the table below for the total number of workers at the site and nearby facilities with areas of observed contamination associated with the site.	5	H	2
5. TERRESTRIAL SENSITIVE ENVIRONMENTS: Assign a value for each terrestrial sensitive environment (SI Table 16) on an area of observed contamination. Sum =	0	H	22
6. RESOURCES: Assign a score of 5 if any one or more of the following resources are present on an area of observed contamination at the site; assign 0 if none applies. • Commercial agriculture • Commercial silviculture • Commercial livestock production or commercial livestock grazing	0	H	2
Total of Targets T=	5		

Number of Workers	Score
0	0
1 to 100	5
101 to 1,000	10
>1,000	15

Terrestrial Sensitive Environment Type	Value

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SI TABLE 16 (HRS TABLE 5-5): SOIL EXPOSURE PATHWAY TERRESTRIAL SENSITIVE ENVIRONMENT VALUES

TERRESTRIAL SENSITIVE ENVIRONMENT	*ASSIGNED VALUE*
Terrestrial critical habitat for Federal designated endangered or threatened species National Park Designated Federal Wilderness Area National Monument	100
Terrestrial habitat known to be used by Federal designated or proposed threatened or endangered species National Preserve (terrestrial) National or State terrestrial Wildlife Refuge Federal land designated for protection of natural ecosystems Administratively proposed Federal Wilderness Area Terrestrial areas utilized by large or dense aggregations of animals (vertebrate species) for breeding	75
Terrestrial habitat used by State designated endangered or threatened species Terrestrial habitat used by species under review for Federal designated endangered or threatened status	50
State lands designated for wildlife or game management State designated Natural Areas Particular areas, relatively small in size, important to maintenance of unique biotic communities	25

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SOIL EXPOSURE PATHWAY WORKSHEET
NEARBY POPULATION THREAT

LIKELIHOOD OF EXPOSURE		Score	Data Type	Ref.
7. Attractiveness/Accessibility (from SI Table 17 or HRS Table 5-6)	Value 5			
Area of Contamination (from SI Table 18 or HRS Table 5-7)	Value 80			
Likelihood of Exposure (from SI Table 19 or HRS Table 5-8)		25	H	2,26
	LE =	25		

TARGETS	Score	Data Type	Ref.
8. Determine the population within 1 mile travel distance that are not exposed to a hazardous substance from the site; record the population for each distance category in SI Table 20 (HRS Table 5-10). Sum the population values and multiply by 0.1.	13.5	H	26
T =	13.5		

102 + 20 + 13 = 135 x .1 = 13.5

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SI TABLE 17 (HRS TABLE 5-6): ATTRACTIVENESS/ACCESSIBILITY VALUES

Area of Observed Contamination	Assigned Value
Designated recreational Area	100
Regularly used for public recreation (for example, vacant lots in urban area)	75
Accessible and unique recreational area (for example, vacant lots in urban area)	75
Moderately accessible (may have some access improvements–for example, gravel road) with some public recreation use	50
Slightly accessible (for example, extremely rural area with no road improvement) with some public recreation use	25
Accessible with no public recreation use	10
Surrounded by maintained fence or combination of maintained fence and natural barriers	5
Physically inaccessible to public, with no evidence of public recreation use	0

SI TABLE 18 (HRS TABLE 5-7): AREA OF CONTAMINATION FACTOR VALUES

Total area of the areas of observed contamination (square feet)	Assigned Value
≥ to 5,000	5
> 5,000 to 125,000	20
> 125,000 to 250,000	40
> 250,000 to 375,000	60
> 375,000 to 500,000	80
> 500,000	100

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SI TABLE 19 (HRS TABLE 5-8): NEARBY POPULATION LIKELIHOOD OF EXPOSURE FACTOR VALUES

AREA OF CONTAMINATION FACTOR VALUE	ATTRACTIVENESS/ACCESSIBILITY FACTOR VALUE						
	100	75	50	25	10	5	0
100	500	500	375	250	125	50	0
80	500	375	250	125	50	25	0
60	375	250	125	50	25	5	0
40	250	125	50	25	5	5	0
20	125	50	25	5	5	5	0
5	50	25	5	5	5	5	0

SI TABLE 20 (HRS TABLE 5-10): DISTANCE-WEIGHTED POPULATION VALUES FOR NEARBY POPULATION THREAT

Travel Distance Category (miles)	Pop.	Number of people within the travel distance category											
		0	1 to 10	11 to 30	31 to 100	101 to 300	301 to 1,000	1,001 to 3,000	3,001 to 10,001	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000
Greater than 0 to $\frac{1}{4}$		0	0.1	0.4	1.0	4	13	41	130	408	1,303	4,081	13,034
Greater than $\frac{1}{4}$ to $\frac{1}{2}$		0	0.05	0.2	0.7	2	7	20	65	204	652	2,041	6,517
Greater than $\frac{1}{2}$ to 1		0	0.02	0.1	0.3	1	3	10	33	102	326	1,020	3,258

JUN 18 1990

SOIL EXPOSURE PATHWAY WORKSHEET (concluded)

WASTE CHARACTERISTICS

9. Assign the hazardous waste quantity score calculated for soil exposure	10
10. Assign the highest toxicity value from SI Table 16	10,000
11. Multiply the toxicity and waste quantity scores. Assign the Waste Characteristics score from the table below:	WC = 18

Product	WC Score
0	0
>0 to <10	1
10 to <100	2
100 to <1,000	3
1,000 to < 10,000	6
10,000 to <1E + 05	10
1E + 05 to <1E + 06	18
1E + 06 to <1E + 07	32
1E + 07 to <1E + 08	56
1E + 08 or greater	100

RESIDENT POPULATION THREAT SCORE:

$$LE \times T \times WC = \frac{550 \times 5 \times 18}{82,500}$$

0.6 (Maximum of 100)

NEARBY POPULATION THREAT SCORE:

$$LE \times T \times WC = \frac{25 \times 13.5 \times 18}{82,500}$$

0.07 (Maximum of 100)

SOIL EXPOSURE PATHWAY SCORE:
Resident Population Threat + Nearby Population Threat

0.67 (Maximum of 100)

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AIR PATHWAY

Air Pathway Observed Substances Summary Table

On SI Table 21, list the hazardous substances detected in air samples of a release from the site. Include only those substances with concentrations significantly greater than background levels. Obtain benchmark, cancer risk, and reference dose concentrations from SCDM. For NAAQS/NESHAPS benchmarks, determine the highest percentage of benchmark obtained for any substance. For cancer risk and reference dose, sum the percentages for the substances listed. If benchmark, cancer risk, or reference dose concentrations are not available for a particular substance, enter N/A for the percentage. If the highest benchmark percentage or the percentage sums calculated for cancer risk or reference dose equal or exceed 100%, evaluate targets in the distance category from which the sample was taken and any closer distance categories as Level I. If the percentages are less than 100% or all are N/A, evaluate targets in that distance category and any closer distance categories that are not Level I as Level II.

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SI TABLE 21: AIR PATHWAY OBSERVED RELEASE SUBSTANCES

Sample ID: _____ Level I _____ Level II _____ Distance from Sources (mi) ____ References _____

Hazardous Substance	Conc. (µg/m³)	Gaseous Particulate	Benchmark Conc. (NAAQS or NESHAPS)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	RfD	% of RfD
	Highest Toxicity/ Mobility		Highest Percent		Sum of Percents		Sum of Percents	

Sample ID: _____ Level I _____ Level II _____ Distance from Sources (mi) ____ References _____

Hazardous Substance	Conc. (µg/m³)	Toxicity/ Mobility	Benchmark Conc. (NAAQS or NESHAPS)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	RfD	% of RfD
	Highest Toxicity/ Mobility		Highest Percent		Sum of Percents		Sum of Percents	

Sample ID: _____ Level I _____ Level II _____ Distance from Sources (mi) ____ References _____

Hazardous Substance	Conc. (µg/m³)	Toxicity/ Mobility	Benchmark Conc. (NAAQS or NESHAPS)	% of Benchmark	Cancer Risk Conc.	% of Cancer Risk Conc.	RfD	% of RfD
	Highest Toxicity/ Mobility		Highest Percent		Sum of Percents		Sum of Percents	

AIR PATHWAY WORKSHEET

LIKELIHOOD OF RELEASE	Score	Data Type	Refs
1. OBSERVED RELEASE: If sampling data or direct observation supports a release to air, assign a score of 550. Record observed release substances on SI Table 21			
2. POTENTIAL TO RELEASE: If sampling data do not support a release to air, assign a score of 500. Optionally, evaluate air migration gaseous and particulate potential to release (HRS Section 6.1.2)	500	H	26
LR =	500		

TARGETS			
3. ACTUAL CONTAMINATION POPULATION: Determine the number of people within the target distance limit subject to exposure from a release of a hazardous substance to the air. a) Level I: _____ people x 10 = _____ b) Level II: _____ people x 1 = _____ Total =	0	H	26
4. POTENTIAL TARGET POPULATION: Determine the number of people within the target distance limit not subject to exposure from a release of a hazardous substance to the air, and assign the total population score from SI Table 22.	94.3	H	26
5. NEAREST INDIVIDUAL: Assign a score of 50 if there are any Level I targets. Assign a score of 45 if there are Level II targets but no Level I targets. If no Actual Contamination Population exists, assign the Nearest Individual score from SI Table 22.	20	H	2,26
6. ACTUAL CONTAMINATION SENSITIVE ENVIRONMENTS: Sum the sensitive environment values (SI Table 13) and wetland acreage values (SI Table 23) for environments subject to exposure from the release of a hazardous substance to the air.	0	H	22
7. POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS: Use SI Table 24 to evaluate sensitive environments not subject to exposure from a release.	0.062	H	22
8. RESOURCES: Assign a score of 5 if one or more air resources applies within 1/2 mile of a source; assign a 0 if none applies • Commercial agriculture • Commercial silviculture • Major or designated recreation area	0	H	22
T =	114.362		

Sensitive Environment Type	Value
_____	_____
_____	_____
_____	_____

Wetland Acreage	Value
_____	_____
_____	_____
_____	_____

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SI TABLE 22 (From HRS TABLE 6-17): VALUES FOR POTENTIAL CONTAMINATION AIR TARGET POPULATIONS

Distance from Site	Pop.	Nearest Individual (choose highest)	Number of People within the Distance Category												Pop. Value
			1 to 10	11 to 30	31 to 100	101 to 300	301 to 1000	1001 to 3000	3001 to 10,000	10,001 to 30,000	30,001 to 100,000	100,001 to 300,000	300,001 to 1,000,000	1,000,000 to 3,000,000	
On a source	10	20	4	17	53	164	522	1,633	5,214	16,325	52,137	163,246	521,360	1,632,455	4
0 to $\frac{1}{4}$ mile	937	*	1	4	13	41	131	408	1,304	4,081	13,034	40,812	130,340	408,114	131
> $\frac{1}{4}$ to $\frac{1}{2}$ mile	1,335	2	0.2	0.9	3	9	28	88	282	882	2,815	8,815	28,153	88,153	88
> $\frac{1}{2}$ to 1 mile	10,462	1	0.06	0.3	0.9	3	8	26	83	261	834	2,612	8,342	26,119	261
> 1 to 2 miles	42,861	0	0.02	0.09	0.3	0.8	3	8	27	83	266	833	2,659	8,326	266
> 2 to 3 miles	57,486	0	0.009	0.04	0.1	0.4	1	4	12	38	120	375	1,199	3,755	120
>3 to 4 miles	72,258	0	0.005	0.02	0.07	0.2	0.7	2	7	28	73	229	730	2,285	73
	Nearest Individual =	20												Total =	943

References 2,26

* Score a 20 if the Nearest Individual is within $\frac{1}{8}$ mile of a site; score a 7 if the Nearest Individual is between $\frac{1}{8}$ and $\frac{1}{4}$ mile of a site.

SI TABLE 23 (HRS TABLE 6-18): AIR PATHWAY VALUES FOR WETLAND AREA

Wetland Area	Assigned Value
< 1 acre	0
1 to 50 acres	25
> 50 to 100 acres	75
> 100 to 150 acres	125
> 150 to 200 acres	175
> 200 to 300 acres	250
> 300 to 400 acres	350
> 400 to 500 acres	450
> 500 acres	500

SI TABLE 24: DISTANCE WEIGHTS AND CALCULATIONS FOR AIR PATHWAY POTENTIAL CONTAMINATION SENSITIVE ENVIRONMENTS

Distance	Distance Weight	Sensitive Environment Type and Value (from SI Tables 14 and 20)	Product
On a Source	0.10	x	
		x	
0-1/4 miles	0.025	x	
		x	
		x	
1/4-1/2 miles	0.0054	x	
		x	
		x	
1/2-1 miles	0.0016	x	
		x	
		x	
1-2 miles	0.0005	x state threatened sp 50	0.025
		x state threatened sp 50	0.025
		x	
2-3 miles	0.00023	x state threatened sp 50	0.012
		x	
		x	
3 to 4 miles	0.00014	x	
		x	
		x	
> 4 miles	0	x	

Total Environments Score = 0.062

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AIR PATHWAY (concluded)

WASTE CHARACTERISTICS

9. If any Actual Contamination Targets exist for the air pathway, assign the calculated hazardous waste quantity score or a score of 100, whichever is greater; if there are no Actual Contamination Targets for the air pathway, assign the calculated HWQ score for sources available to air migration.	10
10. Assign the highest air toxicity/mobility value from SI Table 21.	20
11. Multiply the air pathway toxicity/mobility and waste quantity scores. Assign the Waste Characteristics score from the table below:	WC = 3

Product	WC Score
0	0
>0 to <10	1
10 to <100	2
100 to <1,000	3
1,000 to < 10,000	6
10,000 to <1E + 05	10
1E + 05 to <1E + 06	18
1E + 06 to <1E + 07	32
1E + 07 to <1E + 08	56
1E + 08 or greater	100

500 x 114,362 x 3

AIR PATHWAY SCORE: $\frac{LE \times T \times WC}{82,500}$ = 2.08 (maximum of 100)

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SITE SCORE CALCULATION	S	S^2
GROUND WATER PATHWAY SCORE (S_{GW})	6.13	37.58
SURFACE WATER PATHWAY SCORE (S_{SW})	0.003	9×10^{-6}
SOIL EXPOSURE (S_S)	0.67	0.45
AIR PATHWAY SCORE (S_a)	2.08	4.33
SITE SCORE $\sqrt{\frac{S_{GW}^2+S_{SW}^2+S_S^2+S_A^2}{4}}$ $\sqrt{10.6}$ = 3.25		3.25

RECOMMENDATION

No further action

COMMENTS

DRAFT

REFERENCE 1

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: December 3, 1985

TO: File

FROM: Shirley Dunn

SUBJECT: Telephone Conversation on August 13-14, 1985

Mr. Allen, of Allen Ready Mix was contacted on two separate occasions concerning the drums on the site and about the present ownership. He replied "That he no longer owned the property." In response to the dumping and storage of drums he replied "that there were no drums on the site." He further explained that the property is being utilized by a gravel plant and was presently owned to his knowledge by Permacon Block and Brick Company.

SD/ah/SWM H1

FROM	DATE

TO

PH-0001
SR 3/77

REFERENCE 2

"Rite in the Rain"®

ALL-WEATHER

LEVEL

Notebook No. 311

A0037

Allen Ready-Mix Concrete
9P84
Memphis, Shelby Co., TN
Terry Sawyer

Allen Ready Mix
1572 Chelsea Ave (Mats Construction)

1. Approximate size of the Site.
2. ownership
3. Site Features
4. Check State Files
5. Present description of the site
6. Schools, Day Cares, etc.
7. Nearest resident & distance
8. # of workers
9. estimate # of residences in 0-¼, and ¼-½ mi
10. Site sketch
11. Fenced ?
12. Is the area commercial residential ?

We the undersigned, understand the workplan for this site

* Steve Petridis
Scott Singleton
* Roger Franklin

1/13/97

1

1600 Arrived at site.

Site is active but not under the name of Klein Ready Mix but "Wilson Concrete Products" 1576 Chelsea Avenue.

Site is fenced.

Block storage areas along west end.

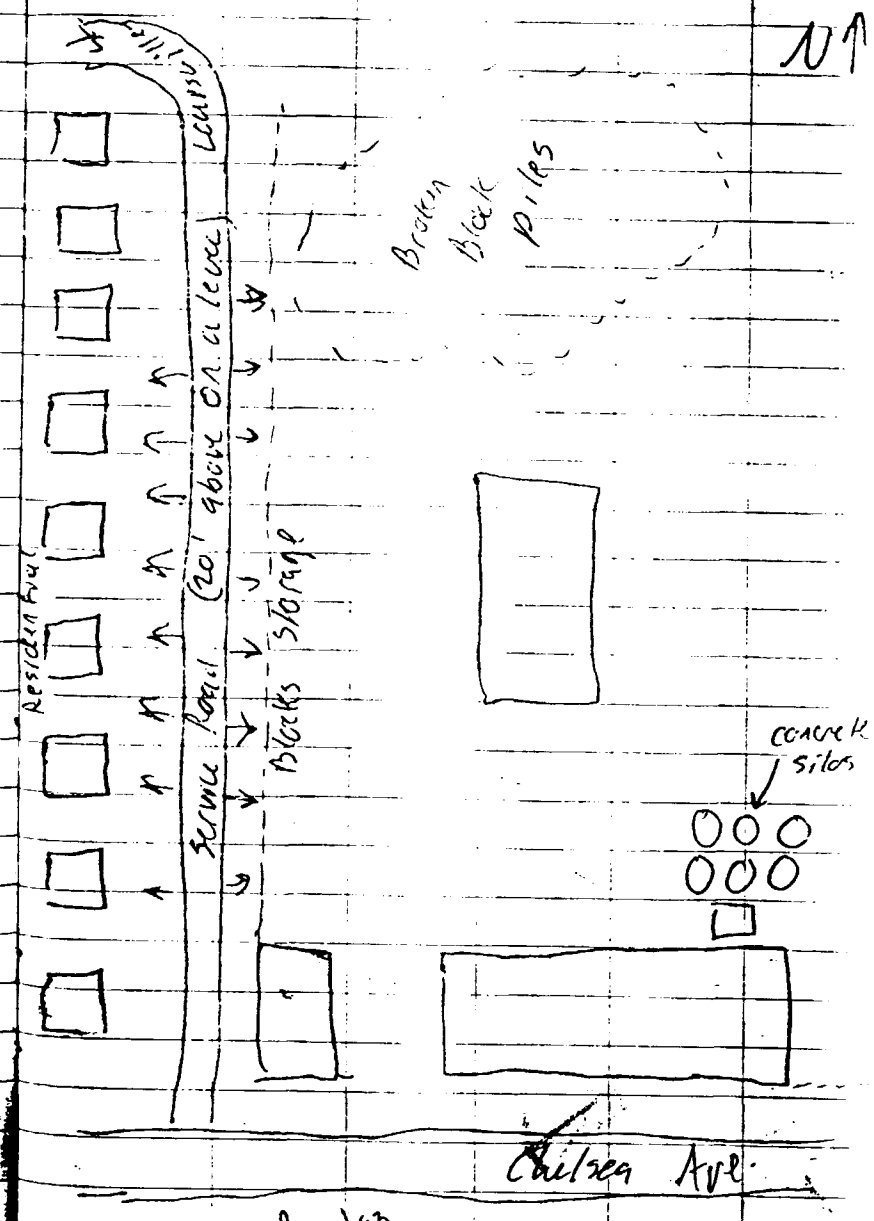
Front end loader working on site

Piles of broken Blocks 20-30' high at north end of site

Residential area west of service road (Louisville St.) which is situated atop a levee

Area is flat, some trees and brush at north end

SP 1/13/93



SP 1/13/93

Memphis Fire Co. North of site

1605 Joy Worship Church west of site 1/4 mile 63 houses within 1/4 mile of site all west

Nine houses within 200 feet of site, however, the levee which Louisville Street is located on directs surface water drainage toward Chelsea Ave.

Total property (site) is approx. 5-10 acres in size

Could not determine # of workers estimate less than 10 based on # cars seen in front of site.

Could not determine any source areas from off-site

SP 1/13/93

Photos #1
1600 SE corner of site looking NW
Photo #2 Front entrance area
1600
Photos 3-5 Panarama view of site looking NE-E-SE
1610

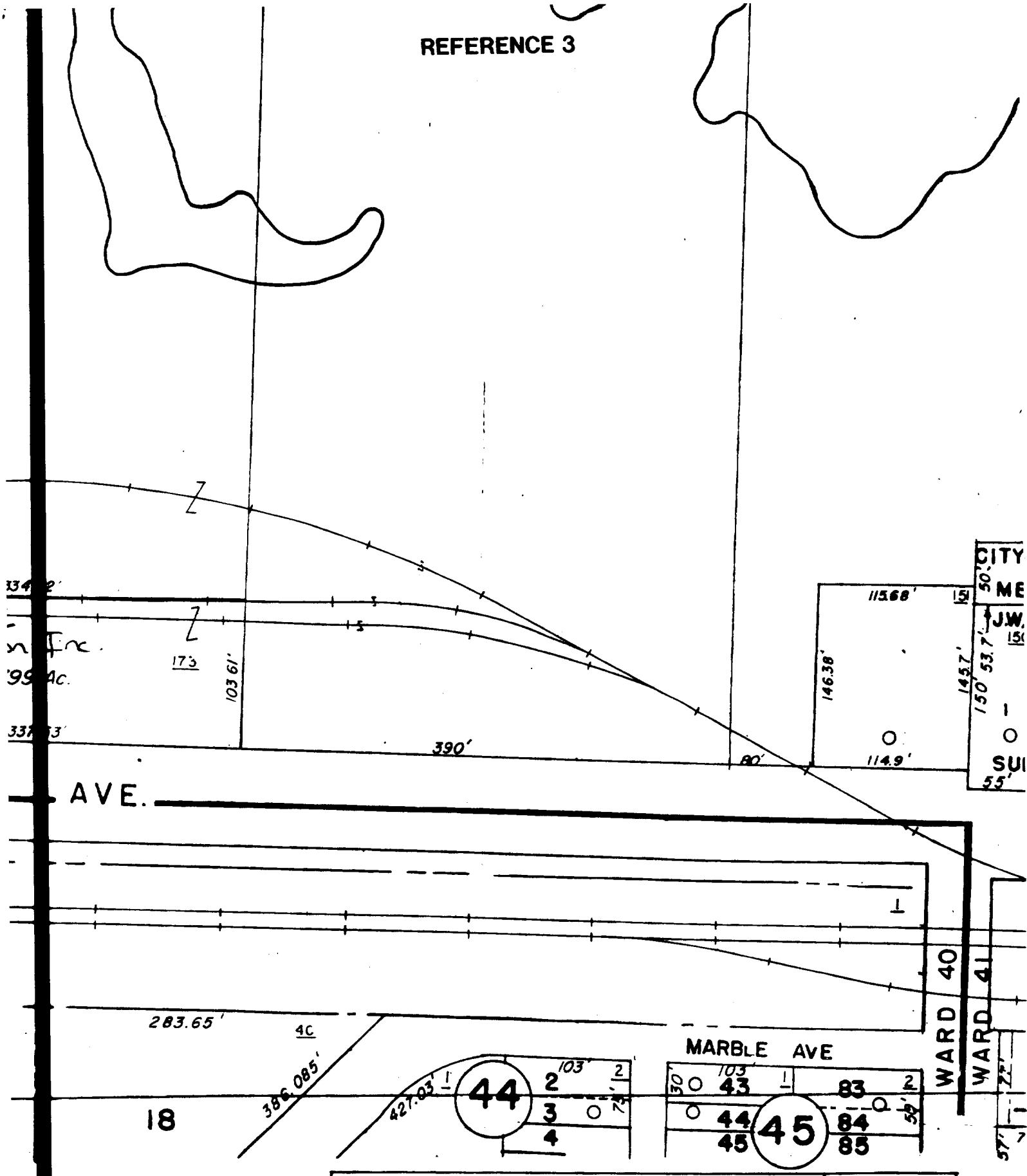
1615 After completing house count and photographing site, left area

1/13/93

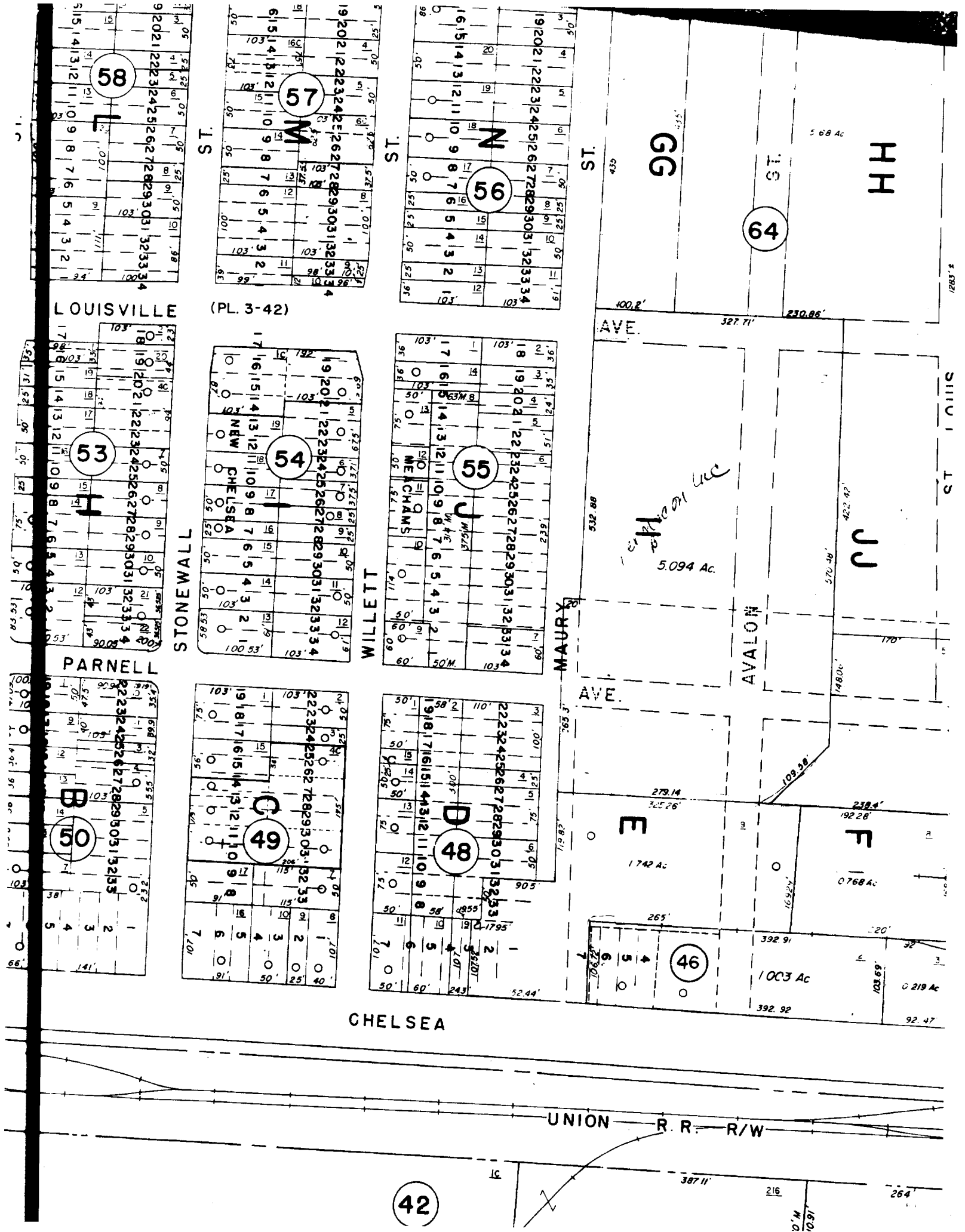
OVERSIZED

DOCUMENT

REFERENCE 3



SHELBY CO TENN.		SHEET NO.
SCALE: 1" = 100'	WARD: 40-41	BC-12
DATE COMPILED: 1962	DATE OF FLYING: NOV. 1962	
DATE REVISED: 3-6-90		


LOUISVILLE
(PL. 3-42)
PARNELL
STONEWALL
WILLETT
MAURY
AVALON
AVE.
ST.
CHELSEA
UNION R. R. R/W
58
57
56
64
53
54
55
50
49
48
46
42
GG
HH
JJ
E
F
5.094 Ac.
1.742 Ac
0.768 Ac
1.003 Ac
0.219 Ac

OVERSIZED

DOCUMENT

REFERENCE 5

Potential Hazardous Waste Site

PRELIMINARY ASSESSMENT

ALLEN READY MIX TND 980 838 825

Preliminary Assessment

Allen Ready Mix

TND 980838825

Allen Ready Mix is located in the Northwest portion of Memphis at 1572 Chelsea Avenue in Shelby County. EPA made an inspection in 1980, observed rusted unlabeled drums that contained an oily waste. At the time of the investigation the site was owned by Allen Ready Mix Concrete. The site has since been subdivided and the area of concern is now owned by Permacon Block and Brick Company.

The EPA site inspection in 1980 indicated that approximately 25 unlabeled rusted drums containing a black oily liquid and about 11 drums were observed on a concrete pad 8 drums were in a fenced enclosure and 5 drums were out in the open. None of the drums were covered. The present site owners were not knowledgeable of the drums nor of the contents.

The site is located within the floodplain of the Wolf River 100-200 feet from the lagoon. The area would be subject to flooding and contamination of surface water. Those uncovered drums on the open ground during a flood would be free to percolate into the groundwater.

Residential areas are located within 300 feet of the site, both west and south. Potentially affected waters include two rivers, the Wolf River and the Mississippi River. There are no wildlife refuges or sensitive environment in the vicinity.

Four years later a follow-up inspection was made March 8, 1984 by the state. Rusted drums were found with plastic liners and the contents were unknown. This inspection indicated that no immediate potential hazard was observed. It is recommended that no further action is necessary at this time.

SD/ah/SWM H1

REFERENCES

1. Mr. Bill Allen, Allen Ready Mix, personal conversation

2. Nashville Central Office, Division of Solid Waste Management, files on Allen Ready Mix site.

3. USGS Topographic Map, 7 1/2 NE/4 Memphis 15' Quadrangle

4. EPA, site investigation report dated June 17, 1980

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
TN	D 980728521

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Allen Ready Mix Concrete	1572 Chelsea Avenue				
03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Memphis	TN	38127	Shelby	157	08
09 COORDINATES LATITUDE	LONGITUDE				
35 10 29 . N	090 00 07 . W				

10 DIRECTIONS TO SITE (Starting from nearest public road)

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)		
Allen Ready Mix Concrete Co.	1572 Chelsea Avenue		
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Memphis	TN	38127	(615) 275-5511
07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)		
Mats/Sand and Gravel Plant	1572 Chelsea Avenue		
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
Memphis	TN	38127	(901) 275-5511

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 3 / 8 / 84 (MONTH DAY YEAR)

☐ NO

BY (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR

☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER _____ (Specify)

CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)

☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION

_____ / _____ (BEGINNING YEAR / ENDING YEAR) ☒ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Plastic uned rusted drums some of which contain black oily substance. These were left by previous owner as noted in EPA site inspection form dated 6/17/80 by Andrew Kromis.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

As per the last inspection. No potential hazard noted.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspection time available basis) ☒ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
Allen, Bill	Allen Consultant Inc.			( ) 901 275-5511
04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Shirley Dunn	TDH&E	DSWM	(615) 741-6287	8 / 26 / 85 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
TN	D 980728521

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

A SOLID
B POWDER, FINES
C SLUDGE
D OTHER (Specify)
E SLURRY
F LIQUID
G GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____
CUBIC YARDS _____
NO OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

A TOXIC
B CORROSIVE
C RADIOACTIVE
D PERSISTENT
E SOLUBLE
F INFECTIOUS
G FLAMMABLE
H IGNITABLE
I HIGHLY VOLATILE
J EXPLOSIVE
K REACTIVE
L INCOMPATIBLE
M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
TN	D 980728521

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE 3-8-84) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None

01 ☐ B. SURFACE WATER CONTAMINATION — 02 ☒ OBSERVED (DATE 3-8-84) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

N/A

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

N/A

01 ☒ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE 3-8-84) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

Rusted drums w/plastic liners, contents unknown

01 ☒ F. CONTAMINATION OF SOIL — 02 ☒ OBSERVED (DATE 3-8-84) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: _____ (Acres) 04 NARRATIVE DESCRIPTION

Rusted drums w/plastic liners, contents unknown

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

N/A

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

N/A

01 ☒ I. POPULATION EXPOSURE/INJURY — 02 ☒ OBSERVED (DATE 3-8-84) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 200 04 NARRATIVE DESCRIPTION

location of plant w/in flood plain.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
TN	D 980728521

HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

01 ☐ J. DAMAGE TO FLORA — 02 ☒ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ K. DAMAGE TO FAUNA — 02 ☒ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION *(Include name(s) of species)*

N/A

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☒ M. UNSTABLE CONTAINMENT OF WASTES *(Spills, runoff, standing liquids, leaking drums)* — 02 ☐ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 200 — 04 NARRATIVE DESCRIPTION

Rusted drums lieing on ground. Contents unknown

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☒ OBSERVED (DATE: 3-8-84) ☒ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☒ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☒ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

Rusted drums lieing on ground, owned by previous owner Allen.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

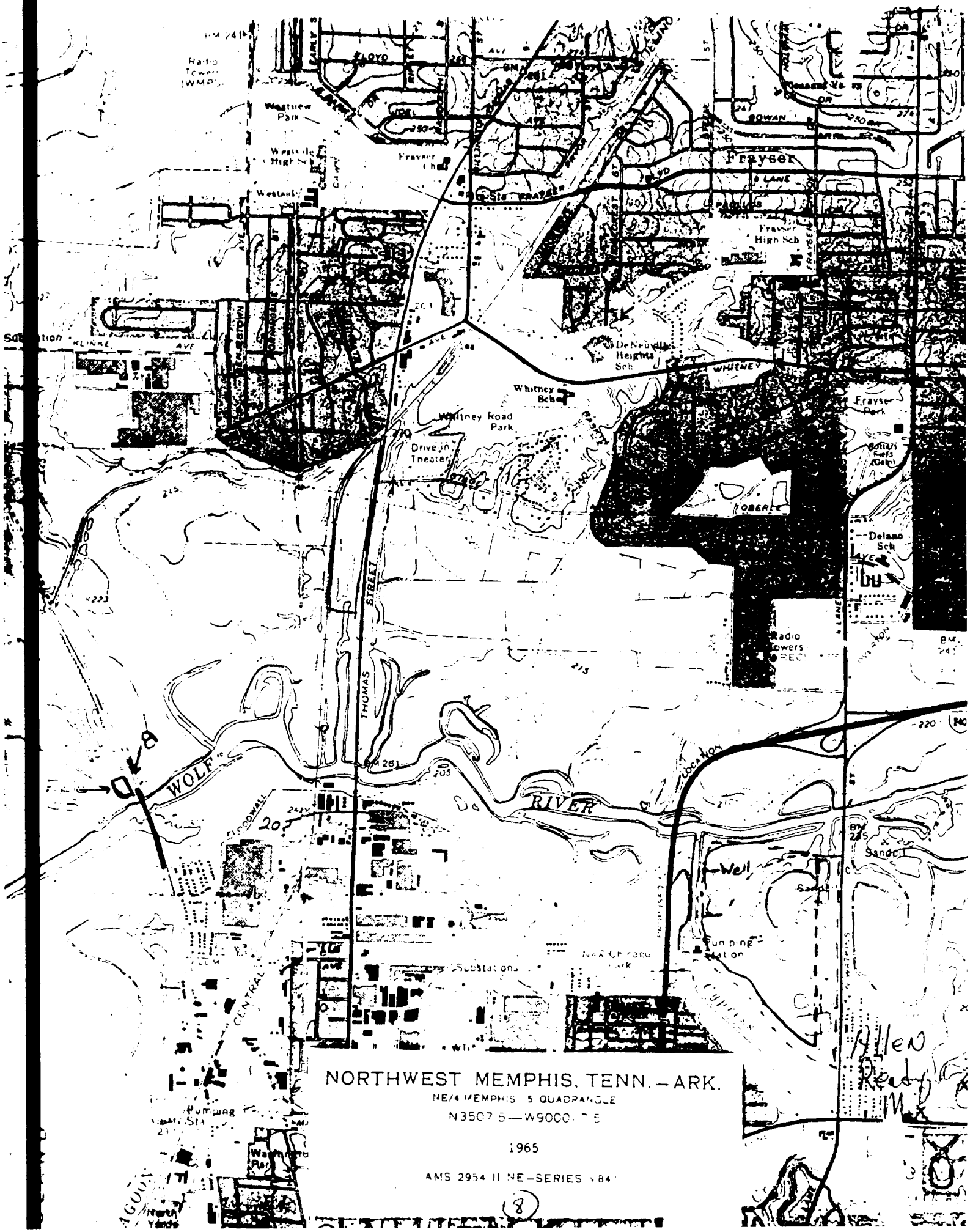
None

TOTAL POPULATION POTENTIALLY AFFECTED: 200

COMMENTS

SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

No Further Action needed.



NORTHWEST MEMPHIS, TENN.—ARK.

NE/4 MEMPHIS 15 QUADRANGLE

N3507.5—W9000.7.5

1965

AMS 2954 II NE—SERIES V84

(8)

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: December 3, 1985

TO: File

FROM: Shirley Dunn

SUBJECT: Telephone Conversation on August 13-14, 1985

Mr. Allen, of Allen Ready Mix was contacted on two separate occasions concerning the drums on the site and about the present ownership. He replied "That he no longer owned the property." In response to the dumping and storage of drums he replied "that there were no drums on the site." He further explained that the property is being utilized by a gravel plant and was presently owned to his knowledge by Permacon Block and Brick Company.

SD/ah/SWM H1

FROM	DATE

10

PH-0001
SR 3/77

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by HQ)
IV	TN 00000 1142

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (*Section II*). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System, Hazardous Waste Enforcement Task Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: EPIC #72

B. STREET (or other identifier): 1572 Chelsea Ave

C. CITY: MEMPHIS

D. STATE: TN

E. ZIP CODE:

F. COUNTY NAME: Shelby

G. SITE OPERATOR INFORMATION

1. NAME: Allen Ready-Mix Concrete Co — Bill Allen - PRESIDENT

2. TELEPHONE NUMBER: (901) 275-5511

3. STREET: 1572 Chelsea Ave

4. CITY: Memphis

5. STATE: TN

6. ZIP CODE:

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME:

2. TELEPHONE NUMBER:

3. CITY:

4. STATE:

5. ZIP CODE:

I. SITE DESCRIPTION: See Section VIII U

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.): 06-17-80

B. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME: ANDREW KROMIS

2. TELEPHONE NUMBER: (FTS) 257-3973

3. DATE (mo., day, & yr.): 06-17-80

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: RICHARD GREEN

2. TITLE: ENVIROMENTAL SCIENTIST

3. ORGANIZATION: EPA, Region IV, Water Enforcement Branch

4. TELEPHONE NO. (area code & no.): (FTS) 257 3973

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Richard Green	EPA, Region IV Water Enforcement Branch	(FTS) 257-3973
ANDREW Kromis	"	"

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: April 5, 1984

TO: The Files

FROM: Michael J. Higgs

SUBJECT: 3012 Program - Site Investigations
EPIC 72

EPIC 72

On March 8, 1984, the EPIC 72 site at 1572 Chelsea Avenue in Memphis was visited by Michael J. Higgs, Karen Bonner, and Ken Davis. Initial information concerning this site indicated that it was owned by Allen Ready-Mix Concrete Company. The site had since been subdivided and the area of concern is now owned by Permacon Block & Brick Company. We met with Chris Campbell, president of Permacon.

Most of the fill material on the site consists of sand and concrete but some rusted drums and several old mixers from cement trucks were also noted. Approximately 25 drums were found in and around a fenced in area north of the block storage yard. All of the drums were unlabelled and badly rusted, and some were rusted completely through. Several had plastic liners and were full of a dark, oily fluid.

Mr. Campbell was not aware of the presence of the drums but would try to ascertain the contents and remove them. It is felt that No Further Action is needed by the 3012 Program, but that the Memphis field office should be apprised of the situation in case a follow-up is needed.

FROM	DATE
TO	

MJH/jw 4/10

PH-000
SR 3/77

JUL 14 1981

20

Allen Ready-Mix Concrete Company

Environmental Engineer
Water Surveillance Branch

Jim Wilburn, Technical Manager
Memphis Study Project

Allen-Ready Mix

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Company, Memphis, Tennessee on March 17, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. Three soil samples and one waste sample were collected during this investigation. Two of the soil samples were collected near drums stored at the pallet area west of the concrete mixers. The other soil sample was collected downgradient from some drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners.

The soil samples collected during this investigations contained low concentrations of polynuclear aromatic hydrocarbon, fatty acids, and pesticide related compound. The waste sample contained relatively low concentrations of fatty acid, alcohols, and aldehydes but did not contain detectable concentrations of pesticide related compounds.

No hazardous or toxic waste materials which would constitute a significant threat to health or the environment were detected in the soil or waste samples collected during this HWSI. The trash and old tires dumped along the dirt road near the dredge pond northwest of Allen Ready-Mix are typical of indiscriminate open dumping throughout the Memphis area. This type of dumping is a nuisance to area residents and businesses and creates a breeding ground for rats, mosquitoes, and other pests.

R. J. Bruner III, P.E.

cc: ~~Finger~~/~~Adams~~/Carter/Lair

CONFIDENTIAL

This document is prepared in anticipation of enforcement litigation. It is not subject to discovery.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REFERENCE 6

DATE JUL 14 1981

SUBJECT Report - Hazardous Waste Site Investigation - Allen Ready-Mix Concrete Company
Memphis, Tennessee

FROM Director
Surveillance and Analysis Division

TO Howard Zeller, Acting Director
Enforcement Division

Attached is a copy of the subject report. Copies of this report should be sent to the following individuals:

Mr. Fred Richardson, Manager
Allen Ready-Mix Concrete Company
1572 Chelsea Avenue
Memphis, Tennessee

Mr. Larry Ledford
Tennessee Division of Solid
Waste Management
814 Jefferson Avenue
Memphis, Tennessee

Billy H. Adamsoffer
James H. Finger

Attachment

cc: Wilburn
Smith/Stonebraker/Mathis
Hopkins
Newton/Turnipseed
Adams
Carroll/Bennett
Carter/Lair
Bruner

REPORT
HAZARDOUS WASTE SITE INVESTIGATION
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, TENNESSEE
JULY 10, 1981

INTRODUCTION

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Co., Memphis, Tennessee on March 18, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. A preliminary inspection of the Allen Ready-Mix Concrete Co., was conducted by Messrs. Richard Green and Andy Cromis, EPA, Enforcement Division, on May 7, 1980 (1). As a result of the preliminary inspection, a HWSI was requested for this site by Mr. Jim Wilburn, Technical Manager, Memphis Study Project.

STUDY AREA

The Allen Ready-Mix Concrete Co., is located at 1572 Chelsea Avenue (see figure 1). There are two large dredge ponds to the north of the company near the Wolf River. The area north of the company's property between the two ponds had been used extensively for disposal of concrete. Some trash and several old concrete mixer drums (truck mount type) had been disposed of in this area. Some crushed 55 gallon drums were also observed; these appeared to be discarded fuel and/or lubricant drums.

The area along the dirt road near the pond northwest of Allen Ready-Mix was strewn with trash (see figure 2). The remains of several fiber drums (drum rings, liners, etc) containing red sandy-looking material were observed in this area. There was also a large pile of tires near the southeast corner of the pond.

Several unlabeled 55 gallon drums were stored in a fenced area northwest of the concrete mixers (see figure 2). Additional drums were stored outside the fence near the southeast corner of the fenced area. This area was described by Mr. Fred Richardson, Manager, Allen Ready-Mix Concrete Co., as a pallet building and repair area which is no longer used. Mr. Richardson said that he did not know what was in the drums. The only other 55 gallon drums observed on the site were stored on a concrete pad and appeared to contain fuels and/or lubricants.

RESULTS AND DISCUSSION

Three soil samples and one waste sample were collected during the investigation at the Allen Ready-Mix Concrete Co. Two of the soil samples were collected near the drums stored at the pallet area. The other soil sample was collected downgradient from the drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners (see table 1 and figure 2). A data summary is presented in table 2; complete analytical results are attached as appendix A.

The soil samples collected near the pallet area contained traces (less than quantifiable concentrations, see table 2) of several polynuclear aromatic hydrocarbons. A large number of organic acids (maximum concentration 14,000 ug/kg hexadecenoic acid), cyclodiene pesticide related materials (maximum concentration 31 ug/kg gamma chlordane), and a petroleum type product were also detected in these samples. Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (2) (3).

The soil sample collected near the dredge pond (ARM-003) contained traces (<4,000 ug/kg) of several polynuclear aromatic hydrocarbons, a trace (<5,000 ug/kg) of a methyl ester of methyl pentadecanoic acid, and several pesticides related materials (maximum concentration 50 ug/kg gamma chlordane, see table 2). Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis.

The sample of red sandy-looking material collected from the remains of the deteriorated fiber drums (ARM-004) contained several fatty acids (maximum concentration 67,000 ug/kg octadecanoic acid), alcohols (maximum concentration 38,000 ug/kg methylene bisphenol), and aldehydes (maximum concentration 4,500 ug/kg hydoxybenzaldehyde, see table 2). No pesticide related materials were detected in this sample. Metals concentrations were at or below the concentrations detected in the soil samples collected during this investigation.

REFERENCES

1) "Hazardous Waste Site Investigations - Memphis, Tennessee - First Phase;" U. S. Environmental Protection Agency, Region IV, Enforcement Division; June, 1980.

2) "Hazardous Waste Site Investigation - Memphis Drum Service - Memphis, Tennessee;" U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; March 10, 1981.

3) "Hazardous Waste Site Investigation - Frayser Pond Site - Memphis, Tennessee;" U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; September 17, 1980.

4) Water Surveillance Branch Standard Operating Procedures and Quality Assurance Manual (Draft); U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; August 29, 1980.

TABLE 1
SAMPLING LOCATIONS
ALLEN READY-MIX
MEMPHIS, TENNESSEE

Sample Number	Location
ARM-003	Soil downgradient from drum rings and liners near dredge pond.
ARM-004	Residual material from fiber or plastic drum near dredge pond.
ARM-005	Soil downgradient of drums stored along the west fence in the pallet area.
ARM-006	Soil downgradient of drums stored near the southeast corner of the pallet area.

TABLE 2
DATA SUMMARY
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, TENNESSEE

	SOIL			WASTE
	ARM-005 West side pallet area	ARM-006 SE corner pallet area	ARM-003 North of drums near dredge pond	ARM-004 Residual from drums near dredge pond
EXTRACTABLE ORGANIC COMPOUNDS (GC/MS)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Naphthalene [1]	ND	<4,000	ND	ND
Acenaphthylene [1]	ND	<4,000	ND	ND
Flourene [1]	ND	<4,000	ND	ND
Phenanthrene and/or anthracene [1]	<4,600	<4,000	<4,000	<3,200
Fluoranthene [1]	<4,600	<4,000	<4,000	ND
Pyrene [1]	<4,600	<4,000	<4,000	ND
Chrysene and/or benzo (A) anthracene [1]	<4,600	<4,000	<4,000	ND
Benzo (B) fluoranthene and/or benzo (K) fluoranthene [1]	ND	<4,000	ND	ND
Phenol [1]	ND	ND	ND	<1,000
2,4-Dimethylphenol [1]	ND	ND	ND	<1,000
Butanoic acid [2]	<1,000	-	-	-
Hexanoic acid [2]	<1,000	<1,000	-	-
Octanoic acid [2]	<1,000	<1,000	-	-
Nonanoic acid [2]	<1,000	<1,000	-	-
Decanoic acid [2]	<1,000	<1,000	-	1,800
Undecanoic acid [2]	<1,000	<1,000	-	-
Dodecanoic acid [2]	<1,000	1,700	-	1,600
Tridecanoic acid [2]	<1,000	<1,000	-	5,400
Tetradecanoic acid [2]	1,600	<1,000	-	<1,000
Pentadecaonic acid [2]	1,600	<1,000	-	26,000
Hexadecanoic acid [2]	9,500	<1,000	-	-
Octadecanoic acid [2]	<1,000	-	-	67,000
Hexadecenoic acid [2]	14,000	-	-	-
Heptadecenoic acid [2]	-	-	-	<1,000
Octadecenoic acid [2]	10,000	-	-	-
Phthalic acid [2]	-	<1,000	-	<1,000
Benzene propanoic [2]	-	<1,000	-	-
Methyl ester of dodecanoic acid [2]	-	<1,000	-	-
Methyl ester of tetradecanoic acid [2]	<1,000	-	-	-
Methyl ester of hexadecenoic acid [2]	2,600	-	-	-
Methyl ester of octadecenoic acid [2]	-	<1,000	-	-
Methyl ester of octadecadienoic acid [2]	<1,000	-	-	-
Methyl ester of hydroxybenzoic acid [2]	-	<1,000	-	<1,000
Methyl ester of hydroxyphenyl propenoic acid [2]	-	<1,000	-	-
Methyl ester of methyl pentadecanoic acid [2]	1,300	<1,000	<5,000	-
Hydroxymethoxy benzaldehyde [2]	<1,000	-	-	-
Hydroxybenzaldhyde [2]	-	-	-	4,500
Methoxy benzenemethanol [2]	-	-	-	1,500
Hydroxybenzene methanol [2]	-	-	-	2,500
Methylene bisphenol [2]	-	-	-	38,000
Bis (hydroxyphenyl) methanone [2]	-	-	-	<1,000
Benzodioxolecarboxaldehyde [2]	-	-	-	<1,000
Petroleum type product	-	P	-	-
CHLORINATED ORGANIC COMPOUNDS (GC/EC)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Dieldrin [1]	ND	ND	45	
p,p'-DDT [1]	ND	ND	27	ND
p,p'-DDE [1]	ND	ND	15	ND
p,p'-DDD [1]	ND	ND	20	ND
Endrin [1]	ND	ND	19	ND
Heptachlor [1]	ND	2.5	3.9	ND
Heptachloronorbornene	ND	2.1	7.4	ND
Gamma chlordane	31	9.8	50	ND
Alpha chlordane	26	7.2	ND	ND
Hexachlorobenzene [1]	ND	ND	6.1	ND
INORGANIC ELEMENTS AND COMPOUNDS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Arsenic [1]	-	27	61	<5
Barium	132	410	287	4
Cobalt	13	<8	<16	<2
Chromium [1]	28	23	42	4
Copper [1]	16	38	56	78
Nickel [1]	18	18	32	<4
Lead [1]	48	95	68	<4
Strontium	40	69	27	<1
Titanium	592	455	462	18
Vanadium	46	44	75	2
Yttrium	12	10	18	<1
Zinc [1]	120	214	187	16
Mercury [1]	<0.05	0.13	0.14	<0.1
Aluminum	21,700	17,500	38,000	4,200
Manganese	475	510	800	25
Calcium	12,500	26,500	2,600	120
Magnesium	3,780	8,200	4,060	50
Iron	23,500	22,600	51,600	690
Cyanide [1]	<0.2	0.35	0.41	<0.2

P - Indicates presence.
NA - Not analyzed.
ND - None detected at or above the minimum detection limit (MDL). The MDL's vary from sample to sample and from parameter to parameter, see analytical data sheets (Appendix A) for exact values.
All concentrations are calculated on a dry weight basis.
1 - Compound/element is on the NRDC list of priority pollutants.
2 - Tentative identification, estimated concentration.

MAP
NORTH CENTRAL MEMPHIS, TN

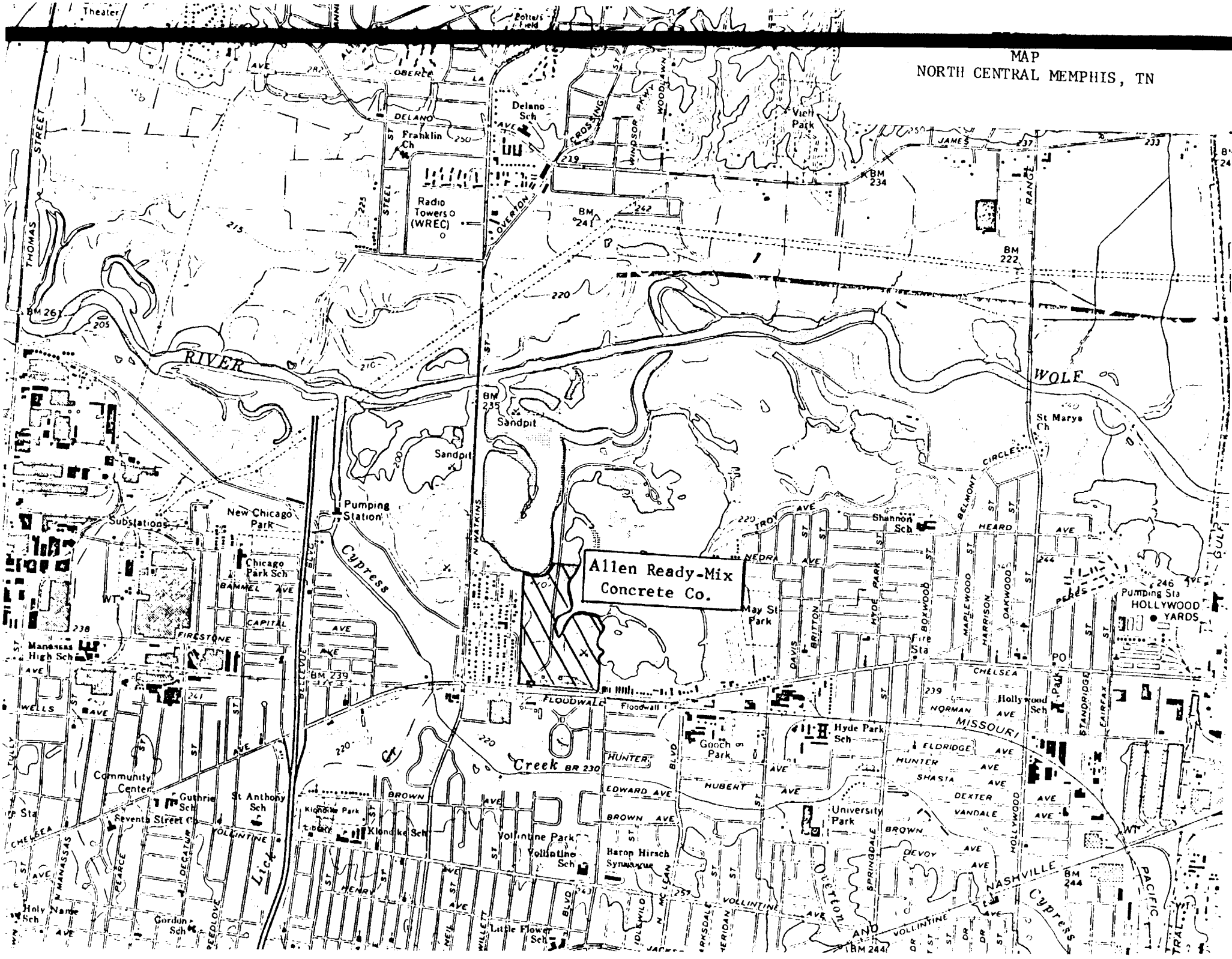
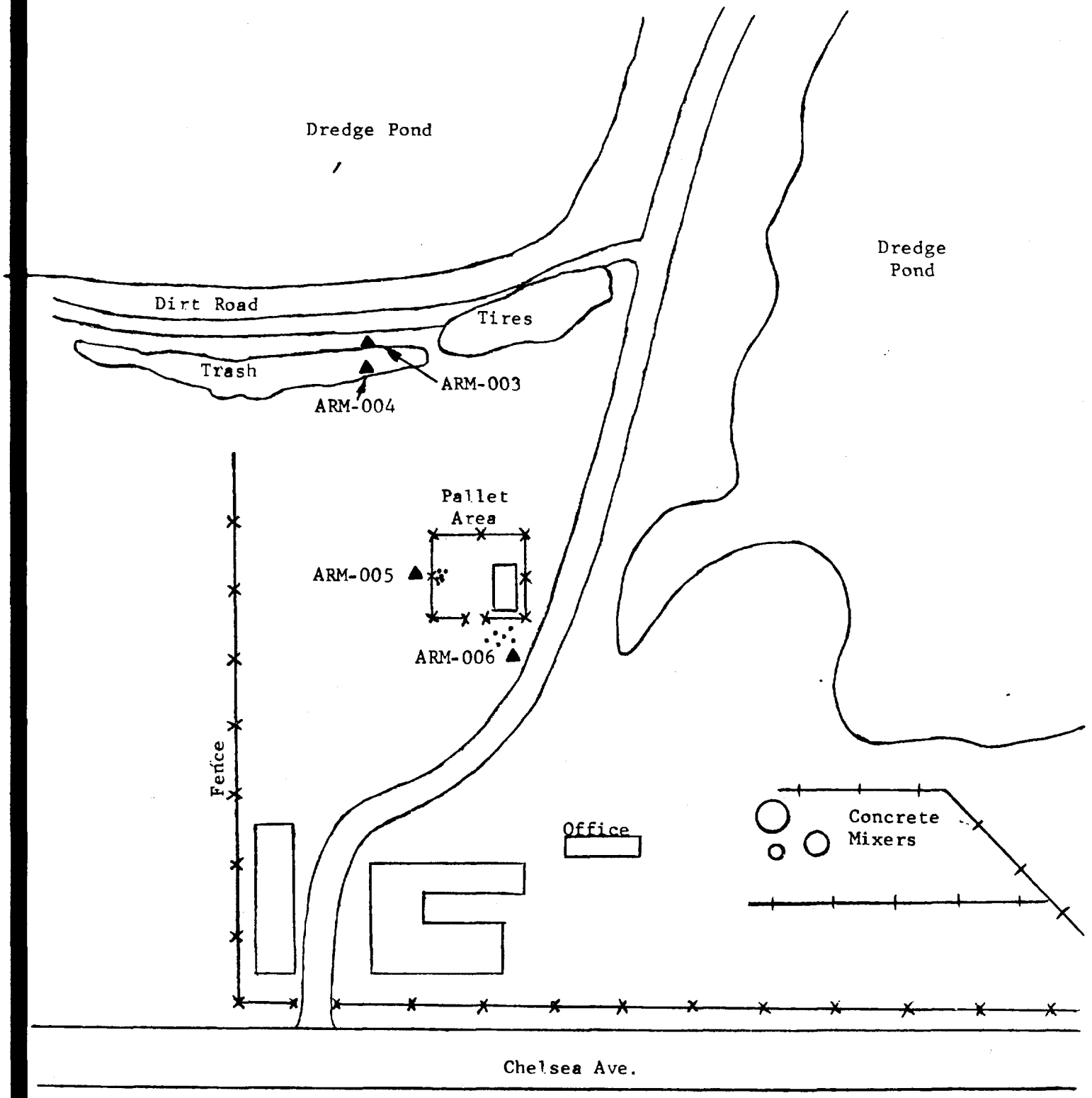


FIGURE 2
SCHEMATIC DIAGRAM
ALLEN READY-MIX CONCRETE CO.
MEMPHIS, TN



APPENDIX A

Analytical Data Sheets and Field Sheets

DATE: 03/23/81

PURGEABLE ORGANICS ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	5U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	5U	UG/KG	*			UG/KG
DICHLORODIFLOUROMETHANE	34334	5U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	5U	UG/KG	*			UG/KG
CHLOROETHANE	34314	5U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	5U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	5U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	5U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	5U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	5U	UG/KG	*			UG/KG
CHLOROFORM	34318	5U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	5U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	5U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	5U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	5U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	5U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	5U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	5U	UG/KG	*			UG/KG
BENZENE	34237	5U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	5U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	5U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	5U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	5U	UG/KG	*			UG/KG
BROMOFORM	34290	5U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	5U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	5U	UG/KG	*			UG/KG
TOLUENE	34483	5U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	5U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	5U	UG/KG	*			UG/KG
ACROLEIN	34213	100U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	100U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 5 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81 [redacted] ATHENS, GA

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	.005U	MG/KG	*			MG/KG
METHYL BROMIDE	.005U	MG/KG	*			MG/KG
DICHLORODIFLUOROMETHANE	.005U	MG/KG	*			MG/KG
VINYL CHLORIDE	.005U	MG/KG	*			MG/KG
CHLOROETHANE	.005U	MG/KG	*			MG/KG
METHYLENE CHLORIDE	.005U	MG/KG	*			MG/KG
TRICHLOROFLUOROMETHANE	.005U	MG/KG	*			MG/KG
1,1-DICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
1,1-DICHLOROETHANE	.005U	MG/KG	*			MG/KG
1,2-TRANS-DICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
CHLOROFORM	.005U	MG/KG	*			MG/KG
1,2-DICHLOROETHANE	.005U	MG/KG	*			MG/KG
1,1,1-TRICHLOROETHANE	.005U	MG/KG	*			MG/KG
CARBON TETRACHLORIDE	.005U	MG/KG	*			MG/KG
DICHLOROBROMOMETHANE	.005U	MG/KG	*			MG/KG
1,2-DICHLOROPROPANE	.005U	MG/KG	*			MG/KG
TRANS-1,3-DICHLOROPROPENE	.005U	MG/KG	*			MG/KG
TRICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
BENZENE	.005U	MG/KG	*			MG/KG
CHLORODIBROMOMETHANE	.005U	MG/KG	*			MG/KG
1,1,2-TRICHLOROETHANE	.005U	MG/KG	*			MG/KG
CIS-1,3-DICHLOROPROPENE	.005U	MG/KG	*			MG/KG
2-CHLOROETHYL VINYL ETHER	.005U	MG/KG	*			MG/KG
BROMOFORM	.005U	MG/KG	*			MG/KG
1,1,2,2-TETRACHLOROETHANE	.005U	MG/KG	*			MG/KG
TETRACHLOROETHYLENE	.005U	MG/KG	*			MG/KG
TOLUENE	.005U	MG/KG	*			MG/KG
CHLOROBENZENE	.005U	MG/KG	*			MG/KG
ETHYLBENZENE	.005U	MG/KG	*			MG/KG
ACROLEIN	.100U	MG/KG	*			MG/KG
ACRYLONITRILE	.100U	MG/KG	*			MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF .005 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81

PURGEABLE ORGANICS ANALYSIS

ATHENS, GA

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RINGS&LINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 4-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	7U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	7U	UG/KG	*			UG/KG
DICHLORODIFLOUROMETHANE	34334	7U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	7U	UG/KG	*			UG/KG
CHLOROETHANE	34314	7U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	7U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	7U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	7U	UG/KG	*			UG/KG
CHLOROFORM	34318	7U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	7U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	7U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	7U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	7U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	7U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	7U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	7U	UG/KG	*			UG/KG
BENZENE	34237	7U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	7U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	7U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	7U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	7U	UG/KG	*			UG/KG
BROMOFORM	34290	7U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	7U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	7U	UG/KG	*			UG/KG
TOLUENE	34483	7U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	7U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	7U	UG/KG	*			UG/KG
ACROLEIN	34213	140U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	140U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 7 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81

[redacted]

ATHENS, GA

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	7U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	7U	UG/KG	*			UG/KG
DICHLORODIFLUOROMETHANE	34334	7U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	7U	UG/KG	*			UG/KG
CHLOROETHANE	34314	7U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	7U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	7U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	7U	UG/KG	*			UG/KG
CHLOROFORM	34318	7U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	7U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	7U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	7U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	7U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	7U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	7U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	7U	UG/KG	*			UG/KG
BENZENE	34237	7U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	7U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	7U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	7U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	7U	UG/KG	*			UG/KG
BROMOFORM	34290	7U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	7U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	7U	UG/KG	*			UG/KG
TOLUENE	34483	7U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	7U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	7U	UG/KG	*			UG/KG
ACROLEIN	34213	140U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	140U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 7U ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS EPA-SAD,REGN IV

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033 CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4000U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4000K	UG/KG
1,2-DICHLOROBENZENE	34539	4000U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4000K	UG/KG
1,3-DICHLOROBENZENE	34569	4000U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4000U	UG/KG
1,4-DICHLOROBENZENE	34574	4000U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4000U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4000U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4000U	UG/KG
HEXACHLOROETHANE	34399	4000U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4000U	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4000U	UG/KG	*	BENZO-A-PYRENE	34250	4000U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4000U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4000U	UG/KG
NITROBENZENE	34450	4000U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4000U	UG/KG
HEXACHLOROBUTADIENE	39705	4000U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4000U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4000U	UG/KG	*	2-CHLOROPHENOL	34589	5000U	UG/KG
NAPHTHALENE	34445	4000U	UG/KG	*	2-NITROPHENOL	34594	5000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4000U	UG/KG	*	PHENOL (GC/MS)	34695	5000U	UG/KG
ISOPHORONE	34411	4000U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	5000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	5000U	UG/KG
2-CHLORONAPHTHALENE	34584	4000U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	5000U	UG/KG
ACENAPHTHYLENE	34203	4000U	UG/KG	*	PARACHLOROMETA CRESOL	34455	5000U	UG/KG
ACENAPHTHENE	34209	4000U	UG/KG	*	2,4-DINITROPHENOL	34619	25000U	UG/KG
DIMETHYL PHTHALATE	34344	4000U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	15000U	UG/KG
2,4-DINITROTOLUENE	34614	4000U	UG/KG	*	PENTACHLOROPHENOL	39061	15000U	UG/KG
2,6-DINITROTOLUENE	34629	4000U	UG/KG	*	4-NITROPHENOL	34649	5000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4000U	UG/KG	*	methyl ester of methyl pentadecanoic acid		5000KN	UG/KG
FLUORENE	34384	4000U	UG/KG	*				UG/KG
DIETHYL PHTHALATE	34339	4000U	UG/KG	*				UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4000U	UG/KG	*				UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4000U	UG/KG	*				UG/KG
HEXACHLOROBENZENE	39701	6.1	UG/KG	*				UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4000U	UG/KG	*				UG/KG
PHENANTHRENE 10/	34464	4000K	UG/KG	*				UG/KG
ANTHRACENE 10/	34223	4000K	UG/KG	*				UG/KG
DI-N-BUTYL PHTHALATE	39112	4000U	UG/KG	*				UG/KG
FLUORANTHENE	34379	4000K	UG/KG	*				UG/KG
PYRENE	34472	4000K	UG/KG	*				UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4000U	UG/KG	*				UG/KG
BENZIDINE	39121	4000U	UG/KG	*				UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 25,000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS	
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*
1,2-DICHLOROBENZENE	34539	4000U	UG/KG	*
1,3-DICHLOROBENZENE	34569	4000U	UG/KG	*
1,4-DICHLOROBENZENE	34574	4000U	UG/KG	*
BIS(2-CHLOROETHYL) ETHER	34276	4000U	UG/KG	*
HEXACHLOROETHANE	34399	4000U	UG/KG	*
BIS(2-CHLOROISOPROPYL) ETHER	34286	4000U	UG/KG	*
N-NITROSODI-N-PROPYLAMINE	34431	4000U	UG/KG	*
NITROBENZENE	34450	4000U	UG/KG	*
HEXACHLOROBUTADIENE	39705	4000U	UG/KG	*
1,2,4-TRICHLOROBENZENE	34554	4000U	UG/KG	*
NAPHTHALENE	34445	4000K	UG/KG	*
BIS(2-CHLOROETHOXY) METHANE	34281	4000U	UG/KG	*
ISOPHORONE	34411	4000U	UG/KG	*
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*
2-CHLORONAPHTHALENE	34584	4000U	UG/KG	*
ACENAPHTHYLENE	34203	4000K	UG/KG	*
ACENAPHTHENE	34209	4000U	UG/KG	*
DIMETHYL PHTHALATE	34344	4000U	UG/KG	*
2,4-DINITROTOLUENE	34614	4000U	UG/KG	*
2,6-DINITROTOLUENE	34629	4000U	UG/KG	*
4-CHLOROPHENYL PHENYL ETHER	34644	4000U	UG/KG	*
FLUORENE	34384	4000K	UG/KG	*
DIETHYL PHTHALATE	34339	4000U	UG/KG	*
1,2-DIPHENYLHYDRAZINE 8/	34349	4000U	UG/KG	*
N-NITROSODIPHENYLAMINE 9/	34436	4000U	UG/KG	*
HEXACHLOROBENZENE	39701	4U	UG/KG	*
4-BROMOPHENYL PHENYL ETHER	34639	4000U	UG/KG	*
PHENANTHRENE 10/	34464	4000K	UG/KG	*
ANTHRACENE 10/	34223	4000K	UG/KG	*
DI-N-BUTYL PHTHALATE	39112	4000U	UG/KG	*
FLUORANTHENE	34379	4000K	UG/KG	*
PYRENE	34472	4000K	UG/KG	*
N-BUTYL BENZYL PHTHALATE	34295	4000U	UG/KG	*
BENZIDINE	39121	4000U	UG/KG	*

COMPOUND	STORET#		UNITS
BIS(2-ETHYLHEXYL) PHTHALATE	39102	4000U	UG/KG
CHRYSENE 11/	34323	4000K	UG/KG
BENZO(A)ANTHRACENE 11/	34529	4000K	UG/KG
3,3'-DICHLOROBENZIDINE	34634	4000U	UG/KG
DI-N-OCTYL PHTHALATE	34599	4000U	UG/KG
BENZO(B)FLUORANTHENE 12/	34233	4000K	UG/KG
BENZO(K)FLUORANTHENE 12/	34245	4000K	UG/KG
BENZO-A-PYRENE	34250	4000U	UG/KG
INDENO (1,2,3-CD) PYRENE	34406	4000U	UG/KG
1,2,5,6-DIBENZANTHRACENE	34559	4000U	UG/KG
BENZO(GHI)PERYLENE	34524	4000U	UG/KG
2-CHLOROPHENOL	34589	1000U	UG/KG
2-NITROPHENOL	34594	1000U	UG/KG
PHENOL (GC/MS)	34695	1000U	UG/KG
2,4-DIMETHYLPHENOL	34609	1000U	UG/KG
2,4-DICHLOROPHENOL	34604	1000U	UG/KG
2,4,6-TRICHLOROPHENOL	34624	1000U	UG/KG
PARACHLOROMETA CRESOL	34455	1000U	UG/KG
2,4-DINITROPHENOL	34619	1800U	UG/KG
4,6-DINITRO-O-CRESOL	34660	1000U	UG/KG
PENTACHLOROPHENOL	39061	1000U	UG/KG
4-NITROPHENOL	34649	1000U	UG/KG
hexanoic acid (2 isomers)		1000KN	UG/KG
octanoic acid		1000KN	UG/KG
nonanoic acid		1000KN	UG/KG
decanoic acid		1000KN	UG/KG
phthalic acid		1000KN	UG/KG
benzene propanoic acid		1000KN	UG/KG
methyl ester of hydroxybenzoic acid		1000KN	UG/KG
undecanoic acid (2 isomers)		1000KN	UG/KG
tridecanoic acid		1000KN	UG/KG
tetradecanoic acid		1000KN	UG/KG
pentadecanoic acid		1000KN	UG/KG
hexadecanoic acid		1000KN	UG/KG
methyl ester of hydroxyphenyl propenoic acid		1000KN	UG/KG
dodecanoic acid (2 isomers)		1700JN	UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
methyl ester of methyl pentadecanoic acid	1000KN	UG/KG
methyl ester of octadecenoic acid	1000KN	UG/KG
methyl ester of dodecanoic acid	1000KN	UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
THE CHROMATOGRAM INDICATES THE PRESENCE		UG/KG
OF A PETROLEUM TYPE PRODUCT.		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS ATHENS,GA

DATA REPORTING SHEET

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4600U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4600K	UG/KG
1,2-DICHLOROBENZENE	34539	4600U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4600K	UG/KG
1,3-DICHLOROBENZENE	34569	4600U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4600U	UG/KG
1,4-DICHLOROBENZENE	34574	4600U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4600U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4600U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4600U	UG/KG
HEXACHLOROETHANE	34399	4600U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4600U	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4600U	UG/KG	*	BENZO-A-PYRENE	34250	4600U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4600U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4600U	UG/KG
NITROBENZENE	34450	4600U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4600U	UG/KG
HEXACHLOROBUTADIENE	39705	4600U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4600U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4600U	UG/KG	*	2-CHLOROPHENOL	34589	1000U	UG/KG
NAPHTHALENE	34445	4600U	UG/KG	*	2-NITROPHENOL	34594	1000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4600U	UG/KG	*	PHENOL (GC/MS)	34695	1000U	UG/KG
ISOPHORONE	34411	4600U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	1000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	1000U	UG/KG
2-CHLORONAPHTHALENE	34584	4600U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	1000U	UG/KG
ACENAPHTHYLENE	34203	4600U	UG/KG	*	PARACHLOROMETA CRESOL	34455	1000U	UG/KG
ACENAPHTHENE	34209	4600U	UG/KG	*	2,4-DINITROPHENOL	34619	2200U	UG/KG
DIMETHYL PHTHALATE	34344	4600U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	1300U	UG/KG
2,4-DINITROTOLUENE	34614	4600U	UG/KG	*	PENTACHLOROPHENOL	39061	1300U	UG/KG
2,6-DINITROTOLUENE	34629	4600U	UG/KG	*	4-NITROPHENOL	34649	1000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4600U	UG/KG	*	butanoic acid		1000K	UG/KG
FLUORENE	34384	4600U	UG/KG	*	hexanoic acid		1000K	UG/KG
DIETHYL PHTHALATE	34339	4600U	UG/KG	*	octanoic acid		1000K	UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4600U	UG/KG	*	nonanoic acid		1000K	UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4600U	UG/KG	*	decanoic acid		1000K	UG/KG
HEXACHLOROBENZENE	39701	6U	UG/KG	*	hydroxymethoxy benzaldehyde		1000K	UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4600U	UG/KG	*	undecanoic acid		1000K	UG/KG
PHENANTHRENE 10/	34464	4600K	UG/KG	*	dodecanoic acid		1000K	UG/KG
ANTHRACENE 10/	34223	4600K	UG/KG	*	tridecanoic acid		1000K	UG/KG
DI-N-BUTYL PHTHALATE	39112	4600U	UG/KG	*	tetradecanoic acid		1600JN	UG/KG
FLUORANTHENE	34379	4600K	UG/KG	*	methyl ester of tetradecanoic acid		1000KN	UG/KG
PYRENE	34472	4600K	UG/KG	*	pentadecanoic acid		1600JN	UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4600U	UG/KG	*	methyl ester of hexadecenoic acid(2 isomers)		2600JN	UG/KG
BENZIDINE	39121	4600U	UG/KG	*	methyl ester of methyl pentadecanoic acid		1300JN	UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4600 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

ESTIMABLE ORGANIC ANALYSIS

DATA REPORTING SHEET

SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
hexadecenoic acid	14000JN	UG/KG
hexadecanoic acid	9500JN	UG/KG
methyl ester of octadecadienoic	1000KN	UG/KG
octadecenoic acid	10000JN	UG/KG
octadecanoic acid	1000KN	UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
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		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4600 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS ATHENS,GA

DATA REPORTING SHEET

WASTE

DRY WEIGHT BASIS

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
BIS(CHLOROMETHYL) ETHER	NA	MG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	3.2U	MG/KG
N-NITROSODIMETHYLAMINE	NA	MG/KG	*	CHRYSENE 11/	3.2U	MG/KG
1,2-DICHLOROBENZENE	3.2U	MG/KG	*	BENZO(A)ANTHRACENE 11/	3.2U	MG/KG
1,3-DICHLOROBENZENE	3.2U	MG/KG	*	3,3'-DICHLOROBENZIDINE	3.2U	MG/KG
1,4-DICHLOROBENZENE	3.2U	MG/KG	*	DI-N-OCTYL PHTHALATE	3.2U	MG/KG
BIS(2-CHLOROETHYL) ETHER	3.2U	MG/KG	*	BENZO(B)FLUORANTHENE 12/	3.2U	MG/KG
HEXACHLOROETHANE	3.2U	MG/KG	*	BENZO(K)FLUORANTHENE 12/	3.2U	MG/KG
BIS(2-CHLOROISOPROPYL) ETHER	3.2U	MG/KG	*	BENZO-A-PYRENE	3.2U	MG/KG
N-NITROSODI-N-PROPYLAMINE	3.2U	MG/KG	*	INDENO (1,2,3-CD) PYRENE	3.2U	MG/KG
NITROBENZENE	3.2U	MG/KG	*	1,2,5,6-DIBENZANTHRACENE	3.2U	MG/KG
HEXACHLOROBUTADIENE	3.2U	MG/KG	*	BENZO(GHI)PERYLENE	3.2U	MG/KG
1,2,4-TRICHLOROBENZENE	3.2U	MG/KG	*	2-CHLOROPHENOL	1U	MG/KG
NAPHTHALENE	3.2U	MG/KG	*	2-NITROPHENOL	1U	MG/KG
BIS(2-CHLOROETHOXY) METHANE	3.2U	MG/KG	*	PHENOL (GC/MS)	1K	MG/KG
ISOPHORONE	3.2U	MG/KG	*	2,4-DIMETHYLPHENOL	1K	MG/KG
HEXACHLOROCYCLOPENTADIENE	2U	MG/KG	*	2,4-DICHLOROPHENOL	1U	MG/KG
2-CHLORONAPHTHALENE	3.2U	MG/KG	*	2,4,6-TRICHLOROPHENOL	1U	MG/KG
ACENAPHTHYLENE	3.2U	MG/KG	*	PARACHLOROMETA CRESOL	1U	MG/KG
ACENAPHTHENE	3.2U	MG/KG	*	2,4-DINITROPHENOL	2U	MG/KG
DIMETHYL PHTHALATE	3.2U	MG/KG	*	4,6-DINITRO-O-CRESOL	1U	MG/KG
2,4-DINITROTOLUENE	3.2U	MG/KG	*	PENTACHLOROPHENOL	1U	MG/KG
2,6-DINITROTOLUENE	3.2U	MG/KG	*	4-NITROPHENOL	1U	MG/KG
4-CHLOROPHENYL PHENYL ETHER	3.2U	MG/KG	*	hydroxybenzaldehyde	4.5JN	MG/KG
FLUORENE	3.2U	MG/KG	*	methyl ester of hydroxybenzoic acid	1.0JN	MG/KG
DIETHYL PHTHALATE	3.2U	MG/KG	*	methoxy benzenemethanol	1.5JN	MG/KG
1,2-DIPHENYLHYDRAZINE 8/	3.2U	MG/KG	*	hydroxybenzene methanol	2.5JN	MG/KG
N-NITROSODIPHENYLAMINE 9/	3.2U	MG/KG	*	phthalic acid	1.0KN	MG/KG
HEXACHLOROBENZENE	4U	MG/KG	*	benzodioxolecarboxaldehyde	1.0KN	MG/KG
4-BROMOPHENYL PHENYL ETHER	3.2U	MG/KG	*	decanoic acid	1.8JN	MG/KG
PHENANTHRENE 10/	3.2K	MG/KG	*	dodecanoic acid (2 isomers)	1.6JN	MG/KG
ANTHRACENE 10/	3.2K	MG/KG	*	tetradecanoic acid	5.4JN	MG/KG
DI-N-BUTYL PHTHALATE	3.2U	MG/KG	*	pentadecanoic acid	1.0KN	MG/KG
FLUORANTHENE	3.2U	MG/KG	*	hexadecanoic acid (2 isomers)	26JN	MG/KG
PYRENE	3.2U	MG/KG	*	methylene bisphenol (3 isomers)	38JN	MG/KG
N-BUTYL BENZYL PHTHALATE	3.2U	MG/KG	*	heptadecenoic acid	1.0JN	MG/KG
BENZIDINE	3.2U	MG/KG	*			MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 3.2 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS

