Figure

Figure #1

Figure #2

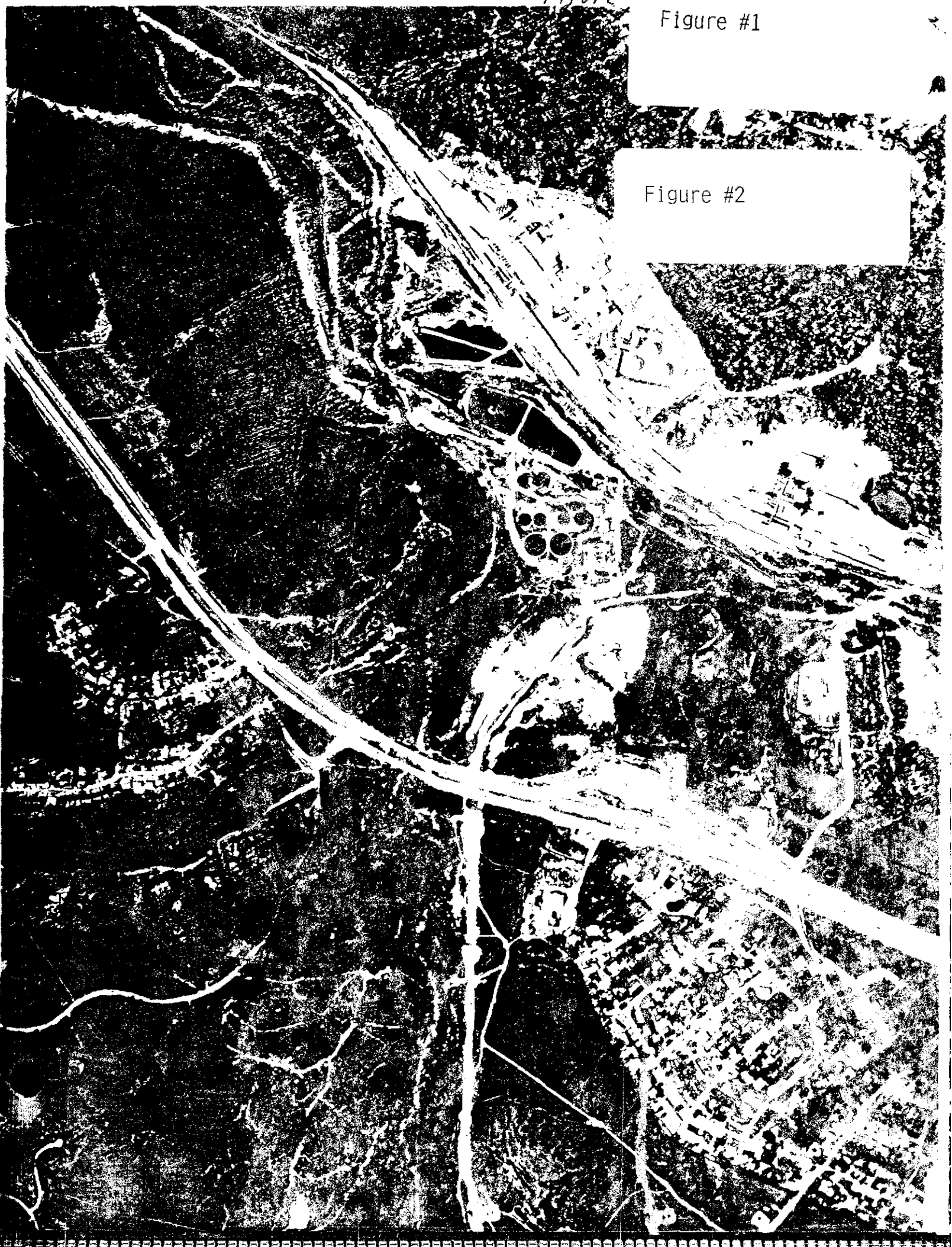

Figure # 4

Figure #3
Soil samples

Figure #4
Active Groundwater
Monitoring Wells

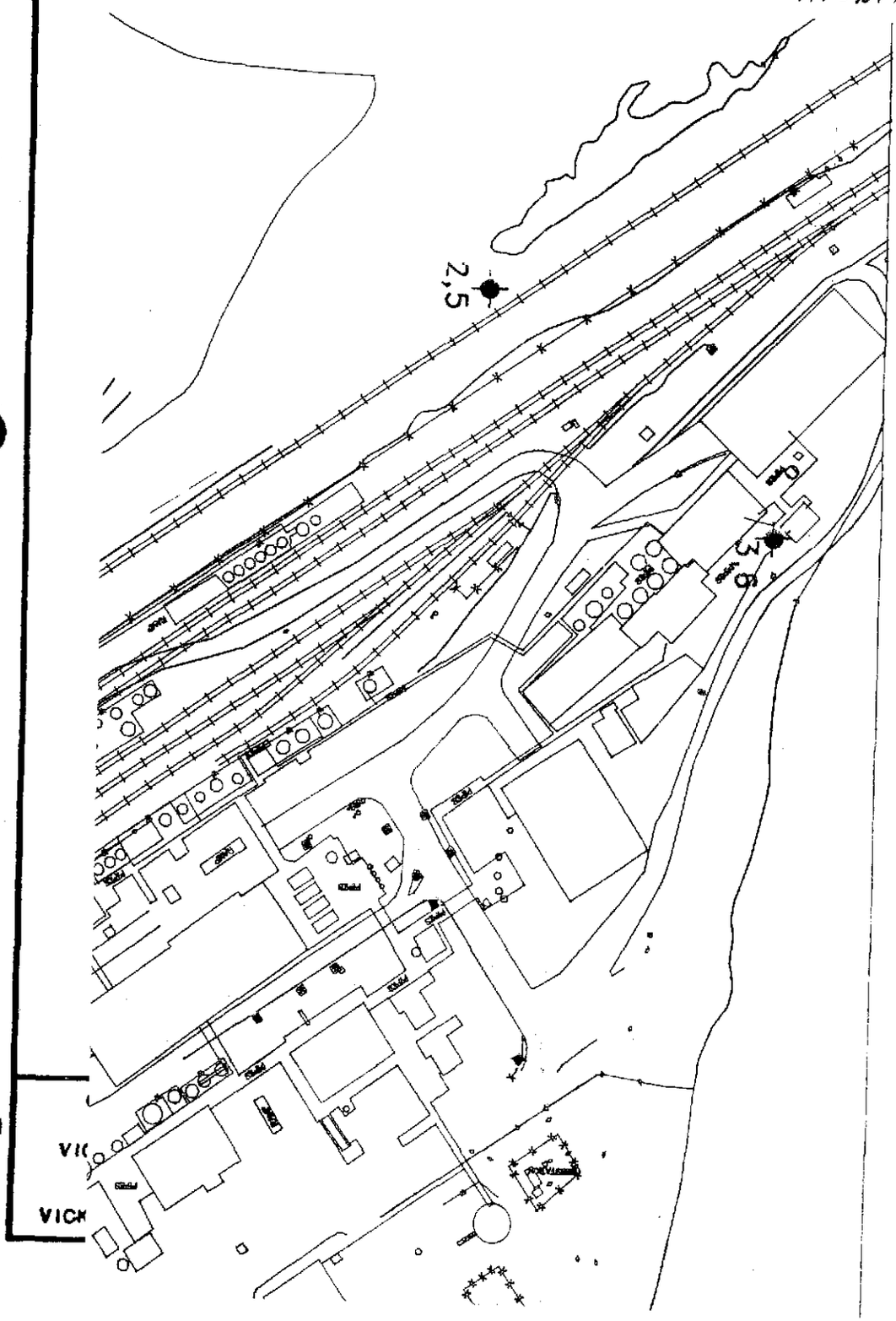

Figure # 3

nts

JNDWATER G WELLS	FILE NO. —
	FIG. NO. 6

Reference 1

12-14-90
Vol. 55 No. 241

federal register

Friday
December 14, 1990

Book 2

Source Characterization ⇒ pg. 51590
GW Pathway ⇒ pg. 51595
SW Pathway ⇒ pg. 51605
Soil Exposure ⇒ pg. 51644
Air Pathway ⇒ pg. 51651

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U.S. Government Printing Office
(ISSN 0097-6326)

Reference 2

SUPERFUND CHEMICAL DATA MATRIX

9 March 1993

Reference

4

STATE OF MISSISSIPPI

HALEY BARBOUR

GOVERNOR

MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

CHARLES H. CHISOLM, EXECUTIVE DIRECTOR

Information from the Office of Pollution Control Permit and Compliance Section Files of highest soil and groundwater concentrations compiled by Jerry Banks.

OFFICE OF POLLUTION CONTROL

POST OFFICE BOX 10385 • JACKSON, MISSISSIPPI 39289-0385 • TEL: (601) 961-5171 • FAX: (601) 354-6612 • www.deq.state.ms.us

AN EQUAL OPPORTUNITY EMPLOYER

Groundwater Concentrations On Site (ppb)

Compound	Groundwater Concentration	Tier 1 Table Concentration
* Arsenic	[288,000]	50 (MCL)
* Atrazine	[146]	3
* Benzene	[23.7]	5 (MCL)
* Bromodichloromethane	[296]	0.168
* Carbon Tetrachloride	[357,500]	5 (MCL)
* Chloroform	[37,380]	0.155
* Chloromethane	[126]	1.43
* 1,1-Dichloroethene	[54.6]	7 (MCL)
1,2-Dichloroethene	[1,758]	7
Dinoseb	[18,821]	7 (MCL)
1,2-Dichloropropane	[42.3]	5 (MCL)
* Methylene Chloride	[908]	5 (MCL)
* Tetrachloroethene (PCE)	[180]	5 (MCL)
* 1,1,2-Trichloroethane	[290]	5 (MCL)
* Trichloroethene (TCE)	[1,346]	5 (MCL)
* Toxaphene	—	3 (MCL)
* Vinyl Chloride	[46.5]	2 (MCL)
Total Petroleum Hydrocarbons	—	650

* Carcinogenic compounds - EPA Integrated Risk Information System (IRIS)

[ ] Above cleanup level

MCL = Maximum Contaminant Level from Safe Drinking Water Act

Soil Concentrations On Site
(ppb)

Compound	Concentration in Soil	Tier 1 Table Restricted/Unrestricted
* Arsenic	[254,000]	3,820/426
* Atrazine	[3,514]	25,800/2880
* Benzene	–	1,360/887
* Bromodichloromethane	165	1,890/1,240
* Carbon Tetrachloride	[6,659]	569/371
* Chloroform	[2,186]	478/312
* Chloromethane	–	440,000/49,100
* 1,1-Dichloroethene	–	118/77.2
1,2-Dichloroethene	–	1,210,000/782,000
Dinoseb	[8,282,600]	204,000/78,200
1,2-Dichloropropane	51.7	445/445
* Methylene Chloride	602	21,900/14,300
* Tetrachloroethene (PCE)	–	18,200/11,900
* 1,1,2-Trichloroethane	47.7	1,670/1,090
* Trichloroethene (TCE)	–	7,920/5,170
* Toxaphene	[110,964]	5,200/581
* Vinyl Chloride	–	939/426
Total Petroleum Hydrocarbons	15,431,000	350,000/300,000

* Carcinogenic compounds - EPA Integrated Risk Information System (IRIS)

[ ] Above cleanup level

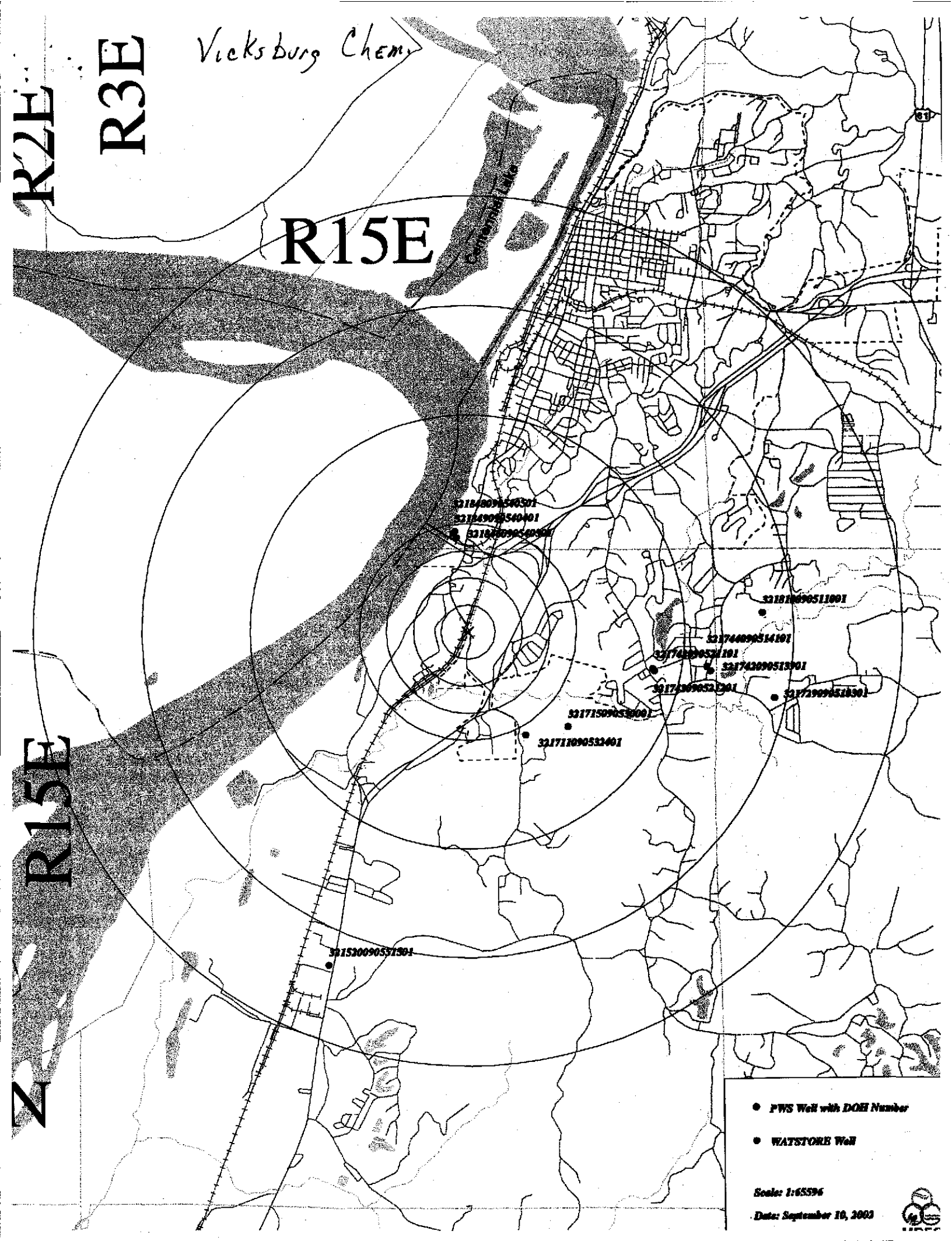
Reference 5

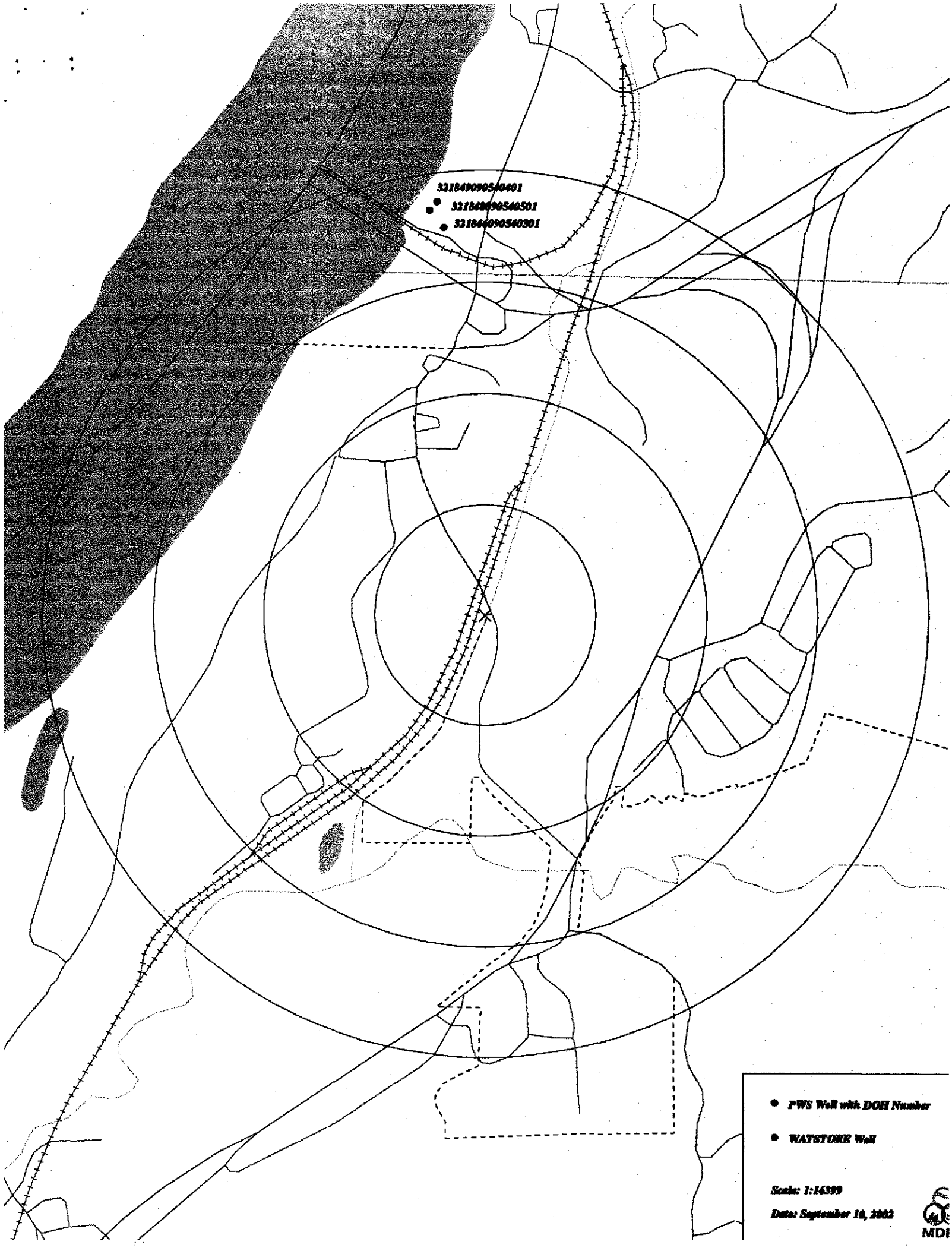
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY

Charles H. Chisolm, Executive Director

Information from the Office of Land and Water Resources.

