

HYDROLOGIC DATA COLLECTED IN THE VICINITY OF THE PROPOSED GAMMA-RAY AND
NEUTRINO DETECTOR SITE, HOT SPRING COUNTY, ARKANSAS, 1988-89

By Daniel J. Fitzpatrick and Paul W. Westerfield

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CONVERSION FACTORS

For use of readers who prefer to use metric (International System) units, rather than the inch-pound units used in this report, the following conversion factors may be used:

<u>Multiply inch-pound unit</u>	<u>By</u>	<u>To obtain metric unit</u>
foot (ft)	0.3048	meter (m)
cubic foot per second (ft ³ /s)	0.02832	cubic meter per second (m ³ /s)
mile (mi)	1.609	kilometer (km)
inch (in.)	25.40	millimeter (mm)
square mile (mi ²)	2.590	square kilometer (mi ²)

Temperature in degrees Fahrenheit (°C) as follows:

$$^{\circ}\text{F} = 1.8 \times ^{\circ}\text{C} + 32$$

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."

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ABSTRACT

An abandoned barite mine in Hot Spring County, Arkansas, has been selected as the location for a proposed gamma-ray and neutrino detector site. As part of the hydrologic evaluation of the site, the U.S. Geological Survey in cooperation with the Arkansas Geological Commission collected hydrologic data at selected locations in the vicinity of the abandoned barite mine.

Data collected as part of the project included water-quality, pond-elevation, and precipitation data within the abandoned barite mine and flow and water-quality data at selected sites in the vicinity of the mine. Water-quality samples from within the abandoned mine were collected at three locations in the pond at selected depths. These data included field measurements of specific conductance, pH, water temperature, dissolved oxygen, major ions, and trace metals. Major ion and trace-metal samples were collected at six stream sites, one lake site, and two wastewater pond sites. Pond elevation and precipitation data from within the abandoned barite mine were measured for the period between July 1, 1988, and June 30, 1989. Twelve discharge measurements during the period between June 21, 1988, and June 26, 1989, were collected at six sites in the vicinity of the abandoned barite mine.

INTRODUCTION

A partially water-filled abandoned barite mine or pit in Hot Spring County in central Arkansas has been selected for a proposed gamma-ray and neutrino detector site (fig. 1). The proposed detector will be enclosed in a watertight plastic bag with approximate dimensions of 800 ft by 800 ft by 250 ft thick. The plastic bag will be filled with purified water, and floated in the existing mine pit. The abandoned barite mine was chosen for the proposed site because the pit is the appropriate size, sufficient water exists on site, freezing is not a problem, and the area is relatively secure.

Part of the project site evaluation involved a hydrologic investigation to determine the hydrologic characteristics at and near the abandoned barite mine (fig. 1). As part of this characterization, the U.S. Geological Survey entered into a 1-year cooperative program with the Arkansas Geological Commission to collect hydrologic data at selected sites. These data included water-quality, pond-elevation, and precipitation data within the abandoned barite mine and discharge and water-quality data in the vicinity of the mine. The purpose of this report is to present these data.

WATER-QUALITY DATA

Water-quality data were collected from the pond within the abandoned barite mine and from other surface-water sites in the vicinity of the mine. Samples were collected from the pond at three sites (fig. 2 and table 1) at varying depths. The total depth of sample collection at the three sites was 120, 190, and 320 feet. Specific conductance, pH, temperature, and dissolved

oxygen were collected at the three sites with a portable multicomponent water-quality monitoring unit at depth intervals ranging from 1 to 50 feet (table 2). Samples for major ion and trace-metal analysis also were collected at each of the three sites within the pond at selected depths (table 3).

Water samples for major ion and trace-metal analysis were collected at six stream sites, one lake site, and two wastewater pond sites (fig. 3 and table 1). Water-quality analyses are given in table 4.

ELEVATION AND PRECIPITATION DATA

Elevation and precipitation data were collected at the abandoned barite mine (fig. 2). The elevation of the pond within the pit was recorded at hourly intervals using a pressure transducer. Mean daily elevations for the period between July 1, 1988, and June 30, 1989, are given in table 5.

Daily precipitation data were collected using a tipping bucket-type rain gage. Total daily and monthly precipitation data for the period between July 1, 1988, and June 30, 1989, are listed in table 6. Pond-stage and precipitation data for the 12-month period are illustrated in figure 4.

Additional pond elevation and rainfall data subsequent to June 30, 1989, are available from the Arkansas District, U.S. Geological Survey, Little Rock, Arkansas.

DISCHARGE DATA

Twelve discharge measurements were obtained at each of six sites in the vicinity of the abandoned barite mine (fig. 3 and table 1). These measurements were made from June 21, 1988, to June 26, 1989. Discharge measurements for the six sites are given in table 7.

