

**McVAY DRILLING COMPANY**

P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX. 39-DRILL

30-015-38390

Well Name and Num: Arcturus 18 Fed. 2H
Location: Sec. 18, T19S, R31E
Operator: Devon
Drilling Contractor: McVay Drilling Company

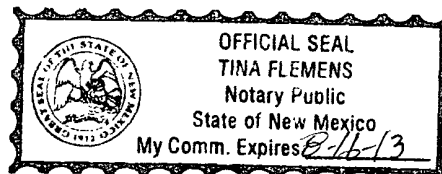
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.75	953	1.75	3970	59.90	8874
1.20	1258	1.33	4797	60.60	8934
3.50	1716	1.43	4667	71.40	9001
4.00	1808	1.06	5143	74.40	9033
4.00	1995	1.84	5998	88.70	9318
5.00	2073	1.61	6474	90.20	9762
4.50	2188	0.96	6924	91.10	9886
4.25	2280	1.56	7426	91.30	10175
3.75	2378	0.24	7902	91.30	10556
3.25	2473	1.19	8373	91.70	10838
3.00	2565	3.40	8855	90.60	11217
4.29	2664	2.23	9950	90.50	11597
4.00	2755	19.40	8363	91.10	11971
3.00	2950	32.00	8493	72.60	12159
2.50	3040	40.70	8588	92.20	12344
2.36	3430	46.20	8684	90.30	12530
2.32	3716	52.10	8778		

By: Hubert Crane

Subscribed and sworn to before me this 8th day of August, 2011

Tina Flemens
Notary Public, Lea County, New Mexico



A Gyrodata Directional Survey

for

DEVON ENERGY

Lease: HELIOS 6 FED COM Well: #2H, 4.5 INCH DRILLPIPE
Location: MCVAY #10, EDDY COUNTY, NEW MEXICO

Job Number: MD0811GVCW365

Run Date: 8/17/2011 10:42:01 PM

Surveyor: Che Garcia, Natilo Pena

Calculation Method: MINIMUM CURVATURE

Survey surface coordinates obtained from: Hand Held GPS

Survey Latitude: 32.683056 deg. N Longitude: 103.906889 deg. W

Azimuth Correction:

Gyro: -0.23000 deg to Grid North

Depth Reference: Rotary Table

Vertical Section Calculated from Well Head Location

Closure Calculated from Well Head Location

Horizontal Coordinates Calculated from Local Horizontal Reference

30-D15-38390

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MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. feet	AZIMUTH deg.	HORIZONTAL COORDINATES feet	
0.00	0.00	0.00	0.00	0.00	0.0	0.0	0.00 N	0.00 E
0 TO 7828 FT RATE VERTICAL CONTINUOUS SURVEY TO RUN INSIDE 4.5 INCH DRILLPIPE								
ALL MEASURED DEPTHS AND COORDINATES REFERENCED TO MC VAY #10 R.K.B 20FT								
100.00	0.10	321.49	0.10	100.00	0.1	321.5	0.07 N	0.05 W
200.00	0.04	110.15	0.13	200.00	0.1	328.1	0.12 N	0.07 W
300.00	0.07	320.65	0.10	300.00	0.2	331.9	0.16 N	0.08 W
400.00	0.19	305.08	0.12	400.00	0.4	319.3	0.29 N	0.25 W
500.00	0.21	297.96	0.04	500.00	0.7	310.8	0.47 N	0.55 W
600.00	0.61	288.71	0.40	600.00	1.4	301.0	0.73 N	1.22 W
700.00	0.87	304.56	0.33	699.99	2.7	299.6	1.33 N	2.34 W
800.00	1.68	326.36	0.93	799.96	4.8	308.3	2.98 N	3.78 W
900.00	1.69	326.43	0.01	899.92	7.7	315.1	5.43 N	5.41 W
1000.00	1.55	328.20	0.15	999.88	10.4	318.4	7.81 N	6.94 W
1100.00	1.39	335.77	0.25	1099.85	12.9	321.0	10.06 N	8.15 W
1200.00	1.28	345.33	0.25	1199.82	15.2	323.9	12.25 N	8.93 W
1300.00	1.14	352.25	0.20	1299.80	17.1	326.9	14.32 N	9.34 W
1400.00	1.00	0.36	0.21	1399.78	18.7	329.7	16.18 N	9.47 W
1500.00	0.94	13.79	0.23	1499.77	20.1	332.5	17.84 N	9.27 W
1600.00	0.95	17.67	0.07	1599.75	21.3	335.6	19.43 N	8.82 W
1700.00	1.00	18.31	0.05	1699.74	22.6	338.5	21.05 N	8.30 W
1800.00	1.02	18.77	0.02	1799.72	24.0	341.2	22.73 N	7.74 W
1900.00	1.20	24.83	0.21	1899.70	25.5	344.0	24.52 N	7.01 W