WASTE

DRY WEIGHT BASIS

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NK DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
bis(hydroxyphenyl)methanone	1.0KN	MG/KG
octadecanoic acid	67JN	MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
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		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 3.2 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS ATHENS,GA

DATA REPORTING SHEET

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
ALDRIN	2U	MG/KG	*	hexachloronorbornadiene	2U	MG/KG
DIELDRIN	5U	MG/KG	*			MG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	10/	MG/KG	*	octachlorocyclopentene	2U	MG/KG
P,P'-DDT	6U	MG/KG	*			MG/KG
P,P'-DDE	6U	MG/KG	*	heptachloronorbornene	4U	MG/KG
P,P'-DDD	6U	MG/KG	*	1-hydroxychlordene	4U	MG/KG
ENDOSULFAN,ALPHA	5U	MG/KG	*	alpha-chlordane 11/	4U	MG/KG
ENDOSULFAN,BETA	9U	MG/KG	*	gamma-chlordane 11/	4U	MG/KG
ENDOSULFAN SULFATE	9U	MG/KG	*			MG/KG
ENDRIN	7U	MG/KG	*			MG/KG
ENDRIN ALDEHYDE	NA	MG/KG	*			MG/KG
HEPTACHLOR	2U	MG/KG	*			MG/KG
HEPTACHLOR EPOXIDE	2U	MG/KG	*			MG/KG
ALPHA-BHC	2U	MG/KG	*			MG/KG
BETA-BHC	2U	MG/KG	*			MG/KG
GAMMA-BHC (LINDANE)	2U	MG/KG	*			MG/KG
DELTA-BHC	2U	MG/KG	*			MG/KG
PCB-1242 (AROCLOR 1242)	10U	MG/KG	*			MG/KG
PCB-1254 (AROCLOR 1254)	60U	MG/KG	*			MG/KG
PCB-1221 (AROCLOR 1221)	10U	MG/KG	*			MG/KG
PCB-1232 (AROCLOR 1232)	10U	MG/KG	*			MG/KG
PCB-1248 (AROCLOR 1248)	10U	MG/KG	*			MG/KG
PCB-1260 (AROCLOR 1260)	60U	MG/KG	*			MG/KG
PCB-1016 (AROCLOR 1016)	10U	MG/KG	*			MG/KG
TOXAPHENE	60U	MG/KG	*			MG/KG
TCDD (DIOXIN)	NA	MG/KG	*			MG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE (DRY WT)

ATHENS, GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
ALDRIN	39333	9U	UG/KG	*	hexachloronorbornadiene		3U	UG/KG
DIELDRIN	39383	7U	UG/KG	*	octachlorocyclopentene		3U	UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*				UG/KG
P,P'-DDT	39301	20U	UG/KG	*				UG/KG
P,P'-DDE	39321	20U	UG/KG	*	heptachloronorbornene		6U	UG/KG
P,P'-DDD	39311	20U	UG/KG	*	gamma-chlordane	8/ 11/	31	UG/KG
ENDOSULFAN,ALPHA	34364	7U	UG/KG	*	alpha chlordane	8/ 11/	26	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	1-hydroxychlordene		4U	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*				UG/KG
ENDRIN	39393	10U	UG/KG	*				UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*				UG/KG
HEPTACHLOR	39413	9U	UG/KG	*				UG/KG
HEPTACHLOR EPOXIDE	39423	9U	UG/KG	*				UG/KG
ALPHA-BHC	39076	9U	UG/KG	*				UG/KG
BETA-BHC	34257	9U	UG/KG	*				UG/KG
GAMMA-BHC (LINDANE)	39343	9U	UG/KG	*				UG/KG
DELTA-BHC	34262	9U	UG/KG	*				UG/KG
PCB-1242 (AROCLOR 1242)	39499	30U	UG/KG	*				UG/KG
PCB-1254 (AROCLOR 1254)	39507	200U	UG/KG	*				UG/KG
PCB-1221 (AROCLOR 1221)	39491	30U	UG/KG	*				UG/KG
PCB-1232 (AROCLOR 1232)	39495	30U	UG/KG	*				UG/KG
PCB-1248 (AROCLOR 1248)	39503	30U	UG/KG	*				UG/KG
PCB-1260 (AROCLOR 1260)	39511	200U	UG/KG	*				UG/KG
PCB-1016 (AROCLOR 1016)	39514	30U	UG/KG	*				UG/KG
TOXAPHENE	39403	200U	UG/KG	*				UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*				UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81 PESTICIDES/PCB'S AND OTHER CHLORINATED COUMPOUNDS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
ALDRIN	39333	4U	UG/KG	*	heptachloronorbornene 8/	2.1	UG/KG
DIELDRIN	39383	4U	UG/KG	*	hexachloronorbornadiene	10U	UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*			UG/KG
P,P'-DDT	39301	10U	UG/KG	*			UG/KG
P,P'-DDE	39321	10U	UG/KG	*	octachlorocyclopentene	4U	UG/KG
P,P'-DDD	39311	10U	UG/KG	*	gamma-chlordane 8/ 11/	9.8	UG/KG
ENDOSULFAN,ALPHA	34364	7U	UG/KG	*	1-hydroxychlordene	2U	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	alpha-chlordane 8/ 11/	7.2	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*			UG/KG
ENDRIN	39393	8U	UG/KG	*			UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*			UG/KG
HEPTACHLOR 8/ 11/	39413	2.5	UG/KG	*			UG/KG
HEPTACHLOR EPOXIDE	39423	5U	UG/KG	*			UG/KG
ALPHA-BHC	39076	5U	UG/KG	*			UG/KG
BETA-BHC	34257	5U	UG/KG	*			UG/KG
GAMMA-BHC (LINDANE)	39343	5U	UG/KG	*			UG/KG
DELTA-BHC	34262	5U	UG/KG	*			UG/KG
PCB-1242 (AROCLOR 1242)	39499	30U	UG/KG	*			UG/KG
PCB-1254 (AROCLOR 1254)	39507	100U	UG/KG	*			UG/KG
PCB-1221 (AROCLOR 1221)	39491	30U	UG/KG	*			UG/KG
PCB-1232 (AROCLOR 1232)	39495	30U	UG/KG	*			UG/KG
PCB-1248 (AROCLOR 1248)	39503	30U	UG/KG	*			UG/KG
PCB-1260 (AROCLOR 1260)	39511	100U	UG/KG	*			UG/KG
PCB-1016 (AROCLOR 1016)	39514	30U	UG/KG	*			UG/KG
TOXAPHENE	39403	100U	UG/KG	*			UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*			UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81

PESTICIDES/PCB'S AND OTHER CHLORINATED COMPOUNDS

[redacted]

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
ALDRIN	39333	4U	UG/KG	*	heptachloronorbornene 8/		7.4	UG/KG
DIELDRIN 8/	39383	45	UG/KG	*				UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*	octachlorocyclopentene		3U	UG/KG
P,P'-DDT 8/	39301	27	UG/KG	*				UG/KG
P,P'-DDE 8/	39321	15	UG/KG	*	hexachloronorbornadiene		3U	UG/KG
P,P'-DDD 8/	39311	20	UG/KG	*	gamma chlordane 8/ 11/		50	UG/KG
ENDOSULFAN,ALPHA	34364	6U	UG/KG	*	alpha chlordane 11/		10U	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	1-hydroxychlordene		4U	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*				UG/KG
ENDRIN 8/	39393	19	UG/KG	*				UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*				UG/KG
HEPTACHLOR 8/ 11/	39413	3.9	UG/KG	*				UG/KG
HEPTACHLOR EPOXIDE	39423	4U	UG/KG	*				UG/KG
ALPHA-BHC	39076	4U	UG/KG	*				UG/KG
BETA-BHC	34257	4U	UG/KG	*				UG/KG
GAMMA-BHC (LINDANE)	39343	4U	UG/KG	*				UG/KG
DELTA-BHC	34262	4U	UG/KG	*				UG/KG
PCB-1242 (AROCLOR 1242)	39499	70U	UG/KG	*				UG/KG
PCB-1254 (AROCLOR 1254)	39507	80U	UG/KG	*				UG/KG
PCB-1221 (AROCLOR 1221)	39491	70U	UG/KG	*				UG/KG
PCB-1232 (AROCLOR 1232)	39495	70U	UG/KG	*				UG/KG
PCB-1248 (AROCLOR 1248)	39503	70U	UG/KG	*				UG/KG
PCB-1260 (AROCLOR 1260)	39511	80U	UG/KG	*				UG/KG
PCB-1016 (AROCLOR 1016)	39514	70U	UG/KG	*				UG/KG
TOXAPHENE	39403	80U	UG/KG	*				UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*				UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81

METALS

SEDIMENT/SOIL/SLUDGE (DRY WT)

ATHENS, GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SAMPLE START (DATE & TIME): 03/17/81 1440

SAMPLE STOP (DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	4K	MG/KG
ARSENIC	AS	01003	---	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	132	MG/KG
BERYLLIUM	BE	01013	.4K	MG/KG
CADMIUM	CD	01028	4K	MG/KG
COBALT	CO	01038	13	MG/KG
CHROMIUM	CR	01029	28	MG/KG
COPPER	CU	01043	16	MG/KG
MOLYBDENUM	MO	01063	8K	MG/KG
NICKEL	NI	01068	18	MG/KG
LEAD	PB	01052	48	MG/KG
ANTIMONY	SB	01098	16K	MG/KG
SELENIUM	SE	01148	16K	MG/KG
TIN	SN	01103	40K	MG/KG
STRONTIUM	SR	01083	40	MG/KG
TELLURIUM	TE	45513	16K	MG/KG
TITANIUM	TI	01153	592	MG/KG
THALLIUM	TL	34480	40K	MG/KG
VANADIUM	V	01088	46	MG/KG
YTTRIUM	Y	45514	12	MG/KG
ZINC	ZN	01093	120	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.05K	MG/KG
ALUMINUM	AL	01108	21700	MG/KG
MANGANESE	MN	01053	475	MG/KG
CALCIUM	CA	00917	12500	MG/KG
MAGNESIUM	MG	00924	3780	MG/KG
IRON	FE	01170	23500	MG/KG
SODIUM	NA	00934	400K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		23	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81 METALS ATHENS,GA

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	4K	MG/KG
ARSENIC	AS	01003	27	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	410	MG/KG
BERYLLIUM	BE	01013	4K	MG/KG
CADMIUM	CD	01028	4K	MG/KG
COBALT	CO	01038	8K	MG/KG
CHROMIUM	CR	01029	23	MG/KG
COPPER	CU	01043	38	MG/KG
MOLYBDENUM	MO	01063	8K	MG/KG
NICKEL	NI	01068	18	MG/KG
LEAD	PB	01052	95	MG/KG
ANTIMONY	SB	01098	16K	MG/KG
SELENIUM	SE	01148	16K	MG/KG
TIN	SN	01103	40K	MG/KG
STRONTIUM	SR	01083	69	MG/KG
TELLURIUM	TE	45513	16K	MG/KG
TITANIUM	TI	01153	455	MG/KG
THALLIUM	TL	34480	40K	MG/KG
VANADIUM	V	01088	44	MG/KG
YTTRIUM	Y	45514	10	MG/KG
ZINC	ZN	01093	214	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.13	MG/KG
ALUMINUM	AL	01108	17500	MG/KG
MANGANESE	MN	01053	510	MG/KG
CALCIUM	CA	00917	26500	MG/KG
MAGNESIUM	MG	00924	4200	MG/KG
IRON	FE	01170	22600	MG/KG
SODIUM	NA	00934	400K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		29	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81

METALS

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-003 DOWNGRADIENT FROM DRUM RINGS&LINERS NR POND SAD NO.: 81C1033

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1415

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	8K	MG/KG
ARSENIC	AS	01003	61	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	287	MG/KG
BERYLLIUM	BE	01013	8K	MG/KG
CADMIUM	CD	01028	8K	MG/KG
COBALT	CO	01038	16K	MG/KG
CHROMIUM	CR	01029	42	MG/KG
COPPER	CU	01043	56	MG/KG
MOLYBDENUM	MO	01063	16K	MG/KG
NICKEL	NI	01068	32	MG/KG
LEAD	PB	01052	68	MG/KG
ANTIMONY	SB	01098	32K	MG/KG
SELENIUM	SE	01148	32K	MG/KG
TIN	SN	01103	80K	MG/KG
STRONTIUM	SR	01083	27	MG/KG
TELLURIUM	TE	45513	32K	MG/KG
TITANIUM	TI	01153	462	MG/KG
THALLIUM	TL	34480	80K	MG/KG
VANADIUM	V	01088	75	MG/KG
YTTRIUM	Y	45514	18	MG/KG
ZINC	ZN	01093	187	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.14	MG/KG
ALUMINUM	AL	01108	38000	MG/KG
MANGANESE	MN	01053	800	MG/KG
CALCIUM	CA	00917	2600	MG/KG
MAGNESIUM	MG	00924	4060	MG/KG
IRON	FE	01170	51600	MG/KG
SODIUM	NA	00934	800K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		27	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81 METALS

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1420

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 5-7-81

ELEMENT	STORET#		UNITS
SILVER	AG	1K	MG/KG
ARSENIC	AS	5K	MG/KG
BORON	B	---	MG/KG
BARIUM	BA	4	MG/KG
BERYLLIUM	BE	1K	MG/KG
CADMIUM	CD	1K	MG/KG
COBALT	CO	2K	MG/KG
CHROMIUM	CR	4	MG/KG
COPPER	CU	78	MG/KG
MOLYBDENUM	MO	2K	MG/KG
NICKEL	NI	4K	MG/KG
LEAD	PB	4K	MG/KG
ANTIMONY	SB	3K	MG/KG
SELENIUM	SE	4K	MG/KG
TIN	SN	10K	MG/KG
STRONTIUM	SR	1K	MG/KG
TELLURIUM	TE	4K	MG/KG
TITANIUM	TI	18	MG/KG
THALLIUM	TL	10K	MG/KG
VANADIUM	V	2	MG/KG
YTTRIUM	Y	1K	MG/KG
ZINC	ZN	16	MG/KG
ZIRCONIUM	ZR	---	MG/KG
MERCURY	HG	0.1K	MG/KG
ALUMINUM	AL	4200	MG/KG
MANGANESE	MN	25	MG/KG
CALCIUM	CA	120	MG/KG
MAGNESIUM	MG	50	MG/KG
IRON	FE	690	MG/KG
SODIUM	NA	100K	MG/KG
CYANIDE	CN		MG/KG
ASBESTOS	ASSB		MG/KG
% Moisture		2	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE: 03/23/81

[redacted]

LABORATORY SERVICES BRANCH
DATA REPORTING SHEET
81C1031 - 81C1034
PROJECT # 81-74 ***PROG ELEMENT # HWSR

SOURCE: ALLEN READY MIX

SAMPLE RECEIVED DATE & TIME: 03/20/81 730

CITY : MEMPHIS STATE: TN

CHEMIST:

COMPLETED: 5/19/81

SAD NO.	STATION	DATE & TIME SAMPLED	SAMPLE TYPE	ANALYSES TO BE RUN					
81C1031	ARM-005 W SIDE OF FENCE I N PALLET AREA DOWNGRADE	03/17/81- 1440- 00/00/00 0	SOIL	ORGS	METS MG/KG	VOA	PEST	CN MG/KG	HG MG/KG
								0.2K	
81C1032	ARM-004 RESIDUAL FROM FIB ER OR DRUM NR DREDGE POND	03/17/81- 1420- 00/00/00 0	CHWAS	ORGS	METS MG/KG	VOA	PEST	CN MG/KG	HG MG/KG
								.2K	
81C1033	ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND	03/17/81- 1415- 00/00/00 0	SOIL	ORGS	METS MG/KG	VOA	PEST	CN MG/KG	HG MG/KG
								0.41	
81C1034	ARM-006 DOWNGRADE FROM DR UMS @ NE CORNER OF PALLET	03/17/81- 1455- 00/00/00 0	SOIL	ORGS	METS MG/KG	VOA	PEST	CN MG/KG	HG MG/KG
								0.35	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER: Allen Ready Mix
ADDRESS: Chelsea Ave, Memphis TN
ONTACT:

SAMPLING STATION NO. ARM-005
SAMPLING LOCATION: West side of fence in pallet area down grade from drums

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO
AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____
LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____
COMPUTED FROM _____

SAMPLE COLLECTION

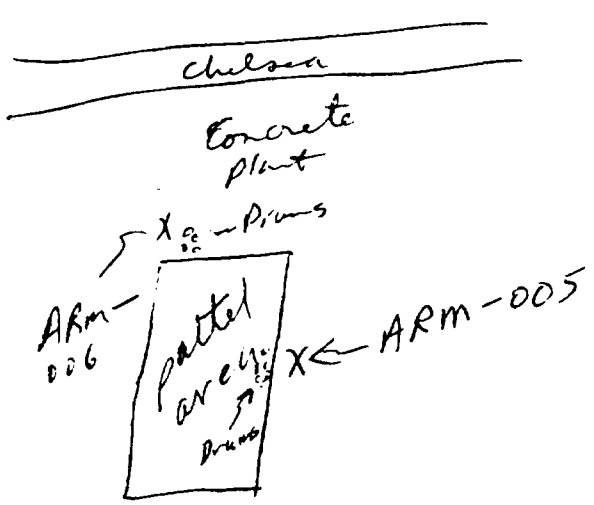
	COMPOSITE	GRAB SAMPLES				SAMPLE CODE [2]
AD NO.	S/C	1031				BACTERIAL
ATE	1					BOD, COD, TOC
IME	1	3/17/81				CYANIDE
LOW ( ) [1]		1440				METALS, Hg
EMPERATURE °C						N, P
H						ORG, O&G, PEST
OT. Cl2 RES, mg/l						PHENOLS
						SOLIDS
						VOA
AMPLE CODE		3356				
AMPLED BY (Sig)		[illegible]				
EALED BY (Sig)		[illegible]				
ATE AND TIME		3/17/81	1500			PRESERVED

[1] Use Avg. Flow for Composites and Inst. Flow for Grabs [2] Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO. CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES



1 qt soil
1 pt soil

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

REGION IV — ATHENS, GEORGIA

DISCHARGER: Allen Ready Mix
ADDRESS: Chelsea Ave, Memphis TN
CONTACT:

SAMPLING STATION NO.: ARM-006
SAMPLING LOCATION: Soil down grade from drums at SE ~~NE~~ corner of pallet area.

SAMPLE AND WASTE FLOW INFORMATION

SAMPLE: ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ ____ ☐ ____ HR. COMP. AT ____ MIN. INTERVALS ☐ FLOW PRO
SAMPLER: ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE ____
FLOW: ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ ____ EQUIP ____
COMPUTED FROM ____

SAMPLE COLLECTION

	COMPOSITE	GRAB SAMPLES				SAMPLE CODE [2]
LAB NO.		1034				BACTERIAL
DATE	1	3/17/81				BOD, COD, TOC
TIME	1	14-55				CYANIDE
FLOW ( ) [1]						METALS, Hg
TEMPERATURE °C						N, P
pH						ORG, OBG, PEST
TOT. Cl2 RES, mg/l						PHENOLS
						SOLIDS
						VOA
SAMPLE CODE		3, 3, 5, 8				
SAMPLED BY (Sig)		[illegible]				
SEALED BY (Sig)		[illegible]				
DATE AND TIME		3/17/81	1510			PRESERVED

[1] Use Avg. Flow for Composites and Inst. Flow for Grabs — [2] Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

SAMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Culquitt	3/20/81	0730	2		

REMARKS AND SKETCHES

See sketch ARM-005

1 qt soil
1 pt soil

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

GION IV — ATHENS, GEORGIA

SCHARGER: Allen Ready Mix
DDRESS: Chelsea Ave, Memphis
ONTACT:

SAMPLING STATION NO. ARM-004
SAMPLING LOCATION: Red sandy looking material - residual from fiber or plastic drum nr. dredge pond

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.
AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____
LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____
COMPUTED FROM _____

SAMPLE COLLECTION

	COMPOSITE	GRAB SAMPLES				SAMPLE CODE [2]	
D NO.	81C	1032				BACTERIAL	0
TE	1	3/17/81				BOD, COD, TOC	1
ME	1	1430				CYANIDE	2
OW ( ) [1]						METALS, Hg	3
MPERATURE °C						N, P	4
						ORG, O&G, PEST	5
T. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
MPLE CODE		2,3,5,8					9
MPLED BY (Sig)		[signature]					A
ALED BY (Sig)		[signature]					B
TE AND TIME						PRESERVED	P

[1] Use Avg. Flow for Composites and Inst. Flow for Grabs [2] Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO. CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	1		

REMARKS AND SKETCHES

1 - qt w-to

See sketch

ARM-003

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-003
DDRESS Chelsea Ave Memphis TN	SAMPLING LOCATION Soil sample down gradient from drum ring and liners nr. dredge pond.
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

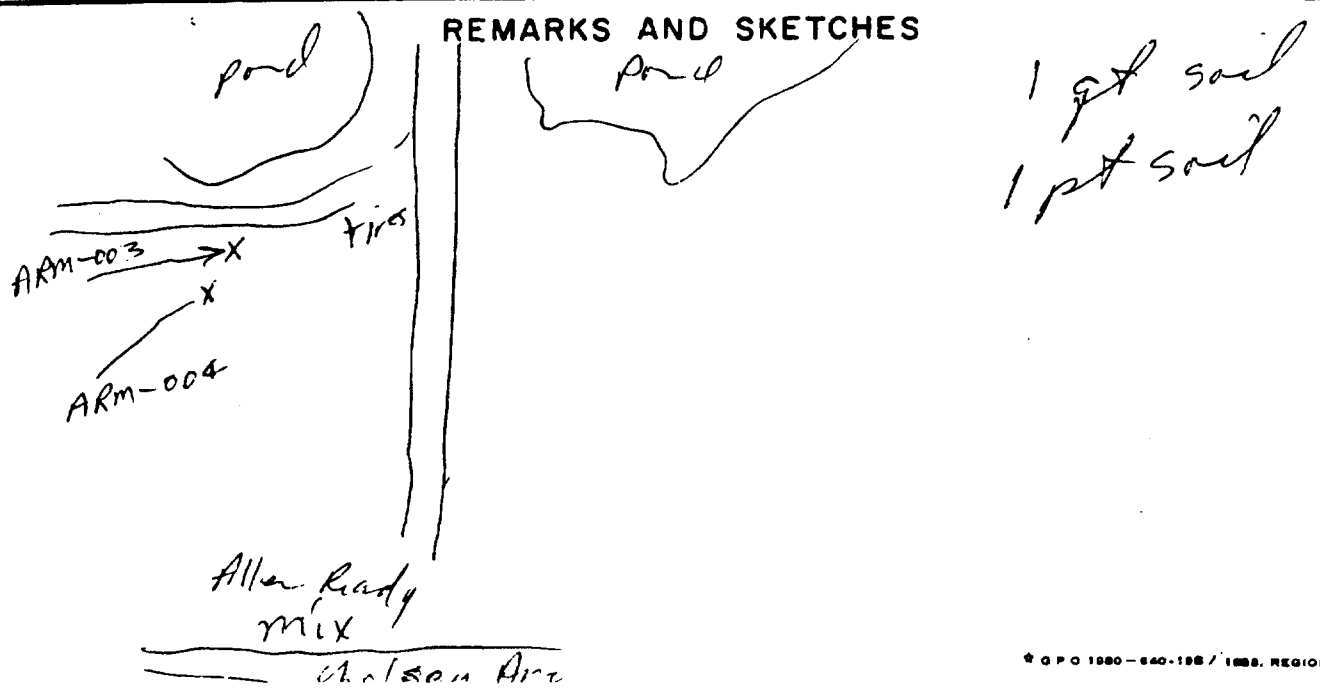
	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2
AD NO. 81c	2	1033				BACTERIAL
ATE	1	3/17/81				BOD, COD, TOC
IME	1	14-15				CYANIDE
LOW ( ) L1						METALS, Hg
EMPERATURE °C						N, P
H						ORG, O&G, PEST
OT. Cl2 RES, mg/l						PHENOLS
						SOLIDS
						VOA
AMPLE CODE		2, 3, 5, 8				
AMPLED BY (Sig)		[illegible]				
EALED BY (Sig)		[illegible]				
ATE AND TIME		3/17/81	1930			PRESERVED

Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

SAMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES



GPO 1980-640-198 / 1988, REGION NO. 4

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV

RECEIPT FOR SAMPLES

The samples described below were collected in connection with the administration and enforcement of the:

(X) Resource Conservation and Recovery Act (RCRA) 42 U.S.C. §6901, et seq., specifically Section 3007 of RCRA, 42 U.S.C. §6927.

( ) Toxic Substances Control Act (TSCA) 15 U.S.C. §2601, et seq., specifically Section 11 of TSCA, 15 U.S.C. §2610.

R. J. Brunner III, USEPA/SAD, College Station Rd, Athens Ga
Inspector Name: Inspector Address:

Allan Ricky Mix, 1572 Chelsea Ave, Memphis TN
Name of Firm: Firm Address:

Fred Richardson, Vice President - Manager
Firm Owner, Operator or Agent: Title:

SAMPLE NUMBER	COLLECTED DATE	COLLECTED TIME	SAMPLE TYPE WATER	SOIL	OTHER	DUPLICATE SAMPLES OFFERED	ACCEPTED	REJECTED	SAMPLE LOCATION ON-SITE	OFF-SITE
ARM-003	3/17/81	1415		X		X			X	
ARM-004	3/17/81	1420			Waste X	X			X	
ARM-005	3/17/81	1440		X		X			X	
ARM-006	3/17/81	1455		X		X			X	

Receipt for the sample(s) described above is hereby acknowledged:

Signature of Inspector

Environmental Engineer
Title

Receipt/Rejection of Duplicate or Split Samples is hereby acknowledged:

Fred Richardson
Signature of Firm Owner, Operator or Agent

Mgr.
Title

ADDITIONAL COMMENTS

Ref. A

REFERENCE 7

HYDROGEOLOGY AND PRELIMINARY ASSESSMENT OF THE POTENTIAL FOR CONTAMINATION OF THE MEMPHIS AQUIFER IN THE MEMPHIS AREA, TENNESSEE

By William S. Parks

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 90-4092

Prepared in cooperation with the
CITY OF MEMPHIS,
MEMPHIS LIGHT, GAS AND WATER DIVISION

Memphis, Tennessee
1990

DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., Secretary

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

For additional information write to:

District Chief
U.S. Geological Survey
A-413 Federal Building
U.S. Courthouse
Nashville, Tennessee 37203

Copies of this report can be purchased from:

U.S. Geological Survey
Books and Open-File Reports Section
Federal Center, Building 810
Box 25425
Denver, Colorado 80225

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CONVERSION FACTORS AND DEFINITIONS

Factors for converting inch-pound units to metric units are shown to four significant digits:

Multiply inch-pound units	By	To obtain metric units
inch (in.)	2.540	centimeter (cm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
million gallons per day (Mgal/d)	0.04381	cubic meter per second (m^3/s)

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Well-Numbering System: Wells are identified according to the numbering system used by the U.S. Geological Survey (USGS) throughout Tennessee. The well number consists of three parts: (1) an abbreviation of the name of the county in which the well is located; (2) a letter designating the USGS 7 $^1/_2$-minute topographic quadrangle on which the well is plotted; and (3) a number generally indicating the numerical order in which the well was inventoried. The well number Sh:K-141, for example, indicates that the well is located in Shelby County on the "K" quadrangle and is identified as well 141 in the numerical sequence. Quadrangles are lettered from left to right, beginning in the southwest corner of the county. In this report, wells in Crittenden County, Ark., and DeSoto County, Miss., are numbered using the prefixes "Ar:" and "Ms:" for the preparation of illustrations. The suffixes (for example, "A-7") for the wells in DeSoto County are the same as the well designations assigned by the USGS in Mississippi.

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Plate 2

EXPLANATION

DAVIS

MEMPHIS LIGHT, GAS AND WATER DIVISION WELL FIELD

NSST — AREA OF NO SIGNIFICANT SATURATED THICKNESS

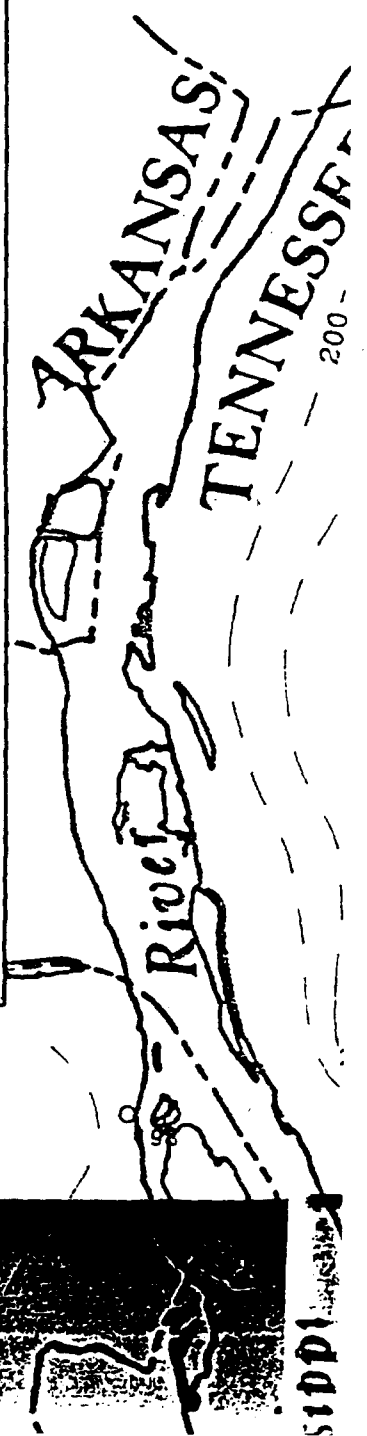
200 — WATER-TABLE CONTOUR--Shows altitude of water table. Dashed where approximately located. Hachures indicate depression. Contour interval 20 feet. Datum is sea level

313 — WELL FOR WHICH WATER-LEVEL MEASUREMENT MADE IN THE FALL 1988 WAS USED AS CONTROL--Number is altitude of water level, in feet above sea level

198 — WELL FOR WHICH HISTORIC (1944-87) WATER-LEVEL MEASUREMENT WAS USED AS SUPPLEMENTAL CONTROL--Number shown as less than (<) indicates altitude of water level is below bottom of well

Sh:P-99 233 — WELL REFERRED TO IN THE TEXT

240 — POINT WHERE 20-FOOT INTERVAL CONTOUR ON 7 1/2-MINUTE TOPOGRAPHIC QUADRANGLE CROSSES PERENNIAL STREAM



35°15'

90°15'

0 — 5 MILES

0 — 5 KILOMETERS

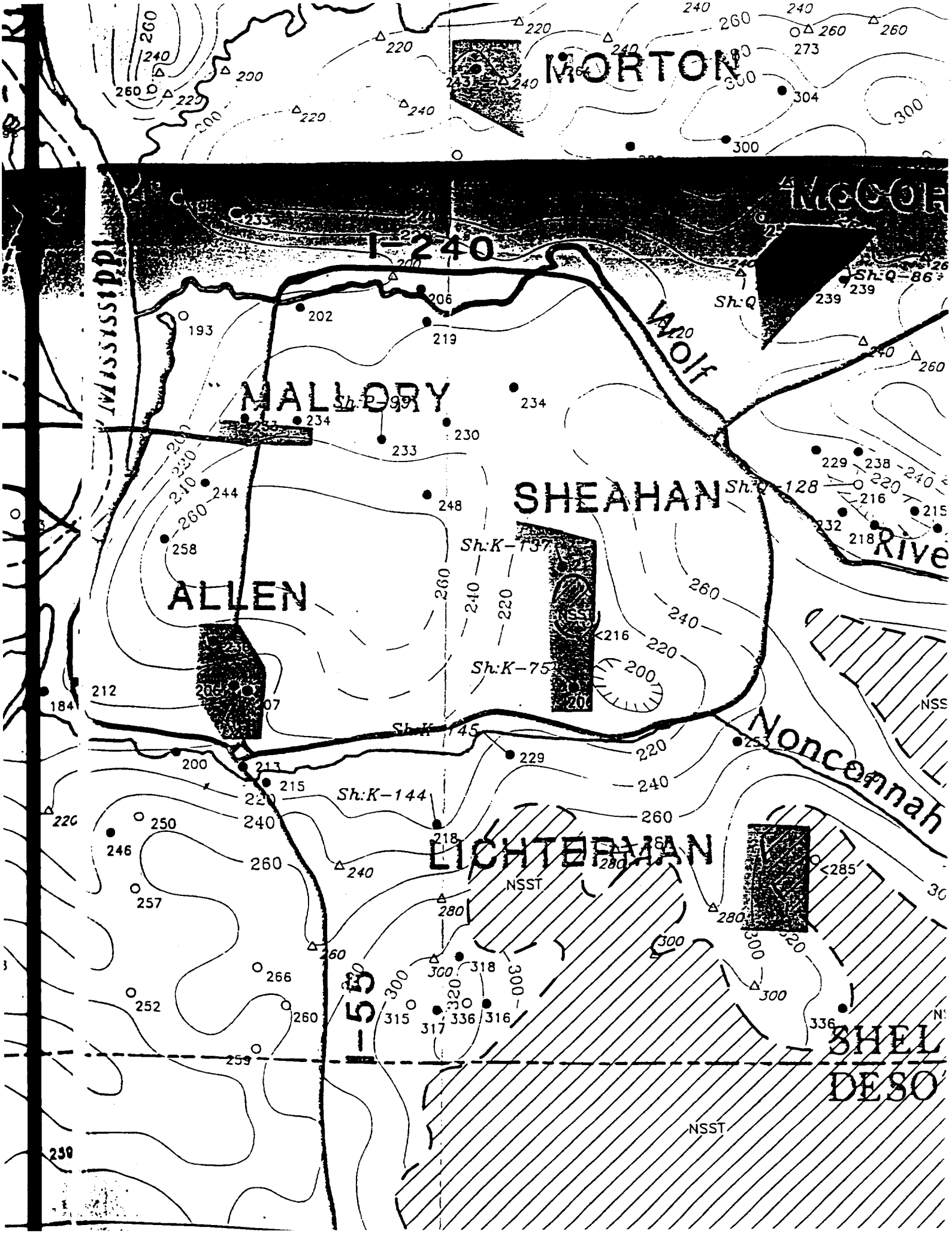

MORTON
McCOR
I-240
Mississippi
Wolf
MALLORY
SHEAHAN
ALLEN
LICHTERMAN
Nonconnah
Rive
I-55
SHEL
DESO
Sh:Q-86
Sh:Q
Sh:P-99
Sh:Q-128
Sh:K-137
Sh:K-75
Sh:K-145
Sh:K-144
NSST

Plate 3

MEM-PH

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U.S. GEOLOGICAL SURVEY

EXPLANATION

DAVIS

MEMPHIS LIGHT, GAS AND WATER DIVISION WELL FIELD

POTENTIOMETRIC CONTOUR--Shows altitude at which water level would have stood in tightly cased wells. Dashed where approximately located. Hachures indicate depression. Contour interval 10 feet. Datum is sea level

175

WELL FOR WHICH WATER LEVEL MEASUREMENT MADE IN THE LATE SUMMER-FALL 1988 WAS USED AS CONTROL--Number is altitude of water level, in feet above sea level

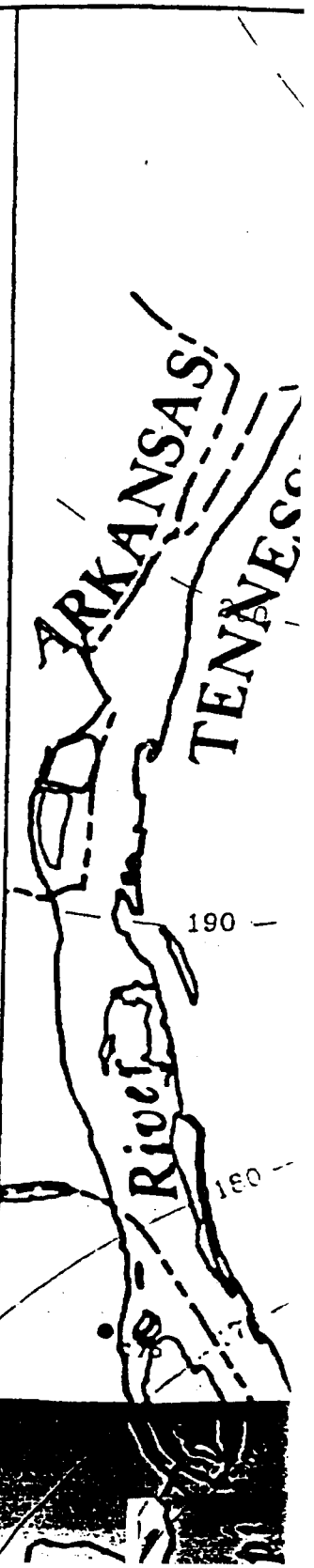
Sh:0-179

119

WELL REFERRED TO IN THE TEXT

0 5 MILES

0 5 KILOMETERS



35°15'

90°15'

55

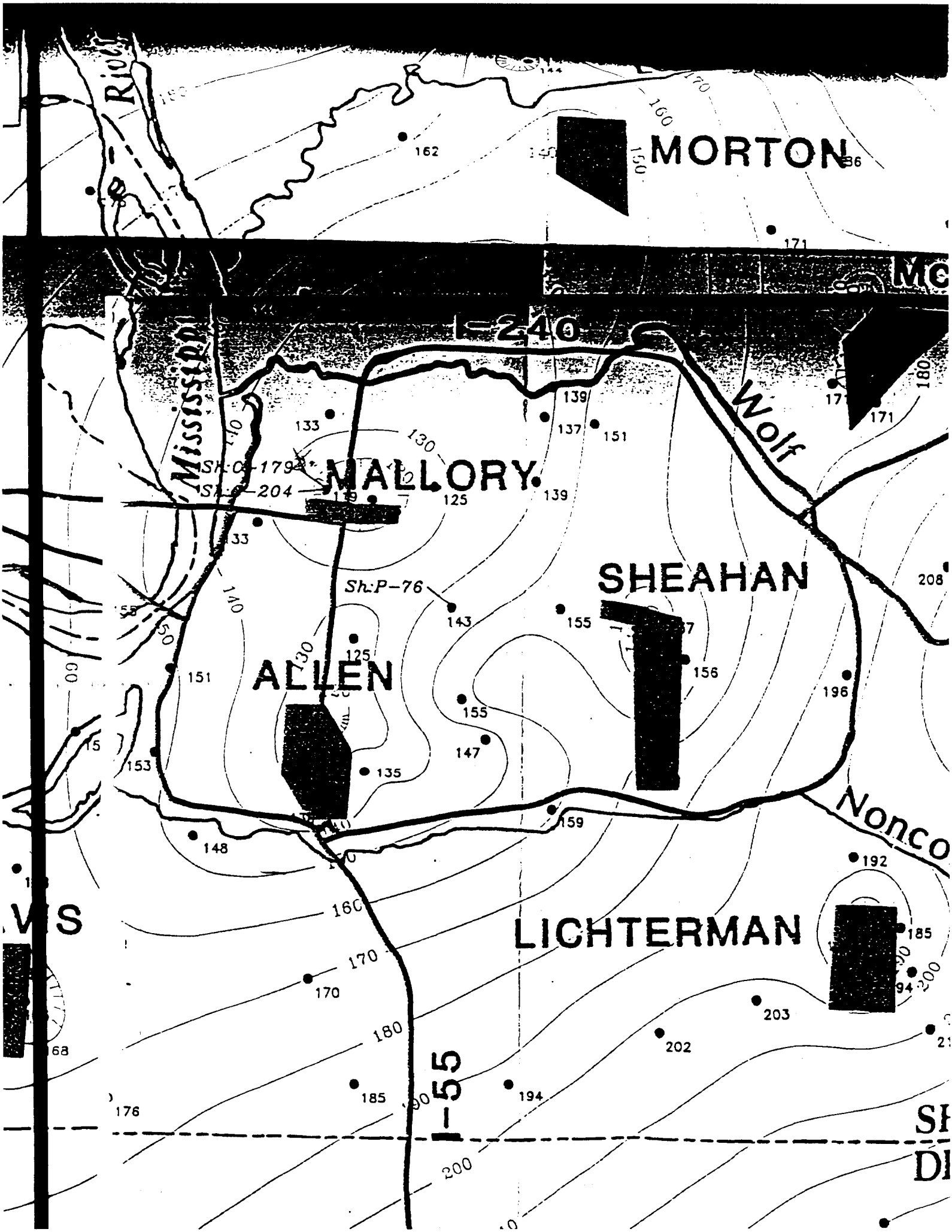

MORTON
I-240
Wolf
Mississippi
MALLORY
Sh:C-179
Sh:C-204
Sh:P-76
SHEAHAN
ALLEN
LICHTERMAN
Nonco
I-55
162
171
139
137
151
133
125
143
155
156
196
208
147
135
153
148
159
192
185
170
203
202
194
176
180
170
160
150
140
130
200

Plate 4

DEPARTMENT OF THE INTERIOR
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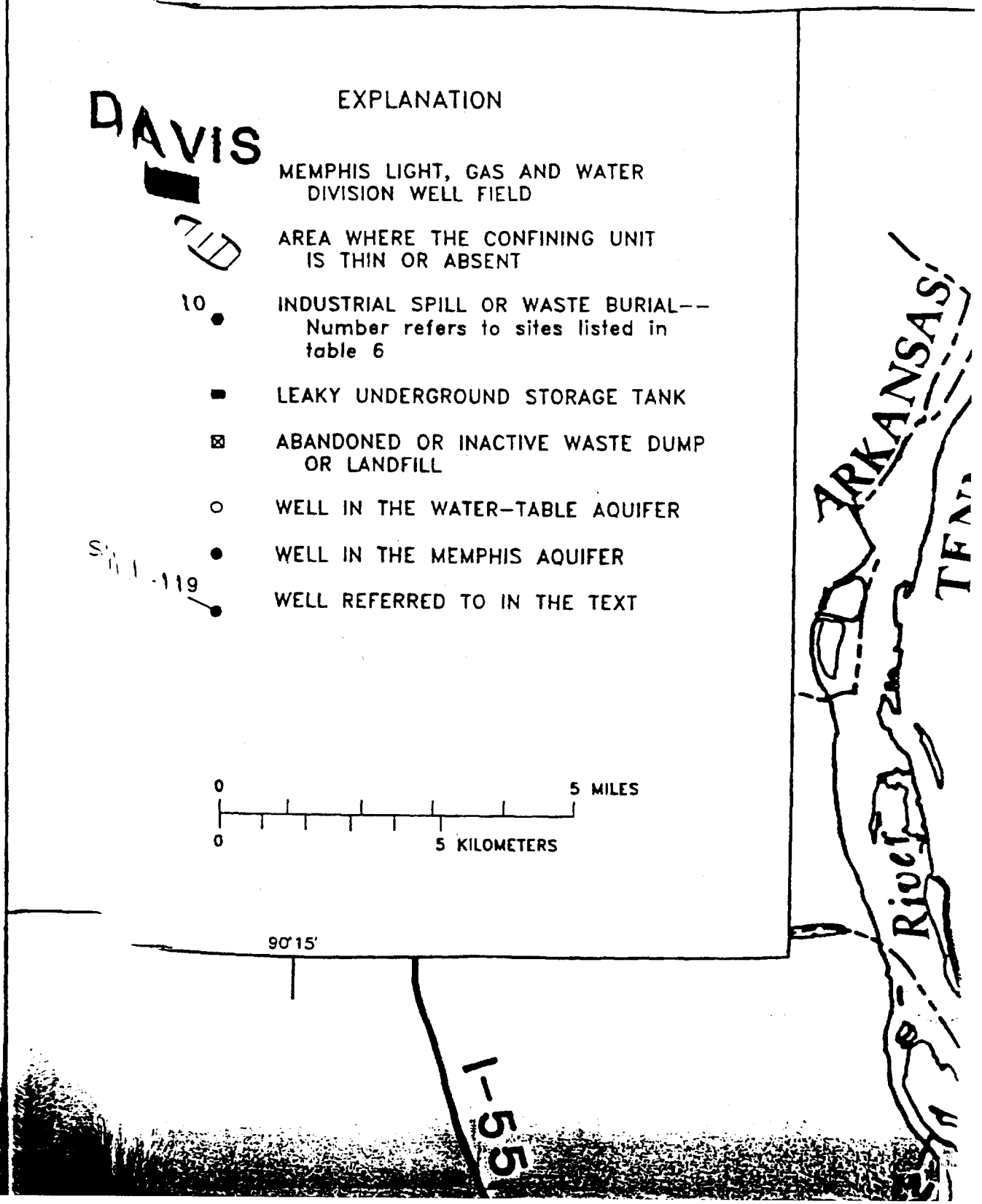

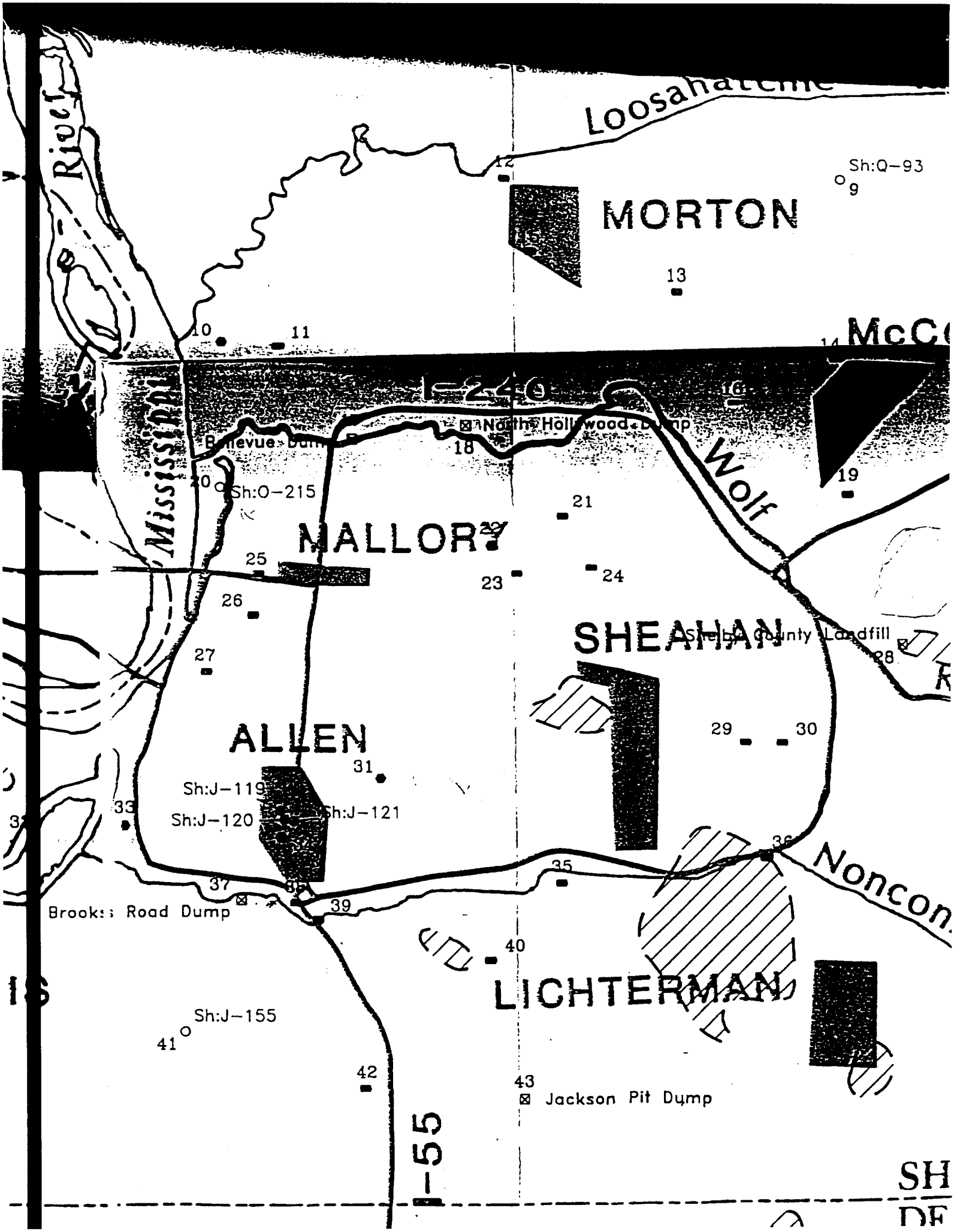
Loosahatchie
Sh:Q-93
MORTON
McC
I-240
North Hollywood Dump
Bellevue Dump
Mississippi
Wolf
Sh:O-215
MALLORY
SHEAHAN
Shelby County Landfill
ALLEN
Sh:J-119
Sh:J-120
Sh:J-121
Brooks Road Dump
Noncon
LICHTERMAN
Sh:J-155
Jackson Pit Dump
I-55
SH

HYDROGEOLOGY AND PRELIMINARY ASSESSMENT OF THE POTENTIAL FOR CONTAMINATION OF THE MEMPHIS AQUIFER IN THE MEMPHIS AREA, TENNESSEE

By William S. Parks

ABSTRACT

Detailed maps of the thickness of the Jackson-upper Claiborne confining unit and the altitude of the water table in the alluvium and fluvial deposits provide much new information concerning areas where downward leakage is or may be occurring from the water-table aquifers to the Memphis aquifer in the Memphis area. A detailed map of the altitude of the potentiometric surface of the Memphis aquifer and the locations of 44 sites where contaminants have been detected in the water-table aquifers indicate that many of these sites are located in areas where the direction of ground-water flow in the Memphis aquifer is toward municipal well fields. Consequently, if contaminants enter the Memphis aquifer, a hydraulic potential exists for their transport to those well fields.

Recently (1986-88), volatile organic compounds were detected in water from five municipal wells screened in the Memphis aquifer—three in the Allen well field of the Memphis Light, Gas and Water Division at Memphis and two in the west well field at Collierville. Concentrations of seven volatile organic compounds totaled about 11 micrograms per liter in a sample from one well in the Allen well field at Memphis, and the concentration of one compound was 25 micrograms per liter in a sample from one well at Collierville. These are the first reported occurrences of synthetic organic compounds in the Memphis aquifer and prove that the principal aquifer in the Memphis area is vulnerable to contamination.

INTRODUCTION

The City of Memphis presently (1989) depends solely on the Memphis aquifer for its water supply. Withdrawals from this aquifer in the Memphis area for municipal, industrial, and commercial uses were about 200 Mgal/d in 1988. Historically, the Memphis aquifer was thought of as an ideal artesian aquifer overlain by a thick, impermeable clay layer that serves as an upper confining unit and protects it from contamination from near-surface sources. Studies made over the past few decades, however, indicate that the confining unit locally is thin or absent or contains sand "windows" that could provide "pathways" for contaminants to reach the Memphis aquifer (Criner and others, 1964; Bell and Nyman, 1968; Parks and Lounsbury, 1976; Graham and Parks, 1986).

Other studies indicate that downward leakage from the water-table aquifers to the Memphis aquifer is widespread in the Memphis area (Graham and Parks, 1986; J.V. Brahana and

R.E. Broshears, USGS, written commun., 1987). Areas particularly susceptible to leakage are places where the confining unit is thin or absent and in the vicinity of the Memphis Light, Gas and Water Division (MLGW) well fields where leakage is accelerated as a result of pumping stress in the Memphis aquifer (Graham and Parks, 1986).

Recently, volatile organic compounds were detected in water from five municipal wells pumping from the Memphis aquifer—three in the MLGW Allen well field at Memphis (J.H. Webb, MLGW, oral commun., 1986-88) and two in the west well field at Collierville (J.L. Ashner, Tennessee Department of Health and Environment (TDHE), oral commun., 1986). These are the first reported occurrences of synthetic organic compounds in the Memphis aquifer and prove that the principal aquifer in the Memphis area is vulnerable to contamination.

The concerns about the effectiveness of the confining unit to protect the Memphis aquifer prompted the City of Memphis, MLGW, and the U.S. Geological Survey (USGS) in 1987 to initiate a cooperative investigation of the potential for contamination of the aquifer. This report summarizes the findings of the investigation.

Purpose and Scope

The objectives of this investigation were to: (1) prepare detailed maps of the thickness of the Jackson-upper Claiborne confining unit, the water table in the alluvium and fluvial deposits, and the potentiometric surface of the Memphis aquifer; (2) identify potential sources of contamination of the Memphis aquifer; (3) update knowledge of indications of downward leakage from the water-table aquifers to the Memphis aquifer; and (4) make a preliminary assessment of the potential for contamination of the Memphis aquifer.

The investigation was limited to the Memphis area, as defined in recent reports (about 1,500 square miles), which includes all of Shelby County and parts of Fayette and Tipton Counties, Tenn., DeSoto and Marshall Counties, Miss., and Crittenden and Mississippi Counties, Ark. (fig. 1). Emphasis was placed on Shelby County, Tenn., where most of the municipal well fields are located (fig. 1).

Tasks included in the investigation were to: (1) interpret and correlate geophysical logs selected from a USGS file of more than 500 logs, (2) measure water levels in about 140 wells in the water-table and Memphis aquifers, (3) search for historic water levels in the USGS and State files to supplement data for the water-table aquifers, (4) collect information from various regulatory agencies relative to the location and type of potential sources of contamination of the Memphis aquifer, and (5) prepare interpretive maps and the final report.

Previous Investigations

Many previous reports include information concerning the local and regional aspects of the aquifer systems in the Memphis area, and many others contain water-level and water-quality data. Consequently, this discussion of previous investigations is limited to primary sources of information concerning the hydrology, geology, water levels, and water quality of the principal aquifers and associated environmental concerns. This report and primary previous reports contain lists of references that provide additional information sources. Extensive lists of selected references (although not all inclusive) are given in reports by Graham and Parks (1986) and Brahana and others (1987).

The hydrology and general geology of the principal aquifers are described in reports by Safford (1890), Glenn (1906), Wells (1931, 1933), Kazmann (1944), Schneider and Cushing

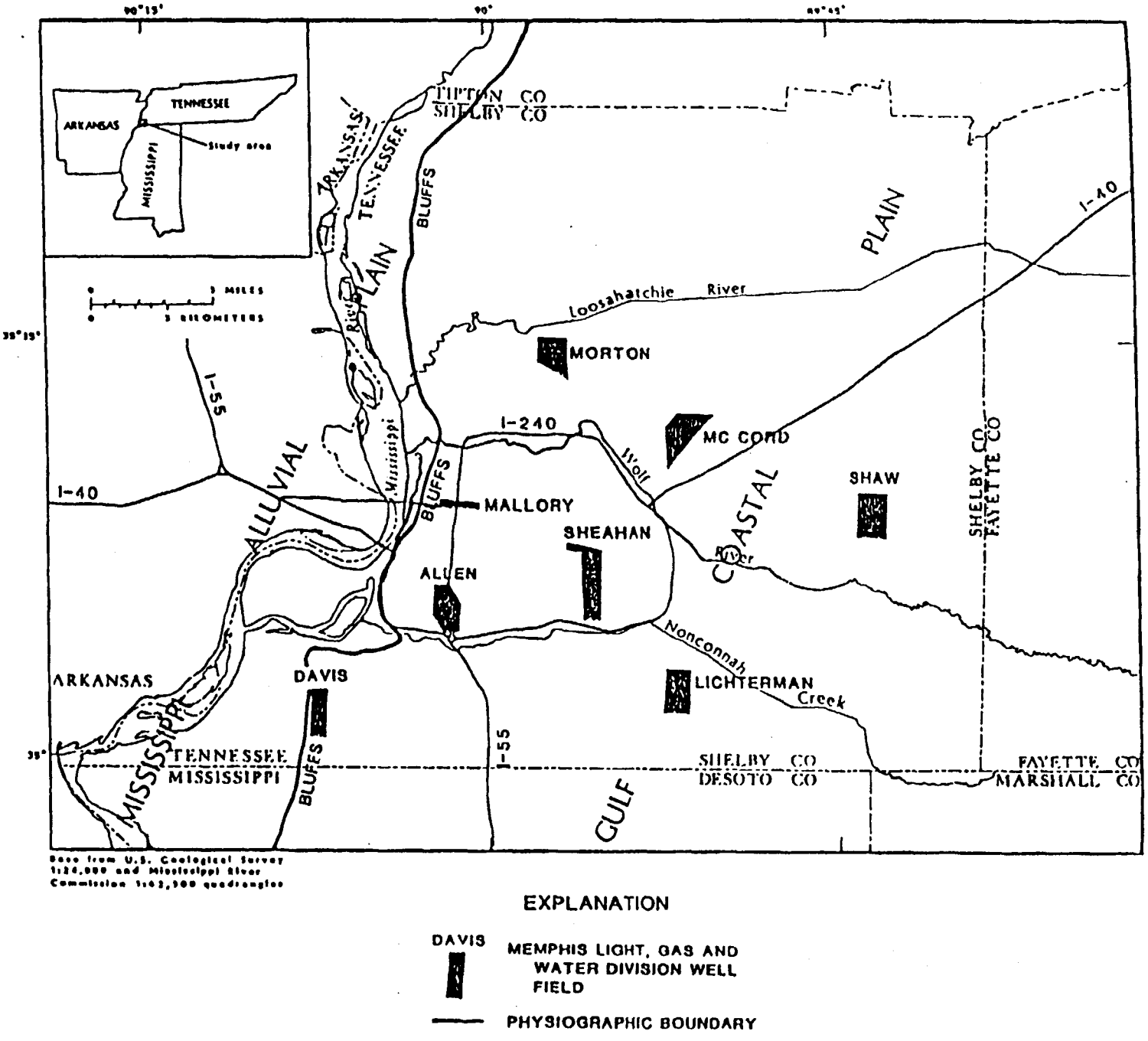

Figure 1.--Major physiographic subdivisions in the Memphis area and

(1948), Criner and Armstrong (1958), Plebuch (1961), Criner and others (1964), Nyman (1965), Bell and Nyman (1968), and Dalsin and Bettandorff (1976). Parks (1973, 1975, 1977, 1978, 1979a, 1979b, 1987a) mapped and described the surface and shallow subsurface geology of the Memphis urban area.

A series of potentiometric-surface maps and graphs showing historic water-level changes and pumpage (1886-1975) from the Memphis and Fort Pillow aquifers are included in a report by Criner and Parks (1976). The potentiometric surface of the Memphis aquifer in August 1978 was given by Graham (1979). Graham (1982) updated pumpage and water-level information for the Memphis and Fort Pillow aquifers through 1980 and included a map of the potentiometric surface of the Memphis aquifer for September 1980. The altitude of the water table in the alluvium and fluvial deposits and the potentiometric surfaces of the Memphis and Fort Pillow aquifers in the Memphis urban area for the fall 1984 are included in a report by Graham and Parks (1986).

A two-dimensional digital computer flow model of the Memphis aquifer was described by Brahana (1982). The application of this model as a predictive tool to estimate aquifer response to various hypothetical pumpage projections was described by Brahana and included in the U.S. Army Corps of Engineers, Memphis Metropolitan Urban Water Resources Study (1981). Brahana and Broshears (USGS, written commun., 1987) described the hydrologic framework of the Memphis area and documented the development of an integrated conceptual model of the ground-water flow and testing of this conceptual model through application of a multilayer finite-difference flow model.

Information concerning quality of water in the principal aquifers in the Memphis area is in reports by Wells (1933), Schneider and Cushing (1948), Lanphere (1955), Criner and Armstrong (1958), Plebuch (1961), Criner and others (1964), Bell and Nyman (1968), and Dalsin and Bettandorff (1976). Graham (1982) summarized the quality of water in the principal aquifers and discussed the potential for contamination of the aquifers. A report by Parks and others (1982) describes the installation and sampling of observation wells at six abandoned or inactive dumps in the Memphis area and provides data on the quality of water in the water-table aquifers at these sites. Graham (1985) described the installation and sampling of additional wells at the North Hollywood Dump and gave a summary of the quality of water in the water-table aquifers in the area of the dump.

Brahana and others (1987) provided background information concerning the quality of natural, uncontaminated water from the principal aquifers in the Memphis area, including tables summarizing the minimum, median, and maximum concentrations of selected major and trace inorganic constituents. This report also summarizes water-quality data for the MLGW well fields. McMaster and Parks (1988) provided background information concerning concentrations of selected trace inorganic constituents and synthetic organic compounds in the water-table aquifers. This report summarizes the results of previous investigations that give information concerning quality of water in the water-table aquifers.

A summary of some current and possible future environmental problems related to geology and hydrology in the Memphis area is given in a report by Parks and Lounsbury (1976). Rima (1979) discussed the susceptibility of the Memphis ground-water supply to contamination from a pesticide waste-disposal site in northeastern Hardeman County, Tenn. Graham and Parks (1986) described the potential for leakage among the principal aquifers in the Memphis area and provided information to support the fact that downward leakage from the water-table aquifers to the Memphis aquifer is widespread.

They also summarize information from previous investigations documenting downward leakage. Parks (1987b) summarized indications of downward leakage from the water-table aquifers to the principal artesian aquifer (Memphis aquifer) at Memphis.

Acknowledgments

Acknowledgments are due many individuals who contributed information or provided assistance during this investigation, particularly in regard to the identification of potential sources of contamination and the measurement of water levels. Early in the investigation, Ms. Jennifer L. Ashner, formerly with the TDHE, Division of Solid Waste Management (DSWM), provided information about sites under investigation in Shelby County, Tenn. Later, Mr. John Fox, Jr., with the TDHE, Division of Ground Water Protection (DGWP), provided lists of 1,679 underground storage tanks in Shelby County, Tenn. Before water-level measurements were made, Mr. James C. Ozment, then with the DGWP, provided information concerning investigations of underground storage tanks in Shelby County where wells installed in the water-table aquifers were available for measurement. Ms. Gwynne A. Woodward of the DSWM provided information on wells in the water-table aquifers at landfills and other sites under investigation and assisted in measuring water levels at many sites. Messrs. Fred P. Von Hofe and William J. Cole, MLGW, arranged to turn off many wells in the Memphis aquifer in the MLGW well fields during a high water-demand period and provided personnel to make airline measurements in the wells. Mr. Ozment, with the TDHE Underground Storage Tank Program, also reviewed the files of underground-storage-tank investigations and identified sites where the water-table aquifers are contaminated. Mr. J. Paul Patterson and Ms. Woodward of the DSWM provided information about contamination of the water-table aquifers at several sites under investigation. Ms. Betty J. Maness and Mr. W. Jordan English of the TDHE, Division of Superfund, reviewed a list and identified sites where contaminants have been detected in the water-table aquifers and provided water-quality analyses for these sites and the two contaminated wells screened in the Memphis aquifer at Collierville. Mr. R.R. Franklin of the U.S. Environmental Protection Agency (U.S. EPA) provided information concerning the Gallaway pits. Mr. James H. Webb, MLGW, provided information concerning contaminants that have been detected in water from wells screened in the Memphis aquifer in the Allen well field.

PHYSIOGRAPHIC SETTING

The Memphis area is situated in two major physiographic subdivisions (fig. 1). The eastern three-quarters of the area is in the Gulf Coastal Plain section and the western one-quarter is in the Mississippi Alluvial Plain section of the Coastal Plain physiographic province (Fenneman, 1938). The principal river in the area is the Mississippi River; the major tributaries are the Wolf River, the Loosahatchie River, and Nonconnah Creek.

The Gulf Coastal Plain is characterized by gently rolling to steep topography formed as a result of erosion of geologic formations of Quaternary and Tertiary age. During the later stages of Pleistocene glaciation, this topography was covered by a relatively thick blanket of loess that makes up the present land surface. The gently rolling to steep topography is broken in many places by the flat-lying alluvial plains of streams crossing the area. Perhaps the most distinctive feature of the Gulf Coastal Plain is the loess covered bluffs that rise abruptly above the Mississippi Alluvial Plain at its eastern boundary. Land-surface altitudes in the Gulf Coastal Plain are as low as 190 feet above sea level at the mouth of Nonconnah Creek in southwestern

Shelby County, Tenn., and are as high as 470 feet above sea level in southwestern Fayette County, Tenn. Maximum local relief between the Gulf Coastal Plain and the Mississippi Alluvial Plain is about 200 feet along the bluffs in northwestern Shelby County.

The Mississippi Alluvial Plain is flat lying and is characterized by features of fluvial deposition such as point bars, abandoned channels, and natural levees. Land-surface altitudes are as low as 180 feet above sea level on the banks of the Mississippi River in extreme northwestern DeSoto County, Miss., and as high as 230 feet above sea level adjacent to the bluffs in southwestern Tipton County, Tenn. Maximum local relief commonly is not more than 10 or 20 feet, except where the Mississippi Alluvial Plain is built up above flood levels by man-placed fill.

HYDROGEOLOGY

The Memphis area is located in the north-central part of the Mississippi embayment, a broad structural trough or syncline that plunges southward along an axis that approximates the Mississippi River (Cushing and others, 1964). This syncline is filled with a few thousand feet of unconsolidated to semiconsolidated sediments that make up formations of Cretaceous and Tertiary age. These formations dip gently westward into the embayment and southward down the axis. Overlying the Cretaceous and Tertiary formations in many areas are the fluvial deposits (terrace deposits), loess, and alluvium of Tertiary(?) and Quaternary age. Descriptions of the post-Wilcox Group geologic units and their hydrologic significance in the Memphis area are given in table 1.

Table 1.--*Post-Wilcox Group geologic units underlying the Memphis area and their hydrologic significance*

[Modified from Graham and Parks, 1986]

System	Series	Group	Stratigraphic unit	Thickness, in feet	Lithology and hydrologic significance
Quaternary	Holocene and Pleistocene		Alluvium	0-175	Sand, gravel, silt, and clay. Underlies the Mississippi Alluvial Plain and alluvial plains of streams in the Gulf Coastal Plain. Thickest beneath the Alluvial Plain, where commonly between 100 and 150 feet thick; generally less than 50 feet thick elsewhere. Provides water to domestic, farm, industrial, and irrigation wells in the Mississippi Alluvial Plain.
	Pleistocene		Loess	0-65	Silt, silty clay, and minor sand. Principal unit at the surface in upland areas of the Gulf Coastal Plain. Thickest on the bluffs that border the Mississippi Alluvial Plain; thinner eastward from the bluffs. Tends to retard downward movement of water providing recharge to the fluvial deposits.
Quaternary and Tertiary(?)	Pleistocene and Pliocene(?)		Fluvial deposits (terrace deposits)	0-100	Sand, gravel, minor clay and ferruginous sandstone. Generally underlie the loess in upland areas, but are locally absent. Thickness varies greatly because of erosional surfaces at top and base. Provides water to many domestic and farm wells in rural areas.
Tertiary	Eocene	? Claiborne	Jackson Formation and upper part of Claiborne Group, includes Cockfield and Cook Mountain Formations ("capping clay")	0-375	Clay, silt, sand, and lignite. Because of similarities in lithology, the Jackson Formation and upper part of the Claiborne Group cannot be reliably subdivided areally based on present work. Most of the preserved sequence consists of the Cockfield and Cook Mountain Formations, but the Jackson Formation occurs beneath the higher hills and ridges in the northern part of the Memphis area. Serves as the upper confining unit for the Memphis aquifer.
			Memphis Sand ("500-foot" sand)	500-880	Sand, clay, and minor lignite. Thick body of sand with lenses of clay at various stratigraphic horizons and minor lignite. Thickest in the southwestern part of the Memphis area; thinnest in the northeastern part. Principal aquifer providing water for municipal and industrial supplies east of the Mississippi River; sole source of water for the City of Memphis. Underlain by the Flour Island Formation of the Wilcox Group, which serves as the lower confining unit for the Memphis aquifer.

Hydrogeologic units considered in this report (discussed in descending order of age) are: (1) the alluvium and fluvial deposits that comprise the shallow water-table aquifers, (2) the Jackson Formation and the Cockfield and Cook Mountain Formations in the upper part of the Claiborne Group that comprise the Jackson-upper Claiborne confining unit, and (3) the Memphis Sand that comprises the Memphis aquifer. Hydrogeologic sections showing the principal aquifers and confining units in the Memphis area are given in figure 2.

The alluvium occurs beneath the Mississippi Alluvial Plain and alluvial plains of streams draining the Gulf Coastal Plain (fig. 1) and consists primarily of sand, gravel, silt, and clay. The unit generally consists of fine sand, silt, and clay in the upper part, and sand and gravel in the lower part. The alluvium ranges from 0 to 175 feet in thickness. It commonly is about 100 to 150 feet thick beneath the Mississippi Alluvial Plain and less than 50 feet thick beneath the alluvial plains of major streams draining the Gulf Coastal Plain. The alluvium supplies water to many domestic, farm, industrial, and irrigation wells in the Mississippi Alluvial Plain.

The fluvial deposits occur beneath the uplands and valley slopes of the Gulf Coastal Plain (fig. 1) and consist primarily of sand, gravel, and minor clay lenses. Locally, the sand and gravel is cemented with iron oxide to form thin layers of ferruginous sandstone or conglomerate in the lower or basal parts. The fluvial deposits range from 0 to 100 feet in thickness. Thickness varies because of erosional surfaces at both the top and base of the unit. The fluvial deposits provide water to many domestic and farm wells in rural areas of the Gulf Coastal Plain.

Because of the lithologic similarities of the Jackson, Cockfield, and Cook Mountain Formations and upper part of the Memphis Sand, a detailed study of the stratigraphy and geologic structure would be needed to correlate the uni on the many geophysical logs available for wel and test holes drilled in the Memphis area. Suc a study is beyond the scope of the present inve tigation. For the Gulf Coast Regional Aquife System Analysis (GC RASA) investigatio (Grubb, 1984), however, the Jackson, Cockfiel and Cook Mountain Formations were correlate and mapped regionally in the subsurface of wes ern Tennessee and the occurrence of these unit was extended into the Memphis area (Parks an Carmichael, 1990a,b). From the GC-RAS work and additional observations made durin the present investigation, some generalization can be made concerning the occurrence of thes units.

The Jackson Formation, which was onc thought to comprise most of the thickness of th confining unit separating the water-table aqui fers from the Memphis aquifer, occurs onl beneath the higher hills and ridges in the north ern part of the Memphis area. Based o geophysical-log correlations, this unit consist generally of fine sand or sandy clay and range from 0 to about 50 feet in thickness. The Jackso Formation (Tennessee, Kentucky, and Missouri and the Jackson Group (Mississippi, Arkansas Louisiana, and Texas) overlies the Cockfiel Formation (Yegua Formation in Texas) and i part of a thick regional confining unit for the Cockfield aquifer (Hosman, 1988). In the Memphis area, the Jackson Formation is included i the upper part of the Jackson-upper Claiborne confining unit.

The Cockfield Formation occurs in the subsurface in most of the Memphis area, extending eastward at places nearly to the approximate eastern limits of the Jackson-upper Claiborne confining unit (plate 1). The Cockfield Formation consists of interfingering fine sand, silt, clay, and local lenses of lignite. The unit ranges from 0 to about 250 feet in thickness. In most of the Memphis area, the formation is an erosional remnant, and the original thickness is preserved

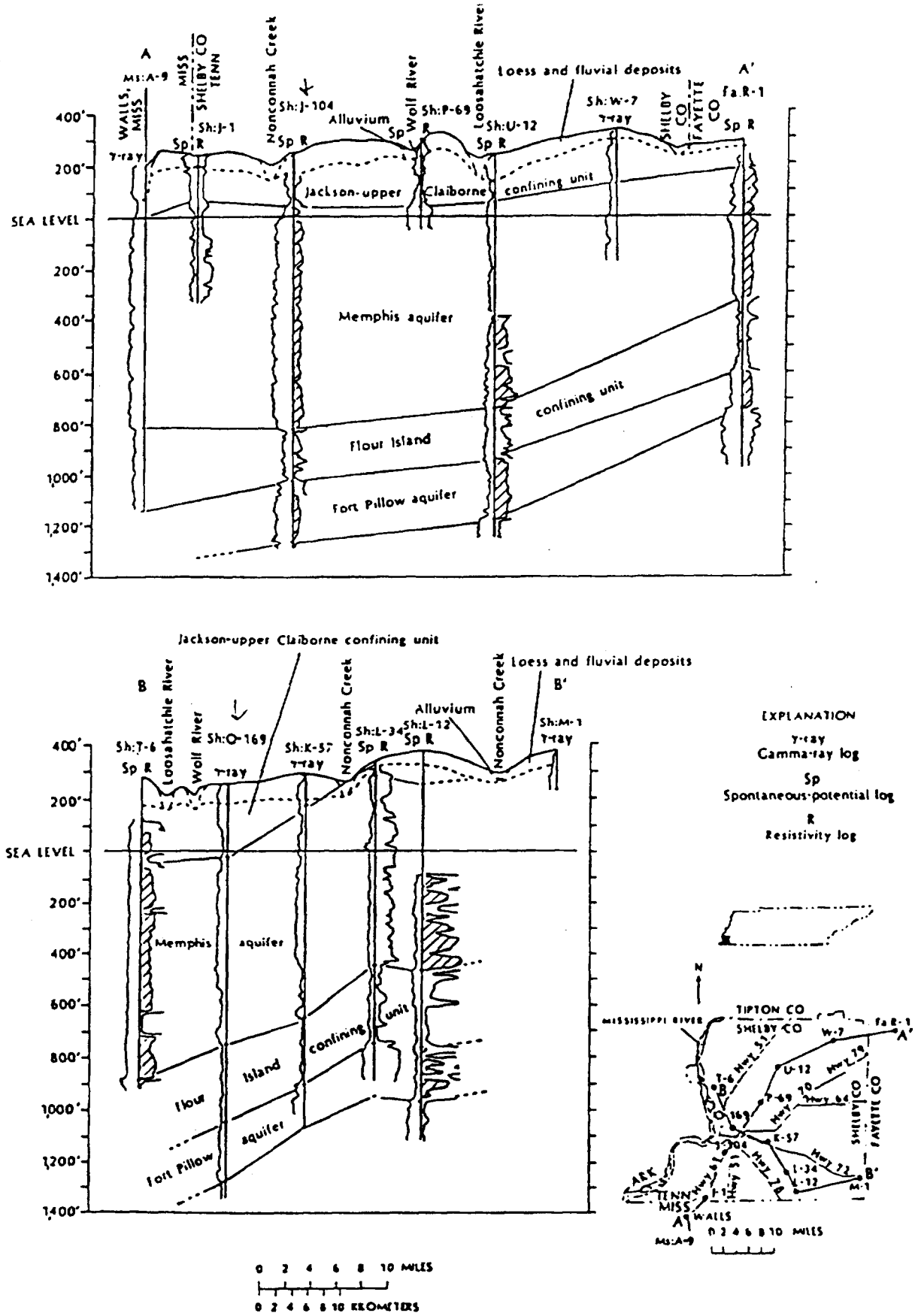

Figure 2.–Hydrogeologic sections showing the principal aquifers and confining units in the Memphis area (Modified from Graham and Parks, 1986.)

only beneath the higher hills and ridges in the northern part. The discontinuous and interconnected sands of the Cockfield Formation constitute a regional aquifer in some parts of the area of occurrence in Tennessee, Kentucky, Missouri, Arkansas, Louisiana, Texas (Yegua Formation), and Mississippi (Hosman, 1988). In the Memphis area, the Cockfield Formation consists predominantly of fine sediments and lacks the thicker, coarser sands present in other areas. Consequently, the formation is included in the Jackson-upper Claiborne confining unit. A few domestic wells in the Memphis area are screened in sands in the Cockfield Formation.

