

Bureau of Mines
Report of Investigations 4811



INVESTIGATION OF MELROSE ZINC-LEAD DEPOSIT
CHEROKEE COUNTY, KANS.

BY L. C. BRICHTA AND S. A. ALLEN

United States Department of the Interior—August 1951

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UNITED STATES DEPARTMENT OF THE INTERIOR
Oscar L. Chapman, Secretary
BUREAU OF MINES
James Boyd, Director

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L. C. Brichta^{1/} and S. A. Allen^{1/}

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INTRODUCTION AND SUMMARY

The Melrose zinc-lead deposit is in an area of structural disturbance of sedimentary rocks in the Melrose mining district in Cherokee County, Kans., 25 miles west of Joplin, Mo., adjacent to the northwest limits of the Tri-State district. Mining and milling in the Melrose district has been sporadic and very limited, largely due to the high cost of exploration through great thicknesses of barren rock, 350 to 440 feet overlying the ore deposits.

No mining has ever been done on the Melrose zinc-lead tract, but it has been drilled extensively. The drill-hole logs indicate extensive structural deformation, silicification, and zinc-lead deposits in the Boone limestone-chert formations of the Mississippian series, which is overlain by thick-bedded Pennsylvanian shale and sandstone. Analyses of samples from Bureau of Mines drilling indicate the ore minerals are sphalerite and galena with no evident oxidation.

During the period from November 2, 1949, to March 18, 1950, the Bureau of Mines investigated the deposit by churn drilling and sampling 23 holes aggregating 10,405 feet of bore.

Factual data on the investigation and logs of holes drilled by private parties and the Bureau of Mines are presented in this report.

ACKNOWLEDGMENTS

Acknowledgment is made to Leon W. Dupuy, then chief, Rolla Branch, former Mining Division, for his aid and direction in the conduct of the project; to Earl K. Nixon, geologist, Kansas Geological Survey, for valuable assistance as consultant on geologic problems; to Karl K. Koelker, mining engineer, Joplin, Mo., for providing old drill-hole records; to Otto Ruhl, mining engineer, and George W. Lester, engineering aide, of the Bureau of Mines, for their advice and assistance on the project work; and to the landowners of the project area for their generous cooperation.

LOCATION, ACCESSIBILITY, AND OWNERSHIP

The Melrose zinc-lead tract is in the Melrose mining district of southwest Cherokee County, Kans., 3 miles north and 4 miles west of Picher, Okla. (fig. 1). It may be reached from Joplin, Mo., by traveling west 25 miles on U. S. Highway 166 and thence north half a mile to the property. A network of graveled farm-to-market roads and paved highways connects with Picher and Miami, Okla., and Chetopa, Columbus, and Baxter Springs, Kans., and other small towns. The project tract contains an area of approximately 840 acres in secs. 28, 29, 32, and 33, T. 34 S., R. 23 E.

OWNERSHIP

Ownership and description of the land are as follows:

<u>Name</u>	<u>Address</u>	<u>Land description</u>	<u>Acres</u>
Amanda and J. M. Roper	Route 1, Columbus, Kans.	S-1/2 SE-1/4 sec. 29 and N-1/2 sec. 32, T. 34 S., R. 23 E.	80 .320
P. L. Stover Estate (C. L. Stover, agent)	Route 1, Columbus, Kans.	NW-1/4 sec. 33, T. 34 S., R. 23 E.	160
Homer, Bertie, and Zelma Goodrich	Route 1 Columbus, Kans.	SW-1/2 and W-1/2 NW-1/4 sec. 28, T. 34 S., R. 23 E.	240
Mrs. Zora Goodrich	525 Byers Ave., Joplin, Mo.	NE-1/4 SE-1/4 sec. 29 T. 34 S., R. 23 E.	40

Messrs. W. M. Robertson and Chas. A. Malsbury, 628-1/2 Main Street, Joplin, Mo., held a lease on the land, which was known as the Goodrich-Roper-Stover lease during the progress of the project.

PHYSICAL FEATURES AND CLIMATE

The project area is relatively flat, open terrain with some thinly wooded tracts along the creeks. Elevations range from 905 feet on the high ridges on the northeast to 870 feet on the lowlands to the southwest. The general drainage is to the southwest along small tributaries of Four Mile Creek, which, in turn, runs into the Neosho River, the main drainage channel of the area. Most of the land is devoted to farming and stock raising.

Railroad transportation is available through the Northwestern Oklahoma Railroad lines, 3 miles east, and the Missouri Pacific and Missouri Pacific and Missouri, Kansas & Texas Railways at Chetopa, 9 miles west.

Power lines of the Empire District Electric Co. serve the area.

Climate and precipitation are generally moderate, affording good year-around mining and milling conditions.

LABOR AND LIVING CONDITIONS

Ample labor is available in the nearby Picher field at prevailing wages of \$0.87 an hour for unskilled labor and \$1.12 an hour for skilled labor (April 1950). Mining and milling equipment, materials, and supplies also are available at Picher and nearby towns of the Tri-State area.

Living accommodations, requirements, and facilities of all kinds are obtainable in Picher, a city of about 5,500 population.

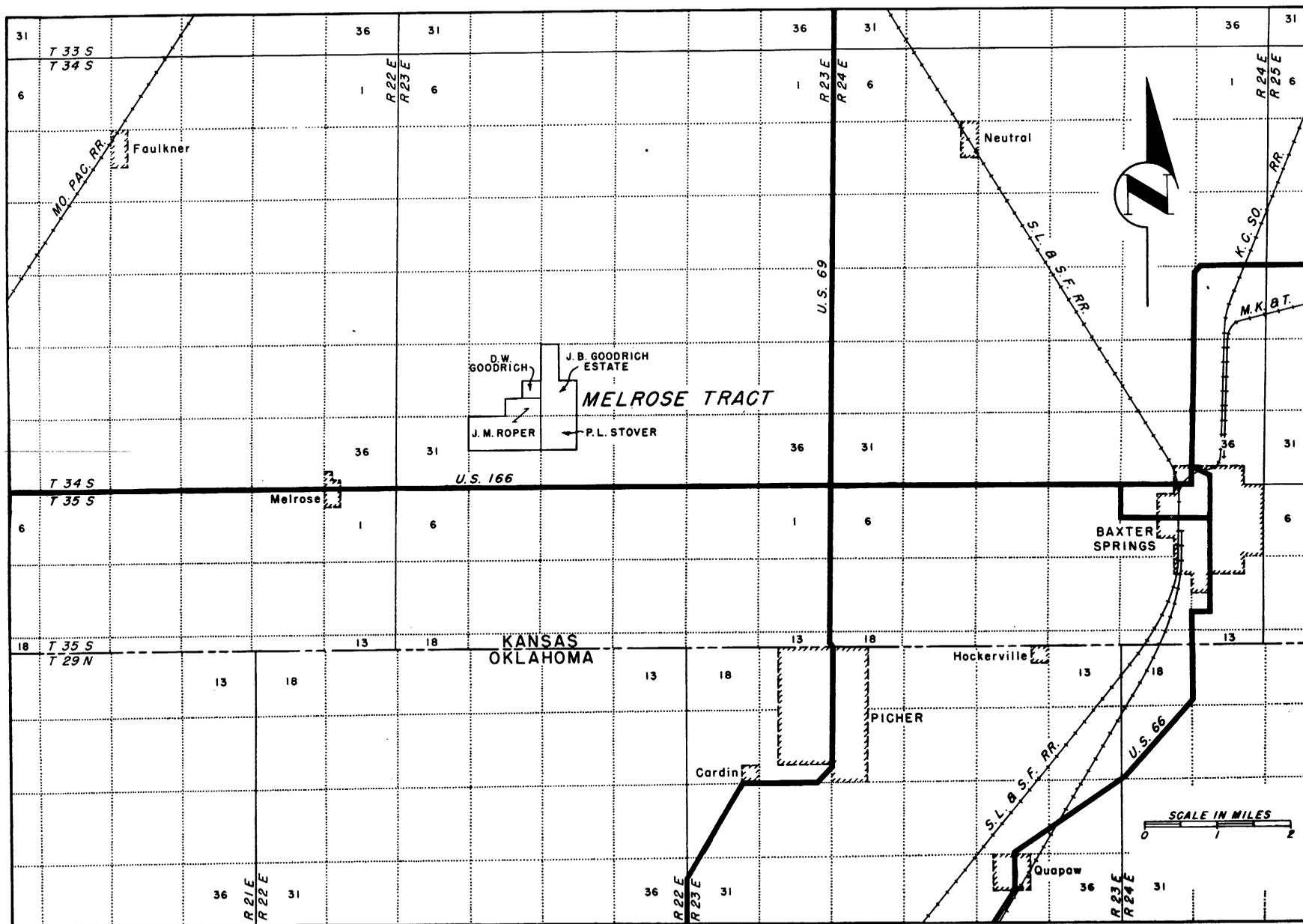


Figure 1.- Location map, Melrose zinc-lead tract

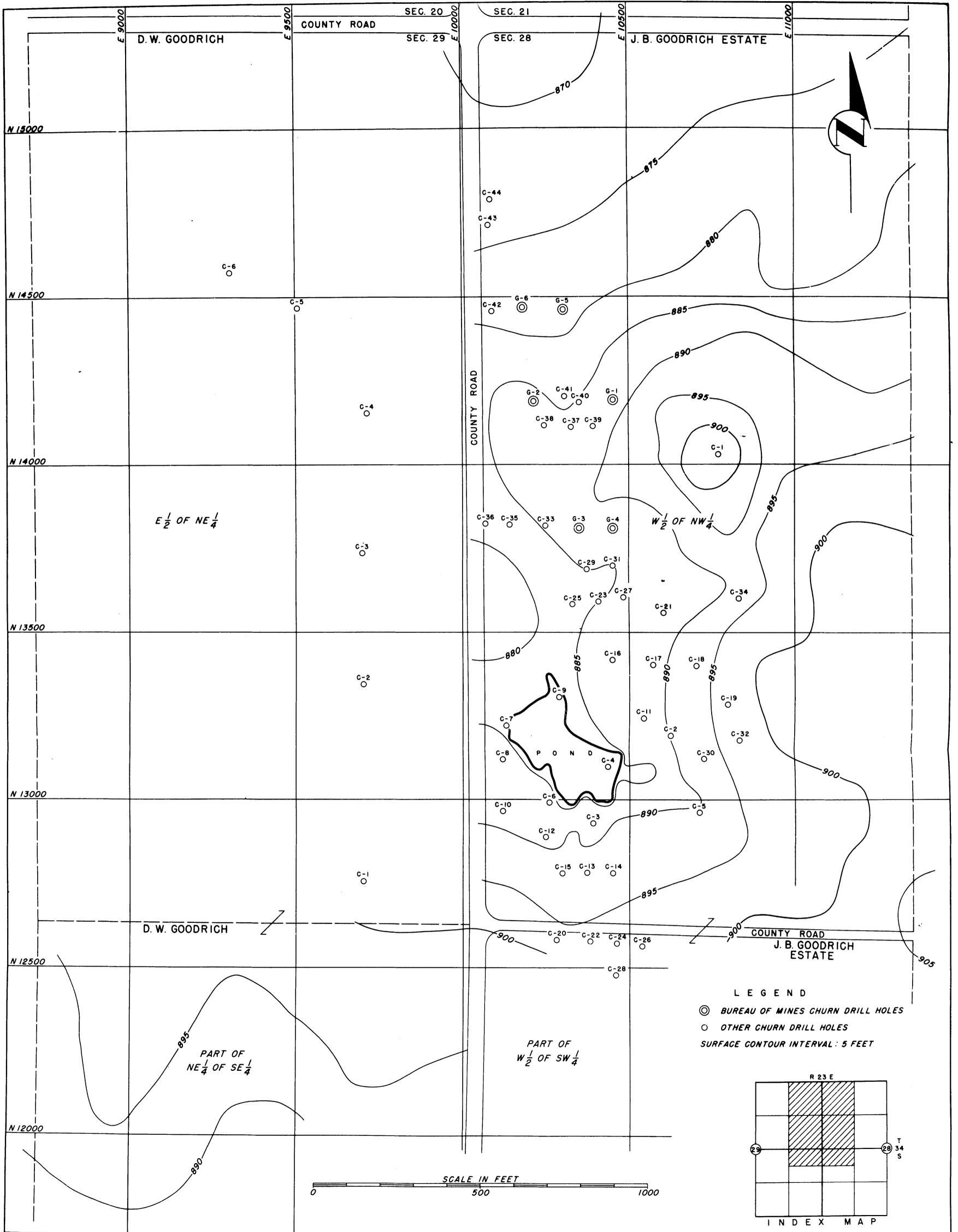


Figure 2.- Topographic map of Melrose lead-zinc tract showing locations of drill holes (north area)

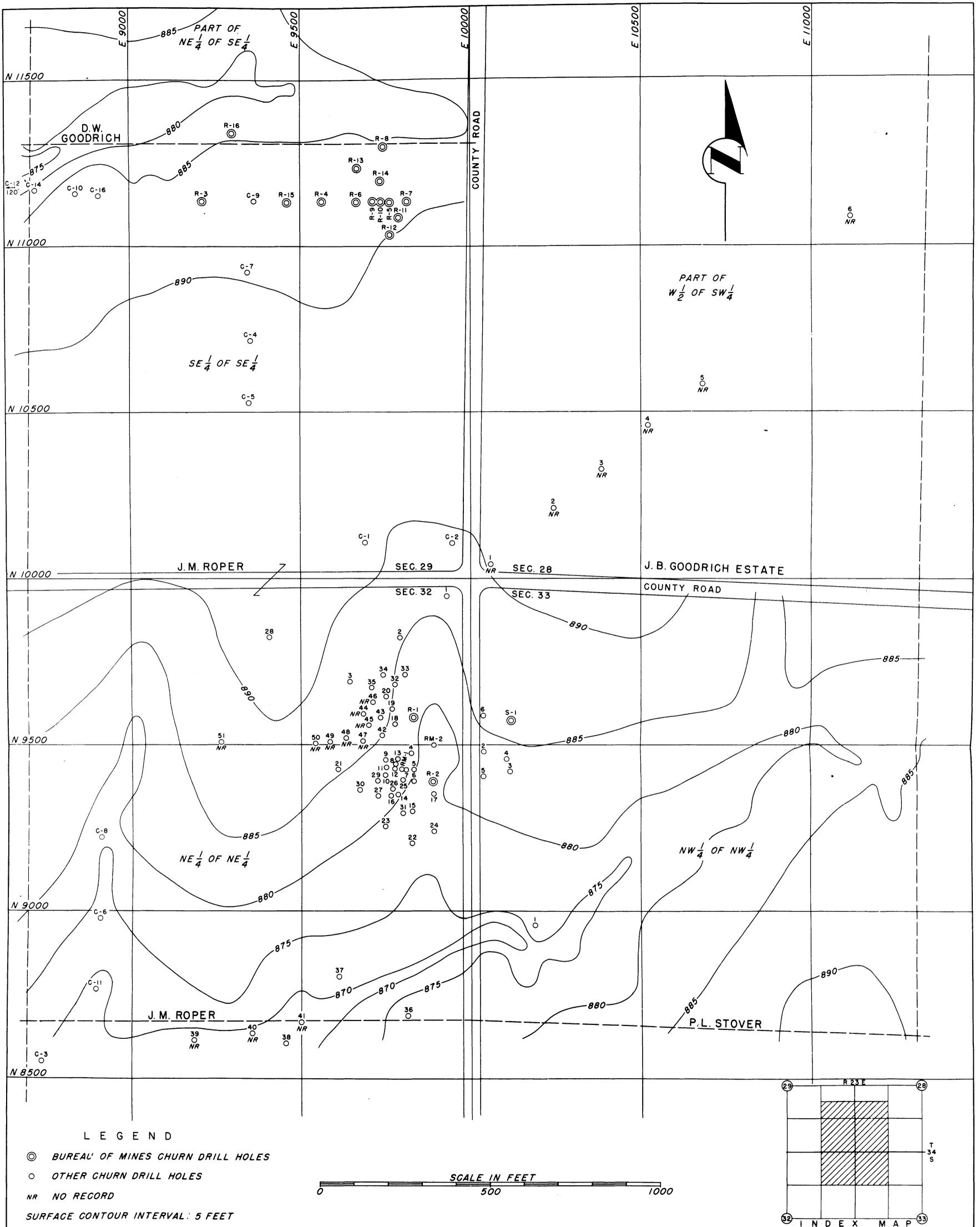


Figure 2A.- Topographic map of Melrose zinc-lead tract showing locations of drill holes (south area)

HISTORY

The Goodrich-Roper-Stover lands embraced in the Melrose zinc-lead project have never been mined, but have been extensively drilled.

In 1929-30, the Century Zinc Co., a subsidiary of the Youngstown Sheet & Tube Co., drilled 6 holes on the D. W. Goodrich land, 44 holes on the J. B. Goodrich lease, and 17 holes on the Roper lease, three of which are outside the project area, though their logs are included in this report.

The Century Zinc Co. operations were preceded by drilling done by the Quapaw Mining Co. Map records indicate that the Quapaw Mining Co. drilled 51 holes on the south area of the tract; logs of only 40 of the holes are now available.

Six holes, marked NR, were drilled on the J. B. Goodrich tract by unknown persons. Logs of the holes are not available.

C. F. Dyke, deceased, Joplin, Mo., drilled six holes on the Stover tract directly east of and adjoining the drilling done on the Roper land.

In 1943, William A. Robertson and Chas. A. Malsbury, of Joplin, Mo., took up the leases on all three properties. To examine the drilling on the Goodrich tract, they opened drill hole C-23 and shot the hole. Their results were as follows:

<u>Depth, ft.</u>		
<u>From-</u>	<u>To-</u>	
363	368	(532-527 sea level elevation) - light zinc shines
373	378	(522-517 sea level elevation) - light zinc shines

Drill hole C-37 also was shot, with the following results:

<u>Depth, ft.</u>		
<u>From-</u>	<u>To-</u>	
375	390	(517-502 sea level elevation) - 7.40% (60% zinc)
390	400	(502-492 sea level elevation) - 6.40% (60% zinc)

Examination of drill hole C-23 did not disclose the same tenor of ore as the original log, whereas examination of drill hole C-37 was very close on the lower section of the ore body and showed higher tenor than the original log in the upper part.

On the Roper tract, Robertson and Malsbury drilled two holes, RM-1 and RM-2. The first was a check hole for drill holes 7 and 12 and proved good. Hole RM-2 was put down in an attempt to extend the ore body toward the east. This hole was a blank and apparently was on a limestone bar lying between two sink holes.

Records of the old drilling activities on the project area indicate that 129 holes were drilled by various persons (figs. 2 and 2a). Logs of 112 of these holes show an aggregate of 47,591 feet of bore. Logs of 17 holes are not available.

DESCRIPTION OF DEPOSITS

The Melrose zinc-lead deposit lies in an area of sedimentary rocks on the northwestern flank of the Ozark uplift. Exploratory drilling has shown that the general stratigraphy of the area does not vary greatly from the adjoining Picher mining field in the Tri-State district (fig. 3), the major difference being in the thickness, 210 to 395 feet, of Pennsylvanian Cherokee shale overlying the Mississippian limestone at Melrose. This formation thins down to the east of the district, and in Missouri it is entirely eroded and evident only in small isolated patches in areas of depression (fig. 4).

The geology of the Tri-State district has been generously described in publications of the United States Geological Survey (1)^{2/} the State Geological Survey of Kansas (2), and by George M. Fowler (3), consulting geologist, Joplin, Mo.

Previous investigations in the Melrose district by the Bureau of Mines have been reported in an earlier publication,^{3/} which likewise describes the geology of the Melrose area.

An average geologic section of the explored area compiled from the information derived from the logs of the drill holes and correlated to that of the above-noted publications is shown in table 1.

The Boone member of the Mississippian series is the principal ore-bearing formation of the Tri-State district. Originally a limestone, the formation now consists of usually flat-bedded limestone, dolomite, and chert nodule beds, and one or more "oolite beds." Fowler (3-f) has subdivided that part of the formation below the Chester to the top of the Fern Glen into 16 distinct beds, lettered B to R in descending vertical order. The Warsaw formation contains beds B, C, D, E, F, G, H, and J; the Keokuk, or upper Burlington, is composed of K, L, M, and Grand Falls chert, or beds N, O, P, and Q; the lower Burlington is composed of the R bed, or Reeds Spring formation. In many parts of the district, one to several lettered beds are missing at erosional unconformities between formations.

Major known features of the Picher-Melrose area are the Miami "trough" or fault, an irregular system of deep structural basins that follow a northeast course, and an intersecting synclinal northwest-striking trough known as the Bendelari trough (fig. 4) (4-g). Other paralleling northeast and northwest structures are indicated, and some ore bodies trend along those respective fracture systems. Apparently, the northwest strike of the Bendelari trough if extended (fig. 4) would traverse the Melrose tract, but sufficient data to confirm it are not at present available.

^{2/} Numbers in parenthesis refer to items in the bibliography.

^{3/} Knox, C. C., Melrose Zinc-Lead District, Ottawa County, Okla., and Cherokee County, Kans.: Bureau of Mines Rept. of Investigations 4337, 1948, 92 pp.

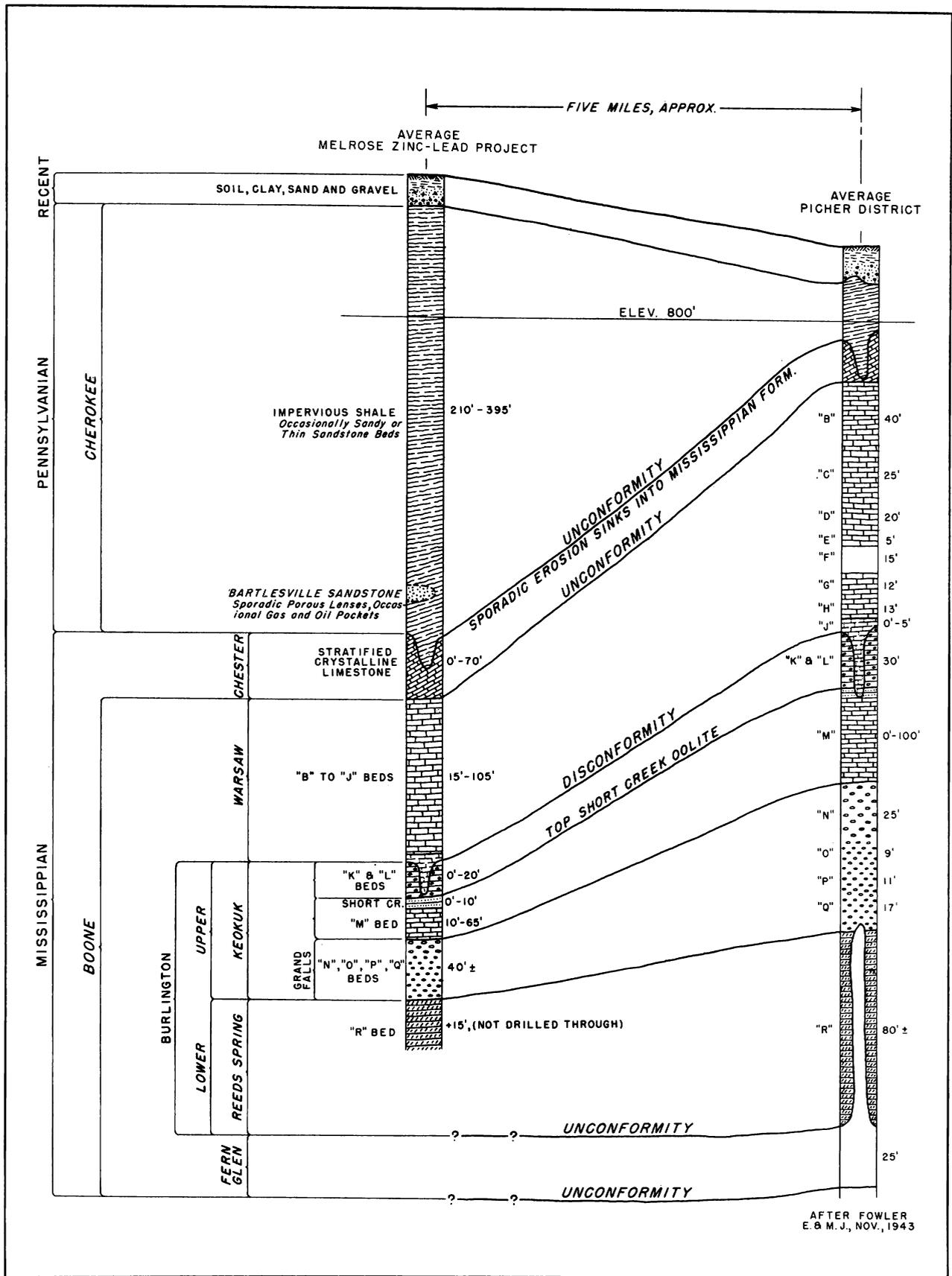


Figure 3.- Stratigraphic correlation, Melrose project and Picher district

TABLE 1. - Average geologic section, Melrose zinc-lead area
(compiled from drill-hole logs)

System	Series or group	Formation	Character of rocks	Thickness, feet
Carboniferous	(Recent)	Alluvium	Soil and clay	5 to 20
	Pennsylvanian	Cherokee	Blue and black shale, brown and gray sandstone	210 to 395
	Mississippian	(Chester or Cartersville)	Dark gray limestone	0 to 70
	(Meramec)	(Warsaw, B, C, D, E, F, G, H, J beds ^{4/})	Gray, tan and brown limestone, gray-white, blue and brown chert and cotton rock	15 to 105
	(Osage)	Boone (Upper Burlington, Keokuk, K, L, M, N, O, P, Q beds)	Gray, brown and tan limestone, white, blue, brown and mottled chert, jasperoid and dolomite	100 to 130
		(Lower Burlington, R bed or Reeds Spring)	Dark blue and gray chert, dark gray limestone	+15 - not drilled through

^{4/} Letters assigned to stratum by Fowler, George M., and Lyden, J. P., The Ore Deposits of the Tri-State District: Trans. Am. Inst. Min. & Met. Eng., vol. 102, 1932, pp. 206-251.