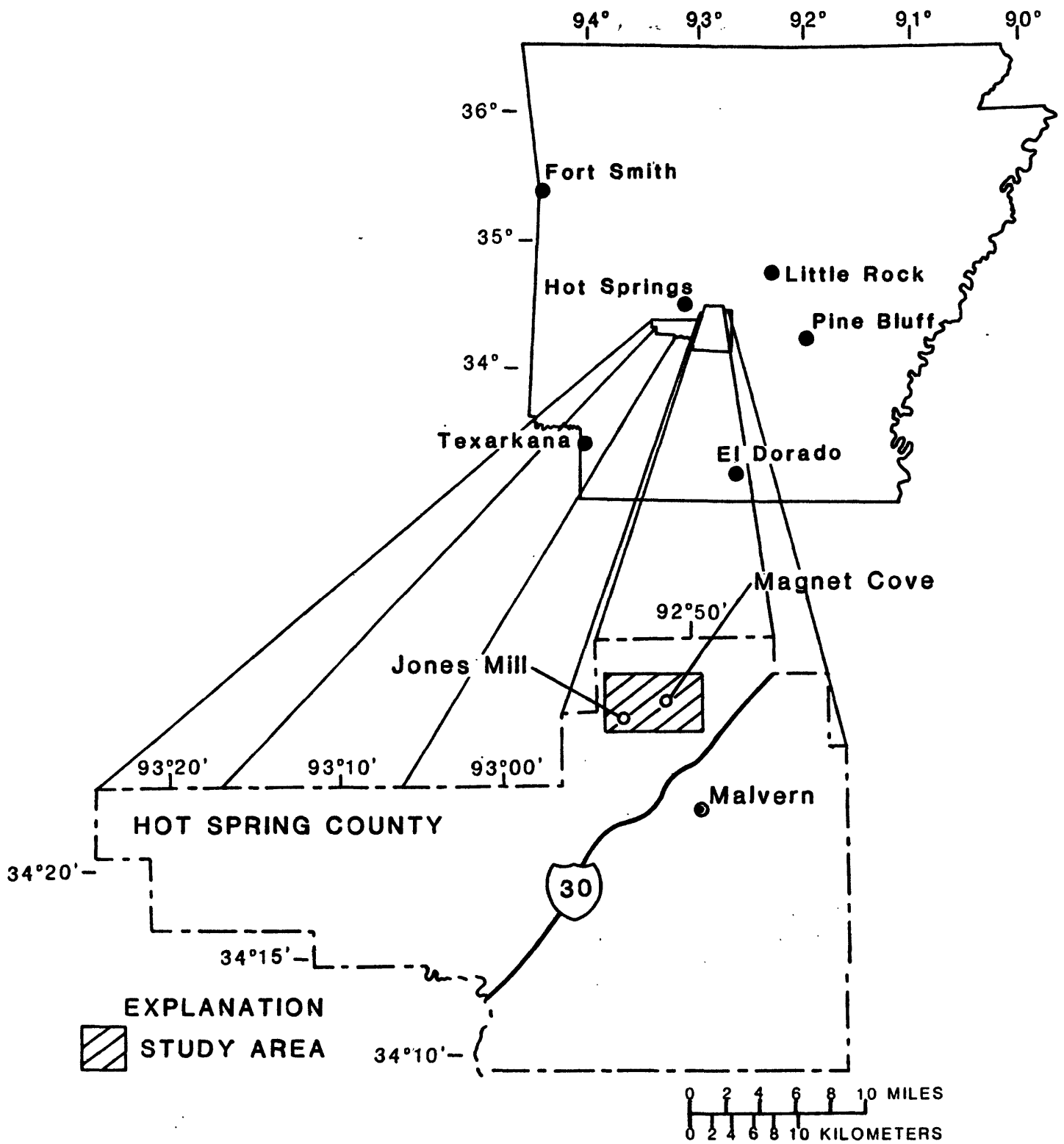
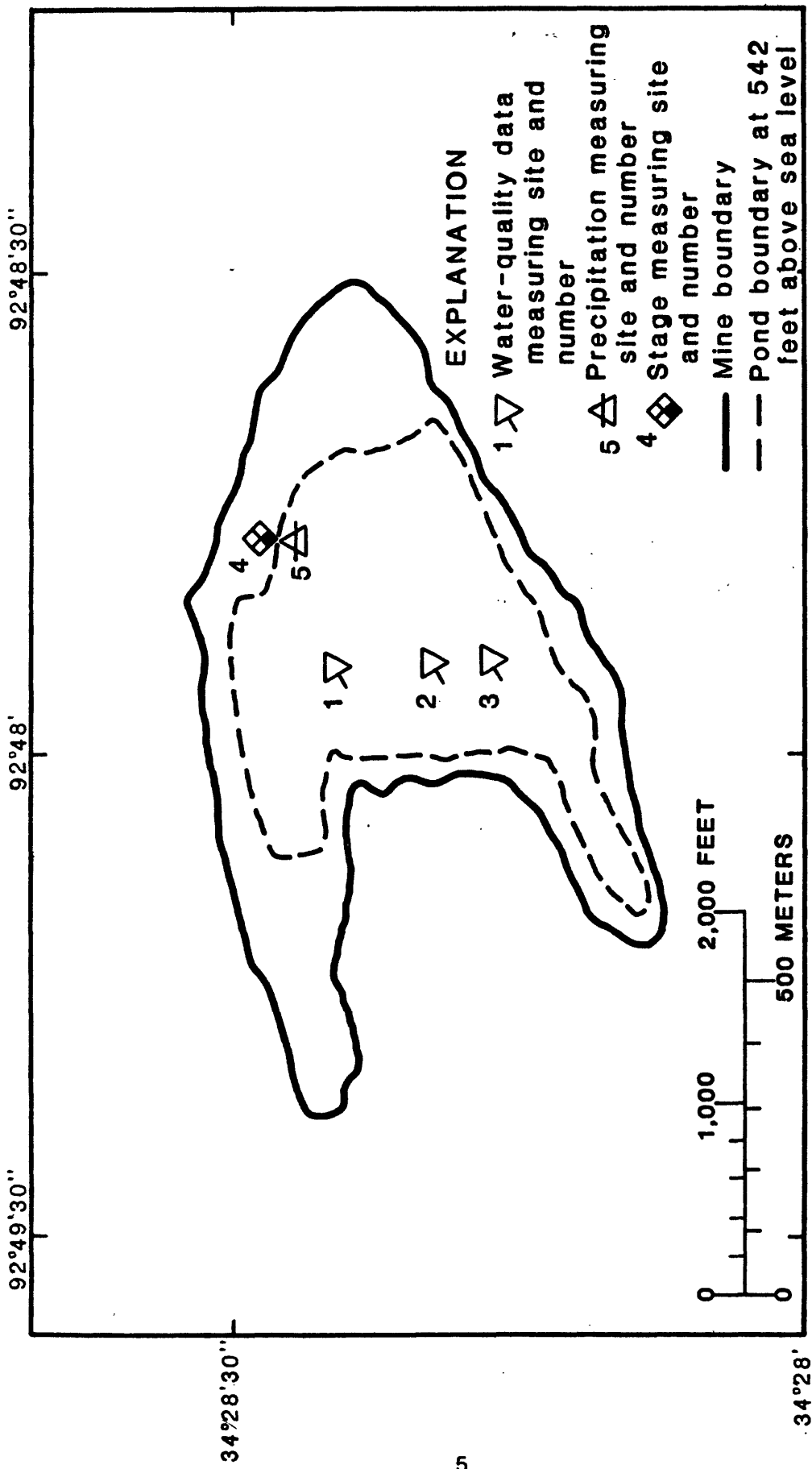