The Cook Mountain Formation occurs in the subsurface of most of the Memphis area, extending eastward to the approximate eastern limits of the Jackson-upper Claiborne confining unit (plate 1). The Cook Mountain Formation consists primarily of clay, but it locally contains varying amounts of fine sand. The formation ranges from about 30 to 150 feet in thickness, but it is commonly about 60 to 70 feet thick. The Cook Mountain Formation is a regional confining unit overlying the Memphis Sand in Tennessee, Missouri, and northeastern Arkansas and the Sparta Sand in Kentucky, southern Arkansas, Louisiana, and Mississippi (Hosman, 1988). In the Memphis area, the formation is the most persistent clay layer in the Jackson-upper Claiborne confining unit.

The Memphis Sand occurs in the subsurface of all of the Memphis area. Eastward from the approximate eastern limits of the Jackson-upper Claiborne confining unit (plate 1), the eroded upper part of the Memphis Sand directly underlies the alluvium and fluvial deposits. The Memphis Sand consists primarily of a thick body of sand that includes subordinate lenses of clay and silt at various horizons and ranges from about 500 to 900 feet in thickness. The Memphis Sand (and its equivalents) is a regional aquifer in Tennessee, Missouri, Kentucky (Tallahatta Formation and Sparta Sand), and northeastern Arkansas. The Memphis Sand is equivalent to (in ascending order) the Tallahatta Formation, Winona Sand, Zilpha Clay, and Sparta Sand of northern Mississippi and the Carrizo Sand, Cane River Formation, and Sparta Sand of southern Arkansas (Hosman, 1988). In the Memphis area, the Memphis aquifer provides water for most municipal, industrial, and commercial supplies.

Thickness of the Confining Unit Overlying the Memphis Aquifer

The thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet are shown in plate 1. This map was prepared by interpretation and correlation of 236 geophysical logs made primarily in test holes for water wells or through the casings of observation wells and abandoned water wells. These logs were selected from a file of more than 500 electric and gamma-ray logs made by the USGS in the Memphis area from the early 1950's to 1989. Most of the logs in the file were examined during this investigation. Because many of the geophysical logs were made in test holes drilled at MLGW and industrial well fields, the logs used for making the map were selected on the basis of well spacing and, when a choice could be made, on the basis of the quality of the log. Through the years, wells were drilled on some MLGW well field lots to both the Memphis and Fort Pillow aquifers or to replace wells in the Memphis aquifer to about the same or greater depths. Thus, the file may contain as many as three logs for wells on the same well lots. In addition, lots in MLGW well fields are commonly about 1,000 feet apart, necessitating a further selection of logs based on well spacing for the scale of the map. Interpretive information from the geophysical logs used to prepare the map showing the thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet (plate 1) are given in table 2.

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*--Continued

Well No.	Lati-tude	Longi-tude	Alti-tude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bot-tom	Clay bed thick-ness	Clay bed top	Clay bed bot-tom	Clay bed thick-ness	Aggregate thicknesses of clay beds
Sh:J-38	350711	0900107	315	97	238	141	109	238	129	--	--	--	129
Sh:J-41	350723	0900213	275	49	248	199	82	116	34	185	248	63	97
Sh:J-47	350508	0900459	230	94	226	132	94	108	14	154	226	72	86
Sh:J-49	350611	0900344	280	75	277	202	112	141	29	149	189	40	
							220	243	23	260	277	17	109
Sh:J-50	350411	0900416	241	54	187	133	104	187	83	--	--	--	83
Sh:J-59	350402	0900513	241	104	189	85	104	189	85	--	--	--	85
Sh:J-62	350459	0900330	223	45	183	138	45	76	31	89	183	94	125
Sh:J-65	350232	0900249	303	94	205	111	94	132	38	145	205	60	98
Sh:J-71	350206	0900212	295	97	165	68	97	108	11	115	165	50	61
Sh:J-74	350022	0900117	303	65	140	75	72	140	68	--	--	--	68
Sh:J-83	350319	0900144	280	45	167	122	45	95	50	112	144	32	82
Sh:J-84	350536	0900627	243	168	197	29	168	186	18	--	--	--	18
Sh:J-104	350537	0900145	248	82	202	120	117	202	85	--	--	--	85
Sh:J-111	350503	0900132	280	114	240	126	114	128	14	140	240	100	114
Sh:J-113	350449	0900136	272	85	174	89	85	174	89	--	--	--	89
Sh:J-115	350553	0900223	295	101	262	161	101	119	18	131	262	131	149
Sh:J-119	350521	0900204	260	98	180	82	112	180	68	--	--	--	68
Sh:J-127	350438	0900136	245	40	168	128	40	57	17	65	79	14	
							88	168	80	--	--	--	111
Sh:J-129	350353	0900640	290	103	249	146	103	160	57	180	249	69	126
Sh:J-133	350653	0900119	300	88	310	222	88	164	76	230	310	80	156
Sh:J-138	350148	0900702	300	84	242	158	162	242	80	--	--	--	80
Sh:J-144	350053	0900708	280	96	204	108	136	204	68	--	--	--	68
Sh:J-166	350611	0900205	278	100	210	110	130	210	80	--	--	--	80
Sh:K-13	350541	0895902	295	80	224	144	117	224	107	--	--	--	107
Sh:K-16	350523	0895801	293	55	206	151	55	110	55	132	206	74	129
Sh:K-23	350647	0895420	320	112	220	108	112	136	24	161	198	37	
							204	220	16	--	--	--	77
Sh:K-28	350111	0895905	320	36	150	114	88	117	29	123	150	27	56
Sh:K-29	350258	0895929	271	58	94	36	58	94	36	--	--	--	36
Sh:K-31	350143	0895357	317	27	52	25	27	52	25	--	--	--	25
Sh:K-33	350545	0895925	275	65	210	145	65	102	37	110	210	100	137
Sh:K-72	350509	0895553	252	44	150	106	44	150	106	--	--	--	106
Sh:K-79	350024	0895627	350	36	172	136	36	66	30	85	172	87	117
Sh:K-81	350103	0895719	380	44	184	140	44	86	42	99	184	85	127
Sh:K-98	350633	0895438	313	83	176	93	128	176	48	--	--	--	48
Sh:K-99	350627	0895533	285	92	118	26	105	118	13	--	--	--	13
Sh:K-104	350151	0895340	300	32	37	5	32	37	5	--	--	--	5
Sh:K-108	350153	0895259	295	24	74	50	24	74	50	--	--	--	50
Sh:K-109	350532	0895553	258	66	194	128	66	84	18	119	194	75	93
Sh:K-114	350205	0895341	302	21	47	26	21	47	26	--	--	--	26
Sh:K-115	350500	0895547	273	92	170	78	92	102	10	132	170	38	48

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*

[Latitude and longitude are in degrees, minutes, and seconds; altitude is in feet above sea level; base of water-table aquifer, base of Cook Mountain Formation, and tops and bottoms of clay beds are depths in feet below land surface; thicknesses are in feet; dashes (--) indicate no data given for any clay beds below base of the Cook Mountain Formation]

Well No.	Latitude	Longitude	Altitude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bottom	Clay bed thickness	Clay bed top	Clay bed bottom	Clay bed thickness	Aggregate thicknesses of clay beds
Ar:C-1	350958	0901738	209	148	288	140	172	204	32	220	288	68	100
Ar:E-2	350519	0901810	207	102	313	211	102	142	40	256	313	57	97
Ar:H-2	350344	0901300	211	90	266	176	90	120	30	162	266	104	134
Ar:H-4	350724	0901347	214	154	272	118	190	272	82	--	--	--	82
Ar:N-1	350849	0900928	211	84	182	98	84	99	15	110	182	72	87
Ar:O-1	351349	0900628	217	105	302	197	105	120	15	126	167	41	
							223	302	79	--	--	--	135
Ar:O-2	350745	0900553	227	99	227	128	99	131	32	150	227	77	109
Ms:A-7	345919	0900826	220	57	150	93	74	150	76	--	--	--	76
Ms:A-9	345731	0900911	211	127	204	77	134	204	70	--	--	--	70
Ms:A-12	345712	0900915	210	117	198	81	117	198	81	--	--	--	81
Ms:A-29	345748	0900629	302	78	318	240	130	140	10	178	204	26	
							242	318	76	--	--	--	112
Ms:A-103	345737	0901028	211	124	226	102	124	226	102	--	--	--	102
Ms:B-5	345835	0900054	325	60	177	117	90	177	87	--	--	--	87
Ms:B-6	345740	0895945	335	49	161	112	104	161	57	--	--	--	57
Ms:B-7	345917	0900100	305	28	123	95	40	54	14	77	113	36	50
Ms:B-63	345657	0900311	289	86	172	86	86	172	86	--	--	--	86
Ms:C-4	345817	0895712	373	50	147	97	119	147	28	--	--	--	28
Ms:C-15	345812	0895851	345	40	198	158	98	198	100	--	--	--	100
Ms:C-17	345805	0895400	402	56	66	10	56	66	10	--	--	--	10
Ms:D-3	345747	0894943	391	53	124	71	53	124	71	--	--	--	71
Ms:D-28	345903	0894741	402	61	82	21	61	82	21	--	--	--	21
Ms:D-46	345709	0895014	412	51	174	123	51	84	33	98	174	76	109
Ms:D-57	345820	0895142	390	36	101	65	36	101	65	--	--	--	65
Fa:R-1	352226	0893301	318	40	122	82	40	122	82	--	--	--	82
Sh:E-3	345842	0895221	335	24	65	41	24	65	41	--	--	--	41
Sh:E-4	345943	0894802	403	76	153	77	76	87	11	101	153	52	63
Sh:H-1	350331	0900729	312	110	270	160	134	270	136	--	--	--	136
Sh:H-2	350405	0900738	215	94	201	107	94	201	107	--	--	--	107
Sh:H-8	350157	0900742	305	84	246	162	138	164	26	181	246	65	91
Sh:H-11	350115	0900740	274	50	191	141	50	65	15	86	102	16	
							139	191	52	--	--	--	83
Sh:H-13	350452	0900759	238	114	198	84	123	175	52	185	198	13	65
Sh:J-1	350004	0900546	240	50	162	112	50	66	16	76	162	86	102
Sh:J-10	350501	0900239	270	104	214	110	104	214	110	--	--	--	110
Sh:J-27	350716	0900330	268	60	265	205	60	107	47	202	265	63	110
Sh:J-32	350657	0900426	280	122	262	140	122	139	17	197	262	65	82

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*--Continued

Well No.	Latitude	Longitude	Altitude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bottom	Clay bed thickness	Clay bed top	Clay bed bottom	Clay bed thickness	Aggregate thicknesses of clay beds
Sh:K-120	350008	0895450	362	29	133	104	46	63	17	83	133	50	67
Sh:K-122	350434	0895739	240	33	155	122	33	155	122	--	--	--	122
Sh:K-125	350114	0895822	311	26	138	112	54	72	18	104	138	34	52
Sh:K-127	350024	0895838	320	36	178	142	60	81	21	107	178	71	92
Sh:K-139	350810	0895528	295	96	120	24	102	120	18	--	--	--	18
Sh:K-141	350724	0895553	311	106	176	70	121	176	55	--	--	--	55
Sh:K-142	350642	0895550	278	99	105	6	99	105	6	--	--	--	6
Sh:K-143	350233	0895938	281	59	112	53	80	112	32	--	--	--	32
Sh:K-148	350228	0895232	300	35	51	16	35	51	16	--	--	--	16
Sh:L-9	350504	0894828	370	45	127	82	45	73	28	100	127	27	55
Sh:L-15	350412	0894530	341	26	74	48	26	74	48	--	--	--	48
Sh:L-17	350721	0895130	310	20	108	88	20	45	25	60	76	16	
							91	108	17	--	--	--	58
Sh:L-18	350516	0894940	320	17	93	76	17	93	76	--	--	--	76
Sh:L-21	350540	0895211	330	51	151	100	99	151	52	--	--	--	52
Sh:L-23	350519	0895212	330	76	155	79	94	155	61	--	--	--	61
Sh:L-25	350435	0895034	288	24	128	104	38	128	90	--	--	--	90
Sh:L-26	350248	0895123	352	43	91	48	43	91	48	--	--	--	48
Sh:L-27	350457	0895044	317	45	154	109	70	154	84	--	--	--	84
Sh:L-29	350440	0894947	325	27	135	108	27	135	108	--	--	--	108
Sh:L-32	350146	0895200	332	23	86	63	23	86	63	--	--	--	63
Sh:L-38	350232	0895158	315	16	72	56	16	72	56	--	--	--	56
Sh:L-46	350658	0894920	260	42	113	71	42	113	71	--	--	--	71
Sh:L-52	350024	0894722	390	52	120	68	52	120	68	--	--	--	68
Sh:L-57	350534	0895121	320	44	157	113	48	157	109	--	--	--	109
Sh:L-61	350354	0895038	272	26	75	49	26	75	49	--	--	--	49
Sh:L-64	350639	0895225	305	53	165	112	88	165	77	--	--	--	77
Sh:L-67	350447	0894828	380	36	136	100	75	85	10	98	136	40	50
Sh:L-69	350259	0895213	329	33	78	45	33	78	45	--	--	--	45
Sh:L-70	350207	0895224	307	21	71	50	20	71	50	--	--	--	50
Sh:L-81	350450	0894807	380	52	156	104	52	82	30	94	156	62	92
Sh:L-88	350730	0894900	257	42	42	0	--	--	--	--	--	--	0
Sh:L-95	350349	0894501	369	58	114	56	58	114	56	--	--	--	56
Sh:L-96	350323	0895156	331	38	90	52	38	90	52	--	--	--	52
Sh:L-97	350207	0895110	353	26	82	56	26	82	56	--	--	--	56
Sh:L-99	350441	0894809	368	32	142	110	32	42	10	44	85	41	
							99	142	43	--	--	--	94
Sh:L-102	350155	0895137	342	90	105	15	90	105	15	--	--	--	15
Sh:M-11	350223	0894459	338	60	71	11	60	71	11	--	--	--	11
Sh:M-17	350017	0894417	336	41	41	0	--	--	--	--	--	--	0
Sh:M-24	350653	0894215	340	33	87	54	33	87	54	--	--	--	54
Sh:M-26	350404	0894356	332	49	66	17	49	66	17	--	--	--	17

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*--Continued

Well No.	Latitude	Longitude	Altitude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bottom	Clay bed thickness	Clay bed top	Clay bed bottom	Clay bed thickness	Aggregate thicknesses of clay beds
Sh:M-27	350334	0894355	355	54	75	21	62	75	13	--	--	--	13
Sh:M-37	350642	0894300	335	42	72	30	42	72	30	--	--	--	30
Sh:M-39	350344	0894449	363	62	98	36	62	98	36	--	--	--	36
Sh:M-40	350460	0894444	342	34	97	63	34	97	63	--	--	--	63
Sh:M-41	350407	0894457	355	64	126	62	64	126	62	--	--	--	62
Sh:M-43	350413	0894133	320	64	64	0	--	--	--	--	--	--	0
Sh:O-1	351437	0900046	229	57	290	233	150	290	140	--	--	--	140
Sh:O-18	351034	0900243	235	76	240	164	78	98	22	118	240	122	144
Sh:O-54	351119	0900223	238	77	308	229	77	185	108	203	308	103	211
Sh:O-67	350828	0900214	266	91	264	173	91	126	35	150	264	114	149
Sh:O-82	350833	0900147	288	87	258	171	87	102	15	184	196	32	
							220	258	38	--	--	--	85
Sh:O-93	350839	0900239	238	46	242	196	46	114	68	129	242	113	181
Sh:O-115	351219	0900232	272	60	328	268	123	328	205	--	--	--	205
Sh:O-120	351050	0900035	230	72	158	86	89	113	24	124	158	34	58
Sh:O-184	350956	0900139	251	78	333	255	78	184	106	193	333	140	246
Sh:O-191	350818	0900335	278	99	292	193	100	148	48	158	292	134	182
Sh:O-194	350817	0900043	295	64	278	214	184	278	94	--	--	--	94
Sh:O-199	350846	0900311	285	65	289	224	102	164	62	179	289	110	172
Sh:O-202	351032	0900143	242	71	256	185	71	256	185	--	--	--	185
Sh:O-204	350922	0900154	257	78	301	223	78	140	62	176	301	125	187
Sh:O-206	350805	0900204	272	82	264	182	82	110	28	166	264	98	126
Sh:O-207	350913	0900109	255	81	236	155	130	236	106	--	--	--	106
Sh:O-213	350916	0900030	250	78	246	168	160	246	86	--	--	--	86
Sh:O-243	350808	0900022	280	70	254	184	70	90	20	166	254	88	108
Sh:P-1	351320	0895401	300	41	239	198	103	120	17	149	239	90	107
Sh:P-11	351028	0893050	244	62	182	120	62	88	26	101	182	81	107
Sh:P-14	350943	0895757	252	62	194	132	62	94	32	107	194	87	119
Sh:P-34	350807	0895825	283	104	188	84	125	188	63	--	--	--	63
Sh:P-36	350950	0895833	243	80	217	137	120	217	97	--	--	--	97
Sh:P-39	351045	0895655	251	62	270	208	62	75	13	83	95	12	
							193	270	77	--	--	--	102
Sh:P-54	350904	0895805	255	80	234	154	166	234	68	--	--	--	68
Sh:P-62	350735	0895733	280	94	170	76	94	108	12	127	170	43	55
Sh:P-69	351220	0895525	300	64	200	136	80	104	24	111	123	12	
							132	200	68	--	--	--	104
Sh:P-71	351323	0895754	290	65	289	224	99	134	35	144	289	145	180
Sh:P-73	350901	0895246	250	52	102	50	52	102	50	--	--	--	50
Sh:P-75	351246	0895525	330	41	276	235	139	276	137	--	--	--	137
Sh:P-76	350735	0895932	287	84	176	92	84	124	40	132	176	44	84
Sh:P-79	350736	0895635	311	109	131	22	109	131	22	--	--	--	22
Sh:P-85	351101	0895240	293	76	220	144	76	117	41	168	220	52	93
Sh:P-88	351131	0895312	275	30	226	196	123	226	103	--	--	--	103

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*--Continued

Well No.	Lati-tude	Longi-tude	Alti-tude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bot-tom	Clay bed thick-ness	Clay bed top	Clay bed bot-tom	Clay bed thick-ness	Aggregate thicknesses of clay beds
Sh:P-93	350831	0895656	279	88	191	103	88	105	17	181	191	10	27
Sh:P-94	350913	0895739	248	78	171	93	98	171	73	--	--	--	73
Sh:P-96	351435	0895300	312	67	266	199	106	122	16	174	266	92	108
Sh:P-103	350927	0895950	258	86	246	160	152	246	94	--	--	--	94
Sh:P-113	351439	0895722	301	72	287	215	116	138	22	166	287	121	143
Sh:P-114	351449	0895641	232	48	209	161	101	209	108	--	--	--	108
Sh:P-115	351327	0895658	292	43	268	225	43	80	37	142	268	126	163
Sh:P-116	351411	0895748	290	51	270	219	140	160	20	204	270	66	86
Sh:P-117	351409	0895709	245	38	205	167	112	205	93	--	--	--	93
Sh:P-118	351458	0895747	265	58	294	236	168	294	126	--	--	--	126
Sh:P-143	351058	0895739	229	50	258	208	68	88	20	192	258	66	86
Sh:Q-1	350900	0894822	330	66	103	37	66	103	37	--	--	--	37
Sh:Q-7	350940	0894504	313	40	101	61	40	101	61	--	--	--	61
Sh:Q-8	350901	0895113	270	32	144	112	80	144	64	--	--	--	64
Sh:Q-16	350909	0895153	260	48	121	73	48	121	73	--	--	--	73
Sh:Q-21	351215	0895127	295	90	210	120	107	210	103	--	--	--	103
Sh:Q-22	351144	0895044	305	81	136	55	81	136	55	--	--	--	55
Sh:Q-23	351138	0895207	283	66	186	120	86	186	100	--	--	--	100
Sh:Q-24	351315	0895150	281	27	205	178	123	205	82	--	--	--	82
Sh:Q-27	351216	0895103	288	65	166	101	65	166	101	--	--	--	101
Sh:Q-30	351113	0895145	295	78	185	107	78	91	13	140	185	45	58
Sh:Q-34	351055	0895206	273	93	171	78	154	171	17	--	--	--	17
Sh:Q-39	351128	0895130	309	81	152	71	81	95	14	120	152	32	46
Sh:Q-42	351127	0895105	309	78	145	67	120	145	25	--	--	--	25
Sh:Q-68	351155	0895142	281	49	130	81	82	130	48	--	--	--	48
Sh:Q-74	351223	0895221	295	82	154	72	97	108	11	112	154	42	53
Sh:Q-82	351326	0895046	322	60	163	103	85	102	17	142	163	21	38
Sh:Q-88	350733	0894825	262	41	118	77	50	118	68	--	--	--	68
Sh:Q-89	350737	0894858	259	31	49	18	31	49	18	--	--	--	18
Sh:Q-90	350749	0895058	247	54	58	4	54	58	4	--	--	--	4
Sh:Q-124	350822	0895003	273	33	60	27	33	60	27	--	--	--	27
Sh:Q-125	350817	0895035	250	37	66	29	37	66	29	--	--	--	29
Sh:Q-130	350835	0894994	320	56	81	25	56	81	25	--	--	--	25
Sh:R-5	351350	0894425	395	35	252	217	54	78	24	126	152	26	
							171	252	81	--	--	--	131
Sh:R-8	351141	0894411	372	34	174	140	68	80	12	86	106	20	
							142	174	32	--	--	--	64
Sh:R-9	351248	0894053	375	40	121	81	57	121	64	--	--	--	64
Sh:R-10	350841	0893940	375	56	56	0	--	--	--	--	--	--	0
Sh:R-15	351239	0893943	342	26	112	86	54	112	58	--	--	--	58
Sh:R-21	350913	0894338	305	46	59	13	46	59	13	--	--	--	13
Sh:R-22	350843	0894240	370	42	98	56	42	98	56	--	--	--	56

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*--Continued

Well No.	Latitude	Longitude	Altitude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bottom	Clay bed thickness	Clay bed top	Clay bed bottom	Clay bed thickness	Aggregate thicknesses of clay beds
Sh:R-23	350848	0894355	340	48	114	66	48	114	66	--	--	--	66
Sh:R-24	350811	0894244	330	45	110	65	45	110	65	--	--	--	65
Sh:R-25	350737	0894342	276	31	78	47	31	78	47	--	--	--	47
Sh:R-26	351402	0893935	285	31	92	61	31	92	61	--	--	--	61
Sh:R-28	350848	0894316	360	34	87	53	34	84	53	--	--	--	53
Sh:R-29	350835	0894341	315	48	107	59	48	107	59	--	--	--	59
Sh:R-30	350811	0894309	325	40	120	80	80	120	40	--	--	--	40
Sh:T-6	351505	0900322	290	165	326	161	296	326	30	--	--	--	30
Sh:T-7	352040	0900154	400	99	420	321	99	120	21	136	206	70	
							209	219	10	286	296	10	
							326	420	92	--	--	--	203
Sh:T-13	352213	0900056	400	90	454	364	123	166	43	228	262	34	
							367	454	87	--	--	--	164
Sh:T-16	352044	0900249	355	102	398	296	112	150	38	321	337	16	
							344	398	54	--	--	--	108
Sh:T-17	351747	0900329	330	92	448	356	110	159	49	182	243	61	
							305	323	18	385	448	63	191
Sh:T-18	352127	0900107	391	75	450	375	120	148	28	366	450	84	112
Sh:U-1	352113	0895706	284	68	216	148	154	216	62	--	--	--	62
Sh:U-5	352057	0895727	268	79	232	153	172	232	60	--	--	--	60
Sh:U-12	351705	0895320	238	92	180	88	92	180	88	--	--	--	88
Sh:U-19	351603	0895840	242	73	207	134	105	118	13	130	207	77	90
Sh:U-22	351737	0895749	300	60	226	166	98	109	11	124	166	42	
							171	226	55	--	--	--	108
Sh:U-29	351556	0895859	242	71	194	123	109	194	85	--	--	--	85
Sh:U-48	352114	0895727	267	74	152	78	80	152	72	--	--	--	72
Sh:U-49	352023	0895627	251	50	155	105	82	155	73	--	--	--	73
Sh:U-52	352038	0895708	257	54	198	144	102	114	12	124	158	34	
							174	198	24	--	--	--	70
Sh:U-54	352034	0895345	265	74	212	138	74	94	20	152	166	14	
							192	212	20	--	--	--	54
Sh:U-55	352036	0895334	265	96	216	120	137	150	13	166	182	16	
							204	216	12	--	--	--	41
Sh:U-56	351907	0895709	292	60	230	170	178	230	52	--	--	--	52
Sh:U-58	352024	0895257	265	66	174	108	66	174	108	--	--	--	108
Sh:U-59	352009	0895253	265	97	164	67	97	164	67	--	--	--	67
Sh:U-60	352027	0895232	292	88	204	116	148	204	56	--	--	--	56
Sh:V-4	352044	0895219	283	78	205	127	78	110	32	160	205	45	77
Sh:V-7	351544	0894616	278	27	177	150	27	72	45	124	177	53	98
Sh:V-9	352012	0895038	273	60	222	162	150	222	72	--	--	--	72
Sh:V-10	352010	0895036	271	63	185	122	116	144	28	150	185	35	63
Sh:V-16	351904	0894900	283	61	164	103	94	134	40	--	--	--	40
Sh:V-17	351850	0894935	282	63	180	117	120	180	60	--	--	--	60
Sh:V-24	352227	0895043	375	69	362	293	255	362	107	--	--	--	107

Table 2.--*Thickness of the Jackson-upper Claiborne confining unit and aggregate thicknesses of clay beds in the confining unit thicker than 10 feet in the Memphis area*--Concluded

Well No.	Latitude	Longitude	Altitude	Base of water-table aquifer	Base of Cook Mountain Formation	Thickness of confining unit	Clay bed top	Clay bed bottom	Clay bed thickness	Clay bed top	Clay bed bottom	Clay bed thickness	Aggregate thicknesses of clay beds
Sh:W-3	351750	0893943	279	49	66	17	49	66	17	--	--	--	17
Sh:W-7	352026	0894408	322	31	202	171	31	44	13	49	60	11	
							102	202	100	--	--	--	124
Sh:W-13	351938	0894130	320	42	147	105	84	147	63	--	--	--	63
Sh:W-16	351923	0894228	364	44	216	172	44	113	69	124	216	92	161
Tp:E-3	352641	0894721	441	102	411	309	160	194	34	338	411	73	107
Tp:F-3	352517	0894124	405	55	296	241	210	296	86	--	--	--	86

contamination of the ground water presently is known at these sites, or investigations of the sites have not progressed to the stage where ground-water contamination has been determined.

All of the above sources have potential for contaminating the water-table aquifers. Work in determining the degree and extent of contamination of the water-table aquifers is still in the beginning stage, although much progress has been made in recent years. The Memphis aquifer is a step removed from these potential sources of contamination inasmuch as under "natural" conditions contaminants must enter the water-table aquifers before they enter the Memphis aquifer.

INDICATIONS OF DOWNWARD LEAKAGE TO THE MEMPHIS AQUIFER

Indications that downward leakage from the water-table aquifers to the Memphis aquifer is widespread were provided by Graham and Parks (1986). This previous investigation used a multi-aspect approach that included studies of: (1) areal variations in the thickness of the Jackson-upper Claiborne confining unit that indicated areas where the confining unit is thin or absent, (2) the configuration of the water table that indicated an anomaly in this surface where the water table is depressed because of downward leakage, (3) differences in hydraulic head between the water-table and Memphis aquifers that indicated a general downward gradient, (4) areal and local variations in carbon-14 and tritium concentrations in water from the upper part of the Memphis aquifer that indicated relatively recent water has entered the Memphis aquifer, and (5) deviations from the normal geothermal gradient that indicated the coolest temperatures in areas of intense pumping are at greater depths (as a result of leakage) than in areas away from this pumping. The present investigation, which includes detailed studies of the thickness of the confining unit and the configuration of the water table, has resulted in much refinement of the previous work and identification of several additional areas where leakage is or may be occurring.

Graham and Parks (1986) indicated four general areas in the Memphis urban area (as defined in that report) where the Jackson-upper Claiborne confining unit is thin or absent and a high potential for downward leakage exists. These areas are: (1) in the eastern part along and north of the Wolf River, (2) in the southeastern part along Nonconnah Creek, (3) in the south-central part along Nonconnah and Johns Creeks in the vicinity of the southern part of Sheahan well field, and (4) in the western part in a belt along the Mississippi River. The areas in the eastern and southeastern parts along the Wolf River and Nonconnah Creek are extensions of the outcrop or subcrop belt of the Memphis aquifer into the Memphis urban area. The boundaries of these areas are refined on the maps prepared for the present investigation as the eastern limits of the Jackson-upper Claiborne confining unit (plates 1-4).

The area in a belt along the Mississippi River where the confining bed is shown to be thin or absent by Graham and Parks (1986, figs. 3 and 21) was significantly modified during the present investigation. The extension of the belt north of Memphis where the confining bed was thought to be thin or absent was removed from the present map showing the thickness of the Jackson-upper Claiborne confining unit (plate 1). This modification of the northern extension of the belt is based on a re-correlation of geophysical logs partly as a result of a new geophysical log made in well Sh:O-115 (plate 1). No new information from geophysical logs is available for the southern part of the belt. However, a study by Richardson (1989) indicates that water-quality changes in several wells in the Davis well field are the result of leakage of water from the Mississippi River alluvium to the Memphis aquifer.

Richardson concluded that the confining unit is thin or absent beneath the alluvium west of the Davis well field or that a "window" exists in the confining unit.

The area in the south-central part of the Memphis urban area along Nonconnah and Johns Creeks in the vicinity of the southern part of the Sheahan well field has the most information to indicate that downward leakage from the water-table aquifers to the Memphis aquifer is occurring. Indications given by Parks and Graham (1986) include: (1) a loss of water along the stretch of Nonconnah Creek south and southeast of the southern part of Sheahan well field, (2) an adjacent area to the southeast where the confining unit is thin or absent, (3) a depression in the water-table surface, (4) long-term water-level declines in shallow observation well Sh:K-75, (5) carbon-14 and tritium concentrations indicating the presence of relatively recent water in the Memphis aquifer, (6) a distorted geothermal gradient with the coolest temperature at a depth of 230 feet below land surface, and (7) head differences between the water-table and Memphis aquifers favoring downward movement of water. The area where the confining unit is thin or absent is shown on plate 1 as the large area southeast of the southern part of Sheahan well field and west of Lichterman well field. This area is enlarged from the area shown by Graham and Parks (1986, fig. 3), based partly on a new geophysical log of the test hole for well Sh:K-148 in the western part of Lichterman well field (plate 1). The depression in the water-table aquifer, shown on plate 2 as the area extending from the southern part to the northern part of Sheahan well field, also is enlarged from the area shown by Graham and Parks (1986, fig. 7), based partly on the water level in new observation well Sh:K-137.

New information from test holes for wells drilled in the northern part of Sheahan well field since the Graham and Parks report (1986) indicates an area west of that part of the well field with a high potential for leakage. The Jackson-upper Claiborne confining unit in this area is shown by Graham and Parks (1986, fig. 3) to be about 150 feet thick. The stratigraphy of the Sheahan well field is complex and faults may exist. The tops of at least two sand beds in the geologic sequence can be interpreted on geophysical logs as being the top of the Memphis Sand and two clay beds can be interpreted as being the Cook Mountain Formation. The top of the shallower clay bed underlies the fluvial deposits and varies in thickness, but it commonly is thin. The deeper clay bed is thick and seems to be persistent throughout the area. Consequently, during the Graham and Parks investigation, the lower clay was interpreted to be the Cook Mountain Formation and the underlying (deeper) sand to be at the top of the Memphis Sand. During 1986 and 1987, test holes for several new MLGW production wells were drilled in the northern part of Sheahan well field. The geophysical and driller's logs for the test hole for well Sh:K-142 (plate 1) indicate that the confining unit, if present, consisted of only about 6 feet of sandy clay (or clayey sand) overlying a thick interval of sand in the Memphis Sand. In addition, the geophysical log of well Sh:K-141 (plate 1), drilled at the Tennessee Earthquake Information Center for installation of a seismic instrument, indicated that the Cook Mountain Formation may be the shallower clay and that the top of the Memphis Sand may be at the top of the shallower sand. Based on this new information, a re-correlation of the geophysical logs available for the northern part of the Sheahan well field and surrounding areas indicates that the confining unit is thin or absent in an area west of the northern part of the well field (plate 1). This area of high potential for leakage is consistent with a depression in the water table as indicated by a deeper than expected water level in observation well Sh:K-137 (plate 2) installed at the Sheahan pumping station in 1986. In addition, in an area between the Sheahan and Allen well fields (defined by the 160-foot contour on plate 3), the potentiometric surface of the

Memphis aquifer is higher than would be expected when considering the intense pumping at these well fields. This "high" in the potentiometric surface may be the result of leakage from the water-table aquifers in the area where the confining unit is thin or absent (plate 1).

A new area of leakage from the water-table aquifers to the Memphis aquifer identified since the Graham and Parks (1986) report is just north and northeast of the Shelby County landfill (plate 4). During an investigation of the area to satisfy requirements of the TDHE, Division of Solid Waste Management, for expansion of the landfill, water levels in auger holes and observation wells drilled in the vicinity of the landfill indicated that the water table is depressed to levels below low-flow stages of the nearby Wolf River (J.L. Ashner, TDHE, oral commun., 1986). Subsequently, the USGS investigated the geohydrology of the area with emphasis on determining the effects of vertical leakage and leachate migration on the ground-water quality. The results of the investigation indicate that (1) the depression in the water table is centered just north or northeast of the landfill and is as much as 14 feet below the low-flow stages of the Wolf River, (2) a downstream loss of water from the Wolf River occurs along the stretch that flows past the landfill, (3) leachate from the landfill has entered the Wolf River alluvium and is moving northward toward the depression in the water table, and (4) uncontaminated water from the alluvium has entered the Memphis aquifer (M.W. Bradley, USGS, written commun., 1989). The map of the thickness of the Jackson-upper Claiborne confining unit indicates an area in the vicinity and east of the landfill where the confining unit is thin or absent. This is based partly on the geophysical log of well Sh:Q-90 drilled for the landfill investigation (plate 1). A depression in the water table is defined by the 220-foot contour on the map of the altitude of the water table in the alluvium and fluvial deposits. The center of this depression is near well Sh:Q-128 installed for the landfill investigation (plate 2).

New areas identified during the present investigation where the Jackson-upper Claiborne confining unit is thin or absent or where depressions are in the water table include: (1) in the southeastern part of Lichterman well field based on the geophysical log for well Sh:L-102 (plate 1), (2) in the vicinity of McCord well field based on an area east of the well field along Fletcher Creek where the confining bed is interpreted to be thin or absent (plate 1) and the lower than expected water levels in wells Sh:Q-86 and Sh:Q-94 (plate 2), (3) south of Nonconnah Creek and between Interstate 55 and U.S. Highway 78 based on the geophysical log of well Sh:K-143 (plate 1) and the lower than expected water levels in wells Sh:K-144 and Sh:K-145 (plate 2), and (4) west of Olive Branch based on the geophysical log of well Ms:C-17 (plate 1). These newly identified areas have a high potential for downward leakage from the water-table aquifers to the Memphis aquifer.

POTENTIAL FOR CONTAMINATION OF THE MEMPHIS AQUIFER

A sequence of events that would result in contamination of the Memphis aquifer under "natural" conditions is: (1) contaminants enter the water-table aquifers; (2) contaminants are transported downward through the Jackson-upper Claiborne confining unit or enter the Memphis aquifer directly in areas where the confining unit is absent; and (3) contaminants persist despite the effects of various physical, chemical, and biological processes, including dilution and adsorption. Other events that would result in contamination of the Memphis aquifer include: (1) contaminated water in the water-table aquifers leaks downward through faulty well seals (cement grout or backfill material) outside the casings of wells screened in the Memphis aquifer and (2) contaminants from spills, vandalism, or illegal waste disposal enter the casings of wells screened in the Memphis aquifer.

Based on "natural" conditions, the potential for contamination of the Memphis aquifer generally is least in the northern and west-central parts of the Memphis area where the confining bed is thickest and contains much clay, and is greatest in the southern and eastern parts where the confining bed is thin or absent (plate 1). The Jackson-upper Claiborne confining unit is as much as 375 feet thick in the northwestern part of the Memphis area in well Sh:T-18 (plate 1). In this area, the confining unit consists of fine sand, silt, clay, and lignite in the Jackson, Cockfield, and Cook Mountain Formations. The confining unit is absent in the southeastern part of the Memphis area in wells Sh:M-17, Sh:M-43, and Sh:R-10 (plate 1). Aggregate thickness of clay beds within the confining unit thicker than 10 feet is greatest in the west-central part of the Memphis area. In the Mallory well field, an aggregate thickness of clay beds thicker than 10 feet makes up 246 feet of the total thickness of 255 feet for the confining unit in well Sh:O-184 (plate 1).

Sites where the water-table and Memphis aquifers are reported to contain contaminants and areas where the Jackson-upper Claiborne confining bed is thin or absent are shown on plate 4. Thus far, 44 sites have been identified where contaminants have been detected in the water-table aquifers (table 6). Many of these sites, which are potential sources of contamination of the Memphis aquifer, are located in areas where the direction of ground-water flow in the Memphis aquifer is toward cones of depression at MLGW well fields (plate 3). Based on present (1989) information, the Allen well field has the most sites in close proximity. Some sites also are located in areas where the confining unit is thin or absent or in areas where the direction of flow in the water-table aquifers is toward these areas (plate 2). It is likely that additional sites where the water-table aquifers are contaminated will be found as monitoring and investigations continue.

Thus far, only two sites have been found where volatile organic compounds have been detected in the Memphis aquifer—wells Sh:J-119 (398 feet deep), Sh:J-120 (452 feet) and Sh:J-121 (436 feet) in the Allen well field at Memphis and wells Sh:M-31 (324 feet) and Sh:M-35 (287 feet) in the west well field at Collierville (plate 4). Volatile organic compounds detected in wells Sh:J-119 and Sh:J-120 are: 1,1-dichlorethane, 1,1-dichloroethylene, cis-1,2-dichloroethylene, 1,2-dichloropropane, 1,2-dichloroethene, trichloroethylene, and vinyl chloride. Concentrations of these compounds ranged from 0.02 to 5.52 $\mu g/L$ in these two wells—the highest concentration was for 1,2-dichloroethane detected in a sample collected from well Sh:J-120. The concentrations of the seven compounds in a sample from this well totaled about 11 $\mu g/L$ (J.H. Webb, MLGW, written commun., 1988). Well Sh:J-120 is about 650 feet and well Sh:J-119 is about 2,000 feet from the nearest known potential source of contamination in the water-table aquifers (site 34, plate 4; table 6). The wells in the Allen well field are in an area where the confining unit is as thin as 82 feet and contains as little as 68 feet of aggregate thickness of clay beds thicker than 10 feet, based on the geophysical log of well Sh:J-119 (plate 1). Driller's logs for wells Sh:J-120 and Sh:J-121 provide no indication that a sand "window" exists in this area, although it is possible.

The volatile organic compound detected in water from wells Sh:M-31 and Sh:M-35 at Collierville is trichloroethylene. Since August 1988, these two municipal wells have been sampled periodically to determine concentrations of trichloroethylene. Concentrations detected have ranged from 1.6 to 25.0 $\mu g/L$ with the highest concentration in a sample collected from well Sh:M-35 (B.J. Maness, TDHE, written commun., 1989). These wells are about 2,000 feet from the nearest known potential source of contamination (site 44, plate 4; table 6). The wells at Collierville are east of the eastern limits of the Jackson-upper Claiborne confining unit

(plate 4). However, the driller's logs for wells Sh:M-31 and Sh:M-35 indicate at least 60 feet of clay in the Memphis aquifer separating the water-table aquifers from sand in the Memphis aquifer.

The facts that these volatile organic compounds (1) have been transported through the Jackson-upper Claiborne confining unit or through (or around) relatively thick intervals of clay in the Memphis aquifer, (2) have persisted despite the effects of various physical, chemical, and biological processes, and (3) have been detected in wells ranging from 287 to 452 feet in depth at distances as far as 2,000 feet from the nearest known potential sources of contamination in the water-table aquifers, emphasize the vulnerability of the Memphis aquifer to contamination.

Recently (1987-88), MLGW began a yearly routine sampling of all of their production wells in the Memphis aquifer and analytical "scans" of the water to determine the presence of organic compounds. If unidentified organic compounds are detected, a follow-up analysis is conducted to identify specific compounds. The results of the first sampling of all production wells indicated that only the water from the three wells in the Allen well field contained contaminants (J.H. Webb, MLGW, oral commun., 1989).

SUMMARY AND CONCLUSIONS

The City of Memphis presently (1989) depends solely on the Memphis aquifer for its water supply. Withdrawals from the Memphis aquifer in the Memphis area for municipal, industrial, and commercial uses totaled about 200 Mgal/d in 1988. Historically, the Memphis aquifer was thought of as an ideal aquifer overlain by a thick, impermeable clay layer that serves as a confining unit and protects the aquifer from contamination from near-surface sources. Studies in recent decades (1964-86), however, indicate that the confining unit locally may be thin or absent and may contain sand "windows" that could provide "pathways" for contaminants to reach the Memphis aquifer. Studies also indicate that downward leakage from the water-table aquifers (alluvium and fluvial deposits) to the Memphis aquifer is widespread in the Memphis area.

Indications of areas where downward leakage from the water-table aquifers to the Memphis aquifer is or may be occurring that were recognized during the previous and present investigations are as follows:

- areas where the confining unit is thin or absent and downward leakage can occur directly from the water-table aquifers to the Memphis aquifer;
- differences in hydraulic head between the water-table aquifers and the Memphis aquifer indicate a general downward gradient in most of the Memphis area;
- local depressions in the water-table surface indicate that leakage from the water-table aquifers to the Memphis aquifer is occurring;
- long-term declines and reduced seasonal fluctuations in observation wells in the water-table aquifers indicate that leakage is occurring;
- downstream losses of water along a stretch of a major stream based on a series of discharge measurements made during low-flow conditions indicate that leakage is occurring;
- areal and local variations in carbon-14 and tritium concentrations in water from the Memphis aquifer show the presence of relatively recent water, indicating leakage;

- local deviations in geothermal gradient in areas of intense pumping indicate that shallow subsurface temperatures in the water-table aquifers, confining unit, and Memphis aquifer are warmer than expected as a result of leakage;

- water-quality anomalies and changes in water quality in the Memphis aquifer indicate downward leakage from the water-table aquifers to the Memphis aquifer; and

- volatile organic compounds detected in water from the Memphis aquifer indicate that contaminants in water from the water-table aquifers has reached the Memphis aquifer.

Detailed maps of the thickness of the confining unit and the altitude of the water table in the alluvium and fluvial deposits prepared during the present investigation have provided much refinement of previously identified areas of downward leakage. Several new areas where downward leakage is or may be occurring also have been identified. Maps showing the altitude of the potentiometric surface of the Memphis aquifer and the locations of 44 sites where contaminants have been detected in the water-table aquifers indicate that many potential sources of contamination are located in areas where the direction of ground-water flow in the Memphis aquifer is toward cones of depression at MLGW well fields. Based on present information, the MLGW Allen well field has the most sites in close proximity. The water-table map also indicates that some of the sites where contaminants have been detected are in areas where the confining unit is thin or absent or in areas where the direction of flow in the water-table aquifer is toward these areas.

Recently, (1986-88) volatile organic compounds were detected in water from five municipal wells in the Memphis area—three in the MLGW Allen well field at Memphis and two in the west well field at Collierville. Concentrations totaled about 11.0 μg/L for seven compounds in a sample from one of the wells at the Allen well field and 25.0 μg/L for one compound in a sample from one of the wells at Collierville.

The facts that volatile organic compounds (1) have been transported downward through the confining unit or through (or around) relatively thick intervals of clay in the Memphis aquifer; (2) have persisted despite the effects of various physical, chemical, and biological processes; and (3) have been detected in wells ranging from 287 to 452 feet in depth at distances as far as 2,000 feet away from the nearest known potential source of contamination in the water-table aquifers, emphasize the vulnerability of the Memphis aquifer to contamination.

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REFERENCE 8

Hydrology of Aquifer Systems in the Memphis Area, Tennes:

By J. H. CRINER, P-C. P. SUN, and D. J. NYMAN

CONTRIBUTIONS TO THE HYDROLOGY OF THE UNITED

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1

Prepared in cooperation with the city of Memphis, Memphis Light, Gas, and Water Division

A hydrogeologic delineation, analysis, and evaluation of the principal water-bearing formations in the Memphis area, Tennessee

U. S. Geological Survey

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HYDROLOGY OF AQUIFER SYSTEMS IN THE MEMPHIS AREA, TENNESSEE

By J. H. Criner, P-C. P. Sun, and D. J. Nyman

ABSTRACT

The Memphis area as described in this report comprises about 1,300 square miles of the Mississippi embayment part of the Gulf Coastal Plain. The area is underlain by as much as 3,000 feet of sediments ranging in age from Cretaceous through Quaternary.

In 1960, 150 mgd (million gallons per day) of water was pumped from the principal aquifers. Municipal pumpage accounted for almost half of this amount, and industrial pumpage a little more than half. About 90 percent of the water used in the area is derived from the "500-foot" sand, and most of the remainder is from the "1,400-foot" sand; both sands are of Eocene age. A small amount of water for domestic use is pumped from the terrace deposits of Pliocene and Pleistocene age.

Both the "500-foot" and the "1,400-foot" sands are artesian aquifers except in the southeastern part of the area; there the water level in wells in the "500-foot" sand is now below the overlying confining clay. Water levels in both aquifers have declined almost continuously since pumping began, but the rate of decline has increased rapidly since 1940. Water-level decline in the "1,400-foot" sand has been less pronounced since 1956.

The cones of depression in both aquifers have expanded and deepened as a result of the annual increases in pumping, and an increase in hydraulic gradients has induced a greater flow of water into the area. Approximately 135 mgd entered the Memphis area through the "500-foot" sand aquifer in 1960, and, of this amount, 60 mgd originated as inflow from the east and about 75 mgd was derived from leakage from the terrace deposits, from the north, south, and west and from other sources. Of the water entering the "1,400-foot" sand, about 5 mgd was inflow from the east, and about half that amount was from each of the north, south, and west directions. The average rate of movement of water outside the area of heavy withdrawals is about 70 feet per year in the "500-foot" sand and about 40 feet per year in the "1,400-foot" sand. The average rate of depletion of storage in each aquifer since pumping began is about 1 mgd.

Most of the recharge to the "500-foot" and "1,400-foot" sands occurs in outcrop areas about 30–80 miles east of Memphis. Also, water leaks from the terrace deposits to the "500-foot" sand in some places, and there may be some

or streams.

The quality of water from both the principal aquifers is very good. Iron, carbon dioxide, and hydrogen sulfide are the only constituents found in undesirable quantities. Water from the terrace deposits is hard but generally contains less iron and carbon dioxide than water from either of the principal aquifers.

The hydraulic characteristics of both aquifers were determined by pumping tests and by applying the knowledge of the geology of the area; these characteristics indicate that the aquifers are capable of producing more water than is currently being pumped from them. The "500-foot" sand will produce more water per unit decline of water level than will the "1,400-foot" sand. There appears to be no reason why the development of water supplies from both aquifers should not continue, but well spacing will remain a factor which could affect future development. Greater well spacing will tend to prolong the useful life of a well and the aquifers.

INTRODUCTION

In 1960, industrial and municipal supply wells in the Memphis area pumped about 150 million gallons of water a day. Pumping has increased continuously since 1898, the earliest date for which records are available, and the rate of this increase has accelerated greatly since 1940. Decline of water levels has accompanied increases in the pumpage, and in 1928 the city of Memphis began a program of periodic water-level measurements to determine ways to reduce the rate of decline. The U.S. Geological Survey was requested to assist in this study, and a continuing cooperative program of investigations was begun in 1940. Early investigations showed the need for proper spacing of wells, which has been practiced to the present time.

PURPOSE AND SCOPE OF INVESTIGATION

The present investigation was started in 1958 as a quantitative study of the two principal aquifers that supply water to the Memphis area. The objectives were to delineate these aquifers, evaluate their hydraulic characteristics, show the relation between pumpage and water-level change, and determine the factors affecting the economical development and use of ground water. The study was based partly on the premise that the questions posed by Kazmann (1944, p. 17–18) must be answered as completely as possible to provide for orderly development and management of the ground-water resources. These questions are repeated and discussed in the concluding section of this report.

Work consisted of (1) delineation of the "500-foot" and "1,400-foot" sands by a series of subsurface contour maps based on drillers' logs and geophysical logs of wells, (2) collection of water-level records from a network of about 150 observation wells, 55 of which were equipped with automatic recorders, (3) preparation of contour maps [illegible] "500-foot" sand, (4) analyses of pumping tests of wells in both nonimi-

area through each aquifer before development began and during 1960, (6) preparation of a ground-water budget for the "500-foot" sand, based on 1960 records, and (7) inventory of ground-water withdrawal and study of its relation to water-level decline.

LOCATION AND GENERAL FEATURES OF THE AREA

The Memphis area (fig. 1), about 1,300 square miles in this report, includes all Shelby County and parts of Fayette and Tipton Counties, Tenn., and contiguous parts of Arkansas and Mississippi. The area is near the center of the upper half of the Mississippi embayment in the Gulf Coastal Plain.

The climate of the Memphis area is warm and humid, having hot summers, mild winters, and a frost-free period of about 230 days between late March and early November. The average annual temperature is 61.9°F; the hottest month is July, which has an average temperature of 81.1°F; and the coldest month is January, which has an average temperature of 41.5°F.

The average annual rainfall Memphis (fig. 2), based on an 89-year period of record (1872–1960), is 48.48 inches. The maximum annual rainfall recorded was 76.85 inches in 1957, and the minimum was 30.54

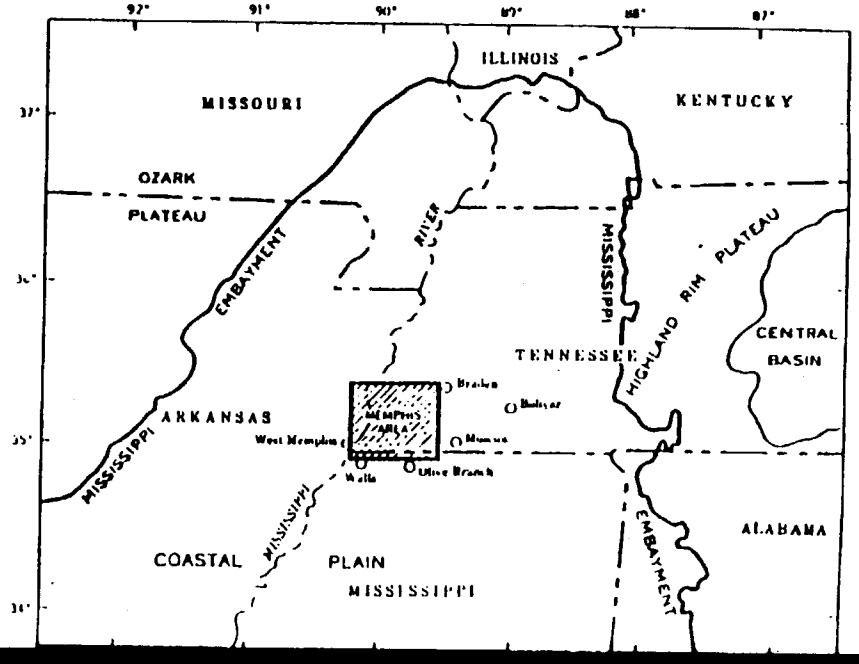


FIGURE 1.—Generalized physiographic map of the northern Mississippi embayment, show

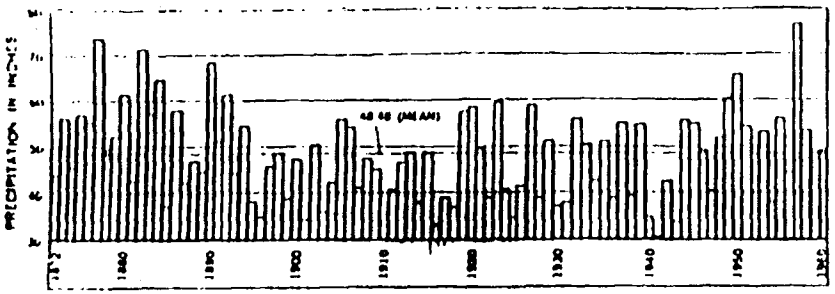


FIGURE 2.—Graph showing annual precipitation at Memphis, Tenn.

inches in 1941. The wet season usually begins in late November and ends in April. Rainfall at Moscow and Bolivar (fig. 1) in the outcrop or recharge area of the principal aquifers, is slightly greater than that in the Memphis area.

The Memphis area (fig. 1) consists mostly of a gently rolling upland ranging in elevation from about 400 feet in the eastern part of Shelby County to about 200 feet on the alluvial plain of the Mississippi River. The maximum topographic relief is about 200 feet, but the local relief of individual topographic features seldom exceeds 40 feet. The upland area is terminated by a bluff 50 to 150 feet high along the eastern margin of the alluvial plain of the Mississippi River. This virtually flat plain, which is approximately 210 feet above sea level, is about 3 miles wide along the east side of the Mississippi River except in the vicinity of Memphis; at Memphis the river flows along the base of the bluff.

The principal streams that drain the Memphis area are the Wolf and Loosahatchie Rivers and Nonconnah Creek, all of which flow north-northwestward and discharge into the Mississippi River. These streams have wide flood plains that are generally adequate to accommodate flood waters during the rainy reason. Some sections of the channels of these and smaller tributaries have been artificially deepened for more effective drainage of the lowland areas. In the past all three major streams have flowed throughout the year; however, in recent years Nonconnah Creek was dry in its lower reach for short periods during the dry season from July to October.

Memphis is a large industrial center; the principal industries produce hardwood lumber and cotton and associated products. The Memphis Chamber of Commerce reported 765 industries in Memphis (1958-59), 120 of which have their own water-supply wells. More than half the total ground-water pumpage from the area is from these

The 1960 U.S. Census shows that the population of Memphis and Shelby County has approximately doubled since 1930. The successive census figures are as follows:

Population of Memphis and Shelby County, Tenn.

Year	Memphis	Shelby County
1930	253,143	306,482
1940	292,942	358,250
1950	396,012	482,393
1960	497,524	627,019

PREVIOUS INVESTIGATIONS

The earliest reports describing the geology and the ground-water resources of the Memphis area were by Safford (1869, 1890) and Glenn (1906). Wells (1931) described the artesian water supply of Memphis and, in a subsequent report (1933), the ground-water resources of West Tennessee, including a more detailed discussion of ground-water conditions in the Memphis area. Since the beginning of the cooperative program in 1940, progress reports have been published by Kazmann (1944), Schneider and Cushing (1948), and Criner and Armstrong (1958).

Regional and local studies relating to the geology of the Memphis area were made by Fisk (1944), Caplan (1954), Stearns and Armstrong (1955), and Stearns (1957).

Records of water levels from 1936 through 1955 have been reported by the U.S. Geological Survey (issued annually). Earlier measurements were reported by Wells (1931, 1933).

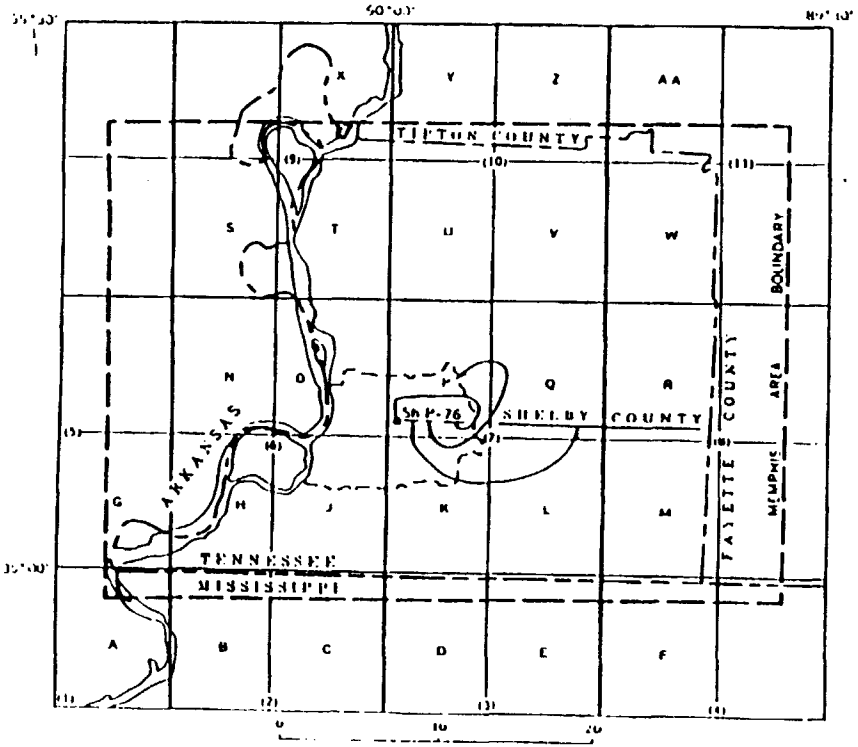
ACKNOWLEDGMENTS

The assistance and cooperation of many city and county officials, industry representatives, drilling contractors, and well owners were helpful in the collection of data for this report. Mr. J. J. Davis, Director, Water Division, and Messrs. A. J. Rumley and Hugh Mills, Memphis Light, Gas, and Water Division, provided essential well and water-use data from the city records and assisted greatly in the investigation. Mr. E. C. Handorf and Mr. W. M. Craddock, of the Memphis and Shelby County Health Department have, through their interest in the Memphis area water supply, contributed substantially to the study. Drilling contractors, industries, and individual well owners also were especially helpful in providing well data, permitting use of wells for geophysical and hydraulic tests, and furnishing in-

WELL-NUMBERING SYSTEM

Figure 3 illustrates the standard system for numbering wells in this report. Each well number consists of of three units: (1) an abbreviation of the name of the county in which the well is located; (2) a letter designating the 7½-minute topographic quadrangle, or 7½-minute quadrant of a 15-minute quadrangle, in which the well is located; and (3) a number generally indicating the numerical order in which the wells were inventoried.

The index map (fig. 3) shows the 15-minute topographic quadrangles of the U.S. Army Corps of Engineers that include Shelby County and adjacent areas described in this report. The example, well Sh: P-76, is in Shelby County, in the northwest quadrant (7½-minute quadrangle designated "P") of the Bartlett 15-minute quadrangle and is identified as well 76 in the numerical sequence.



In this report the county designation "Sh" is omitted in figures. Well numbers in adjoining counties in Tennessee are preceeded by the county abbreviation. Wells in adjoining States are not numbered.

At Memphis, the Memphis Light, Gas, and Water Division many years ago established their own well-numbering system. According to this plan, blocks of numbers were assigned for the city's five existing well fields (pl. 1) and other blocks of numbers were reserved for future well fields. The block assignments are as follows:

1–40	Parkway Field	200–240	McCord Field
50–99	Sheahan Field	250–299	(Not assigned)
100–149	Allen Field	300–349	Hickory Hill (Lichterman) Field (proposed)
150–199	Miscellaneous wells at scattered locations (abandoned)		

Listed below are city-owned wells in use as of January 1962 and those that have been withdrawn from use. Well numbers followed by the letters "A," "B," and so on, indicate first, second, and so on, replacement wells for those withdrawn from use. For convenient reference, the wells owned by the Memphis Light, Gas, and Water Division are listed below, together with the corresponding numbers assigned by the U.S. Geological Survey.

City	Geological Survey	City	Geological Survey	City	Geological Survey
1	Sh:O-125	15A	Sh:O-150	30	Sh:O-175
1A	126	16	151	31	176
2	127	16A	152	32	177
2A	128	17	153	33	178
3	129	18	154	34	179
4	130	19	155	35	180
4A	131	19A	156	36	P- 77
5	132	20	157	37	78
6	133	20B	158	38	O-181
6A	134	21	159	39	182
7	135	21A	160	40	183
7A	136	22	161	41	184
9	137	22A	162	42	185
9A	138	22B	163	43	186
10	139	22C	164	44	187
10A	140	23	165	45	188
11	141	23A	166	46	189
11A	142	24	167	47	190
12	143	24A	168	50	K- 37
12A	144	25	169	51	38
13	145	26	170	52	39
13A	146	26A	171	53	40
14	147	27	172	54	41
14A	148	28	173	54A	42

City	Geological Survey	City	Geological Survey	City	Geological Survey
55A	Sh: K- 44	80	Sh: P- 84	123	Sh: J-116
56	45	81	K- 69	124	117
57	46	82	70	125	118
57A	47	83	71	126	119
57B	48	84	72	127	120
57C	49	85	73	128	121
58	50	86	74	130	122
59	51	86S	75	131	123
60	52	87	76	133	124
61	53	88	77	134	125
61A	54	101	J- 96	135	126
62	55	102	97	136	127
63	56	103	98	137	128
64	57	104	99	193	P- 76
65	58	105	100	201	Q- 29
66	59	106	101	202	30
67	60	107	102	203	31
68	61	108	103	204	32
69	62	109	104	205	33
70	63	110	105	207	34
71	64	111	106	208	35
72	65	112	107	209	36
73	66	113	108	210	37
74	P- 79	114	109	218	38
75	80	115	110	219	39
76	81	116	111	220	40
77	K- 67	117	112	221	41
77A	68	118	113	222	42
78	P- 82	121	114	307	L- 39
79	83	122	115	324	40

GENERAL GEOLOGY OF THE AQUIFER SYSTEMS

The Memphis area is in the northern part of the East Gulf Coastal Plain, near the axis of the Mississippi embayment structural trough (fig. 1). About 3,000 feet of unconsolidated clay, silt, sand, and gravel has been deposited in this area, and these sediments provide a record of the several invasions and recessions of the sea and the intervening periods of erosion that have occurred since the beginning of Cretaceous time. This wedge-shaped sequence of deposits thickens southward toward the Gulf of Mexico and westward toward the Mississippi River.

Stearns and Armstrong (1955, p. 6–7) and Stearns (1957, p. 1084–1085) described the depositional environmental relations and defined three sedimentary rock types that best illustrate these relations in the northern part of the Mississippi embayment. These types are described briefly as follows:

Back-beach clay and sand.—Back-beach beds consist of light-[illegible] in contrast with those of a more marine environment, are characterized by the presence of leaf imprints and the general absence of glauconite. These clay and sand deposits are of limited areal extent and therefore cannot be traced easily in the subsurface, even by means of geophysical logs of closely spaced wells. The irregularly interbedded sediments in the upper part of the Claiborne Group (table 1) are typical of the back-beach deposits.

Shallow-water near-shore sand.—Well-sorted sand interbedded with glauconitic and fossiliferous clay is characteristic of the shallow-water near-shore deposits. The sand is areally extensive, in contrast with the back-beach deposits. Where sand beds grade laterally or vertically into back-beach beds, they contain lignite and wood fragments; where they grade into deeper-water clay beds, they contain glauconite. The sandy middle unit ("1,400-foot" sand) of the Wilcox Group (table 1) in the Memphis area is typical of the shallow-water near-shore deposits.

Deeper water clay and shale.—The deeper water clay and shale is medium gray to dark gray and contains marine fossils, calcareous beds, and glauconite. These beds are thick and areally extensive and therefore are easily recognized and traced in the subsurface by means of drillers' logs and geophysical logs of wells. In the Memphis area, typical deposits of this category are the marine facies of the Jackson(?) Formation and the upper clay unit of the Wilcox Group.

DESCRIPTION OF THE GEOLOGIC UNITS

The Memphis area is underlain by about 3,000 feet of clay, silt, sand, and gravel ranging in age from Cretaceous through Recent. These sediments were deposited on the limestone rocks of Paleozoic age that form the bedrock floor of the Mississippi embayment syncline. This report deals primarily with the geology related to the two principal aquifers in the Memphis area, and for this reason only the stratigraphic units of Eocene and younger age are discussed in detail. These units (table 1) include the major aquifers, the "1,400-foot" sand of the Wilcox Group, and the "500-foot" sand of the Claiborne Group (Kazmann, 1944, p. 2).

WILCOX GROUP

On the basis of drillers' logs and geophysical logs of wells in the Memphis area, the Wilcox Group is divided into a lower clay unit, a middle sand unit ("1,400-foot" sand), and an upper clay unit (Criner and Armstrong, 1958, p. 3).

The lower unit of the Wilcox Group consists of gray to greenish-gray lignitic clay which grades upward into silt and fine-grained [illegible] perhaps representing a transitional phase between the marine Porters

TABLE 1.—*Geologic units underlying the Memphis area*

System	Series	Group	Stratigraphic unit	Thickness (feet)	Description and relation to water
Quaternary	Recent		Alluvium	0-200	Alluvial sand, clay, and gravel. Few domestic wells. Could be important source of water for some industrial uses.
	Pleistocene		Loess	0-100	Wind-deposited silt. (Topographically higher than alluvium.) Low permeability. Not a source of ground water.
	Pleistocene and (or) Pliocene?		Terrace deposits	0-180	Alluvial sand and gravel. Several domestic wells. Could be major source of water for industrial and irrigation uses.
Tertiary	Eocene		Jackson(?) Formation (lower part may include some Claiborne beds)	0-330	Gray, bluish-gray, greenish-gray, and tan clay; minor amounts of lignite and fine-grained sand. Generally impermeable and considered to be upper confining beds for water in "500-foot" sand.
		Claiborne	"500-foot" sand (upper part may include some Jackson(?) beds)	500-800	Fine- to coarse-grained sand; minor amounts of lignite and tan clay and silt; thin clay and lignite zones. Thick clay bed locally at base. Coarse channel sands locally at base. Very good aquifer from which 80 percent of water in Memphis area is obtained.
		Wilcox	Flour Island Upper clay unit	200-395	Gray, greenish-gray, and brown carbonaceous clay. Thin lignite and fine-grained sand lenses locally. Low permeability confines water in "500-foot" and "1,400-foot" sands.
			Middle sand unit ("1,400-foot" sand)	150-300	Fine- to medium-grained sand; minor amounts of lignite and clay lenses. Second principal aquifer which supplies about 10 percent of water used in Memphis area.
			Lower clay unit	180-250	Gray, greenish-gray, and brown carbonaceous clay, and lignite; sandy near top. Impermeable lower confining bed for water in "1,400-foot" sand.

p. 039.

Porters Creek Clay and the predominately sandy middle unit of the Wilcox. The clay unit ranges in thickness from 190 feet in test well Fa: W-1 about 30 miles northeast of Memphis near Braden, Fayette County, to 250 feet in well Sh: U-12, 3.5 miles south of Millington, Shelby County (pl. 1).

1400' Sand The middle sand unit referred to as the "1,400-foot" sand by Criner and Armstrong (1958, p. 3), consists mostly of unconsolidated well-sorted fine- to medium-grained sand. Logs of a few wells in the Memphis area show thin interbedded lenses of clay, but these beds probably are not areally extensive. The sand ranges in thickness from 150 feet in test well Fa: W-1 near Braden, Fayette County, to 240 feet in well Sh: U-12, 3.5 miles south of Millington, Shelby County (pl. 1). The thickness increases westward to 300 feet in an oil-test well 7 miles west of West Memphis, Ark.

Flour Island The upper unit of the Wilcox Group in the Memphis area consists of dark-gray or brown lignitic clay containing local lenses of silty and sandy clay from 1 to 50 feet thick. Thin beds of fine-grained sand cemented with iron oxide form "rock" layers a few inches thick in many parts of the unit. The upper clay of the Wilcox grades upward to a sandy clay; however, the contact with the overlying sand of the Claiborne Group is distinct, as is indicated by geophysical logs (pl. 1) of wells in the area. The thickness of the upper clay section varies greatly, ranging from 200 to 395 feet in the Sheahan well field in the south-central part of Shelby County.

CLAIBORNE GROUP

The Claiborne Group in the Memphis area is represented by the "500-foot" sand, which has been divided into lower and upper parts by Criner and Armstrong (1958, p. 7-8). This subdivision was based on the different lithologies of the two parts and on their separation in much of the area by clay beds as much as 150 feet thick. Electrical logs and drillers' logs of wells show that the lower part of the Claiborne varies greatly in thickness and contains a greater number of clay beds that are thicker and more extensive than those in the upper part. Even the thickest of the clay beds, however, are not continuous, so that no particular bed can be considered as a hydrologic boundary between distinctive lower and upper parts. In this report, therefore, the "500-foot" sand is considered as a single hydrologic unit. Generally the Claiborne Group is characterized by a greater proportion of clay in the lower part and by a gradation in sand particle size from fine to medium grained in the lower part to medium to coarse grained in the upper part. The thickest and most extensive

lower part of the Claiborne Group.

The thickness of the Claiborne Group ranges from 500 feet in test well Fa: W-1 near Braden, Fayette County, to 800 feet in well Sh: J-101 in the southern part of the city of Memphis (pl. 1). The top of the "500-foot" sand was indicated in geophysical logs of wells as the level at which the sediments change from predominantly sand to predominantly clay or silt. The contacts were picked to define a hydrologic unit ("500-foot" sand regardless of geologic age. For this reason the upper part of the unit as shown on plate 1 may include some sandy beds belonging to the overlying Jackson(?) Formation.

JACKSON(?) FORMATION

The Jackson(?) Formation overlies and confines the "500-foot" sand. Locally the two units interfinger with one another, and the contact between them represents a hydrologic boundary rather than a precise stratigraphic horizon (pl. 1).

The Jackson(?) Formation is composed of dark-gray to greenish-gray, dark-blue, or dark-brown clay. It is generally carbonaceous and contains very fine quartz sand along bedding planes. The formation is absent in southeastern Shelby County but is as much as 330 feet thick in the Parkway well field.

Fisk (1944, fig. 67, p. 62) distinguished a lower marine and an upper nonmarine facies in the Jackson(?) Formation. The marine facies closely follows the present course of the Mississippi River and extends northward at least 25 miles to Lauderdale County; there an exposure contains glauconite, foraminifera, shark teeth, and bones of sea animals. Fossil plants and leaves are abundant, and seams of lignite as much as 10 feet thick are common in the nonmarine facies.

TERRACE DEPOSITS AND ALLUVIUM

The terrace deposits ranges from a few feet to about 160 feet in thickness and are composed mostly of coarse-grained quartz sand and fine-grained iron-stained quartz and chert gravel. Thin lenses of silty ocher-colored clay are common in the lower part. The bottom 3 inches to 4 feet of sand and gravel generally is cemented with limonite. Although the contact with the Jackson(?) Formation represents an erosional surface, thin lenses of reworked Jackson(?) clay and sand form a transitional zone at the base of the terrace deposits in many places; geophysical logs show a gradation from one unit to the other.

The terrace deposits occur as an irregular belt parallel to the Mississippi River and also occur along the larger streams in the area. The deposits thin gradually eastward and are absent in many places as a result of erosion or nondeposition.

(1944, p. 63) considered them both to be of Pleistocene age. Because geophysical logs show no consistent correlation points, by means of which the terrace deposits can be divided in the subsurface, they are considered as a single unit in this report.

The alluvium ranges from 0 to 200 feet in thickness and is composed of sand, clay, silt, and gravel. It is confined to narrow strips along the principal streams and in most places is subject to flooding and reworking. The coarsest material is generally near the present stream channels, and the finest is near the featheredges of the deposits.

The alluvium is lithologically similar to the underlying terrace deposits, and the contact cannot be determined from geophysical logs. However, samples of the alluvium locally contain carbonaceous material and decaying vegetation which aid in distinguishing between the two units.

GEOLOGIC STRUCTURE

The Memphis area is near the axis of the Mississippi embayment syncline, which plunges southward at a rate of about 10 feet per mile in the vicinity of Memphis. The syncline began to form in Late Cretaceous time (Fisk, 1944, p. 8, 64; and Caplan, 1954, p. 5) as a result of regional subsidence centered along the present coast of the Gulf of Mexico. The axis of the structural trough approximately follows the present course of the Mississippi River.

As the region subsided, faulting of the unconsolidated sediments and the underlying Paleozoic rocks occurred, forming a rectangular pattern of faults and fractures trending northeast and northwest (Fisk, 1944, p. 64, 66). One of the major faults in this system, the Big Creek fault (Fisk, 1944, p. 66), trends northeast from near West Helena, Ark., along the western edge of the Memphis area to Reelfoot Lake near the Tennessee-Kentucky border; at Reelfoot Lake it appears to be related to the New Madrid (Missouri) fault system. This fault is of particular significance because it apparently restricts the movement of ground water from the west into the Memphis area.

A major fault is suggested by an abrupt bend in the Mississippi River near the mouth of Nonconnah Creek and by electrical logs of wells that indicate as much as 50 feet of displacement of geologic units in the Hickory Hill well field in the south-central part of the area. If such a fault exists, it has so far had little effect on the movement of water in the "500-foot" sand.

