

GROUND WATER FOR INDUSTRIAL USE IN THE VICINITY OF
LITTLE ROCK, ARKANSAS

By
R. C. Baker and others

U.S. Geological Survey

OPEN-FILE REPORT

GROUND WATER FOR INDUSTRIAL USE IN THE VICINITY OF LITTLE ROCK, ARKANSAS

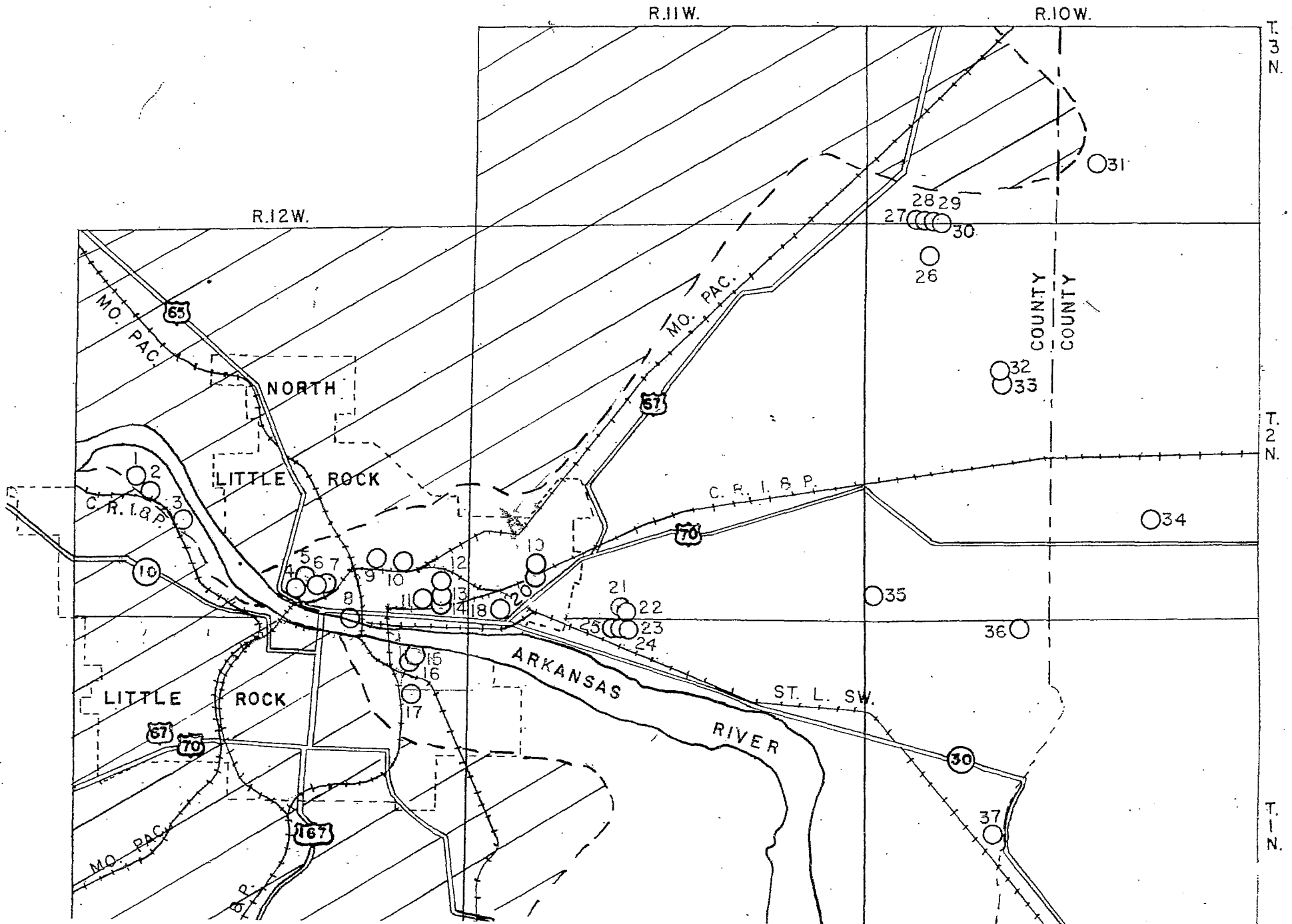
By R. C. Baker and others

Prepared by the United States Geological Survey, Ground Water Branch,
Little Rock, Arkansas, and Quality of Water Branch, Fayetteville, Arkansas

