

Directional
Survey

With Listing
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Using the following logs: PEX BHC

COMPANY: NORTHWEST NATURAL GAS
 WELL: OM 22-26-65 RD
 FIELD: MIST
 COUNTY: COLUMBIA
 STATE: OREGON
 DATE LOGGED: 2000/05/21
 WELL LOCATION: 1744.22 SOUTH, 2512.13' EAST FROM THE NW CORNER OF 26
 ELEVATIONS: KB: 631ft DF: 629ft GL: 621ft
 API NUMBER: 36-009-00330

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

A. Interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation and we are not liable in the case of gross or willful negligence on our part. We have no responsibility for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our offices, agents or employees. These interpretations are also subject to Cause 4 of our General Terms and Conditions as set out in our current Price Schedule.

Field Recording: Location: SACRAMENTO Software Version: 9C1-303 Engineer: M.KHAN

Office Recording: ICS Center: Bakersfield, ICS Baseline: Log Analyst: T.Quinlan

Mud and Borehole Measurements:

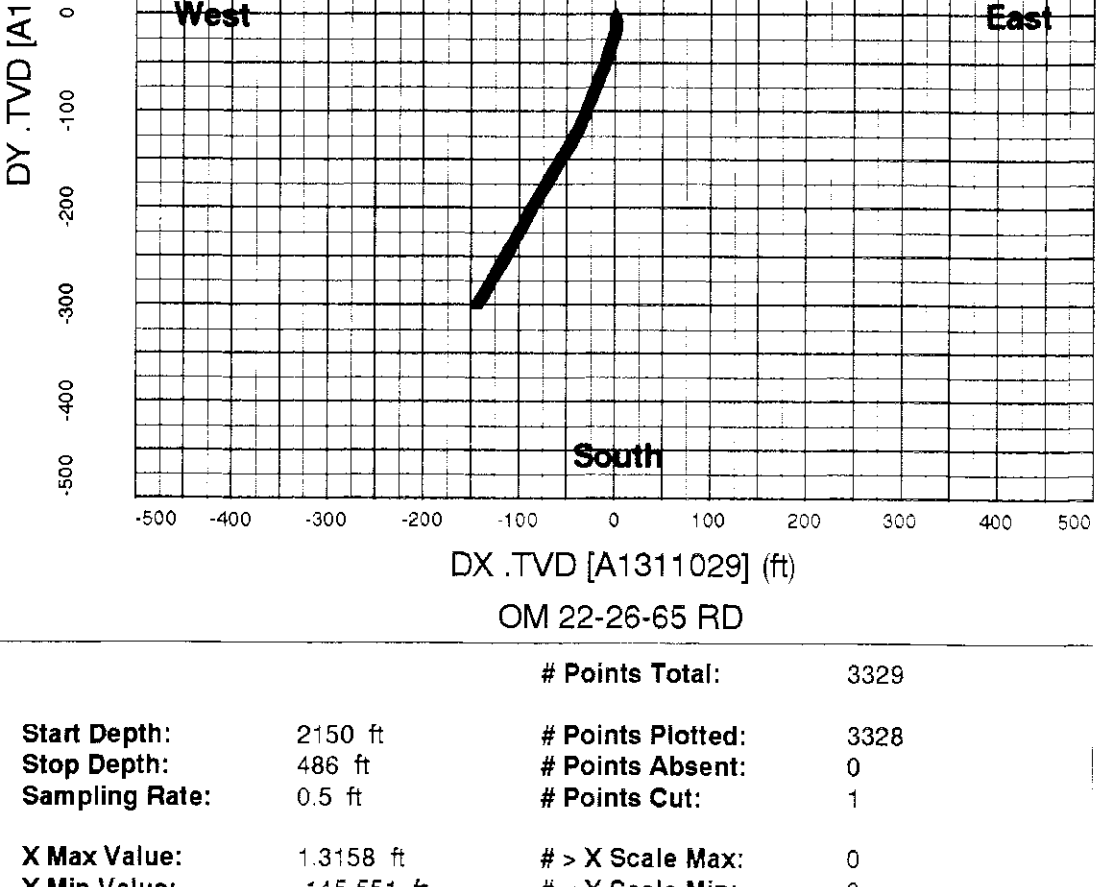
Rm @ Measured Temperature: 1.185ohm.m @ 78degF BHT: 86degF Bitsize: 6.25in

