



Geophysical / Geological
Consulting and Services

2103 Orchard Lane
Lawrence, Kansas 66044
(913) 841-5366

Lease: Jim Bolinger

Well: Bolinger 3 API# 15-087-20,132

Location: 330'N and 4950'W, cSW SW SW Sec. 25 T.9S, R19E
Jefferson County, Kansas

Surface Elevation G.L. 1109' ASL., KB 1114.2' ASG, surveyed

Date Spudded: March 3, 1985

Date Completed: March 6, 1985

Total Depth: 1780 Missippian, Osage

Initial Production: Gas in Lower McLouth Sandstone

Operator: Jerry Lutz
Route 131 South
Reed City, Michigan 49677 616-832-2347

Drilling Company: Caney Valley Drilling
Box 350
Caney, Kansas 67333 316-673-9091

Geology: Tom W. Stander
Orion, Inc.
2103 Orchard Lane
Lawrence, Kansas 66044 913-841-5366

Mud Logger: Tony Wendle
Maverick Mud Co.
P.O. Box 31
Pratt, Kansas 67124 316-672-7565

Engineering: Rex Keith
Karma, Inc.
Route 1, Box 76
Oskaloosa, Kansas 66066 913-863-2294

Drilling Mud: Trotter International
Box 1462
Topeka, Kansas 66601 913-862-0702

Logging: Glen Schmeidler
Great Guns
Box 8196
Topeka, Kansas 66608 913-233-0521

Surface: Bit size $12\frac{1}{4}$ ", set 125' of 8 5/8" O.D. 19.5 lb. pipe, use 30 sacks of portland cement, 3% cal., pump by Consolidated Well Service from Ottawa, Kansas, set up time 8 hours

Production: Bit size $6\frac{1}{2}$ " O.D. using four drill collars, each drilling joint length 30 feet

Drilling Unit: 1984 Speedstar

Mud Pump: 6 x 10

Drilling Fluids: Surface mud up to drill through glacial till sand, 119-1300 native mud and pond water, 1300-T.D. chemical mud, visc. 30-3 , wt. 9.0-9.2 , f.l. 8-12 cc at T.D. mud, visc. 41 , wt. 9.

Logs: Great Guns; Dual Induction, R.A. Guard, Compensated Density, Compensated Neutron, S.P., G.R., Caliper Computer Tape

Cores: Lower McLouth Sandstone, 1565-1592, 27.5 feet sand sent to oil field lab for analysis

Cementing Production $4\frac{1}{2}$ OD x 1665
 Bt. shoe 1666 feet
 Bottom 637' 80 sacks OWC on bottom
 Surface -637 176sacks 50/50 Poz, 5% salt, 6% gilsonite

Total cement: 256 sacks

Summary
Bolinger #3

cSW SW SW Sec. 25, T9S, R19E, Jefferson County, Kansas
Surface elevation: 1109 s.c. KB 1114.2
All depths from surface elevation.

Electric Log Picks

<u>Geologic Section</u>	<u>Depth</u> (feet)	<u>Datum</u> (ft. ASL)	<u>Remarks</u>
T. Oread limestone			
T. Douglas Group (T. Lawrence Fm.)			
T. Stranger Formation			
T. Lansing Group (T. Stanton lm.)	507	602	
T. Vilas shale	539	570	
T. Plattsburg limestone	560	549	
T. Kansas City (T. Bonner Springs)	579	+530	
T. Wyandotte limestone	604	+505	
T. Lane shale	683	+426	
T. Iola limestone	694	+415	
T. Chanute shale	728	+381	
T. Drum limestone	743	+366	
T. Cherryvale shale	748	+361	
T. Dennis limestone	768	+341	
T. Galsburg shale	794	+315	
T. Swope limestone	799	+310	
T. Ladore shale	828	+281	
T. Hertha limestone	832	+277	
B. Kansas City (B. Hertha/ T. Pleasanton Group)	856	+253	
T. Marmaton Gp. (T. Lenapah lm.)	982	+127	
T. Nowata shale	996	+113	
T. Altamont limestone	1004	+105	
T. Bandera shale	1028	+ 81	
T. Pawnee limestone	1032	+ 77	
T. Labette shale	1056	+ 53	
T. Fort Scott limestone	1062	+ 47	
T. Cherokee Group	1074	+ 35	
T. Squirrel sandstone			Not Present
T. Bevier coal bed	1162	- 53	
T. Ardmore limestone	1184	- 75	
T. Croweburg coal bed	1195	- 86	
T. Upper Cattleman sandstone	1204	- 95	12' shaly sandstone, 6-7 ohmm
T. Fleming coal bed	1240	-131	water sand
T. Mineral coal bed	1250	-141	
2nd Upper Cattleman Sandstone	1273	-164	15' sandstone, shaly in
T. Scammon coal bed	1311	-202	3-7 ohmm water sand
T. Middle Cattleman ss.	1314	-205	15' sandstone, shaly, 8-10 ohmm
T. Lower Cattleman ss.			water, sand
T. Tebo coal bed			Not Present
T. Weir-Pittsburg coal bed	1384	-280	

Summary Continued

<u>Geologic Section</u>	<u>Depth</u>	<u>Datum</u>	<u>Remarks</u>
T. Dry Wood coal bed	1452	-343	
T. Rowe coal bed	1464	-355	
T. Neutral coal bed	1471	-362	
T. Upper McLouth sandstone			Not Present
T. Middle McLouth sandstone	1523	-414	14' shaly sandstone, 6 ohmm water sand, show of oil in smples
T. Lower McLouth sandstone	1550	-441	43' clean sandstone, gas & heavy oil sand, 30-40 ohmm Top 28 ft., good how in samples, core, & hot wire
T. Burgess sandstone		Not Present	
T. Mississippian limestone	1594	-484	
T. 40 foot dolomite zone	1626	-517	water zone 3 ohmm
T. Osage (Burlington/Keokuk)	1726	-617	water zone, 5-7 ohmm
T.D.			

Recommendation

I recommend completing and testing the Lower McLouth sandstone based on excellent indications of gas and heavy oil (tar) in the samples, gas hot-wire instrument, core and core analysis report, and the high electric log resistivities of 30 to 40 ohmmeters in the top 28 feet of the sand.

The other potential pay zone indicated to be full of salt water.

Driller's Log: Caney Valley

J. Bolinger #3

API # 15-087-20,132

cSW, SW, SW, Sec. 25, T9S, R19E, 330'N and 4950'W

Jefferson County, Kansas

0-4	4	clay	694-705	11	limestone
4-8	4	sand	705-722	17	shale
8-40	32	clay	722-729	7	limestone
40-62	22	shale	729-743	14	shale
62-70	8	sandy shale	743-749	6	limestone
70-76	6	limestone	749-753	4	shale
76-168	92	sandy shale	753-756	3	limestone
168-171	3	limestone	756-759	3	shale
171-192	21	shale	759-763	4	limestone
192-232	40	limestone (Oread)	763-772	9	shale
232-508	276	shale	772-790	18	limestone
508-511	3	limestone	790-803	13	shale
511-518	7	shale	803-854	51	limestone
518-530	12	limestone	854-1167	313	shale & broken lm
530-534	4	shale	1167-1170	7	limestone
534-539	5	limestone	1170-1212	42	shale
539-561	22	shale	1212-1234	22	sand
561-579	18	limestone	1234-1284	55	shale
579-605	26	shale	1284-1288	4	limestone
605-610	5	limestone	1288-1313	25	shale
610-614	4	shale	1313-1329	16	sandy sand
614-622	8	limestone	1329-1344	15	sand
622-649	27	shale	1344-1358	14	sandy shale
649-665	16	limestone	1358-1375	17	sand
665-679	14	shale	1375-1565	190	sandy shale
679-684	5	limestone	1565-1592	27	core #1 Lower
684-694	10	shale			McLouth Sandstone
705	11	limestone			sand s7.5 ft.
705-722	17	shale	1592-1780 T.D.	188	Mississippi Limest.

Geologist Log: Tom Stander, Orion
 Bolinger #3 API #15-087-20,132
 cSW, SW, Sw, Sec. 25, T9S, R19E, Jefferson County, Kansas
 330'N and 4950'W

Drilling time plotted 500-T.D. 1780
 Samples 1200-TD 1780

1200-1210	10	sandstone, very grained, shaly, gray, to buff angular, medium porosity, minor gilsonite
1210-1220	10	no show, shale, gray, sandy limestone, buff crystalline sandstone, (same as above) mica shale gray, red, lemon
1220-1230	10	color limestone, (same as above) black shale shale, sandy gray, sandstone, gray to white, shaly
1230-1240	10	very fine grained, angular, abundant mica
1240-1250	10	shale, gray sandy, black to dark gray
1250-1260	10	shale, dark gray
1260-1270	10	shale, dark gray, gray, green
1270-1280	10	shale, gray, red, red yellow, black shale, some minor sandstone
1290-1300	10	shale, gray, sandy, red; reddish-yellow limestone buff, crystalline pyrite
1300-1310	10	sandstone, white to light green, sub angular, medium grained, good porosity, cemented mica, pyrite
1310-1320	10	no shows shale, dark gray
1320-1330	10	shale, dark gray, black, very fine sandy streaks, coal, pyrite
1330-1340	10	sandstone clear, very fine grained, rounded, well cemented. low porosity, no shows, 20% dark gray
1340-1350	10	shale, sandy green, pyrite
1350-1360	10	sandstone, (same as above) shale (same as above)
1360-1370	10	shale, green, sandy
1370-1380	10	sandstone, clear, (same as above) sandstone, green fine grained, low porosity, no shows, some gilsonite
1380-1390	10	some sandy shale sandstone, clear, subrounded, good porosity, no shows, some gilsonite
1390-1400	10	shale, dark gray, sandy
1400-1410	10	shale; green, dark gray some very fine grained sandstone, shaly mica, low porosity, gas bubbles in sand
1410-1420	10	shale, dark gray, green, light gray; coal; sandstone, fine grained, soft brown strain
1420-1430	10	sandstone, gray, dirty, fine grained, abundant gilsonite in sandy, mica, coal
1430-1440	10	shaly sandstone, dark gray, very fine grained, well sorted, abundant gilsonite in sand shale, dark gray
1440-1450	10	shale, dark gray, sandy
		sandy shale, dark gray
		shaly sandstone, very fine grain, dark gray

1450-1460	10	shale, sandy, dark gray
1460-1470	10	50% shale, dark gray; 50% sandstone, clear to light brown, subangular, medium grained, well cemented, low porosity, some gilsonite
1470-1480	10	shale, dark gray, coal, pyrite, gilsonite, gas bubbles out of sandy coal
1480-1490	10	shale, dark gray, silty
1490-1500	10	50% dark gray shale, siltstone, fine grained, white gilsonite, a few gas bubbles
1500-1510	10	shale sandy, dark gray, some sand with gas bubbles
1510-1520	10	sandstone, shaly, very fine grain; 50% dark sandy shale
1520-1525	5	shale, dark gray, sandy
1525-1530	5	shale, dark gray, sandy
1530-1540	10	sandstone, gray, subrounded, poorly sorted, shaly, low porosity, good show of brown live oil, medium hardness, no gas bubbles
Middle McLouth Sandstone		
1540-1545	5	sandstone, gray, shaly, (same as above) poor sorted, no show of oil
1545-1550		shale, sandy, gray
1550-1555		sandstone, clear, fine grained, sub-angular, well cement, low porosity, gas bubbles, some live brown oil, fair to poor bleed, poorly sorted
1555-1560	5	sandstone, (same as above), poor show of oil
1560-1565	5	sandstone, clear, (same as above) sandstone, gray shaly, poorly sorted, poor show of oil
1565 15 min. circ.		sandstone, Lower McLouth, clear to brown, subrounded, medium sorted, low to medium porosity, medium hardness, some gilsonite in samples
1565 25 min. circ.		sandstone, (same as above), shale; black, gray gas bubbles out of black shale
Core point #1 1565-1595 Lower McLouth circ. 45 min., short trip and then core		

Lower McLouth Sandstone

Core #1 1565-1592 Cored 28 ft. Recovered 27.5

1565-1565.3	.3	sandstone, shaly, medium grained, broken, carbon zone, no bleed
1565.3-1568.0	2.7	sandstone, medium grained, very clean, no shale, hard 1-1½ broken pores, gassy sand
1568.0-1568.5	.5	sandstone, broken 2-4 inch pieces, horizontal fracture through core, minor oil bleed, gassy
1568.5-1570	1.5	sandstone, medium grained, clean zone, gassy, minor tar bleed
1570-1571.0	1.0	sandstone, coarser grained, clean gassy
1571.0-1571.3	.3	sandstone, clean, broken, tar horizontal fractures medium grained, gassy
1571.3-1572.4	1.1	sandstone, clean, medium grained, hard, gassy

