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CONTAMINATION REPORT NO. 8

A Reconnaissance Investigation of Alleged Contamination of Irrigation Wells Near Lockett, Wilberger County, Texas

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A Reconnaissance Investigation of Alleged Contamination of Irrigation Wells Near Loskott, Wilbarger County, Texas

By

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A RECONNAISSANCE INVESTIGATION OF ALLEGED CONTAMINATION OF IRRIGATION WELLS NEAR LOCKETT, WILBARGER COUNTY, TEXAS

INTRODUCTION

During the period March 8-10 the writer conducted a reconnaissance investigation of alleged contamination of irrigation wells 6 miles west of Lockett in Wilbarger County. The investigation was made at the request of Mr. Leslie King, County Attorney for Wilbarger County, and Mr. Charlie Joe Matysek, a farmer in the area. Mr. Matysek stated that water wells in the area had become "salty" shortly after Tom Meddere, an oil operator, had begun to dispose of salt water in an old Texas Company well.

OCCURRENCE OF GROUND WATER

Ground water occurs in terrace deposits of the Seymour formation, which vary in thickness from 30 to 50 feet. Water levels in wells occur at depths of from 18 to 32 feet below the surface. Recharge occurs through rain and snow which fall on the surface of the terrace between the Pease River and Paradise Creek. Most of this soaks into the ground due to the high permeability of the deposits and the flat-lying topography. The movement of ground water is toward the northeast and natural discharge occurs through springs and seeps near the foot of the terrace along the south side of Pease River. The saturated thickness of the Seymour formation in this area varies from 15 to 30 feet. Well tapping the formation produce from 182 to 400 gallons per minute.

QUALITY OF GROUND WATER

The natural water in the Seymour formation in this area is somewhat hard and high in nitrate, but low in total dissolved solids. Chloride and sulfate ions are generally less than 100 ppm. Water from the underlying Permian red beds is rather high in chloride and sulfate ions.

DISPOSAL OF SALT WATER

In this area salt water produced with oil has been disposed into abandoned oil wells rather than into surface pits. Texas Company disposed of salt water into their Charlie Matysek No. 2 prior to 1953. In 1953 they plugged and abandoned this well.

On May 1, 1959, Tom B. Meddere made application with the Railroad Commission to dispose of 300 barrels of salt water per day at a pressure of 500 pounds per square inch in the Texas Company E. L. Maine No. 1. This well had 11 3/4 inch surface casing set at a depth of 777 feet with 300 sacks of cement, and 7 inch production string set at 2142 feet with 100 sacks of cement. A plug had been set at a depth of 2028 feet. On May 6, 1959, the Board of Water Engineers issued a letter approving of the disposal of salt water in the annulus of this well at a depth of from 777 to 2028 feet.

Shortly after disposal operations had begun farmers in the area complained about their water wells becoming salty. Engineers from the District Office of the Railroad Commission at Wichita Falls inspected the E. L. Maine No. 1 and found that salt water was leaking around the surface casing. The operator was unable to locate the leak; therefore, on August 4, 1959, he plugged the well from the surface to a depth of 250 feet with 150 sacks of cement at the request of the Railroad Commission.

The operator then made application with the Railroad Commission to dispose of 500 barrels of salt water per day at 100 pounds per square inch in his Emma Maine No. 1. The operator set 8 5/8 inch surface casing at 86 feet with 65 sacks of cement and 5½ inch production string at 2926 feet with 100 sacks of cement. The production string was perforated in the zones from 2770 to 2774 feet and 2795 to 2801 feet. On July 16, 1959, the Board of Water Engineers issued a letter approving of the disposal of salt water in this well in the production string through perforations at the zone from 2770 to 2801 feet.

EVIDENCE OF CONTAMINATION

Salt precipitates are apparent on the ground at the site of the Texas Company E. L. Maine No. 1 and at the house well of Jeff Matysek. In a period of nine months the chloride content of Jeff Matysek well had increased from 90 to 3000 ppm. On the farm of Homer Custer cotton irrigation from his well produced stalks from 2 to 3 inches high; whereas cotton not irrigated produced stalks from 2 to 3 feet high. Analyses made by Texas A&M early last fall indicated a high salt content both in the soil and in the plants on this farm. In a period of three months the chloride content of Homer Custer's well had risen from about 90 ppm to 1009 ppm.