OFFICE OF POLLUTION CONTROL
P.O. Box 10385 Jackson, MS 39289.0385 Phone 601.961.5171 Fax 601.354.6612


Vicksburg Chem
R2E
R3E
R15E
R15E
Centennial Lake
61
321848090540501
321849090540401
321744090514101
321744090514101
321743090513901
321729090518901
321715090532001
321711090532401
321530090571301
PWS Well with DOH Number
WATSTORE Well
Scale: 1:65596
Date: September 10, 2003


321849090540401
321849090540501
321849090540301
PWS Well with DOH Number
WATSTORE Well
Scale: 1:16399
Date: September 10, 2003
MDI

September 10, 2002

RADIAL SEARCH ON PUBLIC AND PRIVATE WELLS

Radius: 4.00 miles
Center: 32 18 01 latitude
90 53 57 longitude

SOURCE INFORMATION

Public Water Supply Wells

Public Water Supply (PWS) wells were located by the Mississippi Department of Environmental Quality, Office of Land and Water Resources using mapping-grade GPS equipment. The accuracy should be +/- 5 meters. The identification number and related PWS well data are from the Mississippi Department of Health.

WATSTORE

WATSTORE is a USGS, WRD database of public and private wells. MDEQ acquired a copy of the data, and developed a GIS layer. The source of the positional data is from manually scaled maps, and accuracy may vary greatly.

September 10, 2002

RADIAL SEARCH ON USGS WATSTORE WELLS

Radius: 4.00 miles
Center: 32 18 01 latitude
90 53 57 longitude

Contacted M. Park about wells

Leon Park 630 - 4601

WATSTORE Site ID	321846090540301
County	149
Local Well Number	J044 AMERISTAR
Land Net	S32T16NR03E
Primary Use	
Depth	
Aquifer	

WATSTORE Site ID	321849090540401
County	149
Local Well Number	J045 AMERISTAR
Land Net	S32T16NR03E
Primary Use	
Depth	
Aquifer	

3 well, within 1 mile

10 wells used to dewater Hill

WATSTORE Site ID	321848090540501
County	149
Local Well Number	J046 AMERISTAR
Land Net	S32T16NR03E
Primary Use	
Depth	
Aquifer	

WATSTORE Site ID	321520090551501
County	149
Local Well Number	M005 SOU TRAILER
Land Net	----S20T15NR03E
Primary Use	U
Depth	
Aquifer	

WATSTORE Site ID	321742090521101
County	149
Local Well Number	M006 USCE
Land Net	NWNES13T15NR03E
Primary Use	
Depth	
Aquifer	

WATSTORE Site ID	321743090521201
County	149
Local Well Number	M007 USCE WGC 2
Land Net	NWNES13T15NR03E
Primary Use	U
Depth	
Aquifer	

WATSTORE Site ID	321715090530001
County	149
Local Well Number	M018 JACK B SMITH
Land Net	----S12T15NR03E
Primary Use	H
Depth	165
Aquifer	122CTHL

WATSTORE Site ID	321711090532401

County	149
Local Well Number	M022 GEORGE LEE
Land Net	SWSWS12T15NR03E
Primary Use	H
Depth	70.0
Aquifer	122CTHL

WATSTORE Site ID	[redacted]
County	149
Local Well Number	M023 USCE WES
Land Net	NENES13T15NR03E
Primary Use	H
Depth	284
Aquifer	123FRHL

WATSTORE Site ID	[redacted]
County	149
Local Well Number	M024 USCE WATERWAYS
Land Net	NENES13T15NR03E
Primary Use	
Depth	
Aquifer	

WATSTORE Site ID	[redacted]
County	149
Local Well Number	N020 H H WILKS
Land Net	----S06T15NR04E
Primary Use	S
Depth	128
Aquifer	

WATSTORE Site ID	[redacted]
County	149
Local Well Number	N021 R M TOMPKINS
Land Net	----S07T15NR04E
Primary Use	H
Depth	110
Aquifer	122CTHL

Reference 6

U.S. Census Bureau

Back to Basic Facts

Geographic Comparison Table

GCT-PL. Race and Hispanic or Latino: 2000
Data Set: Census 2000 Redistricting Data (Public Law 94-171) Summary File
Geographic Area: **Mississippi -- Place**

NOTE: For information on confidentiality protection, nonsampling error, and definitions, see http://factfinder.census.gov/home/en/datanotes/expplu.html.

Geographic area	Total population	Race						
		One race						
		Total	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race
Mississippi	2,844,658	2,824,637	1,746,099	1,033,809	11,652	18,626	667	13,784
PLACE								
Abbeville town, Lafayette County	423	421	397	24	0	0	0	0
Aberdeen city, Monroe County	6,415	6,388	2,488	3,862	6	25	3	4
Ackerman town, Choctaw County	1,696	1,689	1,068	591	4	10	0	16
Algoma town, Pontotoc County	508	502	392	110	0	0	0	0
Alligator town, Bolivar County	220	216	46	170	0	0	0	0
Amory city, Monroe County	6,956	6,912	4,859	2,030	8	4	0	11

Geographic area	Total population	Race						
		One race						
		Total	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Some other race
State Line town	555	553	237	316	0	0	0	0
Greene County (part)	327	326	138	188	0	0	0	0
Wayne County (part)	228	227	99	128	0	0	0	0
Stonewall town, Clarke County	1,149	1,145	866	272	6	0	0	1
Sturgis town, Oktibbeha County	206	206	193	12	0	0	0	1
Summit town, Pike County	1,428	1,414	466	945	0	1	0	2
Sumner town, Tallahatchie County	407	404	236	159	0	9	0	0
Sumrall town, Lamar County	1,005	996	770	224	1	0	0	1
Sunflower town, Sunflower County	696	693	194	496	0	3	0	0
Sylvarena village, Smith County	120	118	112	2	4	0	0	0
Taylor village, Lafayette County	289	289	232	52	4	0	1	0
Taylorsville town, Smith County	1,341	1,337	1,094	238	0	0	0	5
Tchula town, Holmes County	2,332	2,319	80	2,237	2	0	0	0
Terry town, Hinds County	664	659	324	335	0	0	0	0
Thaxton town, Pontotoc County	513	513	509	4	0	0	0	0
Tillatoba town, Yalobusha County	121	121	95	26	0	0	0	0
Tishomingo town, Tishomingo County	316	315	307	6	0	0	0	2
Toccopola town, Pontotoc County	189	187	186	1	0	0	0	0
Tremont town, Itawamba County	390	386	375	6	0	1	0	4
Tucker CDP, Neshoba County	534	532	32	1	496	0	0	3
Tunica town, Tunica County	1,132	1,126	768	333	3	12	0	10
Tupelo city, Lee County	34,211	33,921	23,744	9,676	35	301	5	160
Tutwiler town, Tallahatchie County	1,364	1,361	161	1,191	4	5	0	0
Tylertown town, Walthall County	1,910	1,895	1,076	791	3	16	0	9
Union town	2,021	2,000	1,270	718	7	4	0	1
Neshoba County (part)	525	520	351	162	5	2	0	0
Newton County (part)	1,496	1,480	919	556	2	2	0	1
Utica town, Hinds County	966	960	295	641	1	3	0	20
Vaiden town, Carroll County	840	839	239	597	1	1	0	1
Vancleave CDP, Jackson County	4,910	4,862	4,478	331	28	13	0	12
Vardaman town, Calhoun County	1,065	1,057	625	361	2	0	1	68
Verona city, Lee County	3,334	3,296	1,293	1,923	14	11	0	56
Vicksburg city, Warren County	26,407	26,250	9,982	15,957	46	186	4	107
Wade CDP, Jackson County	491	487	476	5	0	1	4	1
Walnut town, Tippah County	754	749	637	109	2	0	0	1
Walnut Grove town, Leake County	488	481	280	199	1	0	1	0
Walthall village, Webster County	170	166	158	6	0	1	0	1
Water Valley city, Yalobusha County	3,677	3,659	2,128	1,498	12	6	8	1
Waveland city, Hancock County	6,674	6,614	5,698	748	33	100	2	33
Waynesboro city, Wayne County	5,197	5,179	2,159	2,977	11	19	0	13
Webb town, Tallahatchie County	587	578	206	360	0	12	0	0
Weir town, Choctaw County	553	553	250	297	5	0	0	1
Wesson town, Copiah County	1,693	1,679	1,316	334	1	4	1	23
West town, Holmes County	220	219	124	94	0	1	0	1
West Hattiesburg CDP, Lamar County	6,305	6,240	4,721	1,394	4	103	0	13
West Point city, Clay County	12,145	12,093	5,211	6,823	9	27	0	23
Wiggins city, Stone County	3,849	3,835	2,602	1,213	2	6	0	11
Winona city, Montgomery County	5,482	5,458	2,637	2,781	8	27	3	1
Winstonville town, Bolivar County	319	319	6	312	0	0	0	1
Woodland village, Chickasaw County	159	158	80	71	0	0	0	1
Woodville town, Wilkinson County	1,192	1,181	292	889	0	0	0	1
Yazoo City city, Yazoo County	14,550	14,463	4,180	10,138	26	85	0	34

Source: U.S. Census Bureau, Census 2000 Redistricting Data (Public Law 94-171) Summary File, Matrices PL1 and PL2.

Reference 7

DRAFT RFA REPORT

CEDAR CHEMICAL CORPORATION
VICKSBURG, MS

Prepared for

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Waste Programs Enforcement
Washington, D.C. 20460

Work Assignment No.	: R04019
EPA Region	: IV
Site No.	: MSD990714081
Contract No.	: 68-W9-0004
CDM Federal Programs Corporation Document No.	: TES7-R04019-RT-BZGF-2
Prepared by	: A.T. Kearney
Work Assignment Project Manager	: Tony Isolda
Telephone Number	: (404) 952-7393
Primary Contact	: Doyle Brittain
Telephone Number	: (404) 347-2643
Date Prepared	: November 7, 1990

D R A F T

E N F O R C E M E N T C O N F I D E N T I A L

Reference 8

RCRA FACILITY ASSESSMENT - INTERIM FINAL REPORT
CEDAR CHEMICAL CORPORATION
VICKSBURG, MISSISSIPPI

Prepared for

U.S. Environmental Protection Agency
Office of Waste Programs Enforcement
Washington, D.C. 20460

Work Assignment No.	:	R04019
EPA Region	:	IV
Site No.	:	MSD990714081
Contract No.	:	68-W9-0004
CDM FEDERAL PROGRAMS CORPORATION		
Document No.	:	TES7-R04019-FR-CQXV-2
Prepared by	:	A.T. Kearney
Work Assignment Project Manager	:	Robert Rose
Telephone Number	:	(404) 952-7393
EPA Work Assignment Manager	:	J.R. Finney
Telephone Number	:	(404) 347-7603
Date Prepared	:	January 17, 1992

Reference
9

74100

RCRA FACILITY INVESTIGATION
DRAFT FINAL REPORT

Prepared for
Vicksburg Chemical Company
Vicksburg, Mississippi

August 2001

File No. 35092B007C.00-04004

URS

URS Corporation
2822 O'Neal Lane
Baton Rouge, Louisiana 70816
225/751-1873

Reference

10

IT CORPORATION

RESPONSIVE TO THE NEEDS OF ENVIRONMENTAL MANAGEMENT

VERTAC CHEMICAL CORPORATION
VICKSBURG FACILITY
PART B PERMIT APPLICATION
APPENDIX 1983

Reference
11

Series 1956, No. 9

SOIL SURVEY

Warren County Mississippi

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
MISSISSIPPI AGRICULTURAL EXPERIMENT STATION

Contents

Series 1961, No. 9

Issued November 1964

References

12

SOURCES FOR WATER SUPPLIES IN MISSISSIPPI

A COOPERATIVE STUDY SPONSORED BY THE
U. S. GEOLOGICAL SURVEY
and the
Mississippi Research and Development Center
JACKSON, MISSISSIPPI

REVISED 1986

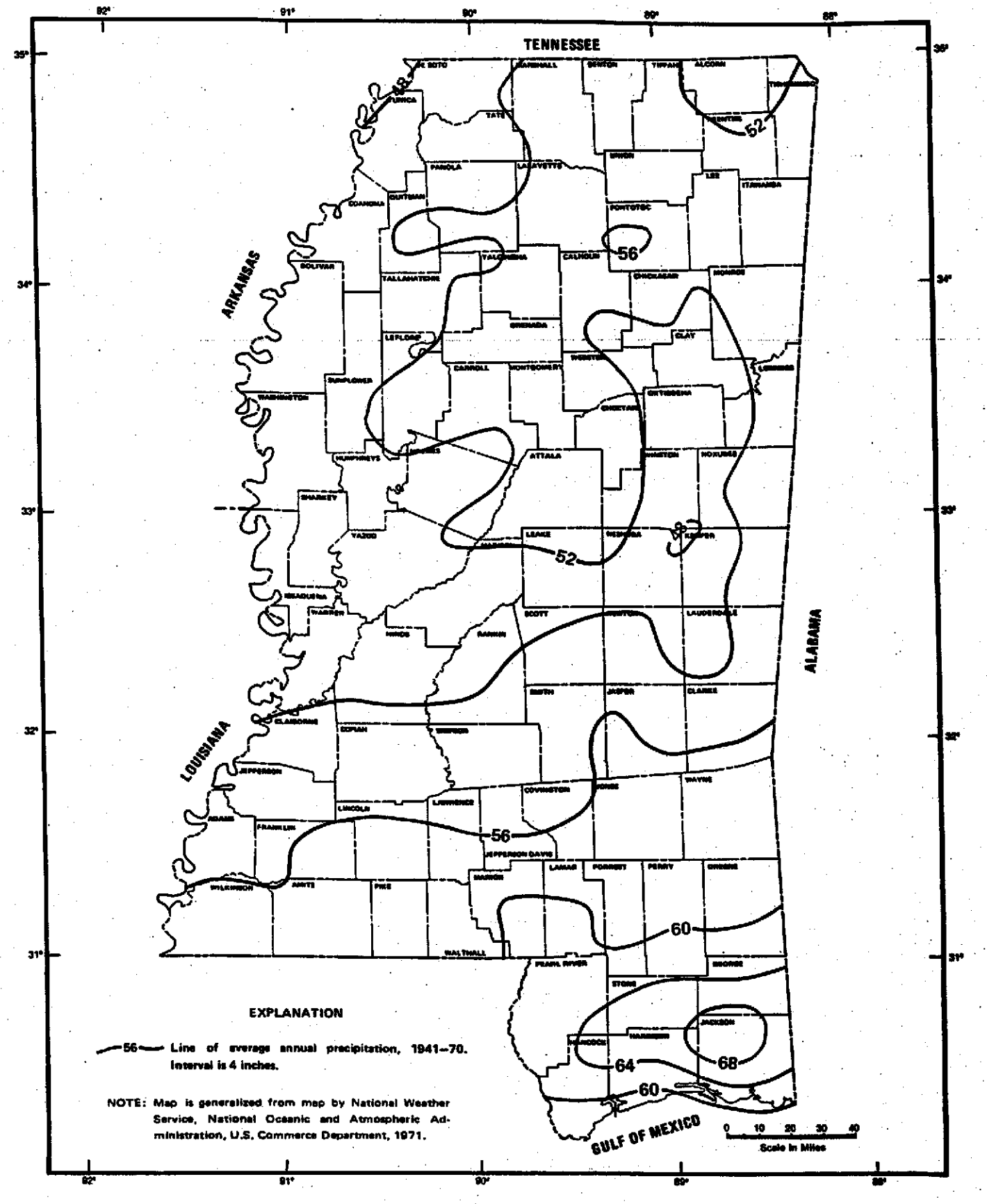


Figure 4. – Average annual precipitation, in inches, in Mississippi for period 1941–70.