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MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. AZIMUTH feet deg.	HORIZONTAL COORDINATES feet
2000.00	1.44	41.11	0.44	1999.68	27.0 347.7	26.41 N 5.75 W
2100.00	1.41	38.36	0.08	2099.65	28.6 351.6	28.32 N 4.16 W
2200.00	1.28	34.38	0.16	2199.62	30.3 354.8	30.20 N 2.77 W
2300.00	1.03	27.13	0.28	2299.60	32.0 356.9	31.92 N 1.73 W
2400.00	1.05	22.07	0.09	2399.58	33.6 358.3	33.57 N 0.98 W
2500.00	1.07	12.98	0.17	2499.57	35.3 359.3	35.32 N 0.42 W
2600.00	1.16	2.21	0.23	2599.55	37.2 359.7	37.23 N 0.18 W
2700.00	1.24	355.84	0.16	2699.52	39.3 359.7	39.32 N 0.22 W
2800.00	1.22	355.72	0.02	2799.50	41.5 359.5	41.46 N 0.37 W
2900.00	1.09	356.54	0.13	2899.48	43.5 359.3	43.47 N 0.51 W
3000.00	0.85	349.22	0.26	2999.47	45.2 359.1	45.15 N 0.71 W
3100.00	0.88	347.78	0.03	3099.46	46.6 358.8	46.63 N 1.01 W
3200.00	0.89	357.09	0.14	3199.44	48.2 358.6	48.15 N 1.21 W
3300.00	0.86	353.51	0.06	3299.43	49.7 358.5	49.67 N 1.33 W
3400.00	0.81	341.10	0.16	3399.42	51.1 358.5	51.11 N 1.37 W
3500.00	0.83	354.76	0.14	3499.41	52.6 358.5	52.53 N 1.38 W
3600.00	0.89	352.54	0.07	3599.40	54.0 358.4	54.02 N 1.55 W
3700.00	0.88	358.25	0.09	3699.39	55.6 358.3	55.56 N 1.67 W
3800.00	0.80	354.57	0.10	3799.38	57.0 358.2	57.02 N 1.76 W
3900.00	0.81	333.70	0.29	3899.37	58.4 357.9	58.34 N 2.14 W
4000.00	0.76	333.34	0.04	3999.36	59.6 357.4	59.56 N 2.75 W

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MEASURED DEPTH feet	INCL deg.	AZIMUTH deg.	DOGLEG SEVERITY deg./ 100 ft.	VERTICAL DEPTH feet	CLOSURE DIST. AZIMUTH feet deg.	HORIZONTAL COORDINATES feet
4100.00	0.80	335.59	0.05	4099.35	60.9 356.9	60.80 N 3.34 W
4200.00	1.17	333.97	0.37	4199.33	62.5 356.3	62.35 N 4.08 W
4300.00	1.67	342.31	0.54	4299.30	64.8 355.6	64.66 N 4.97 W
4400.00	1.51	342.75	0.16	4399.27	67.6 355.1	67.30 N 5.80 W
4500.00	1.25	338.93	0.27	4499.24	69.9 354.6	69.58 N 6.58 W
4600.00	0.78	323.90	0.54	4599.22	71.5 354.1	71.15 N 7.38 W
4700.00	0.38	299.09	0.47	4699.22	72.3 353.6	71.86 N 8.07 W
4800.00	0.45	245.99	0.37	4799.21	72.4 353.1	71.86 N 8.71 W
4900.00	0.46	243.24	0.02	4899.21	72.1 352.5	71.52 N 9.43 W
5000.00	0.49	247.50	0.05	4999.21	71.9 351.9	71.18 N 10.18 W
5100.00	0.07	272.89	0.44	5099.20	71.8 351.5	71.02 N 10.64 W
5200.00	0.58	59.62	0.63	5199.20	72.0 351.8	71.27 N 10.26 W
5300.00	0.58	58.11	0.02	5299.20	72.4 352.5	71.79 N 9.40 W
5400.00	0.45	32.34	0.26	5399.19	72.9 353.1	72.39 N 8.76 W
5500.00	0.28	50.99	0.21	5499.19	73.4 353.5	72.88 N 8.36 W
5600.00	0.27	60.62	0.05	5599.19	73.6 353.8	73.15 N 7.96 W
5700.00	0.18	59.29	0.10	5699.19	73.7 354.1	73.35 N 7.62 W
5800.00	0.36	56.55	0.18	5799.19	74.0 354.4	73.60 N 7.23 W
5900.00	0.81	70.39	0.47	5899.18	74.3 355.1	74.01 N 6.30 W
6000.00	0.98	72.47	0.17	5999.17	74.7 356.3	74.51 N 4.82 W
6100.00	1.32	68.45	0.36	6099.15	75.2 357.8	75.19 N 2.94 W
6200.00	1.55	78.34	0.34	6199.12	75.9 359.6	75.88 N 0.54 W