On the Malrose tract, the deepest formation penetrated was the Reeds Spring (R bed), at a depth of 485 feet. It was highly silicified and showed slight solution action. The overlying Grand Falls chert horizon (N, O, P, Q beds) had a thickness of 30 feet where intersected. The M bed above the Grand Falls chert ranges from 10 to 30 feet in thickness; often the top of the M bed, the overlying Short Creek bolite, and the K and L beds are missing, presumably removed by erosional disconformity at the break between the Keokuk and overlying Warsaw formations.

A thickness of 15 to 105 feet of the overlying Warsaw (B, C, D, E, F, G, H, and J beds) Mississippian members remains, with sharp erosional unconformities in the upper strata. The Warsaw is unconformably overlaid by the Chester limestone formation, which ranges from 0 to 70 feet in thickness. The unconformity at the top of the Mississippian series, or Chester limestone, is overlain by 210 to 395 feet of Pennsylvanian Cherokee shale. The shale, often containing thin, interbedded sandstone, coal strata, gas, and bitumen, is generally covered with 5 to 20 feet of recent surface alluvium.

The drill-hole logs on the Malrose tract indicate that the greater ore deposition generally occurs in irregular localized areas of intense alteration and structural deformation, especially along the regional disconformity between the Warsaw and Keokuk members of the Mississippian formation. A few of the hole logs show small amounts of zinc-lead mineralization in silicified areas of the G and H beds and in the Chester horizon just below the shale.

Sphalerite and galena are the ore minerals; chert, limestone, jasperoid, and dolomite, with minor quantities of calcite and marcasite crystals, are the principal gangue materials. Clay and fine residual limestone, chert, or shale, often fill pockets and crevices in the deposits. No signs of oxidation are evident.

WORK BY THE BUREAU OF MINES

During early, 1949, Otto Ruhl, Mining Engineer, Bureau of Mines, made a preliminary investigation of the area.

During October 1949, the Bureau of Mines made a land and topographic survey of the Malrose project area. Drilling was started November 2, 1949, and the project was terminated March 18, 1950.

During this period, 10,405 feet were drilled in 23 holes. The plan of development was to drill for the intersection of possible extensions of zinc-lead deposits in areas of structural deformation.

Roper-Stover property

On the Roper-Stover land (NE-1/4 NE-1/4 sec. 32 and NW-1/4 NW-1/4 sec. 33), on the south portion of the project area, 66 holes were drilled, 51 of them by the Quapaw Mining Co., 6 by C. F. Dyke, 4 by the Century Zinc Co., 2 by Roberts on and Malsbury, and 3 by the Bureau of Mines (fig. 2a).

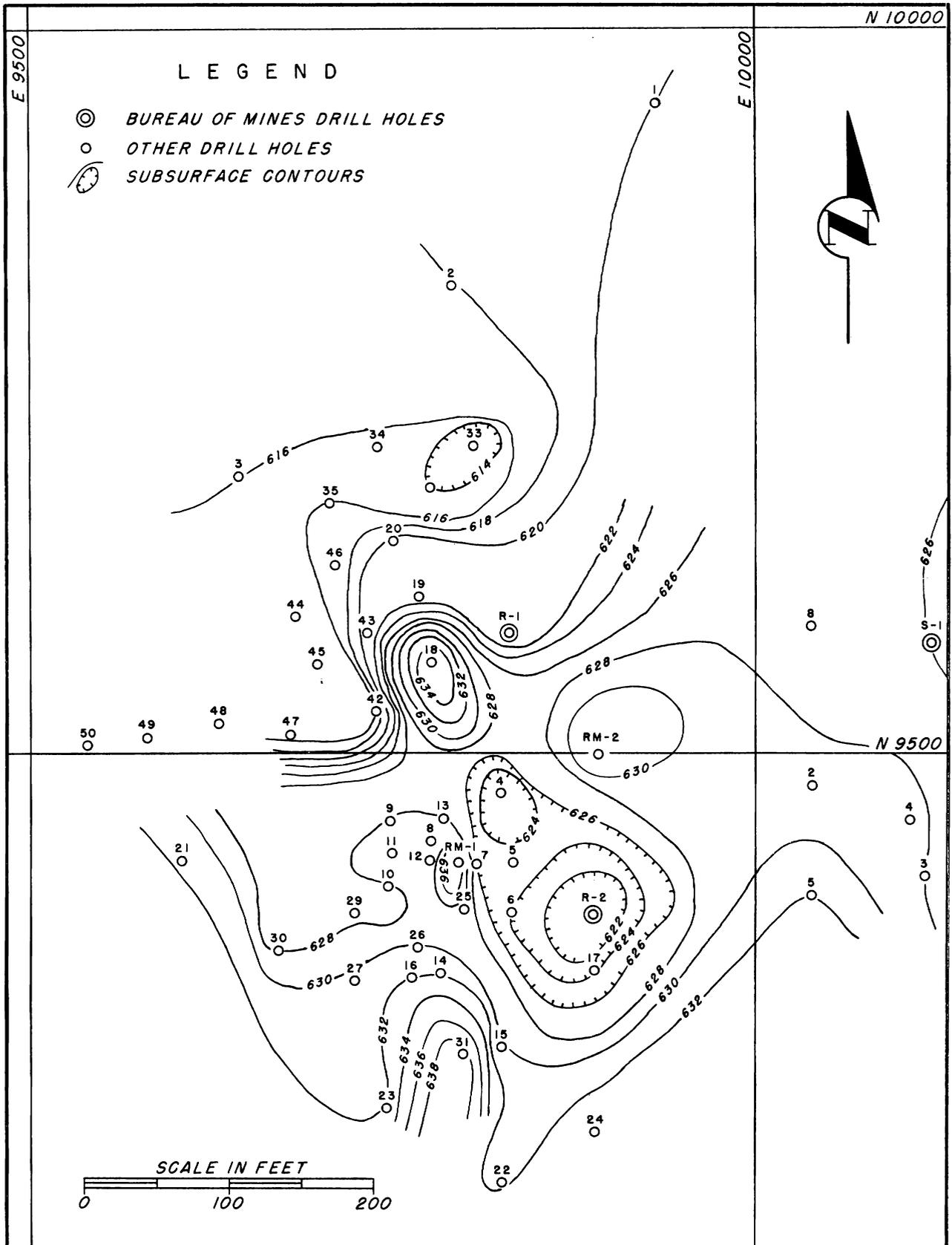


FIGURE 5.— PORTION OF ROPER AND STOVER TRACTS SHOWING SUBSURFACE CONTOURS AT BASE OF CHEROKEE SHALE

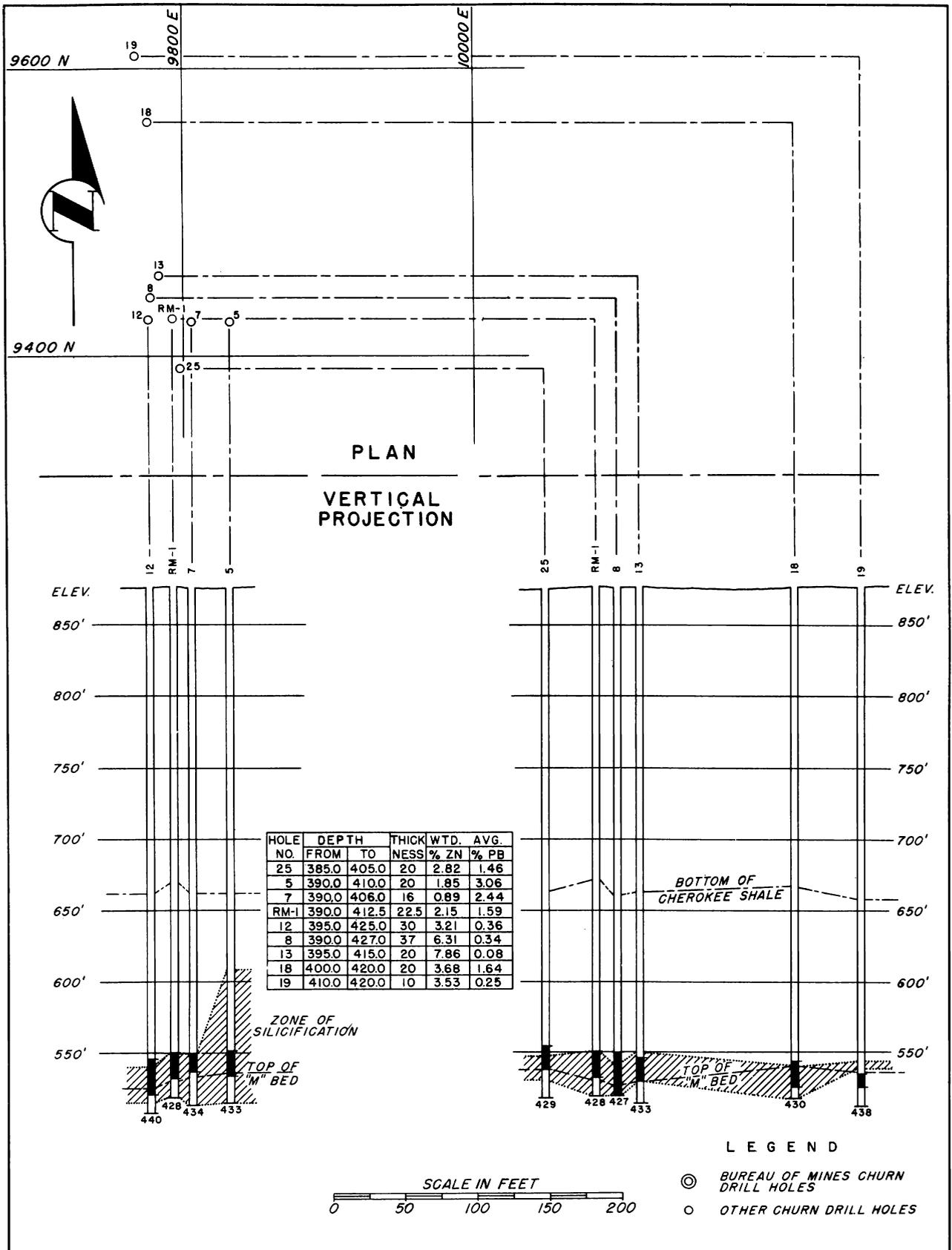


Figure 6.- Vertical projection of ore holes, Roper property

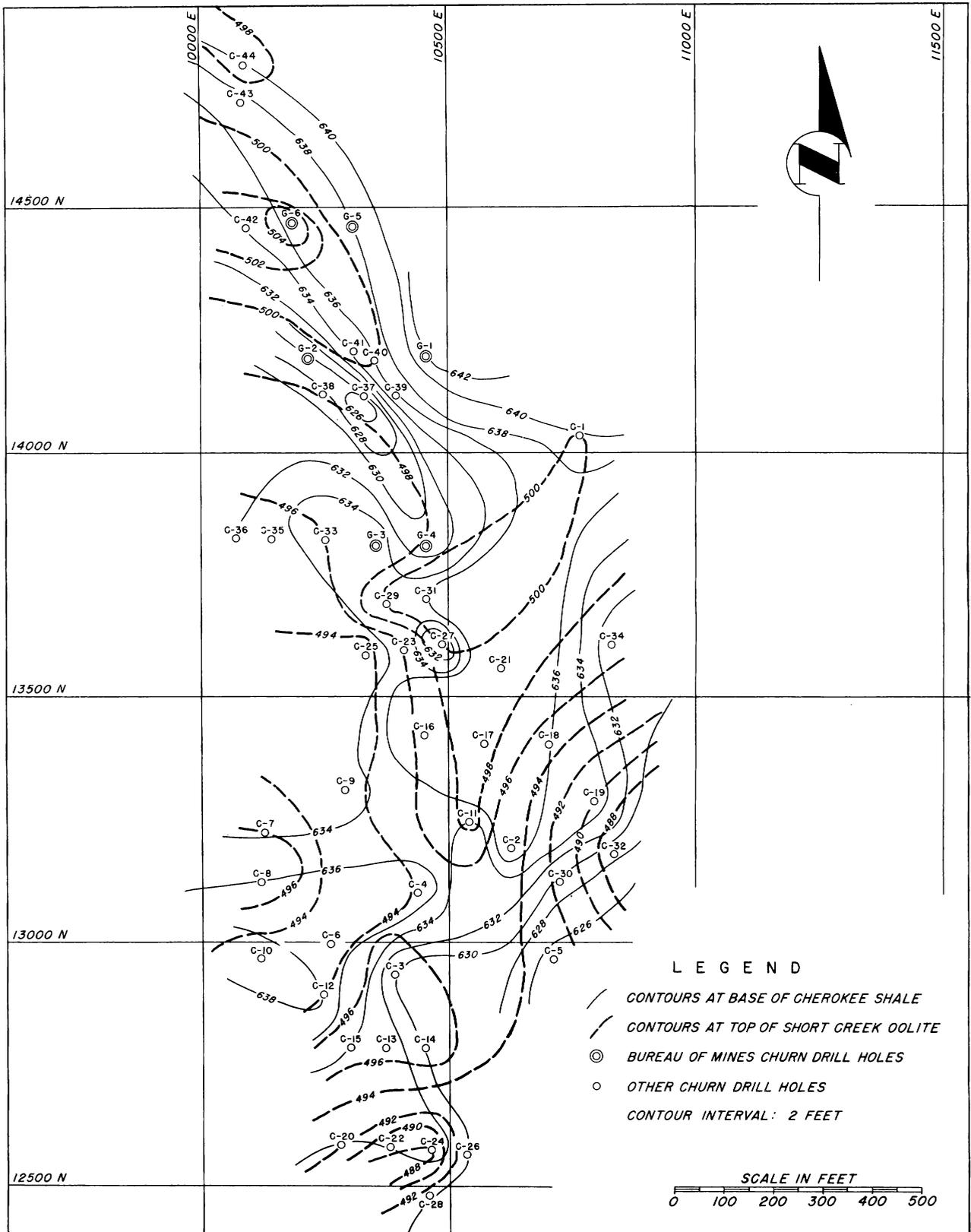


Figure 7.—Portion of J.B. Goodrich property — contours at base of Cherokee shale & top of Short Creek oolite

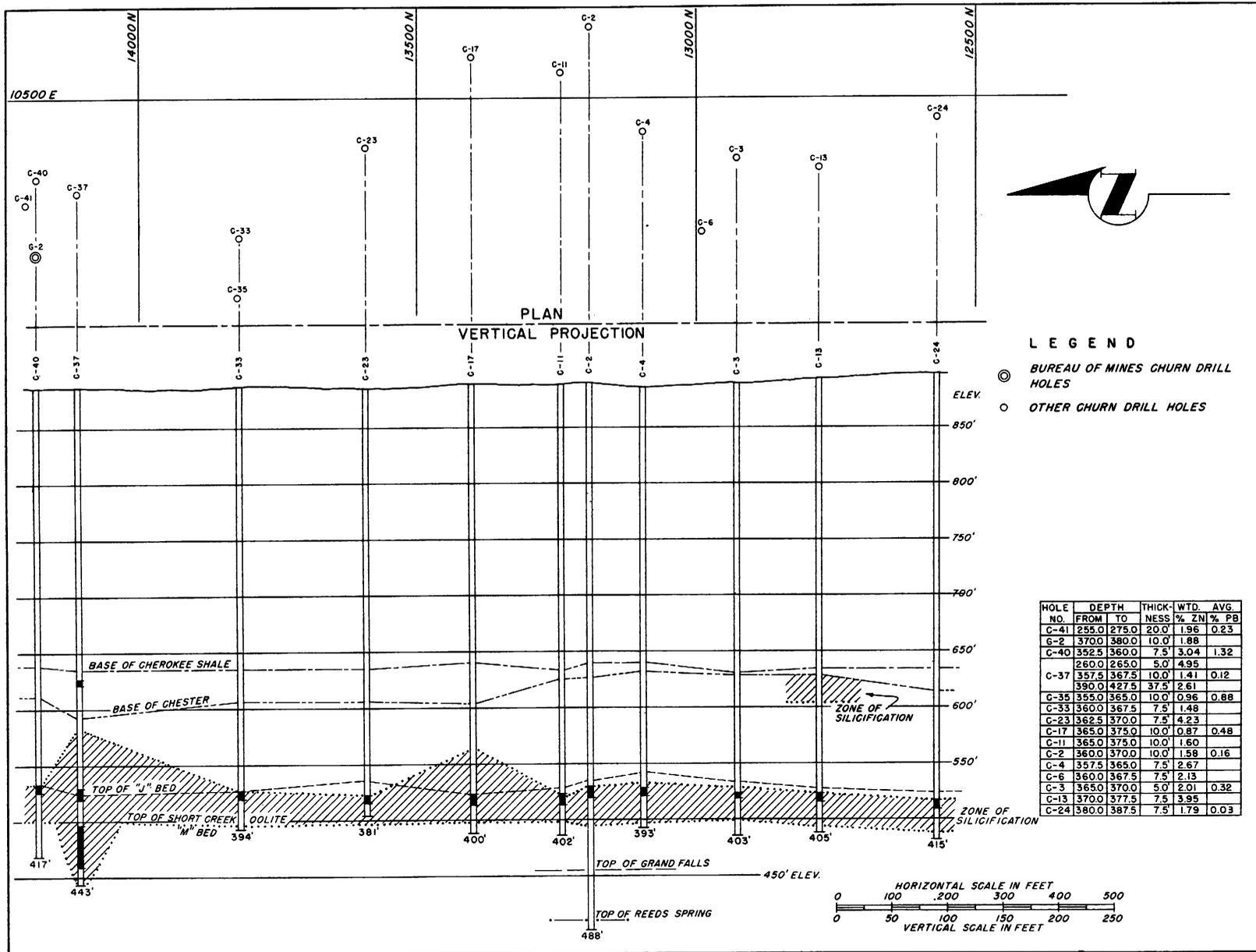


Figure 8.- Vertical projection of ore holes, J. B. Goodrich property

The Century Zinc Co. hole numbers are prefixed with the letter "C". The Quapaw Mining Co. hole numbers are shown without prefix on the location maps, but their logs have prefix number "22-6". The C. F. Dyke holes on the Stover land are numbered plain. The Robertson and Malsbury hole numbers are prefixed with the letters "RM", and the Bureau of Mines hole numbers are prefixed with the letters "G", "R" and "S".

Drill records of 11 of the old Quapaw Mining Co. holes are not available. Logs of the remaining 55 holes are included with this report. Pertinent data on the churn-drill holes are shown in tables 2, 3, 4, and 5.

A study of the hole logs shows that nine holes intersected ore in the northeast corner of the Roper 40 (NE-1/4 NE-1/4 sec. 32). A contour map of the base of the Cherokee shale (fig. 5) indicates well-defined shale slumpages in which zinc-lead mineralization is indicated in the lower Mississippian beds.

The zinc-lead ore occurs in the altered zone at the top of the M bed and Short Creek horizon (fig. 6) and possibly explains the absence or inconspicuousness of the Short Creek oolite in this area.

Numerous holes drilled around the periphery of the ore area failed to intersect extension of the ore deposits. Two holes, numbered 3 and 6, on the northwest corner of the Stover land intersected thin ore, but holes between them contained only zinc-lead traces and precluded their connection. Of the remaining holes in the tract (fig. 2a), 17 showed shines, ⁴/₆ had zinc-lead traces, and 21 were blank.

J. B. Goodrich and D. W. Goodrich Properties

On the J. B. Goodrich property (W-1/2 W-1/2 sec. 28) and the D. W. Goodrich property (E-1/2 NE-1/4 sec. 29) (figs. 2 and 2a), 62 holes were drilled, 50 by the Century Zinc Co., 6 by the Bureau of Mines, and 6, marked "NR", by persons whose identity cannot be ascertained. The logs of the "NR" holes are not available. Pertinent available data on all holes are shown in tables 6 and 7. Fifteen of the holes intersected zinc-lead ore, 27 were shine-holes, 9 had zinc-lead traces, and 5 were blank.

The Short Creek oolite, although not very evident in the rest of the project area, was very prominent here. A structural contour map at the top of the oolite, with superimposed contours at the base of the Cherokee shale, tends to show the same general pattern for both structures and indicates the anticlinal fold with major axis in a north-south direction (fig. 7).

Within the above-contoured area, the logs of 15 drill holes show zinc and lead deposits above the Short Creek oolite, or K and L bed horizon, and two of the holes, C-37 and C-41, show zinc-lead mineralization in the Chester formation below the Cherokee shale. Hole C-37 also shows ore well down in the M bed. Hole C-2 was put down 488 feet to prospect the Reads Spring formation. This showed silicification but no zinc or lead mineralization (fig. 8).

⁴/₆ Minus 1-1/2 percent combined metallic zinc and lead or minus 7-1/2-foot mining face.

TABLE 2. - Pertinent data on churn-drill holes on the Roper tract, NE-1/4 NE-1/4 sec. 32, T. 34 S., R. 23 E., drilled by the Quapaw Mining Co. and Roberts on and Malsbury

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
(Drilled by the Quapaw Mining Co.)									
22-6-1	9947	9930	887	496	267	380	113	Tr	Tr
22-6-2	9822	9790	885	450	424	440	16	-	-
22-6-3	9690	9645	888	439	-	-	-	-	-
22-6-4	9472	9825	882	450	395	400	5	Sh	Sh
					400	405	5	0.83	0.10
					405	415	10	Sh	Sh
					415	420	5	0.70	0.05
					420	430	10	Tr	Tr
22-6-5	9424	9832	882	433	390	410	20	1.85	3.06
					410	420	10	Sh	-
22-6-6	9389	9830	879	430	390	415	25	Sh	Sh
22-6-7	9425	9808	882	434	380	390	10	Sh	Sh
					390	406	16	0.89	2.44
					406	410	4	Sh	-
22-6-8	9439	9776	883	427	390	427	37	6.31	0.34
22-6-9	9453	9747	883	408	-	-	-	-	-
22-6-10	9406	9745	883	437	-	-	-	-	-
22-6-11	9432	9748	883	428	-	-	-	-	-
22-6-12	9425	9775	883	440	390	395	5	-	Sh
					395	425	30	3.21	0.36
					425	430	5	Sh	-
22-6-13	9455	9784	883	433	385	395	10	Sh	Sh
					395	415	20	7.86	0.08
					415	420	5	Sh	-
22-6-14	9348	9783	882	432	410	426	16	-	Sh
22-6-15	9297	9826	879	430	-	-	-	-	-
22-6-16	9343	9762	882	422	-	-	-	-	-
22-6-17	9350	9890	879	419	392	412	20	Sh	-
22-6-18	9562	9776	884	430	390	400	10	Tr	Tr
					400	420	10	3.68	1.64
					420	425	5	Sh	-
22-6-19	9606	9768	885	438	380	405	25	-	Sh
					405	410	5	0.48	0.19
					410	420	10	3.53	0.25
22-6-20	9646	9750	886	429	395	400	5	-	Sh
22-6-21	9425	9605	886	422	-	-	-	-	-
22-6-22	9201	9825	878	429	-	-	-	-	-
22-6-23	9253	9745	879	419	-	-	-	-	-
22-6-24	9237	9890	878	422	-	-	-	-	-
22-6-25	9392	9798	882	429	385	405	20	2.82	1.46
22-6-26	9365	9767	882	430	-	-	-	-	-
22-6-27	9344	9724	883	411	-	-	-	-	-
22-6-28	9823	9404	893	435	-	-	-	-	-

TABLE 2. - Pertinent data on churn-drill holes on the Roper tract, NE-1/4 NE-1/4 sec. 32, T. 34 S., R. 23 E., drilled by the Quapaw Mining Co. and Robertson and Malsbury (cont.)

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
22-6-29	9388	9724	883	410	-	-	-	-	-
22-6-30	9363	9670	883	398	-	-	-	-	-
22-6-31	9291	9799	879	405	-	-	-	-	-
22-6-32	9682	9775	885	409	-	-	-	-	-
22-6-33	9712	9805	884	428	-	-	-	-	-
22-6-34	9710	9739	886	410	-	-	-	-	-
22-6-35	9672	9706	887	440	-	-	-	-	-
22-6-36	8686	9810	877	410	-	-	-	-	-
22-6-37	8803	9606	872	430	-	-	-	-	-
22-6-38	8605	9450	870	425	395	405	10	Sh	-
22-6-39*	-	-	-	-	-	-	-	-	-
22-6-40*	-	-	-	-	-	-	-	-	-
22-6-41*	-	-	-	-	-	-	-	-	-
22-7-42	9528	9738	885	428	410	424	14	-	Sh
22-6-43	9583	9732	886	448	412-1/2	435	22-1/2	0.58	0.27
					435	445	10	1.86	0.34
(Drilled by Robertson and Malsbury)									
RM-1	9424	9795	882	428	380	390	10	Tr	Tr
					390	412-1/2	22-1/2	2.15	1.59
					412-1/2	415	2-1/2	0.36	0.05
RM-2	9500	9890	880	421	-	-	-	-	-

* No record. Above hole straight numbers on map.

TABLE 3. - Pertinent data on churn-drill holes on the Roper tract, NE-1/4 NE-1/4 sec. 32 and SE-1/4 SE-1/4 sec. 29, T. 34 S., R. 23 E., drilled by the Century Zinc Co.

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
C-1	10110	9689	891	480	-	-	-	-	-
C-2	10107	9945	889	470	-	-	-	-	-
C-3	8550	8730	870	470	425	430	5	-	1.67
					430	440	10	Sh	Sh
C-4	10714	9358	882	500	410	415	5	Sh	Sh
C-5	10527	9350	892	485	-	-	-	0	-
C-6	8975	8904	873	465	430	455	25	-	Sh
C-7	10920	9348	890	479	445	450	5	Sh	-
C-8	9218	8907	875	465	435	445	10	Sh	-
C-9	11137	9367	887	418	-	-	-	-	-

TABLE 3. Pertinent data on churn-drill holes on the Roper tract, NE-1/4 NE-1/4 sec. 32 and SE-1/4 SE-1/4 sec. 29, T. 34 S., R. 23 E. drilled by the Century Zinc Co. (cont.)

