

2-31-18W

Page 2 4

#1 Herrington M.L. Brown Co.
C NE NE Section 2-31S-18W
Comanche County Kansas

15-033-20365

Comparison of Sample Tops with those indicated on the
Electric Log. Samples started at 4100'.

Formation	Sample	Electric Log
Heebner	4195 (-2055)	4190 (-2050)
Br. Lime	4354 (-2214)	4362 (-2222)
Lansing	4372 (-2232)	4379 (-2239)
Base Kansas City	4798 (-2658)	4795 (-2655)
Marmaton	4813 (-2673)	4806 (-2666)
Marmaton "X"	4849 (-2709)	4849 (-2709)
Cherokee	4944 (-2804)	4942 (-2802)
Base Cherokee Ls	4996 (-2856)	4994 (-2854)
Reworked Mississippi		5003 (-2863)
Solid Mississippi	5012 (-2872)	5014 (-2874)
Miss Dol Por	5032-34	5032-34
Total Depth	5050 (-2910)	5050 (-2910)

State Geological Survey
WICHITA, BRANCH

2-31-18W

Page 3

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

Detailed sample descriptions of intervals covered by the
drill stem tests.

Top Marmaton 4813 -2673) Log Top 4806
Top Marmaton "X" 4849 -2709)

DST #1 and #2 4952 to 4888*

DST #1 tool unable to penetrate a "bridge" at
approximately 2600'. DST #2 went to bottom but
failed to hold.

DST #3 4840-4888 successful.

*Total anchor was measured after pulling DST #2.
Anchor was ordered to be 36'. Measured 2.6' short.
Anchor for DST #2 corr from 4852 to 4888 TD to
4854 to 4888 TD, 34'.

4849-4859 Ls, dense gray-green, hard very finely crystalline, trace dark brown chert.

4859-4869 Greenish, gritty calcerous shale on buff, granular crystalline limestone; trace buff granular limestone with inter-granular porosity and live fluorescence; trace spongy fossil cast porous limestone, no stain.

4869-4879 Limestone, grayish, dense, hard, finely crystalline, some micro fossiliferous; trace pinhole porosity, one fragment fracture stain.

4879-4888 Limestone, grayish, finely crystalline, trace soft mealy fossiliferous; some finely granular, one fragment medium-fine oolicastic rich tan stain.

 Circulated one hour at 4888 prior to "short" trip
 then circulated 90 minutes before coming out for
 DST #1.

 Drill Stem Test #1 4852-4888 Mis-Run. Solid
 bridge at approximately 2600.

State Geological Survey
WICHITA BRANCH

2-31-18W

Page 4

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

Went back in hole, drilled out bridge,
circulated off bottom.

Drill Stem Test #2 4852-4888 Mis-run, packer
wouldn't seat. Strapped anchor after DST #2,
reported 33.4' instead of 36.
DST #2 corrected 4854 to 4888.

DST #3 changed anchor to 48', DST 4840 to
4888. Tool open 8:58, blow off bottom of
bucket in 5 minutes. Gas to surface in 43
minutes.

<u>Time</u>	<u>Choke</u>	<u>Pressure</u>	<u>Gas Rate</u>
9:45	1/4"	1.18 lb.	8.95 MCF
9:50	1/4"	1.5	11.02
9.55	1/4"	1.5	11.02
			Close tool 9:58 Open tool 10:58
11:05	1/4"	2	12.7
11:10	1/4"	3	15.7
11:15	1/4"	3	15.7
11:20	1/4"	3	15.7
11:25	1/4"	3	15.7
11:30	1/4"	2	12.7
11:35	1/4"	2	12.7
11:40	1/4"	2	12.7
11:45	1/4"	2	12.7
11:50	1/4"	2	12.7
11:55	1/4"	2	12.7

State Geological Survey
WICHITA, BRANCH

Tool open 120 minutes.

Found 500' fluid in pipe:

120' of slightly oil and gas cut mud
60' of brown to black oil cut gassy mud
60' empty
120' of clean gassy to slightly muddy oil
60' empty
80' black muddy oily emulsion
No water.

2- 31-18W

Page 5

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

DST #3 cont.

IHH	2598#
IPP	93-185#
ICIP	1541#
FFF	123-226#
FCIP	1562#
FHH	2536
BHT	119°

Drill Stem Test #4, 4972 to 5019.
Base Cherokee Ls 4996, Top Miss 5012.

4996-5012 Shale, green, trace maroon, few green irregular nodules (phosphatic?), traces of bright green, glauconitic limestone, trace green and orange shaly limestone, trace brown, glossy chert, fractured linear black stain.

Top Mississippi 5012 (-2872)

5012-5019 Limestone, orange and green, stained, mottled, glauconitic, trace green, hard, weathered chert, black mottled stain, trace glossy, gray, semi-translucent sparse fossil chert limestone mostly gray-white, dense, fine crystalline, sparsely glauconitic, trace light tan stained, very fine crystalline dolomitic limestone and dolomite, traces of fracture fluorescence.

Circulated 90 minutes at 5019.

Drill Stem Test #4 4972 to 5019.
Tool open at 16:55.
Strong blow, gas to surface in 16 minutes.

State Geological Survey
WICHITA BRANCH

2-31-18W

Page 6 4

#1 Herrington
 C NE NE Section 2-31S-18W
 Comanche County, Kansas

DST #4 cont.