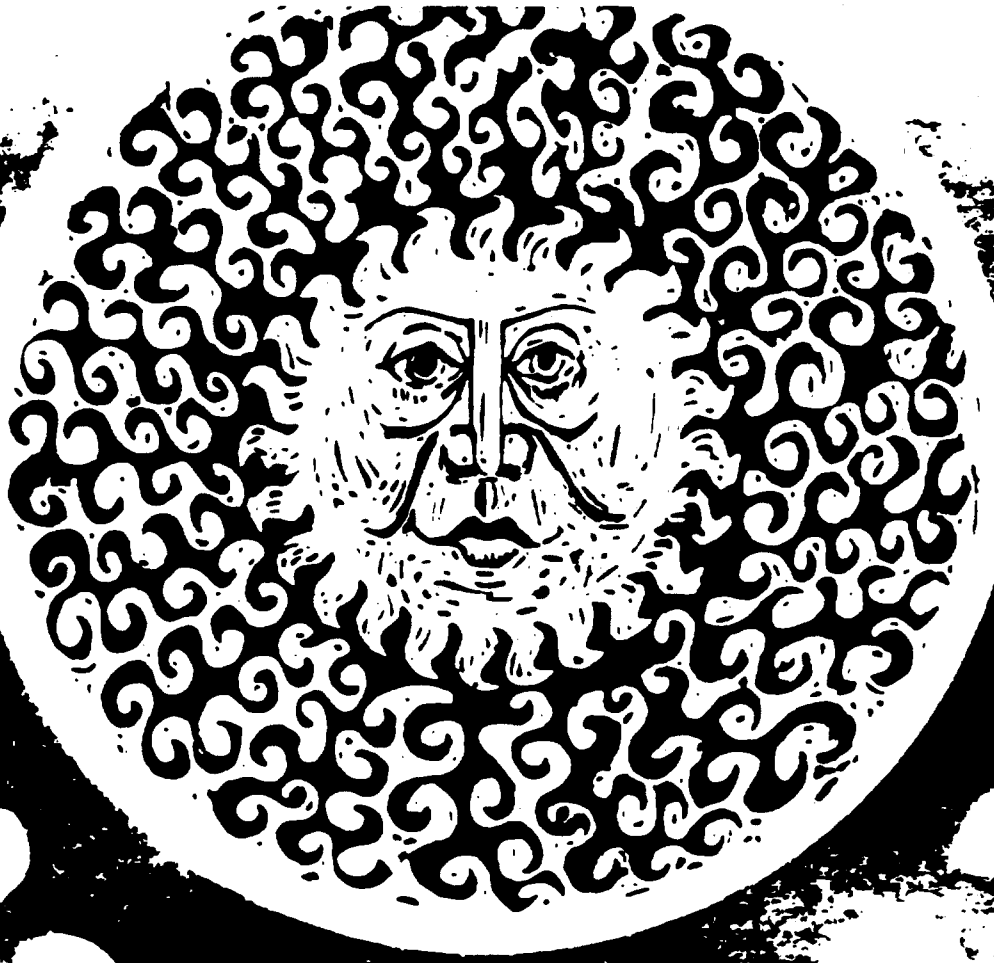
HYDROLOGY OF THE AQUIFER SYSTEMS

GEOLOGIC CONTROL OF GROUND WATER IN THE MEMPHIS AREA

nated the higher as Pliocene and the lower as Pleistocene. Fisk

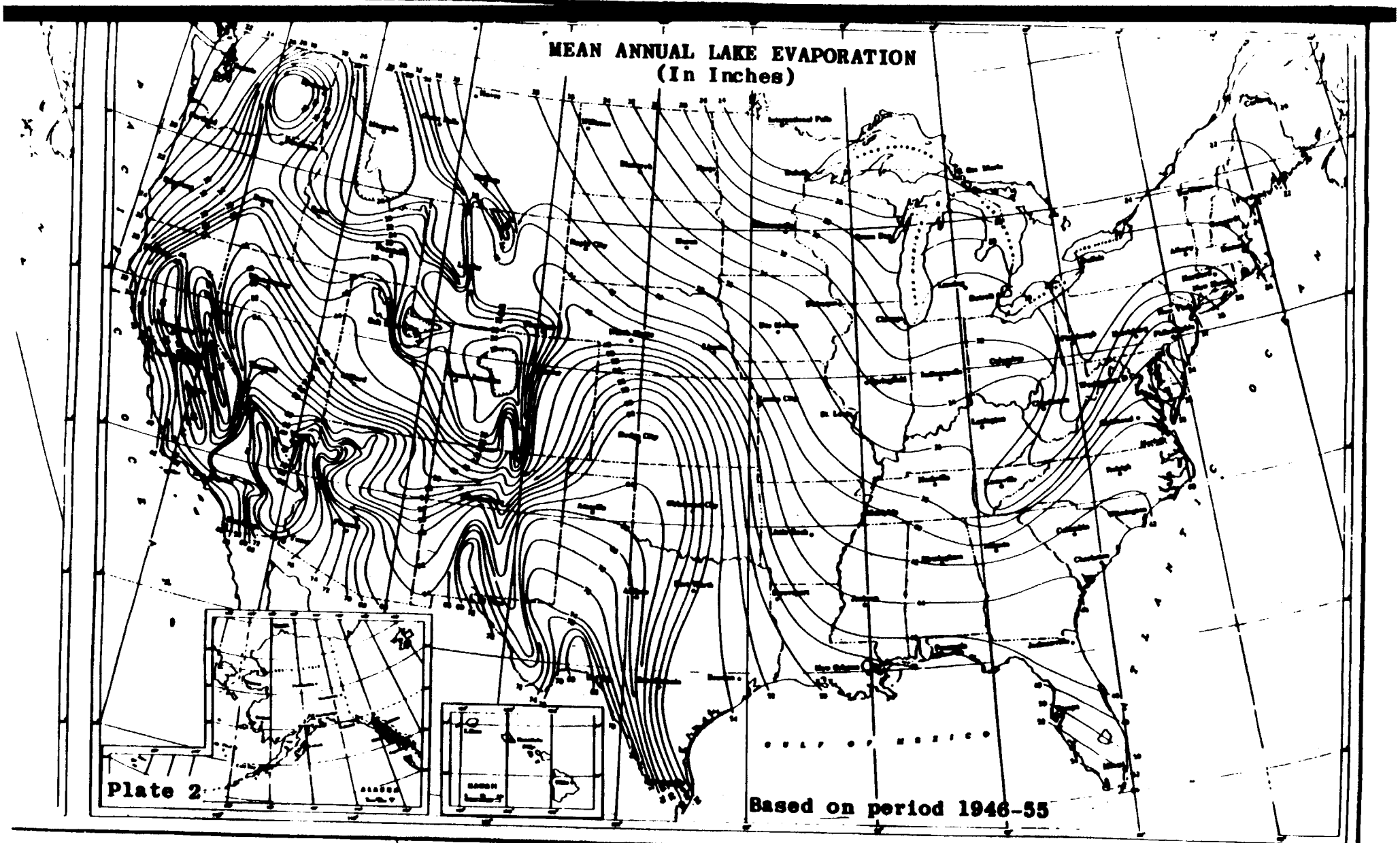
between rock particles control the amount of water that can be ac-

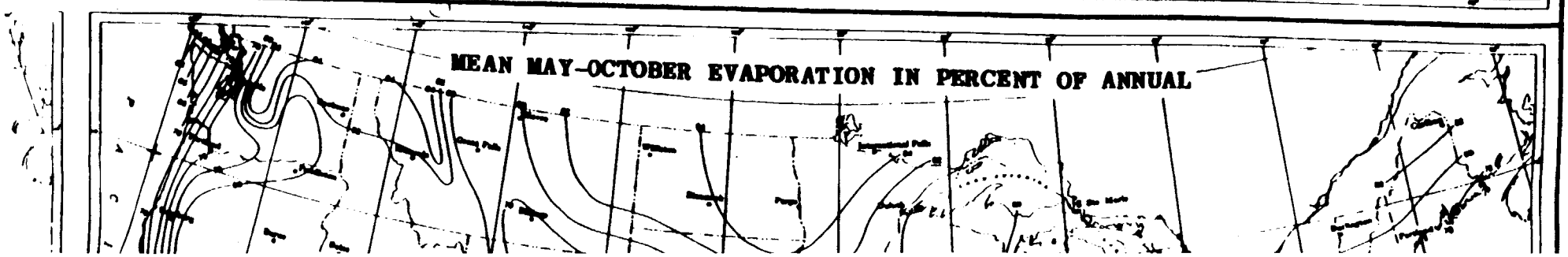
REFERENCE 9



CLIMATIC ATLAS OF THE UNITED STATES

mental Science Services Administration . Environmental Da


MEAN ANNUAL LAKE EVAPORATION
(In Inches)
Plate 2
Based on period 1946-55


MEAN MAY-OCTOBER EVAPORATION IN PERCENT OF ANNUAL

(inches) BY STATE CLIMATIC DIVISIONS

REFERENCE 10

DEPARTMENT OF COMMERCE
[illegible] G. Hodges, Secretary

WEATHER BUREAU
F. W. Reichelderfer, Chief

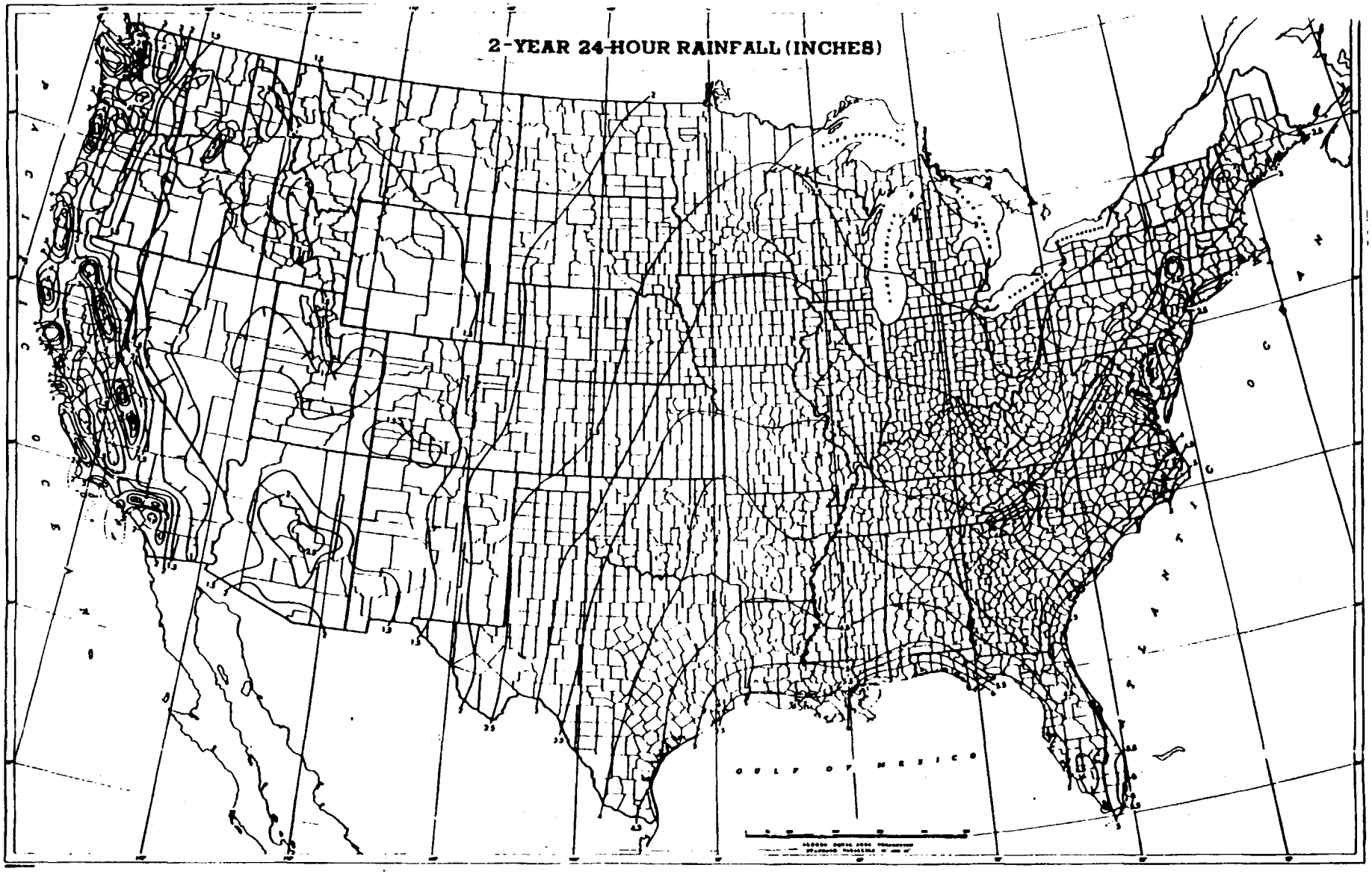
TECHNICAL PAPER NO. 40

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

PROPERTY OF EPA
FIT IV


2-YEAR 24-HOUR RAINFALL (INCHES)
GULF OF MEXICO

REFERENCE 11

SOIL SURVEY

Shelby County Tennessee

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
TENNESSEE AGRICULTURAL EXPERIMENT STATION
Issued November 1970

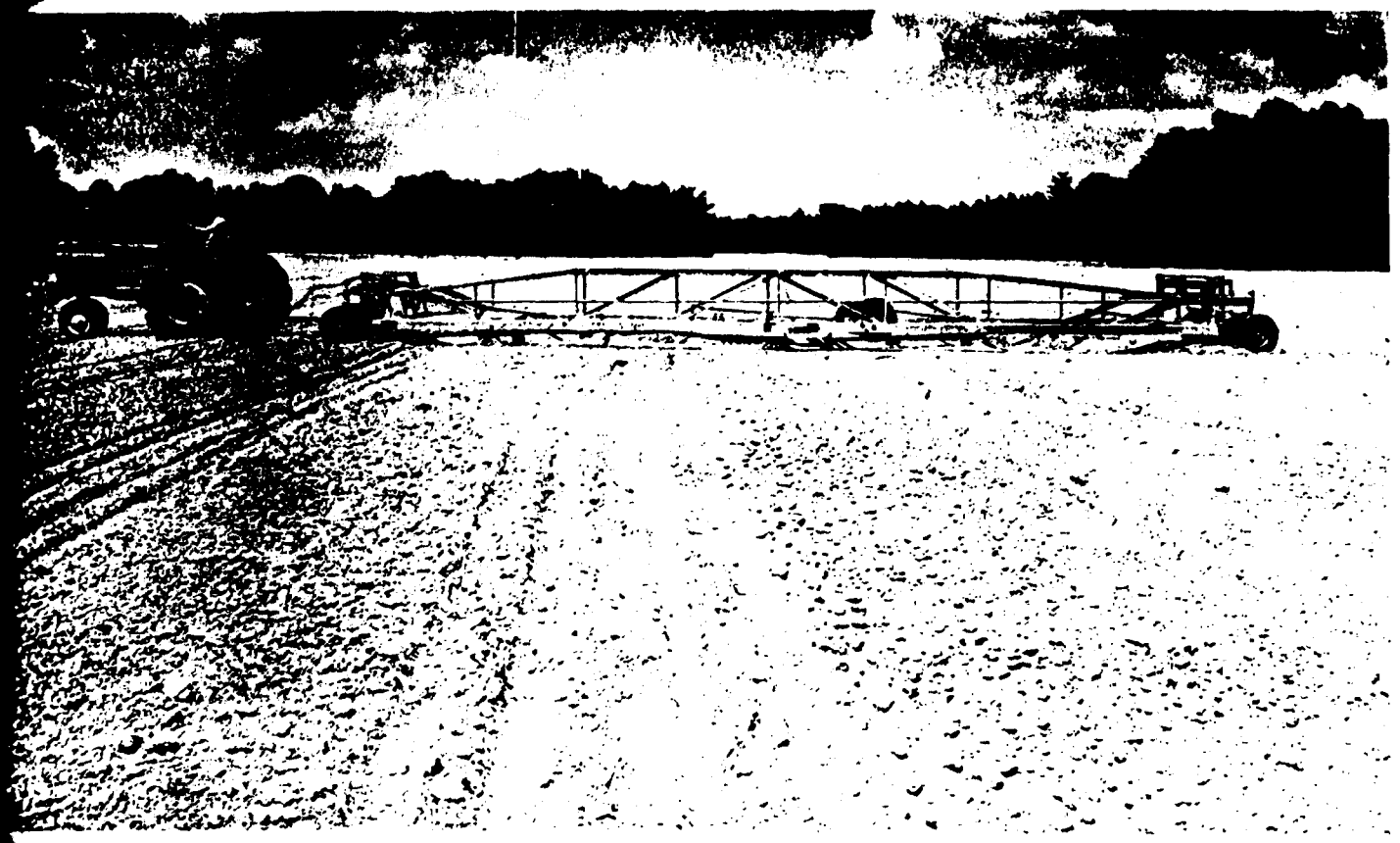


Figure 7.—Shaping an area of Falaya silt loam, to eliminate spots where water collects. The equipment is a land plane.

sted furnish a considerable amount of food for game. he seeds of weeds, annual lespedeza, and native plants at grow along field borders and ditches provide addi-onal food. Scattered areas of trees and bushes along tchbanks and field borders provide some cover. Low eas that are 3 acres or more in size can be developed as ding places for waterfowl by establishing food-pro-cing plants and then flooding. The water must be moved in spring so the crops can be planted in sum-er. (Capability unit IIw-1)

Filled land, silty (Fs).—This land type consists of soil aterial that has been moved for the purpose of level-g and building up sites for industrial, commercial, or sidential development. The areas are 5 to 40 acres in ze. Most are near or on the outer edges of Memphis. cluded in mapping were some gravel pits that have en filled in and are suitable for farming.

A few areas have been filled with trash, tree trunks and ots, overlapping slabs of concrete, and other types of lling material that could cause settling of buildings d could also cause difficulty in sinking pilings. Areas at are adjacent to Graded land, silty materials, gener-ly consist of clean, silty fill.

If a good seedbed is prepared and if enough fertilizer d water are used, this land type is well suited to lawn rasses and ornamental plants. Some areas are suitable r development as recreational sites, such as tennis urts, golf courses, and parks. (Not in a capability unit)

Filled land, sandy (Fy).—This land type consists of sand that was dredged from the Mississippi River. Most areas were made for industrial sites. The largest single tract is the industrial site on Presidents Island, which has been built up to an elevation of 10 feet above the highest locally recorded flood.

This land type is low in natural fertility. The available water capacity is very low. Frequent applications of fertilizer and water are needed to establish and maintain lawns and shrubbery around buildings. (Not in a capability unit)

Grenada Series

This series consists of moderately well drained, silty soils that have a fragipan. These soils formed in loess more than 4 feet thick. The slope range is 0 to 12 percent.

Representative profile of Grenada silt loam, 2 to 5 percent slopes, eroded, 200 yards west of Bobo Road and 400 yards south of Smith Road:

Ap—0 to 6 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; strongly acid; abrupt, smooth boundary.

B21—6 to 13 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; friable; strongly acid; clear, smooth boundary.

B22—13 to 22 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, pale-brown and brown mottles; weak, medium, subangular blocky structure; friable; few,

ure 9.—Severely eroded, strongly sloping Grenada soil. Light-colored areas show where the fragipan is exposed or is close to the surface.

Most of this soil is idle and is either bare of vegetation has a scrubby growth of weeds, broomsedge, briers, d bushes. It is poorly suited to row crops because of slope and the erosion hazard. Only a small acreage is tivated. Grasses and legumes that have shallow root stems or roots that can penetrate the fragipan can be own. These include tall fescue, sericea lespedeza, and nual lespedeza.

The slope and the compact subsoil make management ficult. Well-fertilized hay and pasture help to control noff and erosion.

The site is fair for pine trees, but productivity varies atly from place to place because of differences in ero- n and thickness of root zone. Seedling mortality nges from slight to severe. The hazard of erosion is ere.

Most of this soil has only a sparse cover that provides le food or cover for wildlife. Tall fescue, sericea lespe- a, and annual lespedeza are fairly well suited, and y furnish some food for wildlife. (Capability unit e-2)

Graded land, silty materials (Gr).—This land type sists of areas that have been graded in preparation subdivisions (fig. 10) and for commercial and indus- l building. The depth to which these areas have been ded varies from a few inches to 5 feet or more and is most commonly about 3 feet. The slope, after grading, is generally between 1 and 5 percent.

Grenada, Loring, and Memphis soils were predominant in these areas before grading. In most areas the original soil profiles have been disturbed to such an extent that they no longer can be identified. The soil material is brown, yellowish brown, and dark brown in color and silty in texture.

The areas of this land type range in size from a few acres to about 400 acres. They are on the outer edges of the city of Memphis and in the county just outside the city. Included in some of the areas mapped were small areas of Filled land, silty.

Lawn grasses and ornamental plants and trees grow well if a good seedbed is prepared and enough fertilizer and water are applied. (Not in a capability unit)

Gullied land, silty (Gs).—This land type occurs as tracts 5 to 20 acres in size. It is mostly on hillsides where the slope ranges from 8 to 20 percent. Gullies make up 25 percent or more of each area. The gullies range from 3 to 15 feet in depth and from 5 to 80 feet in width. Except in small patches and narrow strips, the soil profiles have been destroyed. Between the gullies, sheet erosion has removed much of the original surface layer and subsoil. In some gullies sandy and gravelly Coastal Plain material is exposed.

mudagrass, and alfalfa, are suitable. These crops are difficult to establish, but they respond to heavy applications of lime and fertilizer. Grazing is possible during winter because the surface does not get wet and soft. Some areas are in poor native pasture.

This soil erodes easily if not protected. Control of runoff is the main management problem. Well-fertilized pastures of grasses and legumes, if not overgrazed or mowed too closely, help to reduce runoff and limit erosion.

Little or none of this soil is woodland. Most of it is idle and has a scrubby growth of broomsedge, briers, and bushes and a sparse stand of cedars. The site is good for red oak, white oak, yellow-poplar, black walnut, and other upland hardwoods and for loblolly pine. Plant competition is moderate. Abandoned fields where trees are to be planted may need site preparation, cultivation, and weeding. Because of the severe hazard of erosion, protection must be provided if roads and trails are built.

This soil is suited to many perennial plants that provide food and cover for wildlife. Sericea lespedeza, tall fescue, and bermudagrass protect the soil and furnish some food. Autumn olive, pyracantha, and shrub lespedeza are among the perennials that can be planted in idle areas and along field borders. Many native plants, such as sumac, wild plum, wild lespedeza, briers, and bushes, provide some food and cover. (Capability unit VIe-1)

Memphis Series

This series consists of deep, well-drained, strongly acid, silty soils on uplands. These soils formed in loess that ranges in thickness from about 100 feet in the western part of the county to about 4 feet on the hilly slopes in the eastern part of the county.

Representative profile of Memphis silt loam, 2 to 5 percent slopes, 3 miles north of Eads, 20 yards west of Collierville-Arlington Road:

Ap—0 to 7 inches, brown (10YR 4/3) silt loam; weak, fine, granular structure; very friable; strongly acid; abrupt, smooth boundary.

B21t—7 to 18 inches, brown (7.5YR 4/4) to reddish-brown (5YR 4/4) silty clay loam; moderate, fine and medium, subangular blocky structure; friable; thin continuous clay films; strongly acid; gradual, smooth boundary.

B22t—18 to 36 inches, brown (7.5YR 4/4) to reddish-brown (5YR 4/4) silt loam; moderate, medium, subangular blocky structure; friable; thin continuous clay films; strongly acid; gradual, smooth boundary.

B23t—36 to 74 inches, brown (7.5YR 4/4) silt loam; weak, coarse, subangular blocky structure; friable; few pale-brown silt coatings in old root channels and cracks; thin patchy clay films; few, small, black concretions; strongly acid; clear, smooth boundary.

C—74 to 108 inches; dark-brown (7.5YR 3/2) silt loam; massive; firm; pale-brown silt coatings in cracks; strongly acid.

The color of the Ap horizon ranges from dark grayish brown to brown. The texture of the B21 horizon ranges from heavy silt loam to silty clay loam. The color of the B horizon ranges from brown to reddish brown.

Memphis silt loam, 2 to 5 percent slopes (MeB).—This is a deep, well-drained soil on broad tops of low-lying hills. The plow layer is brown, very friable silt loam 7 inches thick. The uppermost 10 to 20 inches of the subsoil is brown to reddish-brown, friable silty clay loam. Below this is brown to reddish-brown, friable silt loam several feet thick.

In some places the texture of all layers is silt loam, but in most places the layer immediately below the surface layer is slightly more clayey than the one above or below it. The more clayey layer is approximately 12 inches thick. Included in mapping were a few small wooded areas that have a surface layer as much as 12 inches thick.

This soil is strongly acid or medium acid in reaction and moderately high in content of phosphorus and potassium. The response to fertilization and other good management practices is good. The root zone is very deep. The available water capacity is high.

This is one of the most productive upland soils in the State and one of the most extensive soils in the county. Except for about 35 percent of the acreage, which is in urban development, the soil is used mainly for cotton, soybeans, and corn. If adequately fertilized and otherwise well managed, it is also suited to lespedeza, alfalfa, white clover, tall fescue, orchardgrass, and all other crops commonly grown in this region.

Runoff is the main limitation. Control of erosion is the main management problem. Even though the slope is gentle, some washing occurs if this soil is cultivated. Clean-tilled row crops should not be grown every year. A suitable cropping system, adequate fertilization, and control of runoff will conserve the soil. An example of a suitable cropping system is a row crop every other year, or 2 years of a row crop followed by 2 years of hay or pasture. The slopes are well suited to contouring, terracing, and stripcropping. Grass should be established in the natural watercourses. Heavy applications of fertilizer can be used.

The suitable crops provide a good vegetative cover and a large amount of crop residue. The vegetative cover helps to control runoff and to conserve moisture. The crop residue helps to maintain the organic-matter content and to keep the soil in good tilth.

The wooded areas occur as small tracts. The site is good for white oak, red oak, yellow-poplar, and other upland hardwoods and for loblolly pine. Loblolly pine is not native, but trial plantings up to 20 years of age show that it is well suited. Mainly because of a lack of suitable seed trees, natural regeneration cannot always be relied upon to provide adequate stocking of high-value trees. Plant competition is moderate. In natural stands it may be necessary to plant seedlings and remove cull trees, low-value trees, and bushes.

This soil is well suited to many plants that furnish food and cover for bobwhite quail, doves, and rabbits. Wastes left when such crops as soybeans, corn, and small grain are harvested and the seeds of weeds, lespedeza, and native plants that grow along field borders furnish food. The small wooded areas and the brush in the odd-shaped areas in the corners of fields and along old fence rows provides some cover. Annuals and perennials can be planted in field borders and along fence rows. Fields managed specifically for doves can be planted to browntop millet, which matures quickly and so can be planted after a small-grain crop has been harvested.

About a third of the acreage is in urban areas. Because it is deep, well drained, and friable, this soil is well

SOIL LEGEND

The first capital letter is the initial one of the soil name. The second capital letter, A, B, C, D, E, F, or G, represents the slope; ranging from nearly level (A) to very steep (G). Most symbols without a slope letter are those of nearly level soils or land types; a few designate land types that have a considerable range of slope. A final number, 2 or 3, in the symbol shows that the soil is eroded or severely eroded.

SYMBOL	NAME
Ad	Adler silt loam
Bo	Bonn silt loam
Bw	Bowdre silty clay
Ca	Calloway silt loam
Co	Collins silt loam
Cr	Commerce silt loam
Cs	Convent silt loam
Cu	Crevasse fine sand
Cv	Crevasse silt loam
Fm	Falaya silt loam
Fs	Filled land, silty
Fy	Filled land, sandy
GaA	Grenada silt loam, 0 to 2 percent slopes
GaB	Grenada silt loam, 2 to 5 percent slopes
GaB2	Grenada silt loam, 2 to 5 percent slopes, eroded
GaC	Grenada silt loam, 5 to 8 percent slopes
GaC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded
GaD	Grenada silt loam, 8 to 12 percent slopes
GaD2	Grenada silt loam, 8 to 12 percent slopes, eroded
GgD3	Grenada complex, 5 to 12 percent slopes, severely eroded
Gr	Graded land, silty materials
Gs	Gullied land, silty
He	Henry silt loam
Ib	Iberia silt loam
Lb	Levees and Borrow Pits
LoB	Loring silt loam, 2 to 5 percent slopes
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded
LoD	Loring silt loam, 8 to 12 percent slopes
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded
LoD3	Loring silt loam, 5 to 12 percent slopes, severely eroded
MeB	Memphis silt loam, 2 to 5 percent slopes
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded
MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded
MeD3	Memphis silt loam, 5 to 12 percent slopes, severely eroded
MeE	Memphis silt loam, 12 to 20 percent slopes
MeF3	Memphis silt loam, 12 to 30 percent slopes, severely eroded
MeG	Memphis silt loam, 30 to 65 percent slopes
Rb	Robinsonville fine sandy loam
Rn	Robinsonville silt loam
Sh	Sharkey clay
Sw	Swamp
Tu	Tunica silty clay
Wv	Waverly silt loam

WOI

Highways and ro

Dual .....

Good motor .

Poor motor ...

Trail .....

Highway markers

National Inters

U. S. .....

State or count

Railroads

Single track .

Multiple track

Abandoned ..

Bridges and cros

Road .....

Trail .....

Railroad ....

Ferry .....

Ford .....

Grade .....

R. R. over ..

R. R. under

Tunnel .....

Buildings .....

School .....

Church .....

Mine and quarry

Gravel pit .....

Power line ....

Pipeline .....

Cemetery .....

Dams .....

Levee .....

Tanks .....

Well, oil or gas

Forest fire or lo

Cotton gin ....

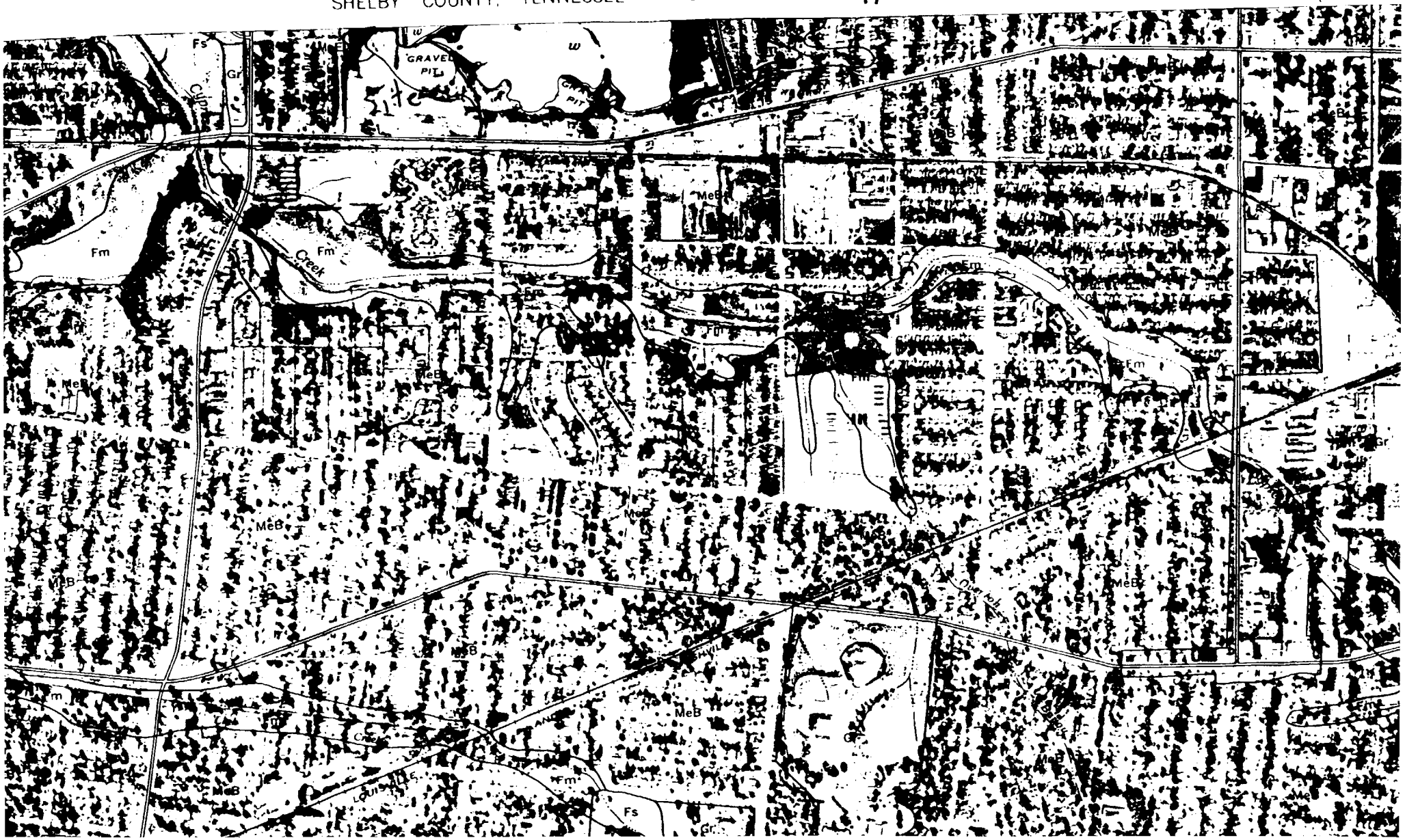
GUIDE TO MAPPING UNITS

For a full description of a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs. The capability units are not discussed separately. For a discussion of the suitability of a given soil for crops and pasture, for woodland, for wildlife, and for lawn grasses and shrubs, see the discussion of the mapping unit. Other information is given in tables as follows:

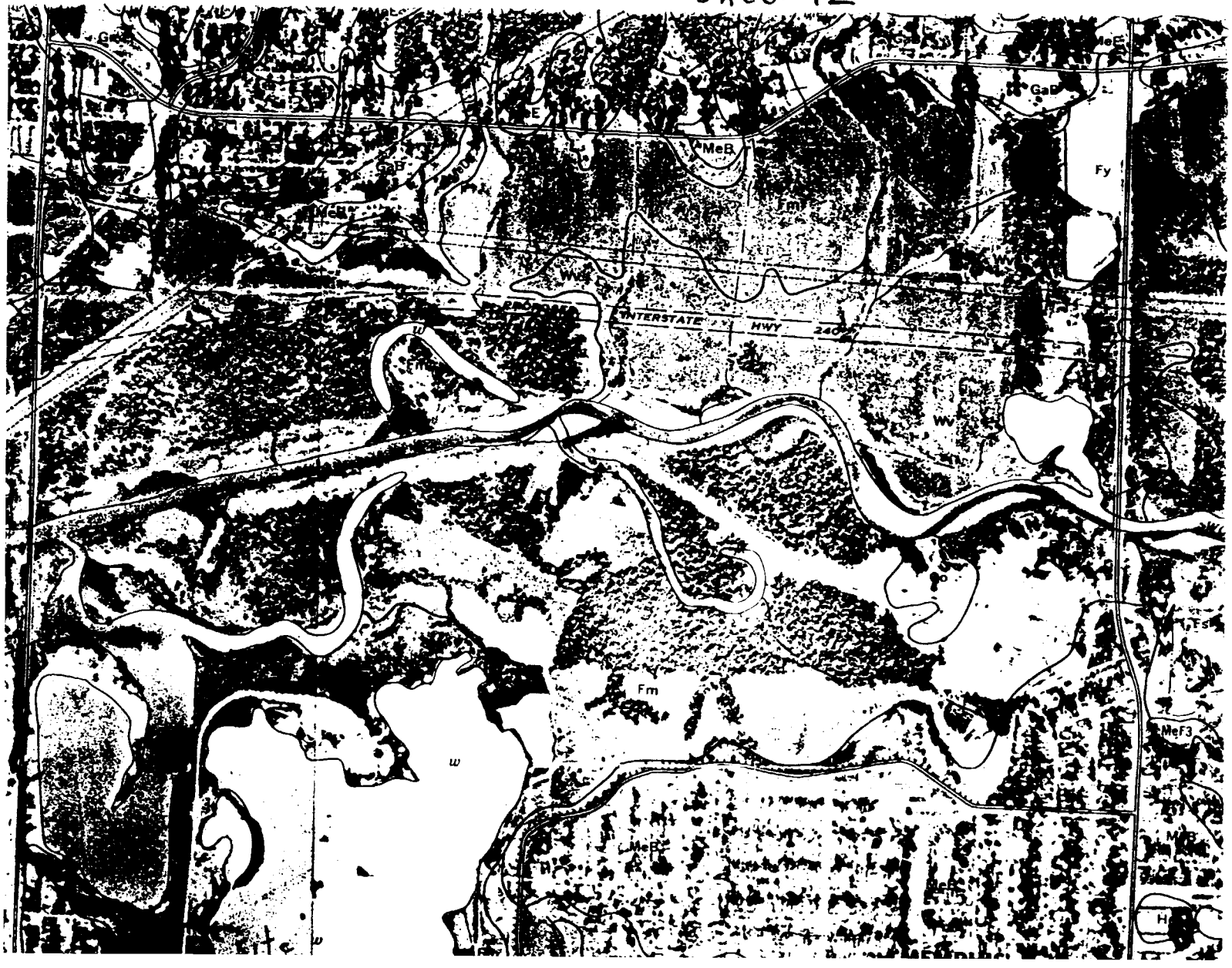
Acreage and extent, table 2, page 11.
Estimated yields, table 3, page 38.
Engineering uses of the soils, table 4, page 42; table 5, page 44.
Nonfarm uses of the soils, table 6, page 48.

Map symbol	Mapping unit	Described on page	Capability unit Symbol
Ad	Adler silt loam	10	I-2
Bo	Bonn silt loam	12	IVw-1
Bw	Bowdre silty clay	12	IIw-1
Ca	Calloway silt loam	13	IIIw-2
Co	Collins silt loam	14	I-2
Cr	Commerce silt loam	14	I-2
Cs	Convent silt loam	15	IIw-1
Cu	Crevasse fine sand	15	IVs-1
Cv	Crevasse silt loam	16	IVs-1
Fm	Falaya silt loam	16	IIw-1
Fs	Filled land, silty	17	None
Fy	Filled land, sandy	17	None
GaA	Grenada silt loam, 0 to 2 percent slopes	18	IIw-2
GaB	Grenada silt loam, 2 to 5 percent slopes	19	IIe-2
GaB2	Grenada silt loam, 2 to 5 percent slopes, eroded	19	IIIe-2
GaC	Grenada silt loam, 5 to 8 percent slopes	20	IIIe-2
GaC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	20	IVe-2
GaD	Grenada silt loam, 8 to 12 percent slopes	21	IVe-2
GaD2	Grenada silt loam, 8 to 12 percent slopes, eroded	21	VIe-2
GgD3	Grenada complex, 5 to 12 percent slopes, severely eroded	21	VIe-2
Gr	Graded land, silty materials	22	None
Gs	Gullied land, silty	22	VIIe-2
He	Henry silt loam	23	IIIw-1
Ib	Iberia silt loam	25	IIIw-3
Lb	Levees and Borrow Pits	25	VIe-3
LoB	Loring silt loam, 2 to 5 percent slopes	26	IIe-1
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	27	IIIe-1
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	27	IIIe-1
LoD	Loring silt loam, 8 to 12 percent slopes	28	IVe-1
LoD2	Loring silt loam, 8 to 12 percent slopes, eroded	28	IVe-1
LoD3	Loring silt loam, 5 to 12 percent slopes, severely eroded	28	VIe-1
MeB	Memphis silt loam, 2 to 5 percent slopes	29	IIe-1
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	30	IIIe-1
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	30	IIIe-1
MeD2	Memphis silt loam, 8 to 12 percent slopes, eroded	31	IVe-1
MeD3	Memphis silt loam, 5 to 12 percent slopes, severely eroded	31	IVe-1
MeE	Memphis silt loam, 12 to 20 percent slopes	31	VIe-1
MeF3	Memphis silt loam, 12 to 30 percent slopes, severely eroded	32	VIe-1
MeG	Memphis silt loam, 30 to 65 percent slopes	32	VIIe-1
Rb	Robinsonville fine sandy loam	33	I-1
Rn	Robinsonville silt loam	33	I-1
Sh	Sharkey clay	33	IIIw-3
Sw	Swamp	34	VIIw-1
Tu	Tunica silty clay	34	IIIw-3
Wv	Waverly silt loam	35	IIIw-1

SHELBY COUNTY, TENNESSEE — SHEET NUMBER 49



Sheet 42



REFERENCE 12

R. Allan Freeze

Department of Geological Sciences
University of British Columbia
Vancouver, British Columbia

John A. Cherry

Department of Earth Sciences
University of Waterloo
Waterloo, Ontario

GROUNDWATER

Prentice-Hall, Inc.
Englewood Cliffs, New Jersey 07632

Table 2.2 Range of Values of Hydraulic Conductivity and Permeability

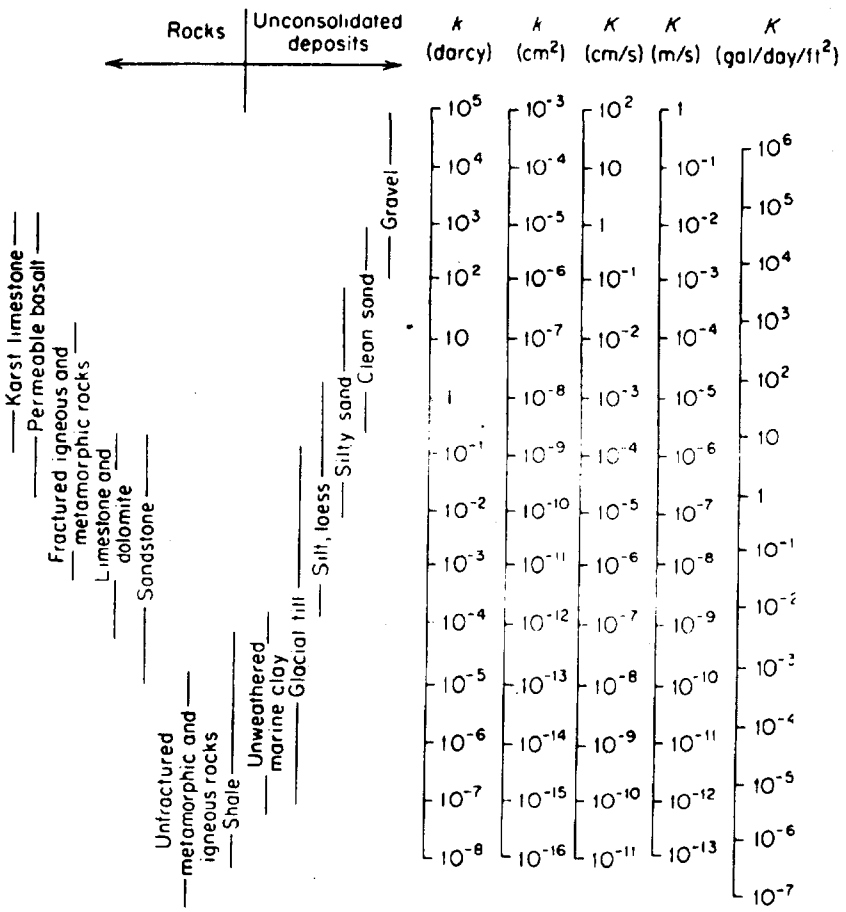


Table 2.3 Conversion Factors for Permeability and Hydraulic Conductivity Units

	Permeability, k*			Hydraulic conductivity, K		
	cm²	ft²	darcy	m/s	ft/s	U.S. gal/day/ft²
cm²	1	1.08×10^{-3}	1.01×10^{8}	9.80×10^{2}	3.22×10^{3}	1.85×10^{9}
ft²	9.29×10^{2}	1	9.42×10^{10}	9.11×10^{5}	2.99×10^{6}	1.71×10^{12}
darcy	9.87×10^{-9}	1.06×10^{-11}	1	9.66×10^{-6}	3.17×10^{-5}	1.82×10^{1}
m/s	1.02×10^{-3}	1.10×10^{-6}	1.04×10^{5}	1	3.28	2.12×10^{6}
ft/s	3.11×10^{-4}	3.35×10^{-7}	3.15×10^{4}	3.05×10^{-1}	1	6.46×10^{5}
U.S. gal/day/ft²	5.42×10^{-10}	5.83×10^{-13}	5.49×10^{-2}	4.72×10^{-7}	1.55×10^{-6}	1

*To obtain k in ft², multiply k in cm² by 1.08×10^{-3}.

REFERENCE 13

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

BVWST Project 52012.001
March 3, 1992
11:00 a.m.

Subject: Site-Specific geology & confining layer information

To: Dr. William S. Parks
Company: USGS Water Investigations
Phone No.: (901) 766-2977

Recorded by: Carter Helm

Since there exists no mention of hydraulic conductivity values for aquitards in the Memphis area in Dr. Parks' publication Hydrogeology and Preliminary Assessment of the Potential for Contamination of the Memphis /Aquifer in the Memphis Area, TN, I asked Dr. Parks if the range 1.0×10^{-7} to 1.0×10^{-5} cm/sec is acceptable for the Jackson-Upper Claiborne clay confining unit. He said it is highly variable but the estimation I extracted from Freeze and Cherry appears to somewhat accurately describe the aquitard.

REFERENCE 14

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

EPA
Raines Road Drum Site
Shelby County Private Wells

BVWST Project 52009.012
BVWST File
October 21, 1991
10:40 a.m.

To: Barry Moore
Company: Shelby County Health Dept.
Phone No.: (901) 576-7741

Recorded by: Jancie Hatcher JSH 10-21-91

He told me that there are probably private wells in the area, but specific locations can't be pinpointed except with a house-to-house survey. The entire area is served by a municipal water system, so everyone has the potential for hook-ups to municipal water.

REFERENCE 15

MEMPHIS LIGHT, GAS AND WATER DIVISION

SISB/SAS
RECEIVED
NOV 1 8 1990
EPA - REGION IV
ATLANTA, GA

November 20, 1990

Mr. Robert Morris
Environmental Engineer
United States
Environmental Protection Agency
Region IV
345 Courtland Street N.E.
Atlanta, Georgia 30365

Dear Mr. Morris:

The answers to the questions asked in your letter dated November 15, 1990 to Fred Von Hofe are as follows:

Answer #1

There are 206,652 active connections served by Memphis Light, Gas and Water (see attachment).

Answer #2

The water from all eight pumping stations is never at one time blended together. However, at the boundaries of service areas of individual pumping stations, the water could potentially blend; for instance, water from Davis and Allen could blend. Also, the boundaries of service areas of individual pumping stations may shift slightly depending on the system demand. See attached map of distribution system.

Answer #3

Private wells in the Memphis City limit would be regulated by the Memphis and Shelby County Health Department. I would suggest you contact Mr. Barry Moore, Technical Specialist, Memphis and Shelby County Health Department, 814 Jefferson, Memphis, Tennessee 38105, telephone number (901) 576-7741.

MEMPHIS
America's Distribution Center

P.O. BOX 430 MEMPHIS, TENNESSEE 38101 TELEPHONE (901) 528-4011

Answer #4

The City of Memphis includes Whitehaven, the Memphis Airport, and Parkway Village. Memphis Light, Gas and Water serves Memphis and all of Shelby County except the municipalities outside the city.

Answer #5

Memphis Light, Gas and Water sells water to Bartlett, Germantown, and Lakeland within the county.

Answer #6

(a) Memphis Light, Gas and Water provides water to Memphis Park Commission for golf course irrigation.

(b) Memphis Light, Gas and Water bottles Memphis water for commercial sale. There are a number of food processing plants in the Memphis area; a few examples would be Smuckers, Ralston Purina, Kelloggs, Cargill, ADM and more.

If we can be of further assistance in your evaluation, please contact me at (901) 320-3901.

Sincerely,

James H. Webb

James Webb
Manager
Water Laboratory

mb

Attachments

cc: Fred Von Hofe

Tancy

REFERENCE 16

MEMPHIS LIGHT, GAS AND WATER DIVISION

SIBB/SAS
RECEIVED
NOV 06 1990
EPA - REGION IV
ATLANTA, GA.

November 5, 1990

Mr. Charlie Stevens
EPA Region IV
345 Courtland Street N.E.
Atlanta, Georgia 30365

Dear Mr. Stevens:

Jordan English of Tennessee Division of Superfund located in Jackson, Tennessee asked MLGW's Mr. Billy Grimm to send you a copy of "MLGW Water Production 1990." Please find enclosed the requested document.

If I can be of further assistance, please contact me at (901)528-4197.

Sincerely,

Fred Von Hofe

Fred Von Hofe
Water Research Engineer

mb

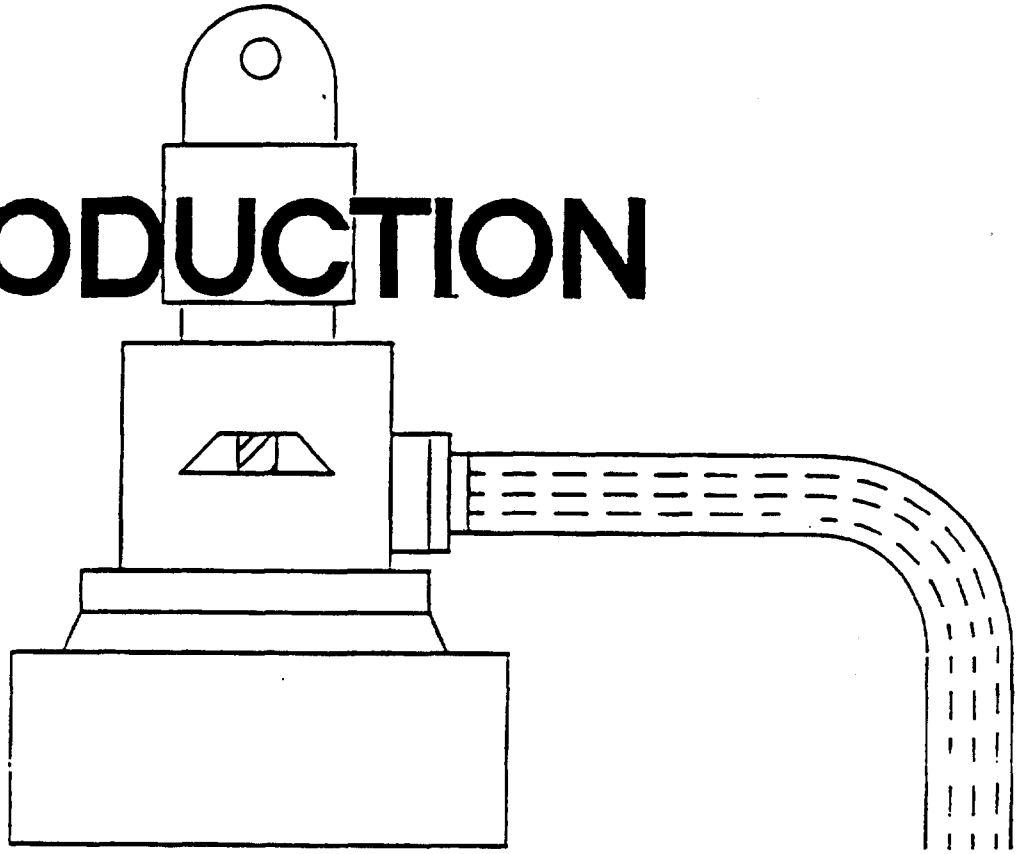
Enclosure

cc: Billy Grimm
R. McDonald
T. Whitlow

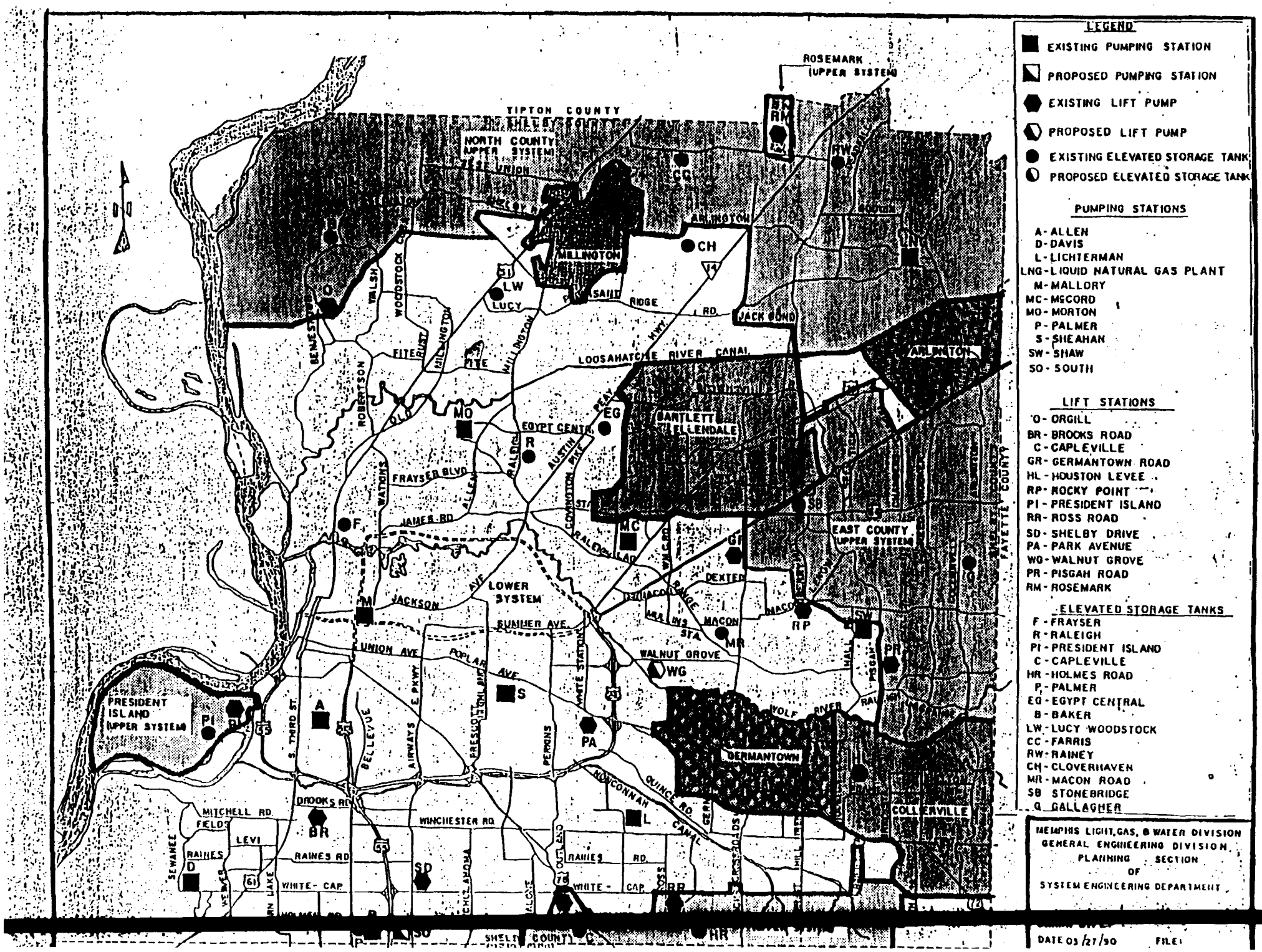
MEMPHIS
America's Distribution Center

MLGW

WATER PRODUCTION



1990


LEGEND
EXISTING PUMPING STATION
PROPOSED PUMPING STATION
EXISTING LIFT PUMP
PROPOSED LIFT PUMP
EXISTING ELEVATED STORAGE TANK
PROPOSED ELEVATED STORAGE TANK
PUMPING STATIONS
A - ALLEN
D - DAVIS
L - LICHTERMAN
LNG - LIQUID NATURAL GAS PLANT
M - MALLORY
MC - MCCORD
MO - MORTON
P - PALMER
S - SHEAHAN
SW - SHAW
SO - SOUTH
LIFT STATIONS
O - ORGILL
BR - BROOKS ROAD
C - CAPLEVILLE
GR - GERMANTOWN ROAD
HL - HOUSTON LEVEE
RP - ROCKY POINT
PI - PRESIDENT ISLAND
RR - ROSS ROAD
SD - SHELBY DRIVE
PA - PARK AVENUE
WG - WALNUT GROVE
PR - PISGAH ROAD
RM - ROSEMARK
ELEVATED STORAGE TANKS
F - FRAYSER
R - RALEIGH
PI - PRESIDENT ISLAND
C - CAPLEVILLE
HR - HOLMES ROAD
P - PALMER
EG - EGYPT CENTRAL
B - BAKER
LW - LUCY WOODSTOCK
CC - FARRIS
RW - RAINEY
CH - CLOVERHAVEN
MR - MACON ROAD
SB - STONEBRIDGE
G - GALLAGHER
MEMPHIS LIGHT, GAS, & WATER DIVISION
GENERAL ENGINEERING DIVISION
PLANNING SECTION
OF
SYSTEM ENGINEERING DEPARTMENT
DATE 03/27/90
FILE:
TIPTON COUNTY
NORTH COUNTY UPPER SYSTEM
ROSEMARK UPPER SYSTEM
WELLINGTON
ARLINGTON
JACK BOND
LOOSAHATCHIE RIVER CANAL
BARTLETT
ELLENDALE
EGYPT CENTRAL
EAST COUNTY UPPER SYSTEM
DEXTER
MACON
LOWER SYSTEM
WALNUT GROVE
PRESIDENT ISLAND UPPER SYSTEM
GERMANTOWN
COLLIERVILLE
WOLF RIVER
FAYETTE COUNTY
SHELBY COUNTY
LUCY
FITE
FRAYSER BLVD
JAMES RD
JACKSON AVE
SUMMER AVE
UNION AVE
POPLAR AVE
BROOKS RD
MITCHELL RD
WINCHESTER RD
RAINES RD
WHITE-CAP
QUINCE RD
NONCONNAH CANAL
ROBERTSON
WOODSTOCK
BELLEVUE
AIRWAYS
PERKINS
OUTLAND
S THIRD ST
SEWANEE
LEVI
FIELDS
RAINES
MACON
PISGAH
WALL
WHITE STATION
CHILLAHOMA
ALCOTT
CROSS
CROSSROADS
HILL
GERMANTOWN
AUSTIN PEAY
COMMERCE
RALEIGH
ALLEN
WATKINS
HILLINGTON
WILLINGTON
BENESTRAND
TALSH
OLD
PEAY
HWY
RIDGE
RD
STA
RAILROAD
RAILWAY
BRIDGE
MAIN LAKE
WEBER
O
B
LW
CC
CH
RW
MO
EG
R
F
M
MC
GR
SB
RP
SW
PR
WG
S
A
PI
PA
L
BR
D
SD
RR
HR
SO
C
G

MEMPHIS LIGHT, GAS AND WATER DIVISION - PRODUCTION WELLS IN SERVICE

MALLORY	SHERMAN	ALLEN	McCORD	LICHTERMAN	DAVIS	MORTON	SHAW	LNG	PALMER
1B	52A	101	201	301	401	601	702	521	506
2B	54B	102	202	303	403	602	706	522	507
3A	56B	103A	203A	304	404	603	710		508
4B	57C	106A	204	305	414	613	722	2 WELLS	509
7B	58B	107	205	306	415	616	723		
9B	61B	108	206	307	416	617	724		4 WELLS
10B	63A	109	207	308	417	619	725		
11B	70A	110A	208	310	418	620	751		
12C	71A	111A	209	311	419	621	755		
13B	72A	112	210	312	420	632	761		
14B	74A	113	215	316	421				
15B	76A	114	217	317	422	10 WELLS	10 WELLS		
16B	78A	115	218	318	424				
17A	79A	117	219	319	425				
19B	80A	118	220	320					
20C	87A	122	221	321	14 WELLS				
21B	91	123	222	322					
23B	93	124	232	323					
24B	95	125A	233	324					
34A	96	126	235	325					
35A	97	127	251	328					
37A	98	128	252	330					
39	99	130	255	332					
40		136A	269						
46	23 WELLS	137		23 WELLS					
		138	24 WELLS						
25 WELLS									
		26 WELLS							

TOTAL PRODUCTION WELLS IN SERVICE 1[illegible]1

MEMPHIS LIGHT, GAS AND WATER DIVISION
CITY OF MEMPHIS
AVERAGE DAILY PUMPAGE TO SYSTEM
AND
PERSONS PER CITY CONNECTION
For Years Ending December 31

Year	Average Pumpage To System MGD	City Population*	Total No. of Active Connections	Connections % Increase Annually	No. of Active City Connections	Persons Per Cit Connecti
1983	122.33	638,000	197,938	1.11	186,780	3.41
1984	124.84	635,000	201,791	1.95	188,671	3.36
1985	129.20	635,000	202,386	0.29	187,373	3.39
1986	133.40	632,000	203,913	0.75	187,258	3.37
1987	132.50	635,000	204,767	0.42	187,396	3.39
1988	137.20	639,000	205,749	0.48	184,151	3.47
1989	133.40	639,000	206,652	0.43	186,881	3.42

*Acquired from Health Dept. - Statistical Services

Bill Payment

Bills are payable at 245 South Main, at 45 billing agencies in Memphis and Shelby County, usually located in drug stores and banks, and at four community offices:

Millington Rural Office 5131 Navy Road
North Community Office 2424 Summer
South Community Office 2935 Lamar
Whitehaven Office 1111 East Shelby Drive

UTILITY USE

Customers	Electric	Gas	Water
Residential	307,215	240,909	185,835
Commercial	33,478	18,331	17,243
Industrial	196	58	*
Other	14,153	23	3,574
Total	355,042	259,321	206,652

Sales	1,000 Kwh	1,000 cf	100 cf
Residential	4,094,889	20,132,164	24,320,332
Commercial	4,649,474	10,899,766	26,002,520
Industrial	1,702,698	3,566,512	*
Other	243,497	91,501	4,515,385
Total	10,690,558	34,689,943	54,838,237

*Commercial and Industrial water customers are combined under Commercial usage figures

Electric Source - Tennessee Valley Authority, power delivery and MLGW transmission at 161,000 volts Maximum hourly demand for the year - 2,427,255 Kw (August 23)

Natural Gas Source - Texas Gas Transmission Corporation and other sources, via pipelines from Texas and Louisiana Maximum daily delivery for the year - 535,841 MCF (December 22)

Water Source - Pumped from deep wells at nine large stations owned by MLGW Maximum hourly rate for the year - 229 0 mgd (December 25); maximum daily pumpage - 209 8 mgd (December 25)

*All time maximum daily pumpage record

For additional copies, contact

Memphis Light, Gas and Water Division
Corporate Communications
P.O. Box 430
Memphis, Tennessee 38101
(901) 528-4557

MLGW

FACTS & FIGURES

For Year Ending December 31, 1980

MEMPHIS LIGHT, GAS AND WATER DIVISION

FINANCIAL

	Thousands of Dollars
UTILITY PLANT IN SERVICE	
Electric	$419,634
Gas	130,497
Water	139,314
LONG-TERM DEBT	
Electric	$205,010
Gas	7,375
Water	90,179
CONSTRUCTION EXPENDITURES	
Electric	$43,002
Gas	21,294
Water	23,512
REVENUE AND INCOME	
Electric	$611,084
Gas	176,645
Water	35,312
PAID TO THE CITY AS DIVIDENDS	
Electric	-0-
Gas	$8,397
Water	-0-

PAID TO THE CITY AS TAX EQUIVALENTS

Electric	$ 14,531
Gas	2,010
Water	-0-

*Metered Water 54,838,237 ccf (does not include unmetered free water for firefighting, street sprinkling, etc.)

AVERAGE ELECTRIC USAGE IN MEMPHIS

	Kwh per month*
15,000 watt electric furnace (cold month)	4,850
Air Conditioner (mild month)	
Three-ton central unit (36,000 Btu)	1,060
Two-ton window unit (24,000 Btu)	700
Water Heater	
(40 gallon)	450
(66 gallon)	750
Lights and small appliances	300
Frostless refrigerator or freezer	150
Range	125
Clothes dryer	90

AVERAGE ELECTRIC USAGE *continued*

Color Television	45
Dishwasher	30
Microwave Oven	15

*One kilowatt hour is equal to the amount of electricity that ten 100-watt light bulbs use when they burn one hour non-stop

MISCELLANEOUS

Population of Memphis	645,190
Area of City, Square Miles	295.5
Population of Shelby County	814,800
Area of Shelby County, Square Miles	772
Electric Street Lights in Service	
City	60,880
All Cities in County	70,402
Electric Private Outdoor Lights	25,174
Fire Hydrants in Service - City	17,742
Average Annual Use Per Residential Customer	
Electricity (Kwh)	12,779
Gas (ccf)	836
Water (ccf)	131

Average Cost Per	
Kilowatt hour of Electricity	$0 0581
Ccf of Gas	$0 4433
Ccf Water	$0 6289
Average Annual Revenue Per Residential Customer	
Electric	$774 14
Gas	$370 51
Water	$ 82 31
Pole Miles (Electric Division)	4,127
U R D Circuit Miles	2,835 63
Miles of Gas Mains	3,412 7
Miles of Water Mains	2,573 7
Transmission Structure Miles	400 26
Overhead Circuit Miles	549 25

Personnel

Total Number of Permanent Employees	2,813
Temporary, part-time and co-ops	78
Salary Continuations	31
Annual Payroll	$86,854,868 43

TREATMENT PLANT DATA

STATION	PLANT FLOW (MGD)	AERATOR RISERS (No)	AERATOR FLOW RATE (GPM/SQ.FT.)	FILTER BOX (No)	FILTER FLOW RATE (GPM/SQ.FT.)	DISCHARGE PRESSURE (PSI)	H.S. PUMPS (No.)	PUMPAGE (RATED) (MGD)
MALLORY	35	16	23.74	8	3.68	87	4	60
SHEAHAN #1	35	17	12.61	10	2.95	72	4	60
SHEAHAN #2	--	8	26.30	-	----	--	-	--
ALLEN	30	14	23.25	10	2.55	76	4	60
McCORD	35	14	27.13	4	7.45	76	5	60
LICHTERMAN	30	14	23.25	4	6.38	68	5	60
LICHTERMAN (WITH BYPASS)	35	14	27.13	4	7.45	--	-	--
PALMER	5.5	2	15.91	6	3.18	60	3	8
DAVIS	15	4	25.00	4	2.89	77	2	25
DAVIS #1 (FUTURE)	32.5	4	25.00	4	6.26	77	4	55
DAVIS #2 (FUTURE)	--	8	23.74	-	----	--	-	--
MORTON	15	7	23.25	4	2.50	74	3	37.5
MORTON (FUTURE)	30	14	23.25	4	5.00	74	5	62.5
SHAW	15	8	20.35	4	2.50	57	3	31.5
SHAW LOWER (FUTURE)	30	16	20.35	4	5.00	57	4	42
SHAW UPPER (FUTURE)	--	-	----	-	----	78	3	22.5
LNG	1.1	1	10.40	1	3.24	70	3	0.9

TREATMENT PLANT DATA

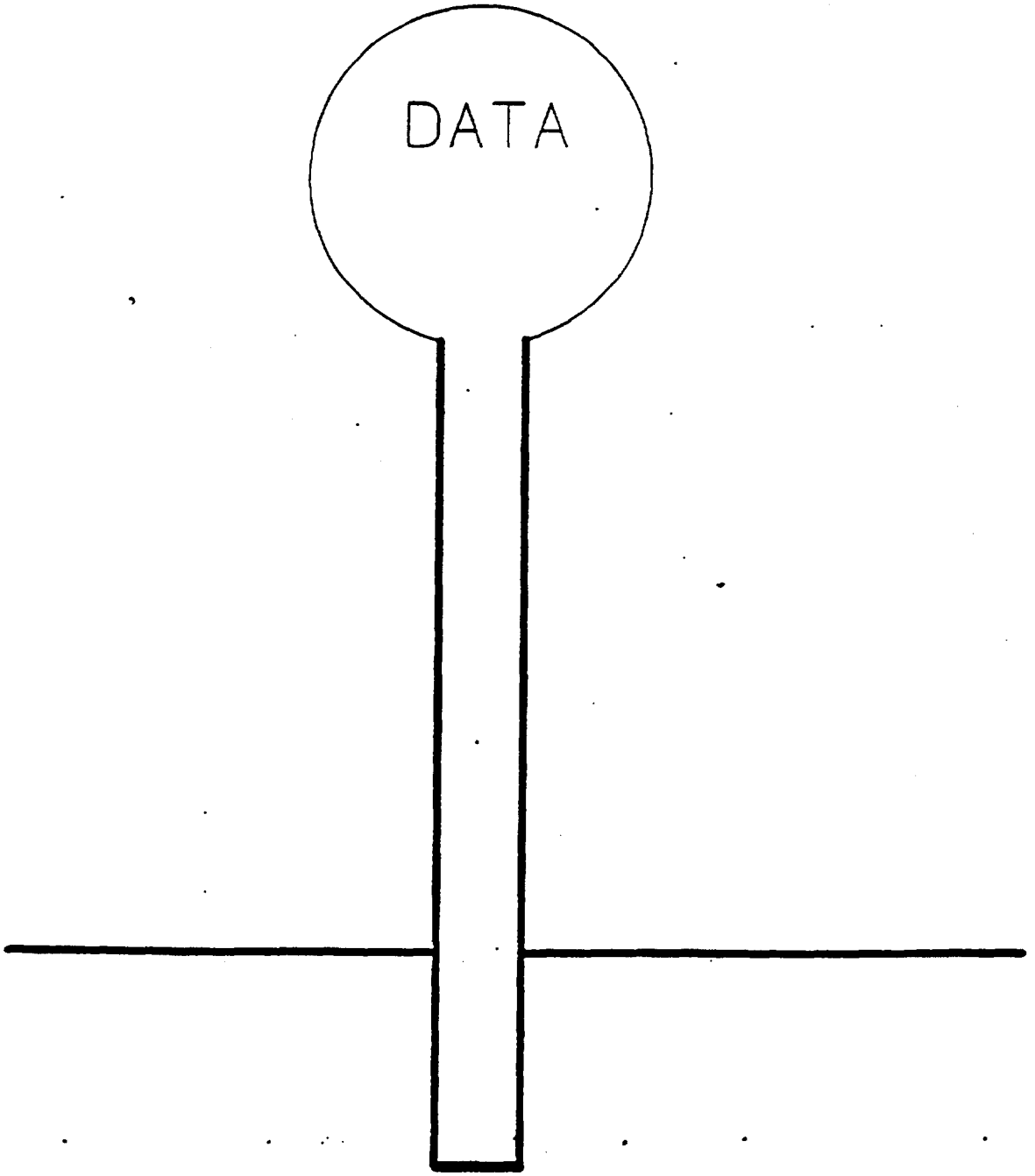
AERATORS

	NO. OF RISERS	WIDTH IN FT.	LENGTH IN FT.	SECTIONS PER RISER	AREA SQ. FT.	TRAYS HIGH
MALLORY	16	4	8	2	64	9
SHEAHAN #1	17	3	6.75	2	40.5	9
SHEAHAN #2	8	4.5	8.25	2	74.25	9
ALLEN	14	4	8	2	64	9
McCORD	14	4	8	2	64	9
LICHTERMAN	14	4	8	2	64	9
DAVIS #1	4	5	10.417	2	104.17	9
DAVIS #2 (FUTURE)	8	4	8	2	64	9
MORTON	7	4	8	2	64	9
MORTON (FUTURE)	14	4	8	2	64	9
SHAW	8	4	8	2	64	9
SHAW (FUTURE)	16	4	8	2	64	9
PALMER	2	4	15	2	120	9
L.N.G.	1	4.5	16	21	72	6

FILTERS

	NO. OF BOXES	WIDTH IN FT.	LENGTH IN FT.	SECTIONS PER BOX	AREA SQ. FT.	TYPE OF MEDIA
MALLORY	8	12.5	33	2	825	mixed
SHEAHAN #1	10	12.5	33	2	825	mixed
ALLEN	10	12	34	2	816	sand
McCORD	4	12	34	2	816	mixed
LICHTERMAN	4	12	34	2	816	mixed
DAVIS #1	4	15	30	2	900	mixed
MORTON	4	13.167	39.5	2	1040.1	mixed
MORTON (FUTURE)	4	13.167	39.5	2	1040.1	mixed
SHAW	4	13.167	39.5	2	1040.1	mixed
PALMER	6	10	20	1	200	sand
L.N.G.	1	17.167	DIA	1	231.46	mixed

LIFT SYSTEM



LIFT SYSTEM DATA

NORTH COUNTY SYSTEM

PUMPING STATION

RATED CAPACITIES	LNG
NUMBER OF WELLS	2
CAPACITY (MGD)	
PUMP #1	0.4
PUMP #2	0.4
PUMP #3	0.3
GROSS PUMPAGE	1.1
TREATMENT	0.7
STORAGE (MG)	0.3
PUMP ELEVATION (FT.)	331
HYDROSTATIC HEAD (FT.)	493.5

LIFT STATIONS

RATED CAPACITIES	ORGILL
CAPACITY (GPM)	
PUMP #1	500
PUMP #2	500
GROSS PUMPAGE (GPM)	1000
LIFT (FT.)	
PUMP #1	128
PUMP #2	128

LIFT SYSTEM DATA

EAST COUNTY SYSTEM

PUMPING STATION

RATED CAPACITIES	SHAW (FUTURE)
NUMBER OF WELLS	10
CAPACITY (MGD)	
PUMP #1	--
PUMP #2	7.5
PUMP #3	--
PUMP #4	7.5
PUMP #5	--
PUMP #6	7.5
PUMP #7	--
GROSS PUMPAGE	22.5
TREATMENT (MGD)	15
STORAGE (MG)	15
PUMP ELEVATION (FT.)	364
HYDROSTATIC HEAD (FT.)	495

LIFT STATIONS

RATED CAPACITIES	ROCKY PT.	PISGAH	HOUSTON LEVEE	GERMANTOWN RD.
CAPACITY (GPM)				
PUMP #1	440	750	600	800
PUMP #2	---	750	200	800
PUMP #3	---	---	---	2000
PUMP #4	---	---	---	2000
GROSS PUMPAGE (GPM)	440	1500	800	5600
LIFT (FT.)				
PUMP #1	127	80	210	164
PUMP #2	---	80	210	164
PUMP #3	---	---	---	125
PUMP #4	---	---	---	125

LIFT SYSTEM DATA

SOUTH COUNTY SYSTEM

	LIFT STATIONS	
RATED CAPACITIES	CAPLEVILLE	ROSS RD.
CAPACITY (GPM)		
PUMP #1	350	2000
PUMP #2	---	825
GROSS PUMPAGE (GPM)	350	2825
LIFT (FT.)		
PUMP #1	110	108
PUMP #2	---	86

PRESIDENT ISLAND

RATED CAPACITIES	PRESIDENT ISLAND
CAPACITY (GPM)	
PUMP #1	3500
PUMP #2	3500
GROSS PUMPAGE (GPM)	7000
LIFT (FT.)	
PUMP #1	63
PUMP #2	63

LIFT SYSTEM DATA

ROSMARK

RATED CAPACITIES	ROSMARK
CAPACITY (GPM)	
PUMP #1	600
PUMP #2	125
GROSS PUMPAGE (GPM)	725
LIFT (FT.)	
PUMP #1	108
PUMP #2	64

INTERNAL BOOSTER STATIONS

RATED CAPACITIES	BROOKS RD.	SHELBY DR.	PARK AVE.
CAPACITY (GPM)			
PUMP #1	5500	3000	7500
PUMP #2	5500	3000	---
GROSS PUMPAGE (GPM)	11000	6000	7500
LIFT (FT.)			
PUMP #1	82	60	90
PUMP #2	82	60	--

LIFT SYSTEM DATA

LOWER SYSTEM

RATED CAPACITIES	MALLORY	SHEAHAN	ALLEN	McCORD	LICHTERMAN	DAVIS	MORTON	SHAW	PALMER	TOTAL
GENERATION (KW)	--	--	1000 (E)	--	--	--	--	1250 (E)	-	2250
NUMBER OF WELLS	25	23	26	24	23	14	10	10	4	159
HIGH SERVICE PUMPS (MGD)										
#1	15	15 (V)	15 (V)	5	10	10 (V)	12.5 (F)	10.5	2.2	--
#2	15	15 (V)	15 (V)	10 (V)	10 (V)	15 (F)	12.5 (V)	--	2.9	--
#3	15 (V)	15	15	15	15	15 (V)	12.5 (V)	10.5 (V)	2.9	--
#4	15 (V)	15	15 (V)	15 (V)	15 (V)	15 (F)	12.5	--	--	--
#5	15 (F)	4 (E)	--	15	15	--	12.5 (F)	10.5 (V)	--	--
#6	4 (E)	--	--	--	--	--	--	--	-	--
#7	--	--	--	--	--	--	--	10.5 (F)	--	--
TOTAL (MGD)	64	64	60	60	65	25	37.5	31.5	8	383.5
TOTAL (Future)	79	--	--	--	--	55	62.5	42	--	--
TREATMENT (MGD)	35	35	30	30	35	15	15	15	5.5	200.5
TREATMENT (Future)	--	--	--	--	--	30	30	30	--	--
STORAGE (MG)	23	18	20	10	10	10	10	15	[illegible]	118
STORAGE (Future)	--	--	--	20	20	20	20	25	--	--
PUMP ELEVATION (FT.)	251	299	294.5	303	328	269	304	364	319	--
HYDROSTATIC HEAD (FT.)	456	458.5	454	474	407	451	480	495	45[illegible]	--

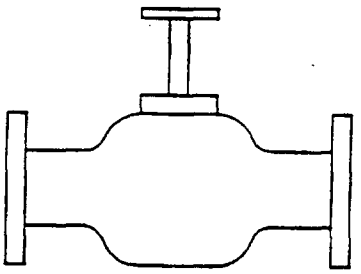
NOTES: E = ENGINE DRIVEN UNIT; V = VARIABLE SPEED PUMP; F = FUTURE

LIFT STATION DATA

ELEVATED STORAGE TANKS

TANK	STREET ADDRESS	OVERHEAD STORAGE (Gal.)	OVERFLOW ELEVATION (FT)	SYSTEM
PALMER	1241 E.HOLMES	300,000	451.5	LOWER
FRAYSER	655 WHITNEY	500,000	415	LOWER
RALEIGH MILLINGTON	3704 RALEIGH-MILLINGTON	300,000	452.48	LOWER
EGYPT CENTRAL	5384 EGYPT CENTRAL	500,000	452.48	LOWER
LUCY	6440 CHASE	300,000	406	LOWER
CLOVERHAVEN	7604 SLEDGE	100,000	424	LOWER
MACON RD	7685 MACON RD.	200,000	484	LOWER
BAKER	7707 BENJESTOWN	500,000	493.5	NORTH COUNTY
FARRIS	6925 MUDVILLE	100,000	493.5	NORTH COUNTY
RAINEY	9907 REDWOOD	250,000	493.5	NORTH COUNTY
CAPLEVILLE	5234 E.HOLMES	100,000	510	SOUTH COUNTY
HOLMES RD.	7599 HOLMES RD.	500,000	530	SOUTH COUNTY
STONEBRIDGE	8894 HWY. 64	500,000	527	EAST COUNTY
GALLAGHER	2040 ARLINGTON-COLLIERVILLE	500,000	527	EAST COUNTY
PRESIDENT ISLAND	1720 DOCK	500,000	407	PRESIDENT IS.