1572.4-1572.7	.3	sandstone, clean, fine grained, gassy tar
1572.7-1574	1.3	sandstone, clean, medium grained, hard
1574.0-1576	2	sandstone, clean, medium grained, gassy, top 3 inches fair tar bleed, minor oil bleed
1576-1578.0	2	sandstone, clean coarse grained, gassy
1578.0-1578.5	.5	sandstone, clean, coarse grained, good tar bleed, gassy
1587.5-1579	.5	sandstone, coarse grained, minor oil (tar) bleed, gassy
1579-1583.1	4.1	sandstone coarse grained, good bleed of heavy oil (tar) hard, 3 to 10 in., gassy
1583.1-1585	1.9	sandstone, coarse grained, clean, fair bleed of tar
1585-1588	3	sandstone, clean, coarse grained, minor tar bleed
1588-1590.5	2.5	sandstone, clean, coarse grained, little if any bleed, water zone?
1590.5-1592	1.5	No core
1592.0-1592.3	.3	limestone, gray, coarse crystalline, minor oil bleed
		Bottom of core 1592
1592-1600	8	sandstone, medium to coarse, subangular, well cemented, low porosity, good show, heavy, black oil, shale, black, green soft. pyrite
1600-1610	10	limestone, buff, medium hardness, crystalline, white chert, shale, green, gray
		Top Mississippi 1592(-483)
1610-1620	10	limestone, buff, very fine to fine crystalline, granular texture, chalk in part, white to gray chert, pyrite, poor porosity, no fluorescence
1620-1630	10	limestone, buff to clear, very fine crystalline, granular texture, chert, pale blue, banded in part minor amount of green and black shale
1629 20 min. circ.,		limestone, fine grained, crystalline, fine granular, buff, white to pale blue chert;
		T. Forty Foot Zone 1628(519)
		dolomite, limy, very fine grained, off white, soft sugar texture, lime-green fluorescence, no show of dolomite, off white, very fine grained, fine sugar texture, light lime-green fluorescence, no fluorescence with lighter fuel, but gas bubbles slower working out of samples therefore a very poor gas show
1631 20 min. circ.		
1630-1640	10	limestone, white, crystalline, chert, pale blue to blue, shale, green and gray; pyrite
1640-1650	10	limestone, white, crystalline pale blue chert; lime green mineral fluorescence
1650-1660	10	limestone, white to buff, crystalline, pale blue chert some mineral fluorescence
1660-1670	10	limestone, white to clear, coarse granular texture; white to very pale blue chert, shale green and shale; pyrite

1670-1680	10	limestone, buff to clear, coarse granular texture, dolomite, brown, very fine grained, sugar texture, medium soft lime-green mineral fluorescence
1690-1700	10	limestone, white to buff, coarse crystalline, fine granular texture; mineral fluorescence, white chert; green and black shale
1700-1710	10	limestone, coarse crystalline, granular texture, white chert, gray, green black shale
1710-1720	10	limestone, buff, crystalline, white to clear chert; pyrite minor amount green, black, gray shale
1720-1730	10	dolomite, clean, fine grained, soft, subangular, medium softened, poor show of live brown oil in a few broken samples; sample cutting and fluorescence, weak streamer cut limestone, brown to buff, fine grained texture, no oil cut, shale gray, green; pyrite
1730 20 min. circ		chert, white, 50% ; 40% limestone, fine grained sugar texture, buff to brown color, medium hardness limestone mineral fluorescence, no cut shale, black, gray, no show of oil or gas
1730-1735	5	T. Osage Burlington Keokuk 1726(-617) limestone, brown, fine grained; white chert; shale green, gray, black limy, lime mineral fluorescence very minor speck of heavy black dead? oil in a few samples
1735-1740	5	chert, white; limestone medium grained texture, brown to buff; black and green shale gilsonite on limy shale
1740-1745	5	chert, white; limestone, brown to clear, (same as above) shale, green and black
1745-1750	5	chert, white, 80% limestone, brown to clear, shale, green and black
1750-1760	10	chert, gray to white, 75% limestone, very fine grained texture, brown to buff, shale green and black
1760-1770	10	chert, gray to gray-blue 75%; limestone buff; black and green shale
1770-1780	10	chert, 80%, white, pale gray limestone, very fine grained texture, buff to clear shale, green, black
1780 T.D. 30 min. circ.		chert, white to pale blue, limestone, buff to gray shale, gray, green, black

March 6, 1985 3:00 a.m.

Circ. $1\frac{1}{2}$ hr. , vis. 41, Wt. 9.0,
pulled pipe,

WELL LOG ANALYSIS

The following report is the result of a computerized analysis of open hole electric well logs. The electric logs conducted at each well were compensated density porosity, compensated neutron porosity, dual induction electrical, R. A. guard, gamma ray (GR), spontaneous potential (SP) and caliper logs.

The reserves results are based on current standard engineering formulas for oil, gas and water estimates for open hole electric logs. Some of the results (true porosity and water saturations) are quite accurate, while other estimates (oil and gas saturations) may vary in accuracy. In particular, the estimated gas saturations may be quite low compared to the actual gas saturation, and at the same time the estimated oil saturation may be quite high compared to the actual oil saturations. The inaccuracies are a result of several uncontrollable drilling and reservoir factors.

Thus in this well, the gas saturation estimates are expected to be lower than the actual inplace gas saturation. Water saturation estimates are expected to be quite accurate.

WELL LOG ANALYSIS

Orion, Inc.

2103 Orchard Lane, Lawrence, Kansas 913-841-5366

Well Name Bolinger #3 API# 15-087-20,132
 Location Sec. 25, T9S, R19E County, State Jefferson / Kansas
 Logging Company Great Guns
 Logs Used Dual Induction, Com. Density, Com. Neutron, GR, SP, Caliper
 Analyst(s) Tammy Steeples, Tom Stander Date March 8-10, 1985

Formation Name Upper Cattleman Rw = .20 @ 90°F
 Formation Summary 1272-1274
 Average Porosity .13 In Place Reserves
 Average Shale Volume .43 Water 15,920 barrels/acre
 Oil 1,702 barrels/acre
 Gas 0 0 MCF/acre

Primary Saturations for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1272-1274	.05	.91	.77	.23	0
1274-1280	.08#	.44#	1.00	0	0
1280-1282	.14	.32	.97	.03	0
1282-1284	.16	.21	1.00	0	0
1284-1286	.20	.15	.97	.03	0
1286-1288	.20	.35	.81	.19	0
1288-1290	.15	.63	.68	.32	0

Formation Name Middle Cattleman Rw = .20 @ 90°F
 Formation Summary 1312-1330
 Average Porosity .11 In Place Reserves
 Average Shale Volume .43 Water 11,064 barrels/acre
 Oil 1,114 barrels/acre
 Gas 16 MCF/acre

Primary Saturations for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1312-1314	.30	.91	.16	.23	.60
1314-1324	.08#	.41#	1.00	0	0
1324-1326	.10	.36	.98	.02	0
1326-1330	.10#	.28#	1.00	0	0

*Each two foot zone analyzed. See computer printout for detailed analysis of each zone.

#Value is the average for these zones.

WELL LOG ANALYSIS

Bolinger #3 (continued)

Formation Name Lower Cattleman Rw = .20 @ 90°F
 Formation Summary 1356-1366
 Average Porosity .12 In Place Reserves
 Average Shale Volume .20 Water 8,938 barrels/acre
Oil 0 barrels/acre
Gas 0 MCF/acre

Primary Saturation for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1356-1366	.11#	.20#	1.00	0	0

Formation Name Middle McLouth Rw = .20 @ 90°F
 Formation Summary 1520-1538
 Average Porosity .12 In Place Reserves
 Average Shale Volume .37 Water 8,998 barrels/acre
Oil 548 barrels/acre
Gas 0 MCF/acre

Primary Saturations for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1520-1522	.09	.77	.93	.07	0
1522-1524	.13	.44	.96	.04	0
1524-1526	.16	.26	.89	.11	0
1526-1528	.14	.32	.90	.10	0
1528-1530	.13	.38	.97	.03	0
1530-1532	.15	.32	.86	.14	0
1532-1534	.14	.33	.93	.07	0
1534-1538	.11#	.41#	1.00	0	0

*Each two foot zone analyzed. See computer printout for detailed analysis of each zone.

WELL LOG ANALYSIS

Bolinger #3 (continued)

Formation Name Lower McLouth

Rw = .20 @ 90°F

Formation Summary 1544-1594

Average Porosity .22

In Place Reserves

Average Shale Volume .05

Water 33,426 barrels/acre

Oil 43,790 barrels/acre

Gas 27 MCF/acre

Primary Saturations for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1544-1546	.10	.36	.93	.07	0
1546-1548	.12	.31	.77	.23	0
1548-1550	.15	.24	.60	.40	0
1550-1552	.22	.03	.41	.54	.05
1552-1554	.23	.03	.32	.60	.08
1554-1556	.22	.05	.30	.64	.06
1556-1558	.24	.01	.27	.66	.07
1558-1560	.25	.02	.24	.69	.07
1560-1562	.25	0	.25	.69	.06
1562-1564	.23	.01	.29	.68	.03
1564-1566	.23	.01	.30	.65	.05
1566-1568	.23	.01	.29	.70	.01
1568-1570	.23	.01	.28	.61	.11
1570-1572	.24	.01	.28	.60	.12
1572-1574	.23	0	.31	.62	.07
1574-1576	.24	0	.31	.63	.06
1576-1578	.24	0	.31	.57	.12
1578-1580	.23	0	.34	.55	.11
1580-1582	.23	0	.40	.46	.14
1582-1584	.23	.01	.42	.52	.06
1584-1586	.24	0	.47	.53	0
1586-1588	.23	.01	.57	.42	.01
1588-1590	.21	0	.70	.30	0
1590-1592	.21	.02	.75	.25	0
1592-1594	.17	.09	.80	.08	.12

*Each two foot zone analyzed. See computer printout for detailed analysis of each zone.

WELL LOG ANALYSIS Bolinger #3 (continued)

Formation Name Forty Foot Zone $R_w = .20 @ 90^\circ F$
 Formation Summary 1624-1640
 Average Porosity .14 In Place Reserves
 Average Shale Volume .01 Water 17,752 barrels/acre
 Oil 0 barrels/acre
 Gas 0 MCF/acre

Primary Saturations for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1624-1640	.14#	.01#	1.00	0	0

Formation Name Osage $R_w = .20 @ 90^\circ F$
 Formation Summary 1722-1762
 Average Porosity .12 In Place Reserves
 Average Shale Volume .02 Water 34,938 barrels/acre
 Oil 814 barrels/acre
 Gas 3 MCF/acre

Primary Saturations for Each Zone in Formation*

Depth	True Porosity	Shale Content	Water Saturation	Oil Saturation	Gas Saturation
1722-1730	.08#	0#	1.00	0	0
1730-1732	.21	.05	.75	.25	0
1732-1762	.12#	.02#	1.00	0	0

*Each two foot zone analyzed. See computer printout for detailed analysis of each zone.

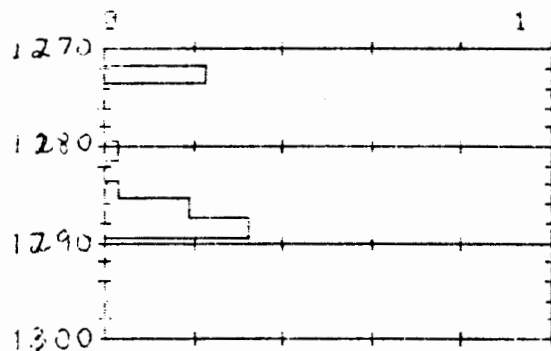
#Value is the average for these zones.