CONCLUSION

Natural contamination of the Seymour formation from highly mineralized water in the underlying Permian red beds is not apparent, since no water is known to occur in the red beds at depths above 1190 feet.

No contamination has occurred as a result of salt water injection by Texas Company into the Charlie Matysek No. 2, since the water from Charlie Joe Matysek's well which is just south of the oil well has a chloride content of less than 90 ppm.

No contamination has occurred as a result of inadequate casing in the old Texas Company wells, since those wells were plugged and abandoned in 1953 and no contamination had been reported prior to the summer of 1959.

The operator had set and cemented sufficient casing on all his wells to adequately protect fresh water in the area.

Contamination of the Seymour formation has occurred due to the seepage of brine through a leak in the surface casing of the Texas Company E. L. Maine No. 1, when this brine was injected into the well at a pressure of 500 pounds per square inch. This situation was corrected by plugging the top 250 feet of surface casing; thereby sealing the Seymour formation off from the brine seepage. The brine in the Seymour formation is moving northeast resulting in an increase of the chloride

of the chloride content of the water produced by Joff Matyeek's well. The chloride content is increasing in wells north and northeast as the brine moves in that direction. With the source of contamination cut off the brine in the formation should be diluted by the downward percolation of rain and snow, which falls on the surface; however, it will take considerable time for the ground water in this area to become usable for irrigation.

RECORDS OF WATER WELLS

WELL NO	OWNER	LOCATION	DRILLER	DEPTH	ELEV	WATER LEVEL BELOW L.S.D.	DATE	USE	REMARKS
1	Jeff Matysek	S/2 of NW/4 Sec. 9 Blk. 8 H&TC	----------	50'	1332	19.75	3-9-60	Irr	Pumps 300 GPM
2	Jeff Matysek	S/2 of NW/4 Sec. 9 Blk. 8 H&TC	----------	50'	1332	-----	------	D	Pumps 300 GPM
3	Charlie Joe Matysek	SW/4 of Sec. 9 Blk. 8, H&TC	----------	50'	1335	19.39	3-9-60	Irr	Pumps 300 GPM
4	Tom Locke	SE/4 of Sec. 10 Blk. 8, H&TC	Robt. Dale	38'	1325	21.89	3-9-60	Irr	Draw Down of 14' After Pumping 102 GPM for 180 Hrs.
5	Homer Custer	SW/4 of Sec. 3 Blk. 8, H&TC	L.E. Stamps	39'	1320	20.25	3-9-60	Irr	Draw Down of 10' After Pumping 400 GPM for 180 Hrs.
6	Mrs. Harvel	SW/4 of Sec. 10 Blk. 8, H&TC	----------	---	1330	21.93	3-9-60	Irr	Pumps 300 GPM
7	Emma Maine	NW/4 of Sec. 46 Blk. 8, H&TC	Texas Co.	30'	1335	4.1	10-21-43	Ind	Pumps 300 GPM Supplies Water for Oil Test
8	Henry Teague	SW/4 of Sec. 4 Blk. 8, H&TC	----------	44'	1325	20.0	1955	Irr	Pumps 400 GPM

CHEMICAL ANALYSES OF WATER IN WELLS

WELL	OWNER	DEPTH	DATE	SPECIFIC CONDUCTANCE	pH	Ca	Mg	Na/K	HCO_3	SO_4	Cl	TOTAL SOLIDS	TOTAL HARDNESS	NO_3
1	Jeff Matysek	50'	8-7-59 9-10-60	---------- 4450	--	159	105	356	418	129	797 3000	1964	485 2080	
2	Jeff Matysek	50'	8-17-59 3-10-60	---------- 4400	--	165	109	319	410	130	769 1200	1903	504 1310	
3	Charlie Joe Matysek	50'	8-6-59 3-10-60	---------- 967	--	62	39	110	440	63	91 70	805	185 248	
4	Tom Locke	38'	3-10-60	1520							194		344	
5	Homer Custer	39'	9-4-59 3-10-60	---------- 2750	--	253	136	422	447	307	1009 540	2574	697 740	
6	Mrs. Harvel	---	3-10-60	1630							268		456	
7	Emma Maine	30'	10-21-43	----------	--	--	---	---	491	92	96			12
8	Henry Teague	44'	11-28-55	2060	8.2	64	55	259	278	175	365	1090	385	12