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6300.00	1.79	79.48	0.24	6299.08	76.5	1.7	76.44 N 2.33 E
6400.00	1.46	66.47	0.50	6399.04	77.4	3.7	77.24 N 5.03 E
6500.00	1.34	53.02	0.35	6499.01	78.8	5.2	78.45 N 7.13 E
6600.00	1.00	35.62	0.49	6598.99	80.3	6.1	79.86 N 8.57 E
6700.00	1.05	17.40	0.33	6698.97	82.0	6.6	81.43 N 9.35 E
6800.00	1.24	348.38	0.60	6798.95	83.9	6.4	83.37 N 9.41 E
6900.00	1.43	314.15	0.80	6898.93	85.7	5.6	85.30 N 8.30 E
7000.00	1.88	313.34	0.45	6998.88	87.5	4.1	87.29 N 6.21 E
7100.00	0.91	2.85	1.46	7098.86	89.4	3.2	89.21 N 5.06 E
7200.00	1.30	57.41	1.07	7198.84	90.8	3.8	90.62 N 6.06 E
7300.00	1.10	50.15	0.25	7298.82	92.2	4.8	91.85 N 7.75 E
7400.00	1.05	44.63	0.11	7398.80	93.6	5.6	93.11 N 9.13 E
7500.00	0.63	47.45	0.42	7498.79	94.7	6.2	94.14 N 10.18 E
7600.00	0.13	228.43	0.76	7598.79	95.0	6.3	94.43 N 10.50 E
7700.00	0.21	150.57	0.23	7698.79	94.8	6.4	94.19 N 10.50 E
7800.00	0.25	147.57	0.03	7798.79	94.5	6.5	93.85 N 10.71 E
7828.00	0.08	120.63	0.64	7826.79	94.4	6.5	93.79 N 10.76 E

Final Station Closure: Distance: 94.40 ft Az: 6.55 deg.

Survey Report

MIN. CURVATURE CALCULATIONS (SPE-3362)

OPERATOR: Devon Energy
WELL: Arcturus-18-Fed #2H
LOCATION: Eddy Co., New Mexico
RIG: McVay #10
Directional Drillers: Brad Long
MWD Engineers: Cameron, Giacobbe, Weston, Graham

START: 07-18-2011 @ 8,239' MD
FINISH: 269' 54"
JOB #: D062048JSNJV
Bit to Survey: 53'
VERTICAL SECTION AZIMUTH: 269' 54"
TOTAL CORRECTION: 7' 52"



TARGET TOP @ 0' VS 8825
TARGET AZIMUTH 269' 54"
FORMATION DIP ANGLE

PROPOSED FINAL ANGLE 90

TARGET BOTTOM @ 0' VS 8870
TARGET AZIMUTH 269' 54"
FORMATION DIP ANGLE 1' 01"