WELL LOG ANALYSIS

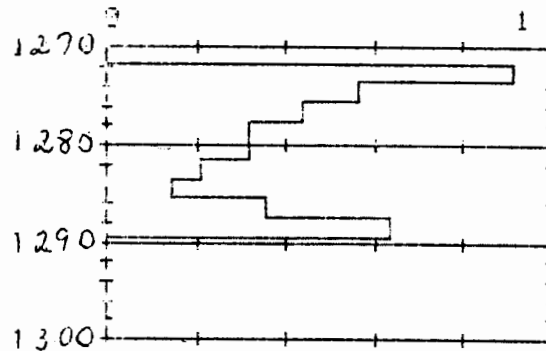
WELL BOLINGER 3
 TEGAL SW SW SW 25 9S 19E
 COUNTY JEFFERSON KANSAS
 LEASE JIM BOLINGER

FORMATION 1
 DEPTH 1272 TO 1290

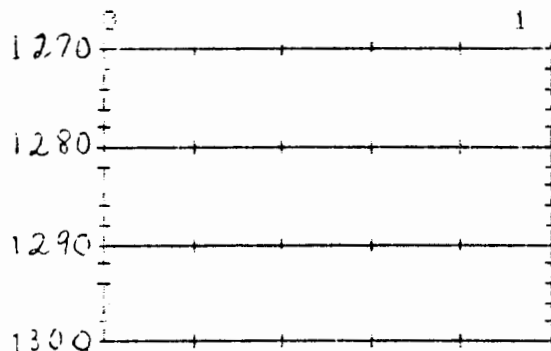
OIL SATURATION



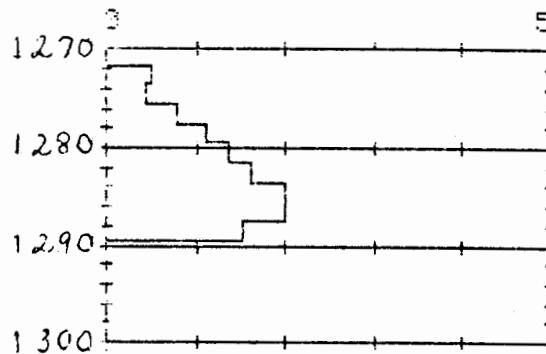
SHALE VOLUME



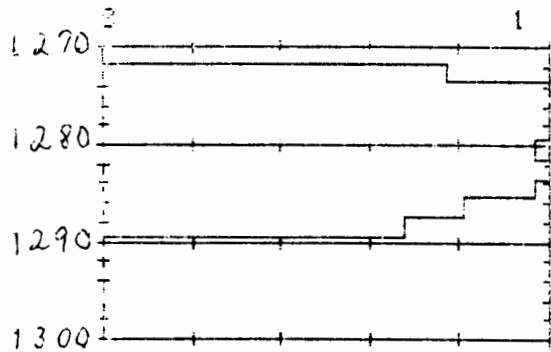
GAS SATURATION



TRUE POROSITY



WATER SATURATION

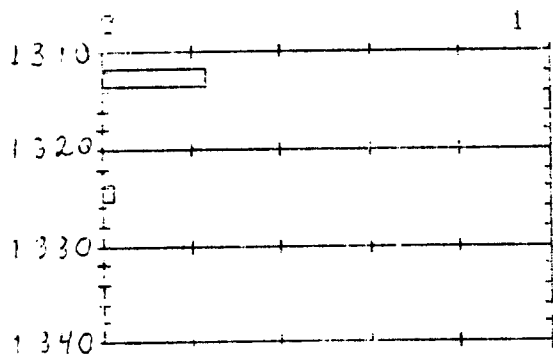


WELL LOG ANALYSIS

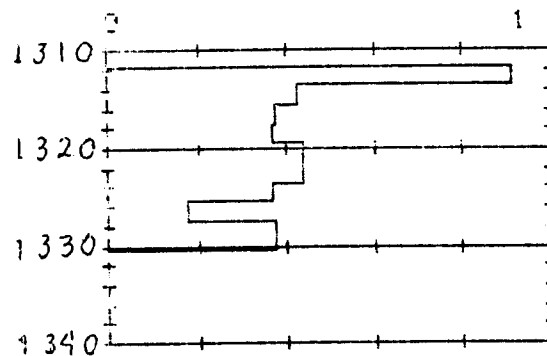
WELL BOLINGER 3
 LEGAL 9M SW SW 25 9S 19E
 COUNTY JEFFERSON KANSAS
 LEASE JIM BOLINGER

FORMATION 2
 DEPTH 1312 TO 1330

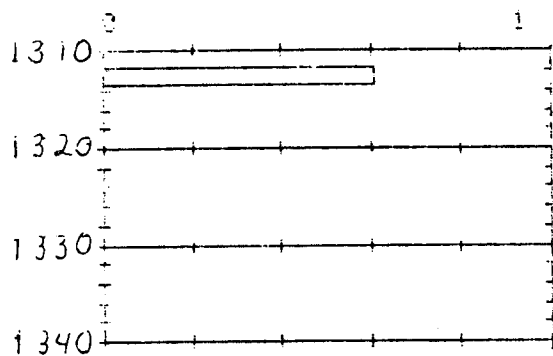
OIL SATURATION



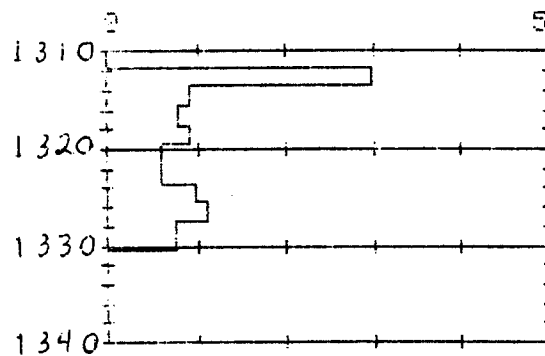
SHALE VOLUME



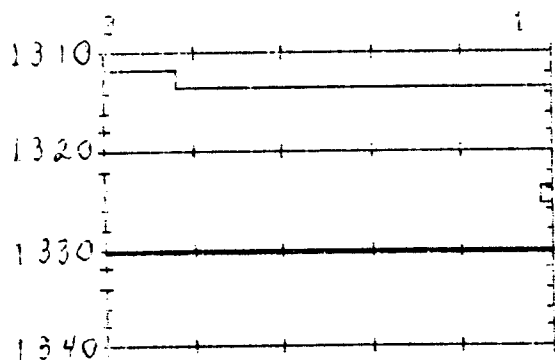
GAS SATURATION



TRUE POROSITY



WATER SATURATION

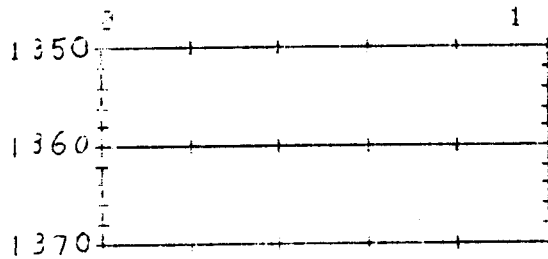


WELL LOG ANALYSIS

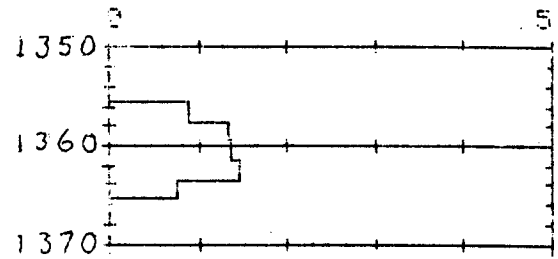
WELL BOLINGER 3
 LEGAL SW SW SW 25 36 19E
 COUNTY JEFFERSON KANSAS
 LEASE JIM BOLINGER

FORMATION 3
 DEPTH 1356 TO 1366

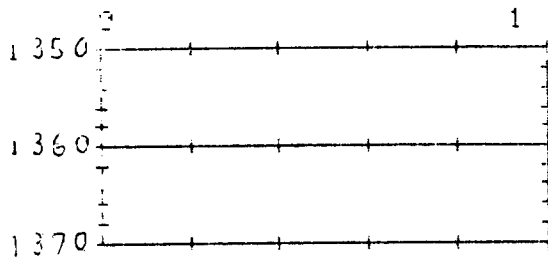
OIL SATURATION



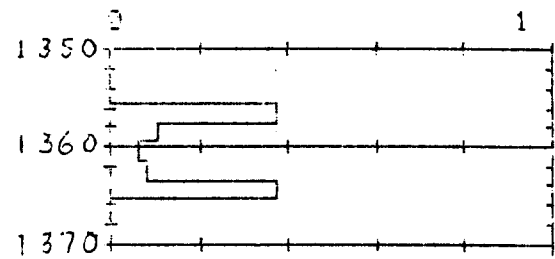
TRUE POROSITY



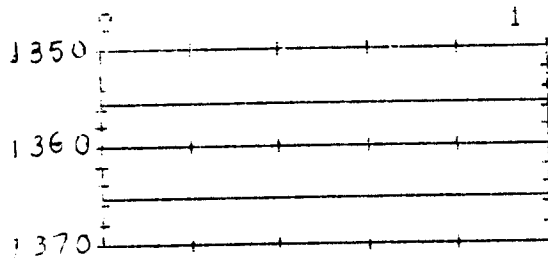
GAS SATURATION



GRAIN VOLUME



WATER SATURATION

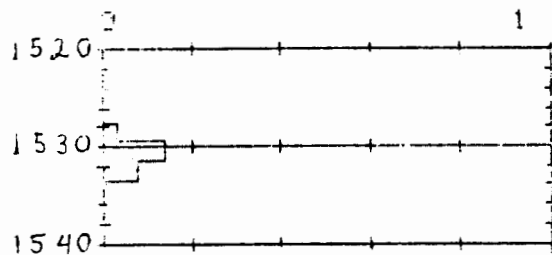


WELL LOG ANALYSIS

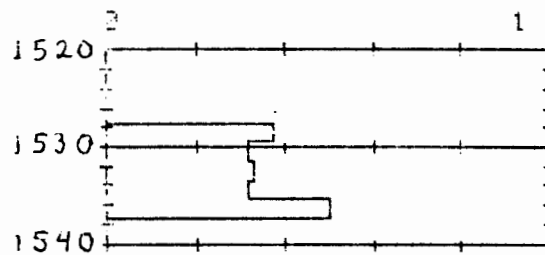
WELL BOLINGER 3
 LEGAL SW SW SW 25 9S 19E
 COUNTY JEFFERSON KANSAS
 LEASE TIM BOLINGER

FORMATION 4
 DEPTH 1528 TO 1538

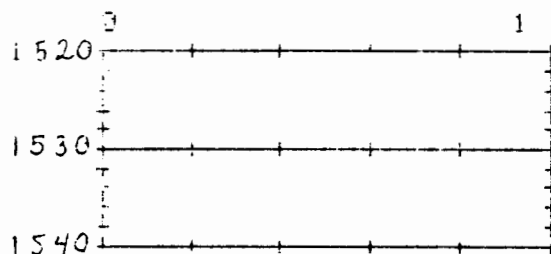
OIL SATURATION



SHALE VOLUME



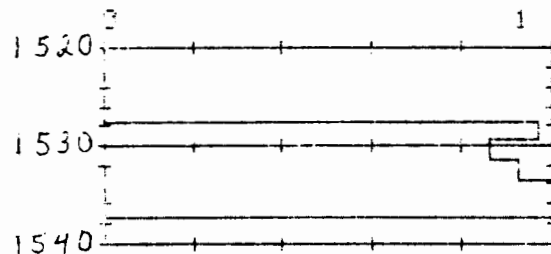
GAS SATURATION



TRUE POROSITY



WATER SATURATION

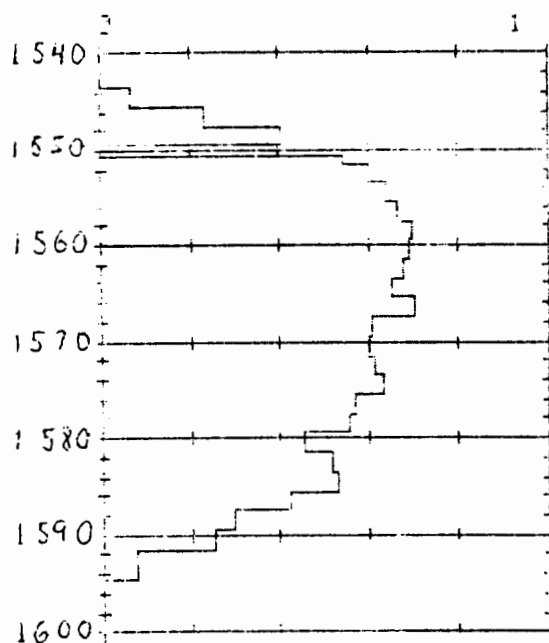


WELL LOG ANALYSIS

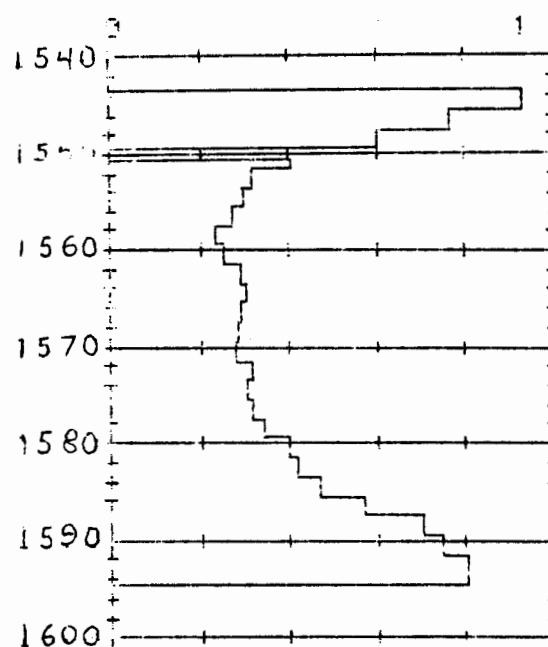
WELL BOLINGER 3
 LEGAL SW SW SW 25 9S 19E
 COUNTY JEFFERSON KANSAS
 LEASE JIM BOLINGER