<u>Time</u>	<u>Choke</u>	<u>Pressure</u>	<u>Gas Rate</u>
17:15	1/4"	1.5	11.2 MCF
17:20	1/4"	5.	20.7
17:25	1/4"	6.5	23.9
17:30	1/4"	8.	27.
17:35	1/4"	9.5	29.9
17:40	1/4"	11.	32.4
17:45	1/4"	12.	34.
17:50	1/4"	13.	35.9
17:55	1/4"	14.	37.6
18:00	1/4"	15.	39.2
18:05	1/4"	15.5	40.
18:10	1/4"	16.	40.9
18:15	1/4"	16.5	41.6
18:20	1/4"	16.5	41.6
18:25	1/4"	16.5	41.6
19:25	1/4"		Closed tool
19:30	1/4"	17.5	43.1
19:35	1/4"	18.	43.9
19:40	1/4"	18.5	44.7
19:45	1/4"	19.	45.5
19:50	1/4"	19.	45.5
19:55	1/4"	19.	45.5
20:00	1/4"	19.5	46.3
20:05	1/4"	19.5	46.3
20:10	1/4"	20.	47.1
20:15	1/4"	20.	47.1
20:20	1/4"	20.	47.1
20:25	1/4"	20.	47.1
			Closed tool

State Geological Survey
 WICHITA, BRANCH

Tool open two hours and 30 minutes.
 Recovered 15' of gas cut mud.

IHH	2785	
IFP	62-82	90 min.
ICIP	1500	60 min.
FFP	51-51	60 min.
FCIP	1459	90 min.
*FHH	2577	
BHT	111°	

*Another interpretation of the Hydrostatic heads
 would be much closer.

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

2-31-18W

Page 7

DST #5 5022-5036

5019-5027 Limestone, white, crystalline, speckled, glauconitic on flaky, fine, granular, crystalline speckled limestone and dolomitic limestone, fracture fluorescence; trace greenish-white, very finely sucrosic dolomite and buff, very finely, sucrosic dolomite, live oil fluorescence, samples light dull tan stain dried.

5027-5030 Dolomite, few light tan, very fine to finely sucrosic tan stain and dolomitic limestone, dense, greenish-white, spicular with bluish-white chert, black splotches.

Circulated 90 minutes at 5029, no free oil.

5030-5032 Interpreted as hard dolomitic limestone, slightly cherty.

Top Mississippi Dolomite Zone 5032 (-2892)

5032-5036 Dolomite, tan stained, soft and hard, very fine to finely sucrosic, few gray, white, opaque chert, black inclusions; trace light gray weathered speckled tan stained dolomitic chert and grayish, hard, flaky, dolomitic limestone and dolomite light stain, fracture fluorescence, few quartzose fragments, trace tan stain.

Circulated 90 minutes at 5036.

State Geological Survey
WICHITA, BRANCH

2-31-18W

Page 8

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

Drill Stem Test #5 5022-5036

Tool open 15:15, strong blow, gas to surface
in fifteen minutes.

<u>Time</u>	<u>Choke</u>	<u>Pressure</u>	<u>Gas Rate</u>
15:35	1/4"	5.	20.7 MCF
15:40	1/4"	8.	27.
15:45	1/4"	10.	30.8
15:50	1/4"	11.	32.4
15:55	1/4"	12.	34.
16:00	1/4"	12.5	35.
16:05	1/4"	13.	35.9
16:10	1/4"	13.	35.9
16:15	1/4"	13.5	36.75
16:20	1/4"	13.5	36.75
16:25	1/4"	14.	37.6
16:30	1/4"	14.5	38.4
16:35	1/4"	14.5	38.4
16:40	1/4"	14.5	38.4
16:45	1/4"	14.5	38.4
17:45			Closed tool
17:50	1/4"	13.5	36.75
17:55	1/4"	15.	39.2
18:00	1/4"	15.	39.2
18:05	1/4"	15.	39.2
18:10	1/4"	15.	39.2
18:15	1/4"	15.	39.2
18:20	1/4"	15.	39.2
18:25	1/4"	15.	39.2
18:30	1/4"	15.	39.2
18:35	1/4"	15.	39.2
18:40	1/4"	15.	39.2
18:45	1/4"	15.	39.2
			Closed tool

State Geological Survey
WICHITA, BRANCH

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

DST #5 cont.

Tool open two and one-half hours.
Rec. 165' of fluid
45' of gassy oil cut mud
60' of gassy muddy oil
60' of fairly clean oil
No water, oil 35° at 60°

IHH	2619	
IFP	31-72	90 min.
ICIP	1459	60 min.
FFP	41-72	60 min.
FCIP	1459	120 min.
FHH	2619	
BHT	112°	

5036-5042 (Circulated one hour on bottom before drilling ahead.)
Dolomite, light buff and green, mottled, very finely crystalline, mostly light tan, soft, very finely sucrosic, minute fluorescence, free oil, few quartzose chert, trace with dolomite attached, much gray opaque, mottled, speckled chert, trace weathered dolomitic chert.

5042-5050 Dolomite, grayish-buff and light greenish-white, very finely crystalline to silty, trace soft, rich tan stain, some gray-white, speckled, mottled glauconitic, dolomite, few gray and tan, mottled, fossiliferous, smooth chert new, and white, gran black, speckled chert as above.

Circulated 90 minutes at 5050.

State Geological Survey
WICHITA, BRANCH

2-31-18W

Page 10

#1 Herrington
C NE NE Section 2-31S-18W
Comanche County, Kansas

4

Drill Stem Test #6 5036-5050

Very weak blow top of bucket, gradually increasing to off bottom of bucket in 75 min. Tool open 90 minutes first opening, relieved back pressure during Initial SI. Blow off bottom of bucket immediately after second opening. Tool open two and one-half hours. Recovered 1365' of gas in the pipe and 65' gassy oil cut to heavily oil cut mud.

IHH	2629	
IFP	31-31	90 min.
ICIP	554	60 min.
FFP	31-41	90 min.
FCIP	1233	120 min.
FHH	2619	
BHT	114°	

Note: CIP curves both rising at approximately a 45° angle.

State Geological Survey
1961