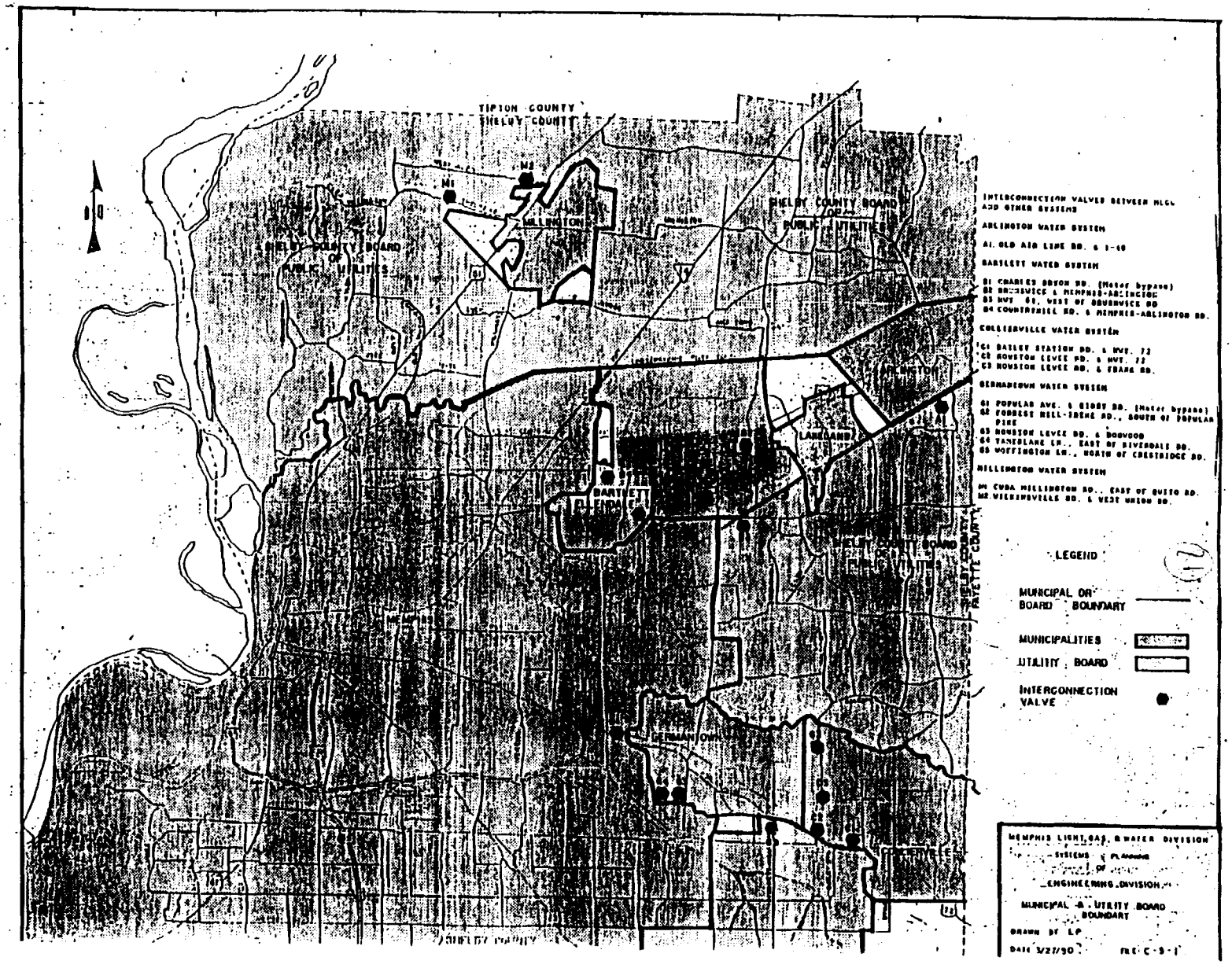
INTERCONNECTION VALVE



DATA

WATER SYSTEM INTERCONNECTION VALVES BETWEEN MLGW AND OTHER SYSTEMS
GENERAL LOCATION

ARLINGTON WATER SYSTEM	VALVE NO	PAGE NO	VALVE SIZE
1. OLD AIR LINE ROAD & I-40	1	301	8"
BARTLETT WATER SYSTEM			
1. CHARLES BRYAN RD. (METER BYPASS)	7	39	6"
2. BRUNSWICK & MEMPHIS-ARLINGTON	2	237	8"
3. HWY. 64 WEST OF BRUNSWICK ROAD	1	97	8"
4. COUNTRYHILL RD. & MEMPHIS-ARLINGTON RD.	9	149	8"
COLLIERVILLE WATER SYSTEM			
1. BAILEY STATION RD. & HWY. 72	2	1527	12"
2. HOUSTON LEVEE RD. & HWY 72	1	1527	8"
3. HOUSTON LEVEE RD. & FRANK RD.	1	1391	8"
GERMANTOWN WATER SYSTEM			
1. POPLAR AVE. & KIRBY RD. (METER BYPASS)	NOT NUMBERED	1265	6"
2. FORREST HILL-IRENE RD. SOUTH OF POPLAR PIKE	1	1455	12"
3. HOUSTON LEVEE RD. & DOGWOOD	1	1269	8"
4. TAMERLANE LN. EAST OF RIVERDALE ROAD	25	1447	6"
5. WOFFINGTON LN. NORTH OF CRESTRIDGE RD.	51	1447	6"
MILLINGTON WATER SYSTEM			
1. CUBA MILLINGTON RD. EAST OF QUITO RD.	1	511	6"
2. WILKINSVILLE RD. & WEST UNION RD.	6	537	8"

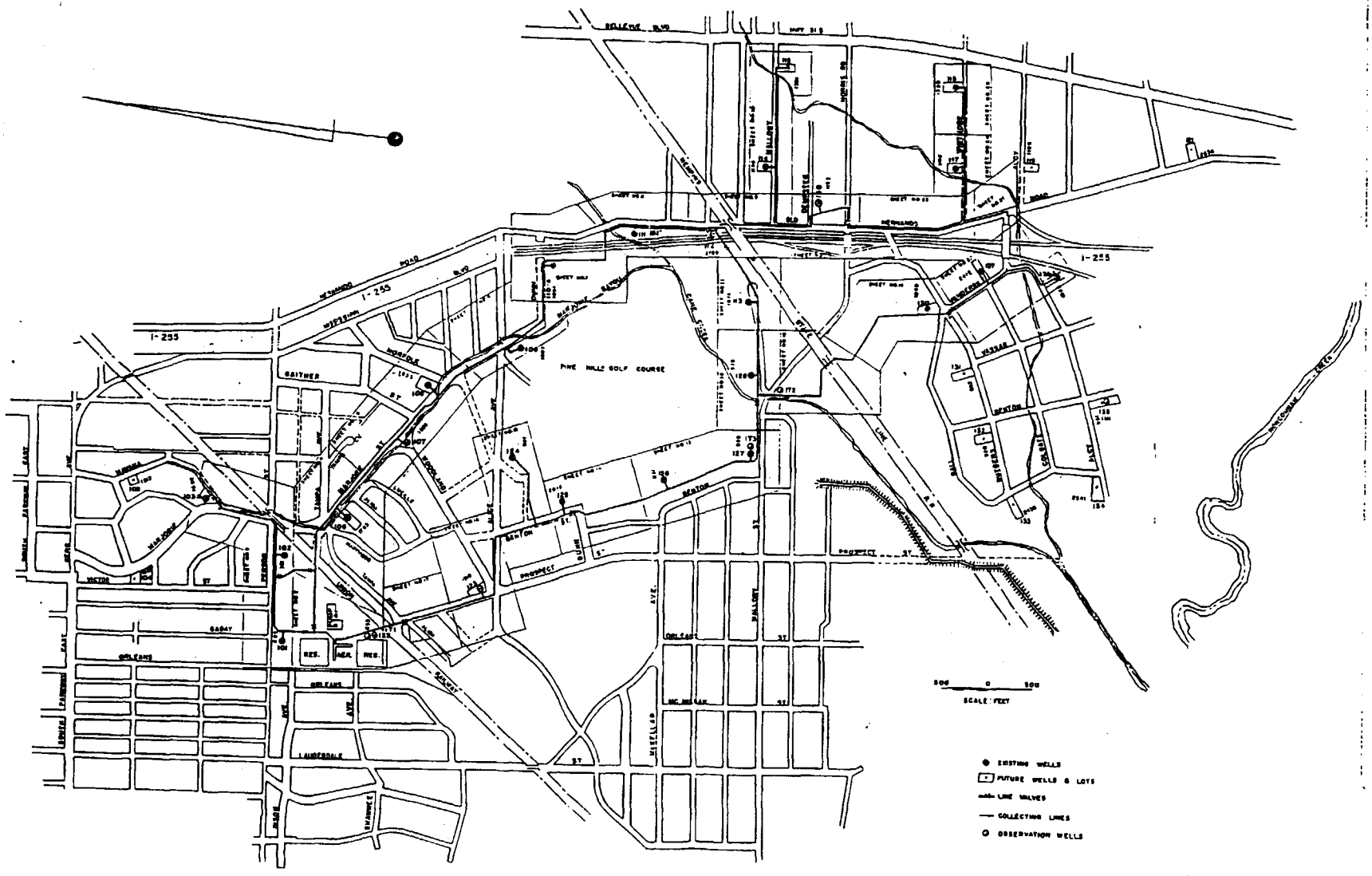

TIPTON COUNTY
SHELBY COUNTY
SHELBY COUNTY BOARD OF PUBLIC UTILITIES
MILLINGTON
M1
M2
ARLINGTON
LAKELAND
BARTLETT
GERMANTOWN
SHELBY COUNTY
FAYETTE COUNTY
INTERCONNECTION VALVES BETWEEN MLGW AND OTHER SYSTEMS
ARLINGTON WATER SYSTEM
A1 OLD AIR LINE RD. & I-40
BARTLETT WATER SYSTEM
B1 CHARLES BRYON RD. (Meter bypass)
B2 BRUNSWICK & MEMPHIS-ARLINGTON
B3 HWY 61, WEST OF BRUNSWICK RD
B4 COUNTRYHILL RD. & MEMPHIS-ARLINGTON RD.
COLLIERVILLE WATER SYSTEM
C1 BAILEY STATION RD. & HWY. 72
C2 HOUSTON LEVEE RD. & HWY. 72
C3 HOUSTON LEVEE RD. & FRANK RD.
GERMANTOWN WATER SYSTEM
G1 POPULAR AVE. & GIBBY RD. (Meter bypass)
G2 FORREST HILL-IRENE RD., SOUTH OF POPULAR PIKE
G3 HOUSTON LEVEE RD. & DOGWOOD
G4 TAMERLANE LN., EAST OF RIVERDALE RD.
G5 WOFFINGTON LN., NORTH OF CRESTRIDGE RD.
MILLINGTON WATER SYSTEM
M1 CUBA MILLINGTON RD., EAST OF QUITO RD.
M2 WICKINSVILLE RD. & WEST UNION RD.
LEGEND
MUNICIPAL OR BOARD BOUNDARY
MUNICIPALITIES
UTILITY BOARD
INTERCONNECTION VALVE
MEMPHIS LIGHT, GAS & WATER DIVISION
SYSTEMS PLANNING
OF
ENGINEERING DIVISION
MUNICIPAL & UTILITY BOARD BOUNDARY
DRAWN BY LP
DATE 3/27/90
FILE C-3-1

HIGH/LOW PRESSURE SYSTEMS
(CLOSED VALVES)

		VALVE NO.	PAGE NO.	VALV SIZ
1.	RAL.MILL @ FORTNER	130	187	10"
2.	BENJESTOWN @ PUMP STATION	3	349	12"
3.	PLEASANT RIDGE @ PLEASANT RIDGE TO (N)	3	371	6"
4.	FAWN LAKE @ SHADY DELL COVE	5	381	8"
5.	WALSH @ LOCKE CUBA	8	449	8"
6.	ARMOUR @ MILL ARL.	4	483	6"
7.	GERMANTOWN @ CHIMNEY ROCK	76	687	10"
8.	MACON @ WHITTEN	15	801	6"
9.	MACON @ WHITTEN	16	801	6"
10.	PATMORE	47	865	8"
11.	PATMORE @ MULLINS STA.	48	865	6"
12.	PATMORE @ MULLINS STA.	49	865	6"
13.	MACON @ ROCKY POINT	6	873	6"
14.	SANGA @ THOR	14	873	6"
15.	ROCKY POINT @ SANGA	8	873	12"
16.	OVERTON PARK @ REMILWORTH	11	923	6"
17.	RIVER EDGE @ OAK KNOLL	6	1121	8"
18.	FLORIDA @ McLEMORE	162	1139	6"
19.	JACK CARLEY @ CHANNEL	17	1209	12"
20.	MEMPHIS AERO CO.	21	1491	10"
21.	PLAYERS CLUB PARKWAY @ WINCHESTER	12	1521	12"
22.	HIGHWAY 72 @ BAILEY STA.	3	1527	12"
23.	BOBO @ WINCHESTER	4	1597	12"
24.	SHELBY DRIVE	14	1709	6"
25.	4800 SOUTH RIDGE/PARKING LOT	118	1717	8"
26.	MALLARD RIDGE @ SHELBY DRIVE	95	1717	8"
27.	CRUMPLER @ SHELBY	3	1717	2"
28.	SHELBY DRIVE @ GLENEAGLE	112	1717	2"
29.	SHELBY DRIVE	137	1717	12"
30.	MALLARD NEST @ SHELBY	2	1721	8"
31.	SHELBY @ ROSS	34	1721	12"
32.	BENOIT & SHELBY	47	1721	8"
33.	SHELBY @ RICHMOND HILLS	41	1723	12"
34.	MALONE @ HOLMES	3	1833	6"
35.	HOLMES @ HIGHWAY 78 (NORMALLY CLOSED)	13	1835	12"
36.	N. PARKWAY @ DECATUR	2	1903	36"
37.	HORIZON @ GERMANTOWN PARKWAY	19	47	12"
38.	GERMANTOWN PARKWAY	103	687	16"
39.	GERMANTOWN PARKWAY	110	687	16"

ALLEN WELL FIELD

SHEET NO. 1



ALLEN

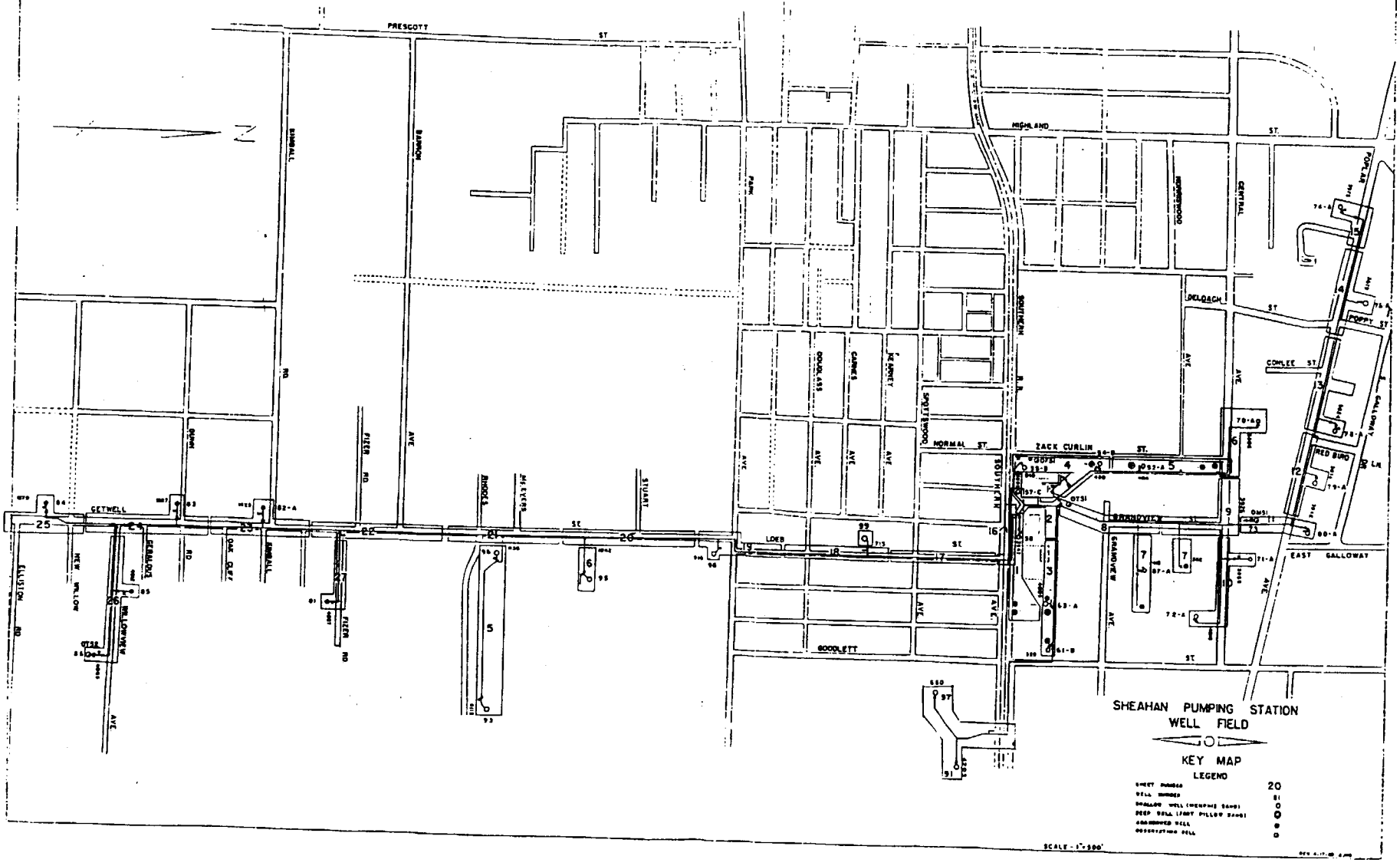
WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	LSTDAY	SY	EFF	Q	TDH
101	SH:J-96	685 DISON	548	457	COOK	100	1050	265	11/04/80	22	67	1192	240
102	SH:J-97	781 PERSON	378	292	LAYNE	100	1050	265	4/07/86	25	65	1226	214
103A	SH:J-166	1609 MARJORIE	372	272	COOK	100	1050	265	10/28/86	51	92	1155	220
106A	SH:J-100	1753 MARJORIE	504	406	LAYNE	150	1400	250					
107	SH:J-102	1809 MARJORIE	381	295	LAYNE	100	1050	265	3/24/87	50	50	1057	216
108	SH:J-103	1853 MARJORIE	362	276	LAYNE	100	1050	265	3/31/86	31	70	1161	238
109	SH:J-104	1007 ALICE	395	305	LAYNE	100	1050	265	9/10/86	49	69	1049	239
110A	SH:J-101	1091 ALICE	364	284	LAYNE	100	1000	230	10/28/80	52	69	1239	214
110B (uc)		1091 ALICE											
111A	SH:J-168	2027 HERNANDO	391	286	LAYNE	150	1400	295	5/17/89	42	61	1886	158
112	SH:J-107	2109 HERNANDO	330	259	LAYNE	100	1050	265	10/14/80	37	70	1176	235
113	SH:J-108	1074 MALLORY	505	423	COOK	100	1050	265	4/17/86	29	66	1211	237
114	SH:J-109	1198 MALLORY	370	297	COOK	100	1050	265	11/06/80	44	67	1245	232
115	SH:J-110	1301 MALLORY	390	229	LAYNE	100	1050	265	10/31/80	81	67	1178	210
117	SH:J-112	1192 WHITMORE	371	285	LAYNE	100	1050	265	10/09/80	64	86		
118	SH:J-113	1280 WHITMORE	499	413	LAYNE	100	1050	265	10/21/80	51	69	1269	217
122	SH:J-115	709 DISON	379	305	LAYNE	100	1050	265	9/11/72	52	70	1300	228
123	SH:J-116	1910 TAMPA	397	317	COOK	100	1050	265	4/29/80	49		1325	
124	SH:J-117	881 ALICE	574	499	LAYNE	100	1050	265	9/05/72	40	64	1104	227
125A	SH:J-118	2016 BENTON	539	431	LAYNE	150	1400	255	12/13/89	35	78	1515	250
126	SH:J-119	2100 BENTON	397	300	COOK	100	1050	265	10/17/80	37	70	1319	235
127	SH:J-120	888 MALLORY	452	381	LAYNE	100	1050	265	10/24/80	37	66	1129	228
128	SH:J-121	976 MALLORY	432	354	COOK	100	1050	265	11/05/80	56	74	1417	227
130	SH:J-122	1040 RUTGERS	401	315	LAYNE	100	1050	265	10/17/80	37	73	1170	243
136A	SH:J-167	1085 ALCY	453	394	WORTHINGTON	100	1050	265	10/27/86	26	61	1055	242
137	SH:J-154	2412 VANDERBILT	376	290	LAYNE	100	1050	265	10/10/80	45	74	1169	241
138	SH:J-132	1153 DEMPSTER	537	457	LAYNE	100	1050	265	10/22/80	57	81	956	225

TOTAL WELLS 26

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

LSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)
uc - Under Construction


SHEAHAN PUMPING STATION
WELL FIELD
KEY MAP
LEGEND
SCALE - 1"=500'
PRESCOTT ST
HIGHLAND ST.
GETWELL ST
LOEB ST
GOODLETT ST
ZACK CURLIN ST.
NORMAL ST.
DELOACH ST
POPPY ST
CONLEE ST
RED BIRD LN
EAST GALLOWAY
GRANDVIEW
SOUTHERN R.R.
SPOTTSWOOD
CARNES
KEARNEY
DOUGLASS
PARK
BARRON
KIMBALL
FIZER RD
STUART
RHODES
MEYERS
DUNN
GERALDUS
OAK CLIFF
NEW WILLOW
WILLOWVIEW
ELLISTON RD
POPLAR
CENTRAL
HENRISWOOD
GALLOWAY
AVE
RD

SHEAHAN

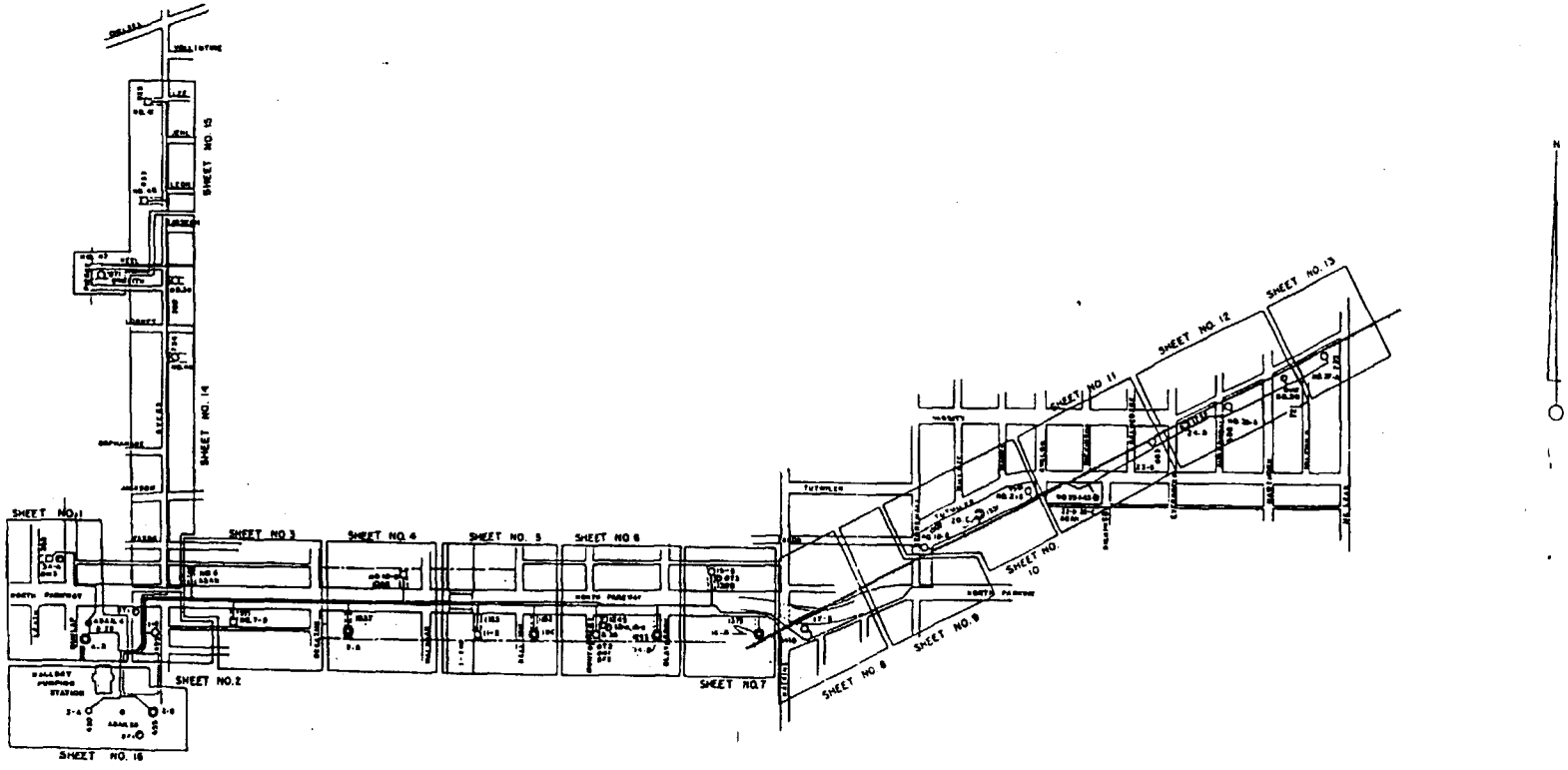
WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TESTDAY	SY	EFF	Q	TDH
52A	SH:K-94	404 ZACH CURLIN	487	407	LAYNE	75	100	220	5/05/81	11	37	604	193
54B	SH:K-110	480 ZACH CURLIN	456	370	GOULDS	100	1050	265	4/22/81	75	63	1126	161
55B	SH:K-117	540 ZACH CURLIN	706	545	LAYNE	150	1400	265	5/11/81	56	52	1022	257
57C	SH:K-49	3920 SOUTHERN	454	368	LAYNE	100	1050	265	4/09/81	50	56	1115	194
58B	SH:K-135	3942 SOUTHERN	489	308	WORTHINGTON	100	1000	250	3/26/81	36	64	1029	203
61B	SH:K-105	525 GOODLETT	377	317	WORTHINGTON	75	1000	250	3/25/81	42	67	964	184
63A	SH:K-136	4007 GOODLETT	421	316	LAYNE	100			11/28/83	43			
70A	SH:K-88	3806 CENTRAL	532	458	LAYNE	75	1000	225	3/23/81	25	65	1227	215
71A	SH:K-82	3968 CENTRAL	480	414	GOULDS	100	1050	265	4/20/81	29	74	1197	209
72A	SH:K-89	4019 CENTRAL			GOULDS	100	1050	265	4/04/81	36	68	1184	203
74A	SH:K-104	3575 POPLAR	569	505	LAYNE	75	1000	225	5/06/81	11	57	875	236
76A	SH:K-112	3678 POPLAR	377	297	LAYNE	100	1200	200	5/11/81	41	60	1176	200
78A	SH:K-108	3824 POPLAR	504	424	LAYNE	100	1050	265	5/13/81	60	77	1248	195
79A	SH:K-111	3874 POPLAR	757	651	LAYNE	150	1400	265	5/07/81	28	67	1475	228
80A	SH:K-109	3842 POPLAR	495	415	GOULDS	100	1050	265	5/18/81	63	72	1281	188
87A	SH:K-96	412 GRANDVIEW	371	311	GOULDS	100	1050	265	5/14/81	46	68	1156	187
88 (uc)		4077 PARK											
91	SH:K-140	4203 SOUTHERN	624	521	FLOWAY	150	1400	295	10/17/89	25	67	1573	237
93	SH:K-118	4112 RHODES	796	690	LAYNE	150	1400	265	4/04/81	56	56	1450	201
95	SH:K-119	1042 GETWELL	883	777	LAYNE	150	1400	265	3/31/81	24	70	1313	270
96	SH:K-115	1116 GETWELL	792	692	LAYNE	150	1400	265	4/01/81	33	71	1374	271
97	SH:K-139	660 GOODLETT	574	471	FLOWAY	150	1400	295	5/11/89	18	62	1508	239
98	SH:K-138	896 GETWELL	594	490	LAYNE	100	1400	295	9/12/88	22	45	880	238
99	SH:K-142	715 LOEB	459	355	LAYNE	150	1400	295	8/29/88	29	71	1604	263

TOTAL WELLS 23

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)
uc - Under Construction



DEEP WELL (FORT PILLOW SAND)
SHALLOW WELL (MEMPHIS SAND)
ABANDONED WELLS
DISCONTINUE WELLS

MEMPHIS LIGHT, GAS AND WATER DIVISION
MEMPHIS, TENNESSEE

MALLORY STATION WELL FIELD
KEY MAP

DATE: SEPT 1938 SCALE 1" = 500'

DRAWN BY

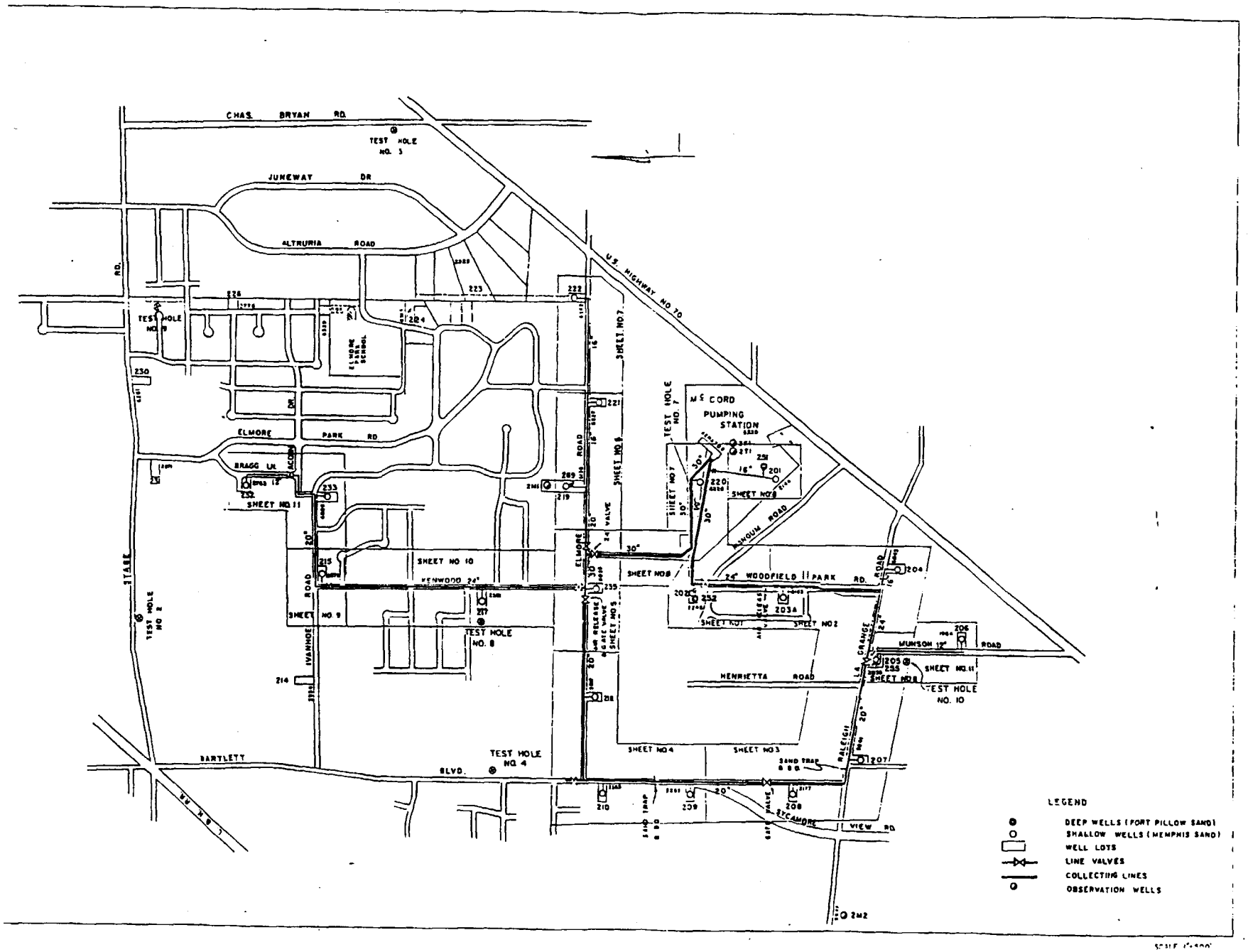
MALLORY

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
1B	SH:0-193	515 AYERS	509	429	LAYNE	100	1050	265	8/29/74	47	63	1299	207
2B	SH:0-219	461 AYERS	797	691	LAYNE	150	1400	265	5/19/81	18	68	1422	240
3A	SH:0-197	466 N.DUNLAP	493	413	LAYNE	100	1050	265	9/03/74	68	59	1281	195
4B	SH:0-220	514 N.DUNLAP	765	659	LAYNE	150	1400	265	5/20/81	18	75	1490	267
7B	SH:0-201	965 N.PARKWAY	514	430	LAYNE	100	1050	265	9/18/74	39	61	1290	202
9B	SH:0-225	1043 N.PARKWAY	706	600	LAYNE	150	1400	265	5/21/81	31	73	1570	224
10B	SH:0-231	1088 N.PARKWAY	518	438	LAYNE	100	1050	265	9/09/74	24	67	1172	234
11B	SH:0-237	1149 N.PARKWAY	539	459	LAYNE	100	1050	265	9/11/74	19	41	776	224
12C	SH:0-207	1195 N.PARKWAY	758	653	WORTHINGTON	150	1400	265	5/27/81	20	71	1508	255
13B	SH:0-238	1247 N.PARKWAY	516	436	LAYNE	100	1050	265	9/13/74	25	65	1187	227
14B	SH:0-223	1293 N.PARKWAY	772	666	LAYNE	150	1400	265	5/28/81	10	20	506	207
15B	SH:0-203	1328 N.PARKWAY	509	429	LAYNE	100	1050	265	9/16/74	40	63	1255	213
16B	SH:0-222	1377 N.PARKWAY	779	673	LAYNE	150	1400	265	6/01/81	25	55	1342	211
17B	SH:0-216	1444 N.PARKWAY	516	427	WORTHINGTON	100	1050	265	6/02/81	22	60	1239	215
19B	SH:0-213	578 STONEWALL	634	548	WORTHINGTON	100	1050	265	6/03/81	13	53	1036	225
20C	SH:0-224	1551 TUTWILER	772	666	LAYNE	150	1400	265	6/04/81	14	62	1400	248
21B	SH:0-210	1589 TUTWILER	542	459	WORTHINGTON	100	1050	265	6/22/81	26	67	1393	213
23B	SH:0-208	663 N.EVERGREEN	514	419	WORTHINGTON	100	1050	265	11/10/81	41	67	1595	194
24B	SH:0-221	670 N.EVERGREEN	784	678	LAYNE	150	1400	265	6/10/81	21	70	1560	231
*34A	SH:0-204	566 LEATH	471	391	LAYNE	100	1050	265	9/05/74	22	71	1233	230
35A	SH:0-209	686 AUBURNDALE	511	418	WORTHINGTON	100	1050	265	6/16/81	25	67	1393	207
37A	SH:0-146	731 N.McLEAN	512	429	WORTHINGTON	100	1050	265	6/17/81	40	65	1567	190
39	SH:0-182	780 AYERS	587	473	LAYNE	75	1350	208	6/10/81	21	34	1018	196
40	SH:0-183	837 AYERS	524	445	LAYNE	75	1350	208	6/18/81	88	79	1079	205
46	SH:0-189	720 AYERS	555	486	LAYNE	100	1200	200	6/08/81	15	96	1043	199

TOTAL WELLS 25

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)
TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)


CHAS. BRYAN RD.
TEST HOLE NO. 3
JUNEWAY DR
ALTRURIA ROAD
U.S. HIGHWAY NO 70
TEST HOLE NO 9
ELMORE PARK SCHOOL
ELMORE PARK RD
BRAGG LN.
SHEET NO 11
SHEET NO 10
KENWOOD 24"
SHEET NO 9
TEST HOLE NO. 8
TEST HOLE NO 2
STATE
IVANHOE ROAD
ELMORE ROAD
SHEET NO 7
SHEET NO 6
SHEET NO 5
24" VALVE
TEST HOLE NO 7
McCORD PUMPING STATION
SHEET NO 8
HANNUM ROAD
24" WOODFIELD PARK RD.
SHEET NO 1
SHEET NO 2
HENRIETTA ROAD
MUNSON 12" ROAD
SHEET NO 11
TEST HOLE NO. 10
L.A. ORANGE
RALEIGH
SHEET NO 4
SHEET NO 3
SAND TRAP
BARTLETT BLVD.
TEST HOLE NO. 4
SYCAMORE VIEW RD.
LEGEND
DEEP WELLS (FORT PILLOW SAND)
SHALLOW WELLS (MEMPHIS SAND)
WELL LOTS
LINE VALVES
COLLECTING LINES
OBSERVATION WELLS

McCORD

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TESTDAY	SY	EFF	Q	TDH
201	SH:Q-29	2144 MANGUM	452	336	LAYNE	100	1050	265	12/12/80	79	70	1269	218
202	SH:Q-30	2265 McCORD STA.	378	293	LAYNE	100	1050	265	6/02/82	53	66	1449	179
203A	SH:Q-31	2165 WOODFIELD PARK	380	280	LAYNE	100	1050	265	3/05/87	27	74	1125	227
204	SH:Q-32	6045 RALEIGH LAGRANGE	458	372	LAYNE	100	1050	265	12/04/80	25	72	1267	223
205	SH:Q-33	2055 MUNSON	361	275	LAYNE	100	1050	265	12/05/80	31	71	1230	224
206	SH:Q-71	1964 MUNSON	406	320	LAYNE	100	1050	265	3/24/81	17	45	843	210
207	SH:Q-34	5841 RALEIGH LAGRANGE	531	445	LAYNE	100	1050	265	11/13/80	21	50	894	218
208	SH:Q-35	2177 BARTLETT BLVD.	391	305	LAYNE	100	1050	265	11/17/80	55	72	1462	195
209	SH:Q-36	2265 BARTLETT BLVD.	370	284	LAYNE	100	1050	265	11/18/80	55	67	1343	197
210	SH:Q-37	2365 BARTLETT BLVD.	540	454	LAYNE	100	1050	265	11/19/80	49	72	1436	193
215	SH:Q-68	2678 KENWOOD	470	385	LAYNE	100	1050	265	3/11/81	57	61	1311	181
217	SH:Q-61	2501 KENWOOD	486	390	LAYNE	100	1050	265	3/11/81	34	70	1295	208
218	SH:Q-38	5917 ELMORE	497	411	LAYNE	100	1050	265	11/24/80	46		1413	
219	SH:Q-39	6138 ELMORE	377	291	LAYNE	100	1050	265	12/18/80	20	73	1250	228
220	SH:Q-40	6226 HWY. 70	441	355	LAYNE	100	1050	265	11/24/80	19	79	1192	252
221	SH:Q-41	6227 ELMORE	505	399	LAYNE	100	1050	265	12/17/80	77	70	1283	215
222	SH:Q-42	6342 ELMORE	435	329	LAYNE	100	1050	265	1/03/83	16	67	1164	222
232	SH:Q-69	2763 BRAGG	477	391	LAYNE	100	1050	265	12/19/80	61	63	1386	182
233	SH:Q-70	6089 IVANHOE	476	380	LAYNE	100	1050	265	3/09/81	52	35	842	172
235	SH:Q-63	6035 ELMORE	506	420	LAYNE	100	1050	265	3/17/81	92	38	809	186
251	SH:Q-67	2144 MANGUM	868	762	LAYNE	150	1400	265	2/04/76	22	71	1618	224
252	SH:Q-65	2265 McCORD STA.	866	760	LAYNE	150	1400	265	3/19/81	29	74	1657	221
255	SH:Q-64	2055 MUNSON	734	628	LAYNE	150	1400	265	3/16/81	13	53	1036	252
269	SH:Q-62	6138 ELMORE	860	755	LAYNE	150	1400	265	3/11/81	57	50	1378	182

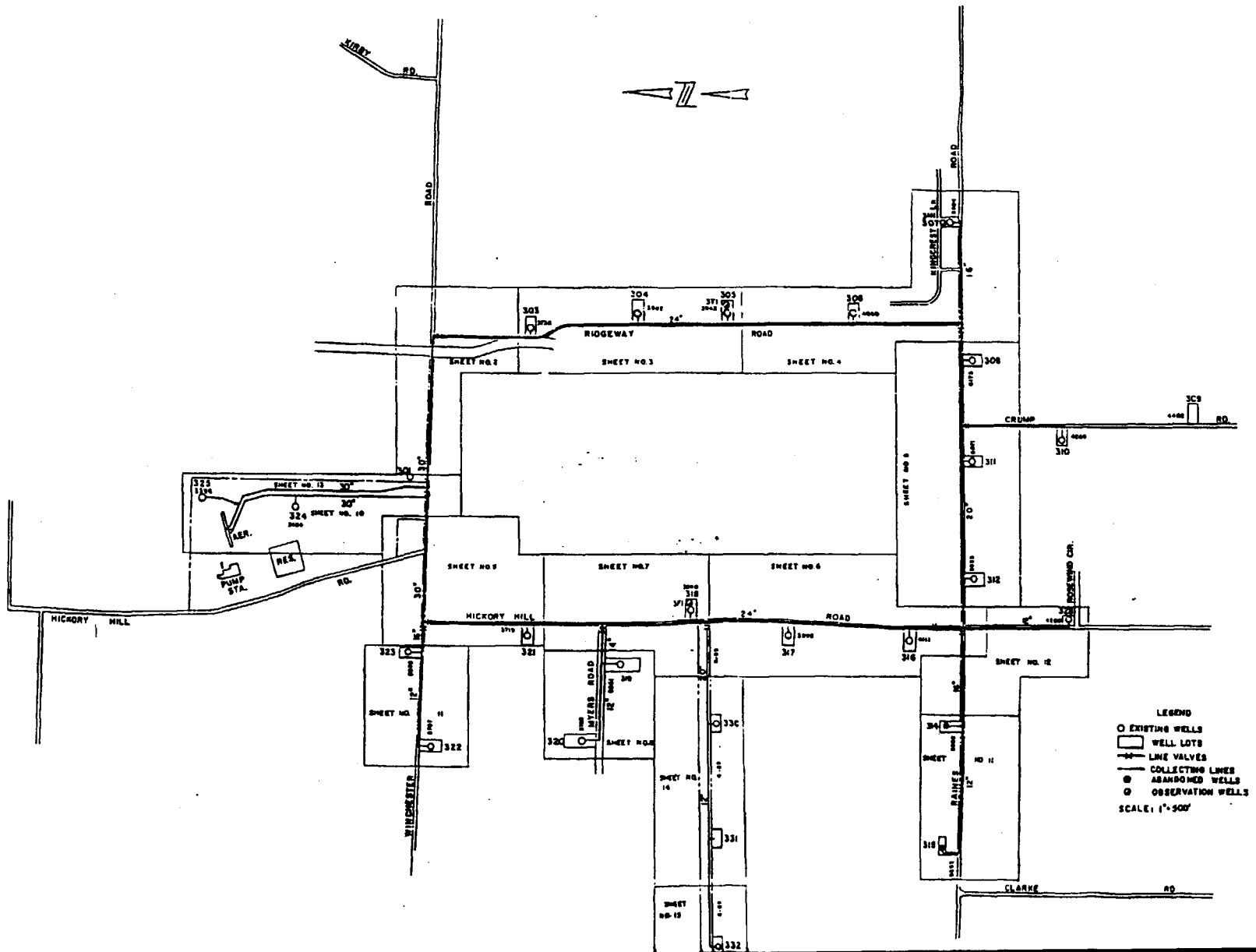
TOTAL WELLS 24

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft).

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)

SHEET NO. 1



KIRBY RD.
ROAD
RIDGEWAY ROAD
SHEET NO. 2
SHEET NO. 3
SHEET NO. 4
SHEET NO. 5
SHEET NO. 6
SHEET NO. 7
SHEET NO. 8
SHEET NO. 9
SHEET NO. 10
SHEET NO. 11
SHEET NO. 12
SHEET NO. 13
SHEET NO. 14
SHEET NO. 15
KINGCREST LN.
CRUMP RD.
ROSEWIND CIR.
HICKORY HILL ROAD
HICKORY HILL RD.
WINCHESTER
MYERS ROAD
RAINES
CLARKE RD
AER.
RES.
PUMP STA.
LEGEND
EXISTING WELLS
WELL LOTS
LINE VALVES
COLLECTING LINES
ABANDONED WELLS
OBSERVATION WELLS
SCALE: 1"=500'

LICHTERMAN

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
301	SH:L-80	6034 WINCHESTER	576	504	JACUZZI	150	1400	295	6/22/78	37	72	1882	213
303	SH:L-26	3736 RIDGEWAY	432	346	LAYNE	100	1050	265	6/01/83	26	67	1257	217
304	SH:L-85	3882 RIDGEWAY	392	306	LAYNE	100	1050	265	6/15/83	20	68	1136	231
305	SH:L-37	3942 RIDGEWAY	382	296	LAYNE	100	1050	265	2/01/90	32	62	1107	218
306	SH:L-36	4060 RIDGEWAY	572	486	LAYNE	100	1050	265	6/01/83	35	69	1308	215
307	SH:L-97	6304 KINGCREST	688	575	LAYNE	150	1400	295	9/08/88	33	75	1739	264
308	SH:L-63	6173 E.RAINES	472	386	LAYNE	100	1050	265	2/07/90	20	76	1165	259
310	SH:L-102	4269 CRUMP	574	463	LAYNE	100	1050	265					
311	SH:L-86	6071 E.RAINES	334	248	LAYNE	100	1050	265	6/07/83	30	69	1158	223
312	SH:L-62	5955 E.RAINES	357	271	LAYNE	100	1050	265	6/15/83	45	68	1190	218
316	SH:L-22	4111 HICKORY HILL	356	270	LAYNE	100	1050	265	6/06/83	41	66	1163	215
317	SH:L-33	3993 HICKORY HILL	342	256	LAYNE	100	1050	265	6/13/83	37	72	1216	226
318	SH:L-38	3890 HICKORY HILL	341	256	LAYNE	100	1050	265	6/16/83	42	68	1222	220
319	SH:L-87	5861 MYERS	417	331	LAYNE	100	1050	265	6/09/83	26	72	1184	245
320	SH:L-24	5788 MYERS	427	341	LAYNE	100	1050	265	6/14/83	51	70	1231	229
321	SH:L-35	3719 HICKORY HILL	315	229	LAYNE	100	1050	265	6/24/83	30	68	1157	226
322	SH:L-71	5787 WINCHESTER	509	319	JACUZZI	150	1400	295	9/28/77	26	75	1643	254
323	SH:L-76	5876 WINCHESTER	579	471	JACUZZI	150	1400	295	9/15/77	40	71	1787	227
324	SH:L-40	3483 HICKORY HILL	378	290	LAYNE	100	1050	265	6/30/83	14	74	1176	242
325	SH:L-93	3396 HICKORY HILL	485	385	LAYNE	150	1400	295	6/12/86	23	71	1612	243
328	SH:L-78	4280 HICKORY HILL	407	271	JACUZZI	150	1400	295	10/25/77	29	74	1645	253
330	SH:L-101	3899 HICKORY HILL	783	680	LAYNE	150	1400	295	7/14/89	38	78	1852	256
332	SH:L-100	3911 HICKORY HILL	471	368	LAYNE	150	1400	295					

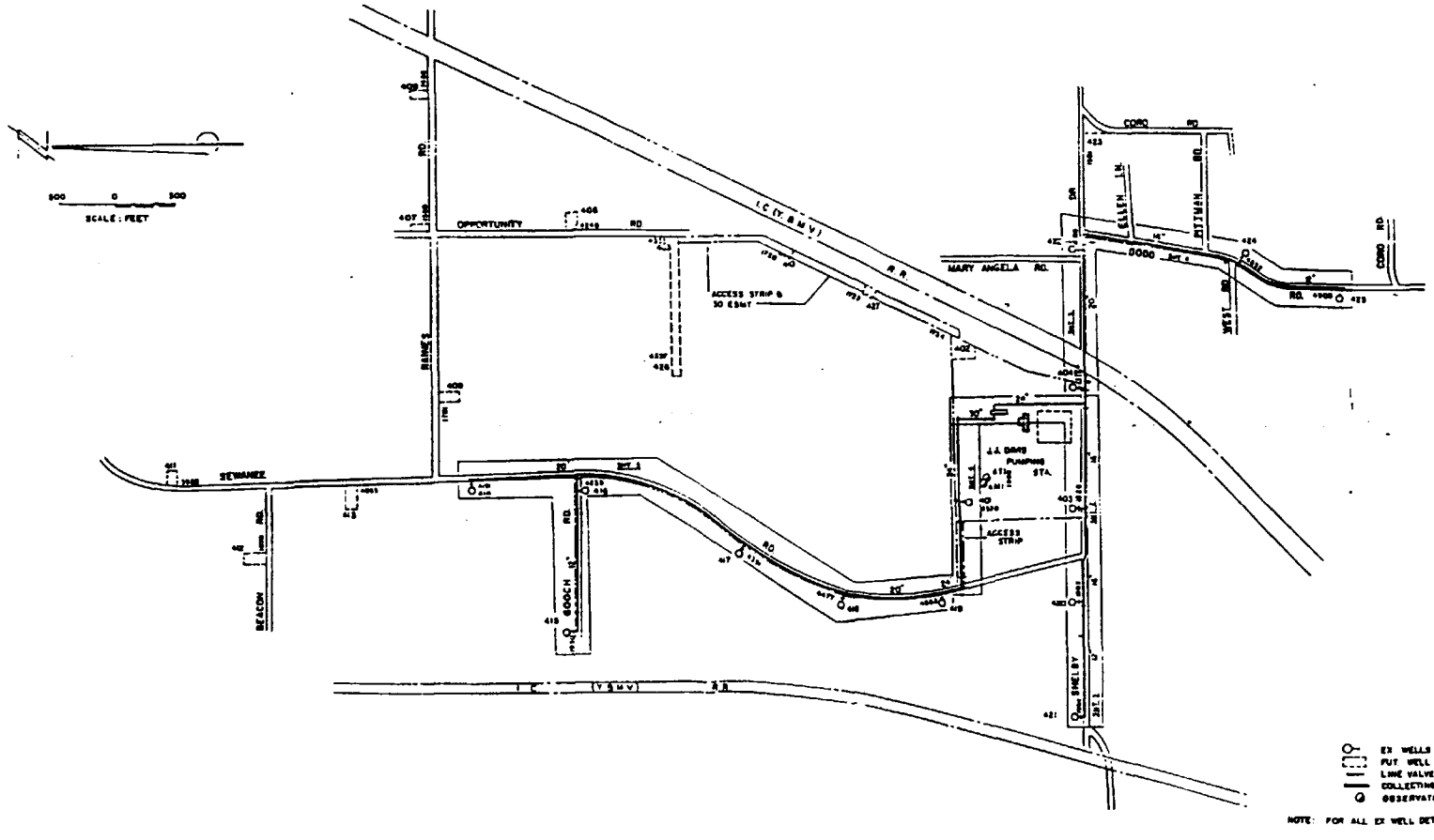
TOTAL WELLS 23

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)

J.J. DAVIS WELL FIELD
SHEET NO. 1



DAVIS

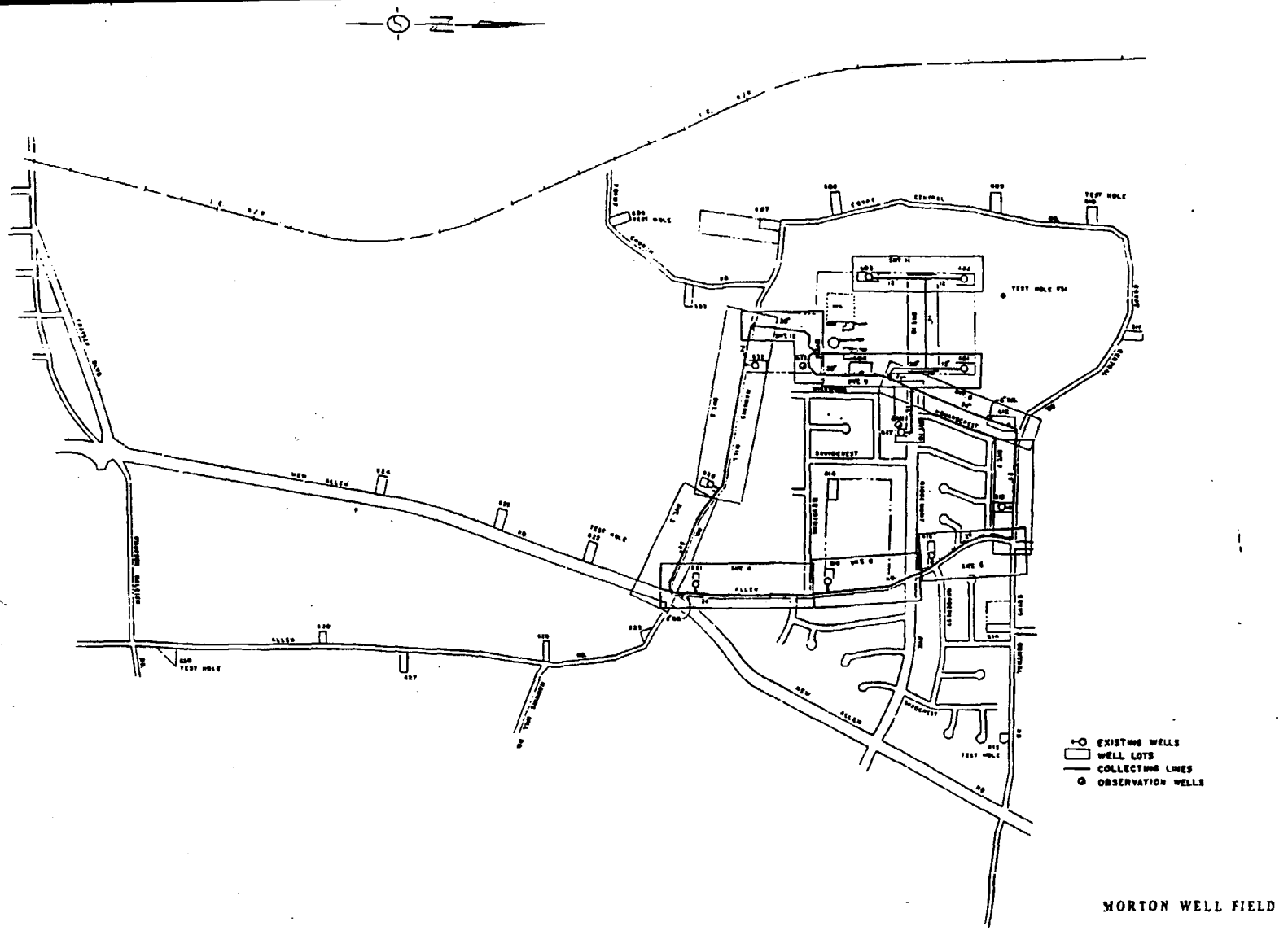
WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
401	SH:J-143	4576 SEWANEE DR.	455	370	LAYNE	100	1050	265	7/18/74	45	56	1444	164
403	SH:H-10	1826 W.SHELBY DR.	454	368	LAYNE	100	1050	265	8/26/80	49	64	1450	180
404	SH:J146	1726 W.SHELBY DR.	446	360	LAYNE	100	1050	265	8/13/80	44	61	1436	176
414	SH:J-145	4191 SEWANEE DR.	472	388	LAYNE	100	1050	265	8/19/80	49	60	1379	181
415	SH:H-8	1930 GOOCH RD.	618	526	LAYNE	100	1050	265	8/14/80	34	63	1319	193
416	SH:J-137	4259 SEWANEE DR.	499	415	LAYNE	100	1050	265	8/21/80	32	66	1287	208
417	SH:H-7	4391 SEWANEE DR.	467	380	LAYNE	100	1050	265	8/15/80	51	60	1367	178
418	SH:H-6	4477 SEWANEE DR.	412	375	LAYNE	100	1050	265	9/27/72	46	60	1429	175
419	SH:H-5	4563 SEWANEE DR.	412	332	LAYNE	100	1050	265	8/22/80	80	58	1347	178
420	SH:H-11	1902 W.SHELBY DR.	445	360	LAYNE	100	1050	265	8/27/74	54	59	1466	169
421	SH:H-9	1944 W.SHELBY DR.	440	360	LAYNE	100	1050	265	8/26/80	63	63	1397	180
422	SH:J-141	1606 W.SHELBY DR.	480	400	LAYNE	100	1050	265	7/11/83	79	576	1565	151
424	SH:J-139	4832 DODD RD.	460	380	LAYNE	100	1050	265	9/03/80	60	59	1433	172
425	SH:J-144	4905 DODD RD.	452	370	LAYNE	100	1050	265	9/03/80	53	63	1367	184

TOTAL WELL 14

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)



MORTON WELL FIELD

SCALE 1" = 500'

WATER ENGINEERING DEPT.
MEMPHIS LIGHT, GAS & WATER DIVISION

MORTON

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
601	SH:P-147	3152 HAEKINS MILL	484	379	WORTHINGTON	150	1400	230	11/03/83	62	71	1544	204
602	SH:P-133	3110 HAWKINS MILL	469	364	WORTHINGTON	150	1400	265	8/16/83	47	75	1515	219
603	SH:P-142	3112 HAWKINS MILL	708	608	WORTHINGTON	150	1400	230	2/22/83	19	73	1445	224
604 (uc)		3154 HAWKINS MILL											
615	SH:P-120	3303 EGYPT CENTRAL	558	443	LAYNE	150	1400	230	7/18/83	05	68	1672	191
616	SH:P-129	4365 OLD ALLEN	435	326	LAYNE	150	1400	230	7/21/83	66	71	1465	230
617	SH:P-134	3225 RIDGEMONT	411	298	FLOWAY	150	1400	230	8/05/82	36	74	1493	220
619	SH:P-130	4275 OLD ALLEN	416	331	LAYNE	150	1400	230	7/25/83	90	69	1652	192
620	SH:P-132	3259 HAWKINS MILL	562	469	WORTHINGTON	150	1400	230	11/01/83	35	75	1504	221
621	SH:P-131	4139 OLD ALLEN	404	295	LAYNE	150	1400	230	8/17/82	58	70	1634	200
632	SH:P-125	3160 HAWKINS MILL	458	352	LAYNE	150	1400	230	7/28/83	35	71	1524	215

TOTAL WELLS 10

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)
uc - Under Construction

SHAW

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
702	SH:R-34	10392 HUMPHREY	801	695	LAYNE	150	1400	295					
706	SH:R-39	10137 HUMPHREY											
710	SH:R-29	657 HALL	589	484	LAYNE	150	1400	295					
722	SH:R-36	326 PISGAH	656	550	LAYNE	150	1400	295					
723	SH:R-37	470 PISGAH											
724	SH:R-40	580 PISGAH											
725	SH:R-30	662 PISGAH											
751	SH:R-33	10390 HUMPHREY	1187	1082	LAYNE	150	1400	295					
755	SH:R-22	10256 HUMPHREY	1225	1116	LAYNE	150	1400	295					
761	SH:R-35	511 HALL	1178	1056	LAYNE	150	1400	295					

TOTAL WELL 10

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)
TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)

LNG

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
521	SH:W-16	11095 MILL-ARLING.	438	286	LAYNE	50	500	165					
522	SH:W-18	11095 MILL-ARLING.	312	272	LAYNE	50	500	165					

TOTAL WELLS 2

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)

PALMER

WELL #	USGS #	ADDRESS	DEPTH	SCREEN	PUMP	MOTOR	RT-Q	RT-HD	TSTDAY	SY	EFF	Q	TDH
506	SH:J-75	1241 E.HOLMES	398	312	LAYNE	75	1000	180					
507	SH:J-74	1241 E.HOLMES	398	312	LAYNE	75	1000	180					
508	SH:J-73	1241 E.HOLMES	385	234	LAYNE	75	1000	180					
509	SH:J-72	1241 E.HOLMES	401	315	LAYNE	75	1000	180					

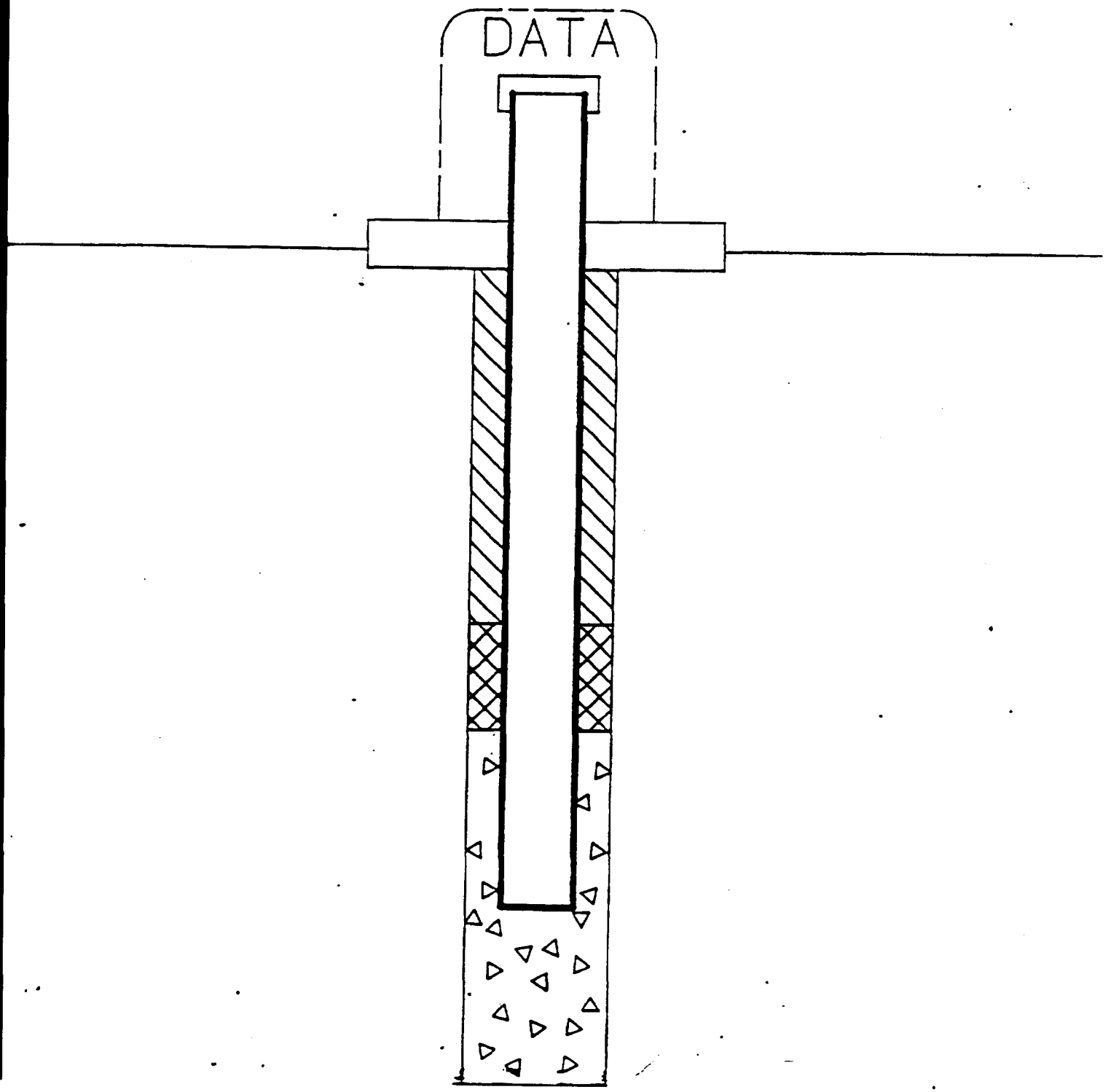
TOTAL WELLS 4

LEGEND

DEPTH - Total depth of well (ft.)
SCREEN - Depth to top of screen (ft.)
PUMP - Make of pump
MOTOR - Horsepower of motor
RT-Q - Flow for rated head (gpm)
RT-HD - Rated head (ft)

TSTDAY - Last test date
SY - Specific yield (gpm/ft/dd)
EFF - Wire to wire efficiency
Q - Flow with valve wide open (gpm)
TDH - Total dynamic head (ft)

OBSERVATION WELL



BSERVATION WELL DATA

LUVIAL (TERRACE) DEPOSITS

LGW/USGS WELLS

LGW UMBER	USGS NUMBER	WELL LOCATION	WELL ADDRESS	TOP SCREEN	WELL DEPTH	LENGT SCREE
T1	SH:O-244	MALLORY STA	488 N.DUNLAP ST.	83	93	10
T2	SH:O-229	WELL LOT 13	1245 N. PARKWAY	110	120	10
T3	SH:O-245	WELL LOT 15	1328 N. PARKWAY	70	80	10
T51	SH:K-137	SHEAHAN STA	3941 GRANDVIEW	76	86	10
T52	SH:K-75	WELL LOT 86	4063 WILLOWVIEW AVE.	81	91	10
T1	SH:J-173	WELL LOT 122	709 DISON AVE.	106	112	6
T2	SH:J-171		MALLORY & NORRIS	61	71	10
T3	SH:J-174	WELL LOT 127	888 MALLORY (GMC-ARRC)		44	
T1	SH:Q-94	McCORD STA	6230 HWY. 70	80	90	10
T1	SH:L-94	WELL LOT 305	3942 RIDGEWAY	57	67	10
T1	SH:J-172	DAVIS STA	1800 W.SHELBY DR.	100	110	10
T1	SH:P-99	OVERTON PARK		53	59	6
T1	SH:P-197	MORTON STA.	MORTON PUMPING STA	70	80	10
T1	SH:R-27	SHAW STA.	10300 HUMPHREY RD.	29	39	10
T2	SH:R-32	WELL LOT 700	10320 KENTWOOD EST.	35	45	10

OTAL WELLS 15

LGW/USGS WELLS
NDER CONSTRUCTION

LGW UMBER	WELL LOCATION	WELL ADDRESS
T4	MALLORY STA.	488 N.DUNLAP
T5	WELL LOT 22	DICKINSON & TUTWILDER
T53	WELL LOT 76A	3678 POPULAR
T4	ALLEN STA.	709 DISON
T5		LINCOLN PARK
T6	WELL LOT 115	1301 MALLORY
T7	WELL LOT 134	2541 BALL
T2	WELL LOT 215	2678 KENWOOD

OTAL WELLS 8

OBSERVATION WELL DATA

MEMPHIS SAND

MLGW/USGS WELLS

MLGW NUMBER	USGS NUMBER	WELL LOCATION	WELL ADDRESS	TOP SCREEN	WELL DEPTH	LENGTH SCREEN
0M1	SH:O-212	WELL LOT 13	1245 N. PARKWAY	733	743	10
0M2	SH:P-97	WELL LOT 36	721 IDLEWOOD	815	825	10
0M3	SH:O-179	WELL LOT 34	566 LEATH	462	472	10
0M51	SH:K-66	WELL LOT 73	3926 CENTRAL	438	499	61
1M1	SH:J-126	WELL LOT 135	961 ALCY	255	265	10
2M1	SH:Q-59	WELL LOT 219	6138 ELMORE	830	840	10
2M2	SH:P-85	TEST HOLE #1	5571 RALEIGH LA GRANGE	312	319	7
3M1	SH:L-39	WELL LOT 307	6304 KINGCREST	341	349	8
4M1	SH:J-140	DAVIS STA.	1800 W.SHELBY DR.	543	553	10
5M1	AR:O-1	ST.CLAIRE ARK	FOGELMAN FARM	477	497	20
5M2	AR:H-2	MILLERS ARK.	REMBERT FARM	480	500	20
5M3	AR:C-1	LEHI ARK.	CARLSON FARM	602	622	20
5M4	SH:P-76	PEABODY PARK	CENTRAL AVE.	428	488	60
5M5	SH:O-1	FRAYSER	O.K. ROBERSON RD.	424	434	10
5M6	SH:P-1	RALEIGH	4858 SCHIBLER RD.	332	342	10
5M7	SH:Q-1	CORDOVA	8179 MACON RD.	375	384	9
5M8	SH:J-1	GOODMAN	5420 WEAVER RD.	327	334	7
6M1	SH:P-113	WELL LOT 617	3225 RIDGEMONT	519	529	10
7M1	SH:R-31	WELL LOT 700	10320 KENTWOOD EST.	500	540	40

TOTAL WELLS 19

USGS WELLS NOT OWNED BY MLGW

WELL OWNER	USGS NUMBER	WELL LOCATION	WELL ADDRESS	TOP SCREEN	WELL DEPTH	LENGTH SCREEN
USGS	FA:R-2	BRADEN	HWY 59	345	365	20
ERVIN	SH:U-2	SLOANVILLE	SHAKE RAG RD.	360	440	80

TOTAL WELLS 2

OBSERVATION WELL DATA

FORT PILLOW SAND

MLGW/USGS WELLS

MLGW NUMBER	USGS NUMBER	WELL LOCATION	WELL ADDRESS	TOP SCREEN	WELL DEPTH	LENGTH SCREEN
0F1	SH:O-170	WELL LOT 26	488 N.DUNLAP	1311	1381	70
0F2	SH:O-181	WELL LOT 13	1245 N. PARKWAY	1308	1386	78
0F51	SH:K-45	WELL LOT 55	540 ZACH CURLIN LN.	1228	1282	54
2F1	SH:Q-154	McCORD STA.	6230 HWY. 70	1252	1426	37
3F1	SH:L-103	WELL LOT 318	3890 HICKORY HILL	1276	1371	39
7F1	SH:R-30	WELL LOT 700	10320 KENTWOOD EST.	1043	1083	40

TOTAL WELLS 6

USGS WELLS NOT OWNED BY MLGW

WELL OWNER	USGS NUMBER	WELL LOCATION	WELL ADDRESS	TOP SCREEN	WELL DEPTH	LENGTH SCREEN
USGS	FA:R-1	BRADEN	HWY 59	1008	1025	17
ERVIN	SH:U-1	SLOANVILLE	SHAKE RAG RD.	1497	1558	61

TOTAL WELLS 2

The MLGW Water Laboratory

The MLGW Water Laboratory is a professionally staffed; State and EPA certified laboratory for the analysis of drinking water. In addition to its analytical function, the laboratory also serves as a clearinghouse for the resolution of customer complaints on water quality.

The Water Lab is currently certified for bacteriological examination; trace metal analyses; nitrate and fluoride; trihalomethanes; volatile organic chemicals; corrosivity; sodium; chlorine; turbidity; filterable residue; calcium; alkalinity; pH; sulfate and cyanide analyses. Analyses are not only performed on these compounds but also on many other EPA non-regulated compounds. More than 2500 samples (from wells, pumping stations, commercial and industrial buildings, and residential taps) are analyzed each month.

50th Anniversary
MLGW
P.O. Box 430 Memphis, Tennessee 38101 Telephone (901) 528-4011

ANALYSIS OF WATER SUPPLIED BY THE CITY OF MEMPHIS

	Sheahan Station	Allen Station	McCord Station	Mallory Station	Lichterman Station
Before Aeration					
Iron (Fe)	0.53 mg/L*	0.44	0.46	0.43	0.14
Manganese (Mn)	0.012	0.013	0.014	0.013	0.003
Fluoride (F^-)	0.09	0.09	0.09	0.11	0.09
pH	6.5	6.5	6.4	6.4	6.3
After Aeration, Filtration and Fluoridation					
Iron (Fe)	0.03	0.02	0.06	0.03	0.03
Manganese (Mn)	0.001	0.001	0.003	0.001	0.005
Fluoride (F^-)	0.99	1.04	0.99	1.07	0.99
pH	7.3	7.4	7.4	7.4	7.4
Alkalinity ($CaCO_3$)	43.0	66.0	49.0	64.0	37.0
Hardness ($CaCO_3$)	39.0	62.0	44.0	58.0	32.0
Calcium ($CaCO_3$)	19.0	31.5	22.8	27.8	18.0
Magnesium ($CaCO_3$)	20.0	30.5	21.2	30.2	14.0
Sodium (Na)	7.94	9.83	8.40	9.16	7.14
Potassium (K)	0.84	0.93	0.88	0.82	0.72
Sulfate (SO_4)	9.0	9.0	14.3	6.3	6.7
Chloride (Cl)	5.8	6.9	7.1	4.5	6.7
Nitrate (NO_3)	0.10	0.08	0.08	0.26	0.20
Phosphate (PO_4)	1.40	1.34	1.50	1.37	1.34
Dissolved Solids	68.0	104.0	80.0	68.0	66.0
Silica (SiO_2)	13.7	15.2	12.8	14.7	14.0
Temperature at Station (F°)	65.0	63.0	63.0	65.0	63.0

pH is influenced by aeration efficiency which varies slightly with the pumping rate and wind velocity.

* mg/L is equal to parts per million

Memphis Light Gas & Water Division
50th Anniversary
MLGW
P.O. Box 430 Memphis, Tennessee 38101 Telephone (901) 528-4011

Analysis (con'd)

ANALYSIS OF WATER SUPPLIED BY THE CITY OF MEMPHIS

	LNG Plant	Davis Station	Morton Station	Palmer Station	Average of All Stations
Before Aeration					
Iron (Fe)	0.75 mg/L*	0.63	0.79	0.07	0.47
Manganese (Mn)	0.012	0.010	0.015	0.007	0.011
Fluoride (F^-)	0.13	0.10	0.10	0.10	0.10
pH	6.3	6.6	6.6	6.3	6.4
After Aeration, Filtration and Fluoridation					
Iron (Fe)	0.02	0.04	0.02	0.01	0.02
Manganese (Mn)	0.017	0.010	0.001	0.001	0.004
Fluoride (F^-)	1.05	1.02	1.02	1.05	1.02
pH	7.3	7.7	7.6	7.3	7.4
Alkalinity($CaCO_3$)	37.0	120.0	57.0	42.0	57.2
Hardness($CaCO_3$)	32.0	110.0	55.0	35.0	51.9
Calcium($CaCO_3$)	17.8	63.5	30.3	17.0	27.5
Magnesium($CaCO_3$)	14.2	46.5	24.7	18.0	24.4
Sodium (Na)	6.92	9.04	6.22	8.43	8.12
Potassium (K)	0.80	1.18	1.24	0.84	0.92
Sulfate (SO_4)	7.5	8.4	7.9	8.1	8.6
Chloride (Cl)	5.2	6.6	4.6	6.5	6.0
Nitrate (NO_3)	0.07	0.16	0.16	0.07	0.13
Phosphate (PO_4)	1.50	1.27	1.59	1.40	1.41
Dissolved Solids	68.0	148.0	68.0	52.0	80.2
Silica (SiO_2)	10.9	14.1	10.0	12.2	13.1
Temperature at Station (F°)	65.0	62.0	64.0	64.0	64.0

pH is influenced by aeration efficiency which varies slightly with the pumping rate and wind velocity.

*mg/L is equal to parts per million

July 1989

J.H. Webb
Manager, Water Laboratory

Memphis Light Gas & Water Division
50th Anniversary
MLGW
P.O. Box 430 Memphis, Tennessee 38101 Telephone (901) 528-4011

ADDITIONAL CHARACTERISTICS OF WATER SUPPLIED BY THE CITY OF MEMPHIS

	Sheahan Station	Allen Station	McCord Station	Mallory Station	Lichterman Station
Color (Units-PCS)	<5	<5	<5	<5	<5
Turbidity (NTU)	0.14	0.11	0.18	0.18	0.13
Specific Conductance (Micromhos / cm @25°C	113	160	122	133	94
Aluminum (Al)*	0.006	0.003	0.008	0.029	0.0039
Arsenic (As)	<0.005	<0.005	<0.005	<0.005	<0.005
Barium (Ba)	0.024	0.058	0.034	0.048	0.021
Cadmium (Cd)	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.048	0.035	0.045	0.061	0.053
Cyanide (CN^{-2})	<0.010	<0.010	<0.010	<0.010	<0.010
Detergents (MBAS)	<0.025	<0.025	<0.025	<0.025	<0.025
Lead (Pb)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury (Hg)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Phenols	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver (Ag)	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	<0.005	<0.005	<0.005	<0.005	<0.005
Total Coliform (Colonies / 100ml)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Organic Carbon	0.492	0.637	0.501	0.654	0.340
Trihalomethanes	0.002	0.006	0.004	0.004	0.004
Volatile Organic Chemicals	ND	ND	ND	ND	ND

Analyses (cont'd)

	LNG Plant	Davis Station	Morton Station	Palmer Station	Average of All Stations
Color (Units-PCS)	<5	<5	<5	<5	<5
Turbidity (NTU)	0.21	0.23	0.12	0.13	0.16
Specific Conductance (Micromhos / cm @25°C)	83	250	123	101	131
Aluminum (Al)	0.047	0.026	0.042	0.015	0.024
Arsenic (As)	<0.005	<0.005	<0.005	<0.005	<0.005
Barium (Ba)	0.047	0.093	0.064	0.021	0.046
Cadmium (Cd)	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr)	<0.001	<0.001	<0.001	<0.001	<0.001
Copper (Cu)	0.038	0.084	0.056	0.012	0.048
Cyanide (CN^{-2})	<0.010	<0.010	<0.010	<0.010	<0.010
Detergents (MBAS)	<0.025	<0.025	<0.025	<0.025	<0.025
Lead (Pb)	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury (Hg)	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Phenols	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium (Se)	<0.005	<0.005	<0.005	<0.005	<0.005
Silver (Ag)	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc (Zn)	<0.005	<0.005	<0.005	<0.005	<0.005
Total Coliform (Colonies / 100ml)	<1.0	<1.0	<1.0	<1.0	<1.0
Total Organic Carbon	0.337	0.606	0.475	0.373	0.491
Trihalomethanes	0.003	0.006	0.004	0.002	0.004
Volatile Organic Chemicals	ND	ND	ND	ND	ND

*
All values are shown in milligrams per liter unless otherwise noted.

The symbol (<) designates less than the amount shown, and in most cases represents the practical limit of the test method.

ND designates a non-detectable amount.