FORMATION 5
 DEPTH 1544 TO 1594

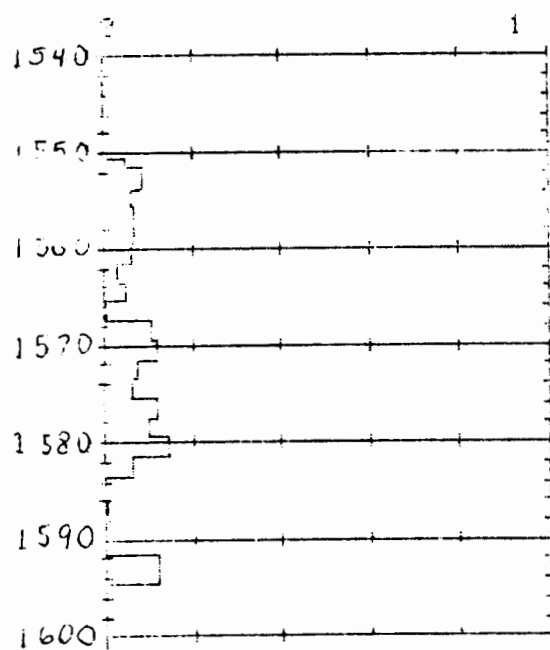
OIL SATURATION



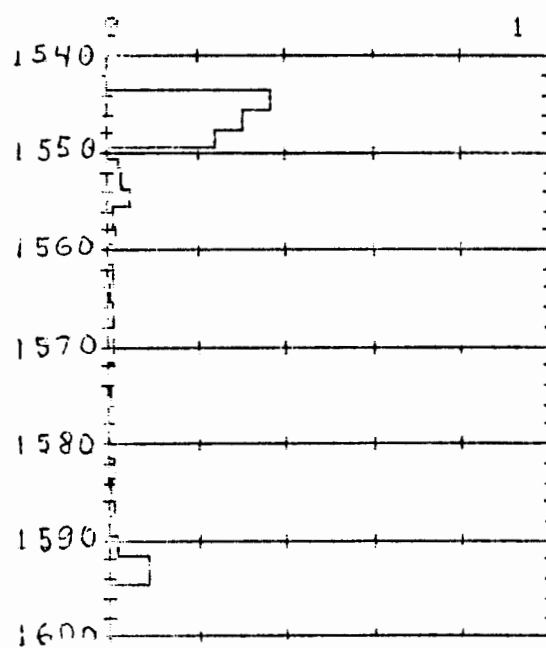
WATER SATURATION



GAS SATURATION



SHALE VOLUME

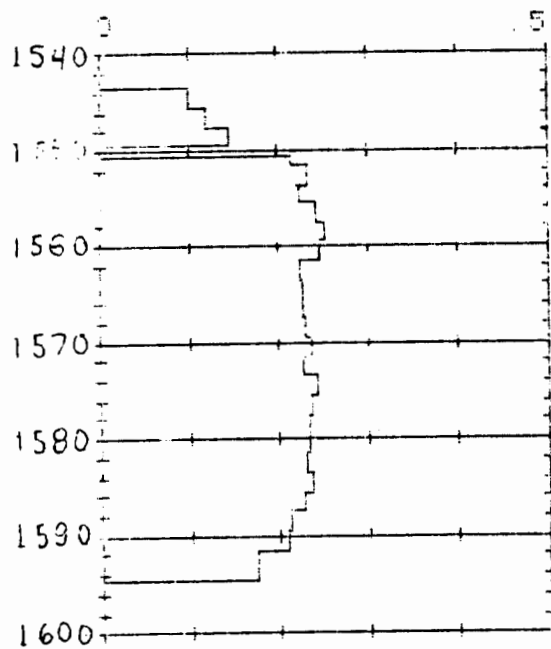


WELL LOG ANALYSIS

WELL BOLINGER 2
LEGAL SW SW SW 25 9S 19E
COUNTY JEFFERSON KANSAS
LEASE BOLINGER

FORMATION 5
DEPTH 1544 TO 1594

TRUE POROSITY

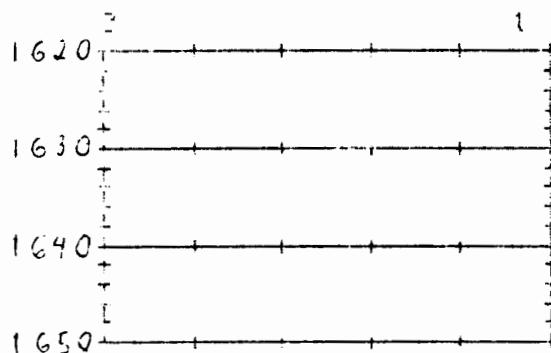


WELL LOG ANALYSIS

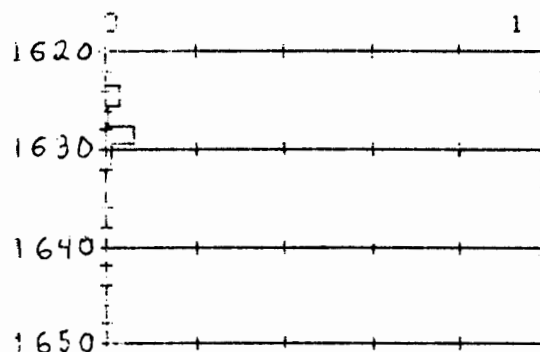
WELL BOLINGER 3
 LEGAL SW SW SW 25 9S 19E
 COUNTY JEFFERSON KANSAS
 LEASE BOLINGER

FORMATION 6
 DEPTH 1624 TO 1640

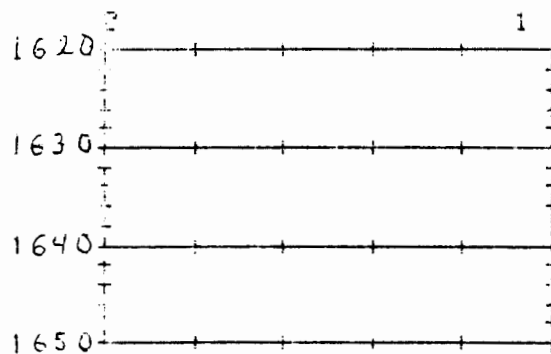
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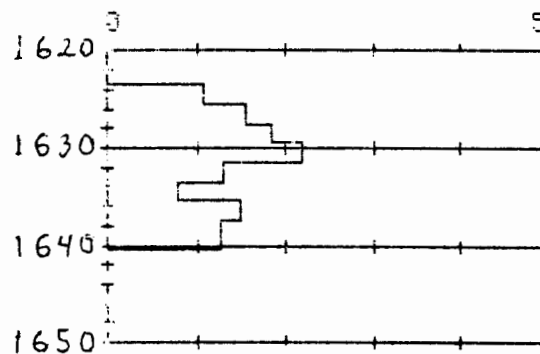
SHALE VOLUME



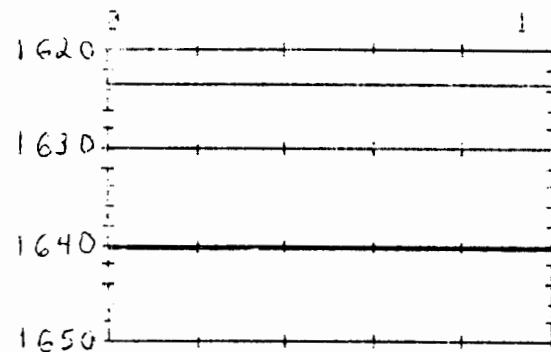
GAS SATURATION



TRUE POROSITY



WATER SATURATION

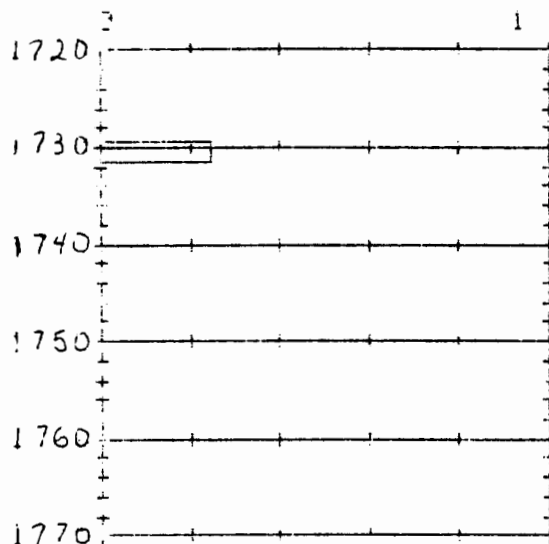


WELL LOG ANALYSIS

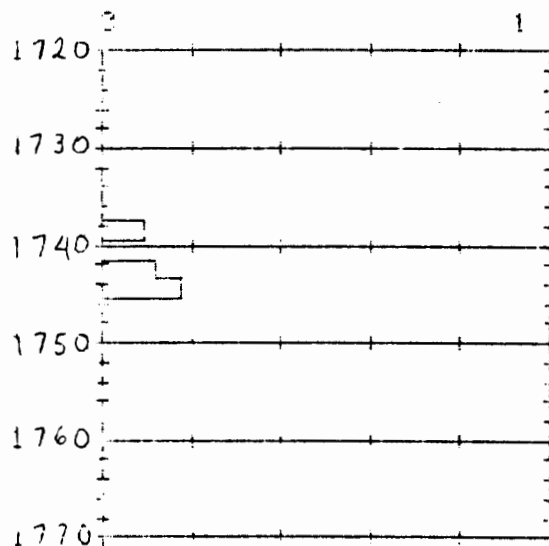
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 LEGAL SW SW SW 25 98 19E
 COUNTY JEFFERSON KANSAS
 LEASE BOLINGER

FORMATION 7
 DEPTH 1722 TO 1762

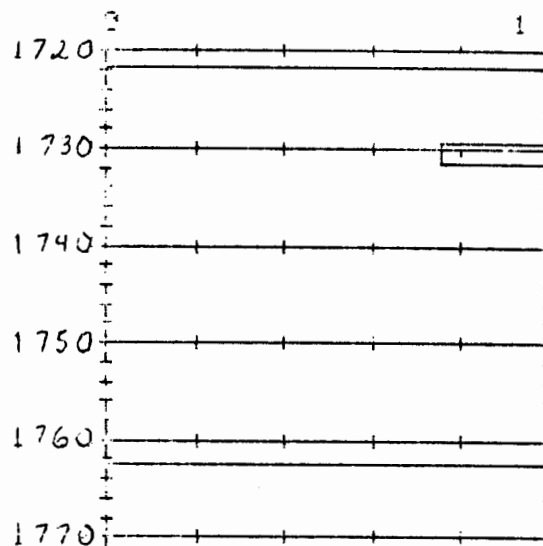
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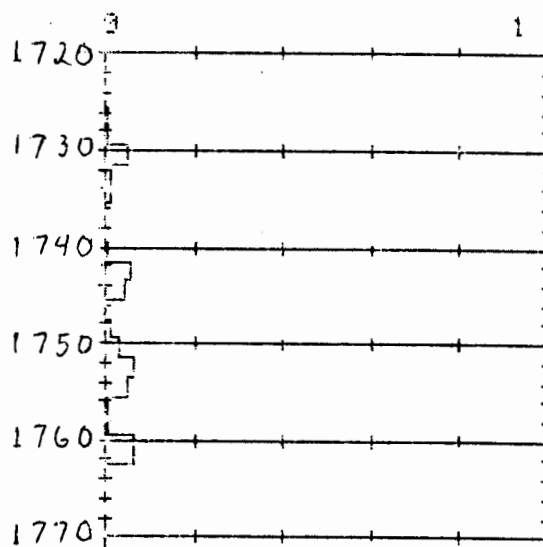
GAS SATURATION



