

dick harnly
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1932 eastlawn ave, durango colorado, 81301, 303-247-1518

WELLSITE GEOLOGIC REPORT

KENAI OIL & GAS INC.

FEDERAL 13-7, WEST LYBROOK UNIT

NW SW Sec 7-T23N-R7W

RIO ARriba COUNTY, NEW MEXICO



Prepared by Dick Harnly
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OPERATOR: Kenai Oil and Gas Inc.

WELL: Federal 13-7, West Lybrook Unit

CLASSIFICATION: Wildcat; Dakota, Gallup

DRILLING CONTRACTOR: Kenai Drilling Co., Rig 10
Tool Pushers; J.D. Wilson, Bill Wiley.

MUD LOGGING: Underwood Well Logging Service
Logging Operator; Russ Bouren, sr.

WELLSITE GEOLOGY: Dick Harnly, consultant

MUD: American Mud Co.
Engineer; Jimmy Morris

TESTING: Halliburton
Testers; G. Brown, D. Bateman

LOGGING: Welex
Engineer; J. Leeper

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SUMMARY OF MUD PROPERTIES (AMERICAN MUD CO.)

<u>Depth</u>	<u>Weight</u>	<u>Viscosity</u>	<u>Water Loss</u>	<u>Cake</u>	<u>ph</u>	<u>Chlorides</u>	<u>Solids %</u>
360	8.4	32	6.0	2	10.5	600	1
860	8.7	37	4.2	2	9.0	600	2
1630	9.1	42	4.2	2	9.0	550	5
2078	9.2	33	6.6	2	8.5	400	6
2314	9.2	37	4.0	2	9.0	550	6
2778	9.3	37	4.2	2	9.0	550	7
2827	8.7	32	7.2	2	9.0	650	2
3250	9.0	38	4.2	2	8.5	600	5
3562	9.3	37	4.6	2	9.0	550	6
3795	9.3	34	4.4	2	8.5	400	6
4065	9.3	36	5.4	2	8.5	500	7
4345	9.3	38	4.4	2	8.5	400	7
4500	9.0	50	4.0	2	8.5	650	5
4500	9.2	46	4.0	2	8.5	650	6
4653	9.3	46	6.8	2	8.5	550	7
4923	9.2	46	6.4	2	8.5	450	6
5253	9.1+	37	7.8	2	8.5	650	5
5376	9.2	49	5.0	2	8.5	550	6
5376	9.2	50	5.0	2	8.5	500	6
5433	9.1	38	7.2	2	8.5	600	5

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<u>Depth</u>	<u>Weight</u>	<u>Viscosity</u>	<u>Water Loss</u>	<u>Cake</u>	<u>ph</u>	<u>Chlorides</u>	<u>Solids %</u>
5665	9.1	34	7.8	2	8.5	700	5
5721	9.0	32	8.0	2	8.5	700	5
5858	9.2	36	10.0	2	9.0	650	6
6019	9.1	35	8.0	2	8.5	700	5
6274	9.2	42	8.0	2	8.5	650	5
6410	9.2	50	6.0	2	8.5	650	6
6447	9.2	45	14.2	2	8.5	650	6
6560	9.3	43	8.0	2	8.5	600	7
6560	9.3	45	10.2	2	8.5	600	7

BIT RECORD

<u>Bit No.</u>	<u>Size</u>	<u>Manufacturer</u>	<u>Type</u>	<u>In</u>	<u>Out</u>	<u>Footage</u>	<u>Rotating Hours</u>
1	7 7/8"	Smith	DT-J	300	1248	948	17
2	7 7/8"	Smith	DGT-J	1248	2290	1042	28
3	7 7/8"	Smith	DTT-J	2290	2822	512	25
4	7 7/8"	Smith	F-2	2282	4500	1678	114½
5	7 7/8"	Smith	F-3	4500	6410	1910	146½
6	7 7/8"	Hughes	J-44	6410	6560	150	16

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FORMATION TOPS (FROM "E" LOGS) Elevations: K.B. 7129, GL 7119		
<u>FORMATION</u>	<u>DEPTH</u>	<u>ELEVATION</u>
Pictured Cliffs	1940	+5189
Cliff House	3440	+3689
Menefee	3525	+3604
Point Lookout	4290	+2839
Mancos	4428	+2701
Gallup	5335	+1794
Sanastee	5906	+1223
Greenhorn	6243	+ 886
Graneros	6310	+ 819
Dakota	6395	+ 734
Total Depth(Drilled)	6560	+ 569
Total Depth(Welex)	6576	+ 553

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SUMMATION

MUD LOGGING

Mud Logging services, ie: gas detection, chromatographic analysis, sample preservation and description, were performed by Mr. Russ Bouren, sr., logging operator for Underwood Well Logging Service of Farmington, New Mexico. Logging was continuous from the bottom of the surface casing at 300 feet to the total depth of 6560 feet.

SAMPLE QUALITY

Samples for the most part were of good to fair quality except at those times when the drilling operation was interrupted by drilling and power plant equipment breakdown, repair and replacement.