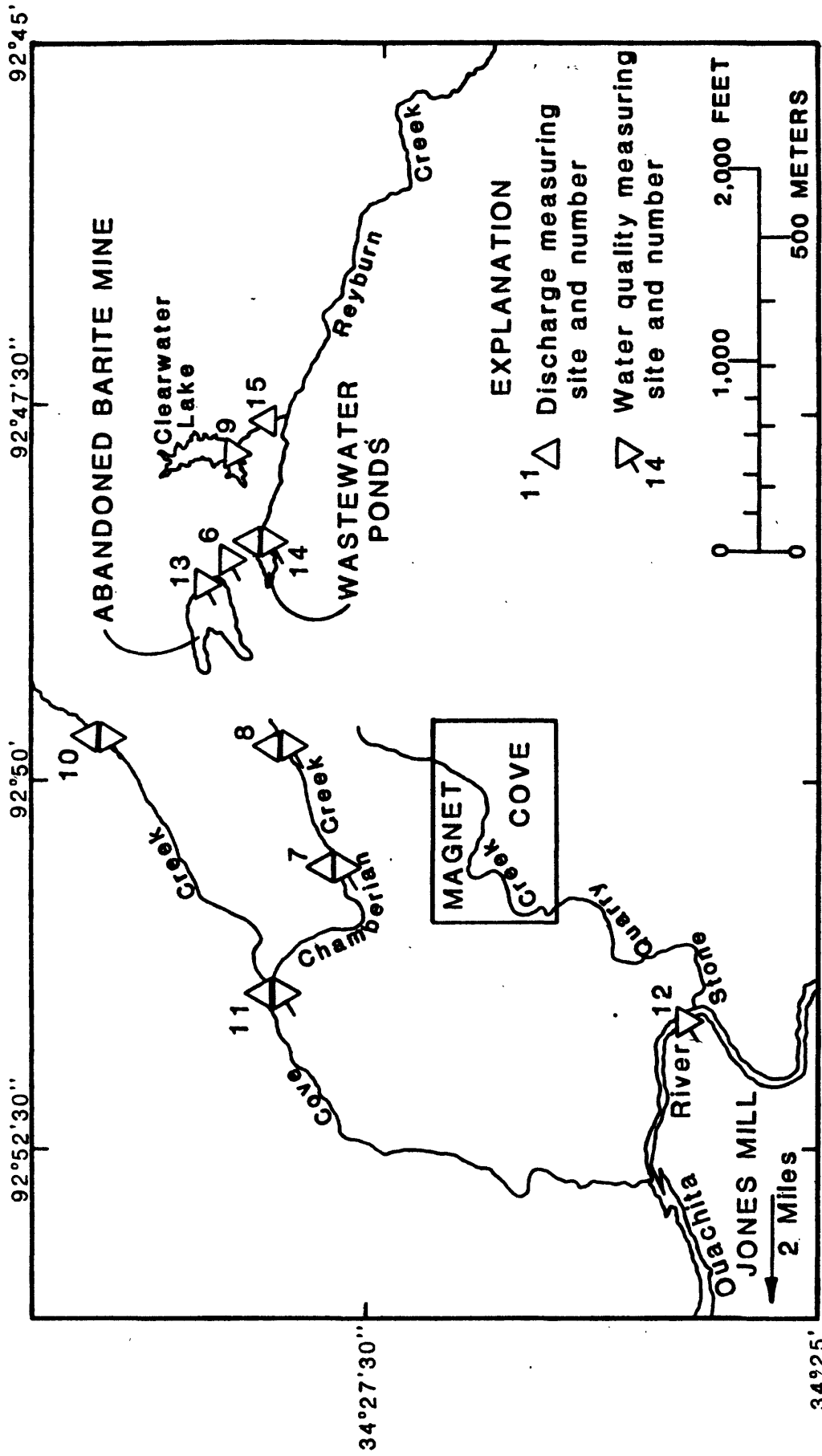