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
C-10	11159	8840	888	466	415	425	10	-	Sh
C-11	8762	8895	870	425	-	-	-	-	-
C-12	11182	8538	880	460	400	420	20	Tr	Tr
C-13*									
C-14	11170	8722	883	460	405	410	5	-	Sh
C-15*									
C-16	11152	8908	887	443	400	405	5	-	1.93
C-17									

* Not in area considered.

TABLE 4. - Pertinent data on churn-drill holes on the Stover tract, NW-1/4 NW-1/4 sec. 33, T. 34 S., R. 23 E., drilled by C. F. Dyke and the Bureau of Mines

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
(Drilled by C. F. Dyke)									
1	8959	10189	876	428	410	415	5	Tr	-
2	9478	10038	884	472	403	408	5	0.54	0.69
					408	413	5	Sh	Sh
					413	418	5	1.31	-
					418	423	5	0.29	-
					433	463	30	Th Sh	-
3	9418	10116	883	454	380	405	5	Th Sh	Th Sh
					405	415	10	2.20	-
4	9455	10105	884	435	390	410	20	Sh	Sh
					410	430	20	Tr	-
5	9403	10037	882	435	325	335	10	-	Tr
					400	410	10	1.31	Sh
					410	415	5	Sh	Sh
					415	425	10	Tr	Tr
6	9588	10038	886	431	380	390	10	-	Sh
					390	400	10	1.67	0.07
					400	405	5	Fair Sh	-
					405	410	5	2.23	-
					410	415	5	Fair Sh	-
					415	420	5	1.31	-
(Drilled by the Bureau of Mines)									
S-1	9574	10120	886	425	-	-	-	-	-

TABLE 5. - Pertinent data on churn-drill holes on the Roper tract, SE-1/4 SE-1/4 sec. 29, T. 34 S., R. 23 E., drilled by the Bureau of Mines

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thickness, feet	Metallic content, percent	
	North	East			From	To		Zinc	Lead
R-1	9582	9832	884	435	420	425	5	Tr	-
R-2	9390	9890	880	425	380	420	40	Tr	Tr
R-3	11137	9218	887	435	390	402-1/2	12-1/2	0.55	Tr
R-4	11136	9566	887	465	340	345	5	Tr	-
R-5	11135	9767	889	470	415	425	10	-	0.71
					265	275	10	Tr	-
					370	375	5	Tr	-
					425	432-1/2	7-1/2	0.18	0.01
					432-1/2	457-1/2	25	2.95	0.03
					457-1/2	462-1/2	5	0.72	-
R-6	11136	9666	888	445	-	-	-	-	-
R-7	11136	9816	889	470	405	420	15	-	0.11
R-8	11301	9746	887	470	-	-	-	-	-
R-9	11137	9714	888	470	-	-	-	-	-
R-10	11137	9739	887	470	365	370	5	0.64	0.03
					370	377-1/2	7-1/2	0.12	2.71
					377-1/2	387-1/2	10	0.05	0.15
					450	455	5	1.39	0.01
					410	415	5	-	Tr
R-11	11088	9789	888	500	425	430	5	1.06	0.01
					430	442-1/2	12-1/2	0.18	0.01
					445	450	5	Tr	-
R-12	11036	9765	890	470	450	457-1/2	7-1/2	0.43	0.03
					457-1/2	465	7-1/2	Tr	-
					420	425	5	0.38	1.18
R-13	11239	9668	886	475	425	430	5	-	Tr.
R-14	11198	9738	887	470	400	420	20	-	Tr.
					435	450	15	Tr	-
R-15	11134	9466	887	470	-	-	-	-	-
R-16	11340	9302	884	475	380	390	10	-	0.28
					390	392-1/2	2-1/2	-	Tr.

TABLE 6. - Pertinent data on churn-drill holes on the Goodrich tracts, W-1/2 NW-1/4 sec. 28, T. 34 S., R. 23 E., drilled by the Century Zinc Co.

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
(J. B. Goodrich tract)									
C-1	14029	10767	900	475	-	-	-	-	-
C-2	13191	10628	890	488	360	370	10	1.58	0.16
C-3	12929	10393	888	403	365	370	5	2.01	0.32
C-4	13098	10438	884	393	357-1/2	365	7-1/2	2.67	-
C-5	12961	10715	893	412	375	385	10	Sh	-
C-6	12994	10262	887	386	360	367-1/2	7-1/2	2.13	-
C-7	13222	10128	884	390	355	362-1/2	7-1/2	0.76	Sh
C-8	13119	10122	887	395	362-1/2	375	12-1/2	Sh	-
C-9	13309	10290	883	395	365	375	10	Sh	-
C-10	12965	10121	888	399	365	395	30	Sh	Sh
C-11	13245	10545	888	402	365	375	10	1.60	-
C-12	12890	10251	889	400	365	375	10	Sh	Sh
C-13	12782	10374	892	405	370	377-1/2	7-1/2	3.95	-
C-14	12780	10253	892	400	372-1/2	385	12-1/2	Sh	-
C-15	12781	10392	892	410	370	380	10	Sh	-
C-16	13418	10450	887	398	365	372-1/2	7-1/2	Sh	Sh
C-17	13403	10571	889	400	365	375	10	0.87	0.48
C-18	13400	10705	893	407	375	377-1/2	2-1/2	Sh	Sh
C-19	13285	10795	897	403	380	382-1/2	2-1/2	Sh	-
					382-1/2	385	2-1/2	2.44	-
					385	400	15	Sh	-
C-20	12580	10284	897	410	375	377-1/2	2-1/2	-	Sh
					380	390	10	Sh	-
C-21	13557	10605	888	390	367-1/2	372-1/2	5	Sh	-
C-22	12575	10384	897	410	377-1/2	385	7-1/2	Sh	Tr
					385	390	5	1.39	-
					390	407	17	Sh	-
C-23	13592	10410	885	381	362-1/2	370	7-1/2	4.23	-
C-24	12568	10465	898	415	380	387-1/2	7-1/2	1.79	0.03
C-25	13582	10334	883	392-1/2	362-1/2	372-1/2	10	Sh	-
C-26	12561	10539	898	411	380	400	20	Sh	-
C-27	13604	10487	886	396	362-1/2	367-1/2	5	0.71	0.22
C-28	12475	10462	898	410	370	390	20	Sh	Tr
C-29	13688	10377	885	391	362-1/2	372-1/2	10	Sh	Sh
C-30	13122	10727	893	396	380	385	5	1.15	0.58
C-31	13698	10455	886	388	362-1/2	370	7-1/2	Sh	Sh
C-32	13178	10837	897	415	385	390	5	Sh	-
C-33	13818	10250	886	394	345	357-1/2	12-1/2	1.10	0.06
					360	367-1/2	7-1/2	1.48	-
C-34	13602	10820	892	401	-	-	-	-	-
C-35	13822	10143	883	375	355	365	10	0.96	0.88
C-36	10070	10070	882	407	350	362-1/2	12-1/2	Sh	-
					362-1/2	365	2-1/2	1.65	0.02

TABLE 6. - Pertinent data on churn-drill holes on the Goodrich tracts, W-1/2 NW-1/4 sec. 28, T. 34 S., R. 23 E., drilled by the Century Zinc Co. (cont.)

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
C-37	14113	10332	886	443	260	265	5	4.95	-
					357-1/2	367-1/2	10	1.41	0.12
					390	427-1/2	37-1/2	2.61	-
					367-1/2	390	22-1/2	Sh	-
C-38	14115	10248	886	425	257	275	18	Tr	Tr
C-39	14115	10395	887	407	375	380	5	-	Sh
					355	365	10	Tr	Tr
C-40	14185	10352	885	417	352-1/2	360	7-1/2	3.04	1.32
					360	382-1/2	22-1/2	Sh	Sh
C-41	14204	10310	884	416	255	275	20	1.96	0.23
					357-1/2	413	55-1/2	Sh	-
C-42	14458	10090	878	385	250	255	5	Sh	-
C-43	14715	10082	874	400	345	355	10	Sh	Sh
					370	400	30	Sh	-
C-44	14790	10088	873	385	360	365	5	Sh	-
(D. W. Goodrich tract)									
C-1				505	382	390	8	Sh	-
C-2				396	357-1/2	370	12-1/2	Sh	Tr
C-3				394	352-1/2	355	2-1/2	Sh	Tr
C-4				377-1/2	-	-	-	-	-
C-5				379	355	365	10	Sh	-
C-6				365	-	-	-	-	-

TABLE 7. - Pertinent data on churn-drill holes on the J. B. Goodrich tract, W-1/2 NW-1/4 sec. 28, T. 34 S., R. 23 E., drilled by the Bureau of Mines

Drill hole No.	Coordinate location		Collar elevation, feet	Total depth, feet	Selected section		Thick-ness, feet	Metallic con-tent, percent	
	North	East			From	To		Zinc	Lead
G-1	14194	10456	889	440	310	320	10	Tr	-
					355	370	15	Tr	-
					390	400	10	Tr	-
G-2	14188	10219	886	425	300	325	25	0.46	-
					370	380	10	1.88	-
					380	390	10	0.40	-
					405	410	5	0.62	-
G-3	13810	10354	887	415	355	360	5	0.14	Tr
					360	367-1/2	7-1/2	1.12	Tr
					367-1/2	372-1/2	5	0.28	Tr
					372-1/2	405	32-1/2	Tr	Tr
G-4	13809	10454	888	420	-	-	-	-	-
G-5	14461	10308	879	435	250	255	5	Tr	-
G-6	14468	10187	879	430	365	375	10	Tr	-

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In several of the holes located on anticlinal domes, small quantities of gas were encountered below the shale, indicating relationship of the gas occurrences to the structure. No relationship between the zinc and lead mineralization and the structural contours of the Cherokee shale and the Short Creek oolite could be established.

Six holes (G-1 to G-6) drilled by the Bureau of Mines at the northern end of the ore deposit indicated by previous drilling failed to intersect continuations or extensions of the deposit.

Roper Property

On the Roper land (SE-1/4 SE-1/4 sec. 29), on the south portion of the project area (fig. 2a) 24 holes were drilled - 10 by the Century Zinc Co. and 14 by the Bureau of Mines. Pertinent data on all the holes are shown in tables 3 and 5. Two of the holes intersected zinc-lead ore, nine were shine holes, five had zinc-lead traces, and eight were blank.

On the northeast corner of this 40-acre tract, drilling disclosed an unusually deep sink-hole structure. A contour map of the base of the Cherokee shale and a cross section of the sink hole show a maximum shale drop of 112 feet (fig. 9); extensive solution action, alteration, and brecciation have obscured identity of most of the formations. No important zinc-lead mineralization was evident within the sink hole, but on the east flank of the sink hole R-5 shows good zinc ore in the M bed horizon, and hole R-10 shows good lead values in the G and H beds.

Drilling to the west of the sink hole indicates normally flat, undisturbed strata.

The Bureau of Mines' drilling was all done on contract. Holes were started with a 10-inch bit, and 8-1/4-inch casing was set on bedrock. It was usually possible to reach the ore horizon with an 8-inch bit, although occasionally it was necessary to set 6-1/4-inch casing in broken ground. All holes were cased immediately upon entering mineralized zones, and casing followed the bit to the bottom of the hole to prevent contamination of samples.

A flat-bottom bailer was used for sampling 5-foot intervals in waste and 2-1/2-foot intervals in mineralized ground. All cuttings were discharged into metal tubs, and the entire sample was quartered in a Jones splitter and dried on a wood-fire furnace, care being used not to "burn" the sample. Splits of samples were sent to a commercial laboratory for assay and to the core library at Rolla, Mo., for future study. Splits were sent also to the State Geological Survey of Kansas at Lawrence.

Drilling was confined to areas of apparent zinc-lead mineralization and structural deformation. The holes were so spaced as to intersect any possible large body of ore present in the area. The locations of all the holes are shown in figures 2 and 2a. Tables 1, 2, 3, 4, 5, 6, and 7 summarize the pertinent data on the holes. Logs of the holes drilled by the Bureau of Mines and all those available from private parties are recorded in the concluding pages of this report.

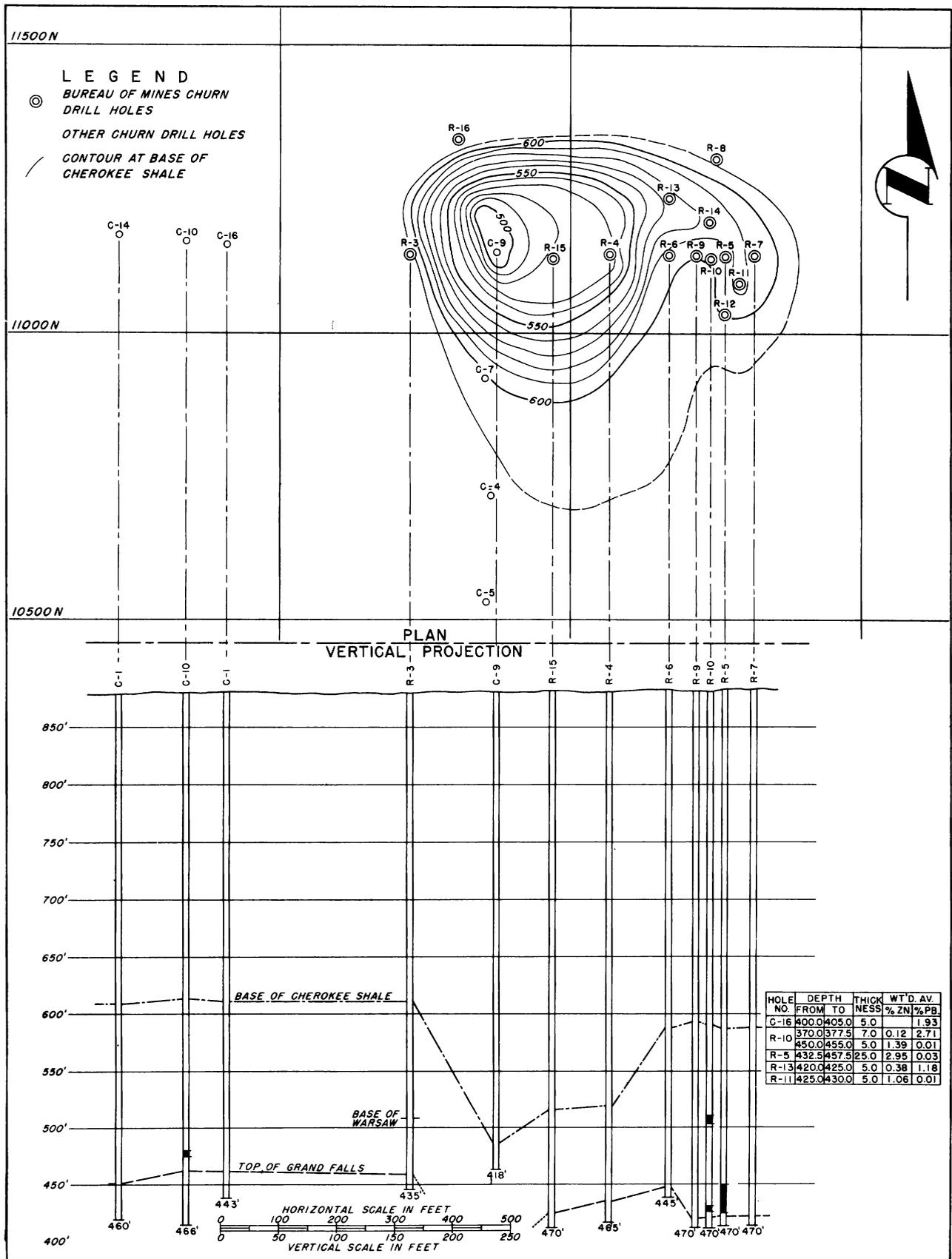


Figure 9.—Subsurface contours at base of Cherokee Shale and cross section of sink hole, Roper tract.

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U. S. BUREAU OF MINES CHURN-DRILL HOLE LOGS

Goodrich Property
(sec. 28, T. 34 S., R. 23 E., Cherokee County, Kans.)

Hole G-1 (NW-1/4 NW-1/4)

Started: 11/2/49
 Completed: 11/14/49
 Coordinates: 14194N-10456E

Struck water: 115 and 350 ft.
 Water stands: 245 ft.
 Elevation: 889 ft.

<u>Depth, ft.</u>		
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	10	Soil, clay, and gravel.
10	247	Cherokee shale.
247	251	Cherokee shale, gray Chester limestone, selvage, iron pyrites.
251	255	Gray Chester limestone, iron pyrites.
255	260	Gray Chester limestone, gray chert, selvage, iron pyrites.
260	265	Gray Chester limestone, gray chert, brown limestone, bitumen, specks of cotton rock.
265	270	Brown limestone, cotton rock, and white chert.
270	285	Brown limestone, cotton rock, and white chert.
285	290	Gray and white chert and brown limestone.
290	295	Brown and gray limestone, gray and white chert.
295	310	Gray and tan limestone, gray and white chert.
310	320	Gray and white chert, gray and brown limestone, specks of zinc.
320	325	Gray limestone, gray and white chert.
325	330	Gray and white chert, gray and brown limestone.
330	335	Gray limestone, gray-blue and white chert.
335	340	Gray and blue chert, gray and white chert.
340	345	Gray, blue, brown and mottled chert, very little gray limestone.
345	350	Gray, blue, brown and mottled chert, very little gray limestone, calcite.
350	355	Gray, blue and brown chert, gray and brown limestone, calcite.
355	360	Dense gray chert, gray chert, jasperoid, calcite, trace gray limestone and specks of zinc.
360	365	Gray and brown chert, some jasperoid, calcite, faint trace of zinc.
365	370	Gray chert, gray limestone, calcite, faint trace zinc.
370	375	Gray limestone, gray chert, some blue chert, calcite.
375	380	Gray chert, gray limestone, calcite.
380	385	Gray limestone, gray chert, calcite.
385	390	Gray and brown chert, gray limestone, specks of jasperoid.
390	395	Brown oolitic limestone, gray chert, specks of zinc.
395	400	Gray limestone, some brown oolitic limestone, gray chert, calcite and specks of zinc.
400	405	Gray and brown limestone, gray chert, calcite.
405	410	Brown and gray limestone, gray chert.
410	420	Brown and little gray limestone.
420	425	Brown limestone, some gray chert.
425	430	Brown limestone, very little gray and brown chert.

Hole G-1 (cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
430	435	Dark gray limestone, some dense gray chert (Grand Falls N bed).
435	440	Gray, brown and some translucent chert, some gray limestone. Number of sludge samples - 70 Number of assay samples - 0 Set 261 feet of 6-1/4" casing

Hole G-2 (NW-1/4 NW-1/4)

Started: 11/14/49	Struck water: 277 ft.
Completed: 11/25/49	Water stands: 246 ft.
Coordinates: 14188N-10219E	Elevation: 886 ft.
	Sulfur water: 280 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	11	Surface soil clay gravel.
11	259	Cherokee shale.
259	265	Gray chert, some gray limestone.
265	275	Gray limestone, gray chert, bitumen (Chester).
275	285	Gray limestone, gray chert (Chester).
285	290	Gray chert, some gray limestone, bitumen, very heavy bitumen.
290	300	Gray chert, some gray limestone.
300	305	Gray chert, some gray limestone, with faint trace zinc.
305	307-1/2	Gray chert, some gray limestone, calcite, heavy bitumen, faint trace zinc.
307-1/2	315	Gray chert, some gray limestone, few zinc crystals.
315	330	Gray chert, some gray limestone, with faint trace zinc.
330	350	Gray and brown chert, some gray limestone, hard formation, no ore.
350	355	Gray, brown and blue chert, hard formation, no ore.
355	370	Brown dense gray to light-gray chert.
370	374	Gray and brown chert, very thin trace zinc.
374	377	Gray water chert, some brown chert, fair zinc shines, crevicy (small cutting recovery).
377	380	Loose gray chert, dark-gray and brown chert, some gray brecciated chert recemented by jasperoid, some dolomite, crevice, trace zinc.
380	382-1/2	Dense gray to light-gray chert, trace zinc.
382-1/2	390	Loose gray and light-gray chert, brown chert, faint trace zinc.
390	395	Dense gray chert, iron pyrites (loose crevicy formation).
395	400	Dense gray to light-gray chert, much iron pyrites.
400	405	Coarse dense gray chert, little gray chert, much iron pyrites.
405	415	Coarse dense gray chert, little gray chert, much iron pyrites, very faint trace zinc.
415	420	Dense gray, light-gray chert, specks mottled chert, little white chert, some gray translucent chert, marcasite.
420	425	Dull gray and translucent chert, brown and gray mottled chert, marcasite.

Hole G-2 (cont.)

Remarks: Heavy flow bitumen at 280-285 ft.
 Number of sludge samples - 59
 Number of assay samples - 13
 Set 262 feet of 6-1/4" casing

Analysis, percent

Zinc

300	305	0.58
305	307-1/2	.46
307-1/2	310	.16
310	315	.22
315	320	1.02
320	325	.16
370	374	.86
374	377	3.76
377	380	1.36
380	382-1/2	.82
382-1/2	385	.26
385	390	.26
405	410	.62

Hole G-3 (SW-1/4 NW-1/4)

Started: 11/26/49
 Completed: 12/6/49
 Coordinates: 13810N-10354E

Struck water: 325 ft.
 Water stands: 247 ft.
 Elevation: 886.96 ft.
 Sulfur water: 370 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	12	Soil clay, gravel.
12	215	Cherokee shale.
215	230	Gray sandy shale (saturated with crude oil - probably Bartlesville).
230	252	Cherokee shale.
252	255	Pyrites iron, some gray limestone
255	270	Gray Chester limestone, some iron pyrites.
270	280	Gray Chester limestone.
280	285	Gray Chester limestone, some iron pyrites with some soft gray limestone.
285	290	Gray Chester limestone, some iron pyrites.
290	295	Gray Chester limestone, some iron pyrites, with very little gray chert.
295	305	Gray Chester limestone, some iron pyrites.
305	310	Gray Chester limestone, some iron pyrites (end Chester).
310	315	Gray limestone, gray and white chert.
315	320	Gray chert, gray limestone.
320	325	Gray chert, gray limestone and tan limestone.
325	335	Gray limestone, gray chert.

Hole G-3 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
325	335	Gray limestone, gray chert.
335	340	Gray-tan limestone, gray chert.
340	345	Dark gray chert, tan limestone, specks sandy glauconitic limestone.
345	350	Dense gray, very dark-brown chert.
350	355	Gray and brown chert, some gray limestone.
355	360	Gray and brown-blue chert, very thin trace lead and zinc.
360	365	Gray and brown-blue chert, jasperoid, fair zinc shines.
365	367-1/2	Dense gray and brown chert, formation loose, trace zinc.
367-1/2	370	Dense gray and brown chert, formations loose, faint trace zinc and lead.
370	375	Gray limestone, gray and brown chert, very faint trace zinc and lead.
375	380	Gray and brown chert, gray limestone, crystals zinc and lead.
380	385	Gray limestone, some gray chert, crystals zinc and lead.
385	390	Gray, some brown chert, gray limestone, some brown oolitic limestone, some calcite, thin trace zinc.
390	395	Brown oolitic limestone, some gray chert, little calcite, thin trace zinc.
395	400	Brown and gray limestone, gray and brown chert, thin trace zinc.
400	405	Brown and gray limestone, gray and brown chert, faint trace zinc and lead.
405	410	Brown limestone, some gray and brown chert.
410	415	Brown limestone, gray chert.

Remarks: Hole caving badly from above - hanging tools - probably caving from 265 to 270 ft. Hole bottoms in the M bed.

Number of sludge samples - 59
 Number of assay samples - 5
 Set 257 feet of 6-1/4" casing.

Analysis, percent

		<u>Zinc</u>
355	360	0.14
360	365	1.50
365	367-1/2	.36
367-1/2	370	.32
370	372-1/2	.24

Hole G-4 (SW-1/4 NW-1/4)

Started: 11/7/49
 Completed: 12/19/49
 Coordinates: 13809N-10454E

Struck water: 285 ft.
 Water stands: 245 ft.
 Elevation: 888 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	12	Soil clay.
12	225	Shale.
225	234	Sandy shale.
234	257	Shale.
257	260	Gray sandy limestone, saturated with crude oil.
260	265	Gray limestone, little gray chert.
265	275	Gray limestone, gray chert.
275	290	Gray limestone, gray chert.
290	295	Gray limestone, gray chert (probably Chester limestone).
295	300	White and gray chert, gray limestone (crevice 296 to 297).
300	310	Gray chert, cotton rock, gray limestone (shelly).
310	320	Gray and white chert, gray limestone, cotton rock.
320	330	White and gray chert, cotton rock, little gray limestone.
330	335	Gray white chert, cotton rock.
335	340	Gray-white little blue chert, little calcite.
340	350	Loose gray little white and blue chert.
350	355	Gray, blue, brown and little white chert (K bed).
355	360	Gray-blue chert, little cotton rock.
360	365	Gray, blue, brown chert, some gray limestone, little cotton rock, calcite.
365	370	Gray, brown and little white chert, some gray limestone (crevice 365-367) (L bed).
370	375	Gray and some tan limestone, very little gray chert.
375	390	Tan limestone, some gray chert.
390	395	Brown oolitic limestone, gray chert (M bed).
395	400	Gray and tan limestone, gray and brown chert.
400	405	Gray limestone, gray chert.
405	415	Gray and tan limestone, gray chert.
415	420	Gray and white chert, cotton rock, some tan limestone.
		Number of sludge samples - 61.
		Number of assay samples - 0.
		Set 258 feet of 6-1/4" and 368 feet of 4-7/8" casing.

Hole G-5 (NW-1/4 NW-1/4)

Started: 12/22/49
 Completed: 12/31/49
 Coordinates: 14461N-10308E

Struck water: 375 ft.
 Water stands: 295 ft. (very weak)
 Elevation: 879 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	18	Soil clay.
18	241	Shale.
241	245	Gray limestone.

Hole G-5 (Cont.)