RECORDS OF OIL WELLS

LEASE NAME	OPERATOR	LOCATION	ELEV.	CASING	DEPTH	PRODUCING HORIZON	REMARKS
E.L. Maine #1	Texas Co.	NE/4 Sec. 16 Blk. 8, H&TC	1328 G.L.	11 3/4" Set at 777' W/500 SX	2800'	1st and 2nd Noble Limestones	Abandoned by Texas Co. Plug set at 2028 feet. Letter issued by RRC May 6, 1959, to dispose of salt water from 777 to 2028 feet. Tom Hedders made application to RRC to dispose of 300 BPD at 500 PSI. May 1, 1959, Discontinued using as a SWD well in July, 1959. Plugged Aug. 4, 1959, W/150 SX from surface to 250'.
E. L. Maine #2	Texas Co.	NE/4 Sec. 16 Blk. 8, H&TC	---	------	2800'	1st and 2nd Noble Limestones	Abandoned. Plugged.
Lela Oliver #1	Texas Co.	SE/4 Sec. 16 Blk. 8, H&TC	---	------	2800'	1st and 2nd Noble Limestones	Abandoned. Plugged.
J.F. Matyaek #1	Texas Co.	S/2 of NW/4 Sec. 9, Blk. 8, H&TC	---	------	2800'	1st and 2nd Noble Limestones	Abandoned. Plugged.
J.F. Matyaek #2	Texas Co.	S/2 of NW/4 Sec. 9, Blk. 8, H&TC	---	------	2800'	-------	Dry Hole.

RECORDS OF OIL WELLS

LEASE NAME	OPERATOR	LOCATION	ELEV.	CASING	DEPTH	PRODUCING HORIZON	REMARKS
Matysek #3	Texas Co.	N/2 of NW/4 Sec. 9, Blk. 8, HSTC	---	------	2800'	1st and 2nd Noble Limestones	Plugged and Abandoned.
C.H. Matysek #1	Texas Co.	SW/4 Sec. 9 Blk. 8, HSTC	---	------	2800'	1st and 2nd Noble Limestones	Plugged and Abandoned.
C.H. Matysek #2	Texas Co.	SW/4 Sec. 9 Blk. 8, HSTC	---	------	2800'	Gunsite Limestone	Used as a SWD well. Plugged and abandoned 1953.
Emma Maine #1	T.B. Heddero	NE/4 Sec. 16 Blk. 8, HSTC	---	8 5/8" 86 w/60SX 5½" Set at 2926' w/100 SX	2926'	Canyon Reef	Letter issued by RRC July 16, 1959 to Heddero to dispose of SW from 2770 to 2801 feet. Application issued by RRC to Heddero to dispose of SW through perf. at 2770 to 2774 & 2795 to 2801'. 500 BPD at 100 PSI.
Emma Maine #2	T.B. Heddero	NE/4 Sec. 16 Blk. 8, HSTC	1335 D.F.	8/5/8" at 103' w/85 SX. 4½" set at 3176' /100 SX	3176'	Canyon Reef	Producing well.
Emma Maine #3	T.B. Heddero	NE/4 Sec. 16 Blk. 8, HSTC	1335 D.F.	8 5/8" set at 119' w/90 SX. 4½" set at 3168' w/75 SX	3168'	Canyon Reef	Producing well.