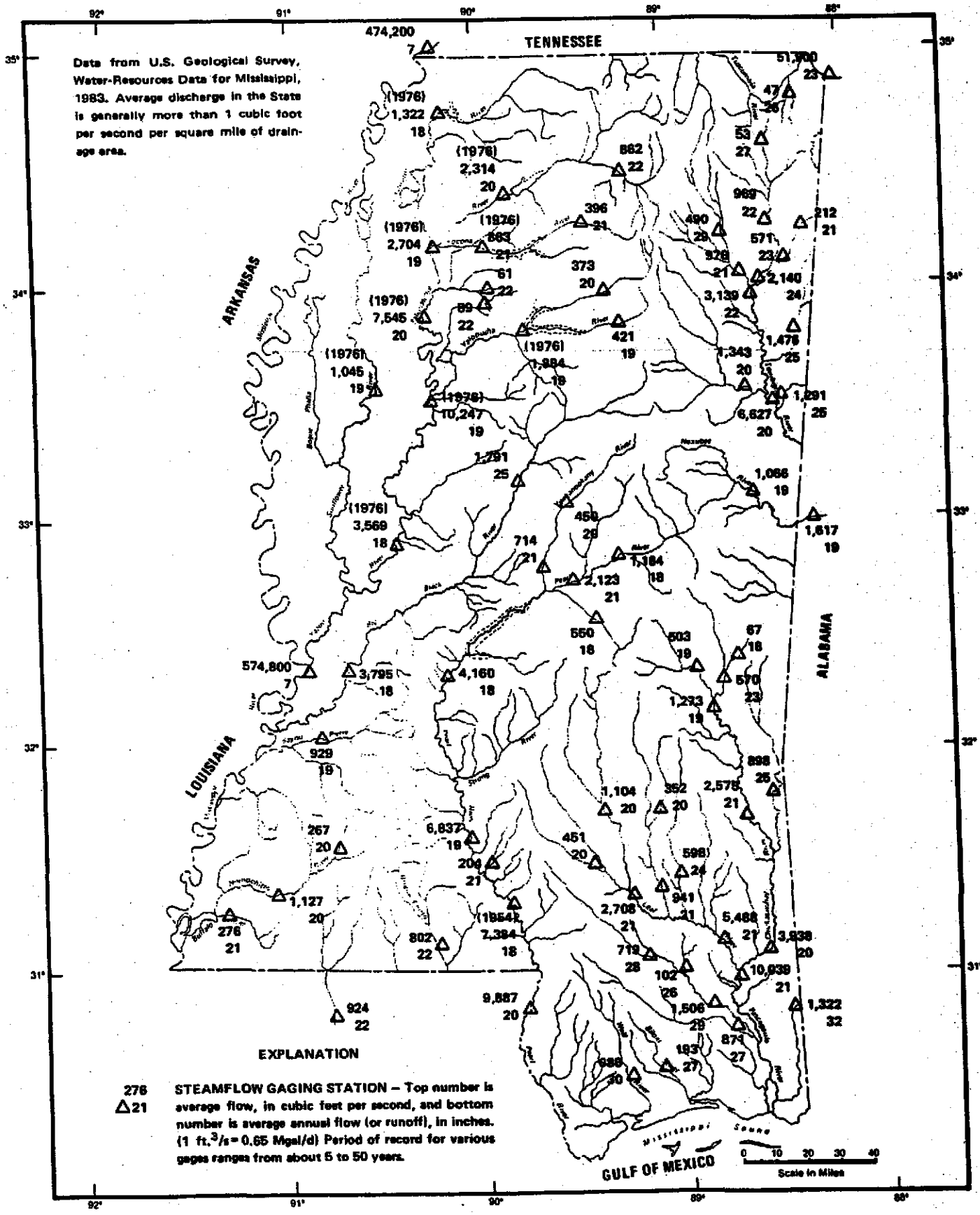


Figure 5. -- Average flow at selected streamgaging sites in cubic feet per second and in inches per year for periods of record through 1983 water year. (If end of record for station is earlier than 1983, the date is shown in parentheses.)

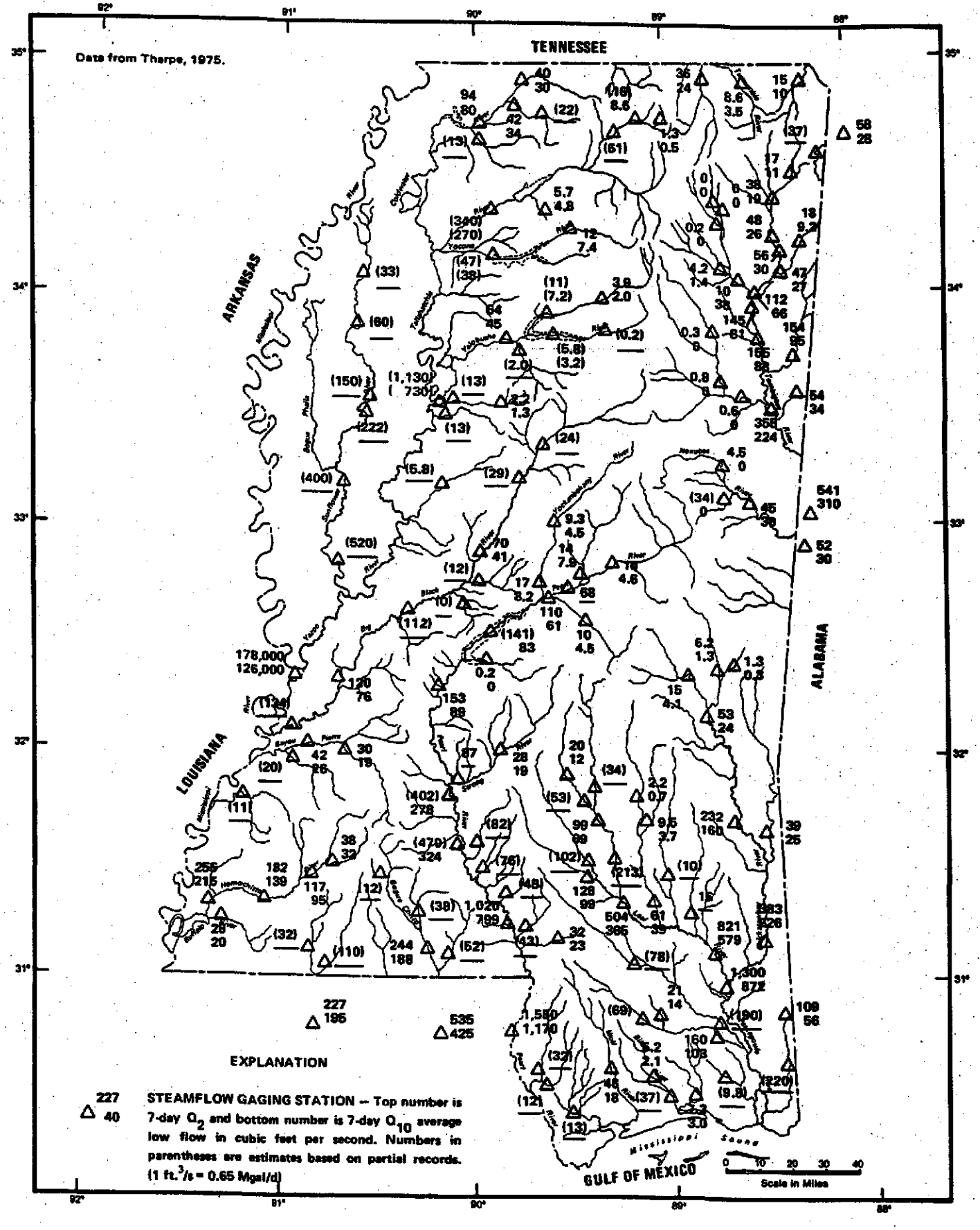


Figure 6. -- Seven-day average low flow with 2-year and 10-year recurrence intervals (7-day Q_2 and 7-day Q_{10}) at selected streamgaging sites.

Mississippi (fig. 7) that were designed for various purposes. Pickwick Lake, on the Tennessee River at the northeastern corner of the State, is a part of the Tennessee Valley Authority hydro-electric system. The discharge from Pickwick Lake is almost completely controlled.

The U.S. Army Corps of Engineers built four reservoirs (fig. 7) on headwater streams of the Yazoo River in northwestern Mississippi for flood control. These flood-control reservoirs also tend to augment downstream flow during dry periods. In northeastern Mississippi, the Tennessee-Tombigbee Waterway has several impoundments.

Water supply has been considered in the design of two major reservoirs in the State—Ross Barnett Reservoir on the Pearl River at Jackson and the Okatibbee Reservoir on Okatibbeee Creek at Meridian (fig. 7).

Thousands of manmade ponds and lakes in the State are used both for watering livestock and for fishing. Other principal uses of ponds and lakes are recreation, irrigation, and catfish farming.

An adequately large reservoir could essentially convert the average flow of a stream (fig. 5) to a dependable water supply, but this near conversion would be expensive. A more practical reservoir might be designed to sustain low flow at only 20 percent of average flow (see Wasson and Tharpe, 1975, for an expanded discussion and bibliography on use of reservoirs for water supply).

Chemical quality of water in reservoirs is strongly affected by the quality of water in the streams entering the reservoirs. Quality of surface water is described in the following section.

Quality

The dissolved-solids concentration and hardness of water in streams in and bordering Mississippi commonly is low. The dissolved-solids concentration of flood water in the State, commonly less than 50 mg/L, reflects the low dissolved-solids concentrations found in rainwater. During long droughts, most of the flow in streams comes from the recharge areas (outcrops) of the aquifers. In the upland areas of the State, the dissolved-solids concentration of low-flow water commonly is less than 100 mg/L and seldom is it greater than 200 mg/L. The map showing dissolved-solids concentrations in surface water (fig. 8) shows minimum, mean, and maximum values at selected stream sampling sites. Commonly, the minimum values were recorded when stream flow was high, and the maximum values were recorded when stream flow was low. The high values generally reflect the quality of the ground water that constitutes the base flow of a stream, but may also reflect manmade pollution.

Surface water in Mississippi generally requires treatment only for sediment and micro-organisms. Surface water sometimes needs treatment to remove color and turbidity. Much specific water-quality data for many sites in the State may be found in the series of annual reports "Water resources data for Mississippi" by the U.S. Geological Survey. Table 1 shows chemical analyses of water collected during low-, medium-, and high-flow periods from selected streams.

GROUND WATER

Geology

Mississippi lies mostly within the Gulf Coastal Plain. The geologic units, composed mostly of sand, gravel, clay, silt, and chalk, crop out in belts that generally trend from northwest to southeast across Mississippi (fig. 9). The geologic units, except the young alluvial and terrace deposits, dip toward the axis of the Mississippi embayment and, in the south, toward the Gulf of Mexico. In the northern part of the State, the dips are generally to the west; in central Mississippi the dips are generally southwest; and in southeast Mississippi the dips are southwest to south. The dip is about 15 to 35 feet per mile where the geologic units are at or near the surface, but farther away from the outcrop areas the dip increases and generally it is about 30 to 50 feet per mile. The dips in a few places in the State are affected by regional and local structures. Some of the geologic units are more than 1,000 feet thick; however, the thicknesses of most of the aquifers that occur within the units range from 100 to 400 feet. Table 2 shows the geologic units and the major aquifers.

Surficial materials of varying thicknesses cover the older geologic units in large parts of Mississippi. Thickness of the Mississippi River Valley alluvium averages about 140 feet in the Yazoo basin, a part of the Mississippi River flood plain. The flood plains of most of the other larger streams in the state are underlain with 10 to 100 feet of alluvium. Small areas of terrace deposits of sand and gravel occur in many areas of the State at elevations higher than the flood plains. Loess thickly blankets the hill area immediately east of the Mississippi River alluvial plain. To the east across the State this blanket of windblown sediment becomes thinner and patchy.

Hydrology

Precipitation is the primary source of freshwater in Mississippi. The water tables in the outcrop areas are commonly at higher elevations than the streams draining the areas, and therefore contribute water to

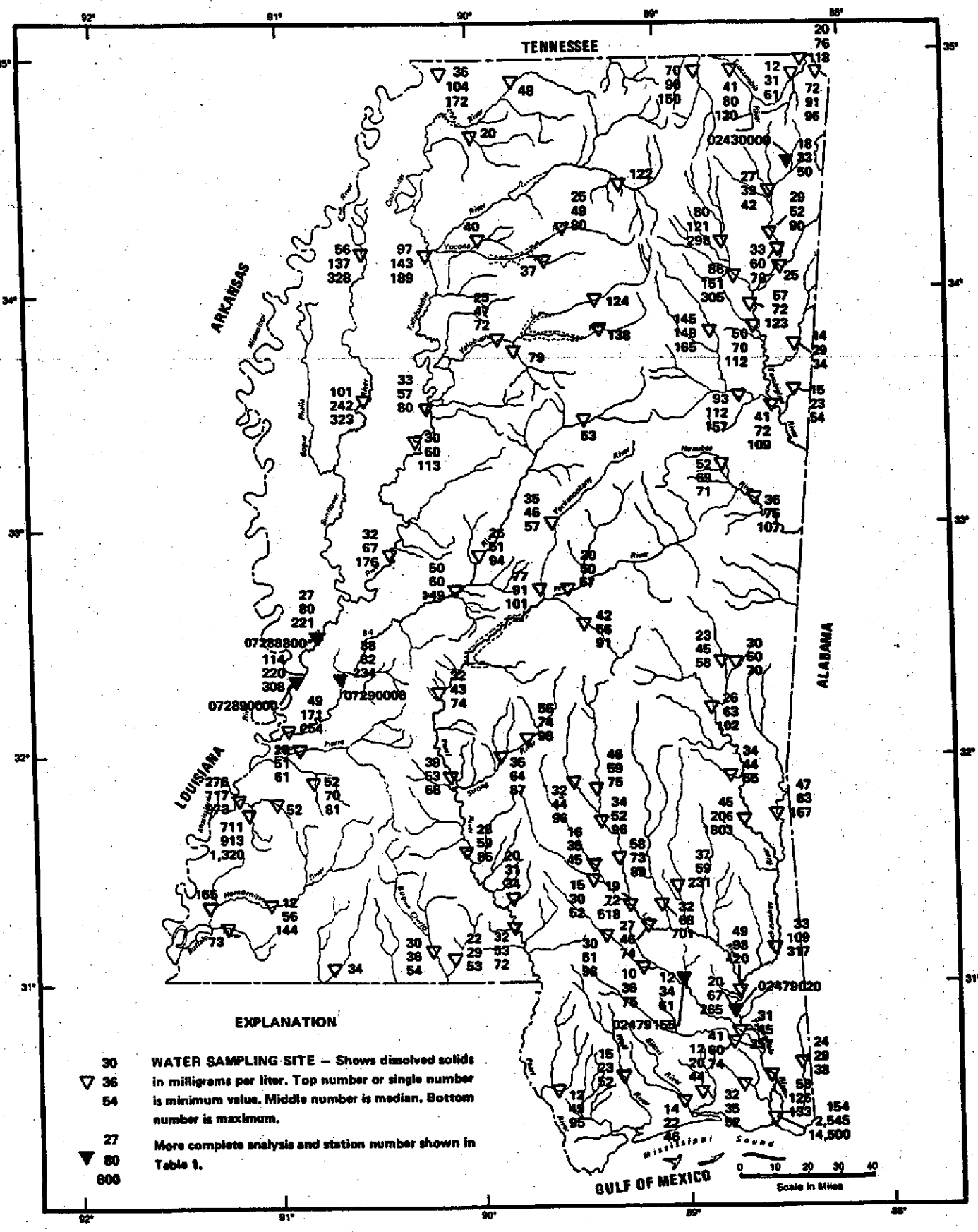


Figure 8. – Dissolved-solids concentrations in streams at selected sites in Mississippi.

Table 1. -- Selected water-quality data for low, medium, and high flows at selected stream-sampling sites.