Figure 1.--Location of study area.



Base from U.S. Geological Survey
Malvern North, 1978

Figure 2.--Location of precipitation, pond elevation and water quality measuring sites within the abandoned barite mine.



Base from U.S. Geological Survey
 Malvern North, 1978

Figure 3.--Locations of discharge and water quality measuring sites in the vicinity of the abandoned barite mine.

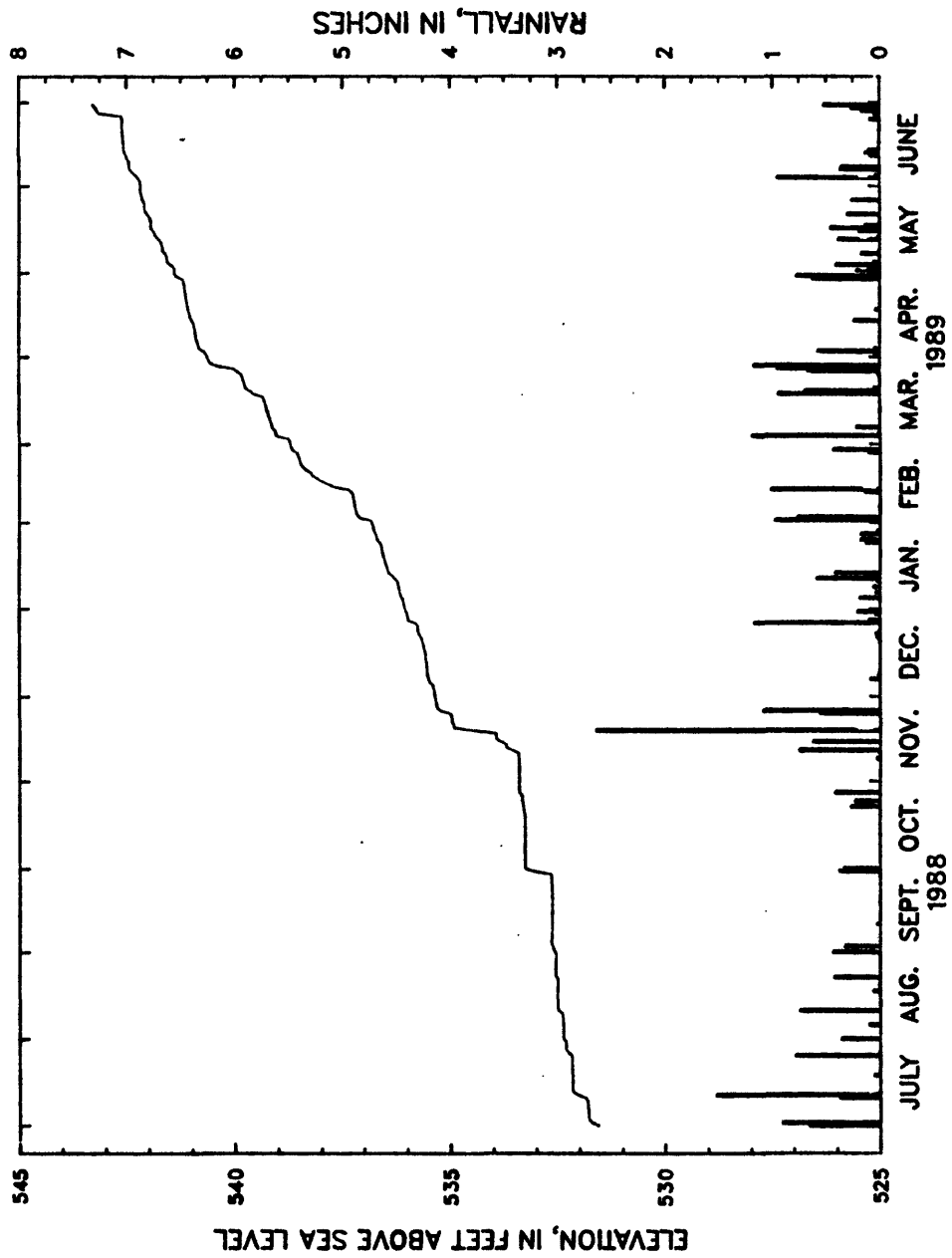


Figure 4.--Pond elevation and rainfall within the abandoned barite mine, July 1, 1988 to June 30, 1989.

Table 1.--Data collection site descriptions

Map number	Station number	Site description
1	07359019	Pond in abandoned barite mine near Magnet Cove, Ark. Lat. 34°28'28", long. 92°48'51", in SE 1/4 SE 1/4 SE 1/4 sec 10, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, 2.2 miles northeast of Magnet Cove.
2	07359021	Pond in abandoned barite mine near Magnet Cove, Ark. Lat. 34°28'20", long. 92°48'54", NW 1/4 NE 1/4 SE 1/4 sec 15, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040101, 2.1 miles northeast of Magnet Cove.
3	07359022	Pond in abandoned barite mine near Magnet Cove, Ark. Lat. 34°28'15", long. 92°48'54", SW 1/4 NE 1/4 NE 1/4 sec 15, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, 2.1 miles northeast of Magnet Cove.
4 and 5	07359020	Abandoned barite mine near Magnet Cove, Ark. Lat. 34°28'28", long. 92°48'51", in SE 1/4 SE 1/4 SE 1/4 sec 10, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, 2.2 miles northeast of Magnet Cove, datum of pond stage elevation gage is 528.00 feet above sea level.
6	07363088	Wastewater pond near Magnet Cove, Ark. Lat. 34°28'10", long. 92°48'31", NE 1/4 SW 1/4 NW 1/4 sec 14, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040203, at large wastewater pond next to mine buildings, 2.3 miles northeast of Magnet Cove.
7	07359024	Chamberlain Creek at Magnet Cove, Ark. Lat. 34°27'42", long. 92°50'35", in NE 1/4 SW 1/4 SW 1/4 sec 16, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, at culvert on county road, 0.9 mile northwest of Magnet Cove, drainage area 1.39 square miles.
8	07359023	Chamberlain Creek near Magnet Cove, Ark. Lat. 34°28'01", long. 92°48'50", in SE 1/4 SE 1/4 NE 1/4 sec 16, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, at culvert on county road, 1.3 miles north of Magnet Cove, drainage area 0.66 square mile.
9	07363085	Clearwater Lake near Magnet Cove, Ark. Lat. 34°28'17", long. 92°47'43", in SW 1/4 NE 1/4 NE 1/4 sec 14, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040203, at spillway, 2.7 miles northeast of Magnet Cove.
10	07359010	Cove Creek north of Magnet Cove, Ark., Lat. 34°28'59", long. 92°49'38", in NW 1/4 SW 1/4 NW 1/4 sec 10, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, at bridge on county road, 2.4 miles north of Magnet Cove, drainage area 2.84 square miles.
11	07359026	Cove Creek northwest of Magnet Cove, Ark. Lat. 34°28'01", long. 92°51'30", in SW 1/4 SE 1/4 NW 1/4 sec 17, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, 0.3 mile downstream from bridge on county road, 1.8 miles northwest of Magnet Cove, drainage area 11.2 square miles.

Table 1.--Data collection site descriptions--Continued

Map number	Station number	Site description
12	07359050	<p>Ouachita River near Jones Mill, Ark.</p> <p>Lat. 34⁰25'40", long. 92⁰51'29", in SW 1/4 NE 1/4 NW 1/4 sec 32, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, 500 feet south of U.S. Highway 270 and 100 feet upstream from Stone Quarry Creek, 1.6 miles east of Jones Mill, drainage area 1,567 square miles.</p>
13	07359017	<p>Tributary to pond in abandoned barite mine near Magnet Cove, Ark.</p> <p>Lat. 34⁰28'34", long. 92⁰48'53", in SE 1/4 SE 1/4 SE 1/4 sec 10, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040102, at ditch on road to pond in abandoned barite mine, 2.2 miles northeast of Magnet Cove.</p>
14	07363089	<p>Spillway out of wastewater pond</p> <p>Lat. 34⁰28'59", long. 92⁰49'38", in NW 1/4 SW 1/4 NW 1/4 sec 14, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040203, 2.0 miles northeast of Magnet Cove.</p>
15	07363087	<p>Reyburn Creek near Magnet Cove, Ark.</p> <p>Lat. 34⁰28'00", long. 92⁰47'36", in SW 1/4 SW 1/4 NW 1/4 sec 13, T.3S., R.17W., Hot Spring County, Hydrologic Unit 08040203, at culvert on county road, 2.8 miles northeast of Magnet Cove, drainage area 1.26 square miles.</p>

Table 2.--Water-quality field measurements of the pond within the abandoned barite mine

[US/CM=microsiemens per centimeter at 25 degrees Celsius; DEG C=degrees Celsius; MG/L=milligrams per liter; five-digit numbers in parentheses are STORET parameter codes used for computer storage of data]