LEASE NAME	OPERATOR	LOCATION	ELEV.	CASING	DEPTH	PRODUCING HORIZON	REMARKS
Charlie Matyeck "B" 1	T.B. Hedderc	SE/4 Sec. 9 Blk. 6, HETC	1334 D.F.	8 5/8" set at 103' 05" w/80 SK. 4½" set at 3248' w/130 SK	3248'	Canyon Reef	Producing well.
Charlie Matyeck "B" 2	T.B. Hedderc	SE/4 Sec. 9 Blk. 6, HETC	1336 D.F.	8 5/8" set at 103' w/75 SK. 4½" set at 3190' w/130 SK	3190'	Canyon Reef	Producing well.
Joff Matyeck #1	T.B. Hedderc	NE/4 Sec. 9 Blk. 6, HETC	1335 D.F.	8 5/8" set at 117' w/75 SK. 4½" set at 3163' w/75 SK	3163'	Canyon Reef	Producing well.

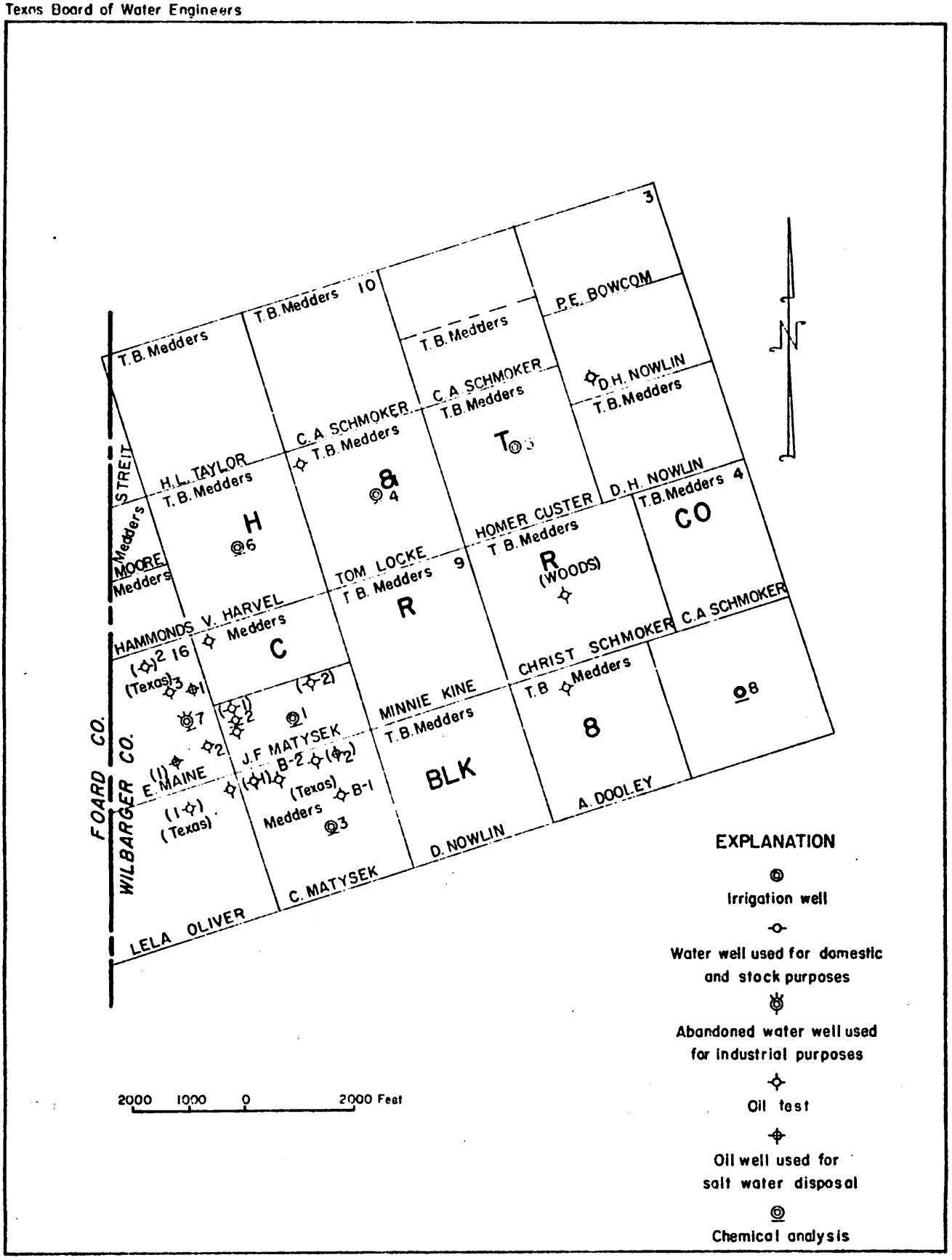

FIGURE 1.- Location of Water Wells and Oil Test in area of Investigation, Wilbarger County, Texas