July 1989

ble 6. Household, Family, and Group Quarters Characteristics: 1990

efinitions of terms and meanings of symbols, see text]

te / unty / ce and [In Selected / tates] County / ubdivision	Persons in households	All house-holds	Family households: Total	Married-couple family	Female house-holder, no husband present	Nonfamily households: Total	Householder liv: Total	65 years and over: Total	65 years and over: Female	Household	Family	Total	Institu-tionalized persons	Other persons in group quarters
The State	4 748 066	1 853 725	1 344 019	1 058 580	232 699	509 706	442 129	178 877	143 166	2.56	3.06	129 129	65 389	63 740
NTY														
son County	67 565	27 384	19 844	16 181	2 956	7 538	6 911	3 117	2 547	2.47	2.96	655	578	77
d County	30 021	11 406	8 768	7 087	1 280	2 640	2 536	1 280	1 017	2.58	3.01	380	343	37
County	14 255	5 784	4 333	3 732	465	1 451	1 340	751	603	2.46	2.80	269	228	41
e County	8 606	3 381	2 522	2 104	300	739	670	320	240	2.64	3.06	1 061	1 051	10
County	84 463	33 624	25 344	21 284	3 237	8 280	7 400	3 267	2 661	2.51	2.94	1 506	1 044	462
y County	72 043	27 604	21 157	17 518	2 841	6 447	5 714	2 277	1 826	2.61	3.02	1 669	539	1 130
bell County	34 783	13 150	10 154	8 036	1 702	2 982	2 789	1 494	1 182	2.65	3.07	296	285	11
n County	10 356	3 980	3 035	2 574	361	945	872	470	375	2.60	3.03	111	111	-
l County	28 660	10 727	8 013	6 612	1 092	2 714	2 531	1 435	1 144	2.50	2.95	654	398	256
y County	50 225	20 189	14 979	12 283	2 114	5 210	4 779	2 314	1 830	2.49	2.94	1 280	749	531
ham County	26 840	9 515	7 748	6 679	776	1 767	1 524	587	436	2.82	3.15	300	180	120
r County	11 791	4 554	3 505	2 833	446	1 053	963	514	422	2.59	3.01	1 028	187	841
rne County	25 533	9 629	7 579	6 266	1 007	2 050	1 910	935	772	2.65	3.05	604	210	394
County	7 156	2 855	2 144	1 748	301	711	649	318	214	2.51	2.93	80	71	9
County	28 840	11 191	8 483	6 551	1 500	2 708	2 470	1 138	862	2.58	3.00	301	270	31
County	38 855	15 500	11 727	9 883	1 556	3 773	3 431	1 568	1 264	2.57	3.01	484	452	32
tt County	13 103	5 183	3 856	3 141	567	1 327	1 257	766	623	2.53	3.00	275	273	-
rland County	34 207	13 426	10 451	8 842	1 265	2 975	2 666	1 298	1 026	2.56	2.92	529	529	-
son County	488 688	207 530	131 395	95 592	29 555	76 135	62 830	18 288	14 988	2.36	2.97	21 095	10 317	10 778
r County	10 330	4 216	3 108	2 603	381	1 107	1 032	607	481	2.45	2.91	142	142	-
b County	14 237	5 606	4 316	3 574	584	1 380	1 280	692	563	2.50	2.93	123	106	17
n County	34 532	13 019	10 099	8 166	1 510	2 920	2 648	1 285	1 007	2.65	3.06	529	389	140
County	34 343	13 617	9 823	7 688	1 643	3 804	3 360	1 773	1 435	2.52	3.01	511	474	37
e County	25 110	8 453	6 717	5 038	1 334	1 736	1 576	765	556	2.97	3.40	449	436	13
ss County	14 559	5 511	4 258	3 415	665	1 253	1 166	545	439	2.64	3.07	110	110	-
n County	33 429	12 660	9 883	8 412	1 135	2 777	2 530	1 312	1 061	2.64	3.04	1 296	314	982
n County	45 566	18 361	13 472	10 708	2 244	4 889	4 573	2 560	2 114	2.48	2.96	747	644	103
County	25 336	9 832	7 454	6 036	1 116	2 378	2 218	1 166	891	2.58	3.02	405	205	200
r County	16 912	6 384	5 075	4 281	591	1 318	1 217	590	454	2.64	3.02	183	146	37
e County	54 175	21 482	16 280	13 290	2 295	5 202	4 747	2 120	1 687	2.52	2.94	1 678	727	951
y County	13 157	4 784	3 743	3 048	534	1 041	978	522	412	2.75	3.16	205	193	12
n County	48 750	19 428	14 795	11 886	2 314	4 634	4 138	1 620	1 313	2.56	2.97	730	525	205
n County	279 044	111 799	78 964	60 780	15 042	32 835	29 025	11 591	9 486	2.50	3.02	6 492	3 622	2 870
k County	6 571	2 484	1 924	1 505	321	560	532	269	212	2.65	3.07	168	168	-
man County	22 589	8 276	6 190	4 524	1 356	2 086	1 867	964	751	2.73	3.22	788	770	18
County	22 350	8 728	6 633	5 480	882	2 093	1 940	978	784	2.56	3.00	283	263	20
s County	44 232	17 167	13 223	11 100	1 624	3 944	3 628	1 671	1 334	2.58	2.98	333	299	34
od County	19 240	7 014	5 150	3 566	1 320	1 864	1 701	905	703	2.74	3.29	197	98	99
rson County	21 630	8 527	6 446	5 300	820	2 081	1 922	975	765	2.54	2.97	214	212	2
County	27 456	11 302	8 216	6 743	1 126	3 146	2 902	1 619	1 302	2.42	2.89	432	388	44
n County	15 715	5 570	4 606	3 883	525	1 368	1 229	618	505	2.63	3.04	1 038	1 038	-
n County	6 642	2 683	2 036	1 706	281	644	604	335	244	2.55	2.96	176	163	13
reys County	15 561	6 083	4 593	3 844	561	1 479	1 373	665	514	2.56	3.01	244	110	134
n County	8 776	3 642	2 782	2 333	334	860	806	475	364	2.52	2.94	121	119	2
on County	31 415	12 329	9 510	8 018	1 144	2 819	2 533	1 182	940	2.55	2.94	1 601	445	1 156
n County	13 609	5 406	4 081	3 280	599	1 325	1 230	618	484	2.52	2.96	157	145	12
County	323 400	133 639	90 561	71 679	15 478	43 078	36 661	12 962	10 642	2.42	2.97	12 349	3 298	9 051
ounty	6 087	2 418	1 735	1 328	323	683	625	343	282	2.50	3.00	1 072	1 051	21
dale County	22 984	8 433	6 361	4 846	1 258	2 072	1 888	1 050	842	2.68	3.15	883	884	9
ce County	34 902	13 338	10 265	8 666	1 291	3 073	2 864	1 506	1 317	2.62	3.06	311	302	9
County	9 058	3 533	2 606	2 179	328	927	850	451	363	2.58	3.06	149	136	13
County	27 010	10 881	8 220	6 872	1 087	2 661	2 455	1 370	1 080	2.57	3.01	247	239	8
County	30 926	12 156	9 299	7 867	1 301	2 886	2 626	1 237	1 006	2.54	2.96	329	329	-
County	41 710	16 361	12 454	10 275	1 751	3 883	3 600	1 736	1 435	2.55	2.98	673	446	227
y County	22 180	8 834	6 679	5 502	824	2 154	2 014	1 073	863	2.51	2.95	242	242	-
County	15 817	6 190	4 711	4 027	522	1 446	1 356	707	577	2.57	3.00	89	56	33
n County	75 515	29 609	21 301	15 980	4 904	8 308	7 307	3 205	2 584	2.55	3.08	2 467	841	1 626
County	24 645	9 215	7 171	5 636	1 032	2 044	1 873	863	701	2.67	3.08	215	205	10
l County	21 248	8 269	6 120	4 980	881	2 149	1 954	909	779	2.57	3.04	291	229	62
County	54 073	20 608	15 562	12 280	2 622	5 056	4 584	2 082	1 880	2.62	3.07	730	684	51
County	7 921	2 996	2 333	1 959	281	663	592	255	194	2.64	3.03	112	112	-
County	29 940	11 383	8 781	7 231	1 163	2 592	2 395	1 167	917	2.63	3.08	601	317	284
mery County	93 516	34 346	26 914	22 284	3 712	7 431	6 208	2 071	1 628	2.72	3.08	6 982	472	6 510
County	4 714	1 734	1 391	1 222	112	343	327	169	136	2.72	3.11	7	7	-
County	16 011	5 841	4 621	3 746	680	1 220	1 119	554	432	2.74	3.13	1 290	1 290	-
County	31 399	12 412	9 219	7 624	1 279	3 193	2 960	1 586	1 280	2.53	3.00	318	298	20
County	17 435	6 734	5 266	4 404	645	1 468	1 365	745	591	2.59	2.99	201	192	9
ounty	6 480	2 512	1 926	1 650	166	587	564	300	232	2.57	3.02	152	152	-
County	4 484	1 766	1 330	1 105	169	456	430	239	184	2.52	2.98	54	49	5
unty	13 534	5 092	4 010	3 373	453	1 082	980	510	418	2.66	3.06	106	106	-
County	48 410	19 753	13 964	11 578	1 913	5 790	4 797	1 945	1 593	2.45	2.93	2 954	534	2 420
ounty	23 630	9 186	6 985	5 606	1 088	2 200	2 022	984	779	2.57	3.00	706	410	296
County	46 747	18 453	13 967	11 612	1 831	4 486	4 126	1 970	1 582	2.53	2.96	480	434	46
on County	41 049	14 801	11 886	9 900	1 537	2 915	2 633	1 283	980	2.77	3.14	449	449	-
rd County	113 372	42 110	31 225	25 678	4 272	10 885	8 546	2 671	2 136	2.69	3.14	5 198	1 455	3 743
ounty	18 189	6 534	5 128	4 150	765	1 406	1 311	664	563	2.78	3.21	189	189	-
hie County	8 778	3 287	2 565	2 087	363	722	654	322	252	2.67	3.06	85	85	-
County	50 384	19 520	15 081	12 706	1 863	4 439	3 854	1 561	1 238	2.58	2.96	649	582	67
County	813 086	303 571	212 075	144 773	56 404	91 496	77 980	25 382	20 346	2.68	3.22	23 246	12 183	11 063
ounty	13 904	5 368	4 161	3 579	447	1 207	1 127	643	512	2.61	3.00	145	134	11
County	9 286	3 570	2 812	2 452	251	958	783	444	344	2.55	2.93	104	96	8
County	141 446	56 728	42 516	36 372	5 022	14 213	13 046	5 074	4 080	2.48	2.93	2 147	1 361	786
County	102 083	36 450	28 511	24 107	3 545	7 939	6 364	2 579	2 083	2.77	3.13	1 216	637	579
ounty	37 301	13 033	10 345	8 119	1 780	2 688	2 410	1 100	884	2.86	3.27	867	867	-
e County	5 786	2 201	1 715	1 402	261	566	512	285	207	2.63	3.01	125	100	25
ounty	16 318	6 621	4 930	4 074	663	1 683	1 566	845	700	2.46	2.91	231	220	11
ounty	13 573	4 932	3 902	3 285	560	1 030	941	385	300	2.75	3.10	121	90	31
n County	4 841	1 780	1 431	1 185	181	349	322	140	106	2.69	3.06	5	5	-
County	32 387	12 881	9 871	7 981	1 386	3 008	2 834	1 404	1 102	2.57	3.01	395	381	14
on County	87 881	35 883	25 375	20 837	3 708	10 446	8 604	3 622	2 985	2.45	2.96	4 424	2 017	2 407
ounty	13 709	5 174	4 079	3 446	482	1 095	1 011	551	440	2.65	3.02	226	204	22
County	30 560	11 902	8 566	7 164	1 075	3 433	2 986	1 475	1 230	2.49	2.96	2 403	479	1 924
ounty	19 880	7 722	5 986	4 989	765	1 736	1 622	915	725	2.57	2.98	210	192	18
n County	80 306	27 928	23 096	20 255	2 228	4 832	4 146	1 380	1 117	2.88	3.20	713	699	14
ounty	67 110	24 678	19 810	16 716	2 340	4 868	3 910	1 686	1 336	2.70	3.13	865	571	294

REFERENCE 18

DEPARTMENT OF THE ARMY
MEMPHIS DISTRICT, CORPS OF ENGINEERS
B-202 CLIFFORD DAVIS FEDERAL BUILDING
167 N. MID-AMERICA MALL
MEMPHIS, TENNESSEE 38103-1894

Reply to
Attention of:

April 1, 1992

Engineering Division
Hydraulics and Hydrology Branch

Ms. Laura J. Morrisson, Project Scientist
B & V Waste Science & Technology Corporation
1117 Perimeter Center West, Suite W-212
Atlanta, Georgia 30338

Dear Ms. Morrisson:

Reference is made to your letter dated March 25, 1992, and follow-up telephone conversation with Ms. Jancie Hatcher on March 31, 1992, inquiring about water flow information in the Memphis, Tennessee, area.

Please find enclosed the following discharge data for 1990 at Corps of Engineers' gaging locations:

a. Mississippi River at Memphis, Tennessee, River Mile 734.4
b. Loosahatchie River at Brunswick, Tennessee, River Mile 25.3
c. Wolf River at Raleigh, Tennessee, River Mile 9.4

Also enclosed are discharge data for USGS gaging locations from October, 1989, to September, 1990:

a. Nonconnah Creek near Germantown, Tennessee, River Mile 17.3
b. Wolf River at Walnut Grove Road at Memphis, Tennessee, River Mile 15.4
c. Loosahatchie River near Arlington, Tennessee, River Mile 30.4

If we can be of further assistance, please feel free to contact us.

Sincerely,

Dewey L. Jones
Chief, Hydraulics and Hydrology Branch

Enclosures

07031660 WOLF RIVER AT WALNUT GROVE ROAD AT MEMPHIS, TN

LOCATION.--Lat 35°07'58", long 89°51'18", Shelby County, Hydrologic Unit 08010210, on right bank at upstream end of bridge on Walnut Grove Road, 0.5 mi east of Interstate Highway 240, and at mile 15.4.

DRAINAGE AREA.--709 mi^2.

PERIOD OF RECORD.--October 1969 to current year. Prior to September 1977 published as "near Germantown" and Oct. 1978 to Sept. 1986 "at Germantown".

GAGE.--Water-stage recorder. Datum of gage is 225.82 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 21, 1986 water-stage recorder at site 2.1 mi upstream at datum 9.94 ft higher.

REMARKS.--Records poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--21 years, 1,023 ft^3/s, 19.59 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,400 ft^3/s, Mar. 14, 1975, gage height, 27.98 ft, site and datum then in use; minimum, 184 ft^3/s, Oct. 8, 9, 12, 13, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,000 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Feb. 5	Unknown	*19,800	*22.92	May 20	1245	7,160	14.78

Minimum discharge, 251 ft^3/s, Sept. 1-3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	956	377	495	e2400	1870	721	750	e4100	700	392	291	253
2	951	377	470	e2130	5090	690	697	e4000	e670	386	282	251
3	807	370	458	e1700	e8430	699	654	3710	e680	372	284	271
4	710	373	439	1960	e11800	681	618	3440	e830	363	280	259
5	724	383	430	e1510	e17300	661	609	3120	e1100	338	282	261
6	757	405	440	e1410	13300	664	1210	2750	e930	315	282	257
7	687	405	417	e1310	6690	762	1120	1990	e850	317	280	257
8	583	1950	411	e1220	3990	4710	943	1290	e690	320	277	262
9	514	1040	425	1020	2970	3510	745	887	e590	319	274	265
10	469	1030	445	882	5760	3730	697	725	e570	323	273	266
11	440	935	443	761	6620	3060	700	624	e550	347	271	283
12	421	740	433	637	6460	2460	667	612	e540	597	268	e410
13	412	599	442	e586	4380	1930	603	611	e530	432	337	406
14	407	556	452	540	2910	1490	573	633	e522	472	318	328
15	403	564	439	533	4020	3840	562	611	e520	448	329	324
16	991	537	430	518	4290	2390	561	617	e610	399	319	327
17	2810	594	403	623	3240	2440	1060	788	e620	374	316	326
18	1370	627	389	1120	2200	2820	1300	806	e550	349	309	316
19	1070	e550	410	1020	1540	2620	1170	911	e530	343	299	308
20	824	e460	406	1140	1010	1860	903	5220	e520	334	289	309
21	681	e445	e399	1110	804	1270	2730	4020	e522	321	283	318
22	631	e890	e391	1100	1520	906	2360	4790	e560	355	277	338
23	611	e899	e392	900	1520	744	2610	4730	e580	378	271	343
24	558	e740	e397	800	1420	651	2470	3940	e550	384	266	344
25	496	e770	e389	733	1270	606	2200	3160	e490	411	261	350
26	447	e690	e395	e672	1060	581	e1600	2430	e470	378	258	370
27	e425	e640	e395	600	925	578	e1780	1710	e460	352	257	397
28	e415	e610	e397	e802	791	578	e2600	1250	438	337	257	388
29	e405	595	471	e3780	---	585	e3350	961	422	321	257	329
30	e390	532	e2200	e2440	---	1510	e4000	718	404	315	258	316
31	387	---	e2250	e2460	---	974	---	685	---	296	256	---
TOTAL	21752	19663	16753	38417	123180	50731	41862	65839	17998	11388	8761	9432
MEAN	702	656	540	1239	4399	1636	1395	2124	600	367	283	314
MAX	2810	1950	2250	3780	17300	4710	4000	5220	1100	597	337	410
MIN	387	370	389	516	791	578	561	611	404	296	256	251
CFSM	.99	.93	.76	1.75	6.20	2.31	1.97	3.00	.85	.52	.40	.44
IN.	1.14	1.03	.88	2.02	6.46	2.66	2.20	3.45	.94	.60	.46	.49

CAL YR 1989 TOTAL 560214 MEAN 1535 MAX 14900 MIN 350 CFSM 2.16 IN. 29.39
WTR YR 1990 TOTAL 425796 MEAN 1167 MAX 17300 MIN 251 CFSM 1.65 IN. 22.34

e Estimated

07030240 LOOSAHATCHIE RIVER NEAR ARLINGTON, TN

LOCATION.--Lat 35°18'37", long 89°38'23", Shelby County, Hydrologic Unit 08010209, on left bank 20 ft downstream from bridge on U.S. Highways 70 and 79, 1.5 mi upstream from Beaver Creek, 1.5 mi northeast of Arlington, and at mile 30.4.

DRAINAGE AREA.--262 mi^2.

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Water-stage recorder. Datum of the gage is 246.43 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--21 years, 378 ft^3/s, 19.59 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,400 ft^3/s, Dec. 25, 1987, gage height, 25.27 ft; minimum, 66 ft^3/s, Apr. 6, 7, 1974.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,500 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Nov. 8	0900	6,850	17.15	Feb. 15	2400	6,330	16.52
Jan. 29	Unknown	Unknown	Unknown	Mar. 8	1200	7,360	17.66
Feb. 4	Unknown	*14,500	*22.11	Apr. 21	1315	5,540	17.59
Feb. 10	Unknown	Unknown	Unknown				

Minimum discharge, 97 ft^3/s, several days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	534	126	115	486	273	353	172	235	e150	107	101	97
2	223	124	115	232	5400	360	168	1660	e150	105	101	97
3	163	123	111	197	8900	348	163	951	e400	105	101	97
4	146	123	110	1120	e12000	328	140	498	e220	103	101	98
5	141	123	110	403	e2350	316	134	190	e170	100	101	98
6	137	138	110	216	820	312	228	173	e145	100	101	98
7	134	304	114	172	634	320	232	170	e140	100	101	98
8	131	5320	114	169	564	4840	159	168	e135	99	101	98
9	130	2200	112	157	947	2810	146	155	e132	99	101	98
10	128	399	110	141	e6700	599	152	143	e129	99	101	102
11	126	211	108	132	e2330	306	179	147	e128	103	101	129
12	125	176	106	125	732	508	151	175	e127	140	101	108
13	124	164	105	117	545	697	140	163	e125	157	102	102
14	124	159	104	116	456	271	138	141	e122	117	102	100
15	123	169	103	115	2900	3340	138	139	e121	108	102	103
16	304	182	100	113	4650	1550	138	138	e120	106	102	100
17	2310	152	100	302	e1100	427	1140	185	e119	104	102	98
18	343	142	100	943	576	296	791	170	e118	103	102	98
19	199	137	100	380	493	243	241	193	e117	104	102	98
20	170	136	101	500	426	211	188	e3570	e116	104	102	98
21	154	133	100	323	396	198	3520	e1600	e114	103	101	99
22	148	327	97	185	1720	189	3140	e700	e160	103	100	100
23	141	490	97	152	856	182	526	e400	e130	103	100	99
24	138	192	97	137	515	175	246	e250	e119	102	100	97
25	134	153	97	144	409	170	203	217	e112	102	99	97
26	131	140	99	126	375	165	181	193	e112	102	99	97
27	130	133	99	114	362	160	326	187	e111	102	99	97
28	128	127	98	346	352	158	5370	182	e110	102	99	97
29	127	119	105	e3910	---	163	2580	162	109	102	98	97
30	127	117	698	e1310	---	754	396	161	108	102	98	97
31	127	---	2180	392	---	278	---	e143	---	102	97	---
TOTAL	7300	12539	5915	13275	57781	21027	21426	13559	4169	3288	3118	2992
MEAN	235	418	191	428	2064	678	714	437	139	106	101	99.7
MAX	2310	5320	2180	3910	12000	4840	5370	3570	400	157	102	129
MIN	123	117	97	113	273	158	134	138	108	99	97	97
CFSM	.90	1.60	.73	1.63	7.88	2.59	2.73	1.67	.53	.40	.38	.38
IN.	1.04	1.78	.84	1.88	8.20	2.99	3.04	1.93	.59	.47	.44	.42

CAL YR 1989 TOTAL 227119 MEAN 622 MAX 13000 MIN 84 CFSM 2.37 IN. 32.25
WTR YR 1990 TOTAL 166389 MEAN 456 MAX 12000 MIN 97 CFSM 1.74 IN. 23.62

e Estimated

DAILY DISCHARGE FOR 1990

MISSISSIPPI RIVER AT MEMPHIS, TENN.

COMPUTED DAILY DISCHARGE IN THOUSAND CUBIC FEET PER SECOND

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	196	601	1120	666	539	1113	669	452	409	258	435	325
2	203	621	1102	643	517	1106	654	422	408	249	422	336
3	222	664	1068	618	497	1103	635	406	407	240	394	358
4	270	715	1010	585	482	1104	614	409	401	238	357	372
5	349	766	922	557	483	1103	592	415	392	230	322	383
6	443	830	814	534	496	1101	577	406	379	225	293	406
7	527	885	722	503	511	1094	560	398	368	227	279	451
8	611	928	683	481	541	1081	542	395	363	240	272	503
9	642	963	676	464	601	1060	524	395	366	252	273	536
10	658	992	643	452	655	1036	514	402	362	260	276	550
11	661	1003	609	439	685	1010	510	410	352	263	275	551
12	648	1009	592	433	685	979	511	413	350	269	279	540
13	619	1015	580	444	664	947	507	406	352	286	285	519
14	580	1017	572	466	633	908	504	389	341	301	299	482
15	537	1029	585	487	611	869	509	375	321	311	319	444
16	504	1052	607	507	604	832	516	364	307	312	337	407
17	485	1066	623	525	618	794	521	352	303	321	347	380
18	471	1081	634	552	660	743	533	340	300	343	354	386
19	445	1103	723	564	743	688	555	334	293	371	351	398
20	418	1125	796	573	850	651	574	326	288	396	344	438
21	403	1141	852	573	933	649	582	318	283	410	333	574
22	428	1154	888	556	990	670	587	316	281	411	315	705
23	483	1155	917	532	1037	676	587	323	285	400	298	812
24	539	1150	923	514	1074	674	577	341	287	392	290	911
25	585	1142	923	516	1102	673	561	365	281	393	286	972
26	614	1134	912	527	1116	679	543	389	273	401	289	1021
27	625	1126	886	535	1121	682	534	411	268	413	298	1078
28	627	1124	841	552	1120	688	533	423	268	422	315	1131
29	634		778	566	1118	689	527	428	267	427	320	1166
30	630		722	560	1116	680	510	429	264	429	321	1198
31	615		691		1112		484	423		433		1232
MEAN	505	985	788	530	771	869	553	386	327	326	319	631
MAX	661	1155	1120	666	1121	1113	669	452	409	433	435	1232
MIN	196	601	572	433	482	649	484	316	264	225	272	325

TOTAL DISCHARGE FOR YEAR WAS 211827 MEAN DISCHARGE FOR YEAR WAS 580

MAXIMUM DISCHARGE WAS 1,242,243 CFS ON DEC. 31.
MINIMUM DISCHARGE WAS 194,180 CFS ON JAN. 1.

MISSISSIPPI RIVER AT MEMPHIS, TENN.

LOCATION. LAT. 35-07-23, LONG. 90-04-36. MILE 734.4, APPROXIMATELY EIGHTEEN HUNDRED FEET DOWNSTREAM FROM HARAHAN BRIDGE.

GAGE. AUTOMATIC RECORDER ON SOUTHWEST CORNER OF AMERICAN COMMERCIAL LIQUID TERMINAL OIL DOCK AT 427 WEST ILLINOIS AVENUE.

GENERAL INFORMATION. DRAINAGE AREA (REVISED), 928,700 SQUARE MILES. BANKFULL STAGE, 34 FEET. LOW WATER REFERENCE PLANE, MINUS 2.6 FEET ON GAGE. THE AVERAGE RELATION BETWEEN BEALE STREET GAGE AND GAGE NEAR BRIDGE IS A STRAIGHT LINE YIELDING STAGES ON THE BRIDGE GAGE THE SAME AT ZERO STAGE, AND 1.6 FEET LOWER AT THE 50 FOOT STAGE.

RECORDS AVAILABLE. STAGE, OCT. 1934 TO SEPT. 1951 AND OCT. 1952 TO DATE IN REPORTS OF U.S. GEOLOGICAL SURVEY. DEC. 1934 TO DATE IN REPORTS OF THE NATIONAL WEATHER SERVICE. (WEATHER SERVICE STAGES FROM DEC. 1890 TO AUG. 1932 REFER TO BEALE ST. GAGE, AND FROM SEPT. 1932 TO DEC. 1934 TO GAGE AT SITE 1,000 FEET DOWNSTREAM.) SINCE 1950 IN REPORTS OF THE CORPS OF ENGINEERS. MEASURED DISCHARGE, INTERMITTENTLY FROM 1882 TO 1904, AND 1932 TO DATE. DAILY DISCHARGE, JAN. 1933 TO DATE. ALSO IN REPORTS OF THE GEOLOGICAL SURVEY.

EXTREMES. HIGHEST, 48.7 FEET ON FEB. 10, 1937. LOWEST, MINUS 10.70 FEET ON JUL. 10 AND 11, 1988. MAXIMUM, 2,020,000 CFS WAS MEASURED ON FEB. 7, 1937 (STAGE, 48.3). MINIMUM, 78,000 CFS ON AUG. 25, 1936 (STAGE, 0.0).

DAILY EIGHT A.M. STAGE IN FEET GAGE ZERO, 183.91 FEET, N.G.V.D. OF 1929

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	-3.4	16.5	31.1	18.3	14.7	30.2	18.4	11.3	8.3	1.6	9.6	3.8
2	-2.9	17.1	30.6	17.6	13.9	30.2	18.1	9.9	8.1	1.2	9.1	4.5
3	-1.9	18.1	29.9	16.8	13.1	30.4	17.6	9.0	8.2	0.6	8.1	5.5
4	0.7	19.7	28.7	15.7	12.3	30.8	17.0	9.0	7.9	0.6	6.5	6.5
5	4.4	21.0	26.6	14.8	12.3	30.7	16.3	9.4	7.5	0.0	4.7	7.0
6	8.6	22.7	23.9	14.1	12.6	30.6	15.9	9.1	7.0	-0.4	3.1	7.8
7	11.5	24.1	21.2	13.1	13.2	30.4	15.5	8.6	6.6	-0.5	2.3	9.8
8	14.4	25.2	19.5	12.1	14.0	30.1	14.9	8.4	6.2	0.6	1.9	12.2
9	15.5	26.1	19.1	11.4	16.1	29.5	14.4	8.3	6.3	1.5	1.8	13.6
10	16.3	26.9	19.1	10.9	18.2	29.0	13.9	8.5	6.3	2.2	2.0	14.3
11	16.6	27.3	16.9	10.5	19.4	28.3	13.6	8.8	5.8	2.5	1.9	14.5
12	16.5	27.5	16.2	10.1	19.7	27.6	13.5	9.0	5.6	2.8	2.0	14.2
13	15.7	27.8	15.7	10.6	19.1	26.9	13.3	8.8	5.9	3.7	2.2	13.7
14	14.6	27.9	15.2	11.4	18.2	26.0	12.9	7.8	5.5	4.4	2.7	12.4
15	13.2	28.1	15.3	12.1	17.2	25.1	13.0	7.2	4.5	5.0	3.6	10.8
16	12.2	28.9	16.1	12.6	16.8	24.3	13.1	6.6	3.6	4.9	4.6	9.2
17	11.6	29.1	16.6	13.2	17.1	23.4	13.2	5.9	3.4	5.1	5.1	7.8
18	11.2	29.3	17.2	14.3	18.1	22.1	13.4	5.3	3.4	6.0	5.5	7.7
19	10.0	29.8	19.3	14.8	20.4	20.5	14.0	5.1	3.0	7.3	5.3	8.3
20	8.8	30.2	21.4	15.3	23.4	19.3	14.6	4.8	2.8	8.4	4.9	9.4
21	7.9	30.6	22.9	15.4	25.4	18.8	14.8	4.4	2.5	9.0	4.3	14.1
22	8.6	31.0	23.8	15.2	26.9	19.3	14.9	4.3	2.3	9.0	3.3	19.0
23	11.1	31.2	24.5	14.3	28.1	19.2	14.8	4.6	2.6	8.5	2.1	21.9
24	13.4	31.3	24.8	13.6	29.1	18.9	14.6	5.6	2.8	7.9	1.7	24.7
25	15.2	31.2	24.9	13.6	29.8	18.5	14.3	6.6	2.5	7.8	1.3	26.2
26	16.3	31.1	24.7	14.0	30.2	18.4	13.7	7.5	2.1	8.0	1.2	27.4
27	16.9	31.1	24.2	14.3	30.3	18.4	13.5	8.3	1.8	8.5	1.7	28.7
28	17.3	31.1	23.2	14.9	30.3	18.7	13.6	8.9	1.8	8.8	2.8	29.9
29	17.7		21.6	15.5	30.3	18.9	13.6	9.2	1.9	9.0	3.3	30.8
30	17.6		20.1	15.4	30.2	18.7	13.3	9.2	1.8	9.1	3.5	31.3
31	17.2		19.0		30.2		12.4	9.0		9.3		32.1

THE FOLLOWING REFER ONLY TO READINGS APPEARING IN THE TABLE ABOVE.

MEAN	11.38	26.85	21.71	13.87	20.98	24.45	14.51	7.69	4.60	4.92	3.74	15.45
MAX.	17.7	31.3	31.1	18.3	30.3	30.8	18.4	11.3	8.3	9.3	9.6	32.1
MIN.	-3.4	16.5	15.2	10.1	12.3	18.4	12.4	4.3	1.8	-0.5	1.2	3.8

HIGHEST STAGE WAS 32.43 ON DEC 31.
LOWEST STAGE WAS -3.46 ON JAN 1.

DAILY DISCHARGE FOR 1990

LOOSAHATCHIE RIVER AT BRUNSWICK, TENN.

COMPUTED DAILY DISCHARGE IN CUBIC FEET PER SECOND

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1					438							
2	493											
3										79		
4												
5												
6		785						115			126	
7					319							
8								123				
9							140			220		
10									112			
11												
12			452									
13		529										
14					201							
15												
16		10100		270								
17	228											345
18									116			
19												7016
20												
21		331			3173							
22												
23				1043			138					
24								121				
25										109		
26	283										142	
27								122				
28												
29					168					100		
30												
31												
MEAN												
MAX.												
MIN.												

A-NO RECORD.
YEARLY RECORD INCOMPLETE.
DISCHARGE VALUES SHOWN ARE ACTUAL DISCHARGE OBSERVATIONS.

LOOSAHATCHIE RIVER AT BRUNSWICK, TENN.

LOCATION. LAT. 35-16-52, LONG. 89-45-50. MILE 23.3, HIGHWAY BRIDGE ABOUT A MILE NORTH OF BRUNSWICK. THE MOUTH OF LOOSAHATCHIE RIVER IS 740.6 MILES UPSTREAM ON THE MISSISSIPPI RIVER FROM HEAD OF PASSES.

GAGE. STAGE DETERMINED FROM MARK ON GUARDRAIL ON UPSTREAM SIDE OF BRIDGE.

GENERAL INFORMATION. DRAINAGE AREA, 506 SQUARE MILES. BANKFULL STAGE, 21 FEET. DUE TO CHANNEL IMPROVEMENTS IN 1976, USING AN AUTOMATIC RECORDER ON THIS BRIDGE BECAME IMPRACTICAL.

RECORDS AVAILABLE. STAGE, JAN. 12, 1939, TO JUN. 28, 1976. STAGES PUBLISHED FROM JUN. 28, 1976, TO DATE ARE MEAN STAGES FOR TIME OF DISCHARGE OBSERVATION. COMPUTED DAILY DISCHARGE, 1939 TO JUN. 28, 1976. DISCHARGE VALUES FROM JUN. 28, 1976 TO DATE ARE ACTUAL DISCHARGE OBSERVATIONS.

EXTREMES. HIGHEST, 28.5 FEET, FROM WATERMARK, IN JAN. 1935. LOWEST OBSERVED STAGE, 4.01 FEET ON AUG 15, 1988. MAXIMUM, 39,700 CFS OBSERVED ON JAN. 9, 1946 (STAGE, 25.8). DISCHARGE NOT DETERMINED FOR RECORD HIGH STAGE. MINIMUM, 46 CFS COMPUTED FOR JUL. 16, 1944, AND SUBSEQUENT DAYS.

DAILY EIGHT A.M. STAGE IN FEET GAGE ZERO, 227.25 FEET, N.G.V.D. OF 1929

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	A	A	A	A	5.7	A	A	A	A	A	A	A
2	5.0	A	A	A	A	A	A	A	A	A	A	A
3	A	A	A	A	A	A	A	A	A	4.3	A	A
4	A	A	A	A	A	A	A	A	A	A	A	A
5	A	A	A	A	A	A	A	A	A	A	A	A
6	A	7.1	A	A	A	A	A	4.3	A	A	4.3	A
7	A	A	A	A	4.8	A	A	A	A	A	A	A
8	A	A	A	A	A	A	A	4.3	A	A	A	A
9	A	A	A	A	A	A	4.3	A	A	4.5	A	A
10	A	A	A	A	A	A	A	A	4.3	A	A	A
11	A	A	A	A	A	A	A	A	A	A	A	A
12	A	A	5.3	A	A	A	A	A	A	A	A	A
13	A	5.5	A	A	A	A	A	A	A	A	A	A
14	A	A	A	A	4.6	A	A	A	A	A	A	A
15	A	A	A	A	A	A	A	A	A	A	A	A
16	A	19.7	A	4.4	A	A	A	A	A	A	A	A
17	4.2	A	A	A	A	A	A	A	A	A	A	4.7
18	A	A	A	A	A	A	A	A	4.3	A	A	A
19	A	A	A	A	A	A	A	A	A	A	A	18.3
20	A	A	A	A	A	A	A	A	A	A	A	A
21	A	4.8	A	A	12.4	A	A	A	A	A	A	A
22	A	A	A	A	A	A	A	A	A	A	A	A
23	A	A	A	7.1	A	A	4.3	A	A	A	A	A
24	A	A	A	A	A	A	A	4.3	A	A	A	A
25	A	A	A	A	A	A	A	A	A	4.3	A	A
26	4.4	A	A	A	A	A	A	A	A	A	4.3	A
27	A	A	A	A	A	A	A	4.3	A	A	A	A
28	A		A	A	A	A	A	A	A	A	A	A
29	A		A	A	4.5	A	A	A	A	4.3	A	A
30	A		A		A		A	A		A		A
31												

THE FOLLOWING REFER ONLY TO READINGS APPEARING IN THE TABLE ABOVE

MEAN
MAX.
MIN.

A-NO RECORD.
YEARLY RECORD INCOMPLETE.
STAGES SHOWN ARE MEAN STAGES FOR TIME OF DISCHARGE OBSERVATIONS.

DAILY DISCHARGE FOR 1990

WOLF RIVER AT RALEIGH, TENN.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	2229	2297	1330	1944	4371			291				
2	2117	7201	1205	1897	5280			299				
3	1925	11368	1122	1849	4510			306		1292		1630
4	2566	12531	1015	1802	4179			313		1628		
5	1761	15195	895	1754	3930			320		1008	385	
6	1612	16095	747	1725	3731			328		932		
7	1448	9994	807		2903			319				
8	1264	6093	5026		2257			311				
9	1102	4895	2906		2090		380					
10		8584	3300						288			
11		8354	3163			997			318			335
12		8651	3044						341			429
13		5849	2552									
14		3970	2124		794						476	
15		5435	5202									
16		6079	3118	713								
17	966	3966	3006	1610								1403
18	1332	2699	3260	2120		537			302			4020
19	1167	1982	3168		1183							4673
20	1166	1479	2394		3670			305				5853
21	1106	1041	2100	3815	3492			304				12280
22		1506	1952	2732	4894	1205		302				13994
23		1541		3040	4786	962	477	301				13313
24		1531		2829	4023	817		301				10529
25		1498		2543	3229	687				383		6758
26	658	1415		2147	2609	608				371	389	4890
27	839	1397		2246	2353					358		5547
28	1320	1356		5259	2146					344		4805
29	5129			3070	1415					334		4072
30	2981		2578	3860	920							5667
31	2944		2067									5968
MEAN		5500										
MAX		16095										
MIN		1041										

MAXIMUM DISCHARGE WAS 17,538 CFS ON FEB. 6.
MINIMUM DISCHARGE WAS NOT DETERMINED.

WOLF RIVER AT RALEIGH, TENN.

LOCATION. LAT. 35-12-08, LONG. 89-55-24. MILE 9.4, AUSTIN PEAY HIGHWAY BRIDGE. THE MOUTH OF WOLF RIVER IS 738.6 MILES UPSTREAM ON THE MISSISSIPPI RIVER FROM HEAD OF PASSES.

GAGE. AUTOMATIC RECORDER ON BRIDGE.

GENERAL INFORMATION. DRAINAGE AREA, 770 SQUARE MILES. BANKFULL STAGE, 12 FEET. DISCHARGE IS AFFECTED BY BACKWATER DURING HIGH MISSISSIPPI RIVER STAGES. RIVER CONDITIONS HAVE CHANGED SINCE 1962 DUE TO CHANNEL ENLARGEMENT AND REALIGNMENT OPERATIONS.

RECORDS AVAILABLE. STAGE, MAY 12, 1936, TO DATE. PRIOR TO NOV. 22, 1940, GAGE WAS 700 FEET DOWNSTREAM. COMPUTED DAILY DISCHARGE, 1936 TO DATE.

EXTREMES. HIGHEST, 23.72 FEET, FROM WATERMARK, ON JAN. 20, 1935. LOWEST, MINUS 5.93 FEET ON OCT. 15, 1963. MAXIMUM, 41,400 CFS COMPUTED FOR JAN. 9, 1946 (STAGE 20.4). DISCHARGE NOT DETERMINED FOR RECORD HIGH STAGE. MINIMUM, NO FLOW FROM JAN. 30 TO FEB. 9, 1937, BECAUSE OF BACKWATER.

DAILY EIGHT A.M. STAGE IN FEET GAGE ZERO, 217.22 FEET, N.G.V.D. OF 1929

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0.1	0.5	0.7	E 0.1	3.2	A	A	-3.3	A	A	A	A
2	0.1	7.3	0.3	E 0.0	2.8	A	A	E -3.3	A	A	A	A
3	-0.4	8.3	0.1	E 0.0	3.1	A	A	E -3.4	A	-3.6	A	0.3
4	0.9	9.1	-0.3	E -0.1	2.7	A	A	E -3.4	A	0.9	A	A
5	-0.4	10.8	-0.6	E -0.2	2.3	A	A	E -3.4	A	-0.8	-3.2	A
6	-0.5	12.5	-1.2	-0.3	2.1	A	A	-3.4	A	E -1.0	A	A
7	-0.8	8.6	-1.3	A	1.3	A	A	-3.4	A	A	A	A
8	-0.9	5.3	4.8	A	0.2	A	A	-3.4	A	A	A	A
9	-1.4	3.5	1.5	A	0.0	A	-3.2	A	A	A	A	A
10	A	8.3	2.3	A	A	A	A	A	-3.6	A	A	A
11	A	6.7	2.0	A	A	-1.1	A	A	-3.4	A	A	-3.0
12	A	7.3	1.7	A	A	A	A	A	-3.3	A	A	-2.0
13	A	5.5	1.2	A	A	A	A	A	A	A	A	A
14	A	3.0	0.5	A	-2.1	A	A	A	A	A	-2.9	A
15	A	3.4	5.1	A	A	A	A	A	A	A	A	A
16	A	6.2	1.7	-2.9	A	A	A	A	A	A	A	A
17	-2.7	3.3	1.6	-0.9	A	A	A	A	A	A	A	-1.5
18	-0.8	2.3	1.8	0.3	A	-2.5	A	A	-3.5	A	A	2.1
19	-1.4	1.6	1.9	A	-2.0	A	A	A	A	A	A	0.6
20	-1.2	1.2	1.0	A	3.1	A	A	-3.4	A	A	A	3.9
21	-1.4	0.8	0.5	0.2	1.1	A	A	E -3.4	A	A	A	6.9
22	A	1.4	0.2	1.0	4.1	-0.1	A	E -3.5	A	A	A	9.7
23	A	1.4	A	1.6	4.2	E -1.3	-2.9	E -3.5	A	A	A	9.5
24	A	1.4	A	1.2	3.5	E -1.7	A	-3.5	A	A	A	8.2
25	A	1.3	A	1.0	2.8	E -2.1	A	A	A	-3.2	A	5.4
26	-2.5	1.0	A	0.5	2.1	-2.5	A	A	A	E -3.2	-3.3	4.5
27	-2.0	0.9	A	0.3	1.8	A	A	A	A	E -3.3	A	4.0
28	-1.6	0.7	A	5.6	1.7	A	A	A	A	E -3.3	A	4.0
29	4.6		A	1.6	1.4	A	A	A	A	-3.4	A	3.0
30	1.1		1.6	2.4	-0.4	A	A	A	A	A	A	3.0
31	1.4		0.3		A		A	A		A		5.3

THE FOLLOWING REFER ONLY TO READINGS APPEARING IN THE TABLE ABOVE.

MEAN	4.40
MAX.	12.5
MIN.	0.5

A- NO RECORD.
E- ESTIMATED.
HIGHEST STAGE WAS 12.50 ON FEB. 6.
LOWEST STAGE WAS NOT DETERMINED.

07032200 NONCONNAH CREEK NEAR GERMANTOWN, TN

LOCATION.--Lat 35°02'59", long 89°49'08", Shelby County, Hydrologic Unit 08010211, on left bank at downstream side of bridge on Winchester Road, 2.6 mi south of Germantown, and at mile 17.3.

DRAINAGE AREA.--68.2 mi^2.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1959-1964, 1969; October 1969 to May 1985, October 1985 to current year.

REVISED RECORDS.--WRD TN-74-1: Drainage area, WRD TN-87-1 (P).

GAGE.--Water-stage recorder. Datum of gage is 262.92 ft above National Geodetic Vertical Datum of 1929 (levels by Soil Conservation Service).

REMARKS.--Records fair. Periodic observations of water temperature are published in this report as miscellaneous water quality data.

AVERAGE DISCHARGE.--20 years (water years 1970-84, 1986-90), 107 ft^3/s, 21.29 in/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft^3/s, July 2, 1989, gage height 24.23 ft, maximum gage height 27.11 ft, Mar. 12, 1975; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,700 ft^3/s and maximum (*):

Date	Time	Discharge (ft^3/s)	Gage height (ft)	Date	Time	Discharge (ft^3/s)	Gage height (ft)
Oct. 16	2145	5,910	16.62	Mar. 15	Unknown	Unknown	Unknown
Feb. 3	Unknown	*Unknown	*Unknown	Apr. 21	0615	5,070	15.41
Feb. 10	Unknown	Unknown	Unknown	Apr. 28	0230	4,260	14.17
Feb. 15	2345	4,830	15.05	May 20	0845	6,750	17.79
Mar. 8	Unknown	Unknown	Unknown				

Minimum discharge, .01 ft^3/s, Sept. 28, 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	.62	.64	100	78	128	52	47	2.0	.36	1.7	.43
2	8.6	4.7	.78	34	2380	169	28	1140	3.0	2.2	1.4	.34
3	3.2	3.8	.83	49	4360	141	e20	207	135	2.2	1.1	.42
4	3.0	1.3	.69	360	962	95	e9.1	179	27	.55	1.0	.29
5	1.8	1.8	.59	83	107	75	e7.3	86	10	5.4	1.0	.27
6	1.3	15	.47	39	51	63	e338	30	4.4	.96	.84	.33
7	1.1	4.1	.31	29	37	e254	e160	17	1.9	.36	.55	.40
8	1.8	394	2.1	44	29	e3660	e64	12	1.1	.49	.58	.65
9	.93	59	2.2	31	369	565	31	9.1	2.7	.41	.68	.99
10	.98	17	1.2	19	e2160	294	e16	6.1	29	.25	.74	.63
11	1.6	11	.78	13	204	186	e8.7	10	9.7	.28	.53	.61
12	1.8	3.8	.59	8.9	58	137	e5.8	24	2.8	67	.41	13
13	2.3	2.7	.40	5.8	37	122	e4.2	18	.89	13	81	49
14	2.1	1.6	.33	3.9	28	109	e3.6	10	.56	3.5	10	3.7
15	2.1	8.2	.28	3.2	1520	e2000	e3.0	8.1	77	1.3	1.9	.74
16	692	15	.23	3.0	e1260	e281	e3.0	3.7	22	.77	.68	.48
17	1310	3.9	.30	75	87	83	e318	28	5.5	.50	.28	.26
18	46	3.4	.33	249	42	45	154	8.5	1.4	.31	.73	.20
19	20	2.0	5.8	99	33	31	36	298	.70	.56	.77	3.9
20	9.4	1.7	1.6	190	25	24	99	3360	.46	.59	.75	1.1
21	5.1	1.0	.67	77	20	20	2620	602	.46	.69	.55	2.2
22	3.9	52	.28	34	e693	16	270	69	406	10	.47	8.7
23	3.2	42	.11	21	258	18	57	25	24	34	.49	.83
24	2.5	16	.03	15	134	12	34	14	7.4	14	.81	.30
25	1.5	8.1	.06	31	94	12	26	7.4	5.3	3.0	.46	.13
26	1.4	3.6	.30	16	76	16	18	4.9	1.3	.92	.45	.09
27	1.5	2.9	.45	10	65	12	252	10	.73	.54	.49	.06
28	.65	3.5	.54	329	59	20	1650	15	.57	.55	.39	.02
29	.56	1.3	8.4	1600	---	25	136	8.0	.50	.76	.40	.01
30	.76	.74	400	171	---	764	44	3.6	.42	7.5	.31	.01
31	.80	---	707	47	---	151	---	2.0	---	3.6	.51	---
TOTAL	2152.88	885.76	1138.07	3789.8	15226	9504	8467.7	8280.4	783.79	178.55	111.97	90.09
MEAN	69.4	22.9	36.7	122	544	307	218	203	26.1	5.70	3.61	3.00
MAX	1310	394	707	1600	4360	3660	2620	3360	406	67	81	49
MIN	.56	.62	.03	3.0	20	12	3.0	2.0	.42	.25	.28	.01
CFSM	1.02	.34	.54	1.79	7.97	4.50	3.16	2.97	.38	.08	.05	.04
IN.	1.17	.37	.62	2.07	8.31	5.18	3.53	3.43	.43	.10	.06	.05

CAL YR 1989 TOTAL 62128.00 MEAN 170 MAX 5900 MIN .03 CFSM 2.50 IN. 33.89
WTR YR 1990 TOTAL 46407.01 MEAN 127 MAX 4360 MIN .01 CFSM 1.86 IN. 25.31

e Estimated

REFERENCE 19

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

Site Assessment
Old Osmose Chemical Facility

BVWST Project 52012.022
October 18, 1991
2:35 p.m.

Surface Water Intakes on the Mississippi River
Groundwater Drinking Water Population

To: Jerry Collins
Company: Department of Memphis Public Works
Phone No.: (901) 576-6720

Recorded by: Laura Morrison LM 10-18-91

Surface Water Intakes on the Mississippi River
There are no surface water intakes on the Mississippi River. rivers, streams and lakes flowing into the Mississippi river in the Memphis area have no surface water intakes.

REFERENCE 20

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

BVWST Project 52012.012
February 7, 1992
4:00 p.m.

Irrigation in the Memphis area

From: Troy Taylor
Company: Shelby County Soil Conservation Service
Phone No.: (901) 766-7650

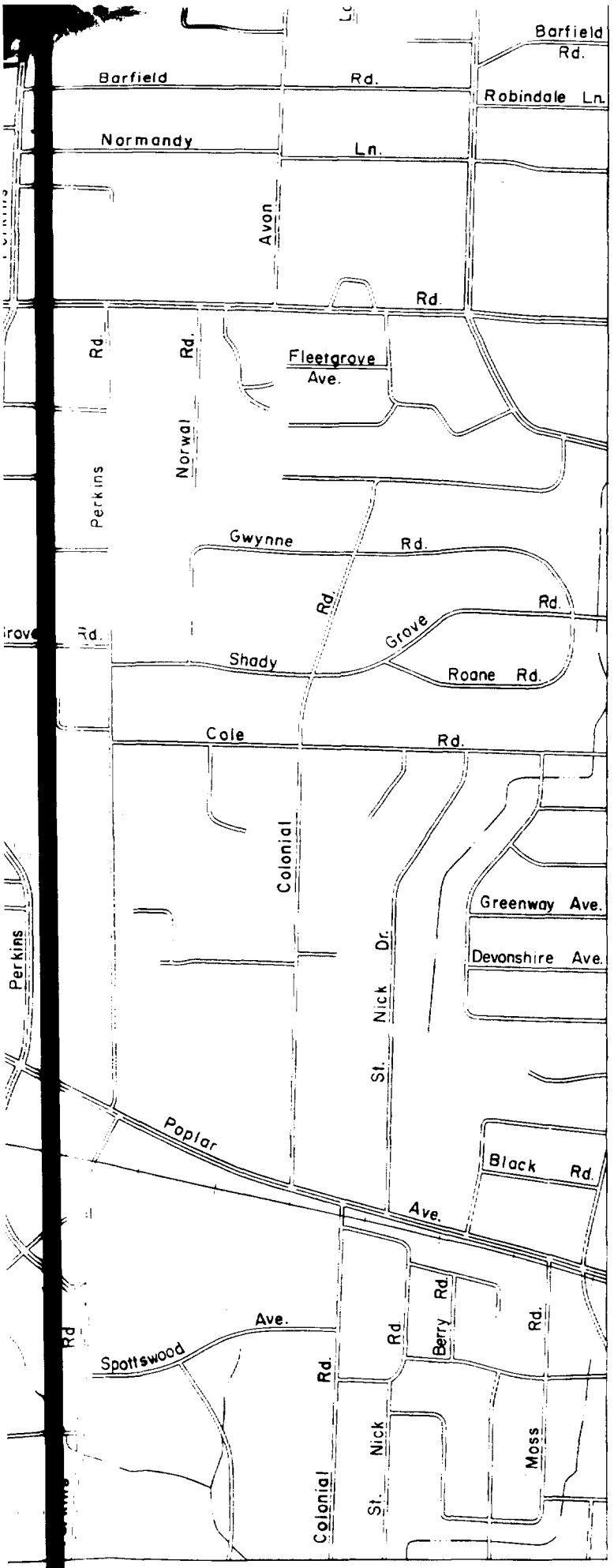
Recorded by: Jancie S. Hatcher

Mr. Taylor informed me that he was aware of 3 areas of irrigation in the Shelby County area:

1. Irrigation at the Agricultural Office at the corner of Walnut Grove and Germantown Road - intake is from a nearby pond

2. Irrigation off Highway 14 (also called Austin Peay Hwy.) near Gragg Road in the northern part of Shelby County - intake from a groundwater well

3. Irrigation for agriculture on Island No. 40 (west of Memphis) - intake from the Mississippi River



structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620.

APPROXIMATE SCALE

1000 0 1000 FEET

REFERENCE 21

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

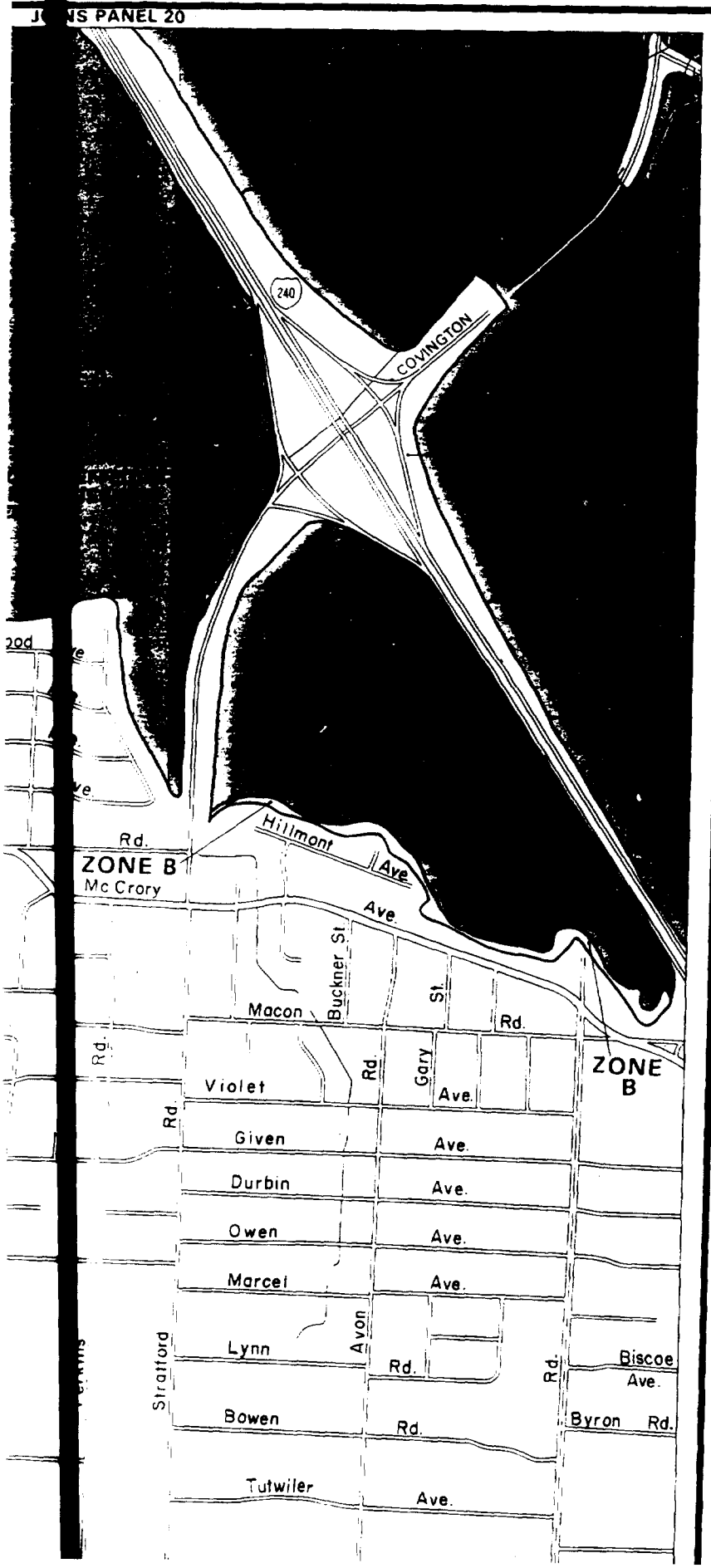
CITY OF
MEMPHIS, TENNESSEE
SHELBY COUNTY

PANEL 35 OF 80

COMMUNITY-PANEL NUMBER
470177 0035 B

EFFECTIVE DATE:
DECEMBER 1, 1982

Federal Emergency Management Agency



KEY TO MAP

500-Year Flood Boundary	
100-Year Flood Boundary	
Zone Designations*	ZONE B / ZONE B
100-Year Flood Boundary	
500-Year Flood Boundary	
Base Flood Elevation Line With Elevation In Feet**	513
Base Flood Elevation in Feet Where Uniform Within Zone**	(EL 987)
Elevation Reference Mark	RM7×
Zone D Boundary	
River Mile	•M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

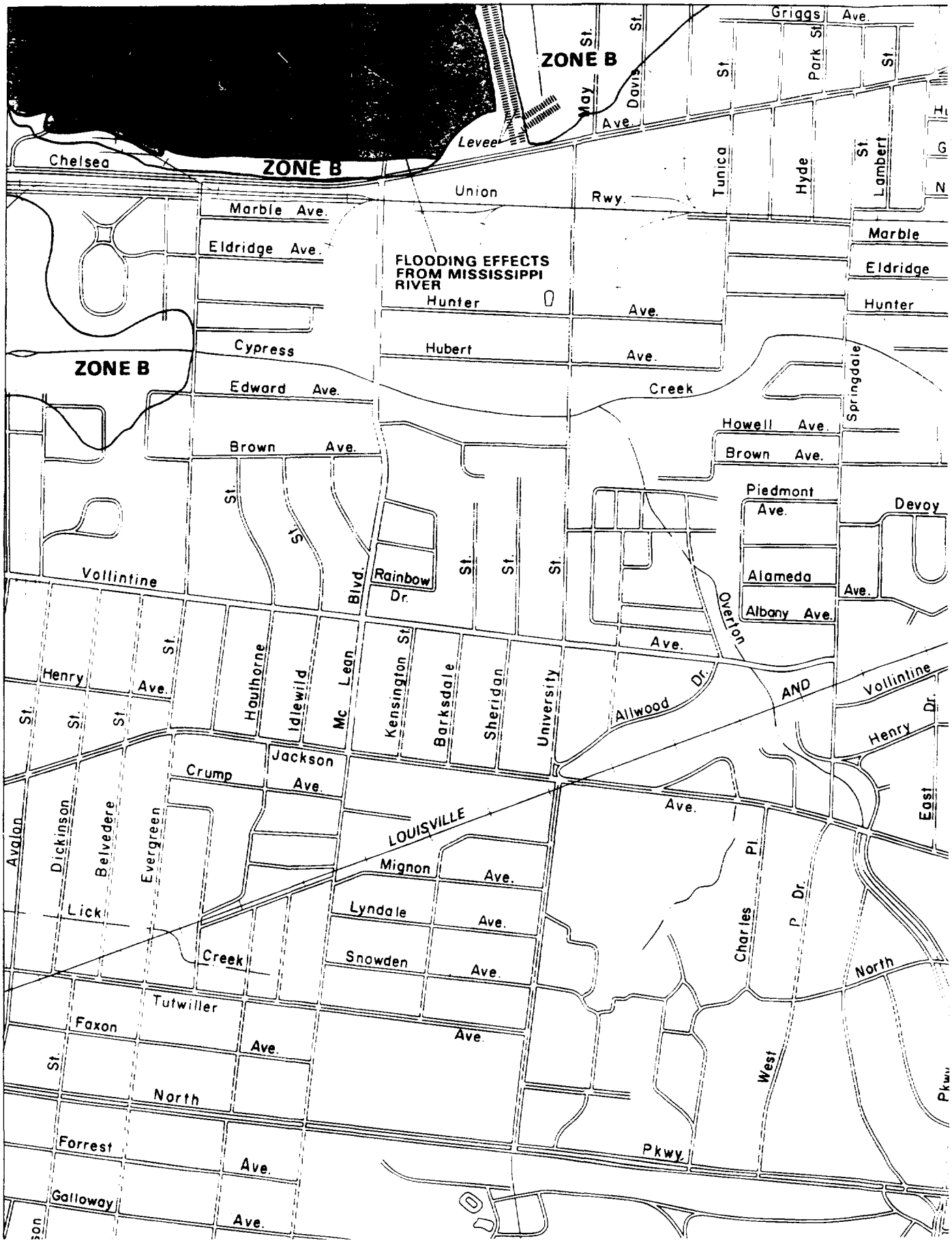
ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.



ZONE B
ZONE B
ZONE B
FLOODING EFFECTS FROM MISSISSIPPI RIVER
Chelsea
Levee
Union
Rwy.
Marble Ave.
Eldridge Ave.
Hunter
Ave.
Hubert
Ave.
Cypress
Edward Ave.
Creek
Brown Ave.
Howell Ave.
Brown Ave.
Piedmont Ave.
Devoy
Alameda
Ave.
Albany Ave.
Overton
Vollintine
Rainbow Dr.
Blvd.
Henry Ave.
Hauthorne
Idlewild
Mc Lean
Kensington St.
Barksdale
Sheridan
University
Allwood Dr.
AND
Vollintine
Henry Dr.
Jackson
Crump
Ave.
Ave.
LOUISVILLE
Avalon
Dickinson
Belvedere
Evergreen
Mignon
Ave.
Lick
Lyndale
Ave.
Creek
Snowden
Ave.
Tutwiller
Faxon
Ave.
Ave.
North
Forrest
Ave.
Galloway
Ave.
Pkwy.
Griggs
Ave.
Park St.
Davis St.
May St.
Tunica St.
Hyde
Lambert St.
Marble
Eldridge
Hunter
Springdale
Charles Pl.
P Dr.
West
North
East

REFERENCE 22

DEFINITIONS OF STATE STATUS FOR THE OFFICIAL LIST OF TENNESSEE'S RARE PLANTS[1]

E - ENDANGERED, Species now in danger of becoming extinct in Tennessee because of:

(a) their rarity throughout their range, or

(b) their rarity in Tennessee as a result of sensitive habitat destruction or restricted area of distribution.

E* - TAXA considered to be endangered in Tennessee due to evidence of large numbers being taken from the wild and lack of commercial success with propagation or transplantation.

T - THREATENED, Species likely to become endangered in the immediately foreseeable future as a result of rapid habitat destruction or commercial exploitation.

S - SPECIAL CONCERN, Species requiring special concern because of:

(a) their rarity in Tennessee because the State represents the limit or near-limit of their geographic range, or

(b) their status is undetermined because of insufficient information.

P - POSSIBLY EXTIRPATED, Species that have not been seen in Tennessee within the past 20 years.

1. Adapted from the Committee for Tennessee Rare Plants. 1978. The rare and vascular plants of Tennessee. J. Tenn. Acad. Sci. 53(4):128-133.

STATE STATUS OF TENNESSEE'S RARE WILDLIFE
(Designated by Tennessee Wildlife Resource Agency)

STATUS DESIGNATIONS

P	-	Possibly extirpated
E	-	Endangered
T	-	Threatened
S	-	Special Concern
I	-	Inactive
D	-	Deemed in Need of Management
*	-	Species Proposed for Federal Protection
ESD	-	Designated by the Ecological Services Division

EXPLANATION OF FEDERAL STATUS DESIGNATIONS

FEDERAL STATUS, DETERMINED BY THE U. S. FISH AND WILDLIFE SERVICE[1]

E/SA	-	Endangered by similarity of appearance
LE	-	Taxa formally listed as endangered
LT	-	Taxa formally listed as threatened
PE	-	Taxa proposed to be formally listed as endangered
PT	-	Taxa proposed to be formally listed as threatened
S	-	Synonyms
LTXN	-	Listed threatened, non-essential experimental population

C1 - Taxa for which the Service has on file substantial information on biological vulnerability and threats to support the appropriateness to list them as endangered or threatened species. Included are those taxa whose status in recent past is known, but may have already become extinct. Such possibly extinct taxa are indicated by an asterisk (*). Double asterisk (**) indicate taxa believed to be extinct in the wild, but known to be extant in cultivation.

C2 - Taxa for which information now in possession of the Service indicated that proposing to list them as endangered or threatened is appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support a proposed rule.

C3- Taxa that are no longer being considered for listing as threatened or endangered species. The following subcategories are used to further indicate the reason(s) for removal from consideration.

3A - Taxa for which the Service has persuasive evidence of extinction of being destroyed. If rediscovered, such taxa might acquire high priority for listing.

3B - Names that on the basis of current taxonomic understanding do not represent taxa meeting the Acts definition of "species." Such proposed taxa could be reevaluated in the future on the basis of subsequent research.

3C - Taxa that have proven to be more abundant or widespread than was previously believed and/or those that are not subject to any identifiable threat.

NOTE: The taxa listed in Categories 1 and 2 may be considered candidates for addition to the list of Endangered and Threatened plants, and, as such, consideration should be given them in environmental planning.

1. Federal Register, 50 (188), September 18, 1985, pp. 37958-37959, and September 27, 1985, pp. 39526-39527.

LIST OF RARE AND ENDANGERED SPECIES FOR NW MEMPHIS QUAD
16 DEC 1992

IENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	ESD STATUS
RTEBRATES				
(2) CLEPTUS ELONGATUS	BLUE SUCKER	C2	T	E
TINIA MISSISSIPPIENSIS	MISSISSIPPI KITE		E	E
TRA CANADENSIS	RIVER OTTER		T	T
(4) REO BELLII	BELL'S VIREO			S

Records Processed

 10:14:11 16 DEC 1992

EOR.....	SNAME:.....	QUADNAME:.....	MARGNUM MANAME:.....	SITENAME:.....
AFCJC04010*003*TN	CYCLEPTUS ELONGATUS	NORTHWEST MEMPHIS	* 1	
AMAJF08010*020*TN	LUTRA CANADENSIS	LOCKE	1	
AFCJC04010*012*TN	CYCLEPTUS ELONGATUS	NORTHWEST MEMPHIS	2	
ABNKC09010*021*TN	ICTINIA MISSISSIPPIENSIS	NORTHWEST MEMPHIS	3	
ABPBW01110*002*TN	VIREO BELLII	NORTHWEST MEMPHIS	4	

5 Records Processed

Numbers [illegible]
keyed to
4-mile radius map

*Circled numbers are
species present in
[illegible]

LIST OF RARE AND ENDANGERED SPECIES FOR NE MEMPHIS QUAD
16 DEC 1992

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	ESD STATUS
INVERTEBRATES				
ELLIPTIO BLASMA TURGIDULA	TURGID-BLOSSOM	LE	E	E
PLANTS				
HYDRASTIS CANADENSIS	GOLDEN SEAL	3C	T	
SILENE OVATA	CATCHFLY	C2	T	
VERTEBRATES				
IANIA MISSISSIPPIENSIS	MISSISSIPPI KITE		E	E
LIMNOTHLYPIS SWAINSONII	SWAINSON'S WARBLER		D	S
SYLVILAGUS AQUATICUS	SWAMP RABBIT			S

6 Records Processed

EOR.....	SNAME:.....	QUADNAME:.....	MARGNUM	MANAME:.....	SITENAME:.....
ABPBX09010*041*TN	LIMNOTHLYPIS SWAINSONII	NORTHEAST MEMPHIS	1	OVERTON PARK	
ABNKC09010*015*TN	ICTINIA MISSISSIPPIENSIS	NORTHEAST MEMPHIS	2	OVERTON PARK	
PDRANOF010*001*TN	HYDRASTIS CANADENSIS	NORTHEAST MEMPHIS	3	OVERTON PARK	
ABNKC09010*019*TN	ICTINIA MISSISSIPPIENSIS	NORTHEAST MEMPHIS	4		
AMAEB01080*002*TN	SYLVILAGUS AQUATICUS	NORTHEAST MEMPHIS	5		
IMBIV16200*019*TN	EPIOBLASMA TURGIDULA	NORTHEAST MEMPHIS	6		
ABNKC09010*020*TN	ICTINIA MISSISSIPPIENSIS	NORTHEAST MEMPHIS	7		
PDCAROU180*007*TN	SILENE OVATA	NORTHEAST MEMPHIS	8		

8 Records Processed

REFERENCE 23

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

BVWST Project 52012.003
December 23, 1991
12:50 p.m.

Recreational Fishing

To: John Condor, Wildlife Manager
Company: Wildlife Resources Agency
Phone No.: (901) 423-5725

Recorded by: Laura Morrisson LM 12-23-91

There has been a commercial fishing ban on the Mississippi River and connecting streams from Tipton County to the Mississippi state line since 1985. Periodic fish sampling has shown chlordane in fish in the Mississippi River. There are warnings posted about eating the fish from the Mississippi River. Recreational fishing occurs despite these warnings.

Arkansas has never participated in the fishing bans on the Mississippi River, even though they are aware of the potential hazards.

/ms

REFERENCE 24

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

TELEPHONE MEMORANDUM

US EPA Site Assessment
Memphis, Tennessee SIPs
Fishing and Recreation on Memphis area water bodies

BVWST Project 52012.xxx
BVWST File
July 1, 1992
9:15 a.m.

To: John Rayfield
Company: TN Wildlife Resource Agency, Shelby County office
Phone No.: (901) 753-1351

Recorded by: Paul Delphos PD 6-1-92

The following water bodies are the only Memphis area rivers which are monitored and/or evaluated by the TN Wildlife Resource Agency. All other creeks are not considered large enough to be monitored. These water bodies include:

Mississippi River
Loosahatchie River
Nonconnah Creek
Wolf River
Lake McKellar

There is a commercial fishing ban for all these water bodies, and it is recommended for recreational fishing that "no consumption of fish" occurs with fish caught from these rivers. This statement is made in the area's fishing guide and Mr. Rayfield only knows of signs posted on Lake McKellar as it is the most utilized water body in the area. He verified that recreational fishing occurs on the above mentioned rivers and caught fish are carried away, therefore, Mr. Rayfield assumes the fish are eaten. He also stated that boating, water skiing, and swimming occur on the above mentioned water bodies, with Lake McKellar being used the most and the Mississippi River being used the least.r

B&V WASTE SCIENCE AND TECHNOLOGY CORP.

REFERENCE 25

TELEPHONE MEMORANDUM

FIT

BVWST Project 52012.003
BVWST File
February 11, 1992

To: Ron Garovelli, Chief of Fisheries
Company: Mississippi Wildlife and Fisheries
Phone No.: (601) 362-9212

Recorded by: Laura Morrisson LM 2-11-92

The state of Mississippi has never had a fishing ban, recreational or commercial, on the Mississippi River.

ms

REFERENCE 26

len Ready-Mix
TITUDE 35:10:24 LONGITUDE 90: 0:13 1980 POPULATION

	0.00-.400	.400-.810	.810-1.60	1.60-3.20	3.20-4.80	4.80-6.40	SECTOR TOTALS
1	0	0	0	1386	9305	9043	19734
2	0	0	0	1297	2235	9647	13179
3	0	0	2223	9679	6119	7431	25452
4	0	1218	798	7509	6993	12672	29190
5	663	0	2741	6772	9160	14883	34219
6	0	0	2905	9144	17719	12426	42194
7	0	0	1795	7074	3513	0	12382
8	274	117	0	0	2442	6156	8989
NG TALS	937	1335	10462	42861	57486	72258	185339

ess RETURN to continue
NU: Geodata Handling Data List procedures
[redacted]ame (in parentheses) ([redacted])
a command: HELP, HELP option, BACK, CLEAR, EXIT, TUTOR
MS> exit

e YES to confirm the EXIT command; type NO to restart GEMS
MS> yes
$ logout
TW logged out at 11-DEC-1992 16:22:51.33
emized resource charges, for this session, follow:

DE: VAXTM1
CT: 9040 START TIME: 11-DEC-1992 16:20:49.36
OJ: GEMS0001 FINISH TIME: 11-DEC-1992 16:22:51.33
ER: HTW BILLING PERIOD: 921201
C: [000710,000012] WEEKDAY: FRIDAY
UD: TERMINAL PORT: VTA2156

DSCRIPTION OF CHARGE		QUANTITY	EXPENDITURE
LL CHARGE LEVELS			
300 baud	(Seconds)	122	0.0000
CPU TIME	(Seconds)	2	0.4656
TOTAL FOR THIS SESSION			$ 0.4656

* Note: This total reflects the charges for this process only, subprocesses created during this session are accounted for separately
er selection:

4WD-WPB

Hubert Wieland
B & V Waste Science and Technology Corp.
1117 Perimeter Center West
Suite W-212
Atlanta, Georgia 30338

RE: Allen Ready-Mix Concrete Company
Site Investigation Prioritization (SIP) Report

Dear Mr. Wieland:

Please address the following comments on the above referenced document:

In section 2.0, Site Description and History, paragraph 1, the size of the facility measures at least 45 acres from the topographic map. Please review references and maps to determine the correct size. In paragraph 6, the description of the sampling event during the HWSI should have an accompanying figure showing the sample locations. These could be included in figure 2.

In section 3.1, Hydrogeologic Setting, paragraph 3, the unit thicknesses should be stated as approximate. In paragraph 5, the 1st sentence should read; "The Allen Ready Mix site, located on a flat lying alluvial plain, east of the confluence of Cypress Creek and the Wolf River, east of..".

In section 4.2, Surface Water Targets, paragraph 1, utilize the Tennessee Wildlife Resources Agencies' designation of wetlands for the surface water pathway.

In section 6.0, Conclusions and Recommendations, paragraph 3, sentence 1 should read; "..confining unit's thickness..".

If you have any questions concerning these comments please call me at (404) 347-5065.

Sincerely,

David G. Williams
Environmental Scientist

~~Enclosure~~

cc. Jancie S. Hatcher, BVWST Technical Reviewer
bcc: Keith Mills, EPA CO
Doug Thompson, EPA PO
Earl Bozeman, EPA WAM
Robert Morris, EPA TN PO

DW:m:07/13/93x5065 Disk: Williams Doc: allen.b&v
WILLIAMS BOZEMAN
7/13

M.2 - SITE MAINTENANCE FORM

EPA ID : TND980838825

SITE NAME: ALLEN READY-MIX CONCRETE CO SOURCE: R

STREET : 1572 CHELSEA AVE CONG DIST: 08

CITY : MEMPHIS ZIP: 38108-2194

CNTY NAME: SHELBY CNTY CODE : 157

LATITUDE : 35/10/30.0 LONGITUDE : 089/58/30.0

LL-SOURCE: G LL-ACCURACY:

SMSA : 4920 HYDRO UNIT: 08010210

INVENTORY IND: Y REMEDIAL IND: Y REMOVAL IND: N FED FAC IND: N

NPL IND: N NPL LISTING DATE: NPL DELISTING DATE:

SITE/SPILL IDS:

RPM NAME: RPM PHONE: - -

SITE CLASSIFICATION: SITE APPROACH:

DIOXIN TIER: REG FLD1: REG FLD2:

RESP TERM: PENDING ( ) NO FURTHER ACTION ( )

ENF DISP: NO VIABLE RESP PARTY ( ) VOLUNTARY RESPONSE ( )
ENFORCED RESPONSE ( ) COST RECOVERY ( )

SITE DESCRIPTION:

ACTION:

PENDING (_) NO FURTHER ACTION (_)

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF EMERGENCY AND REMEDIAL RESPONSE
C E R C L I S V 1.2

M.2 - ALIAS/ALIAS LOCATION MAINTENANCE FORM

* ACTION: _ *

SITE: ALLEN READY-MIX CONCRETE CO

EPA ID: TND980838825 ALIAS SEQ NO: 01

ALIAS NAME: EPIC # 72 SOURCE: T * _____ _ *

ALIAS LOCATION * ACTION: _ *

CONTIGUOUS PORTION OF SITE? C FED FAC IND: N * _ _ *

STREET : 1572 CHELSEA AVE CONG DIST : 07 * _____ __ *

CITY : MEMPHIS ST: TN ZIP: 38108 * _____ __ _____-____ *

CNTY NAME: SHELBY CNTY CODE: 157 * _____ ___ *

LATITUDE : 35/10/30.0 LONGITUDE : 089/58/30.0 * __/__/__.__ __/__/__.__ *

LL-SOURCE: G LL-ACCURACY: * _ _ *

SMSA : 4920 HYDRO UNIT: 08010210 * ____ _____ *

ALIAS DESCRIPTION:

* _____ *

* _____ *

* _____ *

* _____ *

M.2 - PROGRAM MAINTENANCE FORM

ACTION: _

SITE: ALLEN READY-MIX CONCRETE CO

EPA ID: TND980838825 PROGRAM CODE: H01 PROGRAM TYPE:

PROGRAM QUALIFIER: ALIAS LINK :

PROGRAM NAME: SITE EVALUATION

DESCRIPTION:

M.2 - EVENT MAINTENANCE FORM

* ACTION: _ *

SITE: ALLEN READY-MIX CONCRETE CO
PROGRAM: SITE EVALUATION

EPA ID: TND980838825 PROGRAM CODE: H01 EVENT TYPE: PA1

FMS CODE: EVENT QUALIFIER : EVENT LEAD: S * _ __ _ *

EVENT NAME: PRELIMINARY ASSESSMENT STATUS: * _____ _ *

DESCRIPTION:

* _____ *
* _____ *
* _____ *
* _____ *

ORIGINAL	CURRENT	ACTUAL			
START:	START:	START: 02/10/86	__/__/__	__/__/__	__/__/__
COMP :	COMP :	COMP : 02/10/86	__/__/__	__/__/__	__/__/__

HQ COMMENT:

* _____ *

RG COMMENT:

* _____ *

COOP AGR #	AMENDMENT #	STATUS	STATE %				
			0	_____	_____	__	__

M.2 - EVENT MAINTENANCE FORM

* ACTION: _ *

SITE: ALLEN READY-MIX CONCRETE CO
PROGRAM: SITE EVALUATION

EPA ID: TND980838825 PROGRAM CODE: H01 EVENT TYPE: SI1

FMS CODE: EVENT QUALIFIER : EVENT LEAD: E * _ ___ _ *

EVENT NAME: SITE INSPECTION STATUS: * _____ _ *

DESCRIPTION:

* _____ *
* _____ *
* _____ *
* _____ *

ORIGINAL	CURRENT	ACTUAL			
START:	START:	START:	__/__/__	__/__/__	__/__/__
COMP :	COMP :	COMP : 03/01/81	__/__/__	__/__/__	__/__/__

HQ COMMENT:

* _____ *

RG COMMENT:

* _____ *

COOP AGR #	AMENDMENT #	STATUS	STATE %
			0

M.2 - COMMENT MAINTENANCE FORM

SITE: ALLEN READY-MIX CONCRETE CO

EPA ID: TND980838825

COM NO	COMMENT	ACTION
001	COMBINED EPIC #72 WITH ALLEN READY	
	MIX AND DELETED ID# OF DUPLICATE	
002	TND980728521	

Potential Hazardous Waste Site

PRELIMINARY ASSESSMENT

ALLEN READY MIX TND 980 838 825

Preliminary Assessment
Allen Ready Mix
TND 980838825

Allen Ready Mix is located in the Northwest portion of Memphis at 1572 Chelsea Avenue in Shelby County. EPA made an inspection in 1980, observed rusted unlabeled drums that contained an oily waste. At the time of the investigation the site was owned by Allen Ready Mix Concrete. The site has since been subdivided and the area of concern is now owned by Permacon Block and Brick Company.

The EPA site inspection in 1980 indicated that approximately 25 unlabeled rusted drums containing a black oily liquid and about 11 drums were observed on a concrete pad 8 drums were in a fenced enclosure and 5 drums were out in the open. None of the drums were covered. The present site owners were not knowledgeable of the drums nor of the contents.