MAP NUMBER (figure 2)	STATION NUMBER (table 1)	DATE	TIME	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
1	07359019	11-03-88	1245	0	3,080	3.24	18.0	9.7
1	07359019	11-03-88	1247	10	3,080	3.23	17.5	9.2
1	07359019	11-03-88	1249	20	3,090	3.24	17.5	9.1
1	07359019	11-03-88	1251	30	3,080	3.23	17.5	9.1
1	07359019	11-03-88	1253	40	3,190	3.23	13.5	6.3
1	07359019	11-03-88	1255	50	3,330	3.21	12.0	1.3
1	07359019	11-03-88	1257	60	3,670	3.31	12.5	0.9
1	07359019	11-03-88	1259	70	3,770	3.38	12.0	0.9
1	07359019	11-03-88	1302	80	3,980	3.38	12.0	0.9
1	07359019	11-03-88	1304	90	3,980	3.38	12.0	0.7
1	07359019	11-03-88	1305	100	3,980	3.37	12.0	0.5
1	07359019	11-03-88	1307	110	4,000	3.37	12.0	0.4
1	07359019	11-03-88	1309	120	4,000	3.38	12.0	0.3
1	07359019	11-03-88	1311	130	4,010	3.38	12.0	0.3
1	07359019	11-03-88	1314	140	4,020	3.37	12.0	0.3
1	07359019	11-03-88	1316	150	4,040	3.38	12.5	0.3
1	07359019	11-03-88	1318	180	4,060	3.40	12.5	0.2
1	07359019	11-03-88	1320	170	4,070	3.42	12.5	0.2
1	07359019	11-03-88	1322	180	4,130	3.43	12.5	0.2
1	07359019	11-03-88	1323	190	4,150	3.43	13.0	0.2
2	07359021	11-03-88	1000	0	3,070	3.18	18.0	9.3
2	07359021	11-03-88	1002	5	3,070	3.18	18.0	9.3
2	07359021	11-03-88	1003	10	3,070	3.19	17.5	9.3
2	07359021	11-03-88	1004	20	3,080	3.19	17.5	9.2
2	07359021	11-03-88	1006	30	3,080	3.20	17.5	9.1
2	07359021	11-03-88	1008	35	3,070	3.21	17.0	8.8
2	07359021	11-03-88	1010	36	3,100	3.23	16.5	7.8
2	07359021	11-03-88	1012	37	3,130	3.24	15.0	7.1
2	07359021	11-03-88	1014	38	3,150	3.23	14.5	6.5
2	07359021	11-03-88	1016	39	3,160	3.23	14.0	5.8
2	07359021	11-03-88	1018	40	3,180	3.23	13.5	5.4
2	07359021	11-03-88	1020	45	3,230	3.21	12.5	3.2
2	07359021	11-03-88	1022	50	3,300	3.20	12.0	0.3
2	07359021	11-03-88	1024	60	3,650	3.29	12.0	0.2
2	07359021	11-03-88	1026	70	3,930	3.35	12.0	0.2
2	07359021	11-03-88	1028	80	3,970	3.35	12.0	0.3
2	07359021	11-03-88	1030	90	3,990	3.35	12.0	0.4
2	07359021	11-03-88	1032	100	4,000	3.33	12.0	0.5
2	07359021	11-03-88	1034	125	3,990	3.34	12.0	0.4
2	07359021	11-03-88	1036	150	4,050	3.35	12.0	0.3
2	07359021	11-03-88	1038	175	4,140	3.41	12.5	0.3
2	07359021	11-03-88	1040	200	4,280	3.47	13.0	0.3
2	07359021	11-03-88	1042	225	4,400	3.60	13.5	0.2
2	07359021	11-03-88	1044	235	4,400	3.80	13.5	0.2
2	07359021	11-03-88	1046	250	4,400	3.50	14.0	--
2	07359021	11-03-88	1048	300	4,400	3.51	14.5	--
2	07359021	11-03-88	1050	320	4,400	3.58	15.5	0.2
3	07359022	11-03-88	1500	0	3,080	3.26	18.0	8.9
3	07359022	11-03-88	1502	10	3,080	3.25	18.0	8.9
3	07359022	11-03-88	1504	20	3,090	3.25	17.5	9.0
3	07359022	11-03-88	1506	30	3,080	3.25	17.5	8.9
3	07359022	11-03-88	1507	40	3,210	3.24	13.5	5.0
3	07359022	11-03-88	1510	50	3,340	3.22	12.0	1.3
3	07359022	11-03-88	1512	60	3,630	3.30	12.0	0.3
3	07359022	11-03-88	1514	70	3,950	3.37	12.0	0.2
3	07359022	11-03-88	1516	80	3,970	3.37	12.0	0.2
3	07359022	11-03-88	1518	90	3,990	3.38	12.0	0.1
3	07359022	11-03-88	1520	100	3,990	3.38	12.0	0.1
3	07359022	11-03-88	1522	110	3,990	3.38	12.0	0.1
3	07359022	11-03-88	1524	120	4,010	3.38	12.0	0.1

Table 3.--Water-quality data at selected depths for three locations in the pond within the abandoned barite mine. [US/CM=micrograms per centimeter at 25 degrees Celsius; DEG C=degrees Celsius; DEG/L=milligrams per liter; UG/L=micrograms per liter; five-digit numbers in parentheses are STORET parameter codes used for computer storage of data]

MAP NUMBER (fig-ure 2)	STATION NUMBER (table 1)	DATE	TIME	SAMPLING DEPTH (FEET) (00003)	SPECIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE WATER (DEG C) (00010)	OXYGEN SOLVED (MG/L) AS CA (00300)	CALCIUM DIS-SOLVED (MG/L) AS CA (00915)	MAGNESIUM, DIS-SOLVED (MG/L) AS MG (00925)	SODIUM, DIS-SOLVED (MG/L) AS NA (00930)
1	07359019	11-03-88	1247	10	3,080	3.23	17.5	9.2	300	180	39
		11-03-88	1255	50	3,330	3.21	12.0	1.3	330	210	37
		11-03-88	1305	100	3,980	3.37	12.0	0.5	420	280	39
		11-03-88	1323	190	4,150	3.43	13.0	0.2	390	260	38
	07359021	11-03-88	1002	5	3,070	3.18	18.0	9.3	310	190	40
		11-03-88	1022	50	3,300	3.20	12.0	0.3	340	210	38
		11-03-88	1040	200	4,280	3.47	13.0	0.3	400	270	37
		11-03-88	1050	320	4,400	3.58	15.5	0.2	400	250	34
	07359022	11-03-88	1502	10	3,080	3.25	18.0	8.9	340	210	45
		11-03-88	1510	50	3,340	3.22	12.0	1.3	350	210	39
		11-03-88	1514	70	3,950	3.37	12.0	0.2	400	270	38
		11-03-88	1524	120	4,010	3.38	12.0	0.1	400	280	39