Samples were caught at lagged depths by members of the drilling contractor's (Kenai Drilling) crews. Diligent surveillance, of the sample catching operation, by logger Bouren and geologist Harnly, was required due to changes in the drilling crew members and the shortage of experienced roughnecks.

SHOWS

Minor shows of gas (methane) were recorded from coal encountered in the Pictured Cliffs down through the Menefee formations.

The first significant shows of oil and gas were noted in the Point Lookout formation....a very fine grained sandstone exhibiting a trace of very poor porosity and permeability, a trace of gold fluorescence,

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and a trace of very slow poor streaming cut fluorescence was encountered from 4360 to 4380 feet... a very poor show with no gas detected.

Gas recordings from the interval 4450-80 feet reached a maximum of 60 units total gas containing methane, ethane, propane and butane. (see mud log). This interval consisted of sandstone, very fine grained, white clay infilled in part with a trace of poor porosity and permeability. Thirty (30) percent of the sample exhibited a good bright yellow-white fluorescence with a fair streaming milky cut fluorescence. Slightly better fluorescence and cut were noted between 4475 and 4485 feet, however the porosity appears to have decreased to very poor.

The Point Lookout was Drillstem Tested over the interval 4442-4500 ft. No blows of air were noted during the 5 minute pre-flow or the 60 minute final open periods. The shut in periods were of 60 and 120 minutes. No gas, oil or water was recovered at the surface... 4 feet of mud was recovered in the drill pipe. Resistivity of this mud was 2.85 ohms at 65 F. Pressures were recorded as follows: Tool was partially plugged.

Top Recorder at 4434'

Bottom Recorder at 4449'

2270	IHP	2248
27-27	IFP	79-79
934	ISIP	976
54-54	FFP	79-79
1093	FSIP	976
2270	FHP	2328

Sample Chamber contained 1700cc of mud with resistivity of 2.82 ohms at 59 F. Resistivity of the drilling mud was 3.08 ohms at 68 F.

Bottom Hole Temperature: 120F.

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Two zones in the Gallup produced the best shows of gas and sample evidence encountered in the drilling of this test. The upper zone 5333 to 5345 feet was first noted in increased rate of penetration over this 12 foot drilling break. (2 minutes per foot as compared to the preceding 5 minutes per foot). A gas reading of 200 units of total gas was recorded. Chromatographic analysis of this gas revealed methane, ethane, propane, butanes and pentanes, indicating potential oil and gas possibilities. Examination of the cuttings from this interval confirmed this possibility. A very fine grained silty sandstone was noted as having good light brown oil staining in about fifty percent of the sample; good bright yellow white fluorescence in about seventy five percent and exhibited a good yellow white streaming cut fluorescence. Only poor porosity and permeability was noted, however a Drillstem Test was deemed advisable as the possibility of fracturing (which exists in the Gallup in some areas) could offset the lack of good porosity and permeability. This sandstone, being calcareous, might respond to an acid treatment at completion time. The drillstem test of the interval 5330-76 feet was declared a misrun as no pressures were recorded during the test. Six feet of slightly water cut mud was recovered in the drill pipe and 1800cc of similar mud was found in the sample chamber. Resistivity of the pipe recovered mud was 4.26 ohms at 61 F, that of the chamber mud was 4.42 ohms at 66 F, and the drilling mud was 4.24 ohms at 54 F. No gas or oil was found during this test. The bottom hole temperature was 140 F.

The second zone of interest in the Gallup was noted between 5450 and 5460. This zone exhibited the largest show of gas recorded while drilling; 600 units of methane, 250 of ethane, 120 propane, 10 butanes

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and 19 units of pentanes. Sandstone in this zone is fine grained, slightly calcareous and very argillaceous. This tight sandstone exhibits only poor porosity and permeability with good bright yellow fluorescence and a slow streaming cut fluorescence. A trace of very coarse grained subangular loose quartz grains were present. Each of these grains were coated with a light oil which exhibited a good cut and fluorescence. The presence of these loose grains give rise to the possibility of a zone of good reservoir characteristics. Thirty percent of the samples in this interval had light oil staining. This zone was not tested. This zone may well be the same as is producing in the New Mexico State No.1, drilled by Kenai in sw se 32-T24N-R8W.

No gas or shows in the samples of the Dakota formation were noted. The top two sands were penetrated and the hole was bottomed in shale. The upper sand 6390 to 6410 feet was noted to be fine grained, subangular, slightly calcareous and in part tightly infilled with white clay material; a trace of fair porosity and permeability was noted. Although no shows were observed a drillstem test was ordered based on the presence of the fair porosity. Hydrostatic pressure at this depth was calculated to be in excess of 3000 psi, which in the case of several wells logged by this geologist has been enough greater than the formation pressure to flush oil and gas shows back into the formation rather than being returned to the surface in the mud or cuttings. No shows were present in the lower sand 6485-6520; the sandstone being tightly infilled in part with white clay material. However a trace of poor to fair porosity and permeability was noted. The drillstem test ordered for the upper Dakota sand was not attempted due to a breakdown in the transmission

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of the drilling unit and the risk of losing power and sticking the drill-
pipe and testing tool was considered to be too great.