In cooperation with the Arkansas Resources and Development Commission,
Division of Geology, and the University of Arkansas, Institute of Science
and Technology

1951

51-95



GROUND WATER FOR INDUSTRIAL USE IN THE VICINITY OF LITTLE ROCK, ARKANSAS

Several inquiries about the availability of ground water and its quality for industrial use in the vicinity of Little Rock, Ark. have led to the assembling of the following information from the files of the United States Geological Survey in Little Rock and Fayetteville.

There are large undeveloped reserves of ground water in the vicinity of Little Rock that can be made available through large-capacity wells. However, the water probably would require treatment for most industrial uses. Ground water is used in Little Rock and vicinity at an estimated rate of about 10 million gallons per day. The most productive water-bearing material consists of alluvial deposits along the Arkansas River and in a large area extending northeast, east, and southeast of the city. Records of 41 selected wells and chemical analyses of water from 28 wells tapping these deposits are given below. The areas in which the productive deposits occur and the location of the wells are shown on the map.

The maximum thickness of the alluvial deposits is about 150 feet. Generally the bottom part of these deposits is the most permeable, and the large-capacity wells range in depth from 70 to 140 feet. The maximum capacity reported for a well tapping the alluvium is 2,500 gallons per minute. There is considerable variation in the permeability of the deposits and the yield of wells from place to place.