STATION	SURVEY	INC	AZMTH	TVD	N-S	E-W	VERT	DLS/	C L	B / D	Walk	TARGET	ABOVE	TARGET	ABOVE	CLOSURE	+RIGHT
NUMBER	DEPTH						SECTION	100				TOP	BELOW	BOTTOM	BELOW	BEARING	-LEFT
Tie In	8200.00	0.54	45.96	8189.22	33.45	-287.19	286.91	0.00				8825.0	635.8	8864.9	675.7	276.6	35.8
1	8239.00	6.50	244.30	8228.14	32.62	-289.05	288.78	17.99	39.00	15.28	414.51	8825.0	596.9	8864.9	636.8	276.4	34.9
2	8271.00	8.70	244.90	8259.86	30.81	-292.87	292.62	6.88	32.00	6.88	1.87	8825.0	565.1	8864.8	605.0	276.0	33.2
3	8303.00	12.70	246.10	8291.30	28.35	-298.28	298.05	12.52	32.00	12.50	3.75	8825.0	533.7	8864.7	573.4	275.4	30.7
4	8334.00	16.30	249.70	8321.30	25.46	-305.48	305.27	11.97	31.00	11.61	11.61	8825.0	503.7	8864.6	543.3	274.8	27.9
5	8363.00	19.40	253.00	8348.91	22.64	-313.91	313.71	11.24	29.00	10.69	11.38	8825.0	476.1	8864.5	515.6	274.1	25.2
6	8397.00	23.10	254.70	8380.59	19.23	-325.74	325.58	11.03	34.00	10.88	5.00	8825.0	444.4	8864.3	483.7	273.4	21.8
7	8428.00	26.40	256.90	8408.74	16.06	-338.33	338.19	11.05	31.00	10.65	7.10	8825.0	416.3	8864.0	455.3	272.7	18.8
8	8458.00	29.20	256.90	8435.27	12.89	-351.95	351.84	9.33	30.00	9.33	0.00	8825.0	389.7	8863.8	428.5	272.1	15.7
9	8493.00	32.00	258.20	8465.40	9.06	-369.35	369.26	8.22	35.00	8.00	3.71	8825.0	359.6	8863.5	398.1	271.4	12.0
10	8524.00	34.50	258.60	8491.32	5.64	-386.00	385.94	8.10	31.00	8.06	1.29	8825.0	333.7	8863.2	371.9	270.8	8.7
11	8556.00	37.90	259.10	8517.14	1.99	-404.54	404.51	10.66	32.00	10.63	1.56	8825.0	307.9	8862.9	345.7	270.3	5.2
12	8589.00	40.70	260.60	8542.67	-1.68	-425.11	425.11	8.96	33.00	8.48	4.55	8825.0	282.3	8862.5	319.8	269.8	1.7
13	8621.00	41.80	260.80	8566.73	-5.09	-445.93	445.96	3.46	32.00	3.44	0.62	8825.0	258.3	8862.1	295.4	269.3	-1.5
14	8650.00	43.50	261.40	8588.06	-8.13	-465.34	465.39	6.03	29.00	5.86	2.07	8825.0	236.9	8861.8	273.7	269.0	-4.4
15	8684.00	46.20	261.90	8612.16	-11.61	-489.07	489.14	8.01	34.00	7.94	1.47	8825.0	212.8	8861.4	249.2	268.6	-7.7
16	8716.00	48.50	262.40	8633.84	-14.82	-512.38	512.48	7.28	32.00	7.19	1.56	8825.0	191.2	8861.0	227.1	268.3	-10.7
17	8745.00	50.20	262.80	8652.73	-17.65	-534.20	534.32	5.95	29.00	5.86	1.38	8825.0	172.3	8860.6	207.8	268.1	-13.4
18	8778.00	52.10	263.70	8673.43	-20.67	-559.72	559.87	6.14	33.00	5.76	2.73	8825.0	151.6	8860.1	186.7	267.9	-16.2
19	8810.00	54.90	264.40	8692.47	-23.33	-585.30	585.47	8.92	32.00	8.75	2.19	8825.0	132.5	8859.7	167.2	267.7	-18.6
20	8842.00	57.80	264.80	8710.20	-25.84	-611.82	612.01	9.12	32.00	9.06	1.25	8825.0	114.8	8859.2	149.0	267.6	-20.9
21	8874.00	59.90	266.20	8726.75	-27.98	-639.12	639.32	7.56	32.00	6.56	4.37	8825.0	98.3	8858.7	132.0	267.5	-22.9
22	8905.00	61.80	267.30	8741.85	-29.52	-666.15	666.36	6.87	31.00	6.13	3.55	8825.0	83.2	8858.3	116.4	267.5	-24.2
23	8937.00	63.60	267.90	8756.52	-30.71	-694.56	694.78	5.87	32.00	5.63	1.87	8825.0	68.5	8857.8	101.2	267.5	-25.1
24	8969.00	67.70	269.00	8769.72	-31.49	-723.69	723.92	13.19	32.00	12.81	3.44	8825.0	55.3	8857.2	87.5	267.5	-25.7
25	9001.00	71.40	269.00	8780.89	-32.01	-753.66	753.90	11.56	32.00	11.56	0.00	8825.0	44.1	8856.7	75.8	267.6	-26.0
26	9033.00	74.40	267.10	8790.30	-33.06	-784.23	784.47	10.96	32.00	9.38	-5.94	8825.0	34.7	8856.2	65.9	267.6	-26.8
27	9065.00	76.90	267.50	8798.23	-34.52	-815.19	815.44	7.91	32.00	7.81	1.25	8825.0	26.8	8855.6	57.4	267.6	-28.0
28	9097.00	79.60	267.90	8804.75	-35.77	-846.49	846.75	8.53	32.00	8.44	1.25	8825.0	20.3	8855.1	50.3	267.6	-29.0
29	9128.00	81.90	268.70	8809.73	-36.68	-877.07	877.34	7.84	31.00	7.42	2.58	8825.0	15.3	8854.5	44.8	267.6	-29.6
30	9160.00	84.40	269.20	8813.55	-37.26	-908.84	909.11	7.97	32.00	7.81	1.56	8825.0	11.5	8854.0	40.4	267.7	-30.0
31	9192.00	85.60	268.90	8816.34	-37.79	-940.71	940.98	3.86	32.00	3.75	-0.94	8825.0	8.7	8853.4	37.1	267.7	-30.2
32	9224.00	86.80	269.00	8818.46	-38.38	-972.63	972.91	3.76	32.00	3.75	0.31	8825.0	6.5	8852.8	34.4	267.7	-30.6
33	9255.00	87.50	269.10	8820.00	-38.89	-1003.59	1003.87	2.28	31.00	2.26	0.32	8825.0	5.0	8852.3	32.3	267.8	-30.8
34	9286.00	88.70	269.20	8821.03	-39.35	-1034.57	1034.85	3.88	31.00	3.87	0.32	8825.0	4.0	8851.8	30.7	267.8	-31.0
35	9318.00	88.70	269.30	8821.75	-39.77	-1066.56	1066.84	0.31	32.00	0.00	0.31	8825.0	3.2	8851.2	29.4	267.9	-31.2
36	9350.00	89.60	269.60	8822.23	-40.08	-1098.55	1098.84	2.96	32.00	2.81	0.94	8825.0	2.8	8850.6	28.4	267.9	-31.3
37	9381.00	89.80	269.40	8822.39	-40.35	-1129.55	1129.84	0.91	31.00	0.65	-0.65	8825.0	2.6	8850.1	27.7	268.0	-31.3
38	9413.00	89.90	269.30	8822.47	-40.71	-1161.55	1161.84	0.44	32.00	0.31	-0.31	8825.0	2.5	8849.5	27.0	268.0	-31.4
39	9445.00	90.00	268.90	8822.50	-41.21	-1193.55	1193.84	1.29	32.00	0.31	-1.25	8825.0	2.5	8849.0	26.5	268.0	-31.6

30-015-38390

Survey Report

MIN. CURVATURE CALCULATIONS (SPE-3362)

TARGET TOP @ 0' VS
TARGET AZIMUTH
FORMATION DIP ANGLE

8825
269.54
90

PROPOSED
FINAL
ANGLE

OPERATOR: Devon Energy
WELL: Arcturus-18-Fed.#2H
LOCATION: Eddy Co, New Mexico
RIG: McVay.#10
Directional Drillers: Brad Long
MWD Engineers: Cameron, Giacobbe, Weston, Graham

START: 07-18-2011 @ 8:239 AM
FINISH:
JOB #: D062048JSNUV
Bit to Survey 53
VERTICAL SECTION AZIMUTH: 269.54
TOTAL CORRECTION: 7.52