Date	Instantaneous discharge (ft^3/s)	Specific conductance (micromhos)	pH (units)	Temperature (deg. C)	Color (platinum-cobalt units)	Dissolved oxygen (mg/L)	Chemical oxygen demand (high level) (mg/L)	Fecal coliform .7um-mf (col./100 ml)	Hardness (Ca, Mg) (mg/L)	Dissolved calcium (Ca) (mg/L)	Dissolved magnesium (Mg) (mg/L)	Dissolved sulfate (SO_4) (mg/L)	Dissolved chloride (Cl) (mg/L)	Dissolved solids (residue at 180 C) (mg/L)	Total nitrogen (N) (mg/L)	Total phosphorus (P) (mg/L)	Total iron (Fe) (mg/L)	Suspended sediment (mg/L)
02430000 MACKEYS CREEK NEAR DENNIS, MS[1]																		
7/ 6/77	31	36	6.7	25.0	100	7.6	11	14	11	2.7	1.1	3.4	1.6	36	0.45	0.05	3.0	38
4/13/77	95	30	5.7	19.0	60	8.1	10	7	10	2.3	1.0	3.4	1.7	38	.45	.04	3.1	—
3/ 8/77	167	28	5.5	9.0	60	10.9	11	3	4	1.6	.1	4.4	1.6	32	.43	.01	—	—
02479020 PASCAGOULA RIVER NEAR BENDALE, MS																		
7/ 2/77	1,850	165	6.0	31.0	—	6.4	—	260	16	4.0	1.4	4.3	12	82	.86	.06	1.0	—
5/ 8/77	13,900	80	5.9	24.0	—	7.6	—	650	17	4.8	1.2	4.7	9.0	66	1.3	.06	—	—
3/13/77	62,000	55	5.8	15.5	—	8.9	—	900	16	3.8	1.6	5.0	6.2	32	.64	.12	—	252
02479155 CYPRESS CREEK NEAR JANICE, MS																		
6/11/77	12	28	5.9	27.5	—	7.0	—	75	3	.7	.4	1.6	8.7	38	.07	.01	—	—
5/ 8/77	56	25	5.9	—	—	7.9	—	—	—	—	—	—	—	—	—	—	—	—
3/13/77	467	20	5.8	16.0	—	9.8	—	—	—	—	—	—	—	—	—	—	—	120
07288800 YAZOO RIVER AT REDWOOD, MS																		
9/ 1/77	E8,060	317	7.6	29.5	—	—	15	131,800	—	—	—	—	—	184	2.0	.13	1.5	—
7/ 7/77	E14,200	152	7.2	30.0	—	5.5	20	720	—	—	—	11	8.2	91	1.1	.21	6.0	—
3/18/77	E38,100	68	7.0	17.5	—	7.3	45	—	—	—	—	—	—	70	2.1	.56	15.0	—
07289000 MISSISSIPPI RIVER AT VICKSBURG, MS																		
10/12/76	E330,000	450	7.4	19.0	—	8.3	—	960	160	40	14	69	21	259	1.3	.14	2.3	149
12/ 7/76	E594,000	410	8.0	6.5	—	12.2	—	880	160	41	13	63	19	250	1.2	.13	—	142
4/ 5/77	E1,750,000	254	7.6	14.0	—	7.8	—	2,400	110	30	7.7	20	14	165	2.3	.35	9.2	503
0729000 BIG BLACK RIVER AT SOVINA, MS																		
9/ 9/77	298	200	7.4	28.0	—	5.6	—	560	56	13	5.7	7.4	15	113	1.5	.17	—	93
5/ 2/77	1,010	170	7.1	22.0	—	6.7	—	200	58	14	5.7	7.0	12	112	1.2	.15	—	98
3/ 7/77	15,200	60	6.9	12.0	—	8.3	—	5	18	4.0	2.0	5.4	4.2	38	1.7	.62	—	342

1 Water-quality sampling-station number, located on figure 8.

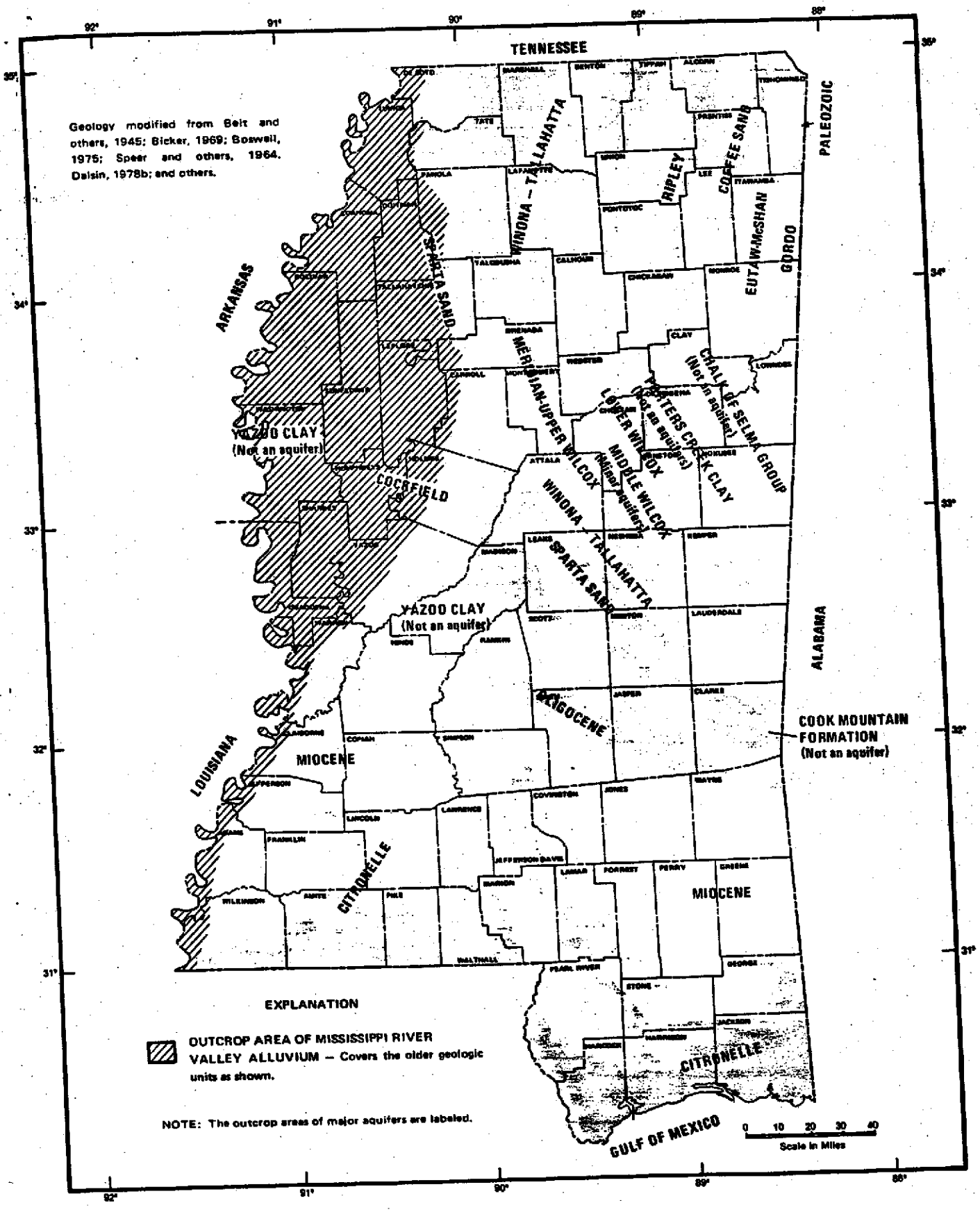


Figure 9. – Geohydrologic map of Mississippi showing outcrop areas of the major aquifers.

Table 2. -- Geologic units and major aquifers in Mississippi

Erathem	System	Series	Group	Geologic unit	Major aquifer
Cenozoic	Quaternary	Holocene and Pleistocene		Undifferentiated alluvium and terrace deposits Mississippi River valley alluvial aquifer	Mississippi River valley alluvial aquifer
		Pleistocene		Loess Terrace deposits, undifferentiated	
	Tertiary	Pliocene		Citronelle Formation Graham Ferry Formation	Citronelle aquifers
		Miocene		Pascagoula Formation Hattiesburg Formation Catahoula Sandstone	Miocene aquifer system
		Oligocene	Vicksburg Group	Byram Formation Bucatunna Clay Member Middle marl member Glendon Limestone Member Marianna Limestone Mint Spring Marl Member Forest Hill Sand	Oligocene aquifer system
		Eocene	Jackson Group	Yazoo Clay Moodys Branch Formation	
			Claiborne Group	Cockfield Formation Cook Mountain Formation Sparta Sand Zilpha Clay Winona Sand Tallahatta Formation Neshoba Sand Member Basic City Shale Member Meridian Sand Member	Cockfield aquifer Sparta aquifer system Winona-Tallahatta aquifer Meridian-upper Wilcox aquifer
				Hatchetigbee Formation	
		Paleocene	Wilcox Group	Tuscahoma Formation Nanafalia Formation Fearn Springs Member	Lower Wilcox aquifer
			Midway Group	Naheola Formation Porters Creek Clay Matthews Landing Marl Member Clayton Formation	
Mesozoic	Cretaceous	Upper Cretaceous	Selma Group	Prairie Bluff Chalk and Owl Creek Formation Ripley Formation Demopolis Chalk Coffee Sand Mooreville Chalk Arcola Limestone Member	Ripley aquifer Coffee Sand aquifer
				Eutaw Formation Tombigbee Sand Member McShan Formation	Eutaw-McShan aquifer
			Tuscaloosa Group	Gordo Formation Coker Formation	Gordo aquifer Coker aquifer Tuscaloosa aquifer system
		Lower Cretaceous		Undifferentiated	
Paleozoic	Pennsylvania Mississippian Devonian			Undifferentiated	Paleozoic aquifer system

the streams even during periods of no precipitation.

Originally, the hydraulic gradients from the outcrop areas toward the areas of natural leakage in the confined parts of the aquifers were very small because natural leakage was small. More recently, water withdrawals from the aquifers through flowing and pumping wells have caused regional water-level declines. In most parts of the confined aquifers in Mississippi water-level declines of 1 to 2 feet per year have been common. Water-level declines of more than 5 feet per year have been recorded in several aquifers in heavily pumped areas. Water levels in several heavily pumped areas are more than 200 feet lower in 1986 than in 1900.

There are great differences in capability of aquifers in Mississippi to transmit water from one place to another. The potential of an aquifer to supply water over a long period may be described by its ability to transmit water (transmissivity) and by its potential for recharge.

Several hundred aquifer tests run in Mississippi and other geohydrologic data indicate that transmissivities of aquifers range from about 10 to more than 100,000 ft^2/d (cubic feet of discharge per foot width of aquifer per day at unit hydraulic gradient). None of the aquifers are uniform over large areas, but some are much more so than others. The 15 transmissivity maps in this report were made using four transmissivity categories as shown in table 3.

Potential of the aquifers to yield water on a long-term basis can be calculated using methods described by Lohman (1972) and Wasson and Thomson (1970, p. 42-43). Aquifer yields for selected values of transmissivity have been computed and are shown in table 3 in the column titled "Aquifer yield per mile." These values, along with the transmissivity maps, can be used to estimate the potential yields of the downdip parts of the aquifers. The above computations assume a steady-state condition in aquifers that are highly confined in the downdip area.

As an example, the computed values can be used with the transmissivity map of the lower Wilcox aquifer (fig. 35) to arrive at an estimate of the potential yield of the southern part of the aquifer. From the northern part of Attala County to the Clark County-Alabama line is about 100 miles. This part of the lower Wilcox is excellent (fig. 35), having a transmissivity of more than 10,000 ft^2/d. Using the above computed value of 1.5 (Mgal/d)/mi of aquifer and 100 miles of aquifer outcrop length gives 150 Mgal/d for the potential yield of the downdip part of the south half of the lower Wilcox aquifer. In this assumption, the hydraulic gradient down the dip would be 20 ft/mi and water levels would be much lower than at present. Probably less than 1 percent of the present (1986) ground-water pumpage in Mississippi is from wells having static water levels more than 300 feet below land surface. Cost of pumping water from wells will increase with an overall increase in withdrawals of water from an aquifer.

The amount of water that can be obtained from a well depends on the specific capacity of the well and the available drawdown in the well. Specific capacity of a well (the number of gallons of water per minute that the well will produce for each foot of drawdown after a specified period of pumping) reflects both the efficiency of the well and the characteristics of the aquifer. The available drawdown in a well is the distance from the static water level down to some limiting point, such as the bottom of the pump intake, the top of the screen, or a point calculated using a designated water lift. The product of available drawdown and specific capacity is the maximum production to be expected from a well.

Water levels in the outcrop areas of the aquifers commonly range from land surface to 100 feet below land surface. The potentiometric head in the confined aquifers ranges from about 100 feet above land surface to as much as 400 feet below land surface. The potentiometric levels in the confined parts of the major aquifers probably average 100 feet below land surface in 1986.

Quality

Ground water having quality suitable for most uses underlies most of Mississippi. However, quality of the water in a confined aquifer changes with distance down the dip of the aquifer away from its outcrop or recharge area. In the outcrop area the water is very similar in quality to rainwater, but downdip at depths ranging from 200 to over 3,000 feet the water becomes saline. Geohydrologic data indicate that all the major aquifers in the State, except possibly the Mississippi River valley alluvial aquifer and the Citronelle aquifers, at one time were filled with saline water. With time, the saline water has been at least partially flushed from all aquifers. Several large pumping centers in the State presently cause large cones or troughs of depression in the potentiometric surfaces of several aquifers. On the geologic downdip sides of these depressions the hydraulic gradients are updip, and water movement, therefore, is updip. With larger ground-water withdrawals and resulting deeper cones of depression in the potentiometric surfaces, the updip migration of highly mineralized water may become significant.

Water of acceptable quality for one use may be unfit for another use. Water from shallow aquifers commonly is good for irrigation, but it may need iron removal and pH adjustment for general use. Water in

Table 3. --Relationships of transmissivity of an aquifer to productivity of a strip of the aquifer, specific capacity of wells, and productivity of wells.

General classification of aquifer	Transmissivity of aquifer*	Sustained yield of 1-mile width of confined aquifer downdip from outcrop area; hydraulic gradient 20 ft/mi		Productivity of 100-percent efficient 12-inch diameter well fully penetrating confined aquifer		
		Aquifer yield/mi		Specific capacity	Yield of well with 50 ft of drawdown	
	ft^2/d	ft^3/d	Mgal/d	(gal/min)/ft	gal/min	Mgal/d
Poor	<1,000	<20,000	<.15	<3.6	<180	<.3
Fair	1,000 - 5,000	20,000 - 98,000	.15 - .7	3.6 - 16	180 - 820	.3 - 1.2
Good	5,000 - 10,000	98,000 - 195,000	.7 - 1.5	16 - 32	820 - 1,585	1.2 - 2.3
Excellent	>10,000	>195,000	>1.5	>32	>1,585	>2.3

* To convert transmissivity to the older term of transmissibility, multiply by 7.5

deeper aquifers may be suitable for general use but, because of a high sodium content, be undesirable for irrigation. At most localities, two or more aquifers containing waters of different quality are available.

The dissolved-solids concentration in water is a good parameter with which to describe and generally judge the quality of water in an aquifer. The 15 dissolved-solids maps in this report can be used to compare the quality of water in the major aquifers in Mississippi. Ground water in Mississippi that has less than 100 mg/L of dissolved solids generally is found in or near the outcrop area, is a calcium-bicarbonate type water, has a low pH, contains excessive iron in solution, and is high in free carbon dioxide. Water having a dissolved-solids concentration of about 500 mg/L, usually found downdip, generally is a sodium-bicarbonate type water, has a pH of about 8, and generally is soft. Water having a dissolved-solids concentration of more than 1,000 mg/L, which is usually near the downdip limit of freshwater, tends to be a sodium-chloride type, has a pH greater than 8, generally is very soft, and generally does not have objectionable concentrations of iron. Color increases downdip in some aquifers, and in some areas of some aquifers the color is objectionable for some uses.

Temperature of ground water is affected by the internal temperature of the earth and by the air temperature. The temperature of shallow ground water normally is about the same as the average annual air temperature, which ranges from 16°C (61°F) at the Tennessee State line to 20°C (68°F) along the Mississippi Gulf Coast. Temperature of ground water in Mississippi increases about 1°C (1.8°F) with each 100 feet of depth.

MAJOR AQUIFERS IN MISSISSIPPI

In this section of the report, ground-water resources of the 15 principal aquifers in Mississippi are described by 45 matched map and data sheets showing structure, transmissivity, and dissolved-solids concentrations. The structure maps generally describe the occurrence of the aquifer; the transmissivity maps can be used to estimate well yields at any place in an aquifer; and the dissolved solids maps show the concentration to be expected at any place. Most of the geologic structure maps are generalized from other reports.

The aquifer transmissivity maps represent an analysis of data available to date. Several hundred aquifer tests have been made in Mississippi since 1940 to determine transmissivity and other aquifer characteristics. For various reasons, the transmissivity values determined by some of these tests are rated no better than estimates, but these estimated values were used in mapping if a more reliable value was not available in the immediate area. Several thousand geophysical logs are available in the state, and interpretation of selected logs for estimated transmissivity values was the principal source of data for the transmissivity maps.

The dissolved-solids maps are based on published reports, a series of computer-plotted dissolved-solids maps, and interpretation of electrical logs. The downdip limit-of-freshwater lines are mostly modified from previous reports and are largely based on interpretation of geophysical logs. The 100-, 200-, and 500-mg/L lines of dissolved solids are based mostly on chemical analyses of water.