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
245	250	Gray limestone, gray chert, iron pyrites.
250	255	Gray limestone, gray chert, trace zinc.
255	280	Gray limestone, some gray chert.
280	285	Gray limestone, some gray chert, trace calcite.
285	300	Light gray limestone, little gray chert.
300	305	Gray limestone, gray chert.
305	310	Gray and tan limestone, gray chert.
310	320	Light gray and tan limestone, little gray chert.
320	325	Gray and brown limestone, gray brown and some mottled chert.
325	330	Gray, brown and mottled chert, gray-brown limestone.
330	335	Gray, some blue and brown chert, gray and brown limestone.
335	345	Gray and brown limestone, some gray chert
345	350	Dark gray, dark brown limestone, little gray chert.
350	355	Gray chert, dark brown and gray limestone.
355	375	Gray limestone, some gray chert.
375	380	Gray, some brown, blue and mottled chert (little sulfur water).
380	390	Brown oolitic limestone, some gray chert.
390	400	Brown and gray limestone, some gray chert.
400	410	Brown limestone, some bluish gray chert.
410	415	Brown limestone, very little gray chert
415	420	Gray, little brown chert, some brown limestone.
420	430	Brown limestone, some gray and brown chert.
430	435	Dense gray brown and some translucent and little white chert, little gray and brown limestone.
		Number of sludge samples - 60
		Number of assay samples - 0
		Set 246 feet of 6-1/4" casing.

Hole G-6 (NW-1/4 NW-1/4)

Started: 1/2/50	Struck water: 370 ft.
Completed: 1/17/50	Water stands: 260 ft. (very weak)
Coordinates: 14468N-10187E	Elevation: 879 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	18	Soil and clay.
18	242	Shale.
242	245	Gray limestone, some gray chert, iron pyrites.
245	250	Do.
250	280	Gray limestone, little gray chert, trace iron pyrites.
280	285	Gray limestone, gray chert.
285	290	Light gray limestone, gray chert.

Hole G-6 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
290	295	Light gray limestone, gray and some white chert.
295	305	Gray and white chert, gray and tan limestone.
305	310	Gray and tan limestone, gray and little blue and white chert.
310	315	Gray and tan limestone, some gray chert.
315	325	Gray, little brown and mottled chert, gray and tan limestone.
325	330	Gray, blue, brown and some mottled chert, brown limestone.
330	335	Brown limestone, dark gray and blue chert.
335	340	Dark gray, blue and some mottled chert, brown limestone.
340	345	Dark brown limestone, dark gray chert.
345	355	Gray, brown and mottled chert, some brown limestone.
355	365	Gray limestone, some gray chert.
365	370	Dense gray chert, little gray limestone, thin trace zinc.
370	375	Dense gray chert, little gray limestone, faint trace zinc.
375	380	Gray chert, brown oolitic limestone.
380	385	Brown oolitic limestone, gray chert.
385	390	Gray limestone (some brown oolitic falling) little gray chert.
390	405	Gray and little brown limestone, gray chert.
405	410	Gray and tan limestone.
410	415	Gray and little tan limestone, very little gray chert.
415	420	Dark brown limestone, some dense gray chert.
420	425	Dense gray and little brown chert, brown limestone.
425	430	Gray, brown, little white chert, brown limestone.
Remarks: Formation looks unfavorable; hole hard.		
Number of sludge samples - 55		
Number of assay samples - 0		
Set 244 feet of 6-1/4" casing.		

Roper Property
(sec. 32, T. 34 S., R. 23 E., Cherokee County, Kans.)

Hole R-1 (NE-1/4 NE-1/4)

Started: 11/2/49	Struck water: 120 and 330 ft.
Completed: 11/9/49	Water stands: 237 ft.
Coordinates: 9582N-9832E	Elevation: 884 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Surface soil, clay and gravel.
6	35	Brown and gray sandstone.
35	263	Cherokee shale.
263	265	Gray Chester limestone, iron pyrites.
265	275	Dark to light gray Chester limestone, iron pyrites.
275	305	Gray Chester limestone, some gray chert, iron pyrites.
305	310	Dark gray to light gray limestone, shelly, trace iron pyrites.
310	325	Gray chert, dark gray limestone.
325	330	Dark gray to light gray limestone, gray chert.
330	345	Gray chert, coarse gray limestone.

Hole R-1 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
345	350	Gray and brown mottled chert, gray limestone, marcasite.
350	355	Gray, brown, mottled chert, gray limestone, marcasite.
355	360	Gray, brown, mottled chert, brown limestone, marcasite.
360	365	Gray, brown chert, brown limestone, selvage.
365	370	Blue-gray chert, brown limestone, calcite.
370	375	Dark blue and gray chert, gray and brown limestone, selvage, some marcasite, calcite, crinoids.
375	380	Blue, gray and brown chert and gray and brown limestone, selvage, some calcite, specks black limestone.
380	385	Dark blue and gray chert, soft gray limestone, selvage.
385	390	Light tan limestone, blue and gray chert, selvage.
390	395	Soft dark gray limestone, gray chert and interbedded shale, marcasite.
395	405	Black shale, gray limestone, gray chert, some brown chert, calcite, marcasite, crinoids, very soft.
405	415	Gray chert, black shale, some gray limestone, calcite, marcasite, very soft formation.
415	420	Gray, brown and mottled chert, gray and brown limestone.
420	425	Gray, white translucent chert, some brown chert, very thin trace lead (Grand Falls N bed).
425	430	Dead gray white and brown chert, some white translucent chert, some gray and brown limestone (Probably falling) calcite.
430	435	White, light gray, some brown chert.
		Number of sludge samples - 87
		Number of assay samples - 0
		Set 268 feet of 6-1/4" casing.

Hole R-2 (NE-1/4 NE-1/4)

Started: 11/10/49	Struck water: 37 and 295 ft.
Completed: 11/21/49	Water stands: 235 ft.
Coordinates: 9390N-9890E	Elevation: 879.59 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	7	Surface soil and clay.
7	18	Brown sandstone (very soft).
18	25	Cherokee shale.
25	37	Gray sandstone (firm).
37	50	Cherokee shale, sandy.
50	258	Cherokee shale with showing pyrites iron.
258	275	Gray Chester limestone with some gray chert, pyrites iron.
275	280	Gray chert, white chert, gray limestone, some gray selvage.
280	285	Gray limestone, gray chert, some pyrites iron.
285	295	Gray limestone, gray chert, gray shale and selvage seams (very soft).
295	300	Soft sandy gray limestone, cotton rock, gray chert, formation soft.

Hole R-2 (Cont.)

Depth, From -	Ft. To -	Formation
300	305	Gray limestone, gray and white chert, some cotton rock.
305	310	Gray and white chert, gray and brown limestone, trace pyrites iron.
310	315	White and gray chert, tan limestone.
315	320	Gray chert, some brown and blue chert, little brown limestone.
320	325	Gray and brown limestone, gray and white chert.
325	330	White and gray chert, some gray and brown limestone, trace pyrites iron.
330	335	Gray and brown limestone, white and gray chert, trace pyrites iron.
335	340	Brown, gray limestone, gray chert, trace pyrites iron.
340	345	Gray and some brown chert, gray and brown limestone, trace pyrites iron.
345	350	Gray chert, brown limestone, trace pyrites iron.
350	370	Brown limestone, gray and blue chert, trace pyrites iron.
370	375	Brown limestone, gray and blue chert, trace pyrites iron, some dolomite.
375	380	Brown limestone, gray chert, dolomite, calcite.
380	385	Dense gray limestone, some gray chert, dolomite, specks lead.
385	390	Dense gray brown limestone, gray and blue chert, dolomite, calcite, very faint trace lead.
390	395	Dense brown limestone, gray chert, dolomite, calcite, very faint trace lead.
395	400	Gray and brown chert, dense brown limestone, calcite, faint trace lead, faint trace zinc.
400	405	Gray and brown chert, much calcite and dolomite, trace zinc, very faint trace lead (small crevices).
405	407-1/2	Gray, brown and some translucent very soft white pasty limestone, calcite, very faint trace zinc (crevicy).
407-1/2	410	Dead white and gray chert, brown chert, thin shines zinc (Grand Falls N bed).
410	412-1/2	Dead white and gray chert, brown chert, some mottled chert, thin trace zinc.
412-1/2	415	Dull gray and white chert, mottled chert, calcite, some brown chert, very faint trace zinc.
415	420	Dull white and gray chert, mottled chert, brown chert, some translucent chert, very thin trace zinc.
420	425	Dull gray and white chert, some brown chert. Hole bottomed in Grand Falls. Number of sludge samples - 59 Number of assay samples - 0 Pulled 260 feet of 6-1/4" casing and reset 300 feet of 6-1/4" casing.

(sec. 29, T. 34 S., R. 23 E.)

Hole R-3 (SE-1/4 SE-1/4)

Started: 12/2/49
Completed: 12/12/49
Coordinates: 11137N-9218E

Struck water: 320 ft.
Water stands: 245 ft.
Elevation: 887.02 ft.
Sulfur water: 365 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	10	Soil - clay.
10	22	Brown sandstone, some clay.
22	30	Soft sandstone, gravel, water.
30	230	Cherokee shale.
230	240	Gray sandstone (Bartlesville).
240	270	Cherokee shale.
270	280	Gray Chester limestone, some gray chert, iron pyrites.
280	290	Gray Chester limestone, some gray chert, selvage.
290	340	Gray Chester limestone, some gray chert.
340	355	Gray chert, gray and tan limestone.
355	365	Gray chert, gray limestone.
365	370	Gray and light blue chert, gray limestone.
370	375	Gray and light blue chert, brown limestone.
375	380	Gray and light blue chert, brown limestone (shelly)
380	390	Brown limestone, dark gray chert, calcite.
390	395	Dark brown limestone, dense gray chert.
395	400	Gray chert, some tan limestone, jasperoid, shines zinc and lead trace.
400	402-1/2	Gray chert, some mottled chert, some jasperoid, thin trace zinc.
402-1/2	405	Gray chert, some mottled chert, some jasperoid, thin trace zinc, marcasite.
405	410	Gray chert, some mottled chert, some jasperoid, specks zinc with some selvage.
410	415	Gray, brown and mottled chert.
415	420	Gray, brown and mottled chert with some selvage.
420	425	Dull gray chert, selvage, some cotton rock.
425	430	Gray limestone, gray chert, selvage, some cotton rock.
430	435	Gray chert, gray and tan limestone, calcite, trace marcasite.
Number of sludge samples - 60		
Number of assay samples - 3		
Set 40 feet of 8-1/4" and 278 feet of 6-1/4" casing.		

Analysis, percent

		<u>Zinc</u>
390	395	0.08
395	400	1.26
400	402-1/2	.32

Hole R-4 (SE-1/4 SE-1/4)

Started: 12/13/49
 Completed: 12/23/49
 Coordinates: 11136N-9566E

Struck water: 15, 45, and 345 ft.
 Water stands: 245 ft.
 Elevation: 887 ft.

Depth, ft.	Formation	
<u>From-</u>	<u>To-</u>	
0	15	Soil and clay.
15	38	Brown sandstone.
38	48	Shale.
48	55	Shale, sandstone, iron pyrites.
55	330	Shale.
330	335	Gray limestone, some gray chert, iron pyrites.
335	340	Gray limestone, selvage, little gray chert.
340	345	Loose gray chert, gray limestone, selvage, iron pyrites, faint trace zinc.
345	360	Shale, gray chert, little gray limestone, iron pyrites.
360	365	Loose white and dull gray chert, little gray limestone, trace iron pyrites.
365	380	Loose dull gray chert, little gray limestone, little calcite, trace iron pyrites.
380	395	Loose dull gray chert, little gray limestone, selvage seams, little calcite, iron pyrites (shale falling).
395	400	Loose dull gray and some leached chert, little gray limestone, trace iron pyrites.
400	405	Loose dull gray and some brown and mottled chert, trace iron pyrites.
405	410	Dull gray and little tan chert, little gray limestone, trace iron pyrites.
410	415	Gray and little brown chert, and shale seams.
415	420	Gray and brown chert, little jasperoid, lead shines.
420	422-1/2	Gray and brown chert, trace lead.
422-1/2	425	Do.
425	435	Gray, brown and some mottled chert, calcite, few specks lead.
435	440	Loose dull gray and little brown chert, trace iron pyrites, cotton rock.
440	445	Dull gray and little brown chert.
445	450	Do.
450	455	Gray and little brown and mottled chert, little gray limestone.
455	460	Gray and little brown and mottled chert, some gray limestone, calcite.
460	465	Gray and brown chert and gray limestone.
Remarks: Formations very badly fractured.		
Number of sludge samples - 63		
Number of assay samples - 3		

Analysis, percent

	Zinc
415 420	0.66
420 422-1/2	.67
422-1/2 425	.84

Hole R-5 (SE-1/4 SE-1/4)

Started: 12/24/49
 Completed: 1/2/50
 Coordinates: 11135N-9767E

Struck water: 25, 135, and
 345 ft.
 Water stands: 245 ft.
 Elevation: 889 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	8	Soil clay.
8	15	Sandstone.
15	25	Clay and sandstone.
25	38	Sandstone.
38	260	Shale.
260	265	Gray sandstone, iron pyrites.
265	275	Gray sandstone, iron pyrites, calcite, thin trace zinc.
275	290	Shale, iron pyrites.
290	295	Gray limestone, iron pyrites, shale.
295	300	Gray limestone, iron pyrites, calcite.
300	315	Gray limestone, little gray chert, iron pyrites.
315	320	Gray limestone, very little chert, trace iron, little green shale.
320	325	Gray, little tan limestone, little gray chert.
325	330	Gray limestone, gray chert.
330	335	Light-gray chert, gray limestone.
335	340	Gray and white chert, gray limestone.
340	345	Light-gray limestone, gray chert.
345	350	Gray chert, gray limestone, little selvage, iron.
350	360	Gray limestone, loose gray chert (shelly).
360	365	Gray chert, gray limestone.
365	370	Gray chert, gray and little tan limestone.
370	375	Gray chert, gray limestone, little cotton rock, thin trace zinc.
375	380	Loose, dull-gray chert.
380	385	Loose, dull-gray chert, calcite, white selvage.
385	390	Gray chert, calcite, little limestone, gray selvage.
390	395	Gray, brown chert, calcite, some brown limestone, calcite, selvage, iron.
395	400	Gray, little blue and brown chert, calcite, little brown limestone, selvage.
400	405	Gray, brown and some mottled chert, calcite, iron.
405	410	Gray, brown and mottled chert, calcite, trace iron, few specks lead.
410	415	Dull gray-brown and little blue chert, calcite, marcasite.
415	425	Gray and brown chert, calcite.
425	430	Gray and brown chert, calcite, thin zinc shines.
430	432-1/2	Gray brown and some mottled chert, some brown limestone. Thin trace zinc.
432-1/2	435	Gray and brown chert, brown jasperoid, calcite, good zinc (factured).
435	437-1/2	Gray and brown chert, brown jasperoid, calcite, fair zinc.
437-1/2	440	Gray and brown chert, brown jasperoid, calcite, dolomite, good zinc.

Hole R-5 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
440	450	Gray and brown chert, brown jasperoid, calcite, good zinc.
450	457-1/2	Gray chert, brown jasperoid, good zinc.
457-1/2	460	Gray chert, brown jasperoid, fair zinc.
460	462-1/2	Light-gray and brown and little translucent chert, little jasperoid, trace zinc.
462-1/2	465	Gray, brown, and translucent chert, thin trace zinc.
465	470	Gray and brown translucent chert (trace zinc probably falling).
		Number of sludge samples 68
		Number of assay samples - 14
		Set 60 feet of 8-1/4" and 305 feet of 6-1/4" casing.

Analysis, percent

		<u>Zinc</u>	<u>Lead</u>
425	430	.20	-
430	432-1/2	.16	.03
432-1/2	435	2.18	.05
435	437-1/2	1.16	.02
437-1/2	440	1.38	.04
440	442-1/2	3.64	.01
442-1/2	445	3.52	.04
445	447-1/2	5.96	.05
447-1/2	450	4.34	.01
450	452-1/2	2.20	.01
452-1/2	455	2.70	.03
455	457-1/2	2.46	.03
457-1/2	460	.98	-
460	462-1/2	.46	-

Hole R-6 (SE-1/4 SE-1/4)

Started: 1/3/50
 Completed: 1/11/50
 Coordinates: 11136N-9666E

Struck water: 25, 140, and
 335 ft.
 Water stands: 245 ft.
 Elevation: 888 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	8	Soil clay.
8	40	Sandstone.
40	45	Sandstone and shale.
45	290	Shale.
290	295	Shale, little gray chert, iron pyrites.
295	300	Gray chert, gray limestone, iron pyrites.
300	310	Gray limestone, gray chert, iron pyrites.
310	330	Gray chert, gray limestone, iron pyrites.
330	335	Gray and little white chert, some tannish limestone, some tar.
335	350	Loose dull gray chert, some gray limestone, calcite, trace iron pyrites (shelly).
350	355	Gray chert, gray limestone, tar.

Hole R-6 (Cont.)

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
355	360	Gray chert, gray limestone.
360	365	Light-gray and white chert, tan limestone.
365	370	Tan limestone, gray and tan chert.
370	375	White and gray chert, tan limestone.
375	380	Gray, white and brown chert, brown limestone.
380	385	Gray chert, brown limestone.
385	400	Gray, blue, brown and mottled chert, brown limestone.
400	405	Gray, blue, brown chert, brown limestone, selvage (loose).
405	410	Gray, dark-gray, brown and mottled chert, some brown limestone.
410	415	Gray, brown and mottled chert, some dark brown jasperoid, little brown limestone.
415	420	Gray, brown and some mottled chert, very little brown limestone.
420	435	Gray and brown chert.
435	440	Gray, brown and little translucent chert, trace calcite.
440	445	Gray and brown chert.
Number of sludge samples - 50		
Number of assay samples - 0		
Set 60 feet of 8-1/4", 310 feet of 6-1/4", and 355 feet of 4-7/8" casing.		

Hole R-7 (SE-1/4 SE-1/4)

Started: 1/12/50	Struck water: 140 and 340 ft.
Completed: 1/21/50	Water stands: 245 ft.
Coordinates: 11136N-9816E	Elevation: 889 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	8	Soil & clay.
8	37	Sandstone.
37	265	Shale.
265	270	Sandstone.
270	296	Shale, iron pyrites.
296	315	Gray limestone, some gray chert, iron pyrites.
315	320	Gray limestone, little gray chert, selvage, calcite iron pyrites.
320	325	Gray chert, gray and tan limestone, iron pyrites.
325	330	Dull-gray chert, little gray limestone, iron pyrites.
330	340	Gray and little tan limestone, gray chert, iron pyrites.
340	345	Gray limestone, dull-gray and white chert, (shelly).
345	350	Gray limestone, dull-gray chert.
350	355	Gray limestone, gray chert.
355	360	Gray and tan limestone, dull-gray chert, calcite.
360	365	Dull, loose, gray chert, gray and tan limestone, calcite.
365	370	Loose, dull, gray and little brown chert, gray limestone, calcite.
370	375	Loose, dull, gray, little brown, and mottled chert, little gray limestone, calcite.
375	390	Tan and gray limestone, gray chert, calcite.

Hole R-7 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
390	395	Gray, brown and some mottled chert, gray and some brown limestone, calcite.
395	405	Loose, dull, gray, brown, and little mottled chert, brown and gray limestone, calcite, selvage.
405	410	Dense gray, brown and mottled chert, little brown limestone, calcite, trace lead.
410	415	Gray, brown and mottled chert, some brown limestone, calcite, thin trace lead.
415	420	Gray, brown and mottled chert, little jasperoid, little brown limestone, calcite, very faint trace lead.
420	425	Gray, brown and mottled chert, little brown limestone, little jasperoid.
425	440	Gray, little brown and mottled chert, little brown limestone.
440	445	Dull-gray chert, some brown limestone.
445	450	Brown limestone, gray chert.
450	455	Gray, brown, and mottled chert, brown limestone.
455	460	Gray, brown, and mottled and some translucent chert, little jasperoid.
460	465	Gray, brown, mottled, and translucent chert.
465	470	Brown, gray, little white, and translucent chert
		Number of sludge samples - 67
		Number of assay samples - 3
		Set 60 feet of 8-1/4" and 315 feet of 6-1/4" casing.

Analysis, percent

		<u>Lead</u>
405	410	0.16
410	415	.07
415	420	.12

Hole R-8 (SE-1/4 SE-1/4)

Started: 1/18/50
 Completed: 2/2/50
 Coordinates: 11301N-9746E

Struck water: 325 ft.
 Water stands: 245 ft.
 Elevation: 887 ft.
 Sulfur water: 380 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	10	Soil - clay.
10	52	Sandstone.
52	262	Shale.
262	265	Gray limestone, some gray and blue chert.
265	280	Gray limestone, very little gray chert.
280	285	Gray limestone, very little gray chert (hit gas pocket at 285 feet) tar.
285	300	Gray limestone, little light-gray chert.
300	310	Gray limestone, white chert.
310	315	Gray and little tan limestone, little gray chert.
315	325	Gray and tan limestone, gray chert.

Hole R-8 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
325	330	Gray limestone, gray chert, tar.
330	335	Dull-gray limestone, dull-gray chert, shelly.
335	340	Gray and white chert, gray and little tan limestone.
340	360	Gray and tan limestone, gray chert.
360	365	Gray, brown, and some mottled chert, brown limestone.
365	370	Gray, little blue and brown chert, brown limestone.
370	375	Brown limestone, gray, little blue and brown chert.
375	385	Dark-brown limestone, gray chert.
385	390	Brown limestone, gray chert.
390	395	Gray and some brown and blue chert, brown limestone.
395	400	Gray chert, brown limestone, calcite.
400	405	Gray chert, little brown limestone.
405	410	Gray chert, brown limestone.
410	420	Gray and brown limestone, gray chert.
420	425	Do.
425	430	Tan and gray limestone, gray and light-gray chert.
430	445	Gray, tan limestone, some gray chert, calcite.
445	455	Brown and gray limestone, gray chert.
455	460	Gray, brown, translucent, little gray limestone.
460	470	Gray, brown, translucent chert, gray limestone.
		Number of sludge samples - 66
		Number of assay samples - 0
		Set 55 feet of 8-1/4" and 270 feet of 6-1/4" casing.

Hole R-9 (SE-1/4 SE-1/4)

Started: 1/23/50
 Completed: 2/2/50
 Coordinates: 11137N-9714E

Struck water: 35 and 345 ft.
 Water stands: 245 ft.
 Elevation: 888 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	9	Soil - clay.
9	43	Sandstone.
43	50	Sandstone, shale.
50	60	Shale.
60	68	Gray and brown sandstone.
68	270	Shale.
270	287	Shale, gray sandstone, iron pyrites.
287	290	Gray limestone, some gray chert, iron pyrites.
290	305	Gray limestone, selvage seams.
305	310	Gray limestone, selvage, shale seams.
310	320	Gray limestone, selvage.
320	330	Dull-gray chert, some gray limestone, selvage.
330	335	Gray chert, gray limestone, trace iron pyrites.
335	345	Gray limestone, gray chert, trace iron pyrites.
345	350	Loose, dull-gray chert, some gray limestone, iron pyrites, little tar.

Hole R-9 (Cont.)

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
350	365	Loose, dull-gray chert, little gray limestone, trace iron pyrites.
365	370	Gray chert, some brown and gray limestone.
370	385	Gray chert, little gray limestone.
385	390	Gray, little blue and brown chert, brown limestone.
390	400	Gray and brown chert, brown limestone.
400	415	Brown and gray chert, some brown limestone.
415	420	Gray, brown and some mottled chert, dolomite, calcite, iron pyrites.
420	430	Gray, brown, and mottled chert, calcite.
430	435	Gray, brown, and some mottled chert.
435	440	Do.
440	445	Gray, brown chert, brown limestone.
445	450	Gray, brown chert, brown limestone, calcite, dolomite.
450	455	Gray and brown chert, little brown limestone.
455	460	Gray and brown chert, brown jasperoid.
460	465	Gray and brown chert, some translucent chert, little brown jasperoid.
465	470	Gray, brown, and translucent chert.
		Number of sludge samples - 65
		Number of assay samples - 0
		Set 60 feet of 8-1/4" and 295 feet of 6-1/4" casing

Hole R-10 (SE-1/4 SE-1/4)

Started: 2/3/50	Struck water: 325 and 345 ft.
Completed: 2/11/50	Water stands: 245 ft.
Coordinates: 11137N-9739E	Elevation: 887 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	8	Soil - clay.
8	40	Sandstone.
40	265	Shale.
265	275	Gray sandstone and shale.
275	289	Shale and iron pyrites.
289	290	Shale, gray limestone, iron pyrites.
290	300	Gray limestone, iron pyrites.
300	305	Gray limestone, some gray chert, iron pyrites.
305	325	Gray limestone, little gray chert.
325	330	Gray chert, gray limestone.
330	340	Light-gray and white chert, some gray limestone.
340	345	Gray and tan limestone, gray chert, calcite
345	360	Loose dull-gray and white chert, gray and tan limestone.
360	365	Gray chert, little gray limestone, calcite, very faint trace lead.
365	370	Gray chert, some gray limestone, thin zinc shales, faint trace lead.
370	372-1/2	Gray chert, gray limestone, trace zinc.

Hole R-10 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
372-1/2	375	Gray chert, gray limestone, trace zinc, trace lead.
375	377-1/2	Gray chert, very little gray limestone, calcite, good lead shines, trace zinc.
377-1/2	385	Gray, brown, and some mottled chert, trace iron pyrites, trace lead.
385	387-1/2	Gray, brown, and mottled chert, iron pyrites, faint trace lead.
387-1/2	395	Gray, brown, and mottled chert, iron pyrites, calcite.
395	410	Dark-gray, brown chert, iron pyrites, calcite.
410	420	Gray and brown mottled chert, iron pyrites, very faint trace lead.
420	425	Gray, brown, and some mottled chert, brown jasperoid, little dolomite, calcite, iron pyrites.
425	440	Gray, brown, and mottled chert, little brown jasperoid, little dolomite and calcite.
440	445	Brown and gray chert, brown jasperoid, some brown limestone, calcite.
445	450	Gray and brown chert, some brown jasperoid, calcite, very faint trace zinc.
450	452-1/2	Brown jasperoid, gray and little brown chert, thin zinc shines
452-1/2	455	Brown jasperoid, gray and little brown chert, thin zinc shines
455	460	Brown jasperoid, gray, brown, and mottled chert, trace zinc.
460	465	Gray, brown, white, and some mottled and translucent chert, brown jasperoid.
465	470	Gray, brown, little white, and translucent chert, marcasite.
Number of sludge samples - 68		
Number of assay samples - 10		
Set 60 feet of 8-1/4" and 295 feet of 6-1/4" casing.		

