

32-14-29W

C N/2 NW

LEE H. CORNELL

Petroleum Geologist

PHONE AMHERST 2-3921

705 ORPHEUM BUILDING

WICHITA 2, KANSAS

July 29, 1963

S and C Drilling, Inc.

P. O. Box 271

Hays, Kansas

Re: No. 1 Lundgren

C/ N/2 NW/4 32-14S-29W

Gove County, Kansas.

Gentlemen:

The following is my report on the above captioned well. One-foot drilling time was kept and five-foot samples were saved from 3500' to 4264', rotary total depth. Samples were delivered to the Kansas Well Sample Bureau.

MISCELLANEOUS DATA

Contractor: S and C Drilling, Inc.

Surface Hole: July 3, 1963.

Surface Casing: 8 5/8" set at 82 feet, cemented with 75 sacks.

Rotary T. D.: 4264'

Oil String: 5 1/2" set at 4242, cemented with 250 sacks.

Centralizers at: 4229, 4155, 4080, 4030 and 3900.

FORMATION TOPS

Elevation 2584 K.B.

By Samples and Drilling Time:

By Welex:

Anhydrite	1985	+ 599	1980	+ 604
Topeka	not picked		3330	- 746
Heebner	3599	-1015	3595	-1011
Toronto	3620	-1036	3616	-1032
Lansing	3634	-1050	3633	-1049
B/KC	3948	-1364	3944	-1364
Marmaton	3967	-1383	3964	-1380
Pawnee	4057	-1473	4053	-1469
Ft. Scott	4123	-1539	4121	-1537
Cherokee Shale	4149	-1565	4146	-1562
Cherokee Lime	4152	-1568	4149	-1565
Conglomerate	4207	-1623	4204	-1620
Miss. (St. Louis)	4214	-1630	4211	-1627
Spergen Dolomite	4249	-1655	4247	-1653
Total Depth	4264	-1680	4262	-1678

There is a consistent difference of 2 to 4 feet up the hole between rotary measurements and Welex Measurements. All depths used in this report for sample descriptions, drill stem tests and cores are adjusted to Welex Measurements

STRUCTURAL POSITION

On top of the Heebner Shale, #1 Lundgren is one foot lower than #1 H. J. Lundgren, 4 feet higher than #1 Phelps and 11 feet higher than #2 Phelps. The well is from 7 to 20 feet lower than the producing wells in Section 31.

On top of the Mississippian (St. Louis), No. 1 Lundgren is 6 feet higher than #1 H. J. Lundgren, 10 feet higher than #1 Phelps and 19 feet higher than #2 Phelps. The well is from 7 feet lower to 16 feet higher than the producing wells in Section 31.

There is a thinning of approximately 5 feet in the Pleasanton Shale (B/KC to Marmaton) and approximately 5 feet in the Pawnee limestone as compared to the Lundgren well and the Phelps wells in Section 5.

Because of a thick section (25 feet) of St. Louis, the Spergen Dolomite in No. 1 Lundgren is 17 feet lower than No. 1 H. J. Lundgren, 3 feet higher than No. 1 Phelps and 14 feet higher than No. 2 Phelps. It is from 2 to 20 feet lower than all of the producing wells except two in Section 31. It is 7 feet higher than No. 3 O'Conner and Wycoff-Williams No. 2 Lundgren.

The structural position of No. 1 Lundgren confirms the seismic work done in the area.

LANSING SECTION

3882 - 86 "M" zone Limestone, oolitic and oolitic, faint odor, small show of free oil, light stain (7 to 8% porosity, 38 to 60% water saturation by Welex).

Halliburton DST No. 1, 3868 - 3898: Open 1 hour, weak, intermittent blow for 40 minutes; recovered 5 ft. of slightly oil cut mud, 60 ft. of thin mud. ICIP 1008#/30 mins.; FCIP 1008#/30 mins.; IFP 26#, FFP 51#. Zone of no value.

3934 - 37 Limestone, dense, slight stain and fluorescence, no visible porosity. Not calculated by Welex. Zone of no value.

MARMATON SECTION

4009 - 11 ("O" Zone) Limestone, medium crystalline, poor porosity, scattered dark stain. (17% porosity, 49% water saturation by Welex). Zone of questionable value.