MAP NUMBER (fig-ure 2)	STATION NUMBER (table 1)	DATE	POTASSIUM, DIS-SOLVED (MG/L) AS K (00935)	ALKALINITY LAB (MG/L) AS CAC03 (80410)	SULFATE DIS-SOLVED (MG/L) AS S04 (00945)	CHLORIDE, DIS-SOLVED (MG/L) AS CL (00940)	FLUORIDE, DIS-SOLVED (MG/L) AS F (00950)	SILICA, DIS-SOLVED (MG/L) AS S102 (00955)	SOLIDS, RESIDUE AT 180 DEG. C (70300)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L) AS N (00631)	PHOSPHORUS, ORTHO, DIS-SOLVED (MG/L) AS P (00671)
1	07359019	11-03-88	10	<1.0	2,100	36	1.4	54	2,990	<0.100	<0.010
		11-03-88	10	<1.0	2,300	32	1.4	54	3,320	<0.100	<0.010
		11-03-88	9	<1.0	3,100	27	0.90	63	4,260	<0.100	0.050
2	07359021	11-03-88	8	<1.0	3,300	27	0.20	63	4,560	<0.100	<0.010
		11-03-88	10	<1.0	2,100	36	1.4	56	3,010	<0.100	<0.010
		11-03-88	10	<1.0	2,400	32	1.4	55	3,380	<0.100	0.020
3	07359022	11-03-88	8	<1.0	3,400	26	0.10	64	4,710	<0.100	0.010
		11-03-88	8	<1.0	3,700	23	2.4	68	5,280	<0.100	0.020
		11-03-88	11	<1.0	2,100	36	1.4	60	3,020	<0.100	<0.010
11-03-88		10	<1.0	2,300	32	1.4	56	3,350	<0.100	<0.010	
		9	<1.0	3,000	27	0.90	61	4,260	<0.100	<0.010	
		9	<1.0	3,100	27	0.70	62	5,660	<0.100	<0.010	

Table 3.--Water-quality data at selected depths for three locations in the pond within the abandoned barite mine--continued

MAP NUMBER (fig-ure 2)	STATION NUMBER (table 1)	DATE	BARIUM, DIS-SOLVED (UG/L AS BA)		BERYL-LIUM, DIS-SOLVED (UG/L AS BE)		BORON, DIS-SOLVED (UG/L AS B)		CADMIUM, DIS-SOLVED (UG/L AS CD)		CHRO-MIUM, DIS-SOLVED (UG/L AS CR)		COBALT, DIS-SOLVED (UG/L AS CO)		COPPER, DIS-SOLVED (UG/L AS CU)		IRON, DIS-SOLVED (UG/L AS FE)		LEAD, DIS-SOLVED (UG/L AS PB)	
			(01005)	(01010)	(01020)	(01025)	(01030)	(01035)	(01040)	(01046)	(01049)									
1	07359019	11-03-88	14	9	870	6	20	1,000	580	7,200	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	11	9	770	8	20	1,100	520	33,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	9	8	860	8	30	830	550	139,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	13	10	970	10	20	1,500	440	195,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2	07359021	11-03-88	15	10	860	8	20	1,100	600	12,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	12	11	760	7	20	1,100	550	28,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	9	12	990	14	30	1,600	460	217,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	8	13	1100	15	30	1,700	320	336,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
3	07359022	11-03-88	16	<0.5	870	8	20	1,100	670	8,500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	13	<0.5	780	18	30	1,100	580	30,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	11	3	860	11	30	830	550	134,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
		11-03-88	5	2	870	5	30	770	500	146,000	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10

MAP NUMBER (fig-ure 2)	STATION NUMBER (table 1)	DATE	LITHIUM, DIS-SOLVED (UG/L AS LI)		MANGA-NESE, DIS-SOLVED (UG/L AS MN)		MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)		NICKEL, DIS-SOLVED (UG/L AS NI)		SILVER, DIS-SOLVED (UG/L AS AG)		STRON-TIUM, DIS-SOLVED (UG/L AS SR)		VANA-DIUM, DIS-SOLVED (UG/L AS V)		ZINC, DIS-SOLVED (UG/L AS ZN)	
			(01130)	(01056)	(01060)	(01065)	(01075)	(01080)	(01085)	(01090)								
1	07359019	11-03-88	380	68,000	<10	1,400	5	3,000	<6	3,700	<6	3,700	<6	3,700	<6	3,700	<6	3,700
		11-03-88	390	78,000	<10	1,500	7	3,300	<6	3,400	<6	3,400	<6	3,400	<6	3,400	<6	3,400
		11-03-88	430	109,000	<10	2,200	<1	4,100	21	4,300	21	4,300	21	4,300	21	4,300	21	4,300
2	07359021	11-03-88	390	71,000	20	1,500	6	3,100	<6	3,900	<6	3,900	<6	3,900	<6	3,900	<6	3,900
		11-03-88	400	80,000	<10	1,600	6	3,300	<6	3,800	<6	3,800	<6	3,800	<6	3,800	<6	3,800
		11-03-88	450	110,000	<10	2,300	8	4,100	25	4,300	25	4,300	25	4,300	25	4,300	25	4,300
		11-03-88	450	118,000	<10	2,500	9	3,700	54	4,300	54	4,300	54	4,300	54	4,300	54	4,300
3	07359022	11-03-88	430	74,000	10	1,600	11	3,400	<6	3,900	<6	3,900	<6	3,900	<6	3,900	<6	3,900
		11-03-88	410	80,000	30	1,600	40	3,400	<6	3,400	<6	3,400	<6	3,400	<6	3,400	<6	3,400
		11-03-88	470	109,000	50	2,000	14	4,100	16	4,400	16	4,400	16	4,400	16	4,400	16	4,400
11-03-88	470	111,000	<10	2,000	18	4,200	18	4,200	18	4,200	18	4,200	18	4,200	18	4,200		

Table 4.--Water-quality data at miscellaneous sampling sites in the vicinity of the abandoned Parite mine

[US/CM=microsiemens per centimeter at 25 degrees Celsius; DEG C=degrees Celsius; MG/L=milligrams per liter; UG/L=micrograms per liter; five digit numbers in parentheses are STORET parameter codes used for computer storage of data]