Analysis, percent

		<u>Zinc</u>	<u>Lead</u>
365	370	0.64	0.03
370	372-1/2	.22	.23
372-1/2	375	.08	5.19
375	377-1/2	.08	2.72
377-1/2	380	.04	.32
380	382-1/2	.06	.18
382-1/2	385	.04	.09
385	387-1/2	.08	.01
450	452-1/2	2.24	.01
452-1/2	455	.54	.01

Hole R-11 (SE-1/4 SE-1/4)

Started: 2/2/50
 Completed: 2/11/50
 Coordinates: 11088N-9789E

Struck water: 39, 270 and 335
 ft. (weak; strong
 at 405 ft.
 Water stands: 245 ft.
 Elevation: 888 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation.</u>
0	10	Soil - clay.
10	39	Sandstone.
39	262	Shale.
262	273	Sandstone.
273	303	Shale.
303	310	Gray limestone, gray chert, selvage, iron pyrites.
310	315	Tan limestone, little gray chert, selvage, green shale, iron pyrites.
315	320	Gray limestone, some gray chert, little green shale, iron pyrites.
320	325	Gray limestone, gray chert, little green shale, iron pyrites.
325	335	Gray limestone, light gray chert.
335	345	Gray and some tan limestone, some gray chert.
345	350	Gray limestone, some gray chert.
350	355	Dull gray chert, gray limestone.
355	365	Dull gray chert, tan limestone.
365	370	Dull gray and brown chert, gray limestone.
370	375	Dull gray and little brown chert, gray limestone.
375	380	Gray and tan limestone, little light gray chert, green shale, iron pyrites.
380	385	Gray limestone, light gray chert, selvage.
385	390	Gray and little tan limestone, little gray chert.
390	395	Gray, brown and some mottled chert, brown limestone, calcite.
395	400	Gray, brown and mottled chert, tan limestone.
400	405	Gray, brown and mottled chert, tan limestone, selvage.
405	410	Gray and brown limestone, gray and blue chert, calcite.
410	415	Gray, brown, little blue and mottled chert, brown limestone, calcite, very thin trace lead, dolomite.
415	425	Loose gray, brown and mottled chert, calcite.
425	435	Loose gray and brown chert, selvage, calcite, thin shines zinc.
435	437-1/2	Loose gray and brown chert, gray sandstone, selvage, calcite, trace zinc.
437-1/2	440	Loose gray, brown and little mottled chert, gray sandstone, trace zinc.
440	442-1/2	Brown and gray chert, little gray sandstone, calcite, trace zinc.
442-1/2	445	Brown, gray and some mottled chert, little dolomite and calcite, trace zinc.
445	450	Gray, brown and some mottled chert, little calcite, faint trace zinc.

Hole R-11 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
450	452-1/2	Gray, brown and mottled chert, little jasperoid, calcite, very faint trace zinc.
452-1/2	455	Gray, brown and mottled chert, calcite, very faint trace zinc.
455	465	Gray, white, brown, mottled and translucent chert, calcite, very faint trace zinc.
465	470	Gray, brown and translucent chert, little white chert.
470	475	Gray, brown, white and some mottled chert.
475	480	Gray, brown, bluish gray and some white and mottled chert.
480	485	Bluish gray, brown and white chert, dark gray limestone.
485	490	Bluish gray, brown and some mottled chert, little gray limestone, calcite.
490	495	Bluish gray, little brown chert, little brown limestone.
495	500	Dense gray, brown and mottled chert, brownish gray limestone. Number of sludge samples - 58 Number of assay samples - 6 Set 50 feet of 8-1/4" and 312 feet of 6-1/4" casing.

Analysis, percent

		<u>Zinc</u>	<u>Lead</u>
425	430	1.06	0.01
430	432-1/2	.30	.01
432-1/2	435	.26	.03
435	437-1/2	.20	.01
437-1/2	440	.12	.01
440	442-1/2	.04	.01

Hole R-12 (SE-1/4 SE-1/4)

Started: 2/15/50
 Completed: 2/24/50
 Coordinates: 11036N-9765E

Struck water: 40, 265 and 390 ft.
 Water stands: 245 ft.
 Elevation: 890 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	10	Soft and clay.
10	40	Sandstone.
40	265	Shale.
265	275	Sandstone.
275	290	Shale.
290	305	Gray limestone, some gray chert.
305	310	Gray limestone, very little gray chert.
310	315	Gray chert, gray limestone, shelly.
315	320	Gray limestone, gray and little mottled chert.
320	325	Gray limestone, little gray chert.
325	330	Light gray limestone, gray chert.
330	340	Gray limestone, gray chert.
340	345	Do.

Hole R-12. (Cont.)

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
345	350	Gray chert, gray limestone.
350	355	Gray chert, gray and tan limestone.
355	360	Gray and white chert, tan limestone.
360	365	Do.
365	370	Gray, brown and white chert, some gray limestone.
370	375	Light gray and tan limestone, light gray chert.
375	380	Tan and gray limestone, gray and white chert.
380	385	Gray limestone, gray chert.
385	390	Gray chert, gray limestone.
390	400	Gray and some blue chert, tan limestone.
400	410	Gray and blue chert, brown limestone.
410	415	Gray, blue and some mottled chert, brown and gray limestone, little selvage.
415	420	Gray and brown chert, brown limestone, calcite.
420	425	Gray, brown, and mottled chert, brown limestone.
425	430	Gray and brown chert, very little brown limestone.
430	435	Gray chert, little calcite.
435	445	Gray and little brown chert, calcite.
445	450	Gray, light-gray, and brown chert, calcite, trace zinc.
450	455	Gray and brown chert, little brown jasperoid, thin zinc shines.
455	457-1/2	Gray, brown, and little mottled chert, trace zinc.
457-1/2	460	Gray, brown, and translucent chert, faint trace zinc.
460	465	Gray, brown, and translucent chert, very faint trace zinc.
465	470	Gray and brown translucent chert.

Analysis, percent

	<u>Zinc</u>	<u>Lead</u>
450 455	0.56	0.04
455 457-1/2	0.16	0.03

Hole R-13 (SE-1/4 SE-1/4)

Started: 2/14/50

Completed: 2/21/50

Coordinates: 11239N-9668E

Struck water: 140 and 340 ft.

Water stands: 240 ft.

Elevation: 886 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	40	Sandstone.
40	286	Shale.
286	292	Gray chert, iron pyrites.
292	315	Shale.
315	320	Gray limestone, little gray chert, shale, calcite, iron.
320	325	Gray limestone, gray chert, iron pyrites, calcite.
325	330	Gray and tan limestone, little gray chert, iron pyrites, calcite.

Hole R-13 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
330	335	Gray chert, gray limestone, iron pyrites, calcite.
335	340	Gray chert, some tan limestone.
340	345	Loose white and light gray chert.
345	350	Gray chert, gray limestone-shale seams, calcite.
350	355	Gray and white chert, gray limestone, calcite (shale seams), gray selvage, iron pyrites.
355	370	Shale, chert, gray limestone, calcite, iron pyrites, selvage.
370	375	Loose dull gray chert, calcite.
375	395	Loose dull gray chert, tar, calcite.
395	400	Loose dull gray chert, selvage, calcite.
400	405	Gray, brown and mottled chert, tan limestone, calcite.
405	415	Gray, brown, some blue mottled chert, tan limestone.
415	420	Gray, little brown, blue and mottled chert, brown limestone, calcite, gray selvage, trace iron.
420	425	Gray chert, very little gray limestone, calcite, thin lead shines.
425	427-1/2	Gray, brown and some mottled chert, faint trace lead.
427-1/2	430	Gray, little brown and mottled chert, gray selvage, faint trace lead.
430	440	Dull gray and brown chert, little brown selvage, calcite.
440	450	Gray, little brown chert, trace calcite.
450	455	Gray, brown and mottled chert.
455	460	Gray, brown and some mottled chert.
460	465	Gray and brown chert.
465	470	Gray, brown and some translucent chert.
470	475	Gray, brown and translucent chert.
		Set 60 feet of 8-1/4", 320 feet of 6-1/4", and 424 feet of 4-7/8" casing.

Analysis, percent

		<u>Zinc</u>	<u>Lead</u>
420	425	0.38	1.18

Hole R-14 (SE-1/4 SE-1/4)

Started: 2/22/50
 Completed: 3/1/50
 Coordinates: 11198N-9738E

Struck water: 30, 140 and 345 ft.
 Water stands: 240 ft.
 Elevation: 887 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	8	Soil and clay.
8	15	Sandstone.
15	25	Sandstone, clay seams.
25	38	Sandstone.
38	280	Shale.
280	290	Sandstone.
290	308	Shale, iron pyrites, calcite.

Hole R-14 (Cont.)

Depth, From-	ft. To-	Formation
308	325	Gray limestone, selvage, iron pyrites.
325	335	Gray limestone, little gray chert, selvage, iron pyrites.
335	340	Loose gray chert, gray limestone, selvage, iron pyrites.
340	350	Gray chert, little gray limestone, selvage, calcite, iron pyrites.
350	360	Loose dull gray chert, little gray limestone, much calcite, iron pyrites, selvage.
360	365	Loose dull gray chert, gray limestone, calcite.
365	370	Gray and little brown chert, calcite.
370	375	Gray limestone, gray chert, calcite.
375	385	Gray and some tan limestone, gray chert, calcite, selvage.
385	390	Gray, little tan and mottled chert, gray and tan limestone, calcite.
390	395	Gray, blue and little brown chert, brown limestone, calcite.
395	400	Gray and blue chert, brown limestone, calcite, selvage.
400	410	Gray and brown chert, little brown limestone, calcite, iron pyrites, very faint trace lead.
410	415	Gray, brown and mottled chert, little tan limestone, calcite, iron pyrites, very faint trace lead.
415	420	Gray and brown chert, calcite, very faint trace lead.
420	435	Gray and brown, little mottled chert, calcite, iron pyrites.
435	440	Gray and brown chert, leached gray sandstone, calcite, very faint trace zinc, marcasite.
440	450	Gray and brown chert, gray leached sandstone, calcite, marcasite, very faint trace zinc.
450	455	Gray, brown and some translucent chert, little gray sandstone, calcite.
455	460	Gray, brown and some translucent chert.
460	470	Gray, brown and translucent chert, calcite.
		Number of sludge samples - 66
		Number of assay samples - 0
		Set 60 feet of 8-1/4" and 308 feet of 6-1/4" casing.

Hole R-15 (SE-1/4 SE-1/4)

Started: 2/25/50	Struck water: 80, 140, and
Completed: 3/4/50	370 ft.
Coordinates: 11134N-9466E	Water stands: 247 ft.
	Elevation: 887 ft.

Depth, From-	ft. To-	Formation
0	15	Soil and clay.
15	366	Shale, sandstone streaks.
366	368	Gray limestone, little gray chert and iron pyrites.
368	370	Do.
370	375	Gray limestone, gray chert and iron pyrites.
375	380	Do.

Hole R-15 (Cont.)

Depth, ft.	Formation	
<u>From-</u>	<u>To-</u>	
380	385	Gray chert, gray limestone and iron pyrites.
385	390	Cotton rock, gray chert, gray limestone.
390	395	Loose dull gray chert, cotton rock, gray limestone.
395	400	Do.
400	405	Cotton rock, gray chert, gray limestone.
405	410	Do.
410	415	Gray, brown, and some mottled chert, gray limestone.
415	420	Gray, some blue, brown, and mottled chert, little calcite.
420	425	Gray, brown, and little white and mottled chert, little calcite.
425	430	Gray, brown chert, some brown limestone, little calcite.
430	435	Gray and brown chert, little brown jasperoid and marcasite.
435	440	Gray, brown, and little blue chert and calcite.
440	445	Loose gray, brown, and little mottled chert.
445	450	Gray and brown chert, little calcite.
450	455	Gray, little brown, and translucent chert.
455	460	Gray and brown chert.
460	465	Gray, brown, and some translucent chert, calcite.
465	470	Gray, brown, and translucent chert, little brown limestone.
		Number of sludge samples - 50
		Number of assay samples - 0
		Set 50 feet of 8-1/4" and 225 feet of 6-1/4", 380 feet of 4-1/8" casing.

Hole R-16 (NE-1/4 SE-1/4)

Started: 3/3/50
 Completed: 3/18/50
 Coordinates: 11340N-9302E

Struck water: 20, 50, and 382 ft.
 Water stands: 245 ft.
 Elevation: 884 ft.

Depth, ft.	Formation	
<u>From-</u>	<u>To-</u>	
0	10	Soil and clay.
10	25	Sandstone.
25	40	Shale.
40	55	Sandstone, shale seems.
55	150	Shale.
150	160	Shale, gray sandstone (gas 150 to 155).
160	230	Shale.
230	235	Gray sandstone.
235	245	Brown sandstone.
245	260	Shale, iron pyrites.
260	265	Gray limestone, iron pyrites.
265	270	Gray and brown limestone, gray and blue chert.
270	275	Gray limestone, gray and tan chert.
275	280	Dark gray and brown limestone, gray and tan chert.
280	285	Dark gray and brown limestone, gray and blue chert.
285	290	Dark gray and gray limestone, gray chert.

Hole R-16 (Cont.)

Depth, ft.		Formation
From-	To-	
290	295	White chert, gray limestone.
295	300	Do.
300	305	Light tan gray limestone, gray chert.
305	310	Gray limestone, gray chert.
310	315	Do.
315	320	Gray chert, gray limestone.
320	325	Gray, little tan limestone, gray chert.
325	330	Tan and gray limestone, gray chert.
330	335	Light gray and gray chert, tan limestone.
335	345	Gray, little brown and mottled chert, tan and gray limestone.
345	350	Dense gray chert, gray and brown limestone.
350	360	Gray and some blue chert, brown limestone.
360	365	Gray and blue chert, brown limestone.
365	370	Dark blue, gray and brown chert, brown limestone.
370	375	Brown and dark gray limestone, gray and blue chert.
375	380	Dark brown and gray limestone, gray chert.
380	385	Gray, brown chert, brown jasperoid, little brown limestone, thin lead shines.
385	390	Gray, brown and mottled chert, little jasperoid, faint trace lead.
390	392-1/2	Gray, brown and mottled chert, jasperoid, faint trace lead.
392-1/2	395	Dull gray, little brown chert.
395	415	Dull gray, little brown and mottled chert.
415	420	Gray and brown and some mottled chert.
420	425	No cuttings.
425	430	Dull gray chert, gray limestone, very few cuttings.
430	435	Gray limestone, gray chert, very few cuttings.
435	440	Tan and gray limestone, tan and little gray chert.
440	445	Tan and gray limestone, gray chert, little dolomite and calcite.
445	455	Dull gray, little brown and mottled chert, little gray limestone.
455	465	Gray, brown and some translucent chert, little brown and gray limestone.
465	469	No cuttings - lost in opening.
469	471	Opening - no cuttings.
471	475	Brown limestone, calcite, white selvage.

Remarks: Formations firm to 420 feet; open from 420 to 435 feet; firm from 435 to 465 feet; open from 465 to 471 feet; firm from 471 to 475 feet.
Hole apparently outside of altered area.

Number of sludge samples - 73
Number of assay samples - 2
Set 60 feet of 8" and 265 feet of 6" casing.

Analysis, percent

		Lead
380	385	0.49
385	390	.07

Stover Property
(sec. 33, T. 34 S., R. 23 E., Cherokee County, Kans.)

Hole S-1 (NW-1/4)

Started: 11/22/49
Completed: 12/1/49
Coordinates: 9574N-10120E

Struck water: 40 and 290 ft.
Water stands: 50 ft.
Elevation: 885.92 ft.

Depth, ft.		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil clay, gravel.
7	15	Brown sandstone, clay.
15	20	Clay and sandstone.
20	260	Cherokee shale.
260	275	Gray Chester limestone, iron pyrites.
275	280	Gray Chester limestone, very little gray chert and iron pyrites.
280	285	Gray Chester limestone, white chert, trace iron pyrites.
285	300	Gray Chester limestone, very little white chert, trace iron pyrites.
300	305	Gray Chester limestone.
305	310	Gray Chester limestone, white chert.
310	315	Gray Chester limestone, white chert, bottom Chester.
315	320	Gray and tan limestone, white chert.
320	330	Gray and white chert, tan and gray limestone.
330	340	Gray and tan limestone, gray and white chert.
340	345	Gray and tan limestone, gray and white chert, trace marcasite.
345	355	Gray and tan limestone, gray and white chert.
355	360	Gray and brown chert, tan limestone.
360	365	Gray and brown chert, tan, gray limestone.
365	375	Blue and gray chert, brown and gray limestone.
375	380	Gray, blue and brown chert, brown limestone, some J glauconitic limestone, shale, trace iron pyrites.
380	385	Brown limestone, some gray and blue chert (M bed).
385	390	Brown limestone, very little gray chert.
390	395	Brown limestone, thin shale seams, trace marcasite.
395	400	Gray and brown limestone, thin shale seams, trace marcasite.
400	405	Gray, brown and blue chert, thin shale seams.
405	410	Gray, brown and some translucent chert, some gray limestone.
410	415	Gray, brown and some translucent chert, some dull white chert, little mottled chert (N bed).
415	425	Dull gray and white, some brown chert, translucent chert.
		Number of sludge samples - 45
		Number of assay samples - 0
		Set 276 feet of 6-1/4" casing.

PRIVATE DRILLING CHURN-DRILL HOLE LOGS

J. B. Goodrich Property

(W-1/2 NW-1/4 sec. 28; SW-1/4 sec. 28,
T. 34 S., R. 23 E., Cherokee County, Kans.)

F. E. Davis, driller

Hole C-1

Started: 8/5/29
Completed: 8/21/29
Depth to water: 25 ft.

Location: 1275 ft. S, 725 ft.
E of NW corner of
W-1/2 NW-1/4
Elevation: 900 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	260	Soapstone.
260	270	Gray lime.
270	355	Gray lime, some flint.
355	375	Brown lime, little flint.
375	380	Brown lime, considerable flint.
380	400	White, dead-looking flint.
400	405	Brown oolitic lime.
405	450	Gray and brown lime, some flint.
450	470	Mostly blue and dark-colored flint, some lime.
470	475	Dark-colored flint and lime.

Hole C-2

Started: 8/21/29
Completed: 9/18/29
Depth to water: 360 ft.

Location: 850 ft. S, 150 ft. W
of hole C-1
Water stands: 140 ft.
Elevation: 890 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	252	Soapstone.
252	265	Gray lime.
265	340	White and gray lime, some flint.
340	355	Brown lime, little flint.
355	365	Blue and brown flint, little jack, shines lead.
365	370	Blue and brown flint, little jack, shines lead, considerable jack.
370	375	White and brown flint, shines jack.
375	395	White flint.
395	400	Brown oolitic lime.
400	435	Mostly brown lime.
435	480	Blue and dull-colored flint, little lime.
480	488	Dark-colored lime and flint.

Hole C-2 (Cont.)

<u>Depth, ft.</u>		<u>Analysis, percent</u>
<u>From-</u>	<u>To-</u>	<u>ZnS (60%)</u>
360	365	1.63
365	370	3.64

Hole C-3

Started: 9/18/29
 Completed: 9/26/29
 Depth to water: 20 and 362 ft.

Location: 250 ft. S, 230 ft.
 W of hole C-2
 Water stands: 155 ft.
 Elevation: 888 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	258	Soaps tone.
258	340	White and gray lime, some flint.
340	355	Brown lime, some flint.
355	360	Black lime, some flint.
360	362-1/2	Black flint, some mundic, shines lead.
362-1/2	365	Blue and brown flint, some mundic.
365	367-1/2	Blue flint, mundic, shines jack and lead.
367-1/2	370	Blue and little brown flint, considerable jack, shines lead.
370	372-1/2	Coarse blue flint, little jack.
372-1/2	380	Blue flint, shines jack.
380	385	Lighter-colored blue flint.
385	390	Blue flint, some siliceous oolite.
390	395	Brown oolitic lime.
395	403	Brown lime.

		<u>Analysis, percent</u>
		<u>ZnS (60%)</u>
367-1/2	370	4.70

Hole C-4

Started: 9/26/29
 Completed: 10/4/29
 Depth to water: 20, 300 and 360 ft.

Location: 175 ft. N, 50 ft.
 E of hole C-3
 Water stands: 160 ft.
 Elevation: 884 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	247	Soaps tone.
247	255	Gray, sandy lime.
255	345	White and gray lime, some flint.
345	355	Black and brown lime, some flint.
355	357-1/2	Black lime, some black and blue flint, shines jack.
357-1/2	360	Blue and brown flint, considerable jack.
360	362-1/2	Do.
362-1/2	365	Blue and brown flint, ros in jack.
365	370	Blue and white flint.
370	390	White flint.
390	393	Brown oolitic lime.
4399		

Hole C-4 (Cont.)

Depth, ft.		Analysis, percent
From-	To-	ZnS (60%)
357-1/2	360	2.00
360	362-1/2	1.35
362-1/2	365	10.00

Hole C-5

Started: 10/4/29
 Completed: 10/16/29
 Depth to water: 30 and 377 ft.

Location: 235 ft. S, 85 ft. E
 of hole C-2
 Water stands: 160 ft.
 Elevation: 893 ft.

Depth, ft.		Formation
From-	To-	
0	268	Soapstone.
268	280	Gray lime.
280	345	Gray lime, some flint.
345	375	Brown lime, little flint.
375	378	Blue flint, some lime, shines jack.
378	385	Blue flint, mundic, shines jack.
385	400	Dull-colored flint.
400	412	Mostly brown colitic lime.
		No gas encountered.

Hole C-6

Started: 10/16/29
 Completed: 10/24/29
 Depth to water: 32 and 362 ft.

Location: 125 ft. W, 75 ft. N
 of hole C-3
 Water stands: 160 ft.
 Elevation: 887 ft.

Depth, ft.		Formation
From-	To-	
0	250	Soapstone.
250	260	Gray, sandy lime.
260	335	White and gray lime, some flint.
335	355	Gray and brown lime, some flint.
355	360	Black lime and flint.
360	362-1/2	Black flint, considerable jack.
362-1/2	365	Blue and brown flint, good jack.
365	367-1/2	Blue flint, little jack.
367-1/2	370	Blue flint, trace jack.
370	375	Blue and brown flint, shines jack.
375	386	White, dead-looking flint.
		Gas encountered from 250 to 255 feet.

Analysis, percent		
ZnS (60%)		
360	362-1/2	4.20
362-1/2	365	3.67
365	367-1/2	2.77

Hole C-7

Started: 10/24/29
 Completed: 11/4/29
 Depth to water: 30 and 361 ft.

Location: 130 ft. W, 220 ft.
 N of hole C-6
 Water stands: 160 ft.
 Elevation: 884 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soapstone.
250	260	Gray, sandy lime.
260	335	White and gray lime, some flint.
335	355	Gray and brown lime, some flint.
355	360	Black flint, shines jack and lead.
360	362-1/2	Blue and some brown flint, considerable mundic, trace lead.
362-1/2	365	Blue and some brown flint, little mundic.
365	370	Blue and trace of brown flint.
370	388	Dead-looking flint.
388	390	Brown oolitic lime.
Gas encountered from 250 to 255 feet.		

Analysis, percent

		<u>ZnS</u>
360	362-1/2	1.12

Hole C-8

Started: 11/4/29
 Completed: 11/12/29
 Depth to water: 30 and 362 ft.

Location: 100 ft. S of hole
 C-7
 Water stands: 160 ft.
 Elevation: 887 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	251	Soapstone.
251	270	Gray sandy lime.
270	280	White flint and gray lime, oil streaks.
280	340	White and gray lime, some flint.
340	355	Brown lime, little flint.
355	362-1/2	Black lime, little black flint.
362-1/2	367-1/2	Coarse blue flint, some pink spar, shines jack.
367-1/2	375	Blue and little brown flint, shines jack.
375	390	White, dull-colored flint.
390	395	Brown oolitic lime.

Hole C-9

Started: 11/12/29
 Completed: 11/30/29
 Depth to water: 265 ft.

Location: 170 ft. E, 80 ft. N
 of hole C-7
 Water stands: 170 ft.
 Elevation: 883 ft.

Depth, ft.	From-	To-	<u>Formation</u>
	0	250	Soapstone.
	250	260	Gray, sandy lime.
	260	280	Gray, sandy lime, some flint, oil and gas streaks.
	280	290	White flint.
	290	300	White and light-blue flint, tar streaks.
	300	315	White and light-blue flint.
	315	335	Loose, blue and white flint.
	335	345	Do.
	345	365	Blue flint.
	365	375	Blue, trace of brown flint, shines jack.
	375	390	Dull-colored flint.
	390	395	Brown oolitic lime.

Set 4-7/8" casing at 330 feet because of hogchaw in hole.
 Gas encountered from 250 to 260 feet.
 Packers were set at 262 and 242 feet - this well was tubed.

Hole C-10

Started: 11/26/29
 Completed: 12/6/29
 Depth to water: 35 and 367 ft.

Location: 150 ft. S of hole C-8
 Water stands: 150 ft.
 Elevation: 888 ft.

Depth, ft.	From-	To-	<u>Formation</u>
	0	250	Soapstone.
	250	260	Gray, sandy lime.
	260	280	Gray lime, some flint, oil and gas streaks.
	280	340	Gray lime, some flint.
	340	355	Brown lime, some flint.
	355	365	Black lime.
	365	370	Blue flint, shines jack and lead.
	370	375	No cuttings.
	375	385	Dull-colored flint, shines zinc and jack.
	385	395	Do.
	395	399	Brown oolitic lime.

Some gas encountered from 250 to 260 feet.

Hole C-11

Started: 11/30/29
 Completed: 12/11/29
 Depth to water: 30 and 365 ft.