TARGET BOTTOM @ 0' VS
TARGET AZIMUTH
FORMATION DIP ANGLE

8870
269.54
101

STATION NUMBER	SURVEY DEPTH	INC	AZMTH	TVD	N-S	E-W	VERT SECTION	DLS/ 100	C L	B / D	Walk	TARGET TOP	ABOVE BELOW	TARGET BOTTOM	ABOVE BELOW	CLOSURE	+RIGHT -LEFT
												TVD	TOP	TVD	BOTTOM	BEARING	PLAN
40	9508.00	90.40	268.10	8822.28	-42.86	-1256.52	1256.83	1.42	63.00	0.63	-1.27	8825.0	2.7	8847.8	25.6	268.0	-32.8
41	9572.00	90.20	268.60	8821.95	-44.70	-1320.50	1320.81	0.84	64.00	-0.31	0.78	8825.0	3.1	8846.7	24.8	268.1	-34.1
42	9635.00	90.70	268.60	8821.45	-46.24	-1383.48	1383.80	0.79	63.00	0.79	0.00	8825.0	3.5	8845.6	24.2	268.1	-35.1
43	9699.00	89.90	268.70	8821.12	-47.75	-1447.46	1447.79	1.26	64.00	-1.25	0.16	8825.0	3.9	8844.5	23.4	268.1	-36.1
44	9762.00	90.20	269.10	8821.06	-48.96	-1510.44	1510.79	0.79	63.00	0.48	0.63	8825.0	3.9	8843.4	22.3	268.1	-36.8
45	9826.00	90.70	269.00	8820.56	-50.02	-1574.43	1574.78	0.80	64.00	0.78	-0.16	8825.0	4.4	8842.2	21.7	268.2	-37.4
46	9889.00	91.10	268.60	8819.57	-51.34	-1637.41	1637.77	0.90	63.00	0.63	-0.63	8825.0	5.4	8841.1	21.6	268.2	-38.2
47	9953.00	91.00	268.80	8817.81	-53.52	-1733.37	1733.74	0.23	96.00	-0.10	0.21	8825.0	7.2	8839.4	21.6	268.2	-39.6
48	10080.00	91.70	267.90	8815.57	-56.25	-1828.30	1828.70	1.20	95.00	0.74	-0.95	8825.0	9.4	8837.8	22.2	268.2	-41.6
49	10175.00	91.30	268.20	8813.09	-59.48	-1923.22	1923.63	0.53	95.00	-0.42	0.32	8825.0	11.9	8836.1	23.0	268.2	-44.0
50	10271.00	92.30	267.20	8810.07	-63.33	-2019.09	2019.53	1.47	96.00	1.04	-1.04	8825.0	14.9	8834.4	24.3	268.2	-47.1
51	10366.00	92.00	267.90	8806.51	-67.39	-2113.93	2114.41	0.80	95.00	-0.32	0.74	8825.0	18.5	8832.7	26.2	268.2	-50.4
52	10461.00	92.00	268.30	8803.19	-70.54	-2208.82	2209.32	0.42	95.00	0.00	0.42	8825.0	21.8	8831.1	27.9	268.2	-52.8
53	10556.00	91.30	269.30	8800.46	-72.53	-2303.76	2304.27	1.28	95.00	-0.74	1.05	8825.0	24.5	8829.4	28.9	268.2	-54.0
54	10648.00	92.40	268.90	8797.49	-73.97	-2395.70	2396.22	1.27	92.00	1.20	-0.43	8825.0	27.5	8827.8	30.3	268.2	-54.7
55	10743.00	91.40	268.30	8794.34	-76.29	-2490.62	2491.15	1.23	95.00	-1.05	-0.63	8825.0	30.7	8826.1	31.7	268.2	-56.3
56	10838.00	91.70	268.70	8791.77	-78.78	-2585.55	2586.10	0.53	95.00	0.32	0.42	8825.0	33.2	8824.4	32.6	268.3	-58.0
57	10933.00	90.90	268.50	8789.61	-81.10	-2680.50	2681.06	0.87	95.00	-0.84	-0.21	8825.0	35.4	8822.7	33.1	268.3	-59.6
58	11027.00	90.60	269.10	8788.38	-83.07	-2774.47	2775.05	0.71	94.00	-0.32	0.64	8825.0	36.6	8821.1	32.7	268.3	-60.8
59	11122.00	91.30	268.50	8786.81	-85.06	-2869.43	2870.02	0.97	95.00	0.74	-0.63	8825.0	38.2	8819.4	32.6	268.3	-62.0
60	11217.00	90.60	268.70	8785.23	-87.38	-2964.39	2965.00	0.77	95.00	-0.74	0.21	8825.0	39.8	8817.7	32.5	268.3	-63.6
61	11312.00	89.90	269.00	8784.82	-89.28	-3059.37	3059.99	0.80	95.00	-0.74	0.32	8825.0	40.2	8816.1	31.2	268.3	-64.7
62	11408.00	90.70	268.60	8784.31	-91.29	-3155.35	3155.98	0.93	96.00	0.83	-0.42	8825.0	40.7	8814.4	30.0	268.3	-66.0
63	11503.00	90.20	268.30	8783.57	-93.86	-3250.31	3250.96	0.61	95.00	-0.53	-0.32	8825.0	41.4	8812.7	29.1	268.3	-67.8
64	11597.00	90.50	267.20	8782.99	-97.55	-3344.23	3344.91	1.21	94.00	0.32	-1.17	8825.0	42.0	8811.0	28.0	268.3	-70.7
65	11692.00	91.80	267.30	8781.09	-102.11	-3439.10	3439.81	1.37	95.00	1.37	0.11	8825.0	43.9	8809.4	28.3	268.3	-74.5
66	11784.00	91.30	267.50	8778.60	-106.28	-3530.97	3531.71	0.59	92.00	-0.54	0.22	8825.0	46.4	8807.7	29.1	268.3	-77.9
67	11837.00	91.30	267.50	8777.39	-108.59	-3583.91	3584.67	0.00	53.00	0.00	0.00	8825.0	47.6	8806.8	29.4	268.3	-79.8
68	11971.00	91.10	267.00	8774.59	-115.02	-3717.73	3718.53	0.40	134.00	-0.15	-0.37	8825.0	50.4	8804.4	29.9	268.2	-85.2
69	12066.00	91.60	266.40	8772.35	-120.49	-3812.54	3813.39	0.82	95.00	0.53	-0.63	8825.0	52.6	8802.8	30.4	268.2	-89.9
70	12252.00	92.50	266.00	8765.70	-132.81	-3998.01	3998.95	0.53	186.00	0.48	-0.22	8825.0	59.3	8799.5	33.8	268.1	-100.7
71	12344.00	92.20	266.60	8761.92	-138.74	-4089.74	4090.72	0.73	92.00	-0.33	0.65	8825.0	63.1	8797.9	36.0	268.1	-105.9
72	12437.00	91.30	266.70	8759.08	-144.17	-4182.54	4183.56	0.97	93.00	-0.97	0.11	8825.0	65.9	8796.2	37.2	268.0	-110.6
73	12534.00	90.30	266.70	8757.73	-149.75	-4279.37	4280.43	1.03	97.00	-1.03	0.00	8825.0	67.3	8794.5	36.8	268.0	-115.4
74	12623.00	91.40	265.80	8756.41	-155.57	-4368.16	4369.27	1.60	89.00	1.24	-1.01	8825.0	68.6	8793.0	36.6	268.0	-120.5
PTB	12676.00	91.40	265.80	8755.11	-159.45	-4421.01	4422.14	0.00	53.00	0.00	0.00	8825.0	69.9	8792.0	36.9	267.9	-124.0