Map no.	Location	Owner	Date drilled	Drilled depth (feet)	Diameter (inches)	Yield gpm
1	NW 1/4 sec. 29, T. 2 N., R. 12 W.	City of Little Rock	1919	72	24	1,778
2	NW 1/4 sec. 29, T. 2 N., R. 12 W.	do	1919	70	24	1,771
3	SE 1/4 sec. 29, T. 2 N., R. 12 W.	do	1915	85	24	1,815
4	SW 1/4 sec. 34, T. 2 N., R. 12 W.	Mo. Pacific R. R.	1931	99	26-12	2,250
5	SW 1/4 sec. 34, T. 2 N., R. 12 W.	do	1947	96	24-16	---
6	SW 1/4 sec. 34, T. 2 N., R. 12 W.	do	1949	102	---	---
7	SW 1/4 sec. 34, T. 2 N., R. 12 W.	do	1939	104	26-16	1,000
8	NW 1/4 sec. 2, T. 1 N., R. 12 W.	Standard Ice Co.	1934	87	18	500
9	NE 1/4 sec. 35, T. 2 N., R. 12 W.	Federal Compress Co.	---	130	6	100±
10	NW 1/4 sec. 36, T. 2 N., R. 12 W.	do	---	140	6	100±
11	SE 1/4 sec. 36, T. 2 N., R. 12 W.	Mathieson Chemical Co.	---	---	12	175
12	SE 1/4 sec. 36, T. 2 N., R. 12 W.	do	---	---	12	175
13	SE 1/4 sec. 36, T. 2 N., R. 12 W.	do	---	---	12	200
14	SE 1/4 sec. 36, T. 2 N., R. 12 W.	do	---	90	8	175
15	SW 1/4 sec. 1, T. 1 N., R. 12 W.	Home Ice Co.	---	70	96	300
16	SE 1/4 sec. 1, T. 1 N., R. 12 W.	Little Rock Packing Co.	1935	60	12	75
17	NW 1/4 sec. 12, T. 1 N., R. 12 W.	Bruce Lumber Co.	1936	68	24-12	50
18	SE 1/4 sec. 31, T. 2 N., R. 11 W.	Rose City Cotton Oil Mill	1943	70	16	50
19	NW 1/4 sec. 32, T. 2 N., R. 11 W.	Koppers Co., Inc.	1907	90	10	50
20	NW 1/4 sec. 32, T. 2 N., R. 11 W.	do	1924	90	10	150
21	SW 1/4 sec. 33, T. 2 N., R. 11 W.	Ark. Power & Light Co.	1946	76	--	703
22	SW 1/4 sec. 33, T. 2 N., R. 11 W.	do	1946	78	--	442
23	NW 1/4 sec. 4, T. 1 N., R. 11 W.	do	1949	76	--	656
24	NW 1/4 sec. 4, T. 1 N., R. 11 W.	do	1949	82	--	643
25	NW 1/4 sec. 4, T. 1 N., R. 11 W.	do	1946	74	--	442
26	NW 1/4 sec. 5, T. 2 N., R. 10 W.	City of Jacksonville	1943	97	14- 6	234
27	SE 1/4 sec. 31, T. 3 N., R. 10 W.	Jacksonville Ord. Works	1942	100±	--	350
28	SE 1/4 sec. 31, T. 3 N., R. 10 W.	do	1942	100±	--	350
29	SE 1/4 sec. 31, T. 3 N., R. 10 W.	do	1942	100±	--	350
30	SW 1/4 sec. 32, T. 3 N., R. 10 W.	do	1942	100±	--	350
31	NE 1/4 sec. 34, T. 3 N., R. 10 W.	R. S. Ayres	1950	105	16	1,000
32	NW 1/4 sec. 16, T. 2 N., R. 10 W.	Hal Young	---	--	--	1,000
33	NW 1/4 sec. 16, T. 2 N., R. 10 W.	do	---	--	--	1,000
34	SW 1/4 sec. 26, T. 2 N., R. 10 W.	D. M. Tate	---	90	7-12	2,500
35	SW 1/4 sec. 31, T. 2 N., R. 10 W.	State Dairy Farm	1947	87	12	100
36	NE 1/4 sec. 4, T. 1 N., R. 10 W.	Hugh Keller	1951	90	12	1,700
37	NW 1/4 sec. 21, T. 1 N., R. 10 W.	Scott School	1927	80	3	10
38	SW 1/4 sec. 8, T. 1 S., R. 9 W.	Sam. Stewart	1951	97	18	2,000
39	NW 1/4 sec. 17, T. 1 S., R. 9 W.	do	1951	107	18	1,200
40	SE 1/4 sec. 25, T. 1 S., R. 10 W.	Everett Steed	---	100	7-10	1,500
41	NW 1/4 sec. 27, T. 1 S., R. 11 W.	Negro Boys Ind. School	---	60	10	---

B/ P.S. - Public supply; Ind. - Industrial; Irr. - Irrigation

No large-capacity wells are reported in the area of alluvial deposits southeast of Little Rock and west of the Arkansas River. However, wells having capacities in excess of 100 gallons per minute likely can be developed in that area. Older unconsolidated sediments underlying the alluvial deposits may give large yields to wells, particularly in the area east and southeast of Little Rock. However, there is no information as to where such yields can be obtained, or as to the quality of the water.