Location: 50 ft. N, 75 ft. W
 of hole C-2
 Water stands: 170 ft.
 Elevation: 888 ft.

<u>Depth,</u>	<u>ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>		
0	254	Soaps tone	
254	265	Gray, sandy lime.	
265	345	Gray lime, some flint.	
345	360	Brown lime, some flint.	
360	365	Black lime, little flint.	
365	367-1/2	Brown and black flint, good jack.	
367-1/2	370	Blue and some brown flint, trace jack.	
370	375	Blue and some brown flint, shines jack.	
375	390	White, dull-colored flint.	
390	395	Brown, oolitic lime.	
395	402	Mostly brown lime.	

Analysis, percent

		<u>ZnS</u>
365	367-1/2	5.67
367-1/2	370	1.00

Hole C-12

Started: 12/7/29
 Completed: 12/17/29
 Depth to water: 367 ft.

Location: 105 ft. S, 15 ft.
 W of hole C-6
 Water stands: 150 ft.
 Elevation: 889 ft.

<u>Depth,</u>	<u>ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>		
0	251	Soaps tone.	
251	260	Gray, sandy lime.	
260	335	White and gray lime, some flint.	
335	355	Gray and brown lime, some flint.	
355	365	Brown and black lime, little flint.	
365	367-1/2	Black lime, shines lead.	
367-1/2	375	Blue flint, shines jack.	
375	395	Dull-colored flint.	
395	400	Brown oolitic lime.	

Some gas encountered from 250 to 260 feet.

Hole C-13

Started: 12/17/29
 Completed: 1/6/30
 Depth to water: 30 and 368 ft.

Location: 150 ft. S of hole
 C-3
 Water stands: 200 ft.
 Elevation: 892 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	259	Soapstone.
259	265	Gray, sandy lime.
265	290	White flint, gray lime, tar streaks.
290	350	Gray lime, some flint.
350	365	Brown lime, some flint.
365	370	Brown and black lime, little flint.
370	372-1/2	Blue flint, good jack.
372-1/2	375	Blue, brown and black chatty flint, rosin jack.
375	377-1/2	White, blue and little brown flint, little jack.
377-1/2	390	Blue flint, trace jack.
390	400	White, dead-looking flint.
400	405	Brown lime.

Hole was shot from 370 to 376 feet and the cuttings averaged 9.73 ZnS.
 Little gas encountered from 259 to 265 feet.

Analysis, percent

		<u>ZnS</u>
370	372-1/2	6.90
372-1/2	375	11.33
375	377-1/2	1.50

Hole C-14

Started: 1/6/30
 Completed: 1/28/30
 Depth to water: 372 ft.

Location: 75 ft. E of hole
 C-13
 Water stands: 160 ft.
 Elevation: 892 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	262	Soapstone.
262	275	Gray lime.
275	350	White and gray lime, some flint.
350	367	Brown lime, some flint.
367	370	Black lime, little flint.
370	372-1/2	Coarse, blue and little brown flint.
372-1/2	375	Blue and little brown flint, mundic, shines jack.
375	385	White, blue and little brown flint, shines jack.
385	395	White, dull-colored flint.
395	400	Brown oolitic lime.

Very little gas encountered in this hole.

Hole C-15

Started: 1/28/30
 Completed: 2/6/30
 Depth to water: 40 and 370 ft.

Location: 75 ft. W of
 hole C-13
 Water stands: 160 ft.
 Elevation: 892 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	258	Soaps tone.
258	270	Gray, sandy lime, little gas.
270	285	Gray lime, white flint, streaks of tar.
285	350	White and gray lime, some flint.
350	365	Brown lime, little flint.
365	370	Black lime.
370	380	Blue and little brown flint, shines jack.
380	385	Blue flint.
385	395	White, dull-colored flint.
395	400	Brown oolitic lime.
400	410	Brown lime, some flint.

Hole C-16

Started: 2/6/30
 Completed: 2/24/30
 Depth to water: 40 and 290 ft.

Location: 90 ft. N, 150 ft. E
 of hole C-9
 Water stands: 150 ft.
 Elevation: 887 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	248	Soaps tone.
248	260	Gray lime, considerable gas.
260	280	Gray lime, white flint, tar streaks.
280	330	White and gray lime, some flint.
330	340	White flint, tar streaks.
340	355	Shelly, blue and white flint, tar streaks.
355	365	Blue and little brown flint.
365	367-1/2	Blue and little brown flint, shines lead.
367-1/2	372-1/2	Coarse, blue flint, shines jack and lead.
372-1/2	385	Dull-colored flint.
385	398	Mostly brown limo.

Hole C-17

Started: 2/24/30
 Completed: 3/6/30
 Depth to water: 30, 325 and 370 ft.

Location: 125 ft. E of
 hole C-16
 Water stands: 150 ft.
 Elevation: 889 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	249	Soaps tone.
249	260	Gray, sandy lime, considerable gas.
260	285	Brown lime, little flint.

Hole C-17 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
285	325	White and gray lime, some flint.
325	340	White, chalky flint.
340	345	Loose, coarse, blue flint.
345	350	Blue and white flint.
350	360	Loose, coarse, blue flint.
360	365	Blue and white flint.
365	370	Blue, white, some brown and black flint, shines jack.
370	372-1/2	Blue and little brown flint, shines jack and lead.
372-1/2	375	Blue and little brown flint, trace lead.
375	390	White, dull-colored flint.
390	400	Mostly brown lime.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
370	372-1/2	1.13	1.66
372-1/2	375	.67	.75

Hole C-18

Started: 3/6/30
 Completed: 3/20/30
 Depth to water: 30, 300, and 370 ft.

Location: 125 ft. E. of
 hole C-17
 Water stands: 150 ft.
 Elevation: 893 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	257	Soapstone.
257	265	Gray, sandy lime, little gas.
265	275	Gray, sandy lime, trace of flint.
275	300	White flint and lime.
300	310	White flint.
310	320	White flint, streaks of tar.
320	345	White flint.
345	355	White and blue flint.
355	360	No cuttings.
360	375	Blue and trace of brown flint, mundic.
375	377-1/2	Blue and brown flint, little jack.
377-1/2	380	No cuttings.
380	395	White flint.
395	407	Brown lime and flint.

Hole C-19

Started: 3/20/30
 Completed: 3/29/30
 Depth to water: 35, 310 and 380 ft.

Location: 170 ft. E, 110 ft.
 N of hole C-2
 Water stands: 150 ft.
 Elevation: 897 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	262	Soapstone.
262	370	Gray, sandy lime.
270	290	Gray, sandy lime, trace of flint.
290	310	White flint and lime.
310	355	Loose white flint.
355	380	Loose blue and white flint.
380	382-1/2	Blue flint, shines jack.
382-1/2	385	Blue flint, considerable jack.
385	387-1/2	Blue flint, shines jack.
387-1/2	400	White and blue flint, shines jack.
400	403	Brown lime and flint.

Analysis, percent

382-1/2	385	<u>ZnS</u> 4.07
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Hole C-20

Started: 3/29/30
 Completed: 4/7/30
 Depth to water: 35 and 365 ft.

Location: 185 ft. S of
 hole C-15
 Water stands: 250 ft.
 Elevation: 897 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	265	Soapstone.
265	275	Gray, sandy lime.
275	295	White lime and flint, tar streaks.
295	355	White and gray lime, some flint.
355	365	Gray and brown lime, some flint.
365	372-1/2	Brown lime, some blue flint
372-1/2	375	Brown lime, blue flint, mud and shale streaks.
375	377-1/2	Blue flint, some brown and black lime, mud seams, shines lead.
377-1/2	380	Blue flint and mundic.
380	382-1/2	Blue and brown flint, trace jack.
382-1/2	390	Blue flint, shines jack.
390	405	White, dull-colored flint.
405	410	Brown oolitic lime.

Little gas was encountered from 280 to 285 feet.

Hole C-21

Started: 3/29/30
 Completed: 4/9/30
 Depth to water: 30 and 367 ft.

Location: 150 ft. N of
 hole 0-17
 Water stands: 150 ft.
 Elevation: 888 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	247	Soapstone.
247	255	Gray, sandy lime.
255	275	White lime and flint, tar seams.
275	300	White flint, trace of lime.
300	340	White flint and lime.
340	367-1/2	Brown lime, some flint.
367-1/2	372-1/2	Blue flint, shines jack and lead.
372-1/2	375	Blue flint.
375	390	White, dull-colored flint.

Little gas was encountered at 255 feet.

Baxter Springs Drilling Co., drillers

Hole C-22

Started: 4/7/30
 Completed: 4/15/30
 Depth to water: 377 ft.

Location: 100 ft. E of
 hole C-20
 Water stands: 225 ft.
 Elevation: 897 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	265	Soapstone.
265	275	Gray, sandy lime.
275	360	White and gray lime, some flint.
360	375	Brown lime, some flint.
375	377-1/2	Black lime, some flint.
377-1/2	380	Blue and little brown flint, mundic, shines jack.
380	382-1/2	Blue and little brown flint, trace jack.
382-1/2	385	Blue and little brown flint, shines jack and lead.
385	387-1/2	Blue, white and brown flint, considerable jack.
387-1/2	390	Blue and some brown flint, little jack.
390	392-1/2	Blue flint, trace jack.
392-1/2	407	Blue flint, shines jack.
407	410	Brown lime and flint.

Analysis, percent

		<u>ZnS</u>
385	387-1/2	3.20
387-1/2	390	1.43

Hole C-23

Started: 4/9/30
 Completed: 4/17/30
 Depth to water: 60 and 362 ft.

Location: 190 ft. W, 50 ft.
 N of hole C-21
 Water stands: 150 ft.
 Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soapstone.
250	260	Gray, sandy lime, little gas.
260	280	Gray, sandy lime, little gas, trace of flint.
280	340	White and gray lime, some flint.
340	350	Brown lime, some flint.
350	362-1/2	Black lime, little flint.
362-1/2	365	Blue and trace of brown flint, considerable jack.
365	367-1/2	Blue and trace of brown flint, trace jack.
367-1/2	370	Blue and trace of brown flint, rosin jack.
370	372-1/2	White, dull-colored flint, trace jack.
372-1/2	381	White, dull-colored flint.

Analysis, percent

		<u>ZnS</u>
362-1/2	365	4.34
365	367-1/2	1.10
367-1/2	370	15.70

Hole C-24

Started: 4/15/30
 Completed: 4/22/30
 Depth to water: 20 and 380 ft.

Location: 75 ft. E of
 hole C-22
 Water stands: 225 ft.
 Elevation: 898 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	265	Soapstone.
265	285	Gray lime.
285	295	White lime and flint, oil streaks.
295	360	White and gray lime, some flint.
360	375	Brown lime, some flint.
375	380	Black lime, some brown and black flint, trace jack.
380	382-1/2	Blue and black flint, some pink spar and sparry lime (rich jack).
382-1/2	385	Hard blue flint, trace of pink spar, trace jack.
385	387-1/2	Blue and little brown flint, mundic, shines jack and lead.
387-1/2	395	Blue flint, mundic, shines jack.
395	410	Blue flint.
410	415	Brown oolitic lime.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
380	382-1/2	7.33	
382-1/2	385	1.10	
385	387-1/2	0.54	0.12

Hole C-25

Started: 4/17/30
 Completed: 4/25/30
 Depth to water: 30, 265 and 325 ft.

Location: Approximately 75 ft.
 W of hole C-23
 Water stands: 150 ft.
 Elevation: 883 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	247	Soapstone.
247	250	Soapstone, some gray limestone.
250	280	Gray limestone.
280	315	White and some gray limestone.
315	355	White, gray limestone and blue flint.
355	362-1/2	Gray and blue flint, little iron, loose ground.
362-1/2	365	Dark gray and blue flint, loose ground, trace jack (chatty).
365	367-1/2	Dark gray and blue flint, few shines jack.
367-1/2	372-1/2	Dark gray and blue flint, rather loose, few shines jack.
372-1/2	390	Blue and some white flint.
390	392-1/2	Brown oolitic lime.

Hole C-26

Started: 4/22/30
 Completed: 4/30/30
 Depth to water: 20, 180 and 382 ft.

Location: 75 ft. E. of
 hole C-24
 Water stands: 200 ft. (strong)
 Elevation: 898 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	268	Soil and soapstone.
268	280	Gray limestone.
280	285	Gray and white limestone, little flint.
285	290	Gray and white limestone, trace of oil.
290	360	Gray and white limestone, some blue and white flint.
360	370	Gray and brown lime, some dark flint.
370	380	Brown lime, some dark flint.
380	382-1/2	Blue and white honeycomb flint, open ground, little chatty jack.
382-1/2	385	Blue and white flint, some mundic.
385	387-1/2	Hard blue and black flint, considerable chatty jack.
387-1/2	392-1/2	Blue, brown and white flint.
392-1/2	400	White, blue, some brown flint, mundic, shines jack.
400	405	White and blue flint.
405	411	Brown oolitic lime, little blue flint.

Hole C-27

Started: 4/25/30
 Completed: 5/5/30
 Depth to water: 40 and 360 ft.

Location: 75 ft. E of
 hole C-23
 Water stands: 150 ft. (strong)
 Elevation: 886 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	246	Clay and soapstone.
246	255	Soapstone and gray lime.
255	275	Gray limestone, oily streaks.
275	295	White and some gray limestone.
295	335	White and gray limestone, blue and some white flint.
335	350	Brown and gray limestone, blue flint.
350	360	Brown limestone, some blue and dirty white flint.
360	362-1/2	Dirty white and blue flint, little mundic, zinc ore, red, shines jack, little lead.
362-1/2	365	Black and white flint, little chatty jack, shines lead.
365	367-1/2	Black and white flint, shines lead.
367-1/2	375	Dirty white water flint.
375	385	Dirty white and some blue flint.
385	390	Brown oolitic lime, some flint.
390	396	Brown oolitic lime, little blue flint.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
362-1/2	365	1.70	0.35
365	367-1/2	.67	.20

Hole C-28

Started: 4/30/30
 Completed: 5/8/30
 Depth to water: 20 and 379 ft.

Location: 95 ft. S of
 hole C-24
 Water stands: 220 ft.
 Elevation: 898 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	268	Soapstone.
268	285	Gray lime, little selvage.
285	360	White and gray lime, some flint.
360	370	Brown lime, some blue and white flint.
370	375	Brown lime, some blue and white flint, trace jack.
375	380	Black lime, green selvage, some flint, shines jack and lead.
380	385	Dark flint, little soap, considerable mundic, shines jack.
385	390	Dark flint, chatty, shines jack.
390	400	Hard, dark and some white flint.
400	405	Dirty white and blue flint.
405	410	Brown oolitic lime, some flint.

Hole C-29

Started: 5/5/30
 Completed: 5/13/30
 Depth to water: 100 and 365 ft.

Location: 95 ft. N, 35 ft. W
 of hole C-23
 Water stands: 150 ft.
 Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soapstone.
250	260	Gray, sandy lime, considerable gas.
260	335	Gray lime, some flint.
335	340	Brown, blue and white flint, shines jack.
340	350	Brown lime, blue and white flint.
350	355	Black and brown lime.
355	362-1/2	Brown and gray lime, some blue flint.
362-1/2	365	Dirty white and brown flint, loose, shines lead.
365	367-1/2	White, brown and black flint, little jack, shines lead.
367-1/2	370	White, brown and black flint, loose, shines jack.
370	372-1/2	White and brown flint, shines jack and lead.
372-1/2	385	White and some brown flint.
385	391	Brown oolitic lime, some flint.

Hole C-30

Started: 5/8/30
 Completed: 5/16/30
 Depth to water: 35 and 345 ft.

Location: 100 ft. E, 65 ft. S
 of hole C-2
 Water stands: 150 ft.
 Elevation: 893 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	264	Soapstone.
265	270	Gray, sandy lime.
270	275	Gray, sandy lime, trace of flint.
275	340	White, gray lime, dirty flint.
340	345	White flint, little lime.
345	360	Gray and brown lime, some flint.
360	370	Brown lime, some flint.
370	375	Black lime, some flint.
375	380	Brown lime, some flint.
380	382-1/2	Blue and little brown flint, little jack and lead.
382-1/2	385	Blue and little brown flint, little jack, trace lead.
385	396	White, dead-looking flint.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
380	382-1/2	2.00	0.90
382-1/2	385	1.85	.55

Hole C-31

Started: 5/13/30
 Completed: 5/21/30
 Depth to water: 100 and 364 ft.

Location: 80 ft. E of
 hole C-29
 Water stands: 160 ft.
 Elevation: 886 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soapstone.
250	255	Gray, sandy lime, trace of gas.
255	265	Gray, sandy lime, trace of flint.
265	280	White lime and flint, tar streaks.
280	335	White and gray lime, some flint.
335	350	Gray and brown lime, some flint.
350	362-1/2	Brown and black lime, some flint.
362-1/2	365	Blue and some brown flint, shines jack and lead.
365	370	Coarse, blue and little brown flint, shines jack and lead.
370	388	White, dull-colored flint.

Hole C-32

Started: 5/16/30
 Completed: 5/23/30
 Depth to water: 40 ft.

Location: 120 ft. S, 40 ft. E.
 of hole C-19
 No deep water - hole dry.
 Elevation: 897 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	269	Soapstone.
269	280	Gray lime.
280	355	White and gray lime, some flint.
355	370	Brown lime, some flint.
370	385	Brown and black lime, some flint.
385	390	Blue and little brown flint, trace of lime, shines jack.
390	410	Dead-looking flint, little lime.
410	415	Brown oolitic lime.

Hole C-33

Started: 5/21/30
 Completed: 5/29/30
 Depth to water: 30 and 340 ft.

Location: 135 ft. W., 125 ft. N
 of hole C-29
 Water stands: 170 ft.
 Elevation: 886 ft.

<u>Depth ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soapstone.
250	255	Gray, sandy lime, no gas.
255	280	White lime, little flint, oil streaks.
280	340	White and gray lime, some flint.
340	345	Blue and white flint.
345	357-1/2	Gray and brown lime, some flint, trace shale, little jack, shines lead.

Hole C-33 (cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
357-1/2	360	Gray and brown lime, some flint.
360	362-1/2	Blue flint, shines jack.
362-1/2	365	Blue and trace of brown flint, considerable jack.
365	367-1/2	Blue flint, shines jack.
367-1/2	390	Dull-colored flint.
390	394	Brown oolitic lime.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
345	357-1/2	1.83	0.08
362-1/2	365	3.37	

Hole C-34

Started: 5/23/30
 Completed: 5/31/30
 Depth to water: 40 and 290 ft.

Location: 220 ft. E, 50 ft. N
 of hole C-21
 Water stands: 190 ft. (no
 lower water)
 Elevation: 892 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	261	Soapstone, little gas at 235 feet.
261	265	Gray, sandy lime.
265	340	White and gray lime, some flint.
340	370	Brown lime, some flint.
370	395	Dark-colored flint, some lime.
395	401	Brown oolitic lime.

Hole C-35

Started: 5/29/30
 Completed: 6/6/30
 Depth to water: 100 and 355 ft.

Location: 100 ft. W of
 hole C-33
 Water stands: 175 ft.
 Elevation: 883 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soapstone.
250	265	Gray, sandy lime, no gas.
265	275	Gray lime, trace of flint.
275	335	White and gray lime, some flint.
335	350	Gray and brown lime, some flint.
350	355	Blue flint, some sparry lime, shines lead.
355	357-1/2	Blue and trace of brown flint, trace of brown sparry lime, streak of shale, shines jack, considerable lead.
357-1/2	360	Hard blue flint, shines jack, considerable lead.
360	365	Do.
365	367-1/2	Blue and trace of brown flint, trace jack.
367-1/2	375	Blue flint.

Hole C-35 (cont.)

<u>Depth, ft.</u>		<u>Analysis, percent</u>	
<u>From-</u>	<u>To-</u>	<u>ZnS</u>	<u>PbS</u>
355	357-1/2	0.40	3.21

Hole C-36

Started: 6/7/30
 Completed: 6/17/30
 Depth to water: 30 ft.; dead water at 335 ft.; live water at 365 ft.

Location: 75 ft. W of hole C-35
 Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	250	Soil clay and soapstone.
250	270	Gray, sandy limestone, traces of oil.
270	290	Gray lime and white flint.
290	330	White and gray lime, blue and white flint.
330	345	Brown and gray limestone, blue and white flint.
345	350	Brown limestone.
350	355	Brown and white flint, mundic, little jack.
355	360	Blue and white flint, mundic, shines jack.
360	362-1/2	Do.
362-1/2	365	Brown and white flint, considerable jack.
365	375	Dead white water flint.
375	380	Dead white flint, tar pocket.
380	400	White flint.
400	407	White flint, little soft, brown lime. Tar pockets from 372-1/2 to 375; water at 365 feet strongly sulfur; no gas; hole firm.

		<u>Analysis, percent</u>	
		<u>ZnS</u>	<u>PbS</u>
362-1/2	365	2.75	0.03

Hole C-37

Started: 6/17/30
 Completed: 7/3/30
 Depth to water: 30 ft.; second water at 320 ft.; strong water at 380 ft.

Location: 310 ft. NE of hole C-33 and 445 ft. NW of hole C-1
 Elevation: 886 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	251	Clay and soapstone.
251	260	Gray limestone, soap streaks, oil streaks.
260	265	Gray and brown limestone, some flint, good jack.
265	270	Gray and brown limes, some flint, shines jack.
270	295	Gray and brown limestone, some white flint, oily streaks.

Hole C-37 (Cont.)

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
295	305	Gray limestone, little dead-white flint.
305	320	Dead-white flint, little gray lime.
320	325	Sandy white flint.
325	345	White and blue flint.
345	355	Dirty white and blue flint.
355	357-1/2	Blue and white flint and brown limestone.
357-1/2	360	Brown, blue and white flint, considerable jack, little lead.
360	362-1/2	Brown, blue and white flint, considerable jack, shines lead.
362-1/2	365	Brown, blue and white flint, little jack.
365	367-1/2	Black, brown and white flint, considerable jack.
367-1/2	370	Dirty brown and white flint, shines jack.
370	372-1/2	Dirty brown and white flint, streaks soapstone, trace jack.
372-1/2	375	Dirty brown and white flint, trace jack.
375	377-1/2	Dirty brown and white flint, trace jack (faint).
377-1/2	380	Dirty brown and white flint, trace jack.
380	382-1/2	Brown, blue and white flint, shines jack.
382-1/2	385	Brown, black, dirty white flint, loose, trace jack.
385	387-1/2	Brown, black, dirty white flint, loose, shines jack.
387-1/2	390	Brown, black, dirty white flint, loose, shines good jack.
390	392-1/2	Black, brown, some white flint, tiff, good jack, lead chatty.
392-1/2	395	Black, some white flint and tiff, jack good, chatty lead.
395	397-1/2	Dirty, white and some black flint, loose, considerable jack.
397-1/2	400	Do.
400	402-1/2	White, blue, some black flint, pink spar, good jack.
402-1/2	405	White, blue, some black flint, tiff, good jack.
405	407-1/2	Do.
407-1/2	410	Do.
410	412-1/2	White, blue, some black flint, tiff, considerable jack.
412-1/2	415	White, blue, little dark flint, little jack.
415	417-1/2	White, blue, little dark flint, considerable jack.
417-1/2	420	Do.
420	422-1/2	Do.
422-1/2	425	Do.
425	427-1/2	White, blue and black flint, tiff, little brown lime, considerable jack
427-1/2	430	White, blue and black flint, tiff, little brown lime shines jack.
430	432-1/2	White, blue flint, few shines jack.
432-1/2	435	White, water flint, faint trace jack.
435	443	White, water flint.

Struck strong gas at 263 feet which is 13 feet in the limestone.
 Struck surface water 30 feet, second water, 320 feet not
 strong, but strongly sulfur. Struck strong water at 380 feet.
 Set casing and installed small tools at 400 feet. From 390 to
 400 feet the ore looks very finely disseminated.

Hole C-37 (Cont.)

Depth, ft.		Analysis, percent	
From-	To-	Zn(60%)	Pb(80%)
260	265	8.25	
357-1/2	360	2.35	0.60
360	362-1/2	3.70	
362-1/2	365	1.35	
365	367-1/2	2.00	
390	392-1/2	10.00	
392-1/2	395	9.00	
395	397-1/2	4.35	
397-1/2	400	3.00	
400	402-1/2	3.75	
402-1/2	405	6.05	
405	407-1/2	5.75	
407-1/2	410	4.35	
410	412-1/2	3.00	
412-1/2	415	3.05	
415	417-1/2	2.85	
417-1/2	420	3.35	
420	422-1/2	3.00	
422-1/2	425	2.02	
425	427-1/2	1.85	

Hole C-38

Started: 7/3/30
 Completed: 7/18/30
 Depth to water: 30, 260 and 370 ft;
 strong sulfur

Location: 75 ft. W of hole C-37
 Water stands: 170 ft.
 Elevation: 886 ft.

Depth, ft.		Formation
From-	To-	
0	257	Soapstone.
257	260	Blue flint, some lime and mundic, strong gas encountered at 260 feet, shines lead.
260	265	Blue and little white flint, some sparry lime, mundic, and little tar, shines jack.
265	270	Sparry lime, some flint, little tar, trace jack
270	275	Do.
275	285	Sparry lime, some flint, little tar.
285	305	White flint, considerable tar.
305	345	White flint.
345	365	Blue and brown flint.
365	375	Blue flint.
375	380	Blue flint, shines lead.
380	390	Blue and some brown flint.
390	425	Blue flint.

Hole C-39

Started: 7/18/30
 Completed: 8/4/30
 Depth to water: 100 and 355 ft.

Location: 61 ft. E. of hole C-37.
 Water stands: 160 ft.
 Elevation: 887 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	251	Soapstone.
251	255	Gray, sandy lime and mudic.
255	280	White and blue flint, gray lime, tar streaks, little gas from 255 to 260 feet.
280	335	White and gray lime, some flint.
335	355	Brown lime, some flint.
355	360	Blue and little brown flint, little tar, trace jack and lead.
360	365	Blue flint, trace jack.
365	388	Dull-colored, dead-looking flint.
388	395	Brown oolitic lime.
395	407	Brown lime, some flint.

Hole C-40

Started: 8/4/30
 Completed: 8/14/30
 Depth to water: 30, 353 and 383 ft.