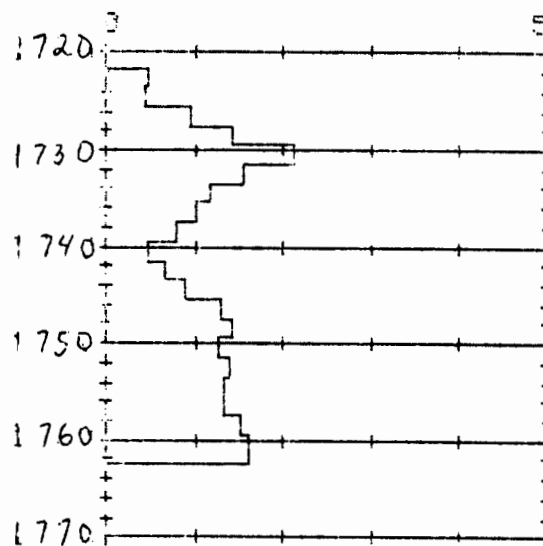
WATER SATURATION



SHALE VOLUME



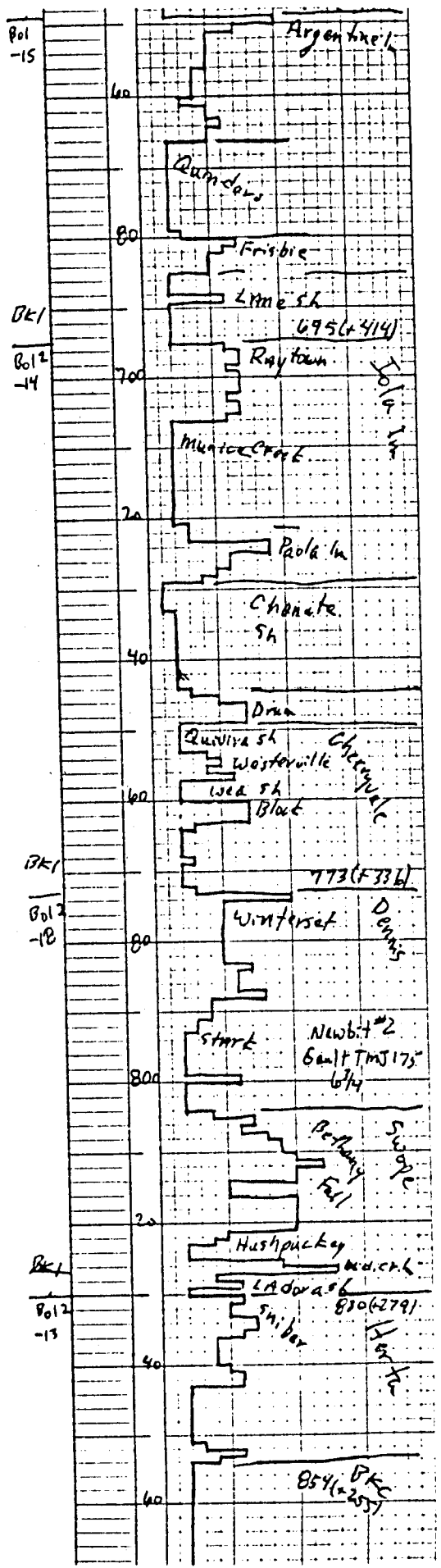
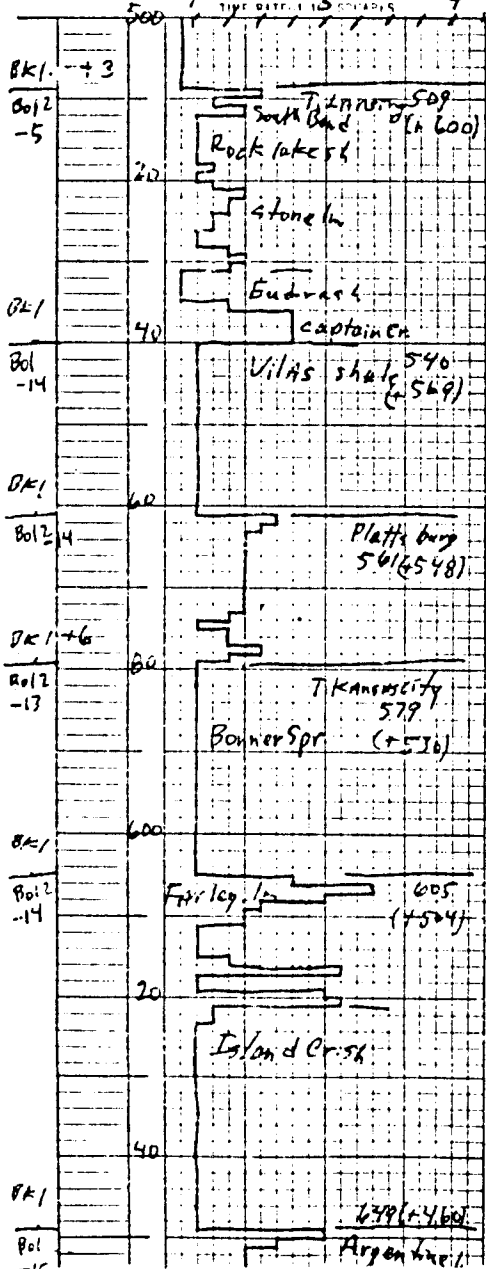
TRUE POROSITY



Ks COMPANY Jerry Lutz
 COUNTY Jefferson FARM J. Bolinger WELL NO. 3
 BLOCK SURVEY 330 N 4950 W
 SEC. 25 Miss. Drage 1780
 T. 9 R. 19E API# 15-087-20,132
 CONTRACTOR Caney Valley
 COMMENCED Mar 3 85
 REMARKS T.W. Stander Drage
 ALTITUDE 1109.6 L.S.M.
 PRODUCTION 1114.2 K.B.S.M.
 CASING RECORD

Surface: 8580 DA 125' 11355 Parting
 Prod: 4 1/4 OD X 1 1/2 LS, btm Rose DWG
 top 1765 x 50/50 Part 3 1/2 inch
 6% g. / om. x
 All depths from ground level
 SHOT QUARTZ STRIP ONE

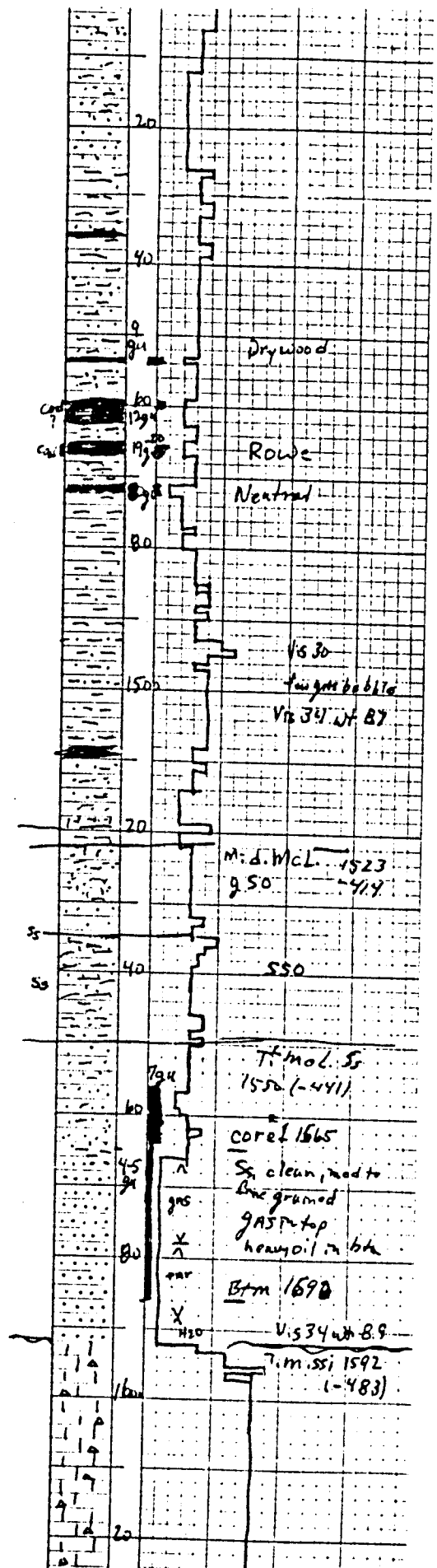
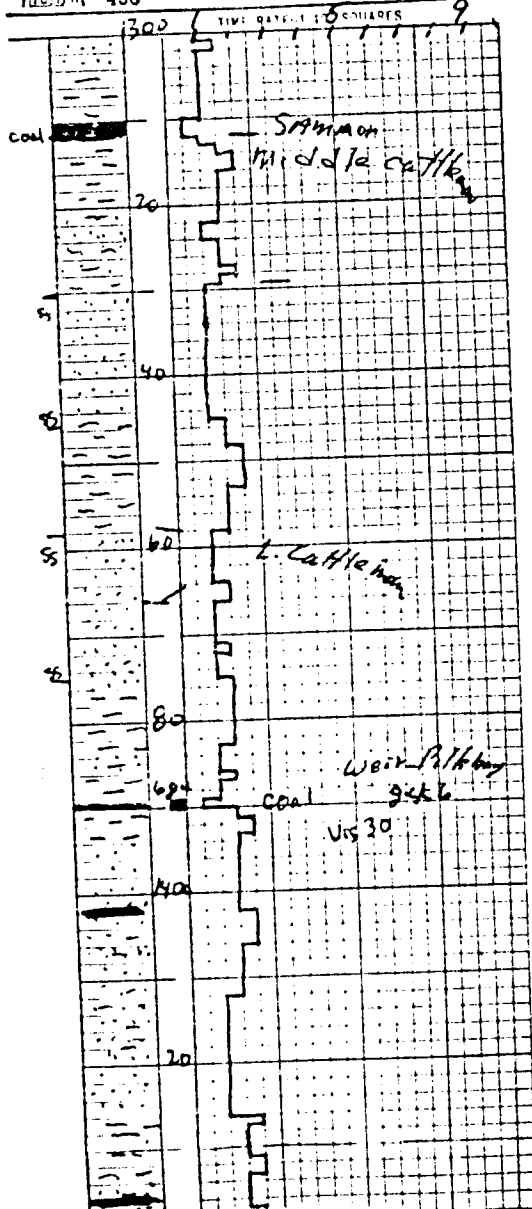
TIME DATE CORRECTION = 1/2 MINUTES
 REC'D 450 TULSA, OKLAHOMA 74101 PRINTED IN U.S.A.