The chemical quality of the water from 28 wells tapping the alluvium in the vicinity of Little Rock, analyzed at the U. S. Geological Survey laboratory at Fayetteville, is variable from place to place. The hardness ranges from 28 to 394 parts per million and generally exceeds 150 parts per million. Most of the samples contained excessive amounts of iron, which ranged from 0.17 to 37 parts per million. Generally the waters are relatively high in bicarbonate but contain only moderate amounts of sulfate and chloride. In most samples the pH ranged between 7.0 and 8.5, which indicated that the waters are noncorrosive. The tolerances in chemical quality of the water by different industries and different processes are so varied that the only generalization that can be made about the suitability of the water from the alluvium in the vicinity of Little Rock for industrial use is that it generally would require treatment, except for noncritical uses such as cooling.

and Chemical Analysis

Static water level below land surface		1/ Use	Date collected	Temperature		Specific conductance at 25° C. (micromhos)	Hardness as CaCO ₃			Carbonate (CO ₃)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)
(feet)	(date)			(°F)	pH		Total	Non-carbonate	Iron (Fe)					
17.2	1934	Unused	----	----	----	----	----	----	----	----	----	----	----	----
19.0	1934	Unused	----	----	----	----	----	----	----	----	----	----	----	----
29.1	1934	Unused	----	----	----	----	----	----	----	----	----	----	----	----
20	1931	Ind.	7- 5-51	65	8.5	813	224	.65	2.5	20	194	28	149	1.7
---	---	Ind.	7- 5-51	65	7.1	926	322	81	5.4	0	287	81	115	.8
32	1949	Ind.	7- 5-51	65	8.5	779	231	42	4.2	20	230	12	132	1.6
---	---	Ind.	7- 5-51	65	8.3	1,010	305	0	15	26	382	61	127	2.2
20	1951	Ind.	9-14-51	65	7.9	789	274	95	8.7	0	218	88	113	2
---	---	Ind.	7- 5-51	64	8.5	761	289	136	1.5	12	186	72	116	.5
---	---	Ind.	7- 5-51	64	8.3	417	176	38	37	8	168	55	22	1.7
17.66	6-14-51	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
19.83	6-14-51	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	6-14-51	64	7.0	692	290	164	35	0	154	137	51	2.3
✓ 21.90	7-5-51	Ind.	6-14-51	64	7.6	875	309	136	.5	0	211	92	112	6.2
✓ 11.0	1951	Ind.	6-14-51	64	7.7	917	394	110	9.8	0	347	72	88	.5
---	---	Ind.	6-14-51	---	7.2	540	210	52	.18	0	193	59	34	3.8
---	---	Ind.	6-13-51	---	7.4	377	182	14	21	0	205	7	18	.2
---	---	Ind.	6-13-51	---	7.4	339	152	33	13	0	145	18	17	.2
16	1951	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	6-12-51	64	7.7	648	310	7	25	0	370	6	34	.9
---	---	Ind.	6-12-51	64	6.9	381	181	1	18	0	219	16	14	.5
18-32	6-12-51	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	6-12-51	64	7.8	311	146	1	9.9	0	177	14	8.2	.9
21.5	1943	P.S.	6-11-51	64	7.7	703	334	0	2.5	0	415	4	28	.5
---	---	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Ind.	6-11-51	64	7.4	646	312	0	.17	0	400	3	14	.3
10	1951	Irr.	8- 6-51	64	6.3	112	28	0	4.9	0	46	2	9.5	.3
---	---	Irr.	----	----	----	----	----	----	----	----	----	----	----	----
---	---	Irr.	8- 2-51	64	7.5	502	248	0	10	6	311	3	14	1.5
---	---	Irr.	7-12-51	64	8.5	371	178	0	17	19	233	4	14	.4
---	---	Ind.	6-13-51	64	7.5	211	93	0	12	0	132	2	3.2	.3
---	---	Irr.	6-11-51	64	7.4	174	70	0	9.1	0	85	17	5.5	.5
---	---	P.S.	6-13-51	64	7.6	630	351	7	13	0	420	4	4.5	.6
19	1951	Irr.	7-13-51	63	8.4	641	283	0	16	18	370	12	40	.6
20	1951	Irr.	7-13-51	64	8.5	575	249	0	18	22	360	10	30	.5
---	---	Irr.	7-16-51	64	8.4	372	166	10	16	14	190	11	20	.5
---	---	P.S.	6-11-51	64	7.5	700	334	85	9	0	304	36	66	.8

GROUND WATER FOR INDUSTRIAL USE IN THE VICINITY OF LITTLE ROCK, ARKANSAS

Several inquiries about the availability of ground water and its quality for industrial use in the vicinity of Little Rock, Ark. have led to the assembling of the following information from the files of the United States Geological Survey in Little Rock and Fayetteville.