Location: 75 ft. N, 15 ft. E
 of hole C-37
 Water stands: 160 ft.
 Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	249	Soapstone.
249	255	Gray, sandy lime, mudic.
255	275	Gray lime, some white flint, little tar and trace of gas from 255 to 260 feet.
275	325	White and gray lime, some flint.
325	352-1/2	Gray and brown lime, some flint.
352-1/2	355	Blue and some brown flint, trace of lime, trace jack and lead.
355	357-1/2	Blue and some brown flint, some sparry lime, considerable tar, sand, considerable jack, shines lead.
357-1/2	360	White and blue flint, shines jack.
360	362-1/2	Blue flint, shines jack and lead.
362-1/2	365	Blue flint, trace jack, shines lead.
365	382-1/2	White, dull-colored flint, shines jack.
382-1/2	385	Loose, dead-looking flint.
385	387-1/2	Brown oolitic lime, boulder formation.
387-1/2	392-1/2	Dead-looking flint and lime.
392-1/2	417	Gray and brown lime, some flint.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
352-1/2	355	4.20	3.29
355	357-1/2	9.00	1.66

Hole C-41

Started: 8/14/30
 Completed: 9/1/30
 Depth to water: 30, 264 and 382 ft.

Location: 45 ft. W, 10 ft. N
 of hole C-40
 Water stands at 150 ft.
 Elevation: 884 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	249	Soapstone.
249	255	Gray, sandy lime.
255	260	Blue, brown and chatty flint, some sparry lime, little jack, trace lead.
260	262-1/2	Blue, brown and chatty flint, some sparry lime, trace jack and lead.
262-1/2	265	Do.
265	270	Blue flint, some lime, trace jack.
270	275	Blue and white flint, some sparry lime, good jack.
275	280	White flint, considerable lime, trace jack.
280	295	White lime and flint, tar streaks.
295	340	White and gray lime, some flint.
340	357-1/2	Gray and brown lime, some flint.
357-1/2	362-1/2	Blue, brown and chatty flint, mud seams, trace jack.
362-1/2	380	Dull-colored flint, shines jack.
380	385	Loose, coarse, blue and trace of brown flint, mud seams, shines jack.
385	390	Blue and trace of brown flint, shines jack.
390	392-1/2	Loose, coarse blue flint, shines jack.
392-1/2	395	No cuttings.
395	397-1/2	Loose, coarse blue flint.
397-1/2	406	Blue and little brown flint, shines jack.
406	413	Blue and little brown flint, little spar, practically no cuttings, shines jack. Opening from 407 to 413.
413	415	Blue and black flint.
415	416	Blue and little brown sandy flint.
		Unable to drill this hole any deeper. Little gas encountered at 255 feet. Set 265 feet of 6-1/4" and 400 ft. of 4-7/9" casing.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
255	260	2.10	0.88
260	262-1/2	1.20	.26
262-1/2	265	2.13	.30
265	270	.84	
270	275	8.50	

Hole C-42

Started: 9/1/30
 Completed: 9/15/30
 Depth to water: 95 and 348 ft.

Location: Approximately 320 ft.
 NW of hole C-41
 Water stands: 150 ft. (strong
 sulfur)
 Elevation: 878 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	244	Soapstone.
244	250	Gray limestone, little soapstone.
250	255	White and blue flint, shines jack.
255	265	Brown, oil limestone.
265	285	Brown and gray limestone, dead-white flint, trace of oil
285	325	Gray lime, little blue flint.
325	350	Blue and white flint, some brown shelly limestone.
350	375	Dead white, and little blue flint.
375	385	Brown oolitic limestone, little blue and white flint.
No gas in this hole - formation did not look at all favorable.		

Hole C-43

Started: 9/15/30
 Completed: 9/23/30
 Depth to water: 35 and 354 ft.

Location: 253 ft. N of hole C-42
 Water stands: 170 ft.
 Elevation: 874 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	237	Soapstone.
237	260	Gray and brown lime, some white flint, oily.
260	275	Gray lime, blue and white dead flint.
275	285	Dead-white and blue flint, little lime.
285	305	Dead-white and blue flint.
305	315	Dead-white flint.
315	330	White and blue flint.
330	335	Brown, blue, little white flint, little brown lime.
335	345	Brown, black and little dark blue flint.
345	350	Brown and white flint, shines jack and lead.
350	355	Dead-white flint, shines jack.
355	370	Dead-white flint.
370	375	Blue and white flint, shines jack.
375	380	Blue and white flint, brown oolitic lime, shines jack.
380	390	Blue and white flint, tiff and tar, shines jack.
390	395	White, some blue flint, shines jack.
395	400	White and blue flint, some lime, shines jack.

Hole C-44

Started: 9/23/30
 Completed: 10/1/30
 Depth to water: 35, 90 and 360 ft.

Location: 85 ft. N of hole C-43.
 Water stands: 180 ft.
 Elevation: 873 ft.

<u>Depth</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	233	Soapstone.
233	235	Gray lime and mundic.
235	270	Gray, sandy lime, some flint, trace of oil, little gas at 200 and 240 feet.
270	315	White lime and flint.
315	340	Brown and black lime, some flint.
340	345	Black lime, some brown and blue flint.
345	360	Dull color flint.
360	365	Dull color flint, little lime, shines jack.
365	375	Dead-looking flint.
375	385	Brown oolitic lime.

J. M. Roper Property

(NE-1/4 NE-1/4 sec. 32, T. 34 S., R. 23 E.,
 Cherokee County, Kans.)

Ralph Sears, Contractor - C. E. Yoachim, Driller

Hole RM-1

Started: 2/4/43
 Completed: 2/18/43

Depth to water: 95 ft.
 Water stands: 70 ft.
 Elevation: 882 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	5	Surface and yellow clay.
5	25	Sand rock.
25	50	Gray, black soap, lime boulders and mundic.
50	245	Gray, black shale streaks of mundic.
245	265	Gray, brown lime.
265	290	Gray to white lime.
290	335	Gray lime, gray flint.
335	355	Gray, brown lime, gray, brown flint.
355	380	Brown, dark gray lime, gray, blue flint selvage.
380	390	Brown, dark gray lime, gray, blue flint, trace lead and zinc.
390	400	Dark-gray, brown flint tiff, some spar, sometimes good lead and zinc shines.
400	415	Dark-gray, brown flint, some tiff-spar-lime, fair zinc, trace lead.
415	428	Dark-gray, brown flint, gray lime, trace zinc.

Hole RM-1 (Cont.)

Depth, ft.		Analysis, percent	
From-	To-	ZnS	PbS
390	395	1.53	6.6
395	400	2.03	1.95
400	405	3.09	.02
405	407-1/2	7.03	.13
407-1/2	410	9.7	.13
410	412-1/2	2.2	.11
412-1/2	415	.6	.06

Hole RM-2

Started: 2/22/43
 Completed: 3/15/43

Depth to water: 30 ft.
 Water stands: 280 ft.
 Elevation: 880 ft.

Depth, ft.		Formation
From-	To-	
0	5	Surface and yellow
5	25	Sand rock.
25	60	Gray, black soap lime boulders, and mundic.
60	200	Gray, black shale, streaks of mundic.
200	250	Gray, black shale, lime boulders, mundic.
250	280	Gray lime, streaks of mundic.
280	305	Dark-gray lime, gray flint, mundic.
305	345	Gray, light-blue flint, crevices.
345	355	Gray limes, gray, white flint.
355	375	Gray, blue, brown flint, gray lime tiff, crevices.
375	410	Gray, white lime selvage seams, gray, blue flint.
410	421	Gray to brown lime, gray, blue flint.

Quapaw Mining Corp., Drillers

Hole 22-6-1

Started: 7/19/24
 Completed: 8/6/24

Depth to water: 17, 70 and
 435 ft.
 Water stands: 70 ft.
 Elevation: 887 ft.

Depth, ft.		Formation
From-	To-	
0	1	Soil.
1	7	Yellow clay.
7	32	Sandstone.
32	267	Soapstone.
267	380	Gray lime, yellow and gray flint, trace lead and zinc.
380	415	Brown lime, some blue flint.
415	425	Oolite lime, strong smell of oil 42 to 425 feet.
435	465	White flint.
465	475	Black flint.
475	496	Gray lime, blue and white flint.

Hole 22-6-2

Started: 8/7/24
 Completed: (?)

Depth to water: 12 and 125 ft.
 Water stands: 75 ft.
 Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil, red and yellow clay.
7	30	Sandstone.
30	267	Soapstone and mundic.
267	360	Lime and white flint.
360	365	Brown and blue flint.
365	400	Brown lime and blue flint.
400	424	Brown and gray flint.
424	435	Brown and gray flint, shines lead.
435	440	Do.
440	450	Gray and white limestone.

Hole 22-6-3

Started: 8/20/24
 Completed: 9/4/24

Depth to water: 12, 292 and
 370 ft.
 Water stands: 150 ft.
 Elevation: 888 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	4	Soil and yellow clay.
4	32	Sandstone.
32	275	Soapstone and mundic.
275	280	Lime and sandstone.
280	325	Gray lime and flint.
325	370	Brown lime and white flint.
370	430	Blue and gray flint and tiff.
430	439	Blue and gray flint.

Hole 22-6-4

Started: (?)
 Completed: 9/28/24

Depth to water: (?)
 Water stands: 200 ft.
 Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	38	Sand.
38	258	Shale.
258	315	Gray lime.
315	345	White flint and white lime.
345	355	Gray lime and white flint.
355	385	Blue and white flint and gray lime.
385	395	Blue flint, lead shines.

Hole 22-6-4
(Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
395	420	Blue flint, lead and jack shines.
420	430	Blue and black flint, trace of lead and jack.
430	450	Blue flint and brown lime.

		<u>Analysis percent</u>	
		<u>Blende</u>	<u>Galena</u>
400	405	1.38	0.13
415	420	1.17	.06

Hole 22-6-5

Started: 9/29/24

Completed: 10/11/24
Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	35	Sand.
35	255	Shale.
255	285	Gray lime.
285	320	Gray lime and white flint.
320	345	White flint and white lime.
345	350	Gray lime, white flint, little coal.
350	370	White flint and white lime.
370	385	Blue flint and gray lime.
385	390	Blue flint, gray lime, lead shines.
390	410	Blue flint, good jack, lead shines.
410	420	Blue flint, jack shines.
420	433	Water flint.

		<u>Analysis, percent</u>	
		<u>Blende</u>	<u>Galena</u>
390	395	3.45	3.45
395	400	6.25	5.25
400	405	1.48	5.45
405	410	1.15	1.15

Hole 22-6-6

Started: 10/14/24
Completed: 10/27/24

Depth to water: 20 ft.
Water stands: 20 ft.
Elevation: 879 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Clay and shale.
7	30	Sand.
30	255	Shale.
255	300	Gray lime.

Hole 22-6-6 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
300	355	Gray lime and gray flint.
355	390	Gray lime and blue flint.
390	400	Blue flint and black lime, lead shines.
400	410	Blue and gray flint, good lead and jack shines.
410	415	Blue and gray flint, jack shines, 1 foot of soap.
415	430	Gray flint

Hole 22-6-7

Started: 10/27/24
 Completed: 11/7/24

Depth to water: 300 ft.
 Water stands: 150 ft.
 Elevation: 882 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	6	Clay.
6	30	Sand.
30	256	Shale.
256	300	Gray lime.
300	350	Gray lime and gray flint.
350	380	Lime and blue flint.
380	385	Lime and blue flint, lead shines.
385	390	Lime and flint, fair lead.
390	395	Blue flint, good lead and zinc shines.
395	400	Blue flint, fair lead and zinc shines.
400	406	Black lime, brown flint, fair lead and jack.
406	410	Gray flint, jack shines.
410	434	Gray flint, lime.

Analysis, percent

		<u>Blende</u>	<u>Galena</u>
385	390	0.59	0.31
390	393	.28	11.54
393	395	.32	4.05
395	400	1.30	.97
400	403	1.65	.20
403	406	3.64	.24

Hole 22-6-8

Started: 11/7/24
 Completed: 11/22/24

Depth to water: (?)
 Water stands: (?)
 Elevation: 883 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	7	Clay.
7	32	Sand.
32	255	Shale.

Hole 22-6-8 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
255	295	Lime.
295	315	Lime and gray flint.
315	380	Lime and blue flint.
380	385	White sand.
385	390	Sand and lime.
390	395	Black lime and blue flint, lead and jack shins.
395	400	Do.
400	420	Blue and gray flint, good jack.
420	427	Gray flint, lime shins.
427	429	Gray flint and lime.

Analysis, percent

		<u>Blende</u>	<u>Galena</u>
390	395	0.50	1.32
395	400	8.55	1.06
400	405	7.17	.30
405	410	22.13	.11
410	415	27.45	.12
415	420	7.24	.04
420	427	3.40	.09

Hole 22-6-9

Started: 11/22/24
Completed: 12/9/24

Depth to water: 175 ft.
Water stands: 175 ft.
Elevation: 883 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	5	Soil.
5	32	Sand rock.
32	255	Shale.
255	290	Gray lime.
290	335	Gray lime and gray flint.
335	385	Gray lime and blue flint.
385	398	Gray lime and gray sand.
398	408	Gray lime and gray flint.

Hole 22-6-10

Started: 12/14/24
Completed: 1/2/25

Depth to water: 175 ft.
Water stands: 175 ft.
Elevation: 883 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	7	Soil and clay.
7	33	Sand.
33	256	Shale.
256	285	Gray lime.

Hole 22-6-10 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
285	330	Gray lime and gray flint.
330	365	Gray lime, gray and blue flint.
365	370	Gray lime and sand.
370	380	Sand, brown and gray flint.
380	410	Blue and gray flint.
410	425	Brown and gray flint.
425	437	Brown lime and flint.

Hole 22-6-11

Started: 1/3/25
Completed: 1/16/25

Depth to water: (?)
Water stands: 165 ft.
Elevation: 883 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Clay.
7	33	Sand rock.
33	254	Shale.
254	260	Lime.
260	265	Lime and white flint.
265	290	Lime.
290	335	Lime and gray flint.
335	365	Lime and blue flint.
365	390	Lime and sand.
390	400	Blue and gray flint.
400	428	Gray lime, brown and gray flint.

Hole 22-6-12

Started: 1/17/25
Completed: 1/31/25

Depth to water: 25 ft.
Water stands: 25 ft.
Elevation: 883 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	34	Sand.
34	254	Shale.
254	290	Lime.
290	310	Lime and blue flint.
310	375	Lime and blue flint, gray.
375	385	Lime and blue flint.
385	390	Lime.
390	395	Lime, blue and gray flint, lead shines.
395	400	Lime, blue and gray flint, fair lead and jack.
400	425	Blue and brown flint, fair jack.
425	430	Blue and brown flint, shines jack.
430	440	Gray lime and gray flint.

Hole 22-6-12 (Cont.)

<u>Depth, ft.</u>		<u>Analysis, percent</u>	
<u>From-</u>	<u>To-</u>	<u>Blende</u>	<u>Galena</u>
395	400	2.84	2.21
400	405	3.07	.29
405	410	2.90	.03
410	415	11.02	.09
415	420	6.67	.05
420	425	5.59	.02

Hole 22-6-13

Started: 2/3/25
Completed: 2/16/25

Depth to water: 280 ft.
Water stands: 170 ft.
Elevation: 883 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	35	Sand rock.
35	255	Shale.
255	285	Lime.
285	385	Lime, gray and blue flint.
385	390	Lime, shines lead.
390	400	Blue and gray flint, jack and lead shines.
400	410	Blue and gray flint, good jack.
410	415	Blue and gray flint, fair jack.
415	420	Blue and gray flint, jack shines.
420	433	Lime and white flint.

Analysis, percent

		<u>Blende</u>
395	400	3.65
400	405	16.90
405	410	18.12
410	415	13.75

Hole 22-6-14

Started: 2/16/25
Completed: 3/2/25

Depth to water: (?)
Water stands: (?)
Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	35	Sand.
35	250	Shale.
250	285	Gray lime.
285	350	Gray lime, blue and gray flint.
350	385	Blue flint and gray lime.

Hole 22-6-14 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
385	400	Gray and brown flint, lots of tiff.
400	410	Do.
410	415	Blue and gray flint, lead shines.
415	426	Lime, blue and gray flint, lead shines.
426	432	Gray and brown flint.

Hole 22-6-15

Started: 3/3/25
Completed: 3/19/25

Depth to water: (?)
Water stands: (?)
Elevation: 879 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	7	Soil and clay.
7	36	Sand.
36	249	Shale.
249	285	Gray lime.
285	335	Gray lime and blue flint.
335	360	Gray lime and gray flint.
360	380	Brown lime.
380	385	Black lime.
385	430	Brown lime and gray flint.

Hole 22-6-16

Started: 3/19/25
Completed: 4/3/25

Depth to water: 25 ft.
Water stands: 170 ft.
Elevation: 882 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	7	Clay.
7	35	Sand.
35	250	Shale.
250	285	Lime.
285	422	Gray lime, blue and gray flint.

Hole 22-6-17

Started: 4/3/25
Completed: (?)

Depth to water: 20 ft.
Water stands: 20 ft.
Elevation: 879 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	6	Clay.
6	35	Sand rock.
35	255	Shale.
255	285	Lime.

Hole 22-6-17 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
285	345	Lime and gray flint.
345	380	Lime, blue and gray flint.
380	392	Lime.
392	397	Black lime, jack shines.
397	402	Blue and gray flint, jack shines.
402	407	Blue and gray flint, fair jack.
407	412	Gray flint, jack shines.
412	419	Gray and brown flint.

Hole 22-6-18

Started: 4/17/25
 Completed: 4/29/25

Depth to water: 25 ft.
 Water stands: 25 ft.
 Elevation: 884 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	7	Soil and clay.
7	36	Sand rock.
36	250	Shale.
250	285	Lime.
285	360	Lime, blue and gray flint.
360	390	Lime and blue flint.
390	395	Lime and blue flint, lead shines.
395	400	Black lime, blue flint, lead shines.
400	405	Black lime, gray and brown flint, good lead, fair jack.
405	420	Gray and brown flint, good jack.
420	425	Gray and brown flint, jack shines.
425	430	Gray flint and brown lime.

Analysis, percent

		<u>Blende</u>	<u>Galena</u>
395	400	0.15	0.15
400	405	3.30	7.71
405	410	7.70	.42
410	415	7.85	.03
415	420	5.71	.02

Hole 22-6-19

Started: 4/30/25
 Completed: 5/9/25

Depth to water: 30 ft.
 Water stands: 170 ft.
 Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	37	Sand rock.
37	264	Shale.
264	285	Lime.
285	360	Lime, blue and gray flint.
360	380	Lime and blue flint.
380	400	Lime, blue flint, lead shins.
400	405	Gray and brown flint, lead shins.
405	415	Black lime, gray and brown flint, good lead, fair jack.
415	420	Black lime, blue and brown flint, good jack.
420	430	Gray lime, gray flint, jack shins.
430	438	Brown lime and gray flint.

Analysis, percent

		<u>Blende</u>	<u>Galena</u>
405	410	0.80	0.24
410	415	2.34	.33
415	417	8.76	.17
417	420	9.85	.36

Hole 22-6-20

Started: 5/11/25
 Completed: 5/19/25

Depth to water: 30 ft.
 Water stands: 180 ft.
 Elevation: 886 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	37	Sand rock.
37	265	Shale.
265	285	Lime.
285	330	Lime, blue and gray flint.
330	336	Opening.
336	355	No cuttings.
355	370	Lime and gray flint.
370	395	Lime and blue flint.
395	400	Lime and blue flint, lead shins.
400	415	Lime, blue and gray flint.
415	429	Lime and gray flint.

Hole 22-6-21

Started: 5/19/25
 Completed: 6/1/25

Depth to water: 25 ft.
 Water stands: 25 ft.
 Elevation: 886 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	9	Soil and clay.
9	40	Sand rock.
40	254	Shale.
254	285	Lime
285	335	Lime and gray flint.
335	380	Lime, blue and gray flint.
380	415	Lime and gray flint.
415	422	Lime.

Hole 22-6-22

Started: 6/27/25

Completed: 7/11/25
 Elevation: 878 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	7	Soil and clay.
7	40	Sand rock.
40	246	Shale.
246	285	Lime.
285	335	Lime and gray flint.
335	360	Lime and blue flint.
360	380	Lime.
380	405	Lime and gray flint.
405	410	Lime.
410	429	Lime and gray flint.

Hole 22-6-23

Started: 7/3/25

Completed: 7/25/25
 Elevation: 879 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	7	Soil and clay.
7	38	Sand.
38	247	Shale.
247	280	Lime.
280	340	Lime and gray flint.
340	360	Lime, blue and gray flint.
360	385	Lime.
385	390	Gray and brown flint.
390	400	Lime, gray and blue flint.
400	410	Lime.
410	419	Lime, gray and brown flint.

Hole 22-6-24

Started: 7/25/25

Completed: 8/10/25
Elevation: 878 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	5	Soil and clay.
5	27	Sand.
27	245	Shale.
245	280	Gray lime.
280	340	Gray lime and gray flint.
340	375	Gray lime and blue-gray flint.
375	390	Gray and black lime, blue flint.
390	410	Gray lime, gray and brown flint.
410	422	Gray and brown flint.

Hole 22-6-25

Started: 8/22/25

Completed: 9/1/25
Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	40	Sand.
40	253	Shale.
253	345	Gray lime and gray flint.
345	385	Gray lime and blue and gray flint.
385	390	Black lime, blue flint, fair lead.
390	395	Black lime, blue and gray flint, fair zinc.
395	400	Blue and gray flint, fair jack.
400	405	Brown and gray flint, jack shines.
405	410	Do.
410	415	Brown and gray flint, trace of jack.
415	429	Gray lime, gray and brown flint.

Analysis, percent

		<u>Blende</u>	<u>Galena</u>
385	390	0.38	4.41
390	395	5.40	.85
395	400	6.25	1.70
400	405	6.75	.35

Hole 22-6-26

Started: 9/3/25

Completed: 9/17/25
Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Clay and soil.
7	40	Sand.
40	252	Shale.

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Hole 22-6-26 (Cont.)

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
252	265	Gray lime.
285	330	Gray lime and gray flint.
330	380	Gray lime, blue and gray flint.
380	390	No cuttings.
390	410	Blue and gray flint, tiff, open ground to 406 feet.
410	430	Blue, gray and brown flint.

Hole 22-6-27

Started: 9/17/25

Completed: 9/30/25
Elevation: 883 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	7	Soil and clay.
7	39	Sand.
39	252	Shale.
252	295	Gray lime.
295	330	Gray lime and gray flint.
330	340	Gray lime, gray and blue flint.
340	385	Gray lime and blue flint.
385	400	Gray lime, gray and brown flint.
400	405	Gray lime and blue flint.
405	411	Gray lime, blue and gray flint.

Hole 22-6-28

Started: 9/26/25

Completed: 10/8/25
Elevation: 893 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	3	Soil and clay.
3	34	Sand rock.
34	275	Shale.
275	295	Lime.
295	310	Lime and gray flint.
310	325	Lime.
325	345	Blue and gray flint, very loose ground.
345	375	Lime and gray flint.
375	410	Blue and gray flint.
410	430	Blue flint.
430	435	Blue flint and lime.

Hole 22-6-29

Started: 10/9/25

Completed: 10/15/25
Elevation: 883 ft.

<u>Depth,</u>	<u>ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>		
0	4	Soil and clay.	
4	32	Sand rock.	
32	255	Shale.	
255	275	Lime.	
275	295	Gray flint and lime.	
295	305	Blue and gray flint.	
305	315	Blue and brown flint.	
315	320	Gray flint and lime.	
320	340	Blue flint and lime.	
340	385	Brown and blue flint.	
385	390	Brown lime and blue flint.	
390	410	Blue flint and lime.	

Hole 22-6-30

Started: 10/15/25

Completed: 10/24/25
Elevation: 885 ft.

<u>Depth,</u>	<u>ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>		
0	6	Clay.	
6	28	Sand rock.	
28	255	Soap.	
255	295	Lime.	
295	305	Gray flint.	
305	315	Lime.	
315	340	Gray and brown flint.	
340	355	Blue and brown flint.	
355	398	Brown flint.	

Hole 22-6-31

Started: 10/10/25

Completed: 11/2/25
Elevation: 879 ft.

<u>Depth,</u>	<u>ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>		
0	6	Soil and clay.	
6	30	Sand rock.	
30	240	Shale.	
240	285	Lime.	
285	295	Lime and gray flint.	
295	305	Blue and gray flint.	
305	330	Gray flint.	
330	345	Do.	
345	385	Blue and brown flint.	
385	405	Gray and brown flint.	

Hole 22-6-32

Started: 11/8/25

Completed: 12/2/25
Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	32	Sand rock.
32	270	Shale.
270	300	Lime.
300	360	Lime and gray flint.
360	370	Blue and gray flint.
370	375	Brown flint.
375	385	Blue and gray flint.
385	405	Brown and blue flint.
405	409	Brown flint.

Hole 22-6-33

Started: 12/4/25

Completed: 12/12/25
Elevation: 884 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	270	Shale.
270	300	Lime.
300	360	Lime and gray flint.
360	370	Brown flint and lime.
370	390	Brown and gray flint.
390	400	Brown flint.
400	405	Shale.
405	410	Brown flint.
410	415	Brown and gray flint.
415	425	Blue and gray flint.
425	428	Brown and gray flint.

Hole 22-6-34

Started: 12/12/25

Completed: 12/20/25
Elevation: 886 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	36	Sand rock.
36	270	Shale.
270	295	Lime.
295	315	Gray lime and flint.
315	325	Brown flint and lime.
325	375	Blue and brown flint.
375	410	Brown flint.

Hole 22-6-35

Started: 12/21/25

Completed: 1/4/26
Elevation: 887 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	36	Sand rock.
36	270	Shale.
270	295	Lime.
295	315	Gray flint and lime.
315	325	Brown flint and lime.
325	375	Blue and brown flint.
375	410	Brown flint.
410	440	Blue and white flint.