Survey Report

MIN. CURVATURE CALCULATIONS (SPE-3362)

OPERATOR: Devon Energy
WELL: Arcturus 18 Fed #2H
LOCATION: Eddy Co, New Mexico
RIG: McVay #10
Directional Drillers: Brad Long
MWD Engineers: Cameron, Giacobbe, Weston, Graham

START: 07-18-2011 @ 8:239 MD
FINISH:
JOB #: D062048JSNJV
Bit to Survey: 53
VERTICAL SECTION AZIMUTH: 269.54
TOTAL CORRECTION: 7.52



TARGET TOP @ 0' VS
TARGET AZIMUTH
FORMATION DIP ANGLE

8825
269.54

PROPOSED
FINAL
ANGLE 90

TARGET BOTTOM @ 0' VS
TARGET AZIMUTH
FORMATION DIP ANGLE

8870
269.54
1.01

STATION NUMBER	SURVEY DEPTH	INC	AZMTH	TVD	N-S	E-W	VERT. SECTION	DLS/ 100	C.L	B / D	Walk	TARGET TOP TVD	ABOVE BELOW TOP	TARGET BOTTOM TVD	ABOVE BELOW BOTTOM	CLOSURE BEARING	+RIGHT -LEFT PLAN
Tie-In	8200.00	0.54	45.96	8189.22	33.45	-287.19	286.91	0.00				8825.0	635.8	8864.9	675.7	276.6	35.8
1	8239.00	6.50	244.30	8228.14	32.62	-289.05	288.78	17.99	39.00	15.28	414.51	8825.0	596.9	8864.9	636.8	276.4	34.9
2	8271.00	8.70	244.90	8259.86	30.81	-292.87	292.62	6.88	32.00	6.88	1.87	8825.0	565.1	8864.8	605.0	276.0	33.2
3	8303.00	12.70	246.10	8291.30	28.35	-298.28	298.05	12.52	32.00	12.50	3.75	8825.0	533.7	8864.7	573.4	275.4	30.7
4	8334.00	16.30	249.70	8321.30	25.46	-305.48	305.27	11.97	31.00	11.61	11.61	8825.0	503.7	8864.6	543.3	274.8	27.9
5	8363.00	19.40	253.00	8348.91	22.64	-313.91	313.71	11.24	29.00	10.69	11.38	8825.0	476.1	8864.5	515.6	274.1	25.2
6	8397.00	23.10	254.70	8380.59	19.23	-325.74	325.58	11.03	34.00	10.88	5.00	8825.0	444.4	8864.3	483.7	273.4	21.8
7	8428.00	26.40	256.90	8408.74	16.06	-338.33	338.19	11.05	31.00	10.65	7.10	8825.0	416.3	8864.0	455.3	272.7	18.8
8	8458.00	29.20	256.90	8435.27	12.89	-351.95	351.84	9.33	30.00	9.33	0.00	8825.0	389.7	8863.8	428.5	272.1	15.7
9	8493.00	32.00	258.20	8465.40	9.06	-369.35	369.26	8.22	35.00	8.00	3.71	8825.0	359.6	8863.5	398.1	271.4	12.0
10	8524.00	34.50	258.60	8491.32	5.64	-386.00	385.94	8.10	31.00	8.06	1.29	8825.0	333.7	8863.2	371.9	270.8	8.7
11	8556.00	37.90	259.10	8517.14	1.99	-404.54	404.51	10.66	32.00	10.63	1.56	8825.0	307.9	8862.9	345.7	270.3	5.2
12	8589.00	40.70	260.60	8542.67	-1.68	-425.11	425.11	8.96	33.00	8.48	4.55	8825.0	282.3	8862.5	319.8	269.8	1.7
13	8621.00	41.80	260.80	8566.73	-5.09	-445.93	445.96	3.46	32.00	3.44	0.62	8825.0	258.3	8862.1	295.4	269.3	-1.5
14	8650.00	43.50	261.40	8588.06	-8.13	-465.34	465.39	6.03	29.00	5.86	2.07	8825.0	236.9	8861.8	273.7	269.0	-4.4
15	8684.00	46.20	261.90	8612.16	-11.61	-489.07	489.14	8.01	34.00	7.94	1.47	8825.0	212.8	8861.4	249.2	268.6	-7.7
16	8716.00	48.50	262.40	8633.84	-14.82	-512.38	512.48	7.28	32.00	7.19	1.56	8825.0	191.2	8861.0	227.1	268.3	-10.7