Mississippi River Valley Alluvial Aquifer

Geologic Data

Structure: The upper surface of the Mississippi River valley alluvium is at land surface and the base of the alluvium averages about 140 feet lower. The aquifer thickness map delineating the Mississippi River valley alluvial aquifer (fig. 10) is generalized from Dalsin (1978b) and Krinitzsky and Wire (1964). The altitude of the Mississippi River flood plain is about 100 feet higher at the Tennessee State line than at Vicksburg.

Area of freshwater occurrence: 7,500 square miles.

Lithologic character: From base to top, beds of gravel, coarse sand, fine sand, and clay.

Thickness: 80 to 240 feet

Confining beds:

Overlying bed: A layer of clay at land surface that commonly is more than 20 feet thick confines or semiconfines the water in most of the aquifer when the water is near land surface.

Underlying bed: The alluvium is underlain by several geologic units which include several aquifers and several confining beds.

Hydrologic atlas describing aquifer: The Mississippi River valley alluvial aquifer in Mississippi (Dalsin, 1978b).

Series of areal reports covering aquifer area: See figure 1 and selected references.

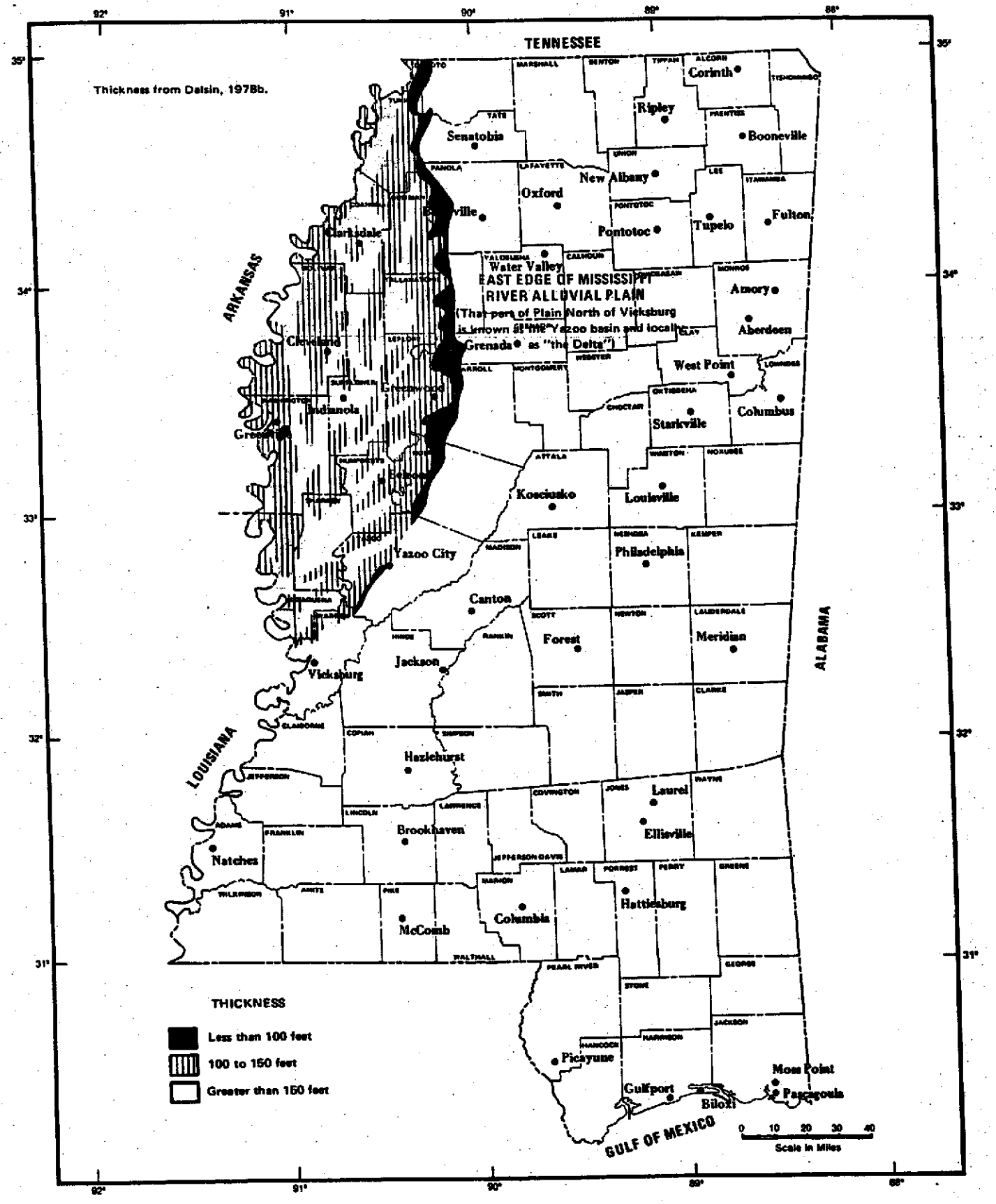


Figure 10. – Thickness of the Mississippi River valley alluvium.

Mississippi River Valley Alluvial Aquifer *(Continued)*

Hydrologic Data

Transmissivity: Excellent (commonly more than 10,000 ft^2/d, table 3 and fig. 11). Transmissivity is several times that value in much of the aquifer. Transmissivity determined from 14 aquifer tests ranges from 13,000 to 79,000 ft^2/d (Dalsin, 1978b).

Largest well yield: 5,000 gal/min.

Largest pumping center yield: 38 Mgal/d near Natchez in Adams County. Other cities where pumpage may exceed 5 Mgal/d are: Clarksdale, Greenwood, Yazoo City, and Vicksburg.

Water use in 1980: 1,142 Mgal/d (Callahan, 1983).

Potential yield of aquifer: A two-dimensional, finite-difference computer model of the alluvial aquifer was constructed, calibrated, and verified using water levels observed for five dates from April 1981 to September 1983 (Sumner and Wasson, 1984). The model showed that the aquifer had a net loss in storage of about 360 Mgal/d from April 1981 to April 1983. During this period, pumpage was about 1,100 Mgal/d (1,270,000 acre feet per year), and the net inflows from the sources of recharge were, in million gallons per day, Mississippi River, 390; recharge along the east edge of the Delta, 170; streams within the Delta, 57; areal recharge from infiltration, 180; and oxbow lakes, 24.

The effects of several levels of pumpage by wells — 0, 670, 1,100, 1,900, and 4,000 Mgal/d — were projected 20 years into the future. In 2003, the 1,100 Mgal/d pumping rate, about average for the early 1980's, would cause 46 percent of the water withdrawn to come from aquifer storage, water levels to be lowered more than 20 feet in a large area in the central part of the Delta, and groundwater levels to continue to decline in future years. As modeled, the aquifer could not sustain this pumping rate to a time of equilibrium without dewatering the aquifer in parts of the central area of the Delta.

Recent potentiometric maps of the alluvium: September 1980 by B. E. Wasson (1980b); April 1981 by Daphne Darden (1981); September 1981 by Daphne Darden (1982a); April 1982 by Daphne Darden (1982b); September 1982 by Daphne Darden (1983); April 1983 by D. M. Sumner (1984); and September 1983 by D. M. Sumner (1985).

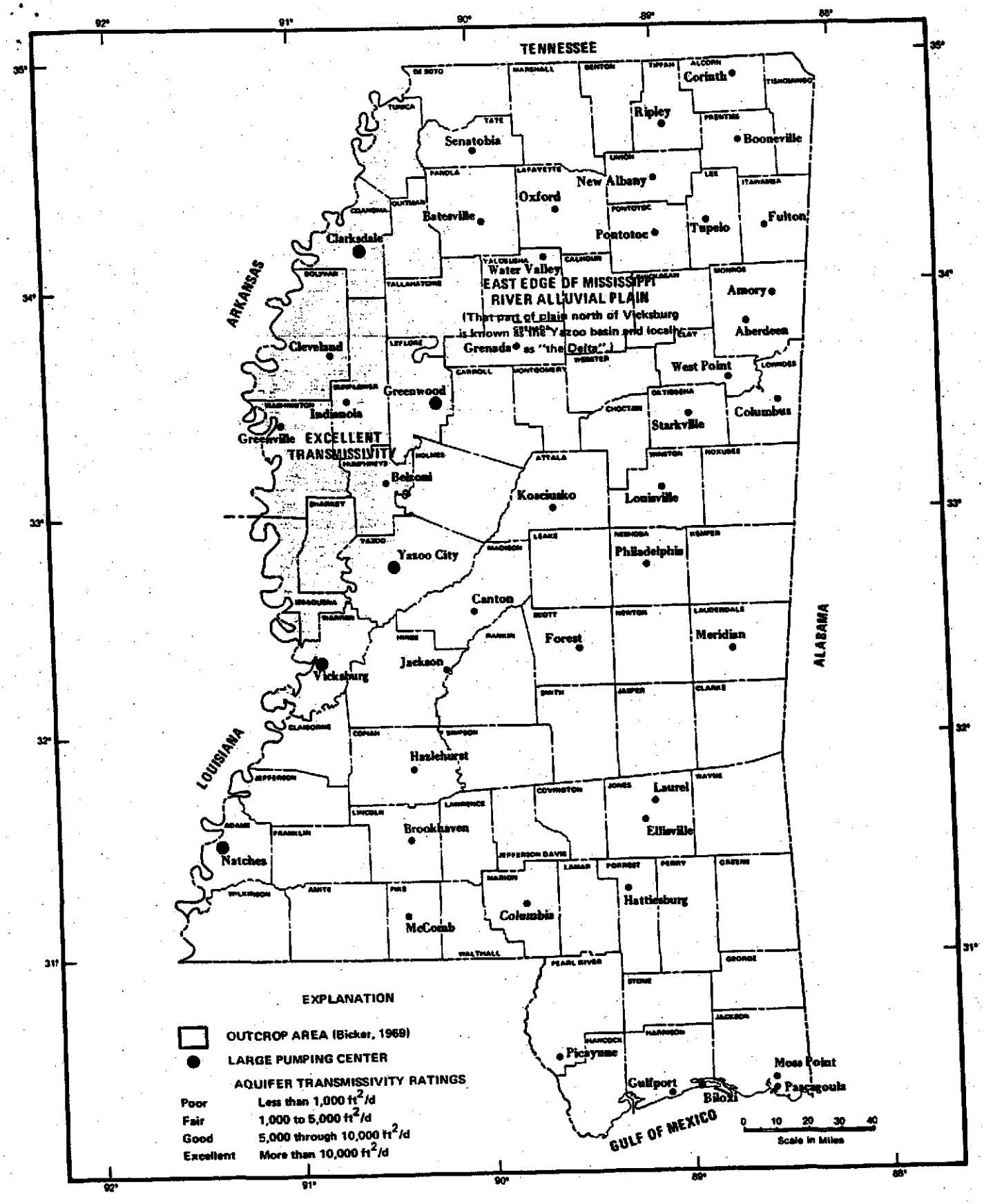


Figure 11. – Transmissivity of the Mississippi River valley alluvial aquifer.

Mississippi River Valley Alluvial Aquifer *(Continued)*

Water-Quality Data

Dissolved-solids concentrations in the Mississippi River valley alluvial aquifer generally increase from north to south and from east to west in the Yazoo basin (fig. 12).

The chemical analyses in the following table have been selected as being typical of water along and near the 200-, 300-, 400-, and 500-mg/L lines of dissolved solids.

Well, County	Depth (feet)	Date of collection	Silica	Iron	Calcium	Magnesium	Sodium	Potassium	Bicarbonate	Sulfate	Chloride	Fluoride	Dissolved solids (residue on evaporation at 180°C)	Hardness as $CaCO_3$: Calcium, Magnesium	Specific conductance (micromhos at 25°C)	pH	Color
200-mg/L dissolved-solids zone																	
A10, Desoto	36	4/60	37	1.9	30	11	12	2.9	121	29	10	0.3	197	100	288	6.5	0
300-mg/L dissolved-solids zone																	
J1, Humphreys	118	7/65	38	6.9	71	19	15	.0	348	.2	3.9	.5	300	255	516	7.0	5
400-mg/L dissolved-solids zone																	
L18, Humphreys	113	1/76	32	3.8	97	28	21	3.0	461	2.4	10	.2	425	360	605	7.0	30
500-mg/L dissolved-solids zone																	
H4, Sharkey	103	11/67	27	6.1	90	33	47	2.3	513	37	9.1	.0	501	362	825	7.1	5

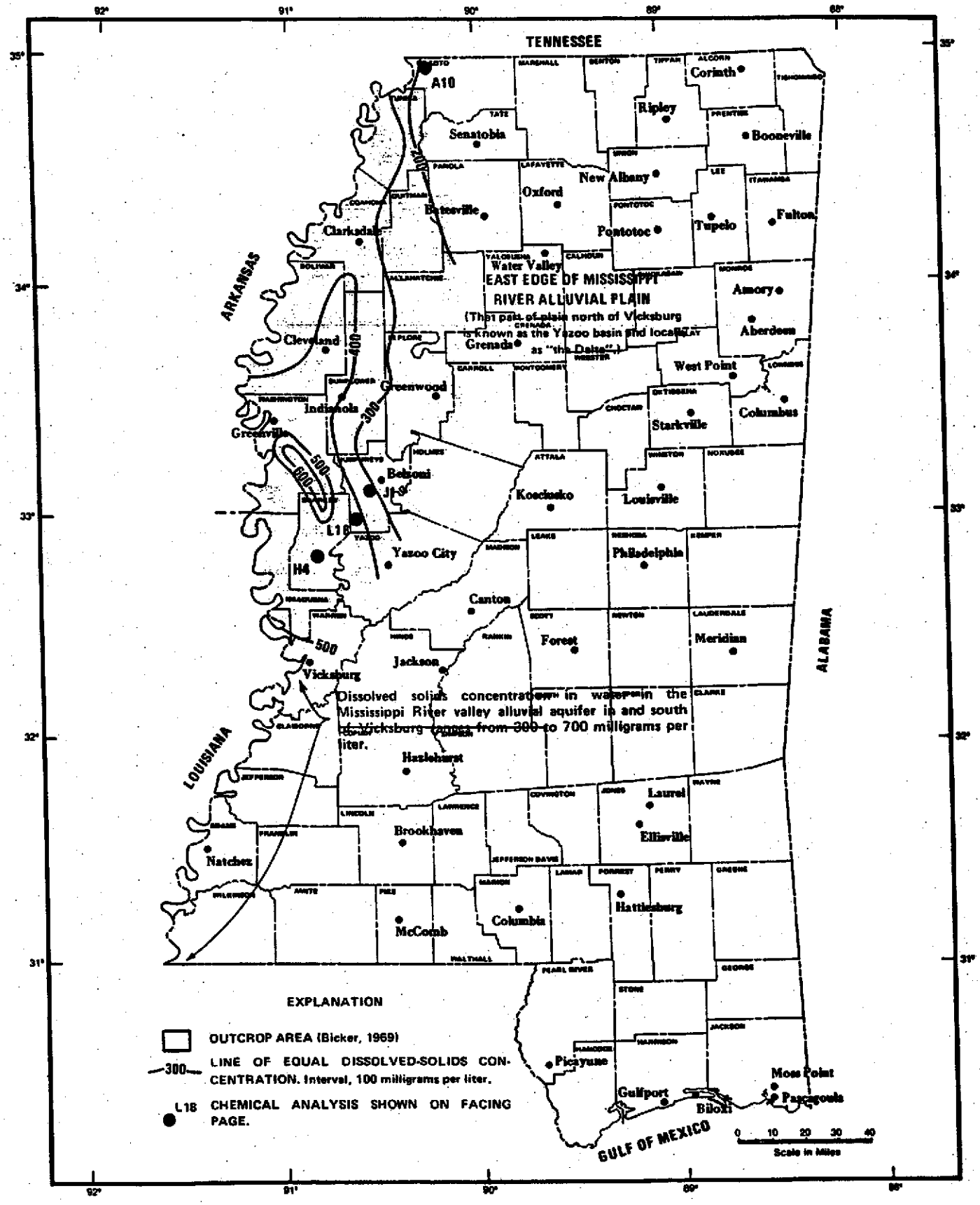


Figure 12. -- Dissolved-solids concentrations of water in the Mississippi River valley alluvial aquifer.