PAWNEE SECTION

Core No. 1 4055--85: Recovered 30 feet.

4055 - 56 3" shale, 9" dense, fractured limestone.

4056 - 62 ("Q" Zone) Detailed description and core analyses below.

4056 - 56½ Limestone, medium crystalline, slight porosity and stain.

4056½ - 59 Limestone, oolitic and fossiliferous, fair porosity, spotted light staining.

4059 - 60 Limestone, fossiliferous, excellent vugular and fossil-cast porosity. Spotted to good staining.

4060 - 62 Limestone, oolitic and fossiliferous; fair oolitic porosity, some fossil-cast porosity, spotted staining.

Core Analyses ("Q" Zone)

<u>Depth</u>	<u>Perm.</u>	<u>Por. %</u>	<u>Oil%</u>	<u>Water%</u>
4056 - 57	0.3	12.0	12.5	60.0
4057 - 58	0.1	10.2	8.8	55.8
4058 - 59	1.5	18.0	11.7	47.8
4059 - 60	42.0	20.5	17.6	69.2
4060 - 61	0.1	15.5	10.3	44.5
4061 - 62	1.9	11.0	13.6	40.0

The Welex analyses of the same interval is 12 to 13% porosity and 26 - 35% water saturation.

4062 - 85 (Balance of Core #1) Limestone, dense, fractured in part, some thin shale separations. No show of oil.

Halliburton DST No. 2, 4038 - 4085: Open 1 hour, weak blow increasing to strong blow. Recovered 60 ft. of slightly oil cut mud, 60 ft. of heavily oil cut mud and 60 ft. of muddy oil (Gravity 35 at 100 degrees = approx. 31.5 gravity corrected). ICIP 1129#/30 mins; FCIP 1051#/30 mins. IFP 51#, FFP 85#.

The "Q" Zone is recommended for testing.

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4100 - 04 ("S" Zone) Limestone, medium crystalline, poor porosity, slight, dark stain. (14% porosity, 20% water saturation by Welex). The low water saturation indicates probable low permeability. Not recommended for testing.

FT. SCOTT SECTION

Core No. 2 4133 - 86½: Recovered 35½ feet.

4133 - 39 Limestone and shale streaks.

4139 - 42 ("U" Zone) Detailed description and core analyses below.

4139 - 40 Limestone, fine crystalline, fair vugular porosity, streaks of fair to good staining.

4140 - 42 Limestone, medium crystalline, some vertical fractures, good vugular porosity, excellent saturation.

Core Analyses ("U" Zone)

<u>Depth</u>	<u>Perm.</u>	<u>Por. %</u>	<u>Oil %</u>	<u>Water %</u>
4139 - 40	7.0	15.0	25.3	36.0
4140 - 41	35.0	20.6	28.6	34.0
4041 - 42	37.0	10.5	33.6	31.4

Welex analyses of same interval is 6 to 7% porosity, 28 - 29% water saturation.

4142 - 46 Limestone, dense.

CHEROKEE SECTION

4146 - 49 Black, carboniferous shale.

4149 - 56 ("V" Zone) Limestone, dense, fractured in part. No show of oil. Welex analysis 4150 - 54 6% porosity, and 39% water saturation.

4156 - 63 Shale and gray-brown, shaley limestone.

4163 - 66 ("W" Zone). See detailed description and core analyses below.

4163 - 64 Limestone, good vugular porosity, spotted to complete staining.

4164 - 66 Limestone, fossiliferous, excellent vugular porosity, complete staining.

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Core Analyses ("W" Zone)

<u>Depth</u>	<u>Perm.</u>	<u>Por. %</u>	<u>Oil %</u>	<u>Water %</u>
4163½ - 64	0.5	7.8	33.4	19.2
4164 - 65	19.0	10.3	18.4	20.4
4165 - 66½	66.0	10.2	24.5	30.4

Welex analyses for same interval 9 to 11% porosity and 45 - 60% water saturation.

4166½ - 68 Limestone, fossiliferous and shale streaks, some hair-line fractures with spots bleeding oil.

4168 - 68½ Limestone, vugular porosity, bleeding oil.