There are large undeveloped reserves of ground water in the vicinity of Little Rock that can be made available through large-capacity wells. However, the water probably would require treatment for most industrial uses. Ground water is used in Little Rock and vicinity at an estimated rate of about 10 million gallons per day. The most productive water-bearing material consists of alluvial deposits along the Arkansas River and in a large area extending northeast, east, and southeast of the city. Records of 41 selected wells and chemical analyses of water from 28 wells tapping these deposits are given below. The areas in which the productive deposits occur and the location of the wells are shown on the map.

The maximum thickness of the alluvial deposits is about 150 feet. Generally the bottom part of these deposits is the most permeable, and the large-capacity wells range in depth from 70 to 140 feet. The maximum capacity reported for a well tapping the alluvium is 2,500 gallons per minute. There is considerable variation in the permeability of the deposits and the yield of wells from place to place.

Records of Selected Wells

Map No.	Location	Owner	Date drilled	Drilled depth (feet)	Diameter (inches)	Yield
1	NW ¹ / ₄ sec. 29, T. 2 N., R. 12 W.	City of Little Rock	1919	72	24	1,778
2	NW ¹ / ₄ sec. 29, T. 2 N., R. 12 W.	do	1919	70	24	1,771
3	SE ¹ / ₄ sec. 29, T. 2 N., R. 12 W.	do	1915	85	24	1,815
4	SW ¹ / ₄ sec. 34, T. 2 N., R. 12 W.	Mo. Pacific R. R.	1931	99	26- 12	2,250
5	SW ¹ / ₄ sec. 34, T. 2 N., R. 12 W.	do	1947	96	24- 16	----
6	SW ¹ / ₄ sec. 34, T. 2 N., R. 12 W.	do	1949	102	----	----
7	SW ¹ / ₄ sec. 34, T. 2 N., R. 12 W.	do	1939	104	26- 16	1,000
8	NW ¹ / ₄ sec. 2, T. 1 N., R. 12 W.	Standard Ice Co.	1934	87	18	500
9	NE ¹ / ₄ sec. 35, T. 2 N., R. 12 W.	Federal Compress Co.	----	130	6	100
10	NW ¹ / ₄ sec. 36, T. 2 N., R. 12 W.	do	----	140	6	100
11	SE ¹ / ₄ sec. 36, T. 2 N., R. 12 W.	Mathieson Chemical Co.	----	----	12	175
12	SE ¹ / ₄ sec. 36, T. 2 N., R. 12 W.	do	----	----	12	175
13	SE ¹ / ₄ sec. 36, T. 2 N., R. 12 W.	do	----	----	12	200
14	SE ¹ / ₄ sec. 36, T. 2 N., R. 12 W.	do	----	90	8	175
15	SW ¹ / ₄ sec. 1, T. 1 N., R. 12 W.	Home Ice Co.	----	70	96	300
16	SE ¹ / ₄ sec. 1, T. 1 N., R. 12 W.	Little Rock Packing Co.	1935	60	12	75
17	NW ¹ / ₄ sec. 12, T. 1 N., R. 12 W.	Bruce Lumber Co.	1936	68	24-12	50
18	SE ¹ / ₄ sec. 31, T. 2 N., R. 11 W.	Rose City Cotton Oil Mill	1943	70	16	50
19	NW ¹ / ₄ sec. 32, T. 2 N., R. 11 W.	Koppers Co., Inc.	1907	90	10	50
20	NW ¹ / ₄ sec. 32, T. 2 N., R. 11 W.	do	1924	90	10	150
21	SW ¹ / ₄ sec. 33, T. 2 N., R. 11 W.	Ark. Power & Light Co.	1946	76	----	703
22	SW ¹ / ₄ sec. 33, T. 2 N., R. 11 W.	do	1946	78	----	442
23	NW ¹ / ₄ sec. 4, T. 1 N., R. 11 W.	do	1949	76	----	656