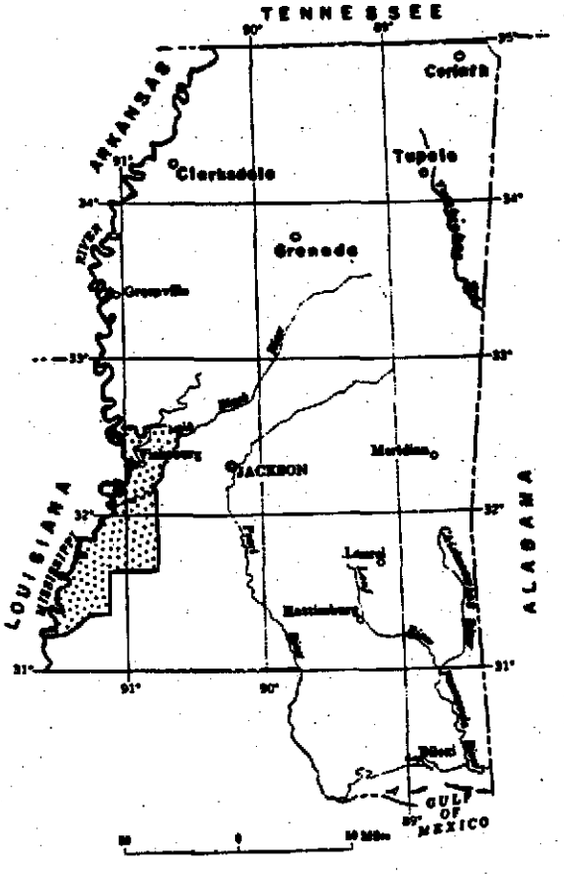
STATE OF MISSISSIPPI
INDUSTRIAL AND TECHNOLOGICAL RESEARCH COMMISSION
JACKSON

Available Water for Industry

in Adams, Claiborne, Jefferson, and Warren Counties, Mississippi.

by

J.A. Callahan, John Shelton,
D.E. Everett, and E.J. Harvey



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Endangered Species OF MISSISSIPPI

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Endangered Species
OF MISSISSIPPI

Introduction

Mississippi has 63 species and subspecies of plants and animals which are in danger of becoming extinct. This does not include whales, which, although officially listed as endangered, rarely occur in Mississippi waters. Extinction is a natural process, but it normally occurs at a low rate. Extinctions have increased in recent years, primarily due to human actions. It has been estimated that man is responsible for the extinction of up to 1000 species per year. Unfortunately, this number appears to be increasing.

Species become endangered for a variety of reasons. In some cases, crucial habitats are destroyed or drastically modified, making it impossible for a species to find food or a place to live. In other cases, species have been overused by man for food, for commercial purposes, or for sport. Species may also decline from the effects of diseases, pollution, or predation. The accounts of endangered species that make up this packet provide information on what each species looks like, where it occurs, its habitat, aspects of its life history and ecology, the basis for listing it as endangered, recommendations on management necessary to insure it remains a part of Mississippi's fauna, and selected references which provide additional information about it. The descriptive information and illustration in each account provide a general idea of what each species looks like. In many cases, however, closely related species that are similar in general appearance also occur in Mississippi. Photographs and illustrations of the endangered species and techniques for distinguishing them from other species can be found in the field guides and reference materials cited at the end of this introductory section.

Some of Mississippi's endangered species have been designated as such by the State of Mississippi and some by both this state and the United States government. The former are commonly referred to as "state-listed species," the latter as "federally-listed species."

State Protection of Endangered Species

Mississippi's endangered species law, entitled "The Nongame and Endangered Species Conservation Act of 1974," declares that "Species or subspecies of wildlife indigenous to the state should be accorded protection in order to maintain and to the extent possible enhance their numbers." An endangered species, as defined by this law, is any species or subspecies of wildlife whose survival and continued welfare in the state is in jeopardy or is likely to become so in the near future. The law prohibits taking, possessing, transporting, exporting, processing, selling, offering to sell, or offering to ship endangered species. Penalties for violating the Nongame and Endangered Species Act include fines of up to $1000 and/or imprisonment for up to one year. Mississippi's official list of endangered species is revised every two years by the Commission on Wildlife, Fisheries and Parks, the governing body of the state's Department of Wildlife, Fisheries and Parks. The latter is responsible for management of endangered species and enforcement of the Nongame and Endangered Species Conservation Act.

Federal Protection of Endangered Species

The United States government protects endangered species under authority of the "Endangered Species Act of 1973," as amended. This act groups species into two categories, endangered and threatened. Endangered species are defined as those that are in danger of becoming extinct throughout all or a significant portion of their range. Threatened species are those that are likely to become endangered in the near future in all or a significant portion of their range. A third classification is used for some species and is referred to as "threatened by similarity of appearance." These species, although not listed as either threatened or endangered, are treated as if they were. This classification is used when the species so closely resembles a threatened or endangered species that enforcement personnel have a difficult time distinguishing between them. This difficulty could act as an additional threat to the listed species especially if the unlisted species or its parts were in commercial demand. Threatened by similarity of appearance is used when such treatment of an unlisted species will aid in the enforcement of the Endangered Species Act.

The U. S. Government agencies responsible for implementing the Endangered Species Act are the Departments of Interior and Commerce. The U.S. Fish and Wildlife Service, part of the Department of the Interior, has been given the responsibility of listing and protecting terrestrial wildlife and plants, along with the polar bear, sea otter, walrus, manatee, and dugong, all of which are generally considered to be marine mammals. The National Marine Fisheries Service, part of the Department of Commerce, is responsible for listing and protecting all other marine mammals as well as other marine organisms. Responsibility for protecting sea turtles belongs to the Fish and Wildlife Service when the turtles are on land and to the National Marine Fisheries Service when the turtles are at sea. Penalties for violating the U.S. Endangered Species Act include fines up to $100,000 and/or imprisonment for up to one year.

The Federal Listing Process

Listing a species or changing the status of an already-listed species usually begins as an action of the Fish and Wildlife Service, National Marine Fisheries Service, or when an organization or person files a petition requesting such action. Both foreign species and species that occur in areas under the jurisdiction of the U.S. Government can be listed. Full species and subspecies of both plants and animals, and distinct population of animals, are eligible for

Bald Eagle

Haliaeetus leucocephalus **(Linnaeus)**
Family Accipitridae
Order Falconiformes

Description:

The Bald Eagle is a large, hawk-like bird 79-94 cm (31-37 in.) in length with a wingspread of 178-229 cm (70-90 in.). Adults are dark brown with a white head, neck, and tail. The bill and feet are yellow. Immature birds are variously marked, not attaining adult plumage until they are about five years old. Juveniles in their first year are uniformly brown while older juveniles have increasing amounts of white giving them a blotchy, mottled appearance. The Bald Eagle's call is a series of high-pitched chitterings.

Range:

Haliaeetus leucocephalus breeds from Alaska and northern and western Canada south to the northern United States, Florida, the Gulf Coast, and Arizona. During the non-nesting season it occurs along large lakes and rivers throughout the United States. Currently, at least 10 pairs of eagles are known to nest in Mississippi. Pairs nest along the Gulf Coast and near the Mississippi River in the west central part of the state, although nests can be found elsewhere in the state. Bald Eagles winter along the Mississippi River and on several of the larger bodies of water within the state during the non-nesting season.

Habitat:

The Bald Eagle generally occurs in the vicinity of lakes, rivers, marshes, and along sea coasts. Nesting usually occurs in areas with mature trees near large bodies of water.

Life History and Ecology:

Bald Eagles generally begin nesting activities in early to mid-December in the southeastern United States. Most nests are placed in the upper 10 m (30 ft.) of a large live pine or bald cypress. A nest is usually placed such that there are branches shielding it from above and a clear view of open water from the top of the nest. The nest itself is cone-shaped and may be 1.8 m (6 ft.) in diameter and 1.8-2.4 m (6-8 ft.) from top to bottom. It is often lined with Spanish moss or grasses. The same nest is often used by a pair of eagles year after year.

The peak of egg-laying in the southeast appears to occur in December, although this may vary, depending upon latitude, from October to March. Usually one or two, or occasionally three, eggs are laid. Hatching occurs in about 35 days and young birds are able to leave the nest in 10-12 weeks. The parents usually care for the young birds an additional four to six weeks after they have left the nest. Research on Florida and South Carolina Bald Eagles has indicated that these birds move northward for long distances after the nesting season. Several birds from these states have been recorded 1000 miles or more north of where they were hatched.

The bulk of the diet of southeastern bald eagles is composed of fish. However, this species also feeds on reptiles, waterfowl, small mammals, and carrion.

Basis for Classification:

Bald Eagles have declined considerably over the last 30 years and are listed as endangered by the U.S. Fish and Wildlife Service. Environmental contaminants were responsible for dramatic declines of this species during the 1950's and 1960's. One of the major chemicals involved was DDT and related compounds that inhibited calcium deposition. This resulted in thin, fragile egg shells which were often broken during normal nesting movements by the adults. Recently, lead poisoning from shotgun pellets, which are ingested when eagles feed on dead or wounded waterfowl, has been implicated as a significant cause of mortality.

Shooting has been a major factor in the decline of bald eagle populations. From 1961-1981, 25 percent of documented eagle deaths were from gunshot wounds.

Habitat destruction has also impacted bald eagle populations. Suburban development, water control projects, and habitat alteration in the vicinity of nest sites have all contributed to the decline of the Bald Eagle.

Recommendations:

Areas along the Mississippi River should be regularly surveyed to locate any new Bald Eagle nests that may be built. Areas with nests should be monitored and protected from development or human disturbance. The use of steel shot for hunting ducks should be continued throughout the state.

Since 1988 there have been two major efforts to augment the state's eagle population through hacking. Hacking is a term used to describe the care and feeding of hatchling eagles in "hack" towers, until they are capable of living on their own. As of 1992 one hundred seven eaglets had been released along the coast and the Tennessee-Tombigbee waterway.

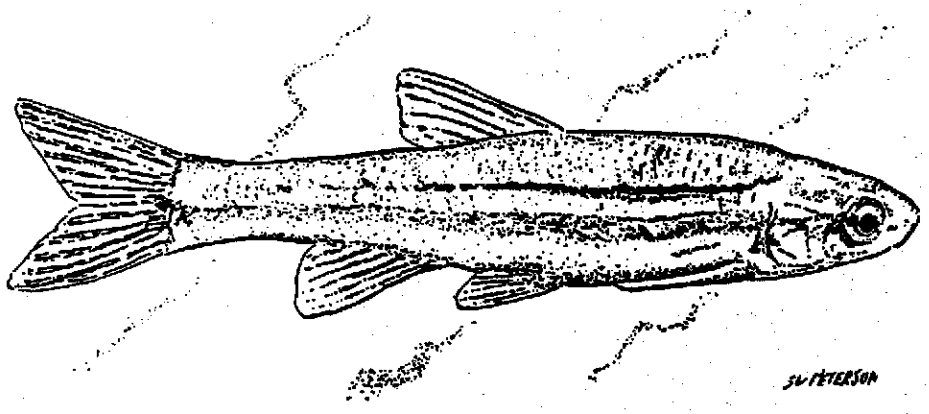
Selected References:

MacKenzie, J.P.S. 1977. Birds in Peril. Houghton Mifflin Co., Boston. 191 pp.

U.S. Fish and Wildlife Service. 1984. Southeastern States Bald Eagle Recovery Plan. U.S. Fish and Wildl. Serv., Atlanta. 63 pp.

Southern Redbelly Dace

Phoxinus erythrogaster (Rafinesque)
Family Cyprinidae
Order Cypriniformes

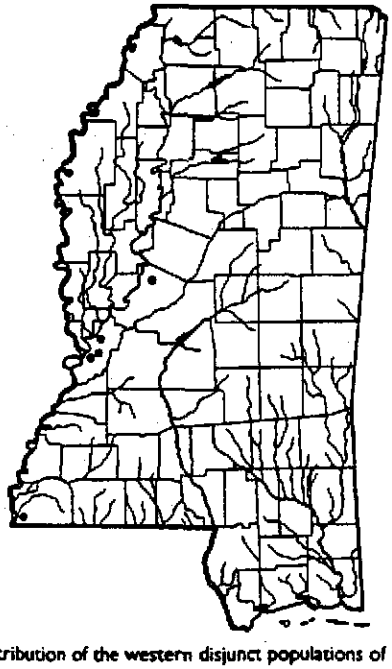


Description:

The southern redbelly dace is a small minnow averaging 55 to 65 mm (2.1-2.6 inches) in length. It has two black stripes along its sides which are separated by a larger light-green to yellow stripe. The back is greenish-brown with scattered dark spots. The belly is white. In breeding males, the undersurface of the head and body is vivid red, the lower fins and undersurface of the posterior part of the body are bright yellow, and the base of the dorsal fin (fin running down the middle of the back) is red or yellow.

Range:

Phoxinus erythrogaster occurs from Minnesota and western Pennsylvania south to Arkansas, Mississippi and Alabama. In Mississippi, the southern redbelly dace occurs in the Tennessee River drainage of Tishomingo County and in small tributaries of the Mississippi River in Wilkinson, Warren, and Yazoo counties.



Distribution of the western disjunct populations of the southern redbelly dace.

Habitat:

The southern redbelly dace occupies small creek and spring run pools which have permanent cool water and clean gravel bottoms.

Life History and Ecology:

Phoxinus erythrogaster is usually found near the bottom of small streams where it forages over rocks and other objects. It appears to feed primarily on algae and other plant materials. Spawning occurs in the spring, when females lay their eggs in the nests of other minnow species on clean gravel sections of riffles. This species matures when it reaches approximately 54 mm (2 inches) in length and probably does not live more than two years.

Basis for Classification:

The populations of the southern redbelly dace occurring in western Mississippi are considered to be endangered while those in Tishomingo County are not. The latter are part of a much larger population occurring throughout the Tennessee River basin in Alabama, Tennessee and Kentucky. Those in western Mississippi are disjunct (separated by a large area) from the main population and thus are of great scientific interest. Sedimentation from industrial activities and from improper agricultural or forestry practices appears to be the principal threat to this species in its disjunct range.

Recommendations:

Areas within the loess bluff region along the Mississippi River with viable populations should be preserved through conservation easements.

Selected References:

Clay, W.M. 1975. The Fishes of Kentucky. Kentucky Dept. Fish and Wildlife Resources, Lexington, Kentucky. 416 pp.

Pflieger, W.L. 1975. The Fishes of Missouri. Missouri Dept. Conservation, Jefferson City, Missouri. 343 pp.

Endangered Species of Mississippi
Miss. Department of Wildlife, Fisheries & Parks
Museum of Natural Science
111 North Jefferson Street
Jackson, MS 39201
(601) 354-7303

Funded in part by:
US Fish and Wildlife Service

EPA in cooperation with Mississippi Department of Agriculture and Commerce, Bureau of Plant Industry

Printed on Recycled Paper
Revised 1994/95

Wood Stork

Mycteria americana (Linnaeus)
Family Ciconiidae
Order Ciconiiformes

Description:

The Wood Stork is a large wading bird 102-112 cm (40-44 in.) in length with a wingspread of 1.5 m (5.5 ft.). Its body is white with black flight feathers and a black tail. The head is naked and blackish-gray in adults and the bill, which is thick and down-curved, is brownish-gray. Juveniles have a feathered, grayish head and a yellow bill. The Wood Stork flies with its neck extended.

Range:

This species formerly bred from South Carolina south to Florida, west to Texas, and south to southern South America. In the United States, it now breeds only in South Carolina, Florida, and Georgia, but disperses throughout the southeast, east, and midwest after breeding activities have concluded. Wood Storks have been observed most frequently in Mississippi along the western edge of the state in those counties bordering the Mississippi River, although they may occur almost anywhere there are sloughs or swamps to provide feeding habitat.

Habitat:

The Wood Stork occurs primarily in freshwater wetlands, including ponds, bayheads, flooded pastures, oxbow lakes, and ditches. Nesting usually occurs in bald cypress trees in swamps, although breeding has also been observed in mangroves.

Life History and Ecology:

Wood Storks apparently nest whenever there are periods of falling water, which usually happens during the winter and spring within its breeding range. Reduced water levels tend to concentrate fish, one of the Wood Stork's major food items, into smaller, more easily workable areas.

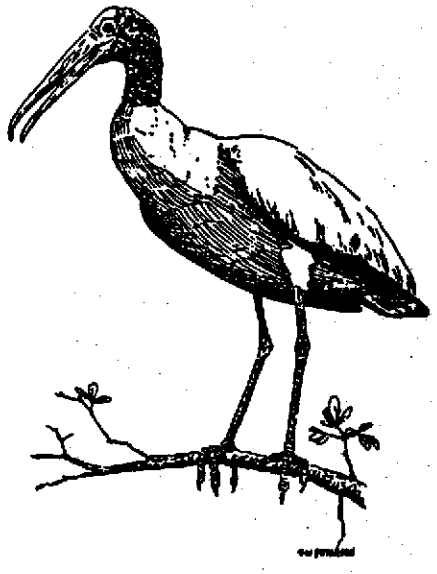
Wood Storks are colonial nesters and formerly occurred in colonies of up to 10,000 pairs. Today, however, most colonies are much smaller. Most nests are built in trees, usually bald cypress, in standing water. The nests may be built in the lower branches a few feet above the water level up to the tops of the tallest trees in the colony area. The nest is a platform of sticks 0.6 to 1 m (2 to 3 ft.) in diameter with a sparse lining of grasses or leaves. Usually three or four eggs are laid which hatch in 28 to 32 days. The young remain in the nest for 50 to 55 days after which they begin making short flights. Wood Storks mature in two to four years.

Wood Storks feed in fresh, brackish, or saltwater habitats both by day and at night. Fish comprise the bulk of the diet, but crayfish, mussels, small turtles, snakes, frogs, small mammals, insects, plants, and seeds are also eaten.