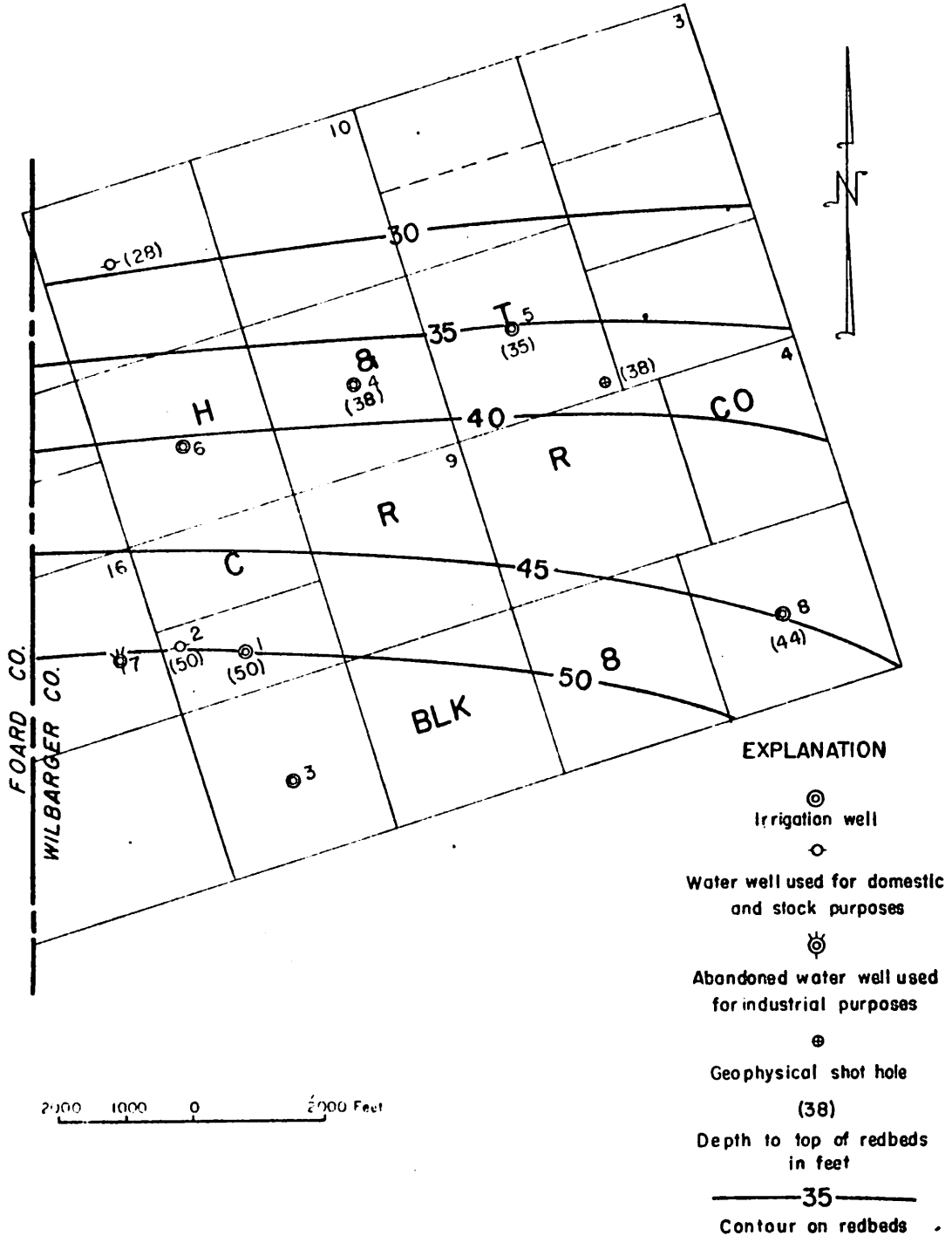

FIGURE 2.- Configuration of the Redbed Surface in area of Investigation, Wilbarger County, Texas