Core Analysis

<u>Depth</u>	<u>Perm.</u>	<u>Por. %</u>	<u>Oil %</u>	<u>Water %</u>
4168 - 68½	0.1	5.4	11.1	40.7

Zone not recognized on Welex Log.

Halliburton DST #3, 4127 - 4168½: Open 1 hour, strong blow throughout test, gas to surface in 75 minutes (includes 15 mins. open time before ICIP); recovered 280 ft. of clean oil, 420 ft. of slightly muddy oil and 300 feet of gassy, muddy oil. (Gravity 38 at 89 degrees = approx. 35 gravity corrected) ICIP 1146#/30 mins.; FCIP 1121#/30 mins. IFP 68#; FCIP 367#.

The oil in DST No. 3 probably came from both the Ft. Scott section at 4139 to 4142 ("U" Zone) and from the Cherokee section at 4163½ - 66½ ("W" Zone). It is recommended that both sections be perforated and tested independently.

4177 - 80 ("X" Zone) Limestone, crystalline, faint odor, small show of dark, free oil; good vugular porosity and fair to good stain.

Halliburton DST #4, 4167 - 83: Open 1 hour, fair blow throughout; recovered 55 ft. of heavily oil cut mud, no water. ICIP 1198#/30 mins., FCIP 1163#/30 mins. IFP 17#, FFP 34#.

It is recommended that the "X" Zone be perforated and tested.

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Core No. 3, 4183 - 4217; recovered 34 feet.

4183 - 86½ Limestone, dense.

4186½ - 91½ Shale, with red chert and limestone pebbles.

4191½ - 97 Limestone, dense with numerous horizontal, vertical and diagonal hair-line fractures. 6" of highly fractured limestone with small show of oil 4193 - 93½ and 12" of highly fractured limestone with small show of oil, 4196 - 97.

These two thin, highly fractured sections are not recognizable on the Welex Log, but probably represent the "Y" Zone, which is found in other wells in the area.

4197 - 4200½ Limestone, dense, with a few shale partings and occasional hair-line fractures.

4200½ - 03 Limestone, highly fractured, no show of oil.

4203 - 05 Limestone, dense, with thin shale partings.

4205 - 11 Greenish, shaley conglomerate, with red and gray chert, small, sub-round sand grains, imbedded in green shale.

4211 - 16½ Limestone, gray, slightly cherty, fractured, with few thin gray-green shale partings; very small show of oil in occasional fractures. Welex 7 to 9% porosity, 45 to 60% water saturation, 4211 - 16. Not recommended for testing.

4216½ - 17 Limestone, dark gray, lithographic, thin, diagonal hair-line fractures with occasional very small show of oil.

(Top of the St. Louis 4211')

Because of the lack of porosity and saturation, none of Core No. 3 was saved for analysis.

4217 - 37 Limestone, light to dark gray, dense, slightly cherty; rare shows of oil and partial staining.

4237 - 62 (Spergen section) Total depth. Dolomite, fine to medium crystalline, fair odor, small show of free oil, light partial to complete staining.

Porosity and water saturation by Welex:

4237 - 40 12% porosity, 75% water.

4240 - 48 17 to 24% porosity, 48 to 60% water.

4248 - 62 17 to 20% porosity, 43 to 82% water.

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Halliburton DST #5, 3236 - 62: Open 1 hour; recovered 3 ft. of oil and 75 ft. of very slightly oil cut mud, no water. ICIP 1198#/30 mins.; FCIP 1103#/30 mins.; IFP 26#; FFP 51#.

It was recommended that 5-1/2 inch casing be set at 4242' and that the well be tested in open hole.

Although there was no water in DST #5, it is quite possible that the bottom 14 feet of the hole would make considerable water if subjected to acid or fracture treatment. It is suggested that after the plug is drilled and the hole tested natural, that the section from 4248 - 62 be plugged off with leadwool or plastic before any artificial stimulation in the hole.

Yours very truly,



Lee H. Cornell,
Petroleum Geologist.

LHC/mlb
encl.