Basis for Classification:

The Wood Stork is listed as an endangered species by the U.S. Fish and Wildlife Service in Florida, Georgia, Alabama, and South Carolina. Storks observed in Mississippi are considered to be visitors from Mexico and Central America by the federal government and thus are not considered to be endangered. However, birds banded in Florida have been observed in Mississippi, and this state should probably be included in the Fish and Wildlife Service listing.

The Wood Stork population in the United States has declined at least 75% in the last 50 years. In the 1930's more than 150,000 birds were present in Florida alone. Today there are only 3000 to 5000 breeding pairs left in that state and fewer in Georgia and South Carolina. The Wood Stork population has declined throughout its range because of habitat alteration. The construction of canals, levees, and other such structures has interfered with normal water cycles upon which successful Wood Stork breeding depends. In a normal cycle, high water levels increase fish populations. This is followed by a drying period which concentrates the fish in shallow water where they become easy prey for the storks. Falling water levels and



concentrations of fish are necessary both to stimulate breeding activity in Wood Storks and to keep the adults feeding the young. Human disturbance at breeding colony sites has also contributed to the decline of this species.

Recommendations:

The Wood Stork does not breed in Mississippi, so there is little that can be done here to help promote successfu' reproduction. Studies should be undertaken, however, to determine how important Mississippi habitats are to the overall status of this species in southeastern United States.

Selected References:

Ogden, J.C., J.A. Kushlan, and J.T. Tilmant. 1978. The Food Habits and Nesting Success of Wood Storks in Everglades National Park, 1974. U.S. Dept. Interior Nat. Park Serv. Natural Res. Rept. No. 16. 24 pp.

Palmer, R.S. (Ed.). 1962. Handbook of North American Birds. Volume 1. Loons through Flamingos. Yale Univ. Press, New Haven,, Conn. 567 pp.

Toups, J.A. and J.A. Jackson. 1987. Birds and Birding on the Mississippi Gulf Coast. Univ. Press of Miss., Jackson. 303 pp.

Reference
15

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

COUNTY OF
WARREN,
MISSISSIPPI
(UNINCORPORATED AREAS)

PANEL 200 OF 275

COMMUNITY-PANEL NUMBER
280198 0200 B

EFFECTIVE DATE:
NOVEMBER 15, 1979

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

74100

Reference 16

74100

Water Resources of Mississippi

THAD N. SHOWS

BULLETIN 113

MISSISSIPPI GEOLOGICAL, ECONOMIC AND TOPOGRAPHICAL SURVEY

WILLIAM HALSELL MOORE
DIRECTOR AND STATE GEOLOGIST

JACKSON, MISSISSIPPI
1970

PRICE $2.00

Reference 17

U.S. DEPARTMENT OF COMMERCE
FREDERICK H. MUELLER, Secretary

WEATHER BUREAU
F. W. REICHELDERFER, Chief

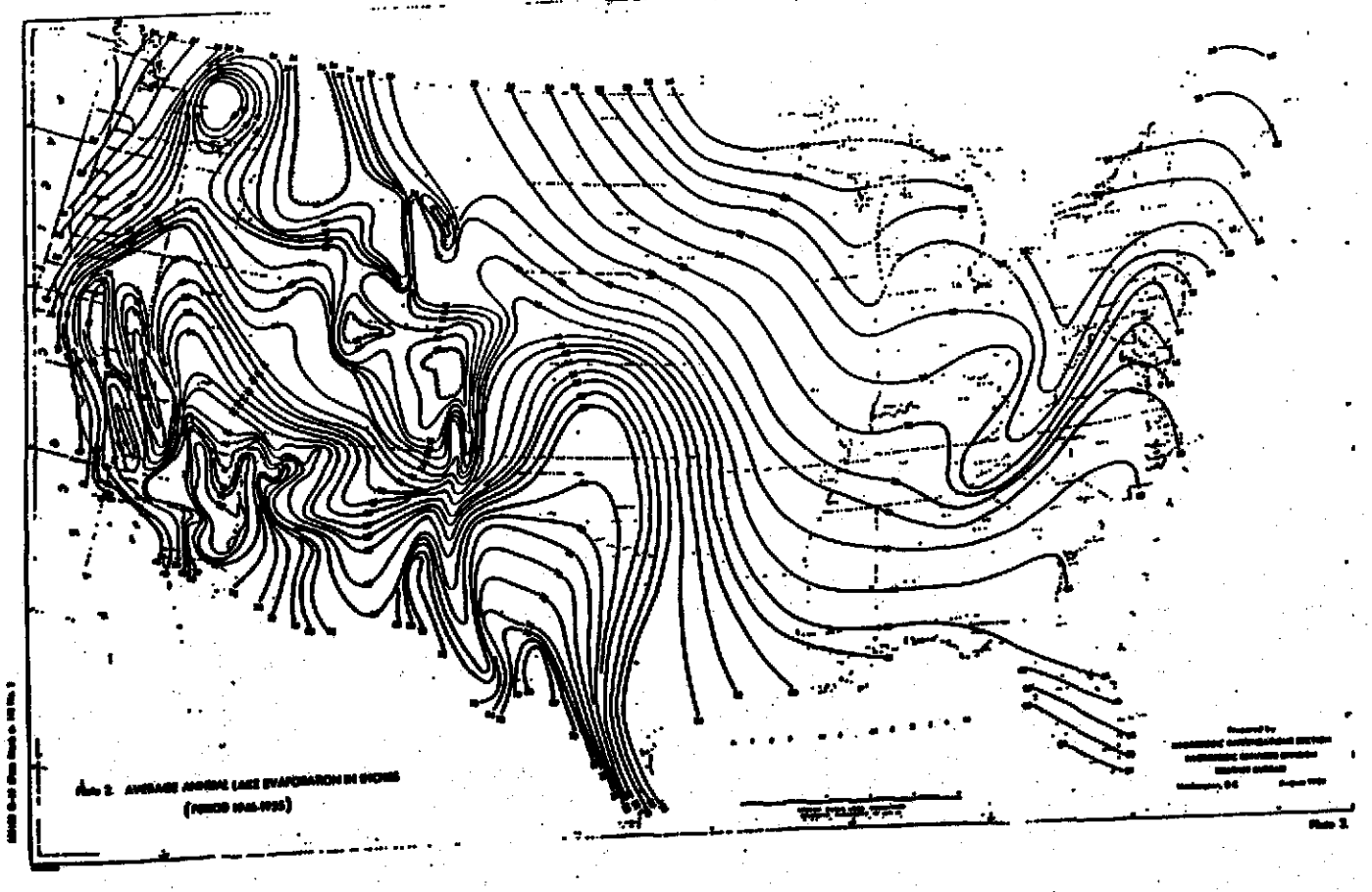
TECHNICAL PAPER NO. 37

Evaporation Maps for the United States

M. A. KOHLER, T. J. NORDENSON, and D. R. BAKER
Hydrologic Services Division

WASHINGTON, D.C.
1959

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. - Price 60 cents



Reference #8

UNITED STATES BANKRUPTCY COURT
SOUTHERN DISTRICT OF NEW YORK

In re:	Chapter 11
CEDAR CHEMICAL CORPORATION and VICKSBURG CHEMICAL COMPANY,	Case Nos. 02-11039 (SMB) and 02-11040 (SMB)
Debtors.	Jointly Administered

STIPULATION AND ORDER AUTHORIZING ABANDONMENT OF WEST HELENA MANUFACTURING FACILITY AND VICKSBURG MANUFACTURING FACILITY AND GRANTING RELATED RELIEF
(A&F No. 031)

WHEREAS on March 8, 2002 (the "**Petition Date**"), Cedar Chemical Corporation ("**Cedar**") and Vicksburg Chemical Company ("**Vicksburg**") (collectively the "**Debtors**") each filed a voluntary petition for relief under Chapter 11 of Title 11 of the United States Code (the "**Bankruptcy Code**") with the United States Bankruptcy Court for the Southern District of New York (the "**Court**");

WHEREAS Cedar owns certain lots, pieces, tracts or parcels of land located at or near 49 Phillips Road 311 in West Helena, Arkansas, more particularly described in **Exhibit A** hereto, along with all buildings, structures, improvements, facilities, equipment, fixtures, and other tangible chattels and articles of tangible personal property thereon, therein or thereunder except for such equipment and the like as have been leased by Vicksburg or otherwise owned by other parties (the "**West Helena Facility**");

WHEREAS Vicksburg owns certain lots, pieces, tracts or parcels of land located at or near 4280 Rifle Range Road in Vicksburg, Mississippi, along with all buildings, structures, improvements, facilities, equipment, fixtures, and other tangible chattels and articles of tangible personal property thereon, therein or thereunder except for such equipment and the like as have been leased by Vicksburg or otherwise owned by other parties (the "**Vicksburg Facility**;" the term "**Vicksburg Facility**" includes all real property and all buildings, structures, improvements, facilities, equipment, fixtures, and other tangible chattels and articles of tangible personal property owned by Vicksburg, and not merely leased by Vicksburg or otherwise owned by other parties, lying within Warren County, Mississippi);

WHEREAS on August 29, 2002 the Debtors filed a motion (the "**Motion**") pursuant to sections 105(a) and 554(a) of the Bankruptcy Code seeking an order authorizing the abandonment by Cedar of the West Helena Facility and the abandonment by Vicksburg of the Vicksburg Facility and granting related relief;

WHEREAS the Court signed an order dated September 4, 2002 scheduling a hearing on the Motion (the "**Scheduling Order**");

WHEREAS a statement in support of the Motion was filed by JPMorgan Chase Bank, as agent (the "**Agent**") to the pre-petition secured lenders (the "**Secured Lenders**"), as listed under a certain Credit Agreement dated as of November 3, 1995, as amended, supplemented or otherwise modified, among Cedar, the Secured Lenders and the Agent (to avoid doubt, "Secured Lenders" does not include the Debtors, any affiliate of the Debtors, Trans Resources Inc., and Arie Genger);

WHEREAS the Arkansas Department of Environmental Quality (the "**ADEQ**"), the Mississippi Commission on Environmental Quality and the Mississippi Department of Environmental Quality

(collectively, the "**MDEQ**") and the United States on behalf of the Environmental Protection Agency (the "**EPA**") (together with the ADEQ and the MDEQ the "**Agencies**" and each individually an "**Agency**"), and Harcros Chemicals Inc. each filed objections to the Motion;

WHEREAS the Agent and the Debtors filed a joint reply to the objections of the Agencies;

WHEREAS on or about September 26, 2002, the MDEQ issued Order No. 4486-02 purporting, among other things, to enjoin Vicksburg from transferring the Vicksburg Facility to another party without complying with Debtors' environmental permits.

WHEREAS good and sufficient notice of the Motion has been provided by the Debtors in accordance with the terms of the Scheduling Order;

WHEREAS a hearing on the Motion was held on September 25, 2002; and an evidentiary hearing on the Motion was held on October 7, 2002 (the "**Evidentiary Hearing**");

WHEREAS the West Helena Facility and the Vicksburg Facility (collectively, the "Facilities") are of inconsequential value and benefit to the estates of the Debtors and that such estates lack sufficient unencumbered assets with which to continue the maintenance, management and oversight of the Facilities;

WHEREAS, the Debtors have cooperated with the Agencies in the transition of the Facilities prior to their proposed abandonment;

WHEREAS the Debtors, the Agencies and the Agent (on behalf of the Secured Lenders) agree to compromise and resolve the various objections to the Motion as provided herein;

NOW, THEREFORE, in consideration of the mutual promises contained herein, and for other good and valuable consideration receipt of which is hereby acknowledged;

IT IS HEREBY STIPULATED and agreed to by and between the parties, subject to approval by the Court, as follows, and upon approval by the Court, it is hereby ORDERED that:

1. The Court has jurisdiction to hear and consider the Motion pursuant to 28 U.S.C. § 1334 and 28 U.S.C. § 157 and to grant the relief requested therein.

2. This is a core proceeding under 28 U.S.C. § 157(b).

3. Good and sufficient notice of the Motion, the proposed abandonment of the Facilities and of the hearings scheduled thereon has been provided and any other requirement for notice be, and hereby is, dispensed with.

4. The Motion, as modified and conditioned herein, is hereby granted.

5. The Facilities are of inconsequential value and benefit to the estates of the Debtors and such estates lack sufficient unencumbered assets with which to continue the maintenance, management, and oversight of the Facilities.

6. All requirements of section 554(a) of the Bankruptcy Code for the abandonment of the Facilities have been satisfied and sufficient circumstances exist in these cases to justify the approval of such abandonment, as conditioned herein.

7. The Facilities are hereby abandoned to the pre-petition Debtors effective 11:59 p.m. on October 14, 2002 (the "**Effective Time**"). The West Helena Facility shall be deemed abandoned to the Cedar non-bankruptcy estate and the Vicksburg Facility shall be deemed abandoned to the Vicksburg non-bankruptcy estate.

8. The Debtors and their respective officers, employees, directors, the pre-petition Debtors' officers, employees and directors and Marotta Gund Budd & Dzera LLC and any of its employees

(collectively, "MGB") shall have no obligation for the management or operation of the Facilities subsequent to the Effective Time.

9. The Debtors and the officers, employees, agents and directors of the Debtors and pre-petition Debtors (but solely in their capacity as officers, employees, agents or directors of the Debtors or pre-petition Debtors) shall be free of any liability for any occurrence or event with respect to (i) the Vicksburg Facility occurring subsequent to the Effective Time and (ii) the West Helena Facility occurring subsequent to 5:00 p.m. Eastern Standard Time on October 18, 2002 arising from the abandonment.

10. The United States, on behalf of the EPA, covenants not to sue the officers, employees, and directors of the Debtors and pre-petition Debtors (but solely in their capacity as officers, employees, or directors of the Debtors or pre-petition Debtors) or MGB for civil liability with respect to the Facilities for any cause of action or other claim for relief asserting environmental liability pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. § 9601 et seq.), the Resource Conservation and Recovery Act (42 U.S.C. § 6901 et seq.), the Clean Water Act (42 U.S.C. § 1251 et seq.) or any state statute, including any regulations promulgated thereunder, for any occurrence or event with respect to the Facilities occurring subsequent to the Effective Time, provided however that this covenant not to sue shall not apply with respect to any affirmative acts of operation or disposal by such persons with respect to the Facilities occurring after the abandonment authorized herein. This covenant not to sue does not pertain to any matters other than those specified in this paragraph.

11. In consideration for the Agent's agreement to allow the Debtors to use an additional amount of cash collateral up to $10,000 to continue the current environmental monitoring and oversight of the West Helena Facility until 5:00 pm Eastern Standard Time on Friday, October 18, 2002 (after which time the

ADEQ or its agent will enter upon the site and assure continued environmental monitoring and oversight of the West Helena Facility), the ADEQ hereby and forever discharges, releases and covenants not to sue, to take any other civil judicial or administrative action (including for injunctive relief) against, or to seek any reimbursement of past or future response costs against, the Agent or any of the Secured Lenders in respect of any hazardous substances, pollutants, contaminants or other environmental conditions, present or existing on or under, or emanating from, the West Helena Facility from the beginning or time until 5:00 pm Eastern Standard Time on Friday, October 18, 2002, including, without limitation, pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. Sections 9601 et seq.), the Resource Conservation and Recovery Act (42 U.S.C. Sections 6901 et seq.), the Clean Air Act (42 U.S.C. Sections 7401 et seq.), the Clean Water Act (42 U.S.C. Sections 1251 et seq.), and Titles 8 and 15 of the Arkansas Code, in each case as amended and including any regulations promulgated thereunder. This Stipulation and Order settles and resolves, without the admission or adjudication of any issue of fact or law, the Agent's and each of the Secured Lenders' potential liability to the ADEQ, with respect to all matters addressed herein, and the Agent and each of the Secured Lenders shall be entitled to protection against contribution claims to the maximum extent provided pursuant to 42 U.S.C. Section 9613(f)(2).

12. After the Effective Time, the EPA and ADEQ, and their agents, shall at all times have the right to access the West Helena Facility for purposes of continuing the operation of the ponds and wastewater systems, as the Agencies deem appropriate, conducting investigations relating to contamination at or near the West Helena Facility, obtaining samples, assessing the need for, planning, or implementing additional response measures, or performing any and all removal or remedial activities, corrective actions

or response measures. Debtors agree to request that ENSAFE provide ADEQ copies of any documents generated, collected or otherwise in the possession of ENSAFE that relate to the West Helena Facility.

13. The Debtors are authorized to cancel any insurance policies pertaining to the Facilities as of the Effective Time, except to the extent the premiums for such insurance coverage have been paid in full and the Debtors would not be entitled to a refund, if such insurance coverage was canceled.

14. After the Effective Time, the EPA and MDEQ, and their agents, shall at all times have the right to access the Vicksburg Facility for purposes of continuing the operation of the ponds and wastewater systems, as the Agencies deem appropriate, conducting investigations relating to contamination at or near the Vicksburg Facility, obtaining samples, assessing the need for, planning, or implementing additional response measures, or performing any and all removal or remedial activities, corrective actions or response measures. This provision shall not act in derogation of Miss. Code Ann. § 49-17-21 or pre-existing state permit conditions with regard to access.