17	8745.00	50.20	262.80	8652.73	-17.65	-534.20	534.32	5.95	29.00	5.86	1.38	8825.0	172.3	8860.6	207.8	268.1	-13.4
18	8778.00	52.10	263.70	8673.43	-20.67	-559.72	559.87	6.14	33.00	5.76	2.73	8825.0	151.6	8860.1	186.7	267.9	-16.2
19	8810.00	54.90	264.40	8692.47	-23.33	-585.30	585.47	8.92	32.00	8.75	2.19	8825.0	132.5	8859.7	167.2	267.7	-18.6
20	8842.00	57.80	264.80	8710.20	-25.84	-611.82	612.01	9.12	32.00	9.06	1.25	8825.0	114.8	8859.2	149.0	267.6	-20.9
21	8874.00	59.90	266.20	8726.75	-27.98	-639.12	639.32	7.56	32.00	6.56	4.37	8825.0	98.3	8858.7	132.0	267.5	-22.9
22	8905.00	61.80	267.30	8741.85	-29.52	-666.15	666.36	6.87	31.00	6.13	3.55	8825.0	83.2	8858.3	116.4	267.5	-24.2
23	8937.00	63.60	267.90	8756.52	-30.71	-694.56	694.78	5.87	32.00	5.63	1.87	8825.0	68.5	8857.8	101.2	267.5	-25.1
24	8969.00	67.70	269.00	8769.72	-31.49	-723.69	723.92	13.19	32.00	12.81	3.44	8825.0	55.3	8857.2	87.5	267.5	-25.7
25	9001.00	71.40	269.00	8780.89	-32.01	-753.66	753.90	11.56	32.00	11.56	0.00	8825.0	44.1	8856.7	75.8	267.6	-26.0
26	9033.00	74.40	267.10	8790.30	-33.06	-784.23	784.47	10.96	32.00	9.38	-5.94	8825.0	34.7	8856.2	65.9	267.6	-26.8
27	9065.00	76.90	267.50	8798.23	-34.52	-815.19	815.44	7.91	32.00	7.81	1.25	8825.0	26.8	8855.6	57.4	267.6	-28.0
28	9097.00	79.60	267.90	8804.75	-35.77	-846.49	846.75	8.53	32.00	8.44	1.25	8825.0	20.3	8855.1	50.3	267.6	-29.0
29	9128.00	81.90	268.70	8809.73	-36.68	-877.07	877.34	7.84	31.00	7.42	2.58	8825.0	15.3	8854.5	44.8	267.6	-29.6
30	9160.00	84.40	269.20	8813.55	-37.26	-908.84	909.11	7.97	32.00	7.81	1.56	8825.0	11.5	8854.0	40.4	267.7	-30.0
31	9192.00	85.60	268.90	8816.34	-37.79	-940.71	940.98	3.86	32.00	3.75	-0.94	8825.0	8.7	8853.4	37.1	267.7	-30.2
32	9224.00	86.80	269.00	8818.46	-38.38	-972.63	972.91	3.76	32.00	3.75	0.31	8825.0	6.5	8852.8	34.4	267.7	-30.6
33	9255.00	87.50	269.10	8820.00	-38.89	-1003.59	1003.87	2.28	31.00	2.26	0.32	8825.0	5.0	8852.3	32.3	267.8	-30.8
34	9286.00	88.70	269.20	8821.03	-39.35	-1034.57	1034.85	3.88	31.00	3.87	0.32	8825.0	4.0	8851.8	30.7	267.8	-31.0
35	9318.00	88.70	269.30	8821.75	-39.77	-1066.56	1066.84	0.31	32.00	0.00	0.31	8825.0	3.2	8851.2	29.4	267.9	-31.2
36	9350.00	89.60	269.60	8822.23	-40.08	-1098.55	1098.84	2.96	32.00	2.81	0.94	8825.0	2.8	8850.6	28.4	267.9	-31.3
37	9381.00	89.80	269.40	8822.39	-40.35	-1129.55	1129.84	0.91	31.00	0.65	-0.65	8825.0	2.6	8850.1	27.7	268.0	-31.3
38	9413.00	89.90	269.30	8822.47	-40.71	-1161.55	1161.84	0.44	32.00	0.31	-0.31	8825.0	2.5	8849.5	27.0	268.0	-31.4
39	9445.00	90.00	268.90	8822.50	-41.21	-1193.55	1193.84	1.29	32.00	0.31	-1.25	8825.0	2.5	8849.0	26.5	268.0	-31.6