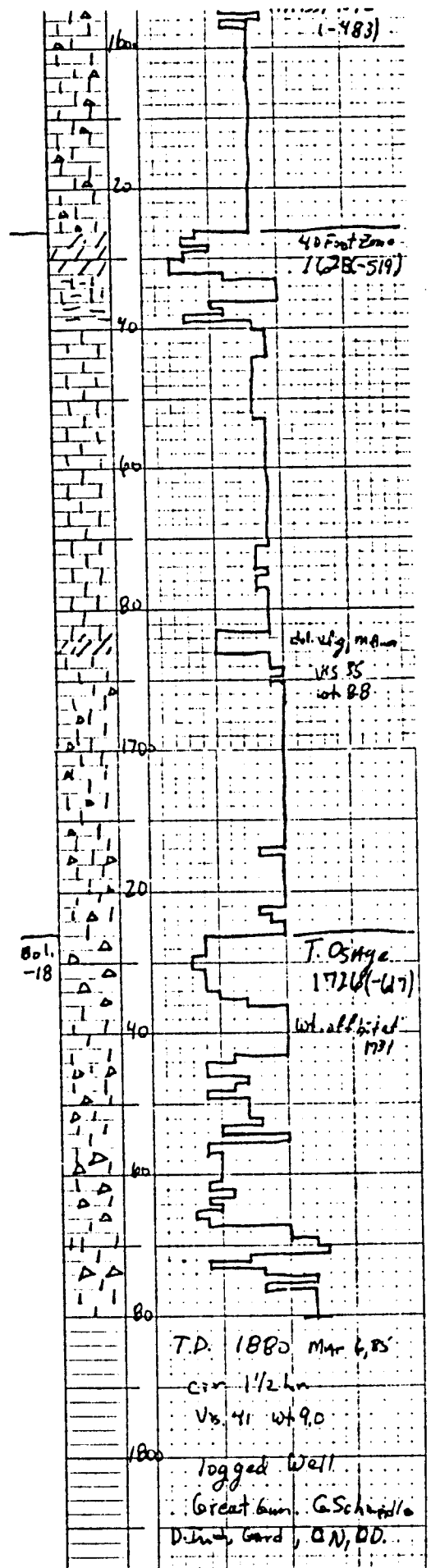


STATE		COMPANY	
KS		Jerry Lutz	
COUNTY	Jackson	FARM	WELL NO.
BLOCK	330 N 49 S 0 W	SURVEY	3
SEC.	25	MISS. ORANGE	1780
T.	9 S	R.	19 E
APR 15-087-20 132		TOTAL DEPTH	
CONTRACTOR		Cane Valley	
COMMENCED		MAR 3, 85	
COMPLETED		MAR 6, 85	
REMARKS		T.W. Stander Ocean	
ALTITUDE		1109.6 h.s.r.	
PRODUCTION		114.2 KPSR	
Maverick Mud		Tonydandle	

CASING RECORD
 Surface: B⁵ 80D x 125', 1725' x 38' 38" 38"
 Prod: 4 1/2" OD x 1665' Btm 805x
 OWC, top 176' ex 50/50 Por
 5% sand, 6% g/somite
 All depth from ground level

SHUT STRIP 1620
 TIME RATE SCALE: 1/10" = 1/2 MINUTES
 PRESSURE 450 TULSA, OKLAHOMA, 4101 PRINTED IN U.S.A.





MAVERICK MUD CO.

P.O. BOX 31

PHONE 1 (316) 672-7565

PRATT, KS 67124

COMPANY: JERRY LUTZ COUNTY: JEFFERSON, KS ENGINEER: T. WENDLE
 WELL: BOLINGER NO 3 ELEVATION: GL 1109 KB 1113 REMARKS: INTERVAL LOGGED
 LOCATION: SEC 25-T9S-R19E DATE LOGGED: 3/4/84 - 3/ 1200'-1800'

WT.
VIS.
WL
FC
PH
CI
OIL

POROSITY #
FAIR
GOOD

SANDSTONE
SILTSTONE
SHALE
LIMESTONE

DOLOMITE
ANHYPDRITE / GYP
CHERT
API NO. 15-087-20132

OIL FLUORESCENCE
& LEACH
FAIR
GOOD

METHANE C-1
ETHANE C-2
PROPANE C-3
BUTANES C-4

NB - NEW BIT
NCB - NEW CORE BIT
CO - CIRCULATED OUT
DST - DRILL STEM TEST
LAT - LOGGED AFTER TRIP

MUD
DATA
&
RIG
TECH

DRILLING RATE
MIN. / FT.