Rmf @ Measured Temperature: 1.05ohm.m @ 72degF Type Fluid in Hole: DMA

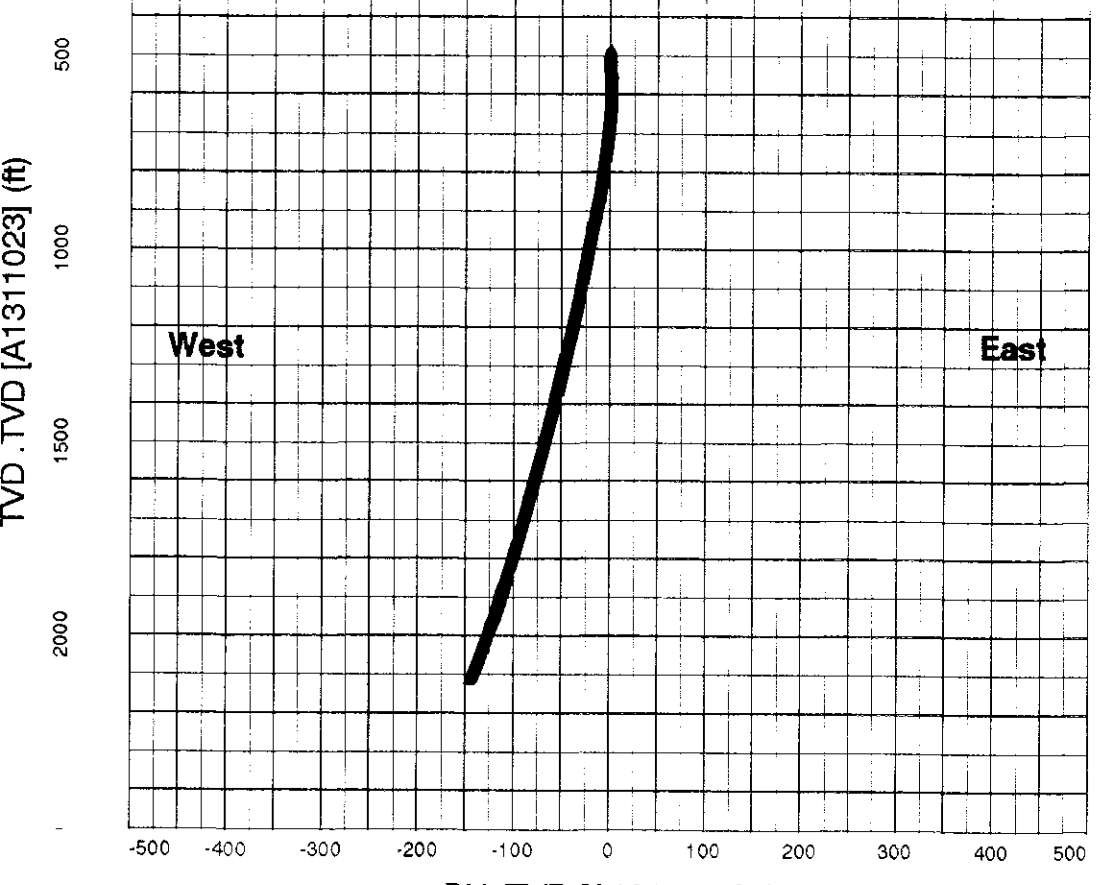
Rmc @ Measured Temperature: 0.93ohm.m @ 76degF Mud Density: 8.9lbm/gal

Remarks:

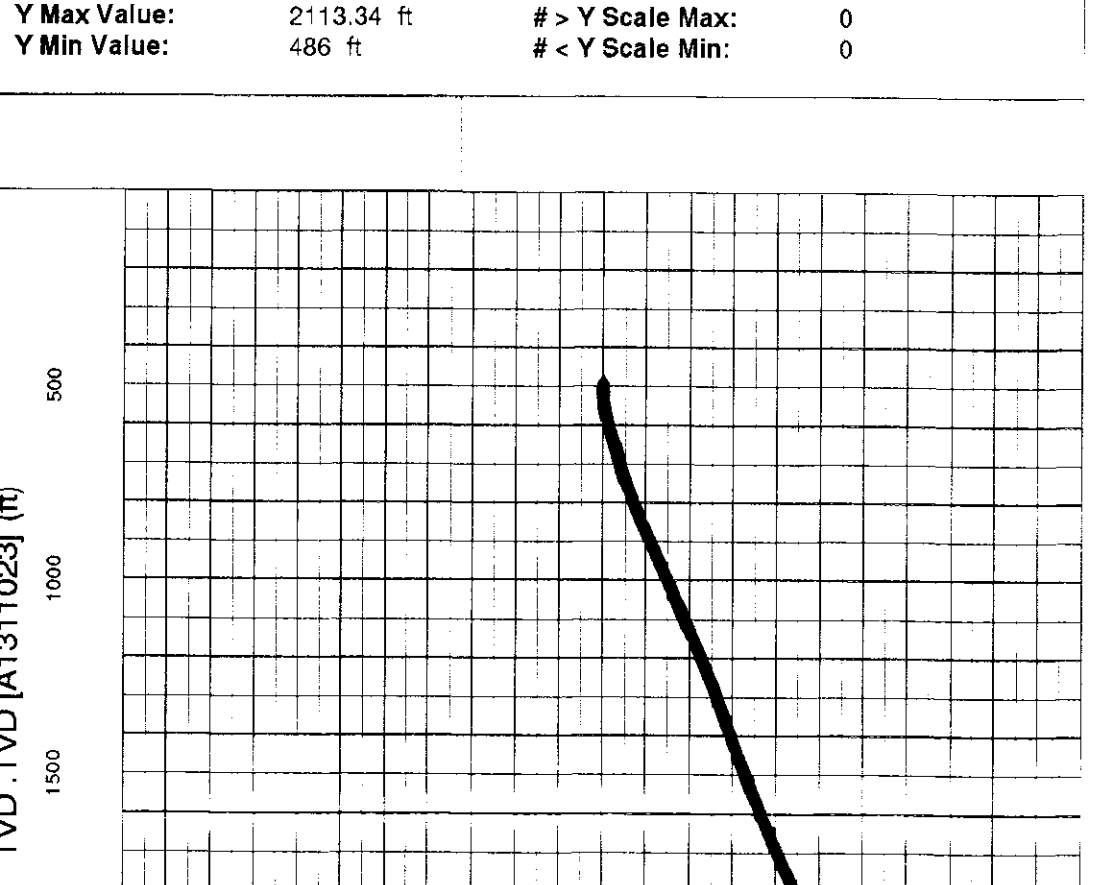
1069545



# Points Total:	3329
Start Depth:	2150 ft
Stop Depth:	486 ft
Sampling Rate:	0.5 ft
X Max Value:	1.3158 ft
X Min Value:	-45.551 ft
Y Max Value:	0.0254915 ft
Y Min Value:	-299.628 ft
# Points Plotted:	3328
# Points Absent:	0
# Points Cut:	1
# > X Scale Max:	0
# < X Scale Min:	0
# > Y Scale Max:	0
# < Y Scale Min:	0