The site is located within the floodplain of the Wolf River 100-200 feet from the lagoon. The area would be subject to flooding and contamination of surface water. Those uncovered drums on the open ground during a flood would be free to percolate into the groundwater.

Residential areas are located within 300 feet of the site, both west and south. Potentially affected waters include two rivers, the Wolf River and the Mississippi River. There are no wildlife refuges or sensitive environment in the vicinity.

Four years later a follow-up inspection was made March 8, 1984 by the state. Rusted drums were found with plastic liners and the contents were unknown. This inspection indicated that no immediate potential hazard was observed. It is recommended that no further action is necessary at this time.

SD/ah/SWM H1

REFERENCES

1. Mr. Bill Allen, Allen Ready Mix, personal conversation

2. Nashville Central Office, Division of Solid Waste Management, files on Allen Ready Mix site.

3. USGS Topographic Map, 7 1/2 NE/4 Memphis 15' Quadrangle

4. EPA, site investigation report dated June 17, 1980

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
TN	D 980728521

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Allen Ready Mix Concrete	1572 Chelsea Avenue				
03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Memphis	TN	38127	Shelby	157	08
09 COORDINATES LATITUDE	LONGITUDE				
35 10 29 N	090 00 07 W				

10 DIRECTIONS TO SITE (Starting from nearest public road)

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)		
Allen Ready Mix Concrete Co.	1572 Chelsea Avenue		
03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Memphis	TN	38127	(615) 275-5511
07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)		
Mats/Sand and Gravel Plant	1572 Chelsea Avenue		
09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
Memphis	TN	38127	(901) 275-5511

13 TYPE OF OWNERSHIP (Check one)

[X] A. PRIVATE [ ] B. FEDERAL: _____ (Agency name) [ ] C. STATE [ ] D. COUNTY [ ] E. MUNICIPAL

[ ] F. OTHER: _____ (Specify) [ ] G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

[ ] A. RCRA 3001 DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) [ ] B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED ___/___/___ (MONTH DAY YEAR) [ ] C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

[X] YES DATE 3 / 8 / 84 (MONTH DAY YEAR)
[ ] NO

BY (Check all that apply)

[ ] A. EPA [ ] B. EPA CONTRACTOR [X] C. STATE [ ] D. OTHER CONTRACTOR
[ ] E. LOCAL HEALTH OFFICIAL [ ] F. OTHER _____ (Specify)

CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)

[X] A. ACTIVE [ ] B. INACTIVE [ ] C. UNKNOWN

03 YEARS OF OPERATION

_____ BEGINNING YEAR | _____ ENDING YEAR [X] UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Plastic uned rusted drums some of which contain black oily substance. These were left by previous owner as noted in EPA site inspection form dated 6/17/80 by Andrew Kromis.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

As per the last inspection. No potential hazard noted.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

[ ] A. HIGH (Inspection required promptly) [ ] B. MEDIUM (Inspection required) [ ] C. LOW (Inspect on time available basis) [X] D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)			03 TELEPHONE NUMBER
Allen, Bill	Allen Consultant Inc.			( ) 901 275-5511
04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Shirley Dunn	TDH&E	DSWM	(615) 741-6287	8 / 26 / 85 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
TN	ID 980728521

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- A SOLID
- B POWDER, FINES
- C SLUDGE
- D OTHER (Specify)
- E SLURRY
- F LIQUID
- G GAS

02 WASTE QUANTITY AT SITE

(Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS _____

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- A TOXIC
- B CORROSIVE
- C RADIOACTIVE
- D PERSISTENT
- E SOLUBLE
- F INFECTIOUS
- G FLAMMABLE
- H IGNITABLE
- I HIGHLY VOLATILE
- J EXPLOSIVE
- K REACTIVE
- L INCOMPATIBLE
- M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
TN	D 980728521

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 [ ] A. GROUNDWATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: 3-8-84) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

None

01 [ ] B. SURFACE WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [X] OBSERVED (DATE: 3-8-84) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

None

01 [ ] C. CONTAMINATION OF AIR
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 [ ] D. FIRE/EXPLOSIVE CONDITIONS
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 [X] E. DIRECT CONTACT
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: 3-8-84) [X] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Rusted drums w/plastic liners, contents unknown

01 [X] F. CONTAMINATION OF SOIL
03 AREA POTENTIALLY AFFECTED: _____ (Acres)
02 [X] OBSERVED (DATE: 3-8-84) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

Rusted drums w/plastic liners, contents unknown

01 [ ] G. DRINKING WATER CONTAMINATION
03 POPULATION POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 [ ] H. WORKER EXPOSURE/INJURY
03 WORKERS POTENTIALLY AFFECTED: _____
02 [ ] OBSERVED (DATE: _____) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 [X] I. POPULATION EXPOSURE/INJURY
03 POPULATION POTENTIALLY AFFECTED: 200
02 [X] OBSERVED (DATE: 3-8-84) [ ] POTENTIAL [ ] ALLEGED
04 NARRATIVE DESCRIPTION

location of plant w/in flood plain.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
TN	D 980728521

HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

J DAMAGE TO FLORA — 02 ☒ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
NARRATIVE DESCRIPTION

N/A

K DAMAGE TO FAUNA — 02 ☒ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
NARRATIVE DESCRIPTION *(Include name(s) of species)*

N/A

L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE:) ☐ POTENTIAL ☐ ALLEGED
NARRATIVE DESCRIPTION

N/A

☒ M UNSTABLE CONTAINMENT OF WASTES *(Spills, runoff, standing liquids, leaking drums)* — 02 ☐ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
POPULATION POTENTIALLY AFFECTED: 200 — 04 NARRATIVE DESCRIPTION

Rusted drums lieing on ground. Contents unknown

N. DAMAGE TO OFFSITE PROPERTY — 02 ☒ OBSERVED (DATE: 3-8-84) ☒ POTENTIAL ☐ ALLEGED
NARRATIVE DESCRIPTION

N/A

O CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☒ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
NARRATIVE DESCRIPTION

N/A

☒ P ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: 3-8-84) ☐ POTENTIAL ☐ ALLEGED
NARRATIVE DESCRIPTION

Rusted drums lieing on ground, owned by previous owner Allen.

DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

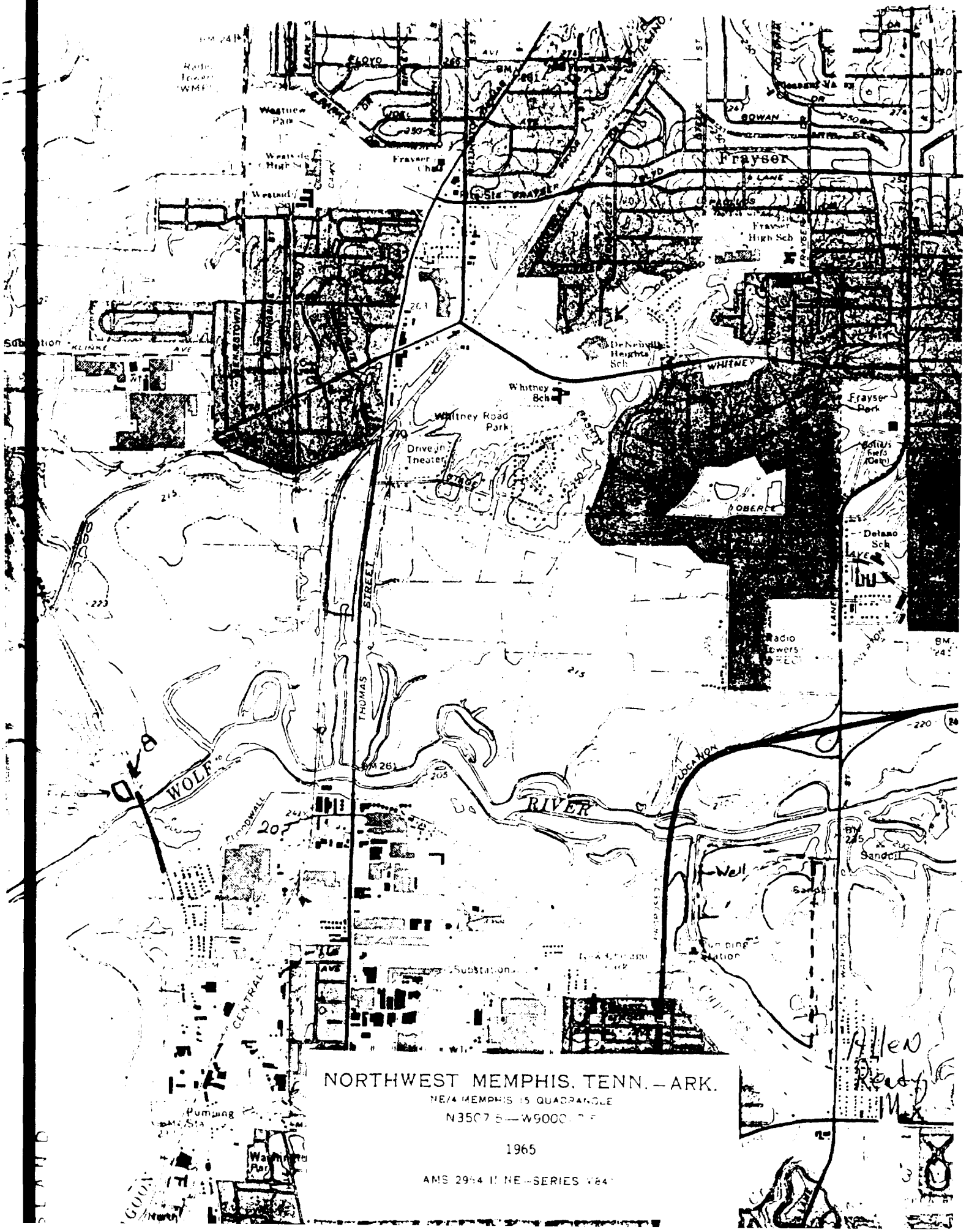
None

TOTAL POPULATION POTENTIALLY AFFECTED: 200

COMMENTS

SOURCES OF INFORMATION *(Cite specific references, e.g., state files, sample analysis, reports)*

No Further Action needed.



NORTHWEST MEMPHIS, TENN.—ARK.

NE/4 MEMPHIS 15 QUADRANGLE

N3507.5—W9000

1965

AMS 2954 II NE—SERIES V84

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: December 3, 1985

TO: File

FROM: Shirley Dunn

SUBJECT: Telephone Conversation on August 13-14, 1985

Mr. Allen, of Allen Ready Mix was contacted on two separate occasions concerning the drums on the site and about the present ownership. He replied "That he no longer owned the property." In response to the dumping and storage of drums he replied "that there were no drums on the site." He further explained that the property is being utilized by a gravel plant and was presently owned to his knowledge by Permacon Block and Brick Company.

SD/ah/SWM H1

FROM	DATE

TO	

PH-0001
SR 3/77

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT

REGION	SITE NUMBER (to be assigned by HQ)
IV	TN 00000 1142

GENERAL INSTRUCTIONS: Complete Sections I and III through XV of this form as completely as possible. Then use the information on this form to develop a Tentative Disposition (Section II). File this form in its entirety in the regional Hazardous Waste Log File. Be sure to include all appropriate Supplemental Reports in the file. Submit a copy of the forms to: U.S. Environmental Protection Agency; Site Tracking System, Hazardous Waste Enforcement Tack Force (EN-335), 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: EPIC #72

B. STREET (or other identifier): 1572 Chelsea Ave

C. CITY: MEMPHIS

D. STATE: TN

E. ZIP CODE:

F. COUNTY NAME: Shelby

G. SITE OPERATOR INFORMATION

1. NAME: Allen Ready-Mix Concrete Co — Bill Allen - PRESIDENT

2. TELEPHONE NUMBER: (901) 275-5511

3. STREET: 1572 Chelsea Ave

4. CITY: Memphis

5. STATE: TN

6. ZIP CODE:

H. REALTY OWNER INFORMATION (if different from operator of site)

1. NAME:

2. TELEPHONE NUMBER:

3. CITY:

4. STATE:

5. ZIP CODE:

I. SITE DESCRIPTION: See Section VIII U

J. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE

II. TENTATIVE DISPOSITION (complete this section last)

A. ESTIMATE DATE OF TENTATIVE DISPOSITION (mo., day, & yr.): 06-17-80

B. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☒ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE

C. PREPARER INFORMATION

1. NAME: ANDREW KROMIS

2. TELEPHONE NUMBER: (FTS) 257-3973

3. DATE (mo., day, & yr.): 06-17-80

III. INSPECTION INFORMATION

A. PRINCIPAL INSPECTOR INFORMATION

1. NAME: RICHARD GREEN

2. TITLE: ENVIROMENTAL SCIENTIST

3. ORGANIZATION: EPA, Region IV, Water Enforcement Branch

4. TELEPHONE NO. (area code & no.): (FTS) 2573973

B. INSPECTION PARTICIPANTS

1. NAME	2. ORGANIZATION	3. TELEPHONE NO.
Richard Green	EPA, Region ~~IV~~ Water Enforcement Branch	(FTS) 257-3973
Andrew Kromis	"	"

C. SITE REPRESENTATIVES INTERVIEWED (corporate officials, workers, residents)

1. NAME	2. TITLE & TELEPHONE NO.	3. ADDRESS

TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT

OFFICE CORRESPONDENCE

FROM	TO	DATE

DATE: April 5, 1984

TO: The Files

FROM: Michael J. Higgs

SUBJECT: 3012 Program - Site Investigations
EPIC 72

EPIC 72

On March 8, 1984, the EPIC 72 site at 1572 Chelsea Avenue in Memphis was visited by Michael J. Higgs, Karen Bonner, and Ken Davis. Initial information concerning this site indicated that it was owned by Allen Ready-Mix Concrete Company. The site had since been subdivided and the area of concern is now owned by Permacon Block & Brick Company. We met with Chris Campbell, president of Permacon.

Most of the fill material on the site consists of sand and concrete but some rusted drums and several old mixers from cement trucks were also noted. Approximately 25 drums were found in and around a fenced in area north of the block storage yard. All of the drums were unlabelled and badly rusted, and some were rusted completely through. Several had plastic liners and were full of a dark, oily fluid.

Mr. Campbell was not aware of the presence of the drums but would try to ascertain the contents and remove them. It is felt that No Further Action is needed by the 3012 Program, but that the Memphis field office should be apprised of the situation in case a follow-up is needed.

FROM	DATE
TO	

MJH/jw 4/10

PH-0001
SR 3/77

JUL 14 1981

20

Allen Ready-Mix Concrete Company

Environmental Engineer
Water Surveillance Branch

Jim Wilburn, Technical Manager
Memphis Study Project

Allen-Ready Mix

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Company, Memphis, Tennessee on March 17, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. Three soil samples and one waste sample were collected during this investigation. Two of the soil samples were collected near drums stored at the pallet area west of the concrete mixers. The other soil sample was collected downgradient from some drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners.

The soil samples collected during this investigations contained low concentrations of polynuclear aromatic hydrocarbon, fatty acids, and pesticide related compound. The waste sample contained relatively low concentrations of fatty acid, alcohols, and aldehydes but did not contain detectable concentrations of pesticide related compounds.

No hazardous or toxic waste materials which would constitute a significant threat to health or the environment were detected in the soil or waste samples collected during this HWSI. The trash and old tires dumped along the dirt road near the dredge pond northwest of Allen Ready-Mix are typical of indiscriminate open dumping throughout the Memphis area. This type of dumping is a nuisance to area residents and businesses and creates a breeding ground for rats, mosquitoes, and other pests.

R. J. Bruner III, P.E.

cc: ~~Finger~~/~~Adams~~/Carter/Lair

CONFIDENTIAL

This document is prepared in anticipation of enforcement litigation. It is not subject to discovery.

JUL 14 1981

20

Allen Ready-Mix Concrete Company

Environmental Engineer
Water Surveillance Branch

Jim Wilburn, Technical Manager
Memphis Study Project

Allen Ready Mix

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Company, Memphis, Tennessee on March 17, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. Three soil samples and one waste sample were collected during this investigation. Two of the soil samples were collected near drums stored at the pallet area west of the concrete mixers. The other soil sample was collected downgradient from some drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners.

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R. J. Bruner III, P.E.

cc: ~~Finger~~/~~Adams~~/Carter/Lair

CONFIDENTIAL

This document is prepared in anticipation of enforcement litigation. It is not subject to discovery.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE JUL 14 1981

SUBJECT Report - Hazardous Waste Site Investigation - Allen Ready-Mix Concrete Company
Memphis, Tennessee

FROM Director
Surveillance and Analysis Division

TO Howard Zeller, Acting Director
Enforcement Division

Attached is a copy of the subject report. Copies of this report should be sent to the following individuals:

Mr. Fred Richardson, Manager
Allen Ready-Mix Concrete Company
1572 Chelsea Avenue
Memphis, Tennessee

Mr. Larry Ledford
Tennessee Division of Solid
Waste Management
814 Jefferson Avenue
Memphis, Tennessee

Billy N. Adams/for
James H. Finger

Attachment

cc: Wilburn
Smith/Stonebraker/Mathis
Hopkins
Newton/Turnipseed
Adams
Carroll/Bennett
Carter/Lair
Bruner

EPA Region IV
Atlanta, GA
RECEIVED
JUL 22 1981
Compliance Branch

EPA Form 1320-6 (Rev. 3-76)

REPORT
HAZARDOUS WASTE SITE INVESTIGATION
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, TENNESSEE
JULY 10, 1981

INTRODUCTION

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Co., Memphis, Tennessee on March 18, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. A preliminary inspection of the Allen Ready-Mix Concrete Co., was conducted by Messrs. Richard Green and Andy Cromis, EPA, Enforcement Division, on May 7, 1980 (1). As a result of the preliminary inspection, a HWSI was requested for this site by Mr. Jim Wilburn, Technical Manager, Memphis Study Project.

STUDY AREA

The Allen Ready-Mix Concrete Co., is located at 1572 Chelsea Avenue (see figure 1). There are two large dredge ponds to the north of the company near the Wolf River. The area north of the company's property between the two ponds had been used extensively for disposal of concrete. Some trash and several old concrete mixer drums (truck mount type) had been disposed of in this area. Some crushed 55 gallon drums were also observed; these appeared to be discarded fuel and/or lubricant drums.

The area along the dirt road near the pond northwest of Allen Ready-Mix was strewn with trash (see figure 2). The remains of several fiber drums (drum rings, liners, etc) containing red sandy-looking material were observed in this area. There was also a large pile of tires near the southeast corner of the pond.

Several unlabeled 55 gallon drums were stored in a fenced area northwest of the concrete mixers (see figure 2). Additional drums were stored outside the fence near the southeast corner of the fenced area. This area was described by Mr. Fred Richardson, Manager, Allen Ready-Mix Concrete Co., as a pallet building and repair area which is no longer used. Mr. Richardson said that he did not know what was in the drums. The only other 55 gallon drums observed on the site were stored on a concrete pad and appeared to contain fuels and/or lubricants.

RESULTS AND DISCUSSION

Three soil samples and one waste sample were collected during the investigation at the Allen Ready-Mix Concrete Co. Two of the soil samples were collected near the drums stored at the pallet area. The other soil sample was collected downgradient from the drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners (see table 1 and figure 2). A data summary is presented in table 2; complete analytical results are attached as appendix A.

The soil samples collected near the pallet area contained traces (less than quantifiable concentrations, see table 2) of several polynuclear aromatic hydrocarbons. A large number of organic acids (maximum concentration 14,000 ug/kg hexadecenoic acid), cyclodiene pesticide related materials (maximum concentration 31 ug/kg gamma chlordane), and a petroleum type product were also detected in these samples. Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (2) (3).

The soil sample collected near the dredge pond (ARM-003) contained traces (<4,000 ug/kg) of several polynuclear aromatic hydrocarbons, a trace (<5,000 ug/kg) of a methyl ester of methyl pentadecanoic acid, and several pesticides related materials (maximum concentration 50 ug/kg gamma chlordane, see table 2). Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis.

The sample of red sandy-looking material collected from the remains of the deteriorated fiber drums (ARM-004) contained several fatty acids (maximum concentration 67,000 ug/kg octadecanoic acid), alcohols (maximum concentration 38,000 ug/kg methylene bisphenol), and aldehydes (maximum concentration 4,500 ug/kg hydoxybenzaldehyde, see table 2). No pesticide related materials were detected in this sample. Metals concentrations were at or below the concentrations detected in the soil samples collected during this investigation.

REFERENCES

1) "Hazardous Waste Site Investigations - Memphis, Tennessee - First Phase;" U. S. Environmental Protection Agency, Region IV, Enforcement Division; June, 1980.

2) "Hazardous Waste Site Investigation - Memphis Drum Service - Memphis, Tennessee;" U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; March 10, 1981.

3) "Hazardous Waste Site Investigation - Frayser Pond Site - Memphis, Tennessee;" U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; September 17, 1980.

4) Water Surveillance Branch Standard Operating Procedures and Quality Assurance Manual (Draft); U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; August 29, 1980.

TABLE 1
SAMPLING LOCATIONS
ALLEN READY-MIX
MEMPHIS, TENNESSEE

Sample Number	Location
ARM-003	Soil downgradient from drum rings and liners near dredge pond.
ARM-004	Residual material from fiber or plastic drum near dredge pond.
ARM-005	Soil downgradient of drums stored along the west fence in the pallet area.
ARM-006	Soil downgradient of drums stored near the southeast corner of the pallet area.

TABLE 2
DATA SUMMARY
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, TENNESSEE

	SOIL			WASTE
	ARM-005 West side pallet area	ARM-006 SE corner pallet area	ARM-003 North of drums near dredge pond	ARM-004 Residual from drums near dredge pond
EXTRACTABLE ORGANIC COMPOUNDS (GC/MS)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Naphthalene [1]	ND	<4,000	ND	ND
Acenaphthylene [1]	ND	<4,000	ND	ND
Flourene [1]	ND	<4,000	ND	ND
Phenanthrene and/or anthracene [1]	<4,600	<4,000	<4,000	<3,200
Fluoranthene [1]	<4,600	<4,000	<4,000	ND
Pyrene [1]	<4,600	<4,000	<4,000	ND
Chrysene and/or benzo (A) anthracene [1]	<4,600	<4,000	<4,000	ND
Benzo (B) fluoranthene and/or benzo (K) fluoranthene [1]	ND	<4,000	ND	ND
Phenol [1]	ND	ND	ND	<1,000
2,4-Dimethylphenol [1]	ND	ND	ND	<1,000
Butanoic acid [2]	<1,000	-	-	-
Hexanoic acid [2]	<1,000	<1,000	-	-
Octanoic acid [2]	<1,000	<1,000	-	-
Nonanoic acid [2]	<1,000	<1,000	-	-
Decanoic acid [2]	<1,000	<1,000	-	1,800
Undecanoic acid [2]	<1,000	<1,000	-	-
Dodecanoic acid [2]	<1,000	1,700	-	1,600
Tridecanoic acid [2]	<1,000	<1,000	-	5,400
Tetradecanoic acid [2]	1,600	<1,000	-	<1,000
Pentadecanoic acid [2]	1,600	<1,000	-	26,000
Hexadecanoic acid [2]	9,500	<1,000	-	-
Octadecanoic acid [2]	<1,000	-	-	67,000
Hexadecenoic acid [2]	14,000	-	-	-
Heptadecenoic acid [2]	-	-	-	<1,000
Octadecenoic acid [2]	10,000	-	-	-
Phthalic acid [2]	-	<1,000	-	<1,000
Benzene propanoic [2]	-	<1,000	-	-
Methyl ester of dodecanoic acid [2]	-	<1,000	-	-
Methyl ester of tetradecanoic acid [2]	<1,000	-	-	-
Methyl ester of hexadecenoic acid [2]	2,600	-	-	-
Methyl ester of octadecenoic acid [2]	-	<1,000	-	-
Methyl ester of octadecadienoic acid [2]	<1,000	-	-	-
Methyl ester of hydroxybenzoic acid [2]	-	<1,000	-	<1,000
Methyl ester of hydroxyphenyl propenoic acid [2]	-	<1,000	-	-
Methyl ester of methyl pentadecanoic acid [2]	1,300	<1,000	<5,000	-
Hydroxymethoxy benzaldehyde [2]	<1,000	-	-	-
Hydroxybenzaldhyde [2]	-	-	-	4,500
Methoxy benzenemethanol [2]	-	-	-	1,500
Hydroxybenzene methanol [2]	-	-	-	2,500
Methylene bisphenol [2]	-	-	-	38,000
Bis (hydroxyphenyl) methanone [2]	-	-	-	<1,000
Benzodioxolecarboxaldehyde [2]	-	-	-	<1,000
Petroleum type product	-	P	-	-
CHLORINATED ORGANIC COMPOUNDS (GC/EC)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Dieldrin [1]	ND	ND	45	
p,p'-DDT [1]	ND	ND	27	ND
p,p'-DDE [1]	ND	ND	15	ND
p,p'-DDD [1]	ND	ND	20	ND
Endrin [1]	ND	ND	19	ND
Heptachlor [1]	ND	2.5	3.9	ND
Heptachloronorbornene	ND	2.1	7.4	ND
Gamma chlordane	31	9.8	50	ND
Alpha chlordane	26	7.2	ND	ND
Hexachlorobenzene [1]	ND	ND	6.1	ND
INORGANIC ELEMENTS AND COMPOUNDS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Arsenic [1]	-	27	61	<5
Barium	132	410	287	4
Cobalt	13	<8	<16	<2
Chromium [1]	28	23	42	4
Copper [1]	16	38	56	78
Nickel [1]	18	18	32	<4
Lead [1]	48	95	68	<4
Strontium	40	69	27	<1
Titanium	592	455	462	18
Vanadium	46	44	75	2
Yttrium	12	10	18	<1
Zinc [1]	120	214	187	16
Mercury [1]	<0.05	0.13	0.14	<0.1
Aluminum	21,700	17,500	38,000	4,200
Manganese	475	510	800	25
Calcium	12,500	26,500	2,600	120
Magnesium	3,780	4,200	4,060	50
Iron	23,500	22,600	51,600	690
Cyanide [1]	<0.2	0.35	0.41	<0.2

P - Indicates presence.
NA - Not analyzed.
ND - None detected at or above the minimum detection limit (MDL). The MDL's vary from sample to sample and from parameter to parameter, see analytical data sheets (Appendix A) for exact values.
All concentrations are calculated on a dry weight basis.
1 - Compound/element is on the NRDC list of priority pollutants.
2 - Tentative identification, estimated concentration.

MAP
NORTH CENTRAL MEMPHIS, TN

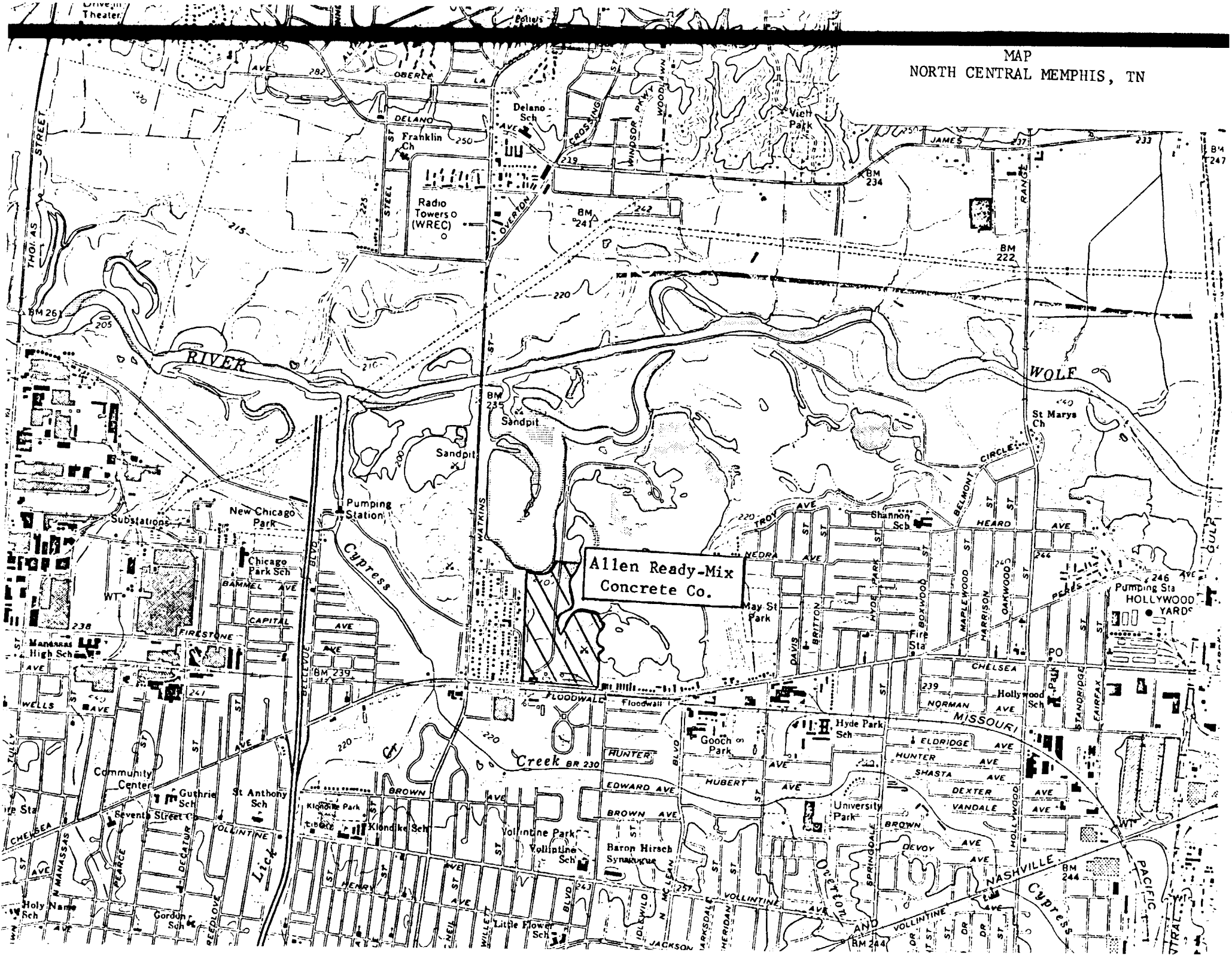
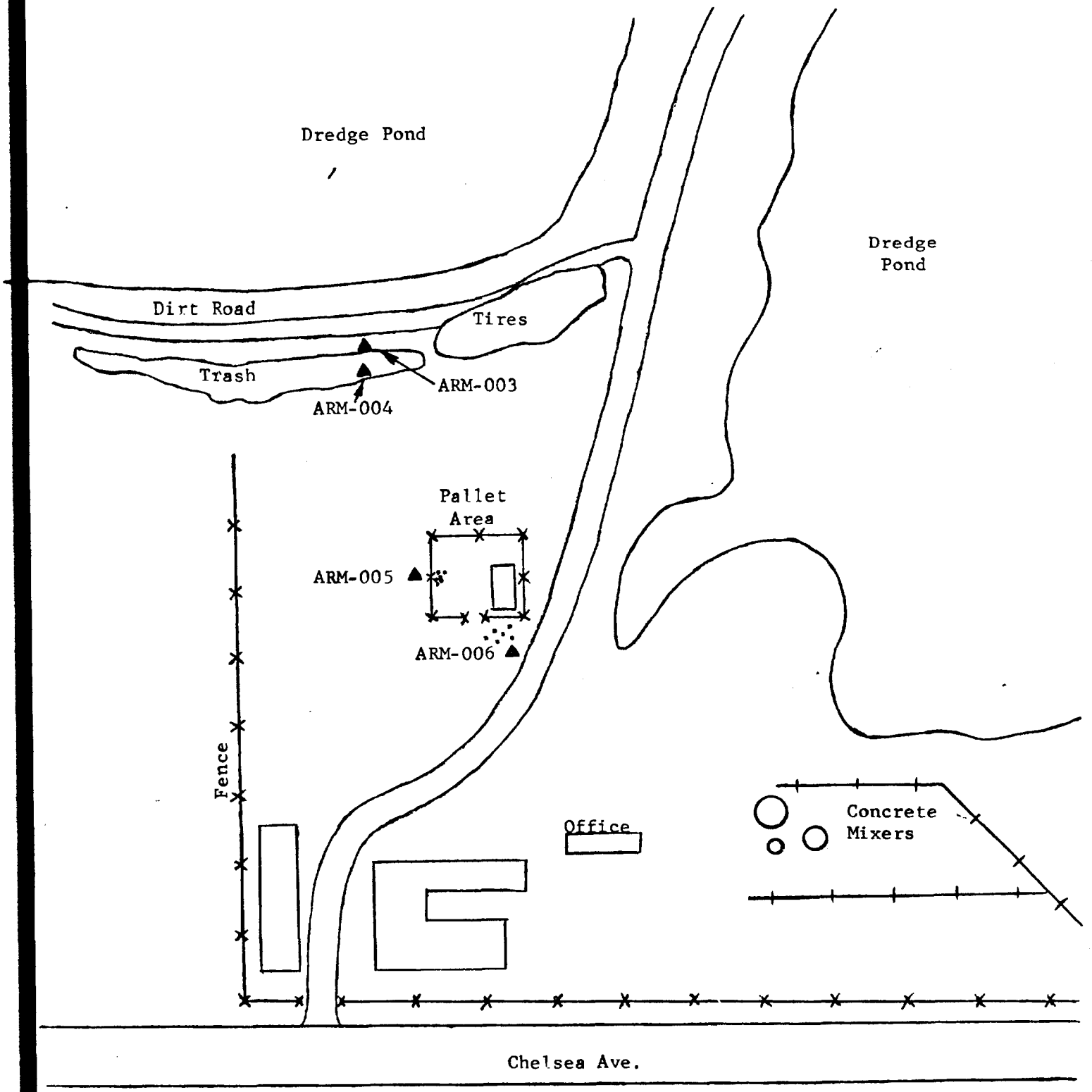


FIGURE 2
SCHEMATIC DIAGRAM
ALLEN READY-MIX CONCRETE CO.
MEMPHIS, TN



APPENDIX A

Analytical Data Sheets and Field Sheets

DATE: 03/23/81 [redacted] ATHENS, GA

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy Jr. COMPLETED 4-8-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	5U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	5U	UG/KG	*			UG/KG
DICHLORODIFLOUROMETHANE	34334	5U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	5U	UG/KG	*			UG/KG
CHLOROETHANE	34314	5U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	5U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	5U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	5U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	5U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	5U	UG/KG	*			UG/KG
CHLOROFORM	34318	5U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	5U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	5U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	5U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	5U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	5U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	5U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	5U	UG/KG	*			UG/KG
BENZENE	34237	5U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	5U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	5U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	5U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	5U	UG/KG	*			UG/KG
BROMOFORM	34290	5U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	5U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	5U	UG/KG	*			UG/KG
TOLUENE	34483	5U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	5U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	5U	UG/KG	*			UG/KG
ACROLEIN	34213	100U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	100U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 5 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81 [redacted]

DATA REPORTING SHEET
WASTE

ATHENS, GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NK DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	.005U	MG/KG	*			MG/KG
METHYL BROMIDE	.005U	MG/KG	*			MG/KG
DICHLORODIFLOUROMETHANE	.005U	MG/KG	*			MG/KG
VINYL CHLORIDE	.005U	MG/KG	*			MG/KG
CHLOROETHANE	.005U	MG/KG	*			MG/KG
METHYLENE CHLORIDE	.005U	MG/KG	*			MG/KG
TRICHLOROFLUOROMETHANE	.005U	MG/KG	*			MG/KG
1,1-DICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
1,1-DICHLOROETHANE	.005U	MG/KG	*			MG/KG
1,2-TRANS-DICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
CHLOROFORM	.005U	MG/KG	*			MG/KG
1,2-DICHLOROETHANE	.005U	MG/KG	*			MG/KG
1,1,1-TRICHLOROETHANE	.005U	MG/KG	*			MG/KG
CARBON TETRACHLORIDE	.005U	MG/KG	*			MG/KG
DICHLOROBROMOMETHANE	.005U	MG/KG	*			MG/KG
1,2-DICHLOROPROPANE	.005U	MG/KG	*			MG/KG
TRANS-1,3-DICHLOROPROPENE	.005U	MG/KG	*			MG/KG
TRICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
BENZENE	.005U	MG/KG	*			MG/KG
CHLORODIBROMOMETHANE	.005U	MG/KG	*			MG/KG
1,1,2-TRICHLOROETHANE	.005U	MG/KG	*			MG/KG
CIS-1,3-DICHLOROPROPENE	.005U	MG/KG	*			MG/KG
2-CHLOROETHYL VINYL ETHER	.005U	MG/KG	*			MG/KG
BROMOFORM	.005U	MG/KG	*			MG/KG
1,1,2,2-TETRACHLOROETHANE	.005U	MG/KG	*			MG/KG
TETRACHLOROETHYLENE	.005U	MG/KG	*			MG/KG
TOLUENE	.005U	MG/KG	*			MG/KG
CHLOROBENZENE	.005U	MG/KG	*			MG/KG
ETHYLBENZENE	.005U	MG/KG	*			MG/KG
ACROLEIN	.100U	MG/KG	*			MG/KG
ACRYLONITRILE	.100U	MG/KG	*			MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF .005 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED.
THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81 [redacted] ATHENS,GA

DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RINGSLINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 4-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	7U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	7U	UG/KG	*			UG/KG
DICHLORODIFLOUROMETHANE	34334	7U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	7U	UG/KG	*			UG/KG
CHLOROETHANE	34314	7U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	7U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	7U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	7U	UG/KG	*			UG/KG
CHLOROFORM	34318	7U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	7U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	7U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	7U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	7U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	7U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	7U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	7U	UG/KG	*			UG/KG
BENZENE	34237	7U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	7U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	7U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	7U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	7U	UG/KG	*			UG/KG
BROMOFORM	34290	7U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	7U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	7U	UG/KG	*			UG/KG
TOLUENE	34483	7U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	7U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	7U	UG/KG	*			UG/KG
ACROLEIN	34213	140U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	140U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 7 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81

PURGEABLE ORGANICS ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	7U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	7U	UG/KG	*			UG/KG
DICHLORODIFLUOROMETHANE	34334	7U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	7U	UG/KG	*			UG/KG
CHLOROETHANE	34314	7U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	7U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	7U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	7U	UG/KG	*			UG/KG
CHLOROFORM	34318	7U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	7U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	7U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	7U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	7U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	7U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	7U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	7U	UG/KG	*			UG/KG
BENZENE	34237	7U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	7U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	7U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	7U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	7U	UG/KG	*			UG/KG
BROMOFORM	34290	7U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	7U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	7U	UG/KG	*			UG/KG
TOLUENE	34483	7U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	7U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	7U	UG/KG	*			UG/KG
ACROLEIN	34213	140U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	140U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 7U ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS ATHENS,GA

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RINGS&LINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4000U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4000K	UG/KG
1,2-DICHLOROBENZENE	34539	4000U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4000K	UG/KG
1,3-DICHLOROBENZENE	34569	4000U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4000U	UG/KG
1,4-DICHLOROBENZENE	34574	4000U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4000U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4000U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4000U	UG/KG
HEXACHLOROETHANE	34399	4000U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4000U	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4000U	UG/KG	*	BENZO-A-PYRENE	34250	4000U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4000U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4000U	UG/KG
NITROBENZENE	34450	4000U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4000U	UG/KG
HEXACHLOROBUTADIENE	39705	4000U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4000U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4000U	UG/KG	*	2-CHLOROPHENOL	34589	5000U	UG/KG
NAPHTHALENE	34445	4000U	UG/KG	*	2-NITROPHENOL	34594	5000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4000U	UG/KG	*	PHENOL (GC/MS)	34695	5000U	UG/KG
ISOPHORONE	34411	4000U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	5000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	5000U	UG/KG
2-CHLORONAPHTHALENE	34584	4000U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	5000U	UG/KG
ACENAPHTHYLENE	34203	4000U	UG/KG	*	PARACHLOROMETA CRESOL	34455	5000U	UG/KG
ACENAPHTHENE	34209	4000U	UG/KG	*	2,4-DINITROPHENOL	34619	25000U	UG/KG
DIMETHYL PHTHALATE	34344	4000U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	15000U	UG/KG
2,4-DINITROTOLUENE	34614	4000U	UG/KG	*	PENTACHLOROPHENOL	39061	15000U	UG/KG
2,6-DINITROTOLUENE	34829	4000U	UG/KG	*	4-NITROPHENOL	34649	5000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4000U	UG/KG	*	methyl ester of methyl pentadecanoic acid		5000KN	UG/KG
FLUORENE	34384	4000U	UG/KG	*				UG/KG
DIETHYL PHTHALATE	34339	4000U	UG/KG	*				UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4000U	UG/KG	*				UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4000U	UG/KG	*				UG/KG
HEXACHLOROBENZENE	39701	6.1	UG/KG	*				UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4000U	UG/KG	*				UG/KG
PHENANTHRENE 10/	34464	4000K	UG/KG	*				UG/KG
ANTHRACENE 10/	34223	4000K	UG/KG	*				UG/KG
DI-N-BUTYL PHTHALATE	39112	4000U	UG/KG	*				UG/KG
FLUORANTHENE	34379	4000K	UG/KG	*				UG/KG
PYRENE	34472	4000K	UG/KG	*				UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4000U	UG/KG	*				UG/KG
BENZIDINE	39121	4000U	UG/KG	*				UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 25,000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS
SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4000U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4000K	UG/KG
1,2-DICHLOROBENZENE	34539	4000U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4000K	UG/KG
1,3-DICHLOROBENZENE	34569	4000U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4000U	UG/KG
1,4-DICHLOROBENZENE	34574	4000U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4000U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4000U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4000K	UG/KG
HEXACHLOROETHANE	34399	4000U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4000K	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4000U	UG/KG	*	BENZO-A-PYRENE	34250	4000U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4000U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4000U	UG/KG
NITROBENZENE	34450	4000U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4000U	UG/KG
HEXACHLOROBUTADIENE	39705	4000U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4000U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4000U	UG/KG	*	2-CHLOROPHENOL	34589	1000U	UG/KG
NAPHTHALENE	34445	4000K	UG/KG	*	2-NITROPHENOL	34594	1000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4000U	UG/KG	*	PHENOL (GC/MS)	34695	1000U	UG/KG
ISOPHORONE	34411	4000U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	1000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	1000U	UG/KG
2-CHLORONAPHTHALENE	34584	4000U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	1000U	UG/KG
ACENAPHTHYLENE	34203	4000K	UG/KG	*	PARACHLOROMETA CRESOL	34455	1000U	UG/KG
ACENAPHTHENE	34209	4000U	UG/KG	*	2,4-DINITROPHENOL	34619	1800U	UG/KG
DIMETHYL PHTHALATE	34344	4000U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	1000U	UG/KG
2,4-DINITROTOLUENE	34614	4000U	UG/KG	*	PENTACHLOROPHENOL	39061	1000U	UG/KG
2,6-DINITROTOLUENE	34629	4000U	UG/KG	*	4-NITROPHENOL	34649	1000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4000U	UG/KG	*	hexanoic acid (2 isomers)		1000KN	UG/KG
FLUORENE	34384	4000K	UG/KG	*	octanoic acid		1000KN	UG/KG
DIETHYL PHTHALATE	34339	4000U	UG/KG	*	nonanoic acid		1000KN	UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4000U	UG/KG	*	decanoic acid		1000KN	UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4000U	UG/KG	*	phthalic acid		1000KN	UG/KG
HEXACHLOROBENZENE	39701	4U	UG/KG	*	benzene propanoic acid		1000KN	UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4000U	UG/KG	*	methyl ester of hydroxybenzoic acid		1000KN	UG/KG
PHENANTHRENE 10/	34464	4000K	UG/KG	*	undecanoic acid (2 isomers)		1000KN	UG/KG
ANTHRACENE 10/	34223	4000K	UG/KG	*	tridecanoic acid		1000KN	UG/KG
DI-N-BUTYL PHTHALATE	39112	4000U	UG/KG	*	tetradecanoic acid		1000KN	UG/KG
FLUORANTHENE	34379	4000K	UG/KG	*	pentadecanoic acid		1000KN	UG/KG
PYRENE	34472	4000K	UG/KG	*	hexadecanoic acid		1000KN	UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4000U	UG/KG	*	methyl ester of hydroxyphenyl propenoic acid		1000KN	UG/KG
BENZIDINE	39121	4000U	UG/KG	*	dodecanoic acid (2 isomers)		1700JN	UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
methyl ester of methyl pentadecanoic acid	1000KN	UG/KG
methyl ester of octadecenoic acid	1000KN	UG/KG
methyl ester of dodecanoic acid	1000KN	UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
THE CHROMATOGRAM INDICATES THE PRESENCE		UG/KG
OF A PETROLEUM TYPE PRODUCT.		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4600U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4600K	UG/KG
1,2-DICHLOROBENZENE	34539	4600U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4600K	UG/KG
1,3-DICHLOROBENZENE	34569	4600U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4600U	UG/KG
1,4-DICHLOROBENZENE	34574	4600U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4600U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4600U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4600U	UG/KG
HEXACHLOROETHANE	34399	4600U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4600U	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4600U	UG/KG	*	BENZO-A-PYRENE	34250	4600U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4600U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4600U	UG/KG
NITROBENZENE	34450	4600U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4600U	UG/KG
HEXACHLOROBUTADIENE	39705	4600U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4600U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4600U	UG/KG	*	2-CHLOROPHENOL	34589	1000U	UG/KG
NAPHTHALENE	34445	4600U	UG/KG	*	2-NITROPHENOL	34594	1000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4600U	UG/KG	*	PHENOL (GC/MS)	34695	1000U	UG/KG
ISOPHORONE	34411	4600U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	1000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	1000U	UG/KG
2-CHLORONAPHTHALENE	34584	4600U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	1000U	UG/KG
ACENAPHTHYLENE	34203	4600U	UG/KG	*	PARACHLOROMETA CRESOL	34455	1000U	UG/KG
ACENAPHTHENE	34209	4600U	UG/KG	*	2,4-DINITROPHENOL	34619	2200U	UG/KG
DIMETHYL PHTHALATE	34344	4600U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	1300U	UG/KG
2,4-DINITROTOLUENE	34614	4600U	UG/KG	*	PENTACHLOROPHENOL	39061	1300U	UG/KG
2,6-DINITROTOLUENE	34629	4600U	UG/KG	*	4-NITROPHENOL	34649	1000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4600U	UG/KG	*	butanoic acid		1000K	UG/KG
FLUORENE	34384	4600U	UG/KG	*	hexanoic acid		1000K	UG/KG
DIETHYL PHTHALATE	34339	4600U	UG/KG	*	octanoic acid		1000K	UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4600U	UG/KG	*	nonanoic acid		1000K	UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4600U	UG/KG	*	decanoic acid		1000K	UG/KG
HEXACHLOROBENZENE	39701	6U	UG/KG	*	hydroxymethoxy benzaldehyde		1000K	UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4600U	UG/KG	*	undecanoic acid		1000K	UG/KG
PHENANTHRENE 10/	34464	4600K	UG/KG	*	dodecanoic acid		1000K	UG/KG
ANTHRACENE 10/	34223	4600K	UG/KG	*	tridecanoic acid		1000K	UG/KG
DI-N-BUTYL PHTHALATE	39112	4600U	UG/KG	*	tetradecanoic acid		1600JN	UG/KG
FLUORANTHENE	34379	4600K	UG/KG	*	methyl ester of tetradecanoic acid		1000KN	UG/KG
PYRENE	34472	4600K	UG/KG	*	pentadecanoic acid		1600JN	UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4600U	UG/KG	*	methyl ester of hexadecenoic acid(2 isomers)		2600JN	UG/KG
BENZIDINE	39121	4600U	UG/KG	*	methyl ester of methyl pentadecanoic acid		1300JN	UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4600 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

[redacted]

ATHENS,GA

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

	COMPOUND	STORET#	UNITS
*	hexadecenoic acid	14000JN	UG/KG
*	hexadecanoic acid	9500JN	UG/KG
*	methyl ester of octadecadienoic	1000KN	UG/KG
*	octadecenoic acid	10000JN	UG/KG
*	octadecanoic acid	1000KN	UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
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*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG
*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4600 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 [redacted] ORGANIC ANALYSIS [redacted]

[redacted] WASTE DRY WEIGHT BASIS [redacted]

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1420

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
BIS(CHLOROMETHYL) ETHER	NA	MG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	3.2U	MG/KG
N-NITROSODIMETHYLAMINE	NA	MG/KG	*	CHRYSENE 11/	3.2U	MG/KG
1,2-DICHLOROBENZENE	3.2U	MG/KG	*	BENZO(A)ANTHRACENE 11/	3.2U	MG/KG
1,3-DICHLOROBENZENE	3.2U	MG/KG	*	3,3'-DICHLOROBENZIDINE	3.2U	MG/KG
1,4-DICHLOROBENZENE	3.2U	MG/KG	*	DI-N-OCTYL PHTHALATE	3.2U	MG/KG
BIS(2-CHLOROETHYL) ETHER	3.2U	MG/KG	*	BENZO(B)FLUORANTHENE 12/	3.2U	MG/KG
HEXACHLOROETHANE	3.2U	MG/KG	*	BENZO(K)FLUORANTHENE 12/	3.2U	MG/KG
BIS(2-CHLOROISOPROPYL) ETHER	3.2U	MG/KG	*	BENZO-A-PYRENE	3.2U	MG/KG
N-NITROSODI-N-PROPYLAMINE	3.2U	MG/KG	*	INDENO (1,2,3-CD) PYRENE	3.2U	MG/KG
NITROBENZENE	3.2U	MG/KG	*	1,2,5,6-DIBENZANTHRACENE	3.2U	MG/KG
HEXACHLOROBUTADIENE	3.2U	MG/KG	*	BENZO(GHI)PERYLENE	3.2U	MG/KG
1,2,4-TRICHLOROBENZENE	3.2U	MG/KG	*	2-CHLOROPHENOL	1U	MG/KG
NAPHTHALENE	3.2U	MG/KG	*	2-NITROPHENOL	1U	MG/KG
BIS(2-CHLOROETHOXY) METHANE	3.2U	MG/KG	*	PHENOL (GC/MS)	1K	MG/KG
ISOPHORONE	3.2U	MG/KG	*	2,4-DIMETHYLPHENOL	1K	MG/KG
HEXACHLOROCYCLOPENTADIENE	2U	MG/KG	*	2,4-DICHLOROPHENOL	1U	MG/KG
2-CHLORONAPHTHALENE	3.2U	MG/KG	*	2,4,6-TRICHLOROPHENOL	1U	MG/KG
ACENAPHTHYLENE	3.2U	MG/KG	*	PARACHLOROMETA CRESOL	1U	MG/KG
ACENAPHTHENE	3.2U	MG/KG	*	2,4-DINITROPHENOL	2U	MG/KG
DIMETHYL PHTHALATE	3.2U	MG/KG	*	4,6-DINITRO-O-CRESOL	1U	MG/KG
2,4-DINITROTOLUENE	3.2U	MG/KG	*	PENTACHLOROPHENOL	1U	MG/KG
2,6-DINITROTOLUENE	3.2U	MG/KG	*	4-NITROPHENOL	1U	MG/KG
4-CHLOROPHENYL PHENYL ETHER	3.2U	MG/KG	*	hydroxybenzaldehyde	4.5JN	MG/KG
FLUORENE	3.2U	MG/KG	*	methyl ester of hydroxybenzoic acid	1.0JN	MG/KG
DIETHYL PHTHALATE	3.2U	MG/KG	*	methoxy benzenemethanol	1.5JN	MG/KG
1,2-DIPHENYLHYDRAZINE 8/	3.2U	MG/KG	*	hydroxybenzene methanol	2.5JN	MG/KG
N-NITROSODIPHENYLAMINE 9/	3.2U	MG/KG	*	phthalic acid	1.0KN	MG/KG
HEXACHLOROBENZENE	4U	MG/KG	*	benzodioxolecarboxaldehyde	1.0KN	MG/KG
4-BROMOPHENYL PHENYL ETHER	3.2U	MG/KG	*	decanoic acid	1.8JN	MG/KG
PHENANTHRENE 10/	3.2K	MG/KG	*	dodecanoic acid (2 isomers)	1.6JN	MG/KG
ANTHRACENE 10/	3.2K	MG/KG	*	tetradecanoic acid	5.4JN	MG/KG
DI-N-BUTYL PHTHALATE	3.2U	MG/KG	*	pentadecanoic acid	1.0KN	MG/KG
FLUORANTHENE	3.2U	MG/KG	*	hexadecanoic acid (2 isomers)	26JN	MG/KG
PYRENE	3.2U	MG/KG	*	methylene bisphenol (3 isomers)	38JN	MG/KG
N-BUTYL BENZYL PHTHALATE	3.2U	MG/KG	*	heptadecenoic acid	1.0JN	MG/KG
BENZIDINE	3.2U	MG/KG	*			MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 3.2 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 ESTIMATABLE ORGANIC ANALYSIS ATHENS,GA

WASTE

DRY WEIGHT BASIS

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NK DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
bis(hydroxyphenyl)methanone	1.0KN	MG/KG
octadecanoic acid	67JN	MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
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		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 3.2 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS ATHENS,GA

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#	UNITS	
ALDRIN	2U	MG/KG	*
DIELDRIN	5U	MG/KG	*
CHLORDANE (TECH. MIXTURE & METABOLITES)	10/	MG/KG	*
P,P'-DDT	6U	MG/KG	*
P,P'-DDE	6U	MG/KG	*
P,P'-DDD	6U	MG/KG	*
ENDOSULFAN,ALPHA	5U	MG/KG	*
ENDOSULFAN,BETA	9U	MG/KG	*
ENDOSULFAN SULFATE	9U	MG/KG	*
ENDRIN	7U	MG/KG	*
ENDRIN ALDEHYDE	NA	MG/KG	*
HEPTACHLOR	2U	MG/KG	*
HEPTACHLOR EPOXIDE	2U	MG/KG	*
ALPHA-BHC	2U	MG/KG	*
BETA-BHC	2U	MG/KG	*
GAMMA-BHC (LINDANE)	2U	MG/KG	*
DELTA-BHC	2U	MG/KG	*
PCB-1242 (AROCLOR 1242)	10U	MG/KG	*
PCB-1254 (AROCLOR 1254)	60U	MG/KG	*
PCB-1221 (AROCLOR 1221)	10U	MG/KG	*
PCB-1232 (AROCLOR 1232)	10U	MG/KG	*
PCB-1248 (AROCLOR 1248)	10U	MG/KG	*
PCB-1260 (AROCLOR 1260)	60U	MG/KG	*
PCB-1016 (AROCLOR 1016)	10U	MG/KG	*
TOXAPHENE	60U	MG/KG	*
TCDD (DIOXIN)	NA	MG/KG	*

COMPOUND	STORET#	UNITS
hexachloronorbornadiene	2U	MG/KG
		MG/KG
octachlorocyclopentene	2U	MG/KG
		MG/KG
heptachloronorbornene	4U	MG/KG
1-hydroxychlordene	4U	MG/KG
alpha-chlordane 11/	4U	MG/KG
gamma-chlordane 11/	4U	MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
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		MG/KG
		MG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
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4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81

PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS

SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
ALDRIN	39333	9U	UG/KG	*	hexachloronorbornadiene		3U	UG/KG
DIELDRIN	39383	7U	UG/KG	*	octachlorocyclopentene		3U	UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*				UG/KG
P,P'-DDT	39301	20U	UG/KG	*				UG/KG
P,P'-DDE	39321	20U	UG/KG	*	heptachloronorbornene		6U	UG/KG
P,P'-DDD	39311	20U	UG/KG	*	gamma-chlordane 8/ 11/		31	UG/KG
ENDOSULFAN,ALPHA	34364	7U	UG/KG	*	alpha chlordane 8/ 11/		26	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	1-hydroxychlordene		4U	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*				UG/KG
ENDRIN	39393	10U	UG/KG	*				UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*				UG/KG
HEPTACHLOR	39413	9U	UG/KG	*				UG/KG
HEPTACHLOR EPOXIDE	39423	9U	UG/KG	*				UG/KG
ALPHA-BHC	39076	9U	UG/KG	*				UG/KG
BETA-BHC	34257	9U	UG/KG	*				UG/KG
GAMMA-BHC (LINDANE)	39343	9U	UG/KG	*				UG/KG
DELTA-BHC	34262	9U	UG/KG	*				UG/KG
PCB-1242 (AROCLOR 1242)	39499	30U	UG/KG	*				UG/KG
PCB-1254 (AROCLOR 1254)	39507	200U	UG/KG	*				UG/KG
PCB-1221 (AROCLOR 1221)	39491	30U	UG/KG	*				UG/KG
PCB-1232 (AROCLOR 1232)	39495	30U	UG/KG	*				UG/KG
PCB-1248 (AROCLOR 1248)	39503	30U	UG/KG	*				UG/KG
PCB-1260 (AROCLOR 1260)	39511	200U	UG/KG	*				UG/KG
PCB-1016 (AROCLOR 1016)	39514	30U	UG/KG	*				UG/KG
TOXAPHENE	39403	200U	UG/KG	*				UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*				UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81

PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS

SEDIMENT/SOIL/SLUDGE (DRY WT)

ATHENS, GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS	
ALDRIN	39333	4U	UG/KG	*
DIELDRIN	39383	4U	UG/KG	*
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*
P,P'-DDT	39301	10U	UG/KG	*
P,P'-DDE	39321	10U	UG/KG	*
P,P'-DDD	39311	10U	UG/KG	*
ENDOSULFAN,ALPHA	34364	7U	UG/KG	*
ENDOSULFAN,BETA	34359	10U	UG/KG	*
ENDOSULFAN SULFATE	34354	10U	UG/KG	*
ENDRIN	39393	8U	UG/KG	*
ENDRIN ALDEHYDE	34369	NA	UG/KG	*
HEPTACHLOR 8/ 11/	39413	2.5	UG/KG	*
HEPTACHLOR EPOXIDE	39423	5U	UG/KG	*
ALPHA-BHC	39076	5U	UG/KG	*
BETA-BHC	34257	5U	UG/KG	*
GAMMA-BHC (LINDANE)	39343	5U	UG/KG	*
DELTA-BHC	34262	5U	UG/KG	*
PCB-1242 (AROCLOR 1242)	39499	30U	UG/KG	*
PCB-1254 (AROCLOR 1254)	39507	100U	UG/KG	*
PCB-1221 (AROCLOR 1221)	39491	30U	UG/KG	*
PCB-1232 (AROCLOR 1232)	39495	30U	UG/KG	*
PCB-1248 (AROCLOR 1248)	39503	30U	UG/KG	*
PCB-1260 (AROCLOR 1260)	39511	100U	UG/KG	*
PCB-1016 (AROCLOR 1016)	39514	30U	UG/KG	*
TOXAPHENE	39403	100U	UG/KG	*
TCDD (DIOXIN)	34678	NA	UG/KG	*

COMPOUND	STORET#		UNITS
heptachloronorbornene 8/		2.1	UG/KG
hexachloronorbornadiene		10U	UG/KG
			UG/KG
			UG/KG
octachlorocyclopentene		4U	UG/KG
gamma-chlordane 8/ 11/		9.8	UG/KG
1-hydroxychlordene		2U	UG/KG
alpha-chlordane 8/ 11/		7.2	UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG
			UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81 PESTICIDES/PCB'S AND OTHER CHLORINATED COUMPOUNDS EPA-SAD,RGN IV

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
ALDRIN	39333	4U	UG/KG	*	heptachloronorbornene 8/	7.4	UG/KG
DIELDRIN 8/	39383	45	UG/KG	*			UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*	octachlorocyclopentene	3U	UG/KG
P,P'-DDT 8/	39301	27	UG/KG	*			UG/KG
P,P'-DDE 8/	39321	15	UG/KG	*	hexachloronorbornadiene	3U	UG/KG
P,P'-DDD 8/	39311	20	UG/KG	*	gamma chlordane 8/ 11/	50	UG/KG
ENDOSULFAN,ALPHA	34364	6U	UG/KG	*	alpha chlordane 11/	10U	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	1-hydroxychlordene	4U	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*			UG/KG
ENDRIN 8/	39393	19	UG/KG	*			UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*			UG/KG
HEPTACHLOR 8/ 11/	39413	3.9	UG/KG	*			UG/KG
HEPTACHLOR EPOXIDE	39423	4U	UG/KG	*			UG/KG
ALPHA-BHC	39076	4U	UG/KG	*			UG/KG
BETA-BHC	34257	4U	UG/KG	*			UG/KG
GAMMA-BHC (LINDANE)	39343	4U	UG/KG	*			UG/KG
DELTA-BHC	34262	4U	UG/KG	*			UG/KG
PCB-1242 (AROCLOR 1242)	39499	70U	UG/KG	*			UG/KG
PCB-1254 (AROCLOR 1254)	39507	80U	UG/KG	*			UG/KG
PCB-1221 (AROCLOR 1221)	39491	70U	UG/KG	*			UG/KG
PCB-1232 (AROCLOR 1232)	39495	70U	UG/KG	*			UG/KG
PCB-1248 (AROCLOR 1248)	39503	70U	UG/KG	*			UG/KG
PCB-1260 (AROCLOR 1260)	39511	80U	UG/KG	*			UG/KG
PCB-1016 (AROCLOR 1016)	39514	70U	UG/KG	*			UG/KG
TOXAPHENE	39403	80U	UG/KG	*			UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*			UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81

METALS

SAMPLE REPORTING SHEET

SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	4K	MG/KG
ARSENIC	AS	01003	---	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	132	MG/KG
BERYLLIUM	BE	01013	4K	MG/KG
CADMIUM	CD	01028	4K	MG/KG
COBALT	CO	01038	13	MG/KG
CHROMIUM	CR	01029	28	MG/KG
COPPER	CU	01043	16	MG/KG
MOLYBDENUM	MO	01063	8K	MG/KG
NICKEL	NI	01068	18	MG/KG
LEAD	PB	01052	48	MG/KG
ANTIMONY	SB	01098	16K	MG/KG
SELENIUM	SE	01148	16K	MG/KG
TIN	SN	01103	40K	MG/KG
STRONTIUM	SR	01083	40	MG/KG
TELLURIUM	TE	45513	16K	MG/KG
TITANIUM	TI	01153	592	MG/KG
THALLIUM	TL	34480	40K	MG/KG
VANADIUM	V	01088	46	MG/KG
YTTRIUM	Y	45514	12	MG/KG
ZINC	ZN	01093	120	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.05K	MG/KG
ALUMINUM	AL	01108	21700	MG/KG
MANGANESE	MN	01053	475	MG/KG
CALCIUM	CA	00917	12500	MG/KG
MAGNESIUM	MG	00924	3780	MG/KG
IRON	FE	01170	23500	MG/KG
SODIUM	NA	00934	400K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		23	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81 METALS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	4K	MG/KG
ARSENIC	AS	01003	27	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	410	MG/KG
BERYLLIUM	BE	01013	4K	MG/KG
CADMIUM	CD	01028	4K	MG/KG
COBALT	CO	01038	8K	MG/KG
CHROMIUM	CR	01029	23	MG/KG
COPPER	CU	01043	38	MG/KG
MOLYBDENUM	MO	01063	8K	MG/KG
NICKEL	NI	01068	18	MG/KG
LEAD	PB	01052	95	MG/KG
ANTIMONY	SB	01098	16K	MG/KG
SELENIUM	SE	01148	16K	MG/KG
TIN	SN	01103	40K	MG/KG
STRONTIUM	SR	01083	69	MG/KG
TELLURIUM	TE	45513	16K	MG/KG
TITANIUM	TI	01153	455	MG/KG
THALLIUM	TL	34480	40K	MG/KG
VANADIUM	V	01088	44	MG/KG
YTTRIUM	Y	45514	10	MG/KG
ZINC	ZN	01093	214	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.13	MG/KG
ALUMINUM	AL	01108	17500	MG/KG
MANGANESE	MN	01053	510	MG/KG
CALCIUM	CA	00917	26500	MG/KG
MAGNESIUM	MG	00924	4200	MG/KG
IRON	FE	01170	22600	MG/KG
SODIUM	NA	00934	400K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		29	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81

METALS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1415

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	8K	MG/KG
ARSENIC	AS	01003	61	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	287	MG/KG
BERYLLIUM	BE	01013	8K	MG/KG
CADMIUM	CD	01028	8K	MG/KG
COBALT	CO	01038	16K	MG/KG
CHROMIUM	CR	01029	42	MG/KG
COPPER	CU	01043	56	MG/KG
MOLYBDENUM	MO	01063	16K	MG/KG
NICKEL	NI	01068	32	MG/KG
LEAD	PB	01052	68	MG/KG
ANTIMONY	SB	01098	32K	MG/KG
SELENIUM	SE	01148	32K	MG/KG
TIN	SN	01103	80K	MG/KG
STRONTIUM	SR	01083	27	MG/KG
TELLURIUM	TE	45513	32K	MG/KG
TITANIUM	TI	01153	462	MG/KG
THALLIUM	TL	34480	80K	MG/KG
VANADIUM	V	01088	75	MG/KG
YTTRIUM	Y	45514	18	MG/KG
ZINC	ZN	01093	187	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.14	MG/KG
ALUMINUM	AL	01108	38000	MG/KG
MANGANESE	MN	01053	800	MG/KG
CALCIUM	CA	00917	2600	MG/KG
MAGNESIUM	MG	00924	4060	MG/KG
IRON	FE	01170	51600	MG/KG
SODIUM	NA	00934	800K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		27	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81 METALS ATHENS,GA

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1420

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 5-7-81

ELEMENT	STORET#		UNITS
SILVER	AG	1K	MG/KG
ARSENIC	AS	5K	MG/KG
BORON	B	---	MG/KG
BARIUM	BA	4	MG/KG
BERYLLIUM	BE	1K	MG/KG
CADMIUM	CD	1K	MG/KG
COBALT	CO	2K	MG/KG
CHROMIUM	CR	4	MG/KG
COPPER	CU	78	MG/KG
MOLYBDENUM	MO	2K	MG/KG
NICKEL	NI	4K	MG/KG
LEAD	PB	4K	MG/KG
ANTIMONY	SB	3K	MG/KG
SELENIUM	SE	4K	MG/KG
TIN	SN	10K	MG/KG
STRONTIUM	SR	1K	MG/KG
TELLURIUM	TE	4K	MG/KG
TITANIUM	TI	18	MG/KG
THALLIUM	TL	10K	MG/KG
VANADIUM	V	2	MG/KG
YTTRIUM	Y	1K	MG/KG
ZINC	ZN	16	MG/KG
ZIRCONIUM	ZR	---	MG/KG
MERCURY	HG	0.1K	MG/KG
ALUMINUM	AL	4200	MG/KG
MANGANESE	MN	25	MG/KG
CALCIUM	CA	120	MG/KG
MAGNESIUM	MG	50	MG/KG
IRON	FE	690	MG/KG
SODIUM	NA	100K	MG/KG
CYANIDE	CN		MG/KG
ASBESTOS	ASSB		MG/KG
% Moisture		2	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE: 03/23/81

[redacted]

LABORATORY SERVICES BRANCH
DATA REPORTING SHEET
81C1031 - 81C1034
PROJECT # 81-74 ***PROG ELEMENT # HWSR

SOURCE: ALLEN READY MIX

SAMPLE RECEIVED DATE & TIME: 03/20/81 730

CITY : MEMPHIS STATE: TN

CHEMIST:

COMPLETED: 5/19/81

SAD NO.	STATION	DATE & TIME SAMPLED	SAMPLE TYPE	ANALYSES TO BE RUN					
81C1031	ARM-005 W SIDE OF FENCE I N PALLET AREA DOWNGRADE	03/17/81- 1440- 00/00/00 0	SOIL	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: 0.2K	: :
				:	:	:	:	:	: :
				:	:	:	:	:	: :
81C1032	ARM-004 RESIDUAL FROM FIB ER OR DRUM NR DREDGE POND	03/17/81- 1420- 00/00/00 0	CHWAS	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: .2K	: :
				:	:	:	:	:	: :
				:	:	:	:	:	: :
81C1033	ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND	03/17/81- 1415- 00/00/00 0	SOIL	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: 0.41	: :
				:	:	:	:	:	: :
				:	:	:	:	:	: :
81C1034	ARM-006 DOWNGRADE FROM DR UMS @ NE CORNER OF PALLET	03/17/81- 1455- 00/00/00 0	SOIL	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: 0.35	: :
				:	:	:	:	:	: :
				:	:	:	:	:	: :

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-005
DDRESS Chelsea Ave Memphis TN	SAMPLING LOCATION West side of fence in pallet area down grade from drums
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

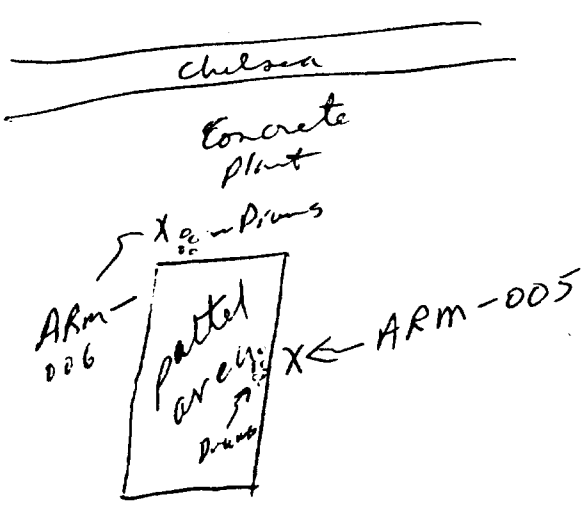
	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
AD NO.	81C	1031				BACTERIAL	0
ATE	/					BOD, COD, TOC	1
IME	/	3/17/81				CYANIDE	2
LOW ( ) L1		1440				METALS, Hg	3
EMPERATURE °C						N, P	4
H						ORG, O&G, PEST	5
OT. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
AMPLE CODE		2,3,5,8					9
AMPLED BY (Sig)		[signature]					A
EALED BY (Sig)		[signature]					B
ATE AND TIME		3/17/81	1500			PRESERVED	P

L1 Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES



1 qt soil

1 pt soil

★ G P O 1980 – 640-188 / 1988, REGION NO. 4

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-006
DDRESS Chelsea Ave Memphis TN	SAMPLING LOCATION Soil down grade from drums at SE ~~NE~~ corner of pallet area.
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
AD NO. 81C		1034				BACTERIAL	0
ATE	1	3/17/81				BOD. COD. TOC	1
IME	1	14 55				CYANIDE	2
LOW ( ) L1						METALS, Hg	3
EMPERATURE °C						N, P	4
H						ORG, O&G, PEST	5
OT. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
AMPLE CODE		2, 3, 5, 8					9
AMPLED BY (Sig)		[signature]					A
EALED BY (Sig)		[signature]					B
ATE AND TIME		3/17/81	1510			PRESERVED	P

L1 Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

SAMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES

See sketch ARM-005

1 qt soil
1 pt soil

GPO 1980-640-190 / 1988, REGION NO. 4

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

SCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-004
DDRESS Chelsea Ave Memphis	SAMPLING LOCATION Red sandy looking material - residual from fiber or plastic drum nr. dredge pond
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
AD NO.	81C	1032				BACTERIAL	0
TE	1	3/17/81				BOD, COD, TOC	1
ME	1	1420				CYANIDE	2
OW ( ) L1						METALS, Hg	3
MPERATURE °C						N, P	4
						ORG, O&G, PEST	5
T. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
MPLE CODE		2, 3, 5, 8					9
MPLED BY (Sig)		[signature]					A
ALED BY (Sig)		[signature]					B
TE AND TIME						PRESERVED	P

Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquett	3/20/81	0730	1		

REMARKS AND SKETCHES

1 - qt waste

See sketch

ARM-003

* G P O 1980 - 340-198 / 1988, REGION NO. 4

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER: Allen Ready Mix
DDRESS: Chelsea Ave, Memphis TN
ONTACT:

SAMPLING STATION NO. ARM-003
SAMPLING LOCATION: Soil sample down gradient from drum ring and liners nr. dredge pitch.

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ ____ ☐ ____ HR. COMP. AT ____ MIN. INTERVALS ☐ FLOW PRO.
AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE ____
LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ ____ EQUIP ____
COMPUTED FROM ____

SAMPLE COLLECTION

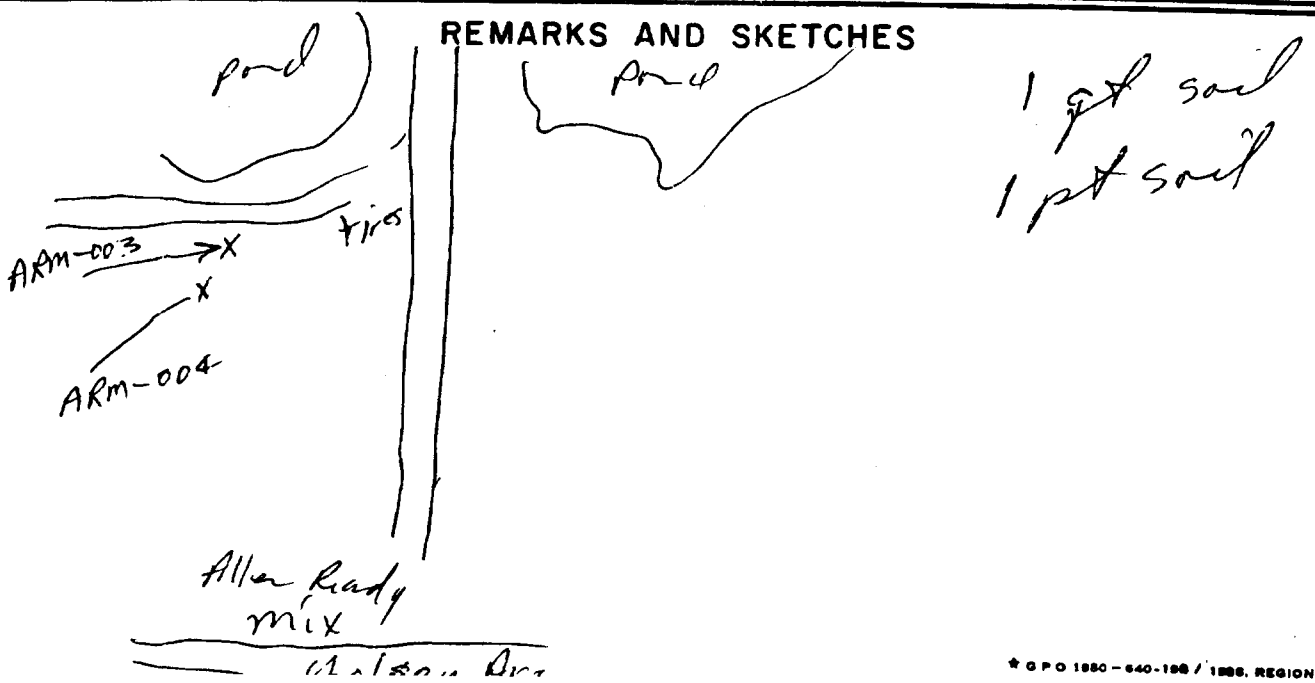
	COMPOSITE	GRAB SAMPLES				SAMPLE CODE [1]	
AD NO. 81c	2	1033				BACTERIAL	0
ATE	1	3/17/81				BOD, COD, TOC	1
IME	1	14-15				CYANIDE	2
LOW ( ) [1]						METALS, Hg	3
EMPERATURE °C						N, P	4
H						ORG, O&G, PEST	5
OT. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
AMPLE CODE		2,3,5,8					9
AMPLED BY (Sig)		[illegible]					A
EALED BY (Sig)		[illegible]					B
ATE AND TIME		3/17/81	1930			PRESERVED	P

[1] Use Avg. Flow for Composites and Inst. Flow for Grabs [2] Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES



U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV

RECEIPT FOR SAMPLES

The samples described below were collected in connection with the administration and enforcement of the:

(X) Resource Conservation and Recovery Act (RCRA) 42 U.S.C. §6901, et seq., specifically Section 3007 of RCRA, 42 U.S.C. §6927.

( ) Toxic Substances Control Act (TSCA) 15 U.S.C. §2601, et seq., specifically Section 11 of TSCA, 15 U.S.C. §2610.

R. J. Brunner III, USEPA/SAD, College Station Rd, Athens Ga
Inspector Name: Inspector Address:

Allen Ready Mix, 1572 Chelsea Ave, Memphis TN
Name of Firm: Firm Address:

Fred Richardson, Vice President - Manager
Firm Owner, Operator or Agent: Title:

SAMPLE NUMBER	COLLECTED DATE	COLLECTED TIME	SAMPLE TYPE WATER	SOIL	OTHER	DUPLICATE SAMPLES OFFERED	ACCEPTED	REJECTED	SAMPLE LOCATION ON-SITE	OFF-SITE
ARM-003	3/17/81	1415		X		X			X	
ARM-004	3/17/81	1420			Waste X	X			X	
ARM-005	3/17/81	1440		X		X			X	
ARM-006	3/17/81	1455		X		X			X	

Receipt for the sample(s) described above is hereby acknowledged:

[signature]
Signature of Inspector

Environmental Engineer
Title

Receipt/Rejection of Duplicate or Split Samples is hereby acknowledged:

Fred Richardson
Signature of Firm Owner, Operator or Agent

Mgr.
Title

ADDITIONAL COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE JUL 14 1981

SUBJECT Conclusions and Recommendations - Hazardous Waste Site Investigation - Allen Ready-Mix Concrete Company

FROM Environmental Engineer
Water Surveillance Branch

TO Jim Wilburn, Technical Manager
Memphis Study Project

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Company, Memphis, Tennessee on March 17, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. Three soil samples and one waste sample were collected during this investigation. Two of the soil samples were collected near drums stored at the pallet area west of the concrete mixers. The other soil sample was collected downgradient from some drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners.