Hole 22-6-36

Started: 1/7/26

Completed: 1/18/26
Elevation: 877 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	7	Soil and clay.
7	36	Sand rock.
36	215	Shale.
215	220	Water sand.
220	255	Lime.
255	305	Gray flint and lime.
305	325	Gray and brown flint.
325	335	Blue and brown flint.
335	365	Brown flint.
365	370	Gray flint.
370	385	Brown flint.
385	390	Brown lime.
390	410	Brown lime, gray flint.

Hole 22-6-37

Started: 1/19/26

Completed: 2/1/26
Elevation: 872 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	25	Sand rock.
25	220	Shale.
220	265	Lime.
265	280	(?)
280	305	Gray flint.
305	325	Blue and gray flint.
325	355	Blue and brown flint.
355	380	Brown flint.
380	430	Brown lime.
4399		

Hole 22-6-38

Started: 2/2/26

Completed: 2/15/26
Elevation: 870 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	8	Soil and clay.
8	20	Shale.
20	23	Sand rock.
23	210	Shale.
210	215	River gravel.
215	250	Lime.
250	280	Gray flint and lime.
280	300	Gray flint.
300	340	Brown and gray flint.
340	370	Brown flint.
370	395	Brown lime and brown flint.
395	405	Blue flint, lime, jack shins.
405	425	Brown lime.

W. P. & C. Drilling Co.
F. C. Foster, Driller - A. Ficke, Helper

Hole 22-6-42

Started: 3/31/26
Completed: 4/8/26

Depth to water: 80 ft.
Elevation: 885 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	28	Sand rock.
28	270	Shale.
270	300	Lime.
300	355	Lime and gray flint.
355	360	Lost cuttings.
360	380	Gray flint.
380	410	Blue and brown flint.
410	424	Blue and brown flint, lead shins.
424	428	Blue and brown flint.

Hole 22-6-43

Started: 4/9/26
Completed: 4/17/26

Depth to water: 60 ft.
Elevation: 886 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	6	Soil and clay.
6	32	Sandrock.
32	275	Shale.
275	310	Lime.

Hole 22-6-43 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
310	325	Lime and gray flint.
325	345	Gray flint.
345	412-1/2	Blue and brown flint.
412-1/2	417-1/2	Blue and brown flint, lead shines.
417-1/2	420	Blue and brown flint, lead and jack shines.
420	430	Blue and brown flint, fair jack and lead.
430	442-1/2	Blue and brown flint, good jack and lead shines.
442-1/2	445	Blue and brown flint, jack and lead shines.
445	448	Blue and brown flint.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
412-1/2	417-1/2	0.36	
417-1/2	420	.24	
420	425	1.62	
425	430	1.74	
430	435	.54	
435	437-1/2	2.61	
437-1/2	440	6.33	
440	445	1.74	

Roper Property

(S-1/2 SE-1/4, sec. 29, and NE-1/4 NE-1/4 sec. 32, T. 34 S.,
R. 23 E., Cherokee County, Kans.)

F. E. Davis, Driller

Hole C-1

Started: 7/19/29

Completed: 8/2/29

Depth to water: 425 ft.

Location: 300 ft. W, 100 ft. N

of SE corner (sec. 29)

Elevation: 891 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	270	Soapstone.
270	275	Soapstone, mundic, and lime.
275	285	Gray lime.
285	370	White and gray lime, some flint.
370	415	Gray and brown lime, some flint.
415	425	Brown and black lime, some flint.
425	435	White and some blue flint.
435	440	White and some blue flint, some lime.
440	465	White and some blue flint.
465	480	White and some blue flint, some dark-colored lime.

Hole C-2

Started: 8/2/29
 Completed: 8/20/29
 Depth to water: 30, 140, and 445 ft.

Location: 100 ft. N, 50 ft. W
 of SW corner S-1/2
 SE-1/4 (sec. 29)
 Water stands: 165 ft.
 Elevation: 889 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	270	Soapstone.
270	275	Soapstone and mudic.
275	360	White and gray lime, some flint.
360	370	Gray and brown lime, some flint.
370	390	Brown lime, little flint.
390	400	Black lime, little flint.
400	405	Gray lime and flint.
405	410	Brown oolitic lime.
410	430	Gray lime and flint.
430	435	White, dead-looking flint.
435	460	Dull-colored glassy flint.
460	470	Dull-colored flint, considerable lime.

Hole C-3

Started: 8/19/29
 Completed: 9/9/29
 Depth to water: 45, 125 and 425 ft.

Location: 1450 ft. S, 1265 ft.
 W of NE corner of
 NE-1/4 (sec. 32).
 Water stands: 100 ft.
 Elevation: 870 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	230	Soapstone.
230	245	Brown lime, trace of flint.
245	295	Soft white flint and lime.
295	320	Gray and brown lime, some flint.
320	350	Brown lime, some flint.
350	355	Brown oolitic lime.
355	415	Mostly brown lime.
415	420	White flint, some lime.
420	425	Dull-colored flint.
425	430	Blue and some brown flint, trace lead.
430	435	Blue flint, lead shines.
435	440	Blue flint, some dark-colored lime, jack shines.
440	470	Dull-colored flint and lime.

Analysis, percent

		<u>PbS (80%)</u>
425	430	2.09

Hole C-4

Started: 8/20/29
 Completed: 9/10/29
 Depth to water: 30 and 425 ft.

Location: 625 ft. N, 600 ft. W
 of hole C-2
 Water stands: 150 ft.
 Elevation: 882 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	280	Soapstone.
280	285	Gray lime, blue flint, and mundic.
285	325	Brown lime, very little flint.
325	385	Gray and brown lime, some flint.
385	400	Brown lime, some flint.
400	410	Black lime, little flint.
410	415	Blue, some brown flint, shines jack and lead.
415	425	Blue flint.
425	430	Brown flint.
430	445	Blue, little brown and black flint.
445	450	Blue flint, some pink spar.
450	455	White and little brown flint.
455	475	White and little brown flint, shelly.
475	490	Blue and some brown flint.
490	495	Lighter-colored flint.
495	500	Dark-colored flint, some lime.

Hole C-5

Started: 9/10/29
 Completed: 9/24/29
 Depth to water: 440 ft.

Location: 200 ft. S of hole C-4
 Water stands: 150 ft.
 Elevation: 892 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	277	Soapstone.
277	305	Gray lime.
305	380	White and gray lime, some flint.
380	420	Brown and black lime, little flint.
420	455	White and dull-colored flint.
455	465	White and brown flint.
465	470	Blue and brown flint.
470	480	Softer blue and brown flint, some lime.
480	485	Dark-colored flint and lime.

Hole C-6

Started: 9/9/29
 Completed: 9/27/29
 Depth to water: 15, 85 and 260 ft.
 (sulfur)

Location: 430 ft. N, 160 ft. E
 of hole C-3
 Water stands: 175 ft.
 Elevation: 873 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	235	Soapstone.
235	255	Brown lime.
255	285	White and gray lime, some flint.
285	300	White flint, some lime.
300	330	Shelly white flint.
330	360	Brown lime, little flint.
360	370	Black lime, little flint.
370	375	Brown oolitic lime.
375	420	Mostly brown lime.
420	430	White flint and lime.
430	435	White flint, shines lead.
435	455	White and brown flint, shines lead.
455	465	Dark-colored flint and lime.

Hole C-7

Started: 9/24/29
 Completed: 10/9/29
 Depth of water: 40, 80, and 325 ft.

Location: 200 ft. N of hole C-4
 Water stands: 180 ft.
 Elevation: 890 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	290	Soapstone.
290	325	Gray, sandy lime, some flint.
325	330	White sand, water.
330	365	White flint, some lime.
365	435	White and blue flint, crevices.
435	445	Blue flint, some gray lime.
445	450	Softer blue flint, mud streaks, shines jack.
450	470	Blue and white glassy flint.
470	475	Blue and brown glassy flint.
475	479	Dark-colored flint and lime.
		Little gas encountered at 290 feet.

Hole C-8

Started: 9/27/29
 Completed: 10/14/29
 Depth to water: 15, 85, 175, and 439 ft.

Location: 250 ft. N of hole C-6
 Water stands: 100 ft.
 Elevation: 875 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	240	Soapstone.
240	245	White sand, considerable mudic.
245	255	Brown sandy lime.

4399

Hole C-8 (Cont.)

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
255	315	White and gray lime, some flint.
315	335	Gray and brown lime, some flint.
335	365	Brown lime, little flint.
365	375	Black lime.
375	385	Brown oolitic lime.
385	420	Mostly gray and brown lime.
420	435	Dull-colored flint, little lime.
435	445	Blue and little brown flint, shines jack.
445	450	White and blue, little brown flint.
450	465	Dark-colored flint, some lime.

Hole C-9

Started: 10/9/29
 Completed: 10/19/29
 Depth to water: 405 ft.

Location: 200 ft. N of hole C-7
 Water stands: 205 ft.
 Elevation: 887 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	320	Soapstone.
320	325	White flint and lime, some mundic.
325	395	Soapstone and mundic.
395	418	Soft white, dead-looking flint and lime, mundic. and selvaige streaks.

Hole C-10

Started: 10/19/29
 Completed: 11/1/29
 Depth to water: 40, 80, 110 and 360 ft.

Location: 520 ft. W of
 hole C-9.
 Water stands: 180 ft.
 Elevation: 888 ft.

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	270	Soapstone.
270	295	Gray lime.
295	360	White and gray lime, white flint.
360	365	No cuttings.
365	375	White flint (1/10 rec.).
375	390	White flint, some tiff (1/20 rec.)
390	400	Blue and white flint, some lime.
400	415	White and black flint, some sparry lime, muddy formation.
415	420	Blue and some brown flint, mundic, shines lead.
420	425	Dull-colored flint, mundic (1/20 rec.). Shines lead.
425	435	Do.
435	440	White and brown sandy flint.
440	455	White, dead-looking flint.
455	466	White and blue glassy flint.

Hole C-11

Started: 10/14/29
 Completed: 11/4/29
 Depth to water: 30 and 175 ft.

Location: 200 ft. S of
 hole C-6
 Water stands: 15 ft.
 Elevation: 870 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	235	Soapstone.
235	320	White and gray lime, some flint.
320	355	Brown lime, some flint.
355	365	Black lime.
365	370	Brown oolitic lime.
370	425	Gray lime, some flint.

Hole C-12

Started: 11/1/29
 Completed: 11/15/29
 Depth to water: 40, 75, 190 and 400 ft.

Location: 300 ft. W of
 hole C-10
 Water stands: 200 ft.
 Elevation: 880 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	275	Soapstone.
275	310	Gray lime.
310	380	White and gray lime, some flint.
380	400	Brown lime, some flint.
400	405	Light blue and brown flint, lead shines.
405	410	White and some brown flint, jack and lead shines.
410	415	White flint.
415	420	White and light blue, little brown flint (1/10 rec.) shines lead and jack.
420	425	White and light blue, little brown flint.
425	430	White and light blue, little brown flint (1/20 rec.)
430	445	White flint.
445	455	White flint, brown lime.
455	460	Blue and white glassy flint.

Hole C-13

Started: 11/4/29
 Completed: 11/19/29
 Depth to water: 30 and 160 ft.

Location: 835 ft. S, 435 ft. E
 of NW corner NE 1/4
 (sec. 32)
 Water stands: 85 ft.
 Elevation: Not recorded

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	250	Soapstone.
250	260	Gray, sandy lime.
260	340	White and gray lime, some flint.
340	360	Brown lime, some flint.
4399		

Hole C-13 (Cont.)

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
360	380	Blue and brown flint, some lime.
380	395	Black lime, some black flint.
395	400	Brown oolitic lime.
400	409	Gray lime and flint.

Hole C-14

Started: 11/15/29
 Completed: 11/30/29
 Depth to water: 415 ft.

Location: 120 ft. W of
 hole C-10
 Water stands: 200 ft.
 Elevation: 883 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	275	Soapstone.
275	320	Gray lime.
320	385	White and gray lime, some flint.
385	400	Brown lime, some flint.
400	405	Brown and black lime, some flint.
405	410	Blue and brown flint, lead shines.
410	415	Blue flint.
415	420	Blue and little brown flint (1/20 rec.)
420	440	White flint.
440	460	White and dull-colored flint, some lime.

Hole C-15

Started: 11/19/29
 Completed: 12/5/29
 Depth to water: 30, 140, and 260 ft.

Location: 1000 ft. W of
 hole C-13.
 Water stands: 85 ft.
 Elevation: Not recorded

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	225	Soapstone.
225	270	Gray lime.
270	325	White and gray lime, some flint.
325	350	Gray and brown lime, some flint.
350	380	Brown lime.
380	385	Black lime.
385	415	Gray and brown lime, little flint. Some gas encountered at 235-250 feet.

Hole C-16

Started: 11/30/29
 Completed: 12/14/29
 Depth to water: 45, 135, 390, and 415 ft.

Location: 75 ft. E of
 hole C-10
 Water stands: 200 ft.
 Elevation: 887 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	270	Soapstone.
270	280	Gray lime, some flint.
280	295	Gray lime.
295	370	White and gray lime, some flint.
370	390	Brown lime, some flint.
390	400	Black lime and flint.
400	405	Tight white and some brown flint, little lead.
405	410	Tight white and some brown flint, some lime, shines lead.
410	415	White and little brown flint, shines lead.
415	420	White and little brown flint, shines lead (1/10 rec.)
420	443	White and dull-colored flint.

Analysis, percent

400	405	<u>PbS (80%)</u> 2.41
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Hole C-17

Started: 12/5/29
 Completed: 12/18/29
 Depth to water: 30, 90, and 160 ft.

Location: 1000 ft. W of
 hole C-15
 Water stands: 75 ft.
 Elevation: Not recorded

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	255	Soapstone.
255	325	White and gray lime, some flint.
325	355	Gray and brown lime, some flint.
355	375	Brown lime, some flint.
375	390	Black lime, little flint.
390	402	Brown lime and flint.

Stover Property

(NW-1/4 sec. 33, T. 34 S., R. 23 E., Cherokee County, Kans.)

Ralph Sears, Driller

Hole 1

Started: 4/12/37
 Completed: 4/30/37

Depth to water: 26 and 400 ft.
 Water stands: 5 ft.
 Elevation: 876 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	20	Surface, yellow clay and sand rock.
20	80	Gray and white soap.
80	185	Gray soap streaks of black shale.
4399		

Hole 1 (Cont.)

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
185	245	Gray-white soap, shale, gray lime and flint.
245	275	Gray lime, white flint.
275	300	Do.
300	350	Hard gray lime, white flint.
350	365	Gray, brown lime, gray, blue flint.
365	375	Gray, brown lime, gray, blue and brown flint.
375	390	Dark gray lime, gray, blue flint.
390	410	Dark gray lime, gray-white flint, mud openings, mundic.
410	415	Dark gray lime, gray-white flint, mud openings, mundic, traces of zinc. No sample.
415	421	Blue, gray, brown flint, mud openings, mundic.
421	428	Blue, gray, brown flint, gray lime.

Hole 2

Started: 5/3/37
 Completed: 5/20/37

Water stands: 35 ft.
 Elevation: 884 ft.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	24	Surface, yellow clay and sand rock.
24	230	Gray, blue soap streaks of shale and lime.
230	235	Brown oil sand and white water sand.
235	255	Gray lime, black shale and mundic.
255	270	Dark gray lime.
270	325	Gray lime, gray flint.
325	355	Gray, brown lime, gray flint.
355	375	Gray, brown lime, gray, blue flint.
375	403	Dark gray lime, gray, blue, brown flint.
403	418	Dark gray, white flint, tiff, lead and zinc shines.
418	423	White, gray flint, mud seams, light zinc shines.
423	433	White, gray, brown flint, some gray lime.
433	463	White, gray, brown flint, light zinc shines.
463	472	White, gray, brown flint, some gray lime.

Analysis, percent

		<u>ZnS</u>	<u>PbS</u>
403	408	0.90	0.86
413	418	2.19	-
418	423	.48	-

Hole 3

Started: 5/24/37
 Completed: 6/6/37

Depth to water: 30, 50, and
 305 ft.
 Water stands: 205 ft.
 Elevation: 885 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	20	Surface yellow clay and sand rock.
20	230	Gray-blue soapstone; streaks of lime and shale.
230	240	Brown oil sand, white water sand.
240	255	Gray lime, black shale and mundic.
255	285	Dark gray lime.
285	330	Gray lime and gray flint.
330	350	Gray lime, gray and blue flint.
350	380	Brown lime, gray and blue flint.
380	390	Brown and gray lime, gray and blue flint, light lead shines.
390	395	Brown and gray lime, black and gray flint, light zinc and lead shines.
395	405	Brown, gray and white flint; tiff crevice; light zinc and lead shines.
405	410	Dark gray lime, blue and gray flint, tiff, fair zinc.
410	415	Brown and gray flint, zinc shines.
415	435	Brown, gray and white flint, hard.
435	454	Brown lime, white and gray flint, hard.

Analysis, percent

		<u>Blende</u>
405	410	4.95
410	415	2.40

Hole 4

Started: 7/9/37
 Completed: 7/29/37
 Lost water at 305 ft.;
 stands at 205 ft.

Depth to water: 50 ft.
 Water stands: 30 ft.
 Water level: 205 ft.
 Elevation: 884 ft.

<u>Depth,</u> <u>From-</u>	<u>ft.</u> <u>To-</u>	<u>Formation</u>
0	26	Surface and yellow clay and sand rock.
26	195	Gray and blue soap.
195	255	Blue and black shale, lime streaks, mundic.
255	285	Gray lime and black shale.
285	300	Gray lime and gray selvage.
300	335	Gray, brown lime and gray flint.
335	350	Gray, brown lime and gray and white flint.
360	390	Gray, brown lime, blue, white and gray flint.
390	400	Brown, black lime, tiff, white, blue flint, jack and lead shines.
400	410	Gray, white, blue, brown flint, lead and jack shines.
410	430	Gray, white, blue, brown flint and trace of jack.
430	440	Gray, white and brown flint.
440	452	Gray, blue flint and brown lime.

4399

Hole 5

Started: 7/1/37
 Completed: 7/17/37

Depth to water: 50 ft.
 Water level: 230 ft.
 Elevation: 882 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	10	Surface and clay.
10	20	Clay and sand rock.
20	29	Blue soap.
29	35	Gray soap, gray, brown, black lime boulders.
35	65	Gray and blue shale and streaks of lime.
65	85	Gray shale, streaks of lime.
85	90	Gray and blue shale, streaks of lime.
90	97	Light gray shale.
97	178	Gray and blue shale, streaks of lime and mundic.
178	232	Black shale, streaks of lime and mundic.
232	237	Black and gray shale, steaks of lime and mundic.
237	240	Black shale, lime and mundic boulders.
240	250	Brown oil sand and white water sand.
250	265	Gray lime and gray flint.
265	280	Gray lime.
280	295	Gray lime, white flint, streaks of black shale.
295	300	Gray lime, white flint.
300	305	Lost cuttings.
305	315	Gray lime, white and blue flint, hog chaw, open ground.
315	325	Gray lime, blue flint, mundic, hog chaw, open ground.
325	335	Gray lime, gray and blue flint, lead traces mundic.
335	370	Gray lime, gray and blue flint, hog chaw, mundic.
370	400	White and blue flint, brown lime and tiff.
400	410	White and blue flint, brown lime, lead and jack shines.
410	415	Blue and gray-spotted flint, brown lime, lead and jack shines.
415	420	Brown lime, gray flint, traces jack and lead.
420	425	Brown lime, gray flint, open ground, few lead and jack shines.
425	435	Brown lime, white and brown flint.

Analysis, percent

	<u>Blende</u>
400	410
	2.192

Hole 6

Started: 8/21/37
 Completed: 9/3/37

Depth to water: 60 ft.
 Water stands: 205 ft.
 Elevation: 886 ft.

<u>Depth,</u>	<u>ft.</u>	<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	25	Surface, yellow clay and sand rock.
25	70	Blue soap and lime boulders.
70	140	Blue and gray soap and shale and lime boulders.
140	225	Blue and gray soap, steaks of shale and lime boulders.
225	230	Blue shale and mundic.
230	235	Gray lime and mundic.

Hole 6 (Cont.)

Depth, ft.	Formation	
From-	To-	
235	245	White water sand and oil sand.
245	255	Black shale seams, gray lime and mundic.
255	260	Gray lime, black shale and mundic.
260	280	Gray flint and gray lime, mundic.
280	310	Gray lime.
310	335	Gray lime and gray flint.
335	380	Gray lime, white and gray flint, mundic, open ground.
380	390	Brown lime, blue, gray, brown flint, lead shins, hog chaw.
390	395	Brown lime, blue, gray, white flint, few lead and jack shins.
395	410	Blue, gray, white flint, tiff, fair jack shins.
410	420	Blue, gray, white, brown flint, fair jack shins, open ground.
420	431	Brown lime, white flint.

Analysis, percent

	ZnS	PbS
390 400	2.79	0.09
400 405	-	-
405 410	3.72	-
410 415	-	-
415 420	2.19	-

D. W. Goodrich Property

(E-1/2 NE-1/4 sec. 29, T. 34 S., R. 23 E., Cherokee County, Kans.)

F. E. Davis, Driller

Hole C-1

Started: 9/20/29
 Completed: 10/10/29
 Depth to water: 22 and 360 ft.

Location: 350 ft. W, 125 ft. N
 of SE corner
 Water stands: 165 ft.
 Elevation: Not recorded

Depth, ft.	Formation	
From-	To-	
0	226	Soapstone.
226	235	White sand, shale streaks.
235	265	Soapstone.
265	270	White, sandy lime, soapstone.
270	295	Gray, sandy lime, little oil.
295	360	White and dark lime, some flint.
360	375	Darker-colored flint and lime, crevices.
375	380	Black lime and flint.
380	382-1/2	Blue, black flint, shins lead.
382-1/2	390	Blue, brown flint (1/10 rec.) shins jack.
390	410	White flint.
410	415	Brown oolitic lime.
415	485	Mostly gray and brown lime.
485	490	Dark-colored lime and flint.
490	505	Lighter-colored lime and flint.
		Gas encountered at 262 feet.
4399		- 94 -

Hole C-2

Started: 8/20/30
 Completed: 8/28/30
 Depth to water: 100, 357 and 165 ft.

Location: 600 ft. N of
 hole C-1,
 Water stands: (?)
 Little gas at 250 ft.
 Elevation: Not recorded

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	247	Soapstone.
247	255	Gray, sandy lime.
255	285	Light lime and flint, trace of oil.
285	335	Light and gray lime, some flint.
335	355	Gray and brown lime, some flint.
355	357-1/2	Brown flint, shines lead.
357-1/2	360	Blue and little brown flint, shines jack.
360	370	Blue flint, shines jack.
370	385	Dead-looking flint.
385	390	Brown oolitic lime.
390	396	Brown lime and flint.

Hole C-3

Started: 8/28/30
 Completed: 9/6/30
 Depth to water: 100 and 240 ft.

Location: 375 ft. N of
 hole C-2
 Water stands: 160 ft.
 Elevation: Not recorded.

<u>Depth, ft.</u>		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	238	Soapstone.
238	245	Gray, sandy lime.
245	270	Gray and brown lime, little flint, considerable oil, some gas at 250 feet.
270	280	Brown, sandy lime, little oil.
280	325	Gray lime, some flint.
325	335	Brown lime, some flint.
335	342-1/2	Blue flint, some brown lime.
342-1/2	345	Blue flint, some gray lime.
345	347-1/2	Shelly blue flint, mud openings.
347-1/2	352-1/2	Blue flint, some tiff and lime (1/20 rec.)
352-1/2	355	Blue and brown chatty flint, trace of shale, little jack.
355	365	Dull-colored flint.
365	375	Blue flint.
375	380	Brown oolitic lime.
380	394	Brown lime and flint.

Hole C-4

Started: 9/6/30
 Completed: 9/15/30
 Depth to water: 105 and 305 ft.
 (sulfur)

Location: Approximately 420 ft.
 N of hole C-3
 Water stands: 160 ft.
 Elevation: Not recorded

Depth, ft.		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	235	Soapstone.
235	255	Gray and brown oily limestone.
255	270	Gray limestone, some white flint.
270	280	Dead-white flint, little gray lime.
280	315	Dead-white flint, little blue flint.
315	330	Dirty white, brown and blue flint.
330	335	Mud opening, dirty white flint.
335	340	Open ground, dead white flint (1/40 rec.)
340	365	Dead-white flint.
365	370	White flint, brown oolitic limestone.
370	377-1/2	Brown oolitic limestone, little white flint.

Remarks: Hole quite firm except for opening from 330 to 340 feet. No gas in this hole.

Hole C-5

Started: 9/19/30
 Completed: 9/27/30
 Depth to water: 110 and 360 ft.;
 not strong.

Location: 300 ft. N, 205 ft. W
 of hole C-4.
 Water stands: 200 ft.
 Elevation: Not recorded.

Depth, ft.		<u>Formation</u>
<u>From-</u>	<u>To-</u>	
0	230	Soapstone.
230	235	Gray, sandy lime.
235	240	Gray lime, white flint, mundic, shines jack.
240	255	Sandy brown and gray lime, white flint, oily.
255	270	Gray lime, white flint.
270	305	White flint, little blue.
305	320	Blue, white, little brown flint.
320	330	White, light brown, little black flint.
330	340	Dirty white, blue flint, soft white lime.
340	345	Dirty white and brown flint.
345	355	Dead white flint.
355	365	White water flint, little mundic, shines jack.
365	370	White flint, brown oolitic lime.
370	379	Brown lime, water flint.

Hole C-6

Started: 9/27/30
 Completed: 10/6/30
 Depth to water: 110 and 330 ft. (weak)

Location: 200 ft. W and 100 ft.
 N of hole C-5
 Water stands: 200 ft.
 Elevation: Not recorded

<u>Depth,</u>	<u>ft.</u>	
<u>From-</u>	<u>To-</u>	<u>Formation</u>
0	225	Soapstone.
225	230	Gray, sandy lime, mundic.
230	255	Gray lime, little flint, trace of oil.
255	290	White lime, some flint.
290	330	Gray and brown lime, little flint.
330	340	Blue and little brown flint.
340	360	White, dead-looking flint.
360	365	Brown oolitic lime, some flint.