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Start Depth:	2150 ft
Stop Depth:	486 ft
Sampling Rate:	0.5 ft
X Max Value:	1.3158 ft
X Min Value:	-145.551 ft
Y Max Value:	2113.34 ft
Y Min Value:	486 ft
# Points Plotted:	3328
# Points Absent:	0
# Points Cut:	1
# > X Scale Max:	0
# < X Scale Min:	0
# > Y Scale Max:	0
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DEPTH ft	TVD ft	DEPTH ft	DY ft	DX ft	AZIM deg	DEVI deg
490.00	490.000	-0.00015	0.22445	81.95889	0.39874	
520.00	519.99164	-0.31179	0.23052	153.55502	1.89444	
550.00	549.94165	-1.93828	0.89511	164.90720	4.84070	
580.00	579.77502	-5.03856	1.31366	179.09900	6.84255	
610.00	609.52502	-8.90543	1.07276	184.82272	7.56939	
640.00	639.25836	-12.83833	0.55697	194.53125	7.68801	
670.00	668.98334	-16.69925	-0.76213	199.51170	7.82089	
700.00	698.70831	-20.52204	-2.10403	199.00169	7.72388	
730.00	728.41669	-24.45692	-3.43161	198.50339	8.76786	
760.00	758.11664	-29.22185	-5.04139	198.41615	10.37574	
790.00	787.85001	-34.62511	-6.81167	197.56250	11.04099	
820.00	816.88336	-40.13679	-8.52842	197.29214	11.11228	
850.00	846.30835	-45.71493	-10.29759	199.76939	11.81665	
880.00	875.61664	-51.65736	-12.70276	203.66976	12.48916	
910.00	904.90833	-57.62611	-15.21837	203.66902	12.43166	
940.00	934.21667	-63.52537	-17.70038	202.42941	12.24384	
970.00	963.53333	-69.39651	-20.12861	202.39662	12.16762	
1000.00	992.86664	-75.22116	-22.49226	201.81264	11.98069	
1030.00	1022.21667	-81.00230	-24.76599	201.48210	11.87481	
1060.00	1051.58337	-86.73981	-27.01885	201.82480	11.86791	
1090.00	1080.96667	-92.35551	-29.27721	201.84958	11.60483	
1120.00	1110.35838	-97.91761	-31.55299	202.71396	11.43532	
1150.00	1139.69165	-103.62709	-34.13019	205.43634	12.46575	
1180.00	1169.00000	-109.40925	-36.90293	206.13240	12.30667	
1210.00	1198.34167	-115.00878	-39.69663	206.71310	11.85659	
1240.00	1227.71667	-120.41270	-42.47473	207.52122	11.55919	
1270.00	1257.12500	-125.64790	-45.24464	207.99335	11.28307	
1300.00	1286.56665	-130.72617	-47.95177	208.16032	12.02039	
1330.00	1316.04163	-135.63269	-50.63487	209.27303	10.64953	
1360.00	1345.53333	-140.43605	-53.35288	209.94182	10.61699	
1390.00	1375.00830	-145.24261	-56.18307	210.59148	10.78166	
1420.00	1404.47498	-150.08594	-59.06432	210.88704	10.91373	
1450.00	1433.92505	-154.98558	-61.99589	210.88762	11.05931	
1480.00	1463.35828	-159.96577	-64.97320	210.82268	11.26590	
1510.00	1492.76672	-165.05032	-68.005	210.77486	11.48036	
1540.00	1522.15833	-170.22478	-71.07619	210.71065	11.90200	
1570.00	1551.52502	-175.51317	-74.20737	210.65628	11.71231	
1600.00	1580.86670	-180.89160	-77.39796	210.61255	12.14365	
1630.00	1610.18335	-186.38121	-80.64265	210.49227	12.40234	
1660.00	1639.46667	-191.96710	-83.94680	210.56270	12.55370	
1690.00	1668.75000	-197.59477	-87.27599	210.56354	12.63475	
1720.00	1698.00830	-203.28786	-90.62580	210.22379	12.83130	
1750.00	1727.25000	-209.11874	-93.94615	209.35451	12.97242	
1780.00	1756.46667	-215.05789	-97.27576	209.15755	13.26615	
1810.00	1785.65172	-221.15930	-100.67986	209.07005	13.65536	
1840.00	1814.77502	-227.42282	-104.15751	209.10353	13.99450	
1870.00	1843.86670	-233.82645	-107.72231	209.09084	14.29540	
1900.00	1872.91663	-240.37706	-111.37202	208.98534	14.57641	
1930.00	1901.93335	-247.05331	-115.05033	208.83350	14.80783	
1960.00	1930.90833	-253.85786	-118.80201	208.91284	15.16948	
1990.00	1959.84167	-260.79834	-122.63986	208.91908	15.47059	
2020.00	1988.72498	-267.87292	-126.55848	209.03008	15.78872	
2050.00	2017.55835	-275.09470	-130.62314	209.47615	16.13719	
2080.00	2046.34998	-282.37842	-134.87811	210.88864	16.47963	
2110.00	2075.10010	-289.69086	-139.34248	211.87596	16.74455	
2140.00	2103.79175	-297.11835	-143.98575	211.89928	17.15141	

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