S. & C. Drilg Inc.

Lundgren #1

Top of the Heebner Shale

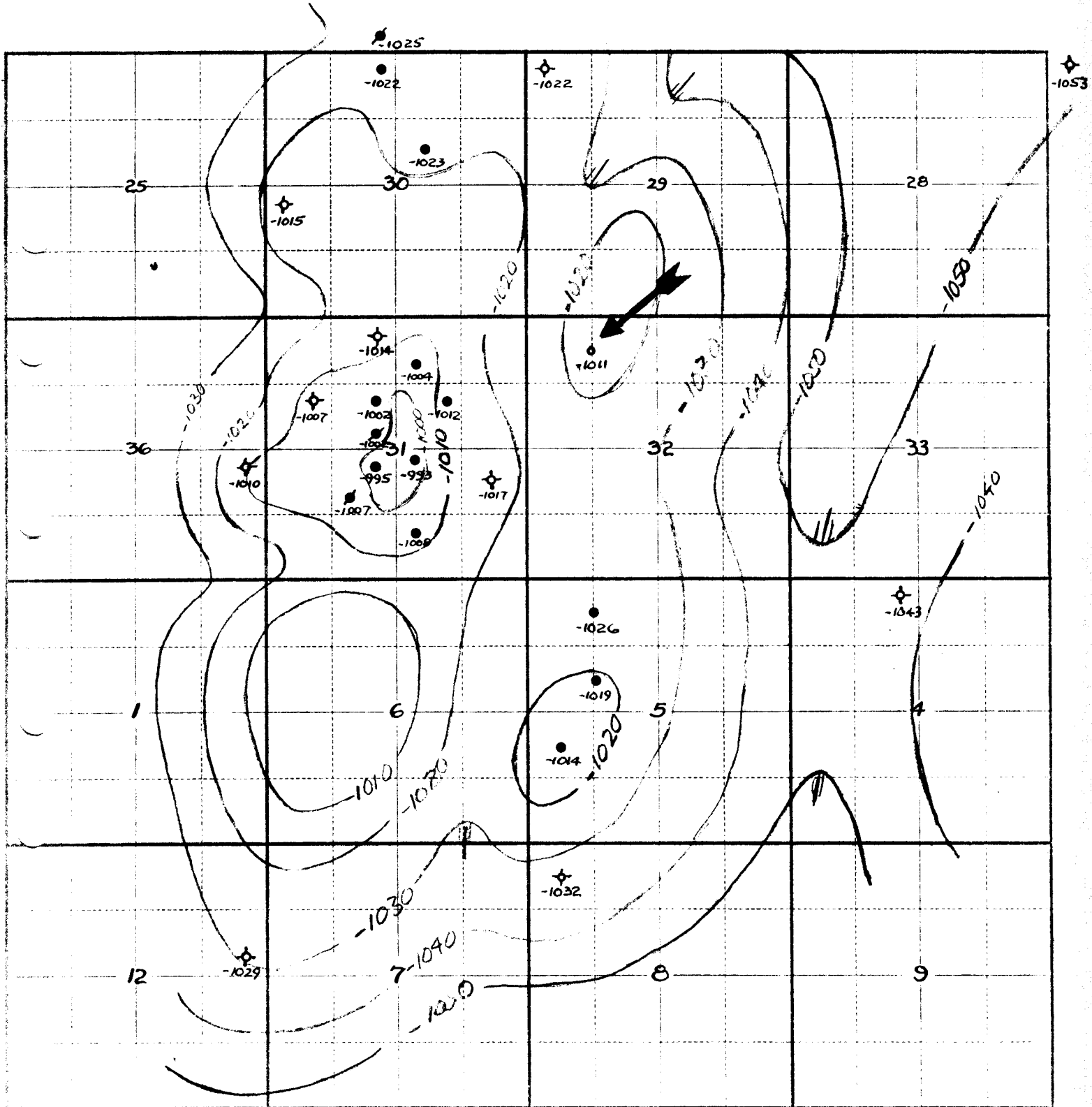
Contour Interval - 10 ft.