CORE X
DST
DEPTH

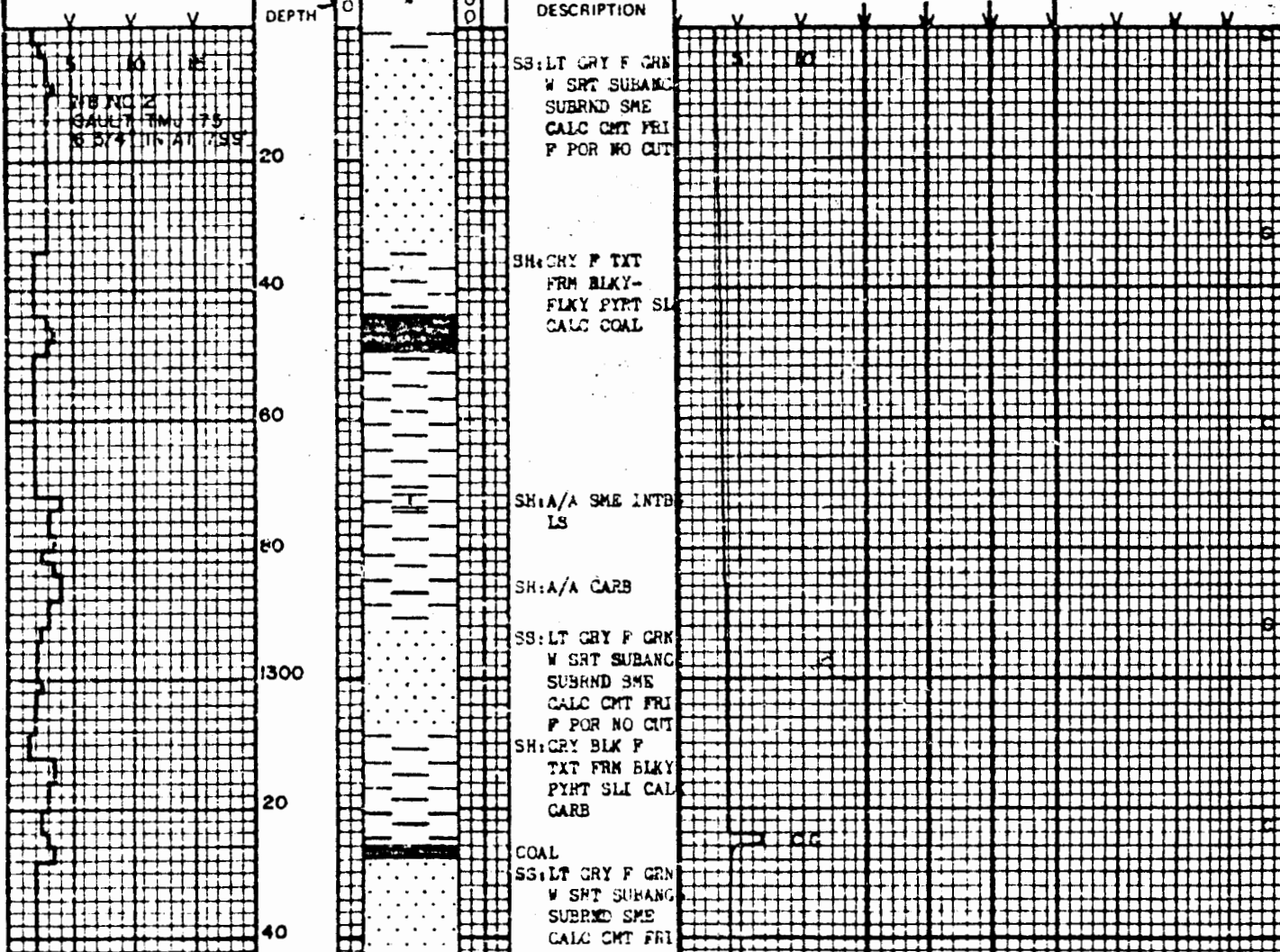
LITHOLOGY
OIL FLUO

FORMATION
DESCRIPTION

CHROMATOGRAPHIC % ANALYSIS
OF GAS IN MUD

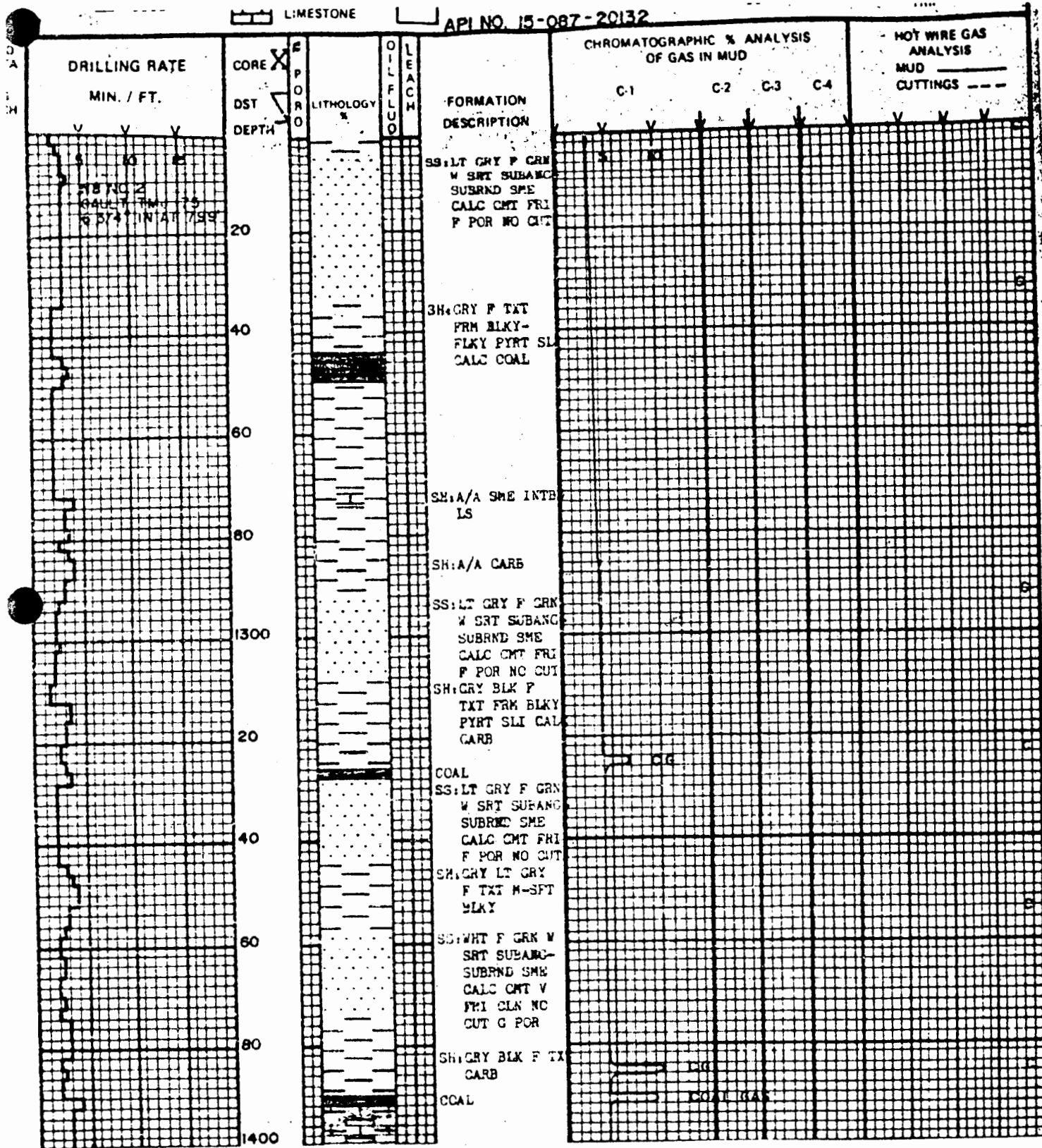
C-1 C-2 C-3 C-4

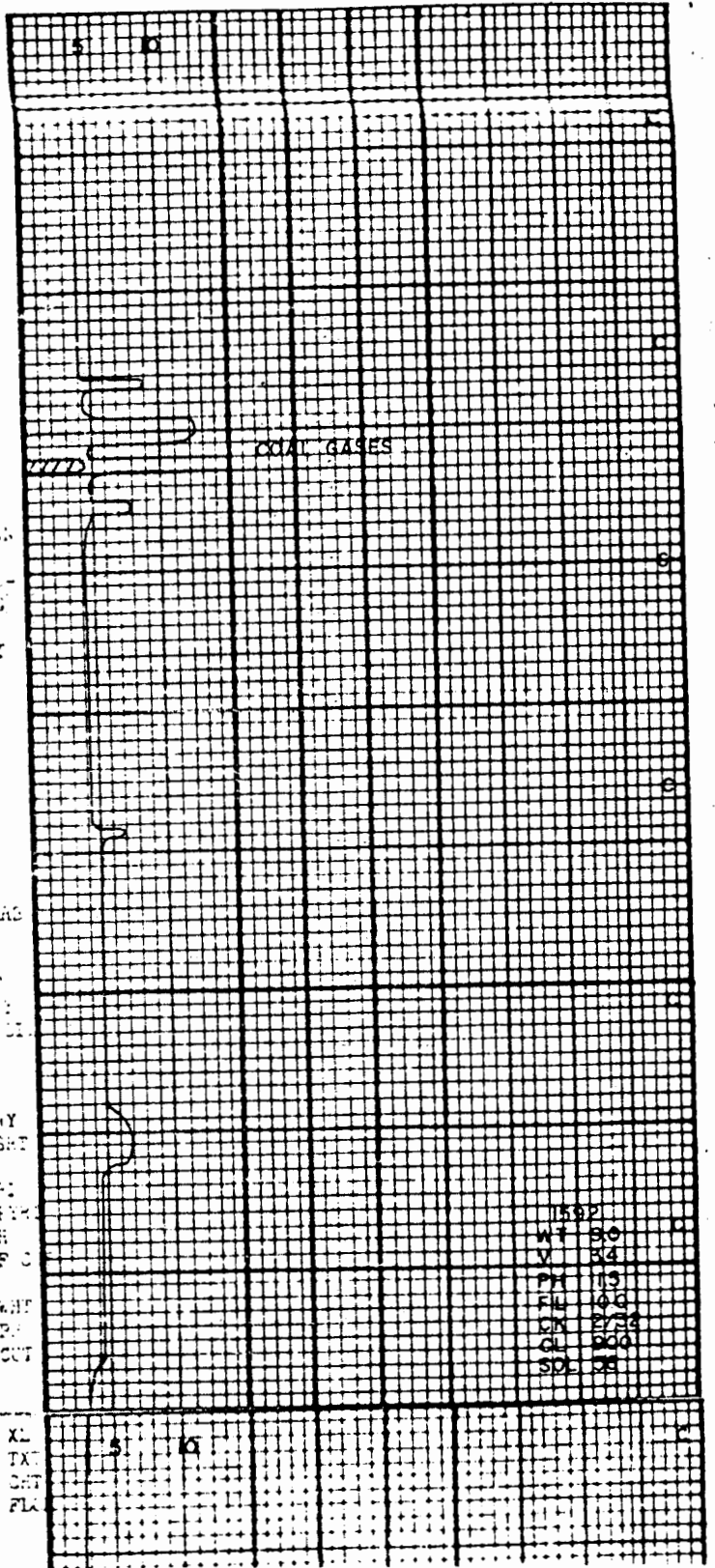
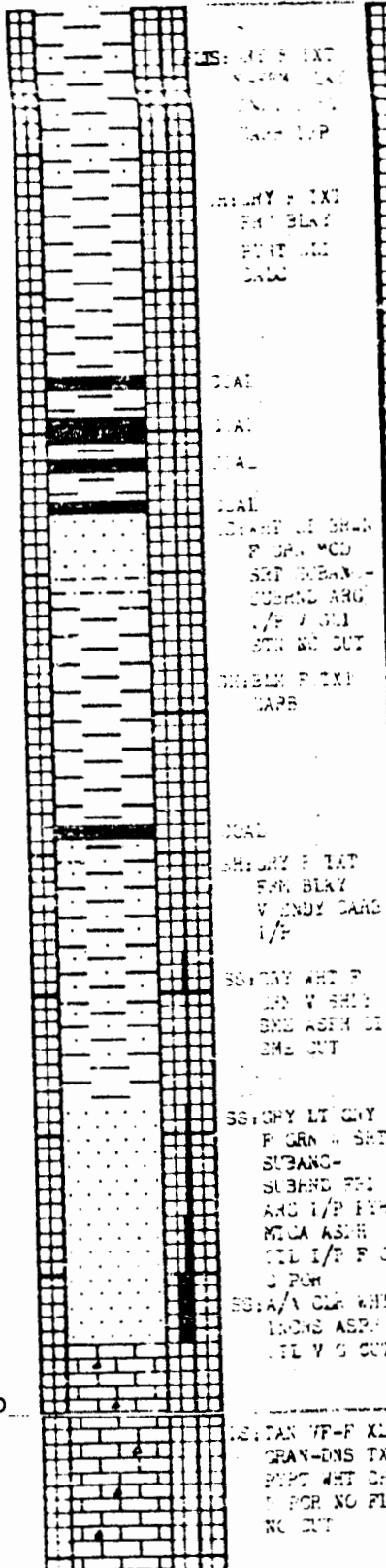
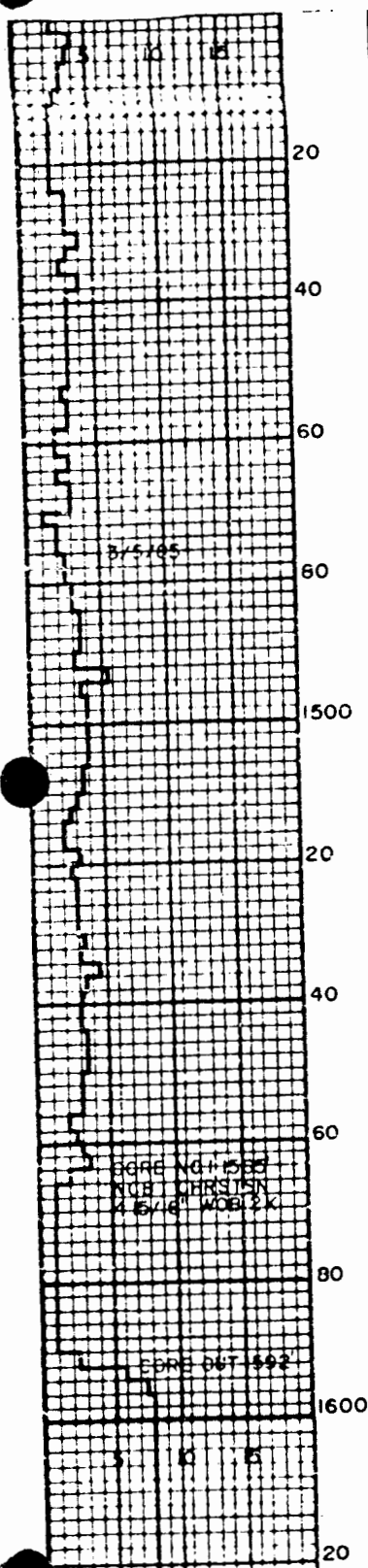
HOT WIRE GAS
ANALYSIS
MUD
CUTTINGS

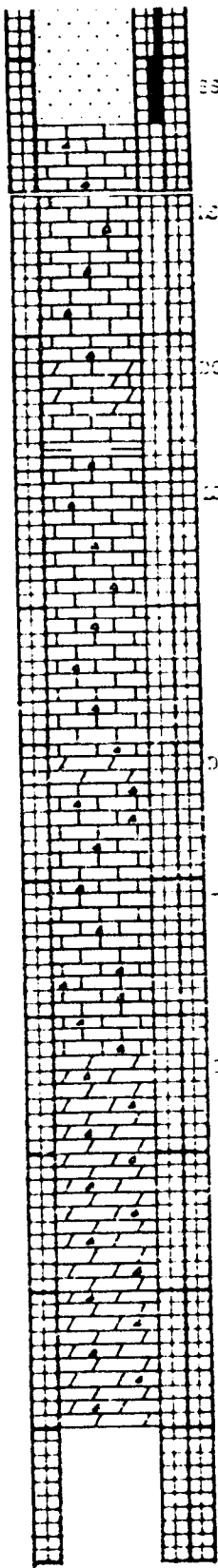
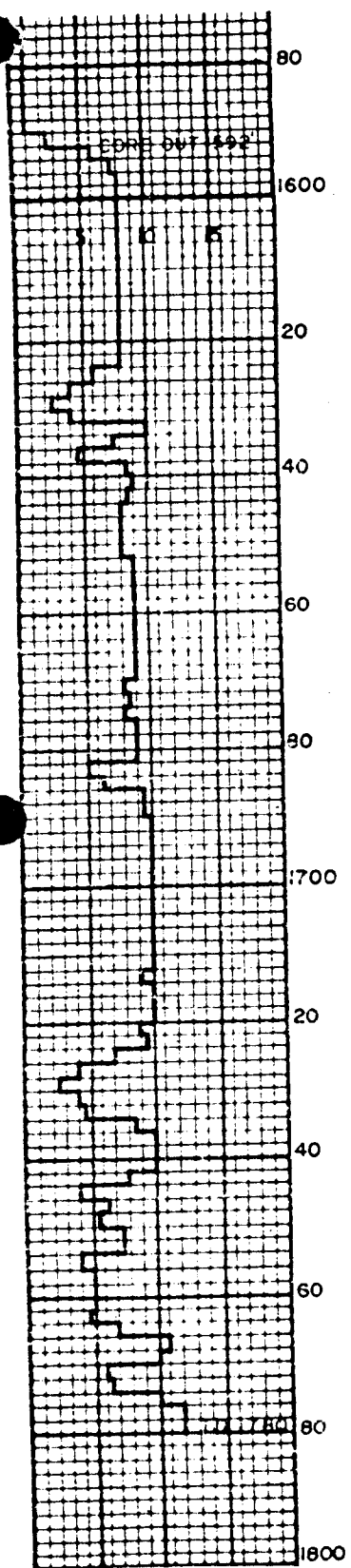


LIMESTONE

API NO. 15-087-20132







WCA ASH
 1/1 P P
 3 PCH
 85:1/1 CLR WHT
 100% ASPH
 1/1 V G OUT

10:1 TAN VF-P XL
 GRAN-ONS TAN
 PCH WHT OUT
 P PCH NO FLO
 NO OUT

10:1 TAN VF XL
 GRAN EXT
 LMY P PCH
 MIN FLO NO
 OUT

10:1 TAN VF XL
 100% EXT PCH
 TR POSS WHT
 100% P PCH NO
 FLO NO OUT

10:1 TAN WHT TAN
 VF-P XL
 GRAN TXT P
 PCH MIN FLO
 NO OUT

10:1 TAN P-VF XL
 GRAN-ONS TAN
 PCH WHT OUT
 P PCH NO FLO
 NO OUT

10:1 TAN LT TAN
 VF AL GRAN
 TAN GRAN
 100% PCH
 GRAN P PCH
 P PCH V OR
 FREE WHT
 100% WHT

10:1 TAN VF AL
 GRAN TAN
 100% WHT
 100% P FLO
 P PCH NO
 OUT

WT 9.0
 V 8.4
 PH 1.5
 FL 1.0
 LN 2.5
 CL 2.0
 SCL 3.0

Oilfield Research Laboratories
GENERAL INFORMATION & SUMMARY

Company Jerry Lutz Lease Bolinger Well No. 3
Location SW $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$
Section 25 Twp. 9S Rge. 19E County Jefferson State Kansas

Elevation, Feet

Name of Sand

Lower McClouth

Top of Core

1565.0

Bottom of Core

1591.0

Top of Sand

1565.0

Bottom of Sand

1590.7

Total Feet of Permeable Sand

25.7

Total Feet of Floodable Sand

*4.2

Distribution of Permeable Sand:
Permeability Range
Millidarcys

Feet

Cum. Ft.

0 - 1	0.0	0.0
145 - 150	1.0	1.0
555 - 575	2.0	3.0
635 - 850	8.0	11.0
870 - 1000	6.5	17.5
1015 - 1176	6.2	23.7
1225 - 1365	2.0	25.7

Average Permeability Millidarcys

878.3

Average Percent Porosity

22.2

Average Percent Oil Saturation

28.1

Average Percent Water Saturation

37.0

Average Oil Content, Bbls./A. Ft.

478.

Total Oil Content, Bbls./Acre

12,283.

Average Percent Oil Recovery by Laboratory Flooding Tests

*2.2

Average Oil Recovery by Laboratory Flooding Tests, Bbls./A. Ft.

*38.

Total Oil Recovery by Laboratory Flooding Tests, Bbls./Acre

*159.

Total Calculated Oil Recovery, Bbls./Acre

*See "Calculated Recovery"

Section

Note: *Sample Nos. 15 thru 24 using fresh water
at room temperature (ambient).

The core was sampled and the samples sealed in plastic by a representative of the client. Fresh water mud was used as a drilling fluid.

FORMATION CORED

The detailed log of the formation cored is as follows:

<u>Depth Interval, Feet</u>	<u>Description</u>
1565.0 - 1578.0	Sandstone, light brown.
1578.0 - 1579.8	Sandstone, brown.
1579.8 - 1589.0	Sandstone, blackish brown, very slightly carbonaceous, with widely scattered gray shale and mica partings.
1589.0 - 1590.7	Sandstone, black and gray, very slightly carbonaceous, slightly calcareous, salt and pepper.
1590.7 - 1591.0	Limestone, gray, shaly.