24	NW ¹ / ₄ sec. 4, T. 1 N., R. 11 W.	do	1949	82	----	643
25	NW ¹ / ₄ sec. 4, T. 1 N., R. 11 W.	do	1946	74	----	442
26	NW ¹ / ₄ sec. 5, T. 2 N., R. 10 W.	City of Jacksonville	1943	97	14- 6	234
27	SE ¹ / ₄ sec. 31, T. 3 N., R. 10 W.	Jacksonville Ord. Works	1942	100	----	350
28	SE ¹ / ₄ sec. 31, T. 3 N., R. 10 W.	do	1942	100	----	350
29	SE ¹ / ₄ sec. 31, T. 3 N., R. 10 W.	do	1942	100	----	350
30	SW ¹ / ₄ sec. 32, T. 3 N., R. 10 W.	do	1942	100	----	350
31	NE ¹ / ₄ sec. 34, T. 3 N., R. 10 W.	R. S. Ayres	1950	105	16	1,000
32	NW ¹ / ₄ sec. 16, T. 2 N., R. 10 W.	Hal Young	----	----	----	1,000
33	NW ¹ / ₄ sec. 16, T. 2 N., R. 10 W.	do	----	----	----	1,000
34	SW ¹ / ₄ sec. 26, T. 2 N., R. 10 W.	D. M. Tate	----	90	?-12	2,500
35	SW ¹ / ₄ sec. 31, T. 2 N., R. 10 W.	State Dairy Farm	1947	87	12	100
36	NE ¹ / ₄ sec. 4, T. 1 N., R. 10 W.	Hugh Keller	1951	90	12	1,700
37	NW ¹ / ₄ sec. 21, T. 1 N., R. 10 W.	Scott School	1927	80	3	10
38	SW ¹ / ₄ sec. 8, T. 1 S., R. 9 W.	Sam Stewart	1951	97	18	2,000
39	NW ¹ / ₄ sec. 17, T. 1 S., R. 9 W.	do	1951	107	18	1,200
40	SE ¹ / ₄ sec. 25, T. 1 S., R. 10 W.	Everett Steed	----	100	?-10	1,500
41	NW ¹ / ₄ sec. 27, T. 1 S., R. 11 W.	Negro Boys Ind. School	----	60	10	----

1/ P.S. - Public supply; Ind. - Industrial; Irr. - Irrigation

No large-capacity wells are reported in the area of alluvial deposits southeast of Little Rock and west of the Arkansas River. However, wells having capacities in excess of 100 gallons per minute likely can be developed in that area. Older unconsolidated sediments underlying the alluvial deposits may give large yields to wells, particularly in the area east and southeast of Little Rock. However, there is no information as to where such yields can be obtained, or as to the quality of the water.

The chemical quality of the water from 28 wells tapping the alluvium in the vicinity of Little Rock, analyzed at the U. S. Geological Survey laboratory at Fayetteville, is variable from place to place. The hardness ranges from 28 to 394 parts per million and generally exceeds 150 parts per million. Most of the samples contained excessive amounts of iron, which ranged from 0.17 to 37 parts per million. Generally the waters are relatively high in bicarbonate but contain only moderate amounts of sulfate and chloride. In most samples the pH ranged between 7.0 and 8.5, which indicates that the waters are noncorrosive. The tolerances in chemical quality of the water by different industries and different processes are so varied that the only generalization that can be made about the suitability of the water from the alluvium in the vicinity of Little Rock for industrial use is that it generally would require treatment, except for noncritical uses such as cooling.