15. With the consent of the Secured Lenders, all mortgages, liens and other security interests held by the Secured Lenders in the Facilities or any part thereof, including the land and any buildings, structures, improvements, facilities, equipment, fixtures, and other tangible chattels and articles of tangible personal property thereon, therein or thereunder (the "**Secured Lender Liens**"), shall be, and are hereby unconditionally and irrevocably deemed released, discharged and terminated as of the Effective Time and the abandonment of the West Helena Facility to the Cedar non-bankruptcy estate and the abandonment of the Vicksburg Facility to the Vicksburg non-bankruptcy estate shall, in each case, be free and clear of the Secured Lender Liens, and this Stipulation and Order shall be binding upon and govern the acts of all entities, including, without limitation, all filing agents, filing officers, title agents, title companies, administrative

agencies, governmental departments, secretaries of state, federal, state and local officials and all other persons and entities who may be required, by operation of law, the duties of their office or contract, to accept, file, register or otherwise record or release any documents or instruments.

16. Upon written request by the ADEQ, the Cedar non-bankruptcy estate shall convey title to the West Helena Facility or parts thereof to any entity identified by the ADEQ, and upon written request by the MDEQ, the Vicksburg non-bankruptcy estate shall convey title to the Vicksburg Facility or parts thereof to any entity identified by the MDEQ. Any consideration received for the transfer of the respective Facilities or parts thereof shall be applied to the environmental cleanup of the respective Facilities and shall be treated as a contribution by the Debtors to such cleanup. Any entity to whom the Facilities or any parts thereof are transferred shall be given a copy of the Stipulation and Order and shall be bound by its terms.

17. Absent an objection, the leases for personal property located at the Facilities (the "Facility Leases"), a schedule of certain of such leases is annexed hereto as Schedule 1, shall be deemed rejected pursuant to section 365(a) of the Bankruptcy Code, as of one day subsequent to the date that the Debtors provide the lessors under the Facility Leases (the "Lessors") with notice by overnight delivery of such proposed rejection. Such notice also shall provide (i) for a ten-day period within which such Lessors may file an objection to such rejection and (ii) that the Lessors should immediately contact Mr. Philip Gund, the Debtors' "Restructuring Officer" or a person designated by Mr. Gund to arrange for a pick-up of the personal property under the Facility Leases.

18. MDEQ, by its agreement to this Stipulation and Order, does not waive any defenses created by Miss. Code Ann. § 11-46-9, nor accept any liabilities not otherwise imposed by operation of law.

19. The Debtors waive and relinquish their interest, if any, in (i) Trustmark National Bank Trust and Asset Management Account No. 35-L903-00-8; (ii) Trust Agreement dated October 6, 1982 between Vertac Chemical Corporation, as Grantor and First National Bank, as Trustee (the "EPA Agreement"); (iii) Trust Agreement dated October 6, 1982 between Vertac Chemical Corporation, as Grantor and First National Bank, as Trustee (the "Mississippi Department of Natural Resources Agreement "); and (iv) Amendment dated June 27, 1986 to the Mississippi Department of Natural Resources Agreement.

20. Each signatory to this Stipulation and Order certifies that he or she is authorized to enter into the terms and conditions of this Stipulation and Order and to bind legally the party represented by him or her except that the execution of this Stipulation and Order by the Assistant Attorney General is required with respect to the United States.

21. This Stipulation and Order shall be deemed a "**Final Order**" when (i) the time to appeal or seek review, rehearing, reargument or certiorari has expired and no stay of appeal is in effect or petition for review, rehearing, reargument or certiorari proceeding is pending; or (ii) an appeal of this Stipulation and Order has been affirmed and the time for further appeal has expired.

22. As a contribution to the environmental cleanup of the Facilities, the Debtors shall pay $200,000 to the ADEQ and $200,000 to the MDEQ from the "proceeds of any sale by the Debtors of the EPA Registrations" deposited into "Avoidance Realization Account" as provided in paragraph 19 of the "Final Order (i) Authorizing Use of Cash Collateral (ii) Providing for Adequate Protection and (iii) Granting Related Relief dated August 21, 2002 (the "Final Cash Collateral Order"), notwithstanding any provisions in the Final Cash Collateral Order to the contrary, but only to the extent the ADEQ and MDEQ

are granted allowed administrative claims in those amounts under section 503(b) of the Bankruptcy Code. The MDEQ and ADEQ shall be entitled to such an administrative priority to the extent that they can demonstrate that such expenses were incurred with respect to the Facilities and were consistent with applicable environmental laws. The ADEQ and MDEQ agree that the Debtors or any chapter 7 trustee in the Debtors' cases will have no administrative expense liability to the MDEQ and ADEQ in excess of the $200,000 claims provided herein. Solely in connection with the confirmation of a chapter 11 plan, the Agencies agree not to object to a plan on the basis of section 1129(a) (9)(A) of the Bankruptcy Code. The abandonment of the Facilities and payment of $400,000 shall be without prejudice to additional administrative expenses or general unsecured claims of the United States, except to the extent that the United States asserts a claim as an assignee of ADEQ or MDEQ. Nothing in this Stipulation and Order shall waive or prejudice any right of any party to object to additional claims by the EPA on any ground other than a lack of an entitlement to an administrative priority based on the abandonment of the Facilities. The United States may perfect a lien for its costs with respect to the Facilities on the abandoned property to the extent permitted by applicable law.

23. The Debtors are authorized to transfer or otherwise make available all books and records relating to the Vicksburg Facility and/or the West Helena Facility (the "Facility Books and Records") to any Agency making such request without further order of the Court. Subject to further order of the Court, the Debtors shall secure and preserve the Facility Books and Records until such time as they are transferred to an Agency and provide each of the Agencies at least ten (10) days notice of their intention to destroy or discard any of the Facility Books and Records or transfer such Facility Books and Records to one of the Agencies.

24. The Debtors are hereby authorized to execute and deliver any instrument and perform any other act that is necessary in order to effectuate the purposes of this Stipulation and Order.

25. This Court shall retain jurisdiction to hear and determine any matter arising from or relating to this Stipulation and Order.

Dated: October 18, 2002

FOR THE DEBTORS

/S/_____
Yehuda Yoked, President
Cedar Chemical Corporation

/S/_____
Yehuda Yoked, President
Vicksburg Chemical Company

AGREED as to paragraphs 1 through 7 (inclusively), 11, 15, 20, 21, 24 and 25. NO OBJECTION as to the remaining paragraphs.

FOR THE AGENT, ON BEHALF OF
THE SECURED LENDERS

Dated: October 18, 2002

/S/_____
Benjamin Kaminetzky (BK 7741)
DAVIS POLK & WARDWELL
450 Lexington Avenue
New York, New York 10017

Counsel for JPMorgan Chase Bank, as
Agent for the Secured Lenders

Except as to paragraph 9, and subject to the approval of the Assistant Attorney General:

Dated: New York, New York
October 17, 2002

JAMES B. COMEY
United States Attorney for the
Southern District of New York
Attorney for the United States

By: /S/_____
David J. Kennedy (DK-8307)
Assistant United States Attorney
100 Church Street - 19th Floor
New York, New York 10007
Temp. Tel: (718) 422-5649
Temp. Fax: (718) 422-1789

Except as to paragraph 9:

Dated: Washington, DC
October __, 2002

_____
THOMAS L. SANSONETTI
Assistant Attorney General
Environment and Natural Resources Division
U.S. Department of Justice
P.O. Box 7611
Washington, D.C. 20044 - 7611

Except as to paragraph 9, and subject to the approval of the Assistant Attorney General:

Dated: Atlanta, Georgia
October 18, 2002

Region 4

/S/_____
J. I. PALMER, Jr.
Regional Administrator
U.S. Environmental Protection Agency,
61 Forsyth Street, S.E.
Atlanta, Georgia 30303
(404) 562-9674; telefax: (404) 562-9664

Except as to paragraph 9, and subject to the approval of the Assistant Attorney General:

Dated: Dallas, Texas
October 17, 2002

/S/_____
MARK A. PEYCKE
Chief, Superfund Branch
Office of Regional Counsel, Region 6
1445 Ross Avenue, Ste. 1200
Dallas, Texas 75202
(214) 665-3159; telefax: (214) 665-6460

Dated: October 17, 2002

FOR THE MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY AND THE MISSISSIPPI COMMISSION ON ENVIRONMENTAL QUALITY

/S/_____
Charles H. Chisolm
Executive Director

Dated: October 17, 2002

/S/_____
Chuck D. Barlow
General Counsel

Dated: October 18, 2002

FOR THE ARKANSAS DEPARTMENT
OF ENVIRONMENTAL QUALITY

/S/_____
Marcus Devine
Director

IT IS SO ORDERED:

Dated: New York, New York
October 18, 2002

/s/ STUART M. BERNSTEIN
Chief United States Bankruptcy Judge

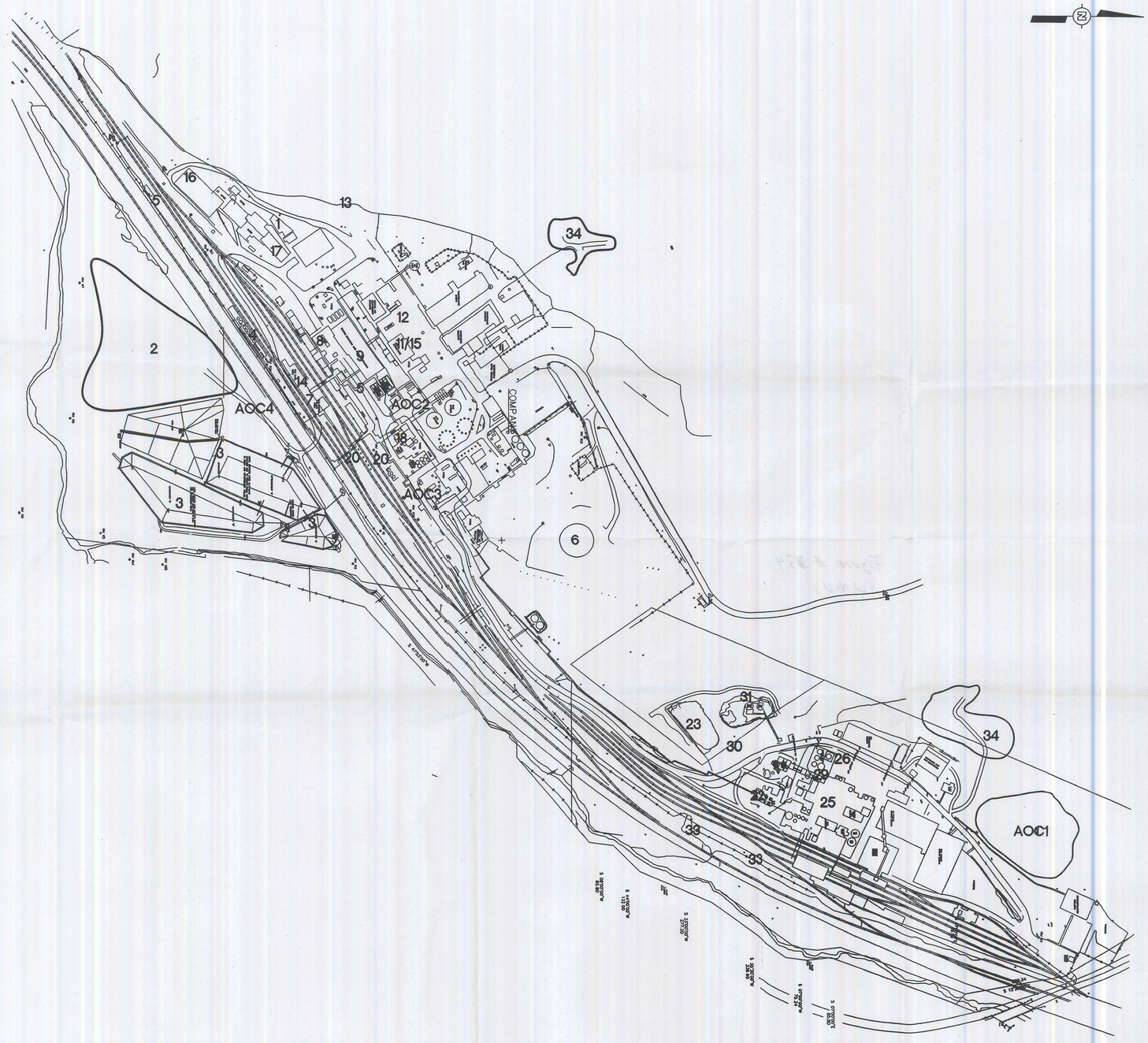
Reference
19

Warren County, Mississippi Chancellor Court Records

Vicksburg, Mississippi 39180

Deed, Mortgage & Lien Recordings on Real Property in Warren County, Mississippi

Figure # 4



SWMU NUMBER — SOUTH PLANT

1	CONTAINER (DRUM) STORAGE AREA
2	INACTIVE LANDFILL
3	SURFACE IMPOUNDMENT (SOUTH PLANT)
4	ACTIVATED CARBON TREATMENT UNITS
5	SOUTH PLANT DRAINAGE SYSTEMS
6	WASTEWATER STORAGE (HILL) TANKS
7	FORMER DINOSEB PRODUCTION AREA
8	DINOSEB LOADING/UNLOADING AREA
9	DINOSEB DRUMMING AREA
11	FORMER MSMA PRODUCTION AREA
12	FORMER MSMA SALT UNLOADING AREA
13	SOUTH PLANT DRAINAGE DITCHES
14	FORMER TOXAPHENE PRODUCTION AREA
15	FORMER METHYL PARATHION PRODUCTION AREA
16	FORMER ATRAZINE PRODUCTION AREA
17	RETURNED PRODUCT STORAGE AREA
18	FORMER BLUE TANK AREA
20	RAILROAD CAR UNLOADING STATION

NORTH PLANT

22	NORTH PLANT NEUTRALIZATION SYSTEM
23	EQUALIZATION/NEUTRALIZATION POND (NORTH PLANT)
25	NORTH PLANT WASTEWATER PIPES
26	C-10 SCRUBBER
29	OIL COLLECTION UNIT
30	NORTH PLANT WASTE OIL ACCUMULATION AREA
31	NO. 6 FUEL OIL AREA
33	NORTH PLANT DRAINAGE DITCHES

BOTH PLANTS

34	SURPLUS EQUIPMENT STORAGE (JUNKYARD)

AOC NUMBER — AOC NAME

1	FISH POND (NORTH PLANT)
2	DRUM STORAGE AREA
3	NEUTRALIZATION TANKS (SOUTH PLANT)
4	CHEMICAL CRYPT (SEPTIC TANKS)

SCALE
200 0 200 400 FEET

NO.	REVISION	DATE	INITIAL

PRELIMINARY REPORT

WOODWARD-CLYDE CONSULTANTS
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

CEDAR CHEMICAL CORPORATION
VICKSBURG CHEMICAL DIVISION
VICKSBURG, MISSISSIPPI

SCALE:	MADE BY: G. THORNTON	DATE: 4/6/92	FILE NO.
1" = 200'	CHECKED BY:	DATE: 4/6/92	92B007C

LOCATION OF SOLID WASTE MANAGEMENT UNITS — FIGURE 2

Location: B:\LJA File name: K:\JOMC\CEDAR\2B007C03.DWG Last edited: 05/05/92 @ 11:36

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

VICKSBURG WEST QUADRANGLE
MISSISSIPPI—LOUISIANA
7.5 MINUTE SERIES (TOPOGRAPHIC)
SW/4 VICKSBURG 15' QUADRANGLE

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography by photogrammetric methods from aerial photographs taken 1961-62, and in part by the City of Vicksburg
Field checked 1962

Polyconic projection. 1927 North American datum
10,000-foot grid based on Mississippi coordinate system, west zone
1000-meter Universal Transverse Mercator grid ticks,
zone 15, shown in blue

Red tint indicates area in which only landmark buildings are shown

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and USCE

Topography by photogrammetric methods from aerial photographs taken 1960 and planetable surveys 1963

Polyconic projection. 1927 North American datum
10,000-foot grids based on Mississippi coordinate system, west zone and Louisiana coordinate system, north zone
1000-meter Universal Transverse Mercator grid ticks,
zone 15, shown in blue
To place on the predicted North American Datum 1983 move the projection lines 13 meters south and 10 meters east as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Map photoinspected 1973
No major culture or drainage changes observed

UTM GRID AND 1963 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND STATE OF LOUISIANA, DEPARTMENT OF PUBLIC WORKS, BATON ROUGE, LOUISIANA 70804
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

ROAD CLASSIFICATION
Heavy-duty ——— Light-duty ———
Medium-duty ——— Unimproved dirt - - - -
U.S. Route

YOKENA, MISS.—LA.
NW/4 YOKENA 15' QUADRANGLE
N3207.5—W9052.5/7.5

1963
PHOTOINSPECTED 1973
AMS 2846 III NW—SERIES V843

Reference 3