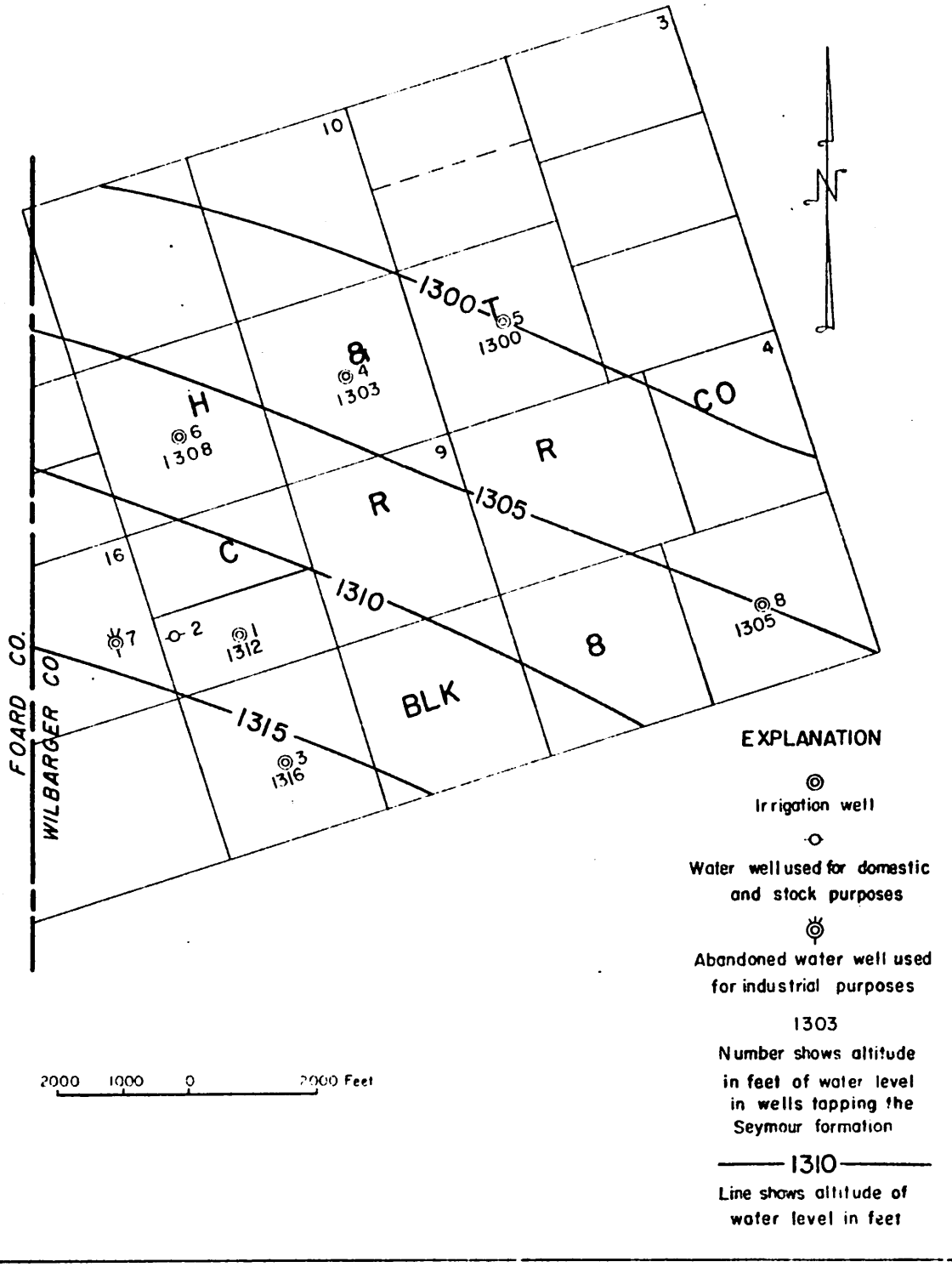

FIGURE 3.- Water Surface Contour Map of area of Investigation, Wilbarger County, Texas