The soil samples collected during this investigations contained low concentrations of polynuclear aromatic hydrocarbon, fatty acids, and pesticide related compound. The waste sample contained relatively low concentrations of fatty acid, alcohols, and aldehydes but did not contain detectable concentrations of pesticide related compounds.

No hazardous or toxic waste materials which would constitute a significant threat to health or the environment were detected in the soil or waste samples collected during this HWSI. The trash and old tires dumped along the dirt road near the dredge pond northwest of Allen Ready-Mix are typical of indiscriminate open dumping throughout the Memphis area. This type of dumping is a nuisance to area residents and businesses and creates a breeding ground for rats, mosquitoes, and other pests.

R. J. Bruner III, P.E.

cc: Finger/Adams/Carter/Lair

CONFIDENTIAL

This document is prepared in anticipation of enforcement litigation. It is not subject to discovery.

EPA Form 1320-6 (Rev. 3-76)

40

DATE: JUL 14 1981

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Report - Hazardous Waste Site Investigation - Allen Ready-Mix Concrete Company
Memphis, Tennessee

FROM: Director
Surveillance and Analysis Division

TO: Howard Zeller, Acting Director
Enforcement Division

Attached is a copy of the subject report. Copies of this report should be sent to the following individuals:

Mr. Fred Richardson, Manager
Allen Ready-Mix Concrete Company
1572 Chelsea Avenue
Memphis, Tennessee

Mr. Larry Ledford
Tennessee Division of Solid
Waste Management
814 Jefferson Avenue
Memphis, Tennessee

EPA/Region IV
Atlanta, GA
RECEIVED
JUL 20 1981
Compliance Branch

Billy H. Adamsoffer
James H. Finger

Attachment

cc: Wilburn
Smith/Stonebraker/Mathis
Hopkins
Newton/Turnipseed
Adams
Carroll/Bennett
Carter/Lair
Bruner

REPORT
HAZARDOUS WASTE SITE INVESTIGATION
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, TENNESSEE
JULY 10, 1981

INTRODUCTION

A hazardous waste site field investigation (HWSI) was conducted at the Allen Ready-Mix Concrete Co., Memphis, Tennessee on March 18, 1981 by Mr. R. J. Bruner III, U. S. Environmental Protection Agency (EPA), Region IV, Surveillance and Analysis Division (SAD) assisted by Mr. Neal Strickland, Ecology and Environment, Inc. A preliminary inspection of the Allen Ready-Mix Concrete Co., was conducted by Messrs. Richard Green and Andy Cromis, EPA, Enforcement Division, on May 7, 1980 (1). As a result of the preliminary inspection, a HWSI was requested for this site by Mr. Jim Wilburn, Technical Manager, Memphis Study Project.

STUDY AREA

The Allen Ready-Mix Concrete Co., is located at 1572 Chelsea Avenue (see figure 1). There are two large dredge ponds to the north of the company near the Wolf River. The area north of the company's property between the two ponds had been used extensively for disposal of concrete. Some trash and several old concrete mixer drums (truck mount type) had been disposed of in this area. Some crushed 55 gallon drums were also observed; these appeared to be discarded fuel and/or lubricant drums.

The area along the dirt road near the pond northwest of Allen Ready-Mix was strewn with trash (see figure 2). The remains of several fiber drums (drum rings, liners, etc) containing red sandy-looking material were observed in this area. There was also a large pile of tires near the southeast corner of the pond.

Several unlabeled 55 gallon drums were stored in a fenced area northwest of the concrete mixers (see figure 2). Additional drums were stored outside the fence near the southeast corner of the fenced area. This area was described by Mr. Fred Richardson, Manager, Allen Ready-Mix Concrete Co., as a pallet building and repair area which is no longer used. Mr. Richardson said that he did not know what was in the drums. The only other 55 gallon drums observed on the site were stored on a concrete pad and appeared to contain fuels and/or lubricants.

RESULTS AND DISCUSSION

Three soil samples and one waste sample were collected during the investigation at the Allen Ready-Mix Concrete Co. Two of the soil samples were collected near the drums stored at the pallet area. The other soil sample was collected downgradient from the drum rings and drum liners observed near the dredge pond northwest of Allen Ready-Mix. The waste sample consisted of the red sandy-looking material associated with the drum rings and liners (see table 1 and figure 2). A data summary is presented in table 2; complete analytical results are attached as appendix A.

The soil samples collected near the pallet area contained traces (less than quantifiable concentrations, see table 2) of several polynuclear aromatic hydrocarbons. A large number of organic acids (maximum concentration 14,000 ug/kg hexadecenoic acid), cyclodiene pesticide related materials (maximum concentration 31 ug/kg gamma chlordane), and a petroleum type product were also detected in these samples. Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis (2) (3).

The soil sample collected near the dredge pond (ARM-003) contained traces (<4,000 ug/kg) of several polynuclear aromatic hydrocarbons, a trace (<5,000 ug/kg) of a methyl ester of methyl pentadecanoic acid, and several pesticides related materials (maximum concentration 50 ug/kg gamma chlordane, see table 2). Metals concentrations did not differ significantly from soil concentrations detected in other areas of Memphis.

The sample of red sandy-looking material collected from the remains of the deteriorated fiber drums (ARM-004) contained several fatty acids (maximum concentration 67,000 ug/kg octadecanoic acid), alcohols (maximum concentration 38,000 ug/kg methylene bisphenol), and aldehydes (maximum concentration 4,500 ug/kg hydoxybenzaldehyde, see table 2). No pesticide related materials were detected in this sample. Metals concentrations were at or below the concentrations detected in the soil samples collected during this investigation.

REFERENCES

1) "Hazardous Waste Site Investigations - Memphis, Tennessee - First Phase;" U. S. Environmental Protection Agency, Region IV, Enforcement Division; June, 1980.

2) "Hazardous Waste Site Investigation - Memphis Drum Service - Memphis, Tennessee;" U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; March 10, 1981.

3) "Hazardous Waste Site Investigation - Frayser Pond Site - Memphis, Tennessee;" U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; September 17, 1980.

4) Water Surveillance Branch Standard Operating Procedures and Quality Assurance Manual (Draft); U. S. Environmental Protection Agency, Region IV, Surveillance and Analysis Division; August 29, 1980.

TABLE 1
SAMPLING LOCATIONS
ALLEN READY-MIX
MEMPHIS, TENNESSEE

Sample Number	Location
ARM-003	Soil downgradient from drum rings and liners near dredge pond.
ARM-004	Residual material from fiber or plastic drum near dredge pond.
ARM-005	Soil downgradient of drums stored along the west fence in the pallet area.
ARM-006	Soil downgradient of drums stored near the southeast corner of the pallet area.

TABLE 2
DATA SUMMARY
ALLEN READY-MIX CONCRETE COMPANY
MEMPHIS, TENNESSEE

	SOIL			WASTE
	ARM-005 West side pallet area	ARM-006 SE corner pallet area	ARM-003 North of drums near dredge pond	ARM-004 Residual from drums near dredge pond
EXTRACTABLE ORGANIC COMPOUNDS (GC/MS)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Naphthalene [1]	ND	<4,000	ND	ND
Acenaphthylene [1]	ND	<4,000	ND	ND
Flourene [1]	ND	<4,000	ND	ND
Phenanthrene and/or anthracene [1]	<4,600	<4,000	<4,000	<3,200
Fluoranthene [1]	<4,600	<4,000	<4,000	ND
Pyrene [1]	<4,600	<4,000	<4,000	ND
Chrysene and/or benzo (A) anthracene [1]	<4,600	<4,000	<4,000	ND
Benzo (B) fluoranthene and/or benzo (K) fluoranthene [1]	ND	<4,000	ND	ND
Phenol [1]	ND	ND	ND	<1,000
2,4-Dimethylphenol [1]	ND	ND	ND	<1,000
Butanoic acid [2]	<1,000	-	-	-
Hexanoic acid [2]	<1,000	<1,000	-	-
Octanoic acid [2]	<1,000	<1,000	-	-
Nonanoic acid [2]	<1,000	<1,000	-	-
Decanoic acid [2]	<1,000	<1,000	-	1,800
Undecanoic acid [2]	<1,000	<1,000	-	-
Dodecanoic acid [2]	<1,000	1,700	-	1,600
Tridecanoic acid [2]	<1,000	<1,000	-	5,400
Tetradecanoic acid [2]	1,600	<1,000	-	<1,000
Pentadecanoic acid [2]	1,600	<1,000	-	26,000
Hexadecanoic acid [2]	9,500	<1,000	-	-
Octadecanoic acid [2]	<1,000	-	-	67,000
Hexadecenoic acid [2]	14,000	-	-	-
Heptadecenoic acid [2]	-	-	-	<1,000
Octadecenoic acid [2]	10,000	-	-	-
Phthalic acid [2]	-	<1,000	-	<1,000
Benzene propanoic [2]	-	<1,000	-	-
Methyl ester of dodecanoic acid [2]	-	<1,000	-	-
Methyl ester of tetradecanoic acid [2]	<1,000	-	-	-
Methyl ester of hexadecenoic acid [2]	2,600	-	-	-
Methyl ester of octadecenoic acid [2]	-	<1,000	-	-
Methyl ester of octadecadienoic acid [2]	<1,000	-	-	-
Methyl ester of hydroxybenzoic acid [2]	-	<1,000	-	<1,000
Methyl ester of hydroxyphenyl propenoic acid [2]	-	<1,000	-	-
Methyl ester of methyl pentadecanoic acid [2]	1,300	<1,000	<5,000	-
Hydroxymethoxy benzaldehyde [2]	<1,000	-	-	-
Hydroxybenzaldhyde [2]	-	-	-	4,500
Methoxy benzenemethanol [2]	-	-	-	1,500
Hydroxybenzene methanol [2]	-	-	-	2,500
Methylene bisphenol [2]	-	-	-	38,000
Bis (hydroxyphenyl) methanone [2]	-	-	-	<1,000
Benzodioxolecarboxaldehyde [2]	-	-	-	<1,000
Petroleum type product	-	P	-	-
CHLORINATED ORGANIC COMPOUNDS (GC/EC)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Dieldrin [1]	ND	ND	45	
p,p'-DDT [1]	ND	ND	27	ND
p,p'-DDE [1]	ND	ND	15	ND
p,p'-DDD [1]	ND	ND	20	ND
Endrin [1]	ND	ND	19	ND
Heptachlor [1]	ND	2.5	3.9	ND
Heptachloronorbornene	ND	2.1	7.4	ND
Gamma chlordane	31	9.8	50	ND
Alpha chlordane	26	7.2	ND	ND
Hexachlorobenzene [1]	ND	ND	6.1	ND
INORGANIC ELEMENTS AND COMPOUNDS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Arsenic [1]	-	27	61	<5
Barium	132	410	287	4
Cobalt	13	<8	<16	<2
Chromium [1]	28	23	42	4
Copper [1]	16	38	56	78
Nickel [1]	18	18	32	<4
Lead [1]	48	95	68	<4
Strontium	40	69	27	<1
Titanium	592	455	462	18
Vanadium	46	44	75	2
Yttrium	12	10	18	<1
Zinc [1]	120	214	187	16
Mercury [1]	<0.05	0.13	0.14	<0.1
Aluminum	21,700	17,500	38,000	4,200
Manganese	475	510	800	25
Calcium	12,500	26,500	2,600	120
Magnesium	3,780	4,200	4,060	50
Iron	23,500	22,600	51,600	690
Cyanide [1]	<0.2	0.35	0.41	<0.2

P - Indicates presence.
NA - Not analyzed.
ND - None detected at or above the minimum detection limit (MDL). The MDL's vary from sample to sample and from parameter to parameter, see analytical data sheets (Appendix A) for exact values.
All concentrations are calculated on a dry weight basis.
1 - Compound/element is on the NRDC list of priority pollutants.
2 - Tentative identification, estimated concentration.

MAP
NORTH CENTRAL MEMPHIS, TN

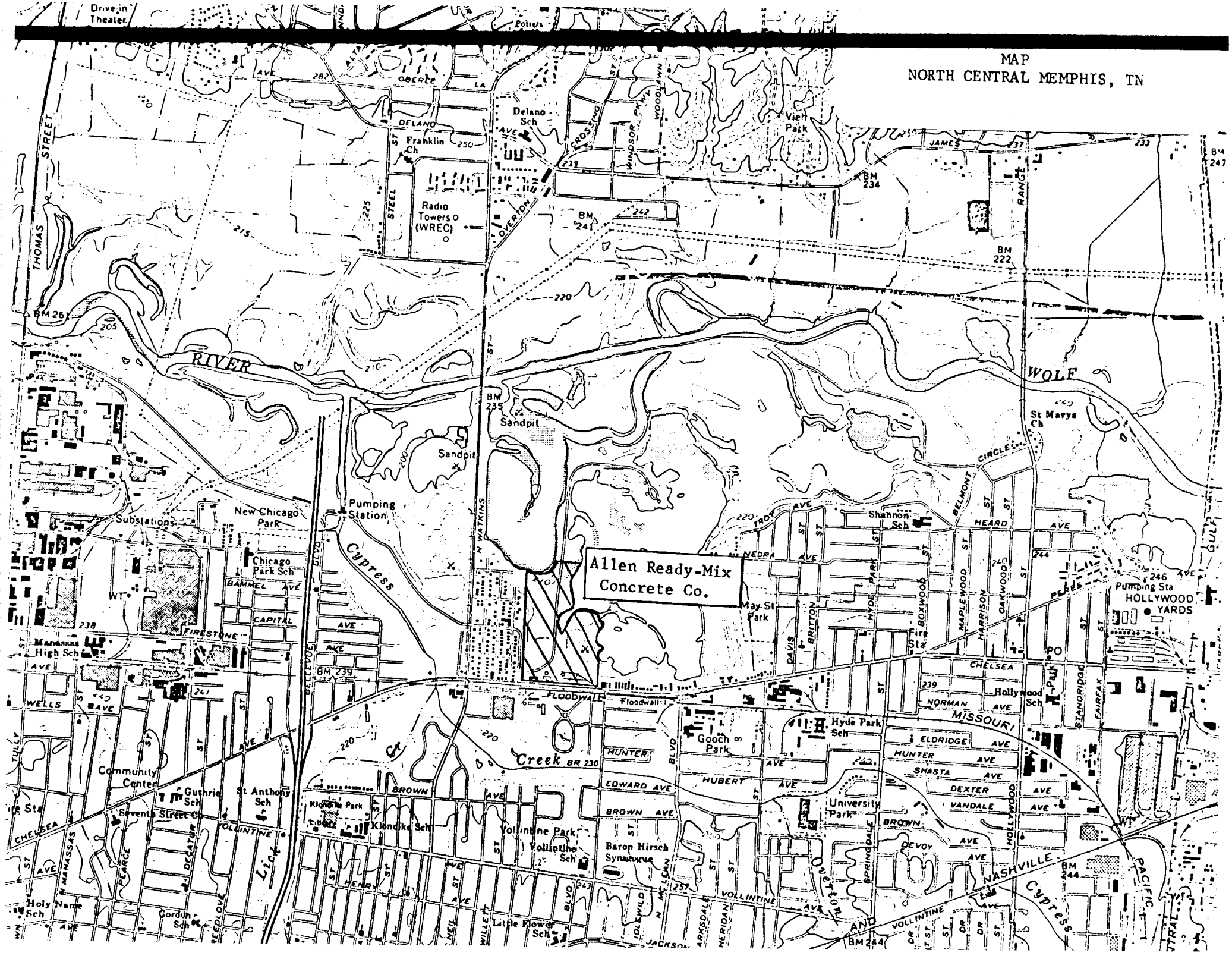
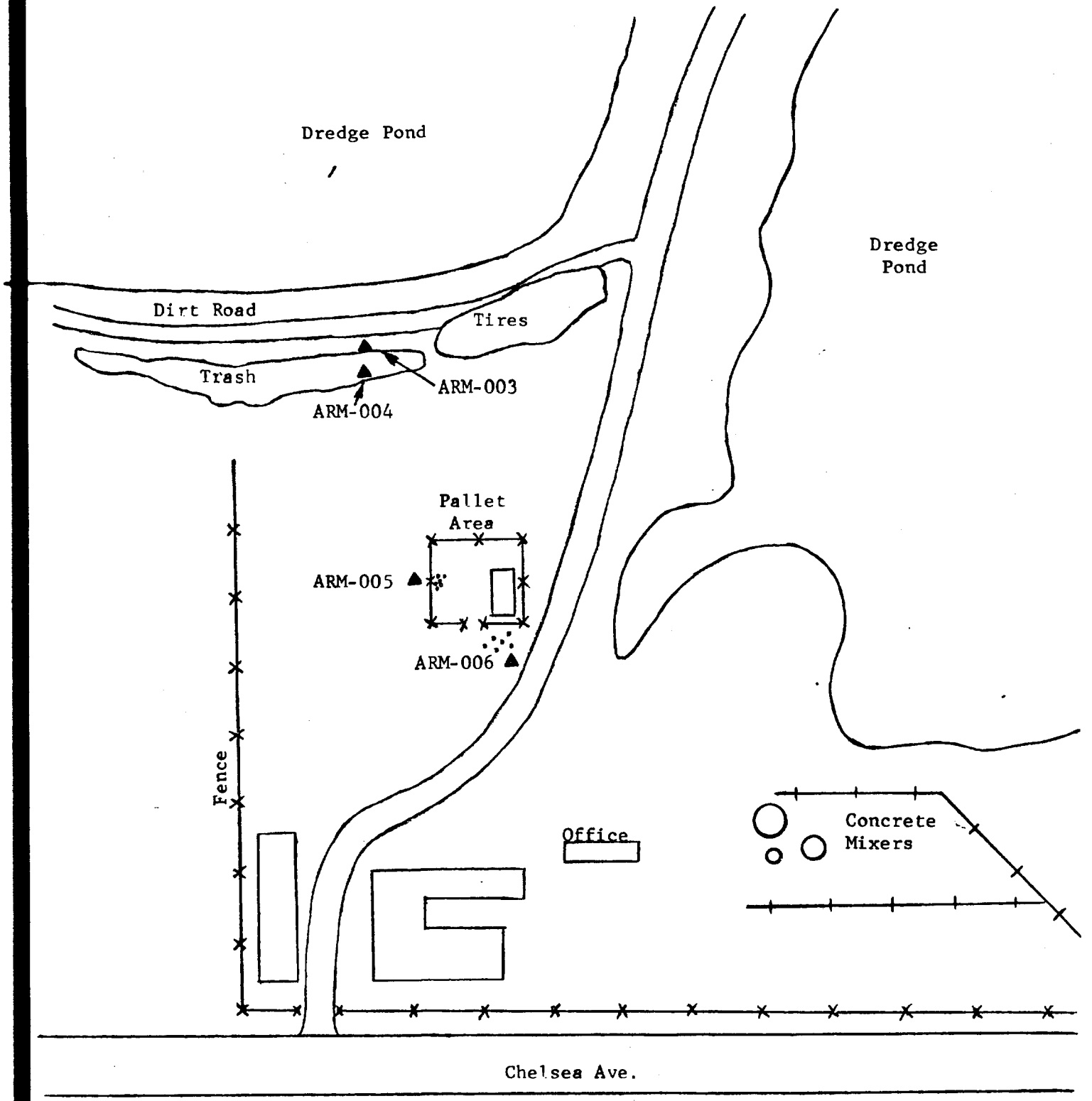


FIGURE 2
SCHEMATIC DIAGRAM
ALLEN READY-MIX CONCRETE CO.
MEMPHIS, TN



APPENDIX A

Analytical Data Sheets and Field Sheets

DATE: 03/23/81 PURGEABLE ORGANICS ANALYSIS ATHENS, GA

DATA REPORTING SHEET

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	5U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	5U	UG/KG	*			UG/KG
DICHLORODIFLOUROMETHANE	34334	5U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	5U	UG/KG	*			UG/KG
CHLOROETHANE	34314	5U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	5U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	5U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	5U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	5U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	5U	UG/KG	*			UG/KG
CHLOROFORM	34318	5U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	5U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	5U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	5U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	5U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	5U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	5U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	5U	UG/KG	*			UG/KG
BENZENE	34237	5U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	5U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	5U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	5U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	5U	UG/KG	*			UG/KG
BROMOFORM	34290	5U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	5U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	5U	UG/KG	*			UG/KG
TOLUENE	34483	5U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	5U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	5U	UG/KG	*			UG/KG
ACROLEIN	34213	100U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	100U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 5 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81

DATA REPORTING SHEET
WASTE

ATHENS, GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NK DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	.005U	MG/KG	*			MG/KG
METHYL BROMIDE	.005U	MG/KG	*			MG/KG
DICHLORODIFLOUROMETHANE	.005U	MG/KG	*			MG/KG
VINYL CHLORIDE	.005U	MG/KG	*			MG/KG
CHLOROETHANE	.005U	MG/KG	*			MG/KG
METHYLENE CHLORIDE	.005U	MG/KG	*			MG/KG
TRICHLOROFLUOROMETHANE	.005U	MG/KG	*			MG/KG
1,1-DICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
1,1-DICHLOROETHANE	.005U	MG/KG	*			MG/KG
1,2-TRANS-DICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
CHLOROFORM	.005U	MG/KG	*			MG/KG
1,2-DICHLOROETHANE	.005U	MG/KG	*			MG/KG
1,1,1-TRICHLOROETHANE	.005U	MG/KG	*			MG/KG
CARBON TETRACHLORIDE	.005U	MG/KG	*			MG/KG
DICHLOROBROMOMETHANE	.005U	MG/KG	*			MG/KG
1,2-DICHLOROPROPANE	.005U	MG/KG	*			MG/KG
TRANS-1,3-DICHLOROPROPENE	.005U	MG/KG	*			MG/KG
TRICHLOROETHYLENE	.005U	MG/KG	*			MG/KG
BENZENE	.005U	MG/KG	*			MG/KG
CHLORODIBROMOMETHANE	.005U	MG/KG	*			MG/KG
1,1,2-TRICHLOROETHANE	.005U	MG/KG	*			MG/KG
CIS-1,3-DICHLOROPROPENE	.005U	MG/KG	*			MG/KG
2-CHLOROETHYL VINYL ETHER	.005U	MG/KG	*			MG/KG
BROMOFORM	.005U	MG/KG	*			MG/KG
1,1,2,2-TETRACHLOROETHANE	.005U	MG/KG	*			MG/KG
TETRACHLOROETHYLENE	.005U	MG/KG	*			MG/KG
TOLUENE	.005U	MG/KG	*			MG/KG
CHLOROBENZENE	.005U	MG/KG	*			MG/KG
ETHYLBENZENE	.005U	MG/KG	*			MG/KG
ACROLEIN	.100U	MG/KG	*			MG/KG
ACRYLONITRILE	.100U	MG/KG	*			MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF .005 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81 [redacted]

DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 4-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	7U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	7U	UG/KG	*			UG/KG
DICHLORODIFLOUROMETHANE	34334	7U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	7U	UG/KG	*			UG/KG
CHLOROETHANE	34314	7U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	7U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	7U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	7U	UG/KG	*			UG/KG
CHLOROFORM	34318	7U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	7U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	7U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	7U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	7U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	7U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	7U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	7U	UG/KG	*			UG/KG
BENZENE	34237	7U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	7U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	7U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	7U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	7U	UG/KG	*			UG/KG
BROMOFORM	34290	7U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	7U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	7U	UG/KG	*			UG/KG
TOLUENE	34483	7U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	7U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	7U	UG/KG	*			UG/KG
ACROLEIN	34213	140U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	140U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 7 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE: 03/23/81 [redacted] ATHENS,GA

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED (DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START (DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP (DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 4-8-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#	UNITS
METHYL CHLORIDE	34421	7U	UG/KG	*			UG/KG
METHYL BROMIDE	34416	7U	UG/KG	*			UG/KG
DICHLORODIFLUOROMETHANE	34334	7U	UG/KG	*			UG/KG
VINYL CHLORIDE	34495	7U	UG/KG	*			UG/KG
CHLOROETHANE	34314	7U	UG/KG	*			UG/KG
METHYLENE CHLORIDE	34426	7U	UG/KG	*			UG/KG
TRICHLOROFLUOROMETHANE	34491	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHYLENE	34504	7U	UG/KG	*			UG/KG
1,1-DICHLOROETHANE	34499	7U	UG/KG	*			UG/KG
1,2-TRANS-DICHLOROETHYLENE	34549	7U	UG/KG	*			UG/KG
CHLOROFORM	34318	7U	UG/KG	*			UG/KG
1,2-DICHLOROETHANE	34534	7U	UG/KG	*			UG/KG
1,1,1-TRICHLOROETHANE	34509	7U	UG/KG	*			UG/KG
CARBON TETRACHLORIDE	34299	7U	UG/KG	*			UG/KG
DICHLOROBROMOMETHANE	34330	7U	UG/KG	*			UG/KG
1,2-DICHLOROPROPANE	34544	7U	UG/KG	*			UG/KG
TRANS-1,3-DICHLOROPROPENE	34697	7U	UG/KG	*			UG/KG
TRICHLOROETHYLENE	34487	7U	UG/KG	*			UG/KG
BENZENE	34237	7U	UG/KG	*			UG/KG
CHLORODIBROMOMETHANE	34309	7U	UG/KG	*			UG/KG
1,1,2-TRICHLOROETHANE	34514	7U	UG/KG	*			UG/KG
CIS-1,3-DICHLOROPROPENE	34702	7U	UG/KG	*			UG/KG
2-CHLOROETHYL VINYL ETHER	34579	7U	UG/KG	*			UG/KG
BROMOFORM	34290	7U	UG/KG	*			UG/KG
1,1,2,2-TETRACHLOROETHANE	34519	7U	UG/KG	*			UG/KG
TETRACHLOROETHYLENE	34478	7U	UG/KG	*			UG/KG
TOLUENE	34483	7U	UG/KG	*			UG/KG
CHLOROBENZENE	34304	7U	UG/KG	*			UG/KG
ETHYLBENZENE	34374	7U	UG/KG	*			UG/KG
ACROLEIN	34213	140U	UG/KG	*			UG/KG
ACRYLONITRILE	34218	140U	UG/KG	*			UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 7U ug/kg

NOTES: 1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED.
THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR.

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4000U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4000K	UG/KG
1,2-DICHLOROBENZENE	34539	4000U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4000K	UG/KG
1,3-DICHLOROBENZENE	34569	4000U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4000U	UG/KG
1,4-DICHLOROBENZENE	34574	4000U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4000U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4000U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4000U	UG/KG
HEXACHLOROETHANE	34399	4000U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4000U	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4000U	UG/KG	*	BENZO-A-PYRENE	34250	4000U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4000U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4000U	UG/KG
NITROBENZENE	34450	4000U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4000U	UG/KG
HEXACHLOROBUTADIENE	39705	4000U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4000U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4000U	UG/KG	*	2-CHLOROPHENOL	34589	5000U	UG/KG
NAPHTHALENE	34445	4000U	UG/KG	*	2-NITROPHENOL	34594	5000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4000U	UG/KG	*	PHENOL (GC/MS)	34695	5000U	UG/KG
ISOPHORONE	34411	4000U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	5000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	5000U	UG/KG
2-CHLORONAPHTHALENE	34584	4000U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	5000U	UG/KG
ACENAPHTHYLENE	34203	4000U	UG/KG	*	PARACHLOROMETA CRESOL	34455	5000U	UG/KG
ACENAPHTHENE	34209	4000U	UG/KG	*	2,4-DINITROPHENOL	34619	25000U	UG/KG
DIMETHYL PHTHALATE	34344	4000U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	15000U	UG/KG
2,4-DINITROTOLUENE	34614	4000U	UG/KG	*	PENTACHLOROPHENOL	39061	15000U	UG/KG
2,6-DINITROTOLUENE	34629	4000U	UG/KG	*	4-NITROPHENOL	34649	5000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4000U	UG/KG	*	methyl ester of methyl pentadecanoic acid		5000KN	UG/KG
FLUORENE	34384	4000U	UG/KG	*				UG/KG
DIETHYL PHTHALATE	34339	4000U	UG/KG	*				UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4000U	UG/KG	*				UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4000U	UG/KG	*				UG/KG
HEXACHLOROBENZENE	39701	6.1	UG/KG	*				UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4000U	UG/KG	*				UG/KG
PHENANTHRENE 10/	34464	4000K	UG/KG	*				UG/KG
ANTHRACENE 10/	34223	4000K	UG/KG	*				UG/KG
DI-N-BUTYL PHTHALATE	39112	4000U	UG/KG	*				UG/KG
FLUORANTHENE	34379	4000K	UG/KG	*				UG/KG
PYRENE	34472	4000K	UG/KG	*				UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4000U	UG/KG	*				UG/KG
BENZIDINE	39121	4000U	UG/KG	*				UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 25,000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 [redacted] ATHENS,GA

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1455

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4000U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4000K	UG/KG
1,2-DICHLOROBENZENE	34539	4000U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4000K	UG/KG
1,3-DICHLOROBENZENE	34569	4000U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4000U	UG/KG
1,4-DICHLOROBENZENE	34574	4000U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4000U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4000U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4000K	UG/KG
HEXACHLOROETHANE	34399	4000U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4000K	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4000U	UG/KG	*	BENZO-A-PYRENE	34250	4000U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4000U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4000U	UG/KG
NITROBENZENE	34450	4000U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4000U	UG/KG
HEXACHLOROBUTADIENE	39705	4000U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4000U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4000U	UG/KG	*	2-CHLOROPHENOL	34589	1000U	UG/KG
NAPHTHALENE	34445	4000K	UG/KG	*	2-NITROPHENOL	34594	1000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4000U	UG/KG	*	PHENOL (GC/MS)	34695	1000U	UG/KG
ISOPHORONE	34411	4000U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	1000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	1000U	UG/KG
2-CHLORONAPHTHALENE	34584	4000U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	1000U	UG/KG
ACENAPHTHYLENE	34203	4000K	UG/KG	*	PARACHLOROMETA CRESOL	34455	1000U	UG/KG
ACENAPHTHENE	34209	4000U	UG/KG	*	2,4-DINITROPHENOL	34619	1800U	UG/KG
DIMETHYL PHTHALATE	34344	4000U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	1000U	UG/KG
2,4-DINITROTOLUENE	34614	4000U	UG/KG	*	PENTACHLOROPHENOL	39061	1000U	UG/KG
2,6-DINITROTOLUENE	34629	4000U	UG/KG	*	4-NITROPHENOL	34649	1000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4000U	UG/KG	*	hexanoic acid (2 isomers)		1000KN	UG/KG
FLUORENE	34384	4000K	UG/KG	*	octanoic acid		1000KN	UG/KG
DIETHYL PHTHALATE	34339	4000U	UG/KG	*	nonanoic acid		1000KN	UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4000U	UG/KG	*	decanoic acid		1000KN	UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4000U	UG/KG	*	phthalic acid		1000KN	UG/KG
HEXACHLOROBENZENE	39701	4U	UG/KG	*	benzene propanoic acid		1000KN	UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4000U	UG/KG	*	methyl ester of hydroxybenzoic acid		1000KN	UG/KG
PHENANTHRENE 10/	34464	4000K	UG/KG	*	undecanoic acid (2 isomers)		1000KN	UG/KG
ANTHRACENE 10/	34223	4000K	UG/KG	*	tridecanoic acid		1000KN	UG/KG
DI-N-BUTYL PHTHALATE	39112	4000U	UG/KG	*	tetradecanoic acid		1000KN	UG/KG
FLUORANTHENE	34379	4000K	UG/KG	*	pentadecanoic acid		1000KN	UG/KG
PYRENE	34472	4000K	UG/KG	*	hexadecanoic acid		1000KN	UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4000U	UG/KG	*	methyl ester of hydroxyphenyl propenoic acid		1000KN	UG/KG
BENZIDINE	39121	4000U	UG/KG	*	dodecanoic acid (2 isomers)		1700JN	UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
methyl ester of methyl pentadecanoic acid	1000KN	UG/KG
methyl ester of octadecenoic acid	1000KN	UG/KG
methyl ester of dodecanoic acid	1000KN	UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
THE CHROMATOGRAM INDICATES THE PRESENCE		UG/KG
OF A PETROLEUM TYPE PRODUCT.		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4000 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81

EXTRACTABLE ORGANIC ANALYSIS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSH

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: R. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
BIS(CHLOROMETHYL) ETHER	34271	NA	UG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	39102	4600U	UG/KG
N-NITROSODIMETHYLAMINE	34441	NA	UG/KG	*	CHRYSENE 11/	34323	4600K	UG/KG
1,2-DICHLOROBENZENE	34539	4600U	UG/KG	*	BENZO(A)ANTHRACENE 11/	34529	4600K	UG/KG
1,3-DICHLOROBENZENE	34569	4600U	UG/KG	*	3,3'-DICHLOROBENZIDINE	34634	4600U	UG/KG
1,4-DICHLOROBENZENE	34574	4600U	UG/KG	*	DI-N-OCTYL PHTHALATE	34599	4600U	UG/KG
BIS(2-CHLOROETHYL) ETHER	34276	4600U	UG/KG	*	BENZO(B)FLUORANTHENE 12/	34233	4600U	UG/KG
HEXACHLOROETHANE	34399	4600U	UG/KG	*	BENZO(K)FLUORANTHENE 12/	34245	4600U	UG/KG
BIS(2-CHLOROISOPROPYL) ETHER	34286	4600U	UG/KG	*	BENZO-A-PYRENE	34250	4600U	UG/KG
N-NITROSODI-N-PROPYLAMINE	34431	4600U	UG/KG	*	INDENO (1,2,3-CD) PYRENE	34406	4600U	UG/KG
NITROBENZENE	34450	4600U	UG/KG	*	1,2,5,6-DIBENZANTHRACENE	34559	4600U	UG/KG
HEXACHLOROBUTADIENE	39705	4600U	UG/KG	*	BENZO(GHI)PERYLENE	34524	4600U	UG/KG
1,2,4-TRICHLOROBENZENE	34554	4600U	UG/KG	*	2-CHLOROPHENOL	34589	1000U	UG/KG
NAPHTHALENE	34445	4600U	UG/KG	*	2-NITROPHENOL	34594	1000U	UG/KG
BIS(2-CHLOROETHOXY) METHANE	34281	4600U	UG/KG	*	PHENOL (GC/MS)	34695	1000U	UG/KG
ISOPHORONE	34411	4600U	UG/KG	*	2,4-DIMETHYLPHENOL	34609	1000U	UG/KG
HEXACHLOROCYCLOPENTADIENE	34389	3U	UG/KG	*	2,4-DICHLOROPHENOL	34604	1000U	UG/KG
2-CHLORONAPHTHALENE	34584	4600U	UG/KG	*	2,4,6-TRICHLOROPHENOL	34624	1000U	UG/KG
ACENAPHTHYLENE	34203	4600U	UG/KG	*	PARACHLOROMETA CRESOL	34455	1000U	UG/KG
ACENAPHTHENE	34209	4600U	UG/KG	*	2,4-DINITROPHENOL	34619	2200U	UG/KG
DIMETHYL PHTHALATE	34344	4600U	UG/KG	*	4,6-DINITRO-O-CRESOL	34660	1300U	UG/KG
2,4-DINITROTOLUENE	34614	4600U	UG/KG	*	PENTACHLOROPHENOL	39061	1300U	UG/KG
2,6-DINITROTOLUENE	34629	4600U	UG/KG	*	4-NITROPHENOL	34649	1000U	UG/KG
4-CHLOROPHENYL PHENYL ETHER	34644	4600U	UG/KG	*	butanoic acid		1000K	UG/KG
FLUORENE	34384	4600U	UG/KG	*	hexanoic acid		1000K	UG/KG
DIETHYL PHTHALATE	34339	4600U	UG/KG	*	octanoic acid		1000K	UG/KG
1,2-DIPHENYLHYDRAZINE 8/	34349	4600U	UG/KG	*	nonanoic acid		1000K	UG/KG
N-NITROSODIPHENYLAMINE 9/	34436	4600U	UG/KG	*	decanoic acid		1000K	UG/KG
HEXACHLOROBENZENE	39701	6U	UG/KG	*	hydroxymethoxy benzaldehyde		1000K	UG/KG
4-BROMOPHENYL PHENYL ETHER	34639	4600U	UG/KG	*	undecanoic acid		1000K	UG/KG
PHENANTHRENE 10/	34464	4600K	UG/KG	*	dodecanoic acid		1000K	UG/KG
ANTHRACENE 10/	34223	4600K	UG/KG	*	tridecanoic acid		1000K	UG/KG
DI-N-BUTYL PHTHALATE	39112	4600U	UG/KG	*	tetradecanoic acid		1600JN	UG/KG
FLUORANTHENE	34379	4600K	UG/KG	*	methyl ester of tetradecanoic acid		1000KN	UG/KG
PYRENE	34472	4600K	UG/KG	*	pentadecanoic acid		1600JN	UG/KG
N-BUTYL BENZYL PHTHALATE	34295	4600U	UG/KG	*	methyl ester of hexadecenoic acid(2 isomers)		2600JN	UG/KG
BENZIDINE	39121	4600U	UG/KG	*	methyl ester of methyl pentadecanoic acid		1300JN	UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4600 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 [redacted] ATHENS,GA

DATA REPORTING SHEET
SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1440

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
hexadecenoic acid	14000JN	UG/KG
hexadecanoic acid	9500JN	UG/KG
methyl ester of octadecadienoic	1000KN	UG/KG
octadecenoic acid	10000JN	UG/KG
octadecanoic acid	1000KN	UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
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		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG
		UG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 4600 ug/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS ATHENS,GA

DATA REPORTING SHEET

WASTE

DRY WEIGHT BASIS

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NK DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
BIS(CHLOROMETHYL) ETHER	NA	MG/KG	*	BIS(2-ETHYLHEXYL) PHTHALATE	3.2U	MG/KG
N-NITROSODIMETHYLAMINE	NA	MG/KG	*	CHRYSENE 11/	3.2U	MG/KG
1,2-DICHLOROBENZENE	3.2U	MG/KG	*	BENZO(A)ANTHRACENE 11/	3.2U	MG/KG
1,3-DICHLOROBENZENE	3.2U	MG/KG	*	3,3'-DICHLOROBENZIDINE	3.2U	MG/KG
1,4-DICHLOROBENZENE	3.2U	MG/KG	*	DI-N-OCTYL PHTHALATE	3.2U	MG/KG
BIS(2-CHLOROETHYL) ETHER	3.2U	MG/KG	*	BENZO(B)FLUORANTHENE 12/	3.2U	MG/KG
HEXACHLOROETHANE	3.2U	MG/KG	*	BENZO(K)FLUORANTHENE 12/	3.2U	MG/KG
BIS(2-CHLOROISOPROPYL) ETHER	3.2U	MG/KG	*	BENZO-A-PYRENE	3.2U	MG/KG
N-NITROSODI-N-PROPYLAMINE	3.2U	MG/KG	*	INDENO (1,2,3-CD) PYRENE	3.2U	MG/KG
NITROBENZENE	3.2U	MG/KG	*	1,2,5,6-DIBENZANTHRACENE	3.2U	MG/KG
HEXACHLOROBUTADIENE	3.2U	MG/KG	*	BENZO(GHI)PERYLENE	3.2U	MG/KG
1,2,4-TRICHLOROBENZENE	3.2U	MG/KG	*	2-CHLOROPHENOL	1U	MG/KG
NAPHTHALENE	3.2U	MG/KG	*	2-NITROPHENOL	1U	MG/KG
BIS(2-CHLOROETHOXY) METHANE	3.2U	MG/KG	*	PHENOL (GC/MS)	1K	MG/KG
ISOPHORONE	3.2U	MG/KG	*	2,4-DIMETHYLPHENOL	1K	MG/KG
HEXACHLOROCYCLOPENTADIENE	2U	MG/KG	*	2,4-DICHLOROPHENOL	1U	MG/KG
2-CHLORONAPHTHALENE	3.2U	MG/KG	*	2,4,6-TRICHLOROPHENOL	1U	MG/KG
ACENAPHTHYLENE	3.2U	MG/KG	*	PARACHLOROMETA CRESOL	1U	MG/KG
ACENAPHTHENE	3.2U	MG/KG	*	2,4-DINITROPHENOL	2U	MG/KG
DIMETHYL PHTHALATE	3.2U	MG/KG	*	4,6-DINITRO-O-CRESOL	1U	MG/KG
2,4-DINITROTOLUENE	3.2U	MG/KG	*	PENTACHLOROPHENOL	1U	MG/KG
2,6-DINITROTOLUENE	3.2U	MG/KG	*	4-NITROPHENOL	1U	MG/KG
4-CHLOROPHENYL PHENYL ETHER	3.2U	MG/KG	*	hydroxybenzaldehyde	4.5JN	MG/KG
FLUORENE	3.2U	MG/KG	*	methyl ester of hydroxybenzoic acid	1.0JN	MG/KG
DIETHYL PHTHALATE	3.2U	MG/KG	*	methoxy benzenemethanol	1.5JN	MG/KG
1,2-DIPHENYLHYDRAZINE 8/	3.2U	MG/KG	*	hydroxybenzene methanol	2.5JN	MG/KG
N-NITROSODIPHENYLAMINE 9/	3.2U	MG/KG	*	phthalic acid	1.0KN	MG/KG
HEXACHLOROBENZENE	4U	MG/KG	*	benzodioxolecarboxaldehyde	1.0KN	MG/KG
4-BROMOPHENYL PHENYL ETHER	3.2U	MG/KG	*	decanoic acid	1.8JN	MG/KG
PHENANTHRENE 10/	3.2K	MG/KG	*	dodecanoic acid (2 isomers)	1.6JN	MG/KG
ANTHRACENE 10/	3.2K	MG/KG	*	tetradecanoic acid	5.4JN	MG/KG
DI-N-BUTYL PHTHALATE	3.2U	MG/KG	*	pentadecanoic acid	1.0KN	MG/KG
FLUORANTHENE	3.2U	MG/KG	*	hexadecanoic acid (2 isomers)	26JN	MG/KG
PYRENE	3.2U	MG/KG	*	methylene bisphenol (3 isomers)	38JN	MG/KG
N-BUTYL BENZYL PHTHALATE	3.2U	MG/KG	*	heptadecenoic acid	1.0JN	MG/KG
BENZIDINE	3.2U	MG/KG	*			MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 3.2 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 EXTRACTABLE ORGANIC ANALYSIS ATHENS,GA

WASTE

DRY WEIGHT BASIS

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NK DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-19-81

COMPOUND	STORET#	UNITS
bis(hydroxyphenyl)methanone	1.0KN	MG/KG
octadecanoic acid	67JN	MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
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		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG
		MG/KG

NO OTHER ORGANIC COMPOUND DETECTED WITH AN ESTIMATED MINIMUM DETECTION LIMIT OF 3.2 mg/kg

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED. THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) NA-COMPOUND NOT ANALYZED FOR.
6) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
7) A-AVERAGE VALUE
8) AND/OR AZOBENZENE
9) AND/OR DIPHENYLAMINE
10) PHENANTHRENE AND/OR ANTHRACENE
11) CHRYSENE AND/OR 1,2-BENZANTHRACENE
12) BENZO(B)FLUORANTHENE AND/OR BENZO(K)FLUORANTHENE

DATE:03/23/81 PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS ATHENS,GA

DATA REPORTING SHEET

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1420

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#	UNITS		COMPOUND	STORET#	UNITS
ALDRIN	2U	MG/KG	*	hexachloronorbornadiene	2U	MG/KG
DIELDRIN	5U	MG/KG	*			MG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	10/	MG/KG	*	octachlorocyclopentene	2U	MG/KG
P,P'-DDT	6U	MG/KG	*			MG/KG
P,P'-DDE	6U	MG/KG	*	heptachloronorbornene	4U	MG/KG
P,P'-DDD	6U	MG/KG	*	1-hydroxychlordene	4U	MG/KG
ENDOSULFAN,ALPHA	5U	MG/KG	*	alpha-chlordane 11/	4U	MG/KG
ENDOSULFAN,BETA	9U	MG/KG	*	gamma-chlordane 11/	4U	MG/KG
ENDOSULFAN SULFATE	9U	MG/KG	*			MG/KG
ENDRIN	7U	MG/KG	*			MG/KG
ENDRIN ALDEHYDE	NA	MG/KG	*			MG/KG
HEPTACHLOR	2U	MG/KG	*			MG/KG
HEPTACHLOR EPOXIDE	2U	MG/KG	*			MG/KG
ALPHA-BHC	2U	MG/KG	*			MG/KG
BETA-BHC	2U	MG/KG	*			MG/KG
GAMMA-BHC (LINDANE)	2U	MG/KG	*			MG/KG
DELTA-BHC	2U	MG/KG	*			MG/KG
PCB-1242 (AROCLOR 1242)	10U	MG/KG	*			MG/KG
PCB-1254 (AROCLOR 1254)	60U	MG/KG	*			MG/KG
PCB-1221 (AROCLOR 1221)	10U	MG/KG	*			MG/KG
PCB-1232 (AROCLOR 1232)	10U	MG/KG	*			MG/KG
PCB-1248 (AROCLOR 1248)	10U	MG/KG	*			MG/KG
PCB-1260 (AROCLOR 1260)	60U	MG/KG	*			MG/KG
PCB-1016 (AROCLOR 1016)	10U	MG/KG	*			MG/KG
TOXAPHENE	60U	MG/KG	*			MG/KG
TCDD (DIOXIN)	NA	MG/KG	*			MG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81 PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS ATHENS,GA

DATA REPORTING SHEET

SEDIMENT/SOIL/SLUDGE (DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS	
ALDRIN	39333	9U	UG/KG	*
DIELDRIN	39383	7U	UG/KG	*
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*
P,P'-DDT	39301	20U	UG/KG	*
P,P'-DDE	39321	20U	UG/KG	*
P,P'-DDD	39311	20U	UG/KG	*
ENDOSULFAN,ALPHA	34364	7U	UG/KG	*
ENDOSULFAN,BETA	34359	10U	UG/KG	*
ENDOSULFAN SULFATE	34354	10U	UG/KG	*
ENDRIN	39393	10U	UG/KG	*
ENDRIN ALDEHYDE	34369	NA	UG/KG	*
HEPTACHLOR	39413	9U	UG/KG	*
HEPTACHLOR EPOXIDE	39423	9U	UG/KG	*
ALPHA-BHC	39076	9U	UG/KG	*
BETA-BHC	34257	9U	UG/KG	*
GAMMA-BHC (LINDANE)	39343	9U	UG/KG	*
DELTA-BHC	34262	9U	UG/KG	*
PCB-1242 (AROCLOR 1242)	39499	30U	UG/KG	*
PCB-1254 (AROCLOR 1254)	39507	200U	UG/KG	*
PCB-1221 (AROCLOR 1221)	39491	30U	UG/KG	*
PCB-1232 (AROCLOR 1232)	39495	30U	UG/KG	*
PCB-1248 (AROCLOR 1248)	39503	30U	UG/KG	*
PCB-1260 (AROCLOR 1260)	39511	200U	UG/KG	*
PCB-1016 (AROCLOR 1016)	39514	30U	UG/KG	*
TOXAPHENE	39403	200U	UG/KG	*
TCDD (DIOXIN)	34678	NA	UG/KG	*

COMPOUND	STORET#		UNITS
hexachloronorbornadiene		3U	UG/KG
octachlorocyclopentene		3U	UG/KG
heptachloronorbornene		6U	UG/KG
gamma-chlordane	8/ 11/	31	UG/KG
alpha chlordane	8/ 11/	26	UG/KG
1-hydroxychlordene		4U	UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81 PESTICIDES/PCBS AND OTHER CHLORINATED COMPOUNDS

DATA REPORTING SHEET

SEDIMENT/SOIL/SLUDGE(DRY WT)

ATHENS,GA

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
ALDRIN	39333	4U	UG/KG	*	heptachloronorbornene 8/		2.1	UG/KG
DIELDRIN	39383	4U	UG/KG	*	hexachloronorbornadiene		10U	UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*				UG/KG
P,P'-DDT	39301	10U	UG/KG	*				UG/KG
P,P'-DDE	39321	10U	UG/KG	*	octachlorocyclopentene		4U	UG/KG
P,P'-DDD	39311	10U	UG/KG	*	gamma-chlordane 8/ 11/		9.8	UG/KG
ENDOSULFAN,ALPHA	34364	7U	UG/KG	*	1-hydroxychlordene		2U	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	alpha-chlordane 8/ 11/		7.2	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*				UG/KG
ENDRIN	39393	8U	UG/KG	*				UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*				UG/KG
HEPTACHLOR 8/ 11/	39413	2.5	UG/KG	*				UG/KG
HEPTACHLOR EPOXIDE	39423	5U	UG/KG	*				UG/KG
ALPHA-BHC	39076	5U	UG/KG	*				UG/KG
BETA-BHC	34257	5U	UG/KG	*				UG/KG
GAMMA-BHC (LINDANE)	39343	5U	UG/KG	*				UG/KG
DELTA-BHC	34262	5U	UG/KG	*				UG/KG
PCB-1242 (AROCLOR 1242)	39499	30U	UG/KG	*				UG/KG
PCB-1254 (AROCLOR 1254)	39507	100U	UG/KG	*				UG/KG
PCB-1221 (AROCLOR 1221)	39491	30U	UG/KG	*				UG/KG
PCB-1232 (AROCLOR 1232)	39495	30U	UG/KG	*				UG/KG
PCB-1248 (AROCLOR 1248)	39503	30U	UG/KG	*				UG/KG
PCB-1260 (AROCLOR 1260)	39511	100U	UG/KG	*				UG/KG
PCB-1016 (AROCLOR 1016)	39514	30U	UG/KG	*				UG/KG
TOXAPHENE	39403	100U	UG/KG	*				UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*				UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81 PESTICIDES/PCB'S AND OTHER CHLORINATED COUMPOUNDS EPA-SAD-RGN-IV

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX SAMPLE START(DATE & TIME): 03/17/81 1415

CITY: MEMPHIS STATE: TN SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033 CHEMIST: E. W. Loy, Jr. COMPLETED 5-14-81

COMPOUND	STORET#		UNITS		COMPOUND	STORET#		UNITS
ALDRIN	39333	4U	UG/KG	*	heptachloronorbornene 8/		7.4	UG/KG
DIELDRIN 8/	39383	45	UG/KG	*				UG/KG
CHLORDANE (TECH. MIXTURE & METABOLITES)	39351	10/	UG/KG	*	octachlorocyclopentene		3U	UG/KG
P,P'-DDT 8/	39301	27	UG/KG	*				UG/KG
P,P'-DDE 8/	39321	15	UG/KG	*	hexachloronorbornadiene		3U	UG/KG
P,P'-DDD 8/	39311	20	UG/KG	*	gamma chlordane 8/ 11/		50	UG/KG
ENDOSULFAN,ALPHA	34364	6U	UG/KG	*	alpha chlordane 11/		10U	UG/KG
ENDOSULFAN,BETA	34359	10U	UG/KG	*	1-hydroxychlordene		4U	UG/KG
ENDOSULFAN SULFATE	34354	10U	UG/KG	*				UG/KG
ENDRIN 8/	39393	19	UG/KG	*				UG/KG
ENDRIN ALDEHYDE	34369	NA	UG/KG	*				UG/KG
HEPTACHLOR 8/ 11/	39413	3.9	UG/KG	*				UG/KG
HEPTACHLOR EPOXIDE	39423	4U	UG/KG	*				UG/KG
ALPHA-BHC	39076	4U	UG/KG	*				UG/KG
BETA-BHC	34257	4U	UG/KG	*				UG/KG
GAMMA-BHC (LINDANE)	39343	4U	UG/KG	*				UG/KG
DELTA-BHC	34262	4U	UG/KG	*				UG/KG
PCB-1242 (AROCLOR 1242)	39499	70U	UG/KG	*				UG/KG
PCB-1254 (AROCLOR 1254)	39507	80U	UG/KG	*				UG/KG
PCB-1221 (AROCLOR 1221)	39491	70U	UG/KG	*				UG/KG
PCB-1232 (AROCLOR 1232)	39495	70U	UG/KG	*				UG/KG
PCB-1248 (AROCLOR 1248)	39503	70U	UG/KG	*				UG/KG
PCB-1260 (AROCLOR 1260)	39511	80U	UG/KG	*				UG/KG
PCB-1016 (AROCLOR 1016)	39514	70U	UG/KG	*				UG/KG
TOXAPHENE	39403	80U	UG/KG	*				UG/KG
TCDD (DIOXIN)	34678	NA	UG/KG	*				UG/KG

NOTES:
1) J-ESTIMATED VALUE
2) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
3) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN
4) U-MATERIAL WAS ANALYZED FOR BUT NOT DETECTED THE NUMBER IS THE MINIMUM DETECTION LIMIT.
5) N-PRESUMPTIVE EVIDENCE OF PRESENCE OF MATERIAL
6) A-AVERAGE VALUE
7) NA-COMPOUND NOT ANALYZED FOR
8) CONFIRMED ON TWO DIFFERENT GC COLUMNS
9) CONFIRMED BY GC/MS
10) REPORTED AS INDIVIDUAL COMPOUNDS
11) CONSTITUENTS OF TECHNICAL CHLORDANE

DATE:03/23/81 METALS DATA REPORTING SHEET ATHENS,GA

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SOURCE: ALLEN READY MIX

SAMPLE START(DATE & TIME): 03/17/81 1440

CITY: MEMPHIS STATE: TN

SAMPLE STOP(DATE & TIME): 00/00/00 0

STATION: ARM-005 W SIDE OF FENCE IN PALLET AREA DOWNGRADE SAD NO.: 81C1031

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	4K	MG/KG
ARSENIC	AS	01003	---	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	132	MG/KG
BERYLLIUM	BE	01013	.4K	MG/KG
CADMIUM	CD	01028	4K	MG/KG
COBALT	CO	01038	13	MG/KG
CHROMIUM	CR	01029	28	MG/KG
COPPER	CU	01043	16	MG/KG
MOLYBDENUM	MO	01063	8K	MG/KG
NICKEL	NI	01068	18	MG/KG
LEAD	PB	01052	48	MG/KG
ANTIMONY	SB	01098	16K	MG/KG
SELENIUM	SE	01148	16K	MG/KG
TIN	SN	01103	40K	MG/KG
STRONTIUM	SR	01083	40	MG/KG
TELLURIUM	TE	45513	16K	MG/KG
TITANIUM	TI	01153	592	MG/KG
THALLIUM	TL	34480	40K	MG/KG
VANADIUM	V	01088	46	MG/KG
YTTRIUM	Y	45514	12	MG/KG
ZINC	ZN	01093	120	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.05K	MG/KG
ALUMINUM	AL	01108	21700	MG/KG
MANGANESE	MN	01053	475	MG/KG
CALCIUM	CA	00917	12500	MG/KG
MAGNESIUM	MG	00924	3780	MG/KG
IRON	FE	01170	23500	MG/KG
SODIUM	NA	00934	400K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		23	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81 METALS

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-006 DOWNGRADE FROM DRUMS @ NE CORNER OF PALLET SAD NO.: 81C1034

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1455

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	4K	MG/KG
ARSENIC	AS	01003	27	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	410	MG/KG
BERYLLIUM	BE	01013	.4K	MG/KG
CADMIUM	CD	01028	4K	MG/KG
COBALT	CO	01038	8K	MG/KG
CHROMIUM	CR	01029	23	MG/KG
COPPER	CU	01043	38	MG/KG
MOLYBDENUM	MO	01063	8K	MG/KG
NICKEL	NI	01068	18	MG/KG
LEAD	PB	01052	95	MG/KG
ANTIMONY	SB	01098	16K	MG/KG
SELENIUM	SE	01148	16K	MG/KG
TIN	SN	01103	40K	MG/KG
STRONTIUM	SR	01083	69	MG/KG
TELLURIUM	TE	45513	16K	MG/KG
TITANIUM	TI	01153	455	MG/KG
THALLIUM	TL	34480	40K	MG/KG
VANADIUM	V	01088	44	MG/KG
YTTRIUM	Y	45514	10	MG/KG
ZINC	ZN	01093	214	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.13	MG/KG
ALUMINUM	AL	01108	17500	MG/KG
MANGANESE	MN	01053	510	MG/KG
CALCIUM	CA	00917	26500	MG/KG
MAGNESIUM	MG	00924	4200	MG/KG
IRON	FE	01170	22600	MG/KG
SODIUM	NA	00934	400K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		29	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

SEDIMENT/SOIL/SLUDGE(DRY WT)

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND SAD NO.: 81C1033

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1415

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 4-23-81

ELEMENT		STORET#		UNITS
SILVER	AG	01078	8K	MG/KG
ARSENIC	AS	01003	61	MG/KG
BORON	B	01023	---	MG/KG
BARIUM	BA	01008	287	MG/KG
BERYLLIUM	BE	01013	8K	MG/KG
CADMIUM	CD	01028	8K	MG/KG
COBALT	CO	01038	16K	MG/KG
CHROMIUM	CR	01029	42	MG/KG
COPPER	CU	01043	56	MG/KG
MOLYBDENUM	MO	01063	16K	MG/KG
NICKEL	NI	01068	32	MG/KG
LEAD	PB	01052	68	MG/KG
ANTIMONY	SB	01098	32K	MG/KG
SELENIUM	SE	01148	32K	MG/KG
TIN	SN	01103	80K	MG/KG
STRONTIUM	SR	01083	27	MG/KG
TELLURIUM	TE	45513	32K	MG/KG
TITANIUM	TI	01153	462	MG/KG
THALLIUM	TL	34480	80K	MG/KG
VANADIUM	V	01088	75	MG/KG
YTTRIUM	Y	45514	18	MG/KG
ZINC	ZN	01093	187	MG/KG
ZIRCONIUM	ZR	01163	---	MG/KG
MERCURY	HG	71921	0.14	MG/KG
ALUMINUM	AL	01108	38000	MG/KG
MANGANESE	MN	01053	800	MG/KG
CALCIUM	CA	00917	2600	MG/KG
MAGNESIUM	MG	00924	4060	MG/KG
IRON	FE	01170	51600	MG/KG
SODIUM	NA	00934	800K	MG/KG
CYANIDE	CN	00721		MG/KG
ASBESTOS	ASSB	34228		MG/KG
	% Moisture		27	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE:03/23/81 METALS ATHENS,GA

DATA REPORTING SHEET

WASTE

PROJECT #: 81-74 PROG ELEMENT #: HWSR

SOURCE: ALLEN READY MIX

CITY: MEMPHIS STATE: TN

STATION: ARM-004 RESIDUAL FROM FIBER OR DRUM NR DREDGE POND SAD NO.: 81C1032

SAMPLE RECEIVED(DATE & TIME): 03/20/81 730

SAMPLE START(DATE & TIME): 03/17/81 1420

SAMPLE STOP(DATE & TIME): 00/00/00 0

CHEMIST: B. McDaniel COMPLETED 5-7-81

ELEMENT	STORET#		UNITS
SILVER	AG	1K	MG/KG
ARSENIC	AS	5K	MG/KG
BORON	B	---	MG/KG
BARIUM	BA	4	MG/KG
BERYLLIUM	BE	1K	MG/KG
CADMIUM	CD	1K	MG/KG
COBALT	CO	2K	MG/KG
CHROMIUM	CR	4	MG/KG
COPPER	CU	78	MG/KG
MOLYBDENUM	MO	2K	MG/KG
NICKEL	NI	4K	MG/KG
LEAD	PB	4K	MG/KG
ANTIMONY	SB	3K	MG/KG
SELENIUM	SE	4K	MG/KG
TIN	SN	10K	MG/KG
STRONTIUM	SR	1K	MG/KG
TELLURIUM	TE	4K	MG/KG
TITANIUM	TI	18	MG/KG
THALLIUM	TL	10K	MG/KG
VANADIUM	V	2	MG/KG
YTTRIUM	Y	1K	MG/KG
ZINC	ZN	16	MG/KG
ZIRCONIUM	ZR	---	MG/KG
MERCURY	HG	0.1K	MG/KG
ALUMINUM	AL	4200	MG/KG
MANGANESE	MN	25	MG/KG
CALCIUM	CA	120	MG/KG
MAGNESIUM	MG	50	MG/KG
IRON	FE	690	MG/KG
SODIUM	NA	100K	MG/KG
CYANIDE	CN		MG/KG
ASBESTOS	ASSB		MG/KG
% Moisture		2	

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.
3) A-AVERAGE VALUE
4) NA-ELEMENT NOT ANALYZED FOR

DATE: 03/23/81

LABORATORY SERVICES BRANCH
DATA REPORTING SHEET
81C1031 - 81C1034
PROJECT # 81-74 ***PROG ELEMENT # HWSR

SOURCE: ALLEN READY MIX

SAMPLE RECEIVED DATE & TIME: 03/20/81 730

CITY : MEMPHIS STATE: TN

CHEMIST:

COMPLETED: 5/19/81

SAD NO.	STATION	DATE & TIME SAMPLED	SAMPLE TYPE	ANALYSES TO BE RUN					
81C1031	ARM-005 W SIDE OF FENCE I N PALLET AREA DOWNGRADE	03/17/81- 1440- 00/00/00 0	SOIL	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: 0.2K	:
				:	:	:	:	:	:
				:	:	:	:	:	:
81C1032	ARM-004 RESIDUAL FROM FIB ER OR DRUM NR DREDGE POND	03/17/81- 1420- 00/00/00 0	CHWAS	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: .2K	:
				:	:	:	:	:	:
				:	:	:	:	:	:
81C1033	ARM-003 DOWNGRADIENT FROM DRUM RING&LINERS NR POND	03/17/81- 1415- 00/00/00 0	SOIL	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: 0.41	:
				:	:	:	:	:	:
				:	:	:	:	:	:
81C1034	ARM-006 DOWNGRADE FROM DR UMS @ NE CORNER OF PALLET	03/17/81- 1455- 00/00/00 0	SOIL	:ORGS	:METSCMG/KG:	:VOA	:PEST	:CN MG/KG:	:HG MG/KG:
				:	:	:	:	: 0.35	:
				:	:	:	:	:	:
				:	:	:	:	:	:

NOTES: 1) K-ACTUAL VALUE IS KNOWN TO BE LESS THAN VALUE GIVEN.
2) L-ACTUAL VALUE IS KNOWN TO BE GREATER THAN VALUE GIVEN.

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-005
DDRESS Chelsea Ave Memphis TN	SAMPLING LOCATION West side of fence in pallet area down grade from drums
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

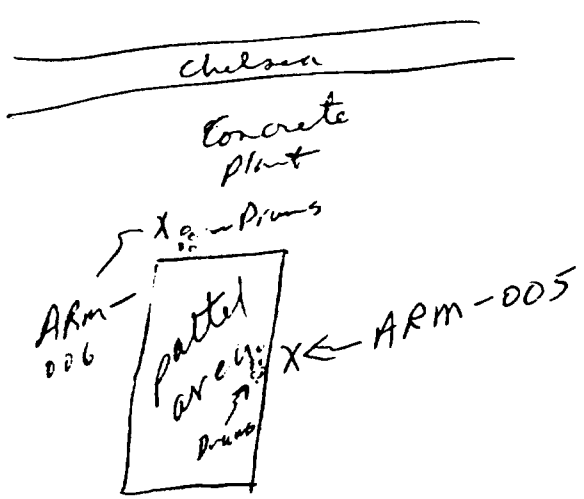
	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
AD NO.	81C	1031				BACTERIAL	0
ATE	1					BOD, COD, TOC	1
IME	1	3/17/81				CYANIDE	2
LOW ( ) L1		1440				METALS, Hg	3
EMPERATURE °C						N, P	4
H						ORG, O&G, PEST	5
OT. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
AMPLE CODE		2,3,5,6					9
AMPLED BY (Sig)		[signature]					A
EALED BY (Sig)		[signature]					B
ATE AND TIME		3/17/81	1500			PRESERVED	P

Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES



1 qt soil
1 pt soil

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

ISCHARGER Allen Ready Mix
DDRESS Chelsea Ave
Memphis TN
ONTACT

SAMPLING STATION NO. ARM-006
SAMPLING LOCATION Soil down grade from drums at SE ~~NE~~ corner of pallet area.

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.
AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____
LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____
COMPUTED FROM _____

SAMPLE COLLECTION

	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
AD NO. 81C		1034				BACTERIAL	0
ATE	1	3/17/81				BOD, COD, TOC	1
IME	1	14-55				CYANIDE	2
LOW ( ) L1						METALS, Hg	3
EMPERATURE °C						N, P	4
H						ORG, O&G, PEST	5
OT. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
AMPLE CODE		3, 3, 5, 8					9
AMPLED BY (Sig)		[signature]					A
EALED BY (Sig)		[signature]					B
ATE AND TIME		3/17/81	1510			PRESERVED	P

Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

SAMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D. Culquitt	3/20/81	0730	2		

REMARKS AND SKETCHES

See sketch
ARM-005

1 qt soil
1 pt soil

* G P O 1980 - 640-198 / 1980, REGION NO. 4

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV

ATHENS, GEORGIA

SCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-004
DDRESS Chelsea Ave Memphis	SAMPLING LOCATION Red sandy looking material - residual from fiber or plastic drum nr. dredge pond
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
D NO.	81C	1032				BACTERIAL	0
TE	1	3/17/81				BOD. COD. TOC	1
ME	1	1420				CYANIDE	2
OW ( ) L1						METALS, Hg	3
MPERATURE °C						N, P	4
						ORG, O&G, PEST	5
T. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
MPLE CODE		2, 3, 5, 8					9
MPLED BY (Sig)		[signature]					A
ALED BY (Sig)		[signature]					B
TE AND TIME						PRESERVED	P

Use Avg. Flow for Composites and Inst. Flow for Grabs L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquett	3/20/81	0730	1		

REMARKS AND SKETCHES

See sketch

ARM-003

1 - qt waste

GPO 1980-640-198 / 1988, REGION NO. 4

U.S. ENVIRONMENTAL PROTECTION AGENCY
SURVEILLANCE AND ANALYSIS DIVISION

EGION IV — ATHENS, GEORGIA

SCHARGER Allen Ready Mix	SAMPLING STATION NO. ARM-003
DDRESS Chelsea Ave Memphis TN	SAMPLING LOCATION Soil sample down gradient from drum ring and liners nr. dredge pond.
ONTACT	

SAMPLE AND WASTE FLOW INFORMATION

AMPLE ☐ MUN. ☐ IND. ☐ INF. ☐ EFF. ☐ _____ ☐ _____ HR. COMP. AT _____ MIN. INTERVALS ☐ FLOW PRO.

AMPLER ☐ EPA ☐ DISCHARGER ☐ MAN. ☐ AUTO. ☐ TYPE _____

LOW ☐ EPA ☐ DISCHARGER ☐ AVG. ☐ INST. ☐ EST. ☐ _____ EQUIP _____

COMPUTED FROM _____

SAMPLE COLLECTION

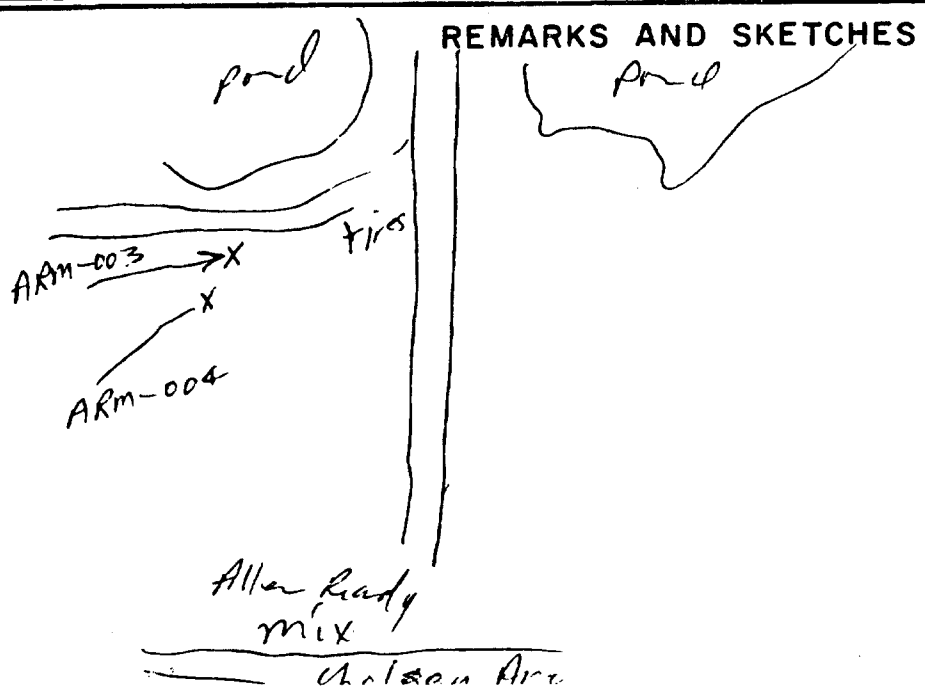
	COMPOSITE	GRAB SAMPLES				SAMPLE CODE L2	
AD NO. 810	2	1033				BACTERIAL	0
ATE	1	3/17/81				BOD, COD, TOC	1
ME	1	14-15				CYANIDE	2
LOW ( ) L1						METALS, Hg	3
EMPERATURE °C						N, P	4
						ORG, O&G, PEST	5
OT. Cl2 RES, mg/l						PHENOLS	6
						SOLIDS	7
						VOA	8
AMPLE CODE		2, 3, 5, 8					9
AMPLED BY (Sig)		[signature]					A
ALED BY (Sig)		[signature]					B
ATE AND TIME		3/17/81	1930			PRESERVED	P

Use Avg. Flow for Composites and Inst. Flow for Grabs — L2 Circle or Indicate Analysis and Enter Numerical Code

SAMPLE CUSTODY AND SHIPPING INFORMATION

AMPLES RELEASED TO (SIG) OR SHIPPED VIA	DATE	TIME	NO. CONT.	NO CART.	RECEIPT NO.
D Colquitt	3/20/81	0730	2		

REMARKS AND SKETCHES



1 pt soil
1 pt soil

★ G P O 1980 – 640-198 / 1988, REGION NO. 4

U. S. ENVIRONMENTAL PROTECTION AGENCY
REGION IV

RECEIPT FOR SAMPLES

The samples described below were collected in connection with the administration and enforcement of the:

(X) Resource Conservation and Recovery Act (RCRA) 42 U.S.C. §6901, et seq., specifically Section 3007 of RCRA, 42 U.S.C. §6927.

( ) Toxic Substances Control Act (TSCA) 15 U.S.C. §2601, et seq., specifically Section 11 of TSCA, 15 U.S.C. §2610.

R. J. Brunner III, USEPA/SAD, College Station Rd, Athens Ga
Inspector Name: Inspector Address:

Allen Ready Mix, 1572 Chelsea Ave, Memphis TN
Name of Firm: Firm Address:

Fred Richardson, Vice President - Manager
Firm Owner, Operator or Agent: Title:

SAMPLE NUMBER	COLLECTED DATE	COLLECTED TIME	SAMPLE TYPE WATER	SOIL	OTHER	DUPLICATE SAMPLES OFFERED	ACCEPTED	REJECTED	SAMPLE LOCATION ON-SITE	OFF-SITE
ARM-003	3/17/81	1415		X		X			X	
ARM-004	3/17/81	1420			Waste X	X			X	
ARM-005	3/17/81	1440		X		X			X	
ARM-006	3/17/81	1455		X		X			X	

Receipt for the sample(s) described above is hereby acknowledged:

Signature of Inspector

Environmental Engineer
Title

Receipt/Rejection of Duplicate or Split Samples is hereby acknowledged:

Fred Richardson
Signature of Firm Owner, Operator or Agent

Mgr.
Title

ADDITIONAL COMMENTS

ROUTING AND TRANSMITTAL SLIP

Date 7/14/81

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Enforcement Division		
2. Howard Zeller		
3.		
4.		
5.		

	Action		File		Note and Return
	Approval		For Clearance		Per Conversation
	As Requested		For Correction		Prepare Reply
	Circulate	✓	For Your Information		See Me
	Comment		Investigate		Signature
	Coordination		Justify		

REMARKS

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
James Finger	Phone No. 3136

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

☆ GPO : 1981 O - 341-529 (25)

Initial Priority 2

Site No. 72

EPIC Description: Possible old fill. Dumping and some piles of tanks. Several tank trucks. Numerous leachate ponds.

TND 980 838 825

Facility Name & Location: Allen Ready-Mix Concrete Co.
1572 Chelsea Ave.
Shelby Memphis, Tennessee

Contact: Bill Allen, President; 901/275-5511

EPA Inspectors: Richard Green and Andrew Kromis

Date & Time of Inspection: 7 MAY 80, 1420

Summary of Field Observations:

Site 72 belongs to the Allen Ready Mix Concrete Co. and is located on the southwest corner of a large lagoon on the south side of the Wolf River. Large piles of sand and gravel are processed and stored on the property. A major portion of the area is probably filled but no evidence of leaching to the lagoon was observed.

A small fenced area just west of the plant property contained about fifteen unlabeled drums. Some were full and several were badly corroded. Outside of the fenced area were ten or twelve additional drums. These were unlabeled and badly corroded. Some were full. The side of one of the drums was completely rusted through and the contents contained by a plastic liner.

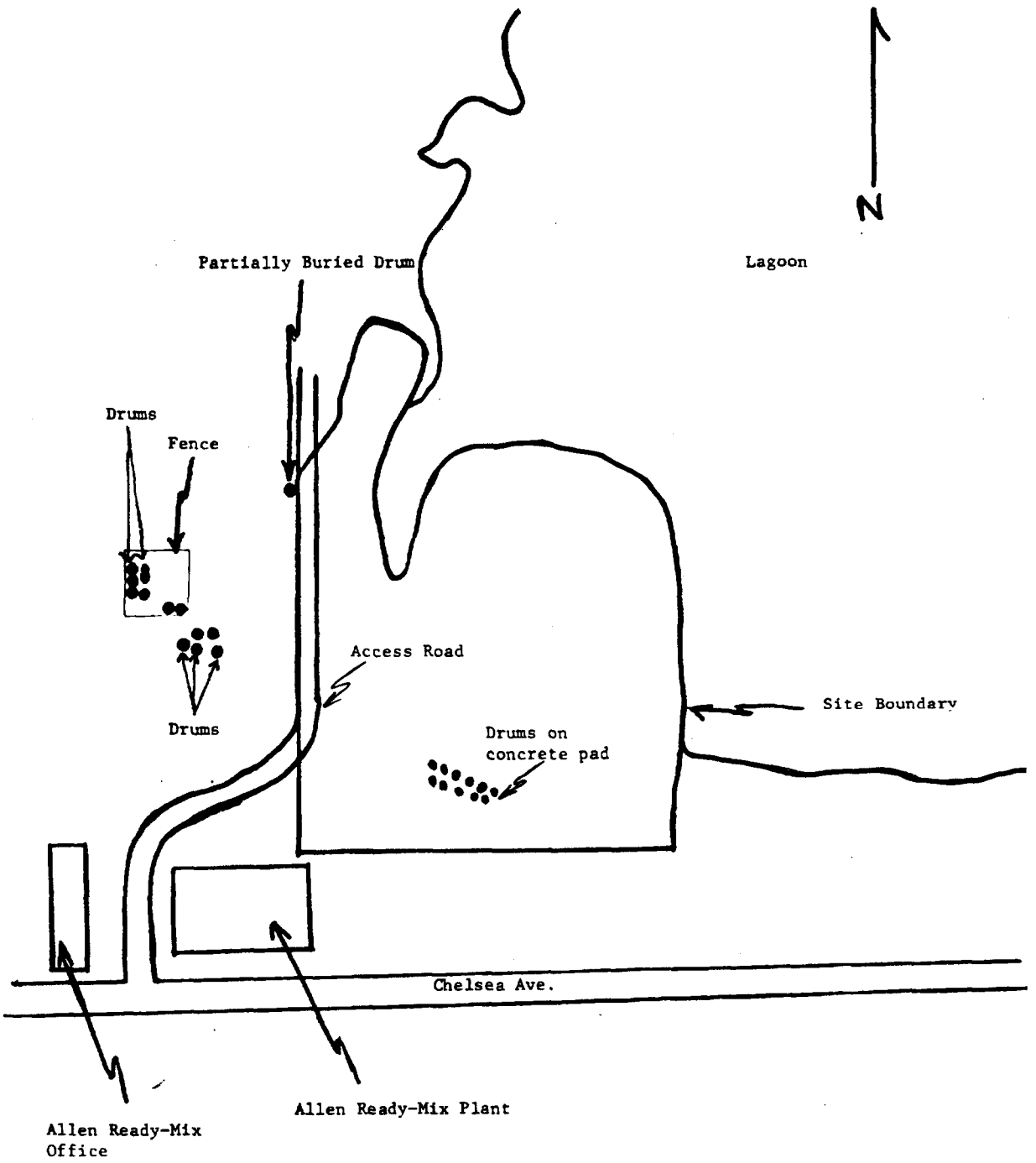
A partially buried drum was examined just west of the access road and northwest of the aforementioned fenced area. It appeared empty.

It is to be noted that all of the drums discussed above were not actually within the boundaries of Site 72. The only drums which were seen within the boundaries of the actual site were stored on a concrete pad visible from Chelsea Avenue. This group was comprised of about fifteen drums and appeared to contain fuel or lubricating oil for the heavy equipment. Mr. Allen was not available at the time of the inspection; however, personnel in the main office knew of no other drums on site.

Preliminary Sampling and Coordinating Recommendations:

Further investigation and sampling of selected off-site drums.

Site No. 72


N
Partially Buried Drum
Lagoon
Drums
Fence
Drums
Access Road
Site Boundary
Drums on
concrete pad
Chelsea Ave.
Allen Ready-Mix
Office
Allen Ready-Mix Plant