LABORATORY FLOODING TESTS

At the request of the client, another series of flooding susceptibility tests were run on selected samples using fresh water at 148°F, and steam. The results are presented in Table VI.

CALCULATED RECOVERY

Samples 15 thru 24

It would appear from a study of the core data, that efficient primary and waterflood operations in the vicinity of this well should recover approximately 860 barrels of oil per acre. This is an average recovery of 206 barrels per acre foot from 4.2 feet of floodable sand analyzed in this core.

-3-

These recovery values were calculated using the following data and assumptions:

Original formation volume factor, estimated	1.04
Reservoir water saturation, percent, estimated	15.0
Average porosity, percent	22.0
Oil saturation after flooding, percent	59.8
Performance factor, percent, estimated	55.0
Net floodable sand, feet	4.2

No calculated recovery values are presented using the data collected from the hot water or steam investigations.

25-9-19E

Oilfield Research Laboratories

RESULTS OF SATURATION & PERMEABILITY TESTS

TABLE 1-B

Company Jerry Lutz Lease Holinger Well No. 3

Sample No.	Depth, Feet	Effective Porosity Percent	Percent Saturation			Oil Content Bbbs. / A Ft.	Perm., Mill.	Feet of Sand		Total Oil Content	Perm. Capacity Ft. X md.
			Oil	Water	Total			Ft.	Cum. Ft.		
1	1565.5	21.2	2	49	51	33	556.	1.0	1.0	33	556.00
2	1566.6	20.6	7	54	61	112	148.	1.0	2.0	112	148.00
3	1567.6	22.4	5	48	53	87	728.	1.0	3.0	87	728.00
4	1568.2	23.0	5	45	50	89	637.	1.5	4.5	134	955.50
5	1570.5	25.0	31	40	71	601	873.	1.5	6.0	902	1309.50
6	1571.6	22.4	9	38	47	156	571.	1.0	7.0	156	571.00
7	1572.7	24.0	3	46	49	56	1175.	1.0	8.0	56	1175.00
8	1573.6	24.7	4	44	48	77	1019.	1.0	9.0	77	1019.00
9	1574.5	21.4	4	46	50	66	804.	1.0	10.0	66	804.00
10	1575.5	23.0	2	45	47	36	1092.	1.0	11.0	36	1092.00
11	1576.4	22.5	1	47	48	18	1363.	1.0	12.0	18	1363.00
12	1577.5	22.4	9	42	51	156	1022.	1.0	13.0	156	1022.00
13	1578.5	22.3	16	45	61	277	849.	1.0	14.0	277	849.00
14	1579.6	23.9	21	42	63	389	764.	0.8	14.8	311	611.20
15	1580.6	24.9	72	16	88	1391	1175.	1.2	16.0	1669	1410.00
16	1581.5	22.2	49	37	86	844	1132.	1.0	17.0	844	1132.00
17	1582.6	22.6	70	10	80	1227	1226.	1.0	18.0	1227	1226.00
18	1583.6	22.1	67	12	78	1149	929.	1.0	19.0	1149	929.00
19	1584.6	20.7	59	21	80	948	943.	1.0	20.0	948	943.00
20	1585.5	20.3	57	18	75	898	929.	1.0	21.0	898	929.00
21	1586.5	20.3	46	32	78	724	955.	1.0	22.0	724	955.00
22	1587.6	19.1	48	32	80	711	764.	1.0	23.0	711	764.00
23	1588.6	19.8	42	39	81	645	926.	1.0	24.0	645	926.00
24	1589.4	20.9	38	39	77	616	679.	1.7	25.7	1047	1154.30

Oilfield Research Laboratories
SUMMARY OF PERMEABILITY & SATURATION TESTS

TABLE III

Company		Lease		Well No.	
Jerry Lutz		Bolinger		3	
Depth Interval, Feet	Feet of Core Analyzed	Average Permeability, Millidarcys	Permeability Capacity Ft. x Md.		
1565.0 - 1579.8	14.8	824.5	12,203.20		
1579.8 - 1590.7	10.9	951.2	10,368.30		
1565.0 - 1590.7	25.7	878.3	22,571.50		

Depth Interval, Feet	Feet of Core Analyzed	Average Percent Porosity	Average Percent Oil Saturation	Average Percent Water Saturation	Average Oil Content Bbl./A. Ft.	Total Oil Content Bbls./Acre
1565.0 - 1579.8	14.8	22.8	9.0	44.9	164	2,421
1579.8 - 1590.7	10.9	21.3	54.0	26.3	905	9,862
1565.0 - 1590.7	25.7	22.2	28.1	37.0	478	12,283

Oilfield Research Laboratories

TABLE IV

Company		Jerry Lutz		Lease		Bolinger		Well No.		3	
Sample No.	Depth, Feet	Effective Porosity Percent	Original Oil Saturation		Oil Recovery		Residual Saturation		Volume of Water Recovered cc*	Effective Permeability Millidarcys**	Initial Fluid Production Pressure Lbs./Sq./In.
			%	Bbls./A. Ft.	%	Bbls./A. Ft.	% Oil	% Water			

Notes: eo—cubic centimeter.

•—Volume of water recovered at the time of maximum oil recovery.

••—Determined by passing water through sample which still contains residual oil.

Oilfield Research Laboratories

SUMMARY OF LABORATORY FLOODING TESTS

TABLE V

Company	Jerry Lutz	Lease	Bolinger	Well No.	3
Depth Interval, Feet	Fresh Water at Room Temperature (ambient) Sample Nos. 15 thru 24 1579.8 - 1590.7				
Feet of Core Analyzed	4.2				
Average Percent Porosity	22.0				
Average Percent Original Oil Saturation	62.0				
Average Percent Oil Recovery	2.2				
Average Percent Residual Oil Saturation	59.8				
Average Percent Residual Water Saturation	29.3				
Average Percent Total Residual Fluid Saturation	89.1				
Average Original Oil Content, Bbls./A. Ft.	1,077.				
Average Oil Recovery, Bbls./A. Ft.	38.				
Average Residual Oil Content, Bbls./A. Ft.	1,039.				
Total Original Oil Content, Bbls./Acre	4,522.				
Total Oil Recovery, Bbls./Acre	159.				
Total Residual Oil Content, Bbls./Acre	4,363.				
Average Effective Permeability, Millidarcys	7.09				
Average Initial Fluid Production Pressure, p.s.i.	16.3				

NOTE: Only those samples which recovered oil were used in calculating the above averages.

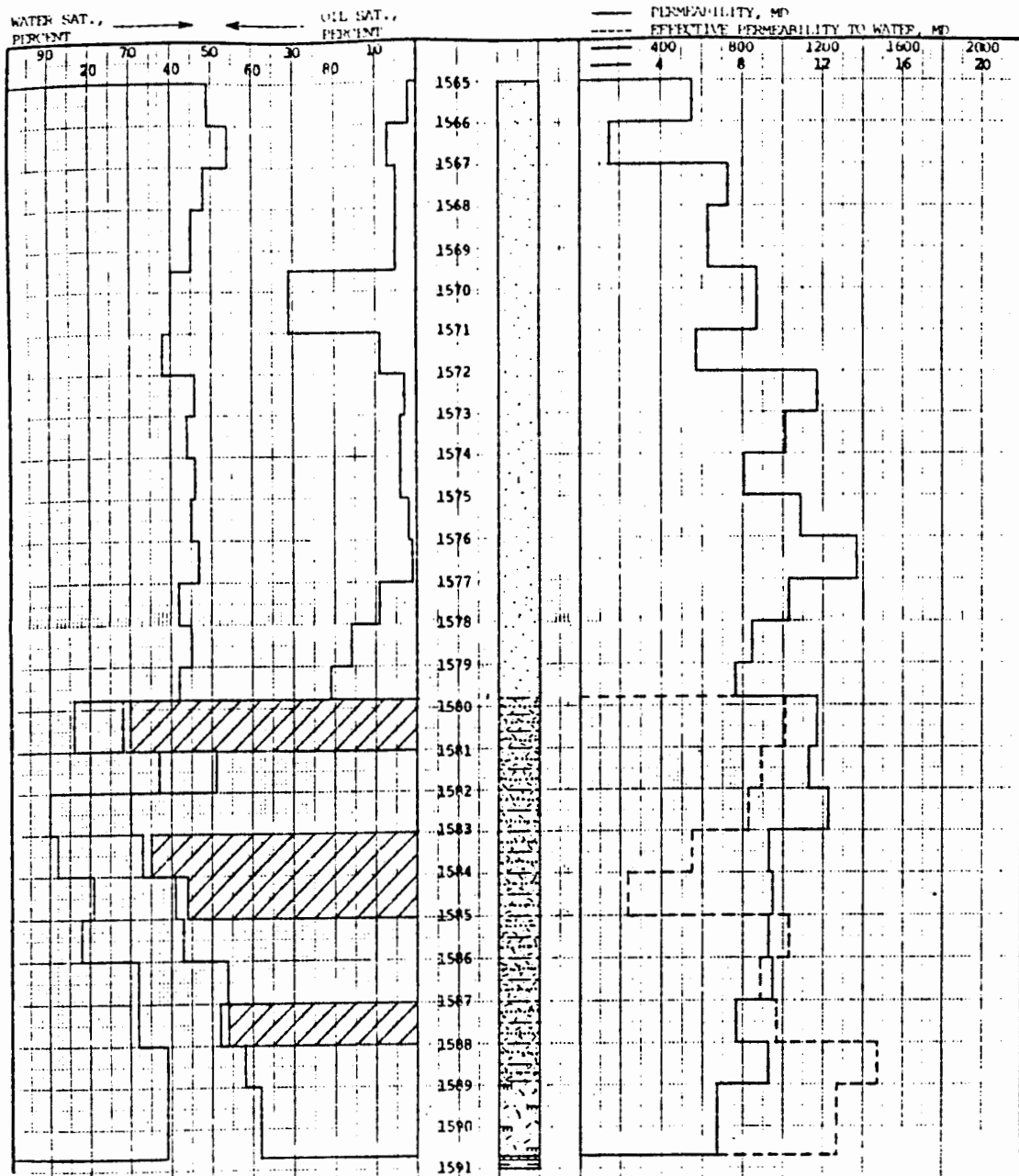
OILFIELD RESEARCH LABORATORIES

Results of Special Waterflood Susceptibility Tests

Company Jerry Lutz Lease Bolinger Well No. 3

Table VI

<u>Sample No.</u>	<u>Porosity Percent</u>	<u>Oil Sat. Percent</u>	<u>Residual Oil Saturation - Percent</u>		
			<u>Ambient</u>	<u>Hot</u>	<u>Steam</u>
15	25.4	72	70	68	25
16	22.6	49	49	47	-
17	22.8	70	70	68	31
18	22.4	67	65	59	-
19	20.7	59	56	54	-
20	20.6	57	57	55	28
21	20.8	46	46	46	-
22	19.0	48	46	44	-
23	19.9	42	42	42	-
24	20.7	38	38	38	-



JERRY LUTZ

ROLINGER LEASE

JEFFERSON COUNTY, KANSAS

WELL NO. 3

DEPTH INTERVAL, FEET	FEET OF CORE ANALYZED	AVERAGE PERCENT POROSITY	AVG. OIL SATURATION PERCENT	AVG. WATER SATURATION PERCENT	AVERAGE PERMEABILITY, MILLIDARCYS	CALCULATED OIL RECOVERY RBLS. / ACRE
1565.0 - 1579.8	14.8	22.8	9.0	44.9	824.5	
1579.8 - 1590.7	10.9	21.3	54.0	26.3	951.2	
1565.0 - 1590.7	25.7	22.2	28.1	37.0	878.3	860 (PRIMARY AND WATERFLOODING)

OILFIELD RESEARCH LABORATORIES
CHANUTE, KANSAS
MARCH, 1985 RAL

Card 1, 2, 3

Sec. 25, T. 9 S., R. 19 E.
Location or Spot 330' N 4950' W
65W56SW
County Telford

Well Lutz #3 Bolinger

Core Diameter 1565-1592 Inch (es) Temperature in acid room
Clarokee

Box <u>1 of 4</u>	Depth <u>1565-1572.9</u>	Box	Depth
Box <u>2 of 4</u>	Depth <u>1572.9-1578</u>	Box	Depth
Box <u>3 of 4</u>	Depth <u>1578-1585</u>	Box	Depth
Box <u>4 of 4</u>	Depth <u>1585-1592</u>	Box	Depth
Box	Depth	Box	Depth
Box	Depth	Box	Depth
Box	Depth	Box	Depth
Box	Depth	Box	Depth