MAP NUMBER (figure 3)	STATION NUMBER (table 1)	DATE	TIME	PH (STANDARD ARD UNITS) (00400) (00085)	TEMPERATURE WATER (DEG C) (00010)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
6	07363088	01-28-88	1303	3.80	7.0	63	12	12
7	07359024	08-02-88	1315	3.10	26.0	.39	45	4.6
8	07358023	07-27-88	1230	3.20	31.5	270	420	11
9	07363085	08-02-88	1030	4.40	29.5	7.2	5.2	2.5
10	07359010	07-27-88	1430	6.20	25.0	3.5	1.6	2.0
11	07359026	08-02-88	1520	6.70	29.5	11	4.7	2.9
12	07359050	08-01-88	1520	6.60	26.5	8.2	1.8	19
13	07359017	01-28-88	1200	2.70	10.0	<270	<260	<91
14	07363089	08-02-88	1215	4.00	32.0	55	20	64

MAP NUMBER	DATE	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB AS CAC03 (90410)	SULFATE DIS-SOLVED (MG/L AS S04) (00945)	CHLORIDE DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SI02) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (009631)
6	01-28-88	2.2	<1.0	300	1.9	0.20	12	420	<0.100
7	08-02-88	2.3	<1.0	490	2.1	0.60	24	682	0.210
8	07-27-88	4.3	<1.0	3,100	0.40	0.10	79	5,400	<0.100
9	08-02-88	1.0	<1.0	52	1.8	0.30	5.9	84	<0.100
10	07-27-88	0.90	10	6.5	2.4	0.10	9.6	42	<0.100
11	08-02-88	1.3	12	40	2.2	0.30	10	82	<0.100
12	08-01-88	3.4	11	29	19	0.30	4.9	109	0.470
13	01-28-88	3.6	<1.0	2,900	120	0.10	42	4,180	<0.100
14	08-02-88	2.6	<1.0	320	1.2	0.30	5.5	432	<0.100

Table 4.--Water-quality data at miscellaneous sampling sites in the vicinity of the abandoned barite mine--continued

MAP NUMBER (fig. 3)	DATE	PHOSPHORUS		BERYLLIUM		BORON		CADMIUM		CHROMIUM		COBALT		COPPER		IRON	
		ORTHOPHOSPHATE (MG/L AS P) (00671)	DISSOLVED (UG/L AS BA) (01005)	DISSOLVED (UG/L AS BE) (01010)	DISSOLVED (UG/L AS B) (01020)	DISSOLVED (UG/L AS CD) (01025)	DISSOLVED (UG/L AS CR) (01030)	DISSOLVED (UG/L AS CO) (01035)	DISSOLVED (UG/L AS CU) (01040)	DISSOLVED (UG/L AS FE) (01045)	DISSOLVED (UG/L AS SR) (01080)	DISSOLVED (UG/L AS V) (01085)	DISSOLVED (UG/L AS ZN) (01090)	DISSOLVED (UG/L AS ZN) (01095)	DISSOLVED (UG/L AS ZN) (01100)	DISSOLVED (UG/L AS ZN) (01105)	DISSOLVED (UG/L AS ZN) (01110)
6	01-28-88	<0.010	21	<0.5	40	<1	<5	<1	<5	<5	40	50	220				
7	08-02-88	<0.010	57	<4	20	<1	<5	<1	<5	<180	<60	<60	2,300				
8	07-27-88	<0.010	<25	17	110	--	50	110	1,400	110	34,000						
9	08-02-88	<0.010	150	<0.5	30	<1	<5	<10	20	<10	230						
10	07-27-88	<0.010	150	<0.5	<10	<1	<5	<10	<3	<10	62						
11	08-02-88	<0.010	120	<0.5	<10	<1	<5	8	<10	8	<10						
12	08-01-88	0.010	47	<0.5	10	<1	<5	<10	<3	<10	150						
13	01-28-88	<0.010	11	7	6,700	<3	40	800	<3	170	78,000						
14	08-02-88	<0.010	79	<0.5	20	<1	<5	<10	<3	<10	3						

MAP NUMBER (fig. 3)	DATE	LEAD		LITHIUM		MANGANESE		MOLYBDENUM		NICKEL		SILVER		STRONTIUM		VANADIUM		ZINC	
		DISSOLVED (UG/L AS PB) (01049)	DISSOLVED (UG/L AS LI) (01130)	DISSOLVED (UG/L AS MN) (01056)	DISSOLVED (UG/L AS MO) (01060)	DISSOLVED (UG/L AS NI) (01065)	DISSOLVED (UG/L AS AG) (01075)	DISSOLVED (UG/L AS SR) (01080)	DISSOLVED (UG/L AS V) (01085)	DISSOLVED (UG/L AS ZN) (01090)	DISSOLVED (UG/L AS ZN) (01095)	DISSOLVED (UG/L AS ZN) (01100)	DISSOLVED (UG/L AS ZN) (01105)	DISSOLVED (UG/L AS ZN) (01110)	DISSOLVED (UG/L AS ZN) (01115)	DISSOLVED (UG/L AS ZN) (01120)	DISSOLVED (UG/L AS ZN) (01125)	DISSOLVED (UG/L AS ZN) (01130)	DISSOLVED (UG/L AS ZN) (01135)
6	01-28-88	<10	18	7,600	<10	130	<1.0	1,300	<6	430									
7	08-02-88	<10	120	17,000	<10	<10	<1.0	280	<6	790									
8	07-27-88	--	990	160,000	50	2,400	11	1,300	--	5,000									
9	08-02-88	<10	9	2,400	<10	40	<1.0	0	<6	63									
10	07-27-88	<10	<4	180	<10	<10	<1.0	32	<6	14									
11	08-02-88	<10	7	1,100	<10	<10	<1.0	100	<6	22									
12	08-01-88	<10	8	240	90	<10	<1.0	42	200	7									
13	01-28-88	<30	510	120,000	<30	1,300	75	1,700	<18	3,000									
14	08-02-88	<10	9	480	<10	<10	<1.0	640	<6	6									

Table 5.--Mean daily elevation in the pond within the abandoned barite mine for the period July 1988 to June 1989

[in feet above sea level]