By Lee H. Cornell

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C N/2 NW

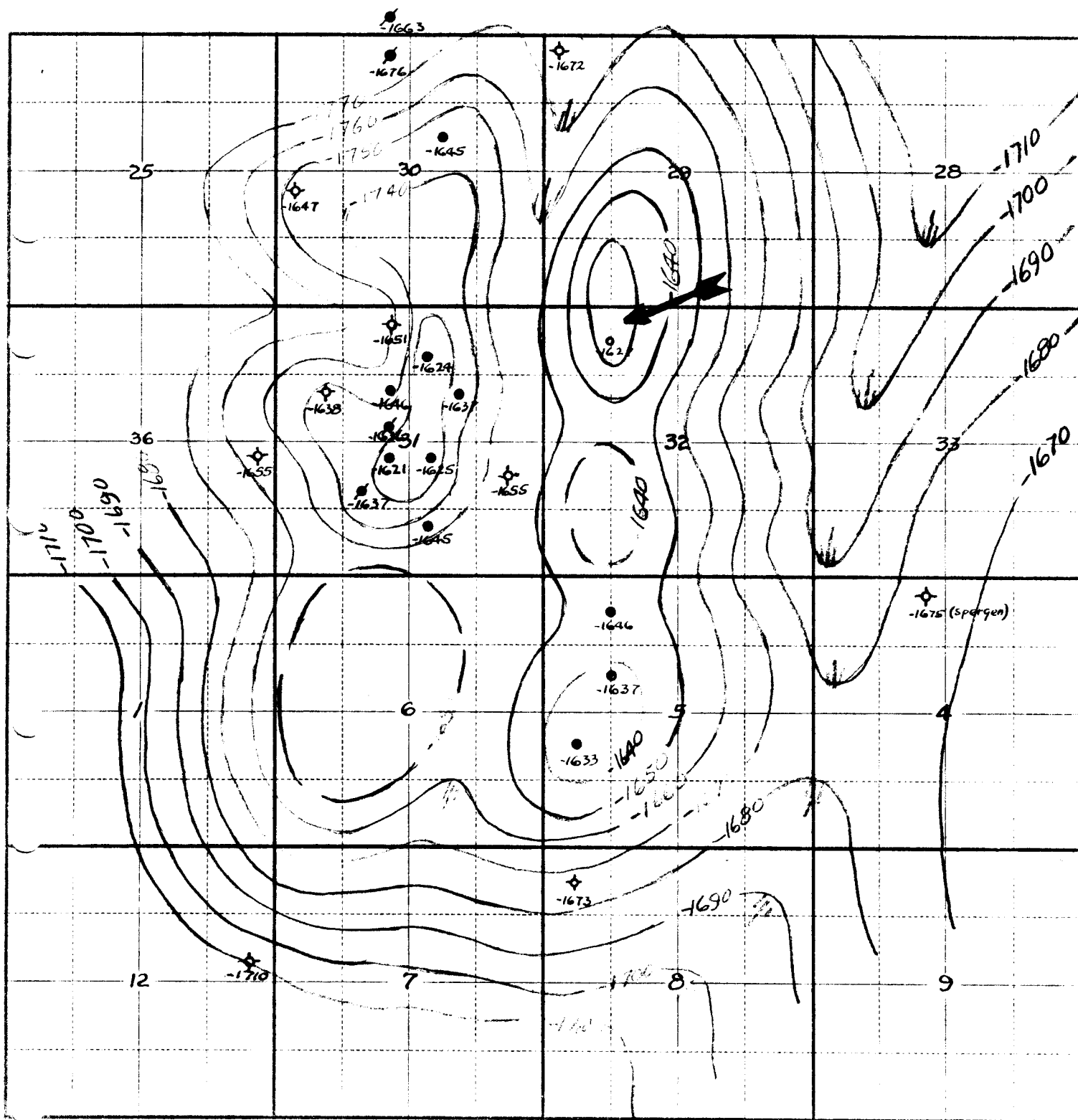
Township 14 & 15s Range 29 & 30 w County Gove State Kansas



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C N/2 NW

C N/2 NW

Township 14 & 15 S Range 29 & 30 W County Gove State Kansas



S. & C. Drlg. Inc. Top of the Spergen Dolomite
Lundgren #1 Contour Interval - 10 ft.
By Lee H. Cornell

32-14-29W
C N 1/2 NW

Township 14 N 15 S Range 29 E 30 W County Gove State Kansas