and Chemical Analysis

Static water level below land surface (feet)		Date collected	Temperature (°F)	pH	Specific conductance at 25° C. (micromhos)	Hardness as CaCO ₃		Carbonate (CO ₃)	Bicarbonate (HCO ₃)	Sulfate (SO ₄)	Chloride (Cl)	Nitrate (NO ₃)		
(feet)	(Date)					Non-carbonate	Iron (Fe)						Total	
17.2	1934	Unsed	---	---	---	---	---	---	---	---	---	---		
19.0	1934	Unsed	---	---	---	---	---	---	---	---	---	---		
29.1	1934	Unsed	---	---	---	---	---	---	---	---	---	---		
20	1931	Ind.	7- 5-51	65	8.5	813	224	65	2.5	20	194	28	149	1.7
---	---	Ind.	7- 5-51	65	7.1	926	322	81	5.4	0	287	81	115	.8
32	1949	Ind.	7- 5-51	65	8.5	779	231	42	4.2	20	230	12	132	1.6
---	---	Ind.	7- 5-51	65	8.3	1,010	305	0	15	26	382	61	127	2.2
20	1951	Ind.	9-14-51	65	7.9	789	274	95	8.7	0	218	88	113	2
---	---	Ind.	7- 5-51	64	8.5	761	289	136	1.5	12	186	72	116	.5
---	---	Ind.	7- 5-51	64	8.3	417	176	38	37	8	168	55	22	1.7
17.66	6-14-51	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
19.83	6-14-51	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	6-14-51	64	7.0	692	290	164	35	0	154	137	51	2.3
21.90	7-5-51	Ind.	6-14-51	64	7.6	875	309	136	.5	0	211	92	112	6.2
---	---	Ind.	6-14-51	64	7.7	917	394	110	9.8	0	347	72	88	.5
11.0	1951	Ind.	6-14-51	---	7.2	540	210	52	.18	0	193	59	34	3.8
---	---	Ind.	6-13-51	---	7.4	377	182	14	21	0	205	7	18	.2
---	---	Ind.	6-13-51	---	7.4	339	152	33	13	0	145	18	17	.2
16	1951	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	6-12-51	64	7.7	648	310	7	25	0	370	6	34	.9
---	---	Ind.	6-12-51	64	6.9	381	181	1	18	0	219	16	14	.5
18-32	6-12-51	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	6-12-51	64	7.8	311	146	1	9.9	0	177	14	8.2	.9
21.5	1943	P.S.	6-11-51	64	7.7	703	334	0	2.5	0	415	4	28	.5
---	---	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Ind.	6-11-51	64	7.4	646	312	0	.17	0	400	3	14	.3
10	1951	Irr.	8- 6-51	64	6.3	112	28	0	4.9	0	46	2	9.5	.3
---	---	Irr.	---	---	---	---	---	---	---	---	---	---	---	---
---	---	Irr.	8 -2-51	64	7.5	502	248	0	10	0	311	3	14	1.5
---	---	Irr.	7-12-51	64	8.5	371	178	0	17	19	233	4	14	.4
---	---	Ind.	6-13-51	64	7.5	211	93	0	12	0	132	2	3.2	.3
---	---	Irr.	6-11-51	64	7.4	174	70	0	9.1	0	85	17	5.5	.5
---	---	P.S.	6-13-51	64	7.6	630	351	7	13	0	420	4	4.5	.6
19	1951	Irr.	7-13-51	63	8.4	641	283	0	16	18	370	12	40	.6
20	1951	Irr.	7-13-51	64	8.5	575	249	0	18	22	360	10	30	.5
---	---	Irr.	7-16-51	64	8.4	372	166	10	16	14	190	11	20	.5
---	---	P.S.	6-11-51	64	7.5	700	334	85	9	0	304	36	66	.8