DAY	1988							1989				
	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE
1	531.56	532.37	532.57	533.26	533.40	535.35	536.05	536.81	538.71	540.63	541.40	542.18
2	531.70	532.37	532.60	533.26	533.40	535.36	536.06	536.84	538.73	540.66	541.40	542.19
3	531.78	532.37	532.62	533.26	533.40	535.37	536.07	537.13	538.75	540.71	541.40	542.19
4	531.79	532.37	532.65	533.26	533.40	535.39	536.09	537.16	539.02	540.82	541.48	542.25
5	531.79	532.37	532.65	533.26	533.40	535.40	536.11	537.19	539.04	540.85	541.56	542.30
6	531.80	532.37	532.64	533.26	533.40	535.48	536.15	537.20	539.06	540.86	541.57	542.38
7	531.80	532.38	532.64	533.26	533.40	535.50	536.16	537.21	539.12	540.88	541.58	542.43
8	531.81	532.39	532.64	533.26	533.40	535.52	536.18	537.23	539.14	540.90	541.61	542.44
9	531.81	532.39	532.63	533.26	533.41	535.53	536.19	537.24	539.16	540.91	541.67	542.45
10	531.82	532.39	532.63	533.26	533.41	535.54	536.21	537.25	539.18	540.92	541.68	542.45
11	531.86	532.49	532.63	533.26	533.41	535.54	536.22	537.26	539.20	540.93	541.69	542.50
12	532.03	532.51	532.63	533.26	533.56	535.55	536.29	537.28	539.22	540.95	541.71	542.51
13	532.15	532.51	532.63	533.26	533.70	535.55	536.34	537.36	539.24	540.96	541.76	542.54
14	532.16	532.51	532.63	533.26	533.70	535.57	536.42	537.70	539.26	541.00	541.83	542.56
15	532.16	532.51	532.63	533.26	533.82	535.57	536.45	537.84	539.28	541.03	541.86	542.56
16	532.16	532.50	532.63	533.26	533.94	535.58	536.47	537.99	539.30	541.05	541.89	542.56
17	532.16	532.50	532.63	533.26	533.94	535.59	536.49	538.10	539.32	541.06	541.95	542.57
18	532.16	532.50	532.63	533.26	533.94	535.61	536.51	538.20	539.34	541.08	541.95	542.57
19	532.16	532.50	532.63	533.26	534.44	535.62	536.53	538.24	539.55	541.10	541.94	542.58
20	532.17	532.50	532.63	533.26	534.93	535.64	536.55	538.34	539.63	541.11	541.96	542.59
21	532.17	532.50	532.63	533.28	534.93	535.66	536.57	538.42	539.74	541.12	541.98	542.59
22	532.17	532.49	532.63	533.29	534.96	535.68	536.58	538.47	539.76	541.13	542.04	542.60
23	532.17	532.53	532.64	533.30	534.97	535.73	536.59	538.49	539.78	541.14	542.08	542.60
24	532.17	532.56	532.64	533.31	534.97	535.75	536.60	538.51	539.80	541.15	542.09	542.60
25	532.17	532.55	532.64	533.33	534.98	535.75	536.63	538.53	539.82	541.16	542.09	542.60
26	532.17	532.55	532.65	533.33	535.22	535.75	536.69	538.55	539.85	541.17	542.10	542.62
27	532.24	532.55	532.65	533.32	535.30	535.80	536.71	538.67	539.94	541.18	542.14	543.14
28	532.31	532.55	532.65	533.40	535.31	535.98	536.72	538.69	540.02	541.19	542.15	543.19
29	532.31	532.54	532.65	533.40	535.32	535.98	536.76	---	540.43	541.21	542.17	543.21
30	532.31	532.54	533.06	533.40	535.34	535.99	536.78	---	540.57	541.37	542.18	543.28
31	532.31	532.54	---	533.40	---	536.02	536.79	---	540.61	---	542.18	---

Table 6.--Daily and monthly precipitation data at a site within the abandoned barite mine for the period from July 1988 to June 1989

[in inches]

DAY	1988												1989						
	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JAN	FEB	MAR	APR	MAY	JUNE	
1	0.66	0.36	0.44	0.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	.91	.00	.00	.00	.00	.00	.00	.98	.00	.00	.00	.00	.00	.00	.00	.04	.22	.00	.00
3	.00	.00	.33	.00	.00	.00	.00	.77	.00	.00	.00	.00	.00	.00	.58	.10	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	1.19	.00	.00	.00	.00	.00	.05	.41	.06	.04	.04
5	.00	.00	.00	.00	.00	.00	.19	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.09	.04	.01	.22	.00	.00	.00	.00	.00	.00	.00	.00	.37	.00
8	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00	.00	.17	.00	.36	.00
9	.00	.00	.00	.00	.03	.01	.06	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00
10	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.38	.75	.03	.00	.01	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	1.53	.00	.00	.00	.75	.00	.59	.14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.00
13	.01	.00	.00	.00	.00	.00	.08	1.02	.00	.00	.00	.00	.00	.00	.00	.39	.00	.13	.00
14	.00	.00	.00	.00	.00	.00	.42	.00	.00	.00	.00	.00	.00	.00	.24	.02	.00	.10	.00
15	.00	.00	.00	.00	.63	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.19	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.46	.00	.00
18	.00	.06	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.14	.00	.00	.00
19	.06	.00	.01	.00	2.65	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.01	.01	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.33	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.30	.00	.00
23	.00	.43	.00	.27	.00	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.23	.56	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.09	.00
26	.79	.00	.00	.00	1.09	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00
27	.01	.00	.00	.00	.00	1.17	.00	.44	.00	.00	.00	.00	.00	.00	.00	.26	.00	.05	.00
28	.00	.00	.00	.42	.00	.10	.18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.17	.00
29	.00	.00	.00	.00	.00	.00	.03	.00	1.17	.00	.00	.00	.00	.00	.63	.00	.00	.26	.00
30	.00	.00	.38	.00	.00	.04	.00	.00	.00	.00	.00	.00	.00	.00	.78	.00	.00	.52	.00
31	.00	.00	.00	.00	.00	.21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	4.36	1.71	1.19	1.26	5.72	2.05	1.93	3.47	5.94	2.36	2.73	3.18	1.93	3.47	5.94	2.36	2.73	3.18	3.18

Table 7.--Instantaneous discharge data at six locations near the abandoned barite mine
 [in cubic feet per second]

Map number	1988							1989				
	June 21	July 27	Aug. 2	Sept. 7-8	Oct. 24	Nov. 10	Dec. 6	Jan. 13	Mar. 3-8	Apr. 17	May 31	June 26
7	0.06	0.11	0.05	0.01	0.06	0.13	0.81	1.94	4.60	0.74	0.15	0.09
8	.03	.05	.00	.00	.04	.05	.27	.44	1.96	.34	.08	.04
10	.21	.24	.19	.04	.19	.36	2.80	8.58	11.4	--	.54	.34
11	1.71	2.26	1.53	.48	2.54	3.52	--	28.4	48.1	--	3.39	3.29
14	0	0	0	0	0	0	0	0	0	0	0	0
15	.06	.20	.16	.06	.13	.41	.87	1.93	2.68	1.26	.51	.22