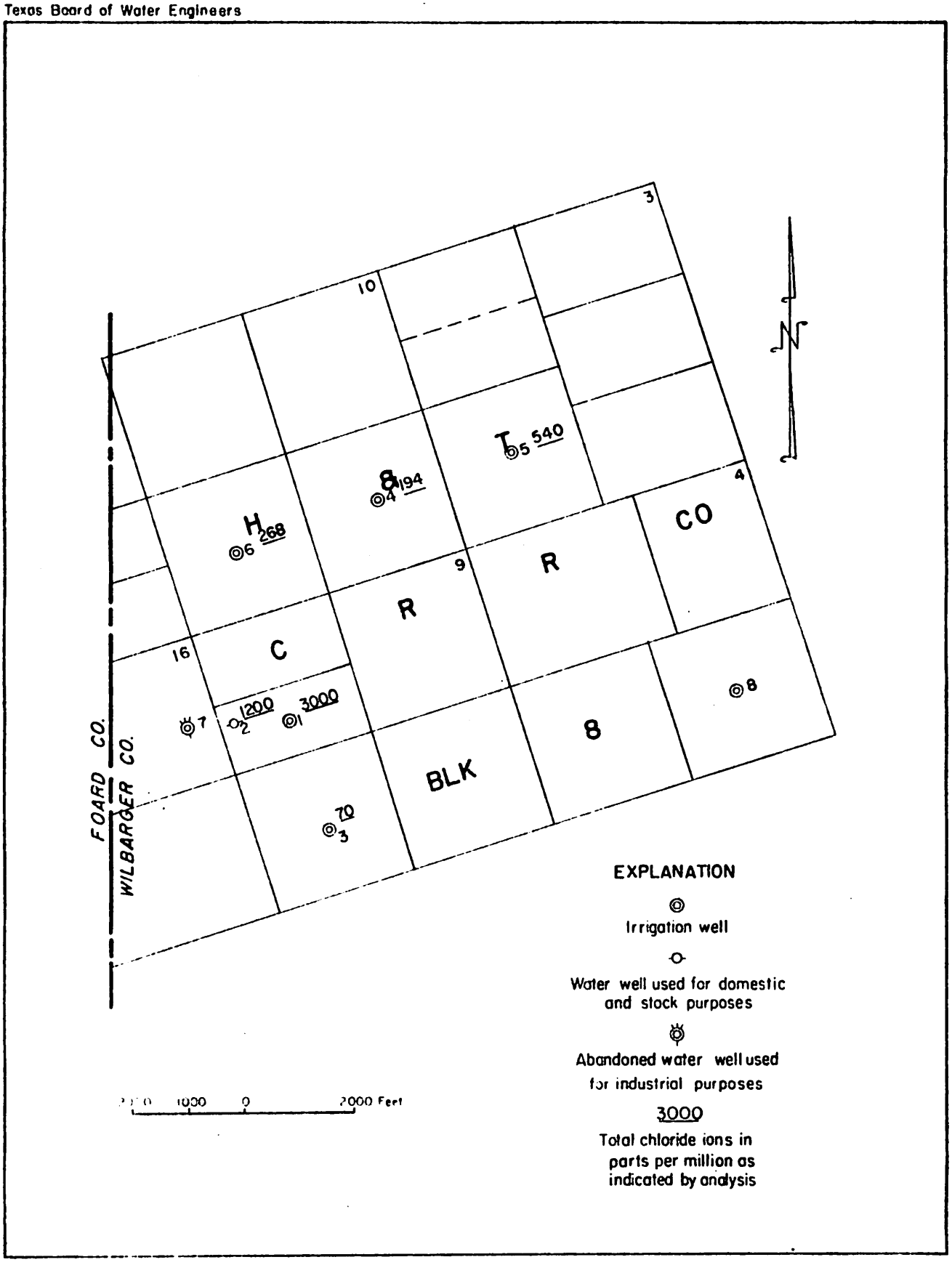

FIGURE 4.- Concentration of Chloride Ions in area of Investigation, Wilbarger County, Texas