Survey Report

MIN. CURVATURE CALCULATIONS (SPE-3362)

OPERATOR: Devon Energy
WELL: Arcturus 18 Fed #2H
LOCATION: Eddy Co., New Mexico
RIG: McVay #10
Directional Drillers: Brad Long
MWD Engineers: Cameron Giacobbe/Weston Graham

START: 07-18-2011, @ 8,239' MD
FINISH:
JOB #: D062048JSNJV
Bit to Survey: 53
VERTICAL SECTION AZIMUTH: 269.54
TOTAL CORRECTION: 7.52



TARGET TOP @ 0' VS 8825
TARGET AZIMUTH 269.54
FORMATION DIP ANGLE

PROPOSED
FINAL
ANGLE 90

TARGET BOTTOM @ 0' VS 8870
TARGET AZIMUTH 269.54
FORMATION DIP ANGLE 1.01

STATION	SURVEY											TARGET	ABOVE	TARGET	ABOVE	+RIGHT
NUMBER	DEPTH	INC	AZMTH	TVD	N-S	E-W	SECTION	DLS/100	C.L	B / D	Walk	TOP	BELOW	BOTTOM	BELOW	CLOSURE
												TVD	TOP	TVD	BOTTOM	BEARING
40	9508.00	90.40	268.10	8822.28	-42.86	-1256.52	1256.83	1.42	63.00	0.63	-1.27	8825.0	2.7	8847.8	25.6	268.0
41	9572.00	90.20	268.60	8821.95	-44.70	-1320.50	1320.81	0.84	64.00	-0.31	0.78	8825.0	3.1	8846.7	24.8	268.1
42	9635.00	90.70	268.60	8821.45	-46.24	-1383.48	1383.80	0.79	63.00	0.79	0.00	8825.0	3.5	8845.6	24.2	268.1
43	9699.00	89.90	268.70	8821.12	-47.75	-1447.46	1447.79	1.26	64.00	-1.25	0.16	8825.0	3.9	8844.5	23.4	268.1
44	9762.00	90.20	269.10	8821.06	-48.96	-1510.44	1510.79	0.79	63.00	0.48	0.63	8825.0	3.9	8843.4	22.3	268.1
45	9826.00	90.70	269.00	8820.56	-50.02	-1574.43	1574.78	0.80	64.00	0.78	-0.16	8825.0	4.4	8842.2	21.7	268.2
46	9889.00	91.10	268.60	8819.57	-51.34	-1637.41	1637.77	0.90	63.00	0.63	-0.63	8825.0	5.4	8841.1	21.6	268.2
47	9985.00	91.00	268.80	8817.81	-53.52	-1733.37	1733.74	0.23	96.00	-0.10	0.21	8825.0	7.2	8839.4	21.6	268.2
48	10080.00	91.70	267.90	8815.57	-56.25	-1828.30	1828.70	1.20	95.00	0.74	-0.95	8825.0	9.4	8837.8	22.2	268.2
49	10175.00	91.30	268.20	8813.09	-59.48	-1923.22	1923.63	0.53	95.00	-0.42	0.32	8825.0	11.9	8836.1	23.0	268.2
50	10271.00	92.30	267.20	8810.07	-63.33	-2019.09	2019.53	1.47	96.00	1.04	-1.04	8825.0	14.9	8834.4	24.3	268.2
51	10366.00	92.00	267.90	8806.51	-67.39	-2113.93	2114.41	0.80	95.00	-0.32	0.74	8825.0	18.5	8832.7	26.2	268.2
52	10461.00	92.00	268.30	8803.19	-70.54	-2208.82	2209.32	0.42	95.00	0.00	0.42	8825.0	21.8	8831.1	27.9	268.2
53	10556.00	91.30	269.30	8800.46	-72.53	-2303.76	2304.27	1.28	95.00	-0.74	1.05	8825.0	24.5	8829.4	28.9	268.2
54	10648.00	92.40	268.90	8797.49	-73.97	-2395.70	2396.22	1.27	92.00	1.20	-0.43	8825.0	27.5	8827.8	30.3	268.2
55	10743.00	91.40	268.30	8794.34	-76.29	-2490.62	2491.15	1.23	95.00	-1.05	-0.63	8825.0	30.7	8826.1	31.7	268.2
56	10838.00	91.70	268.70	8791.77	-78.78	-2585.55	2586.10	0.53	95.00	0.32	0.42	8825.0	33.2	8824.4	32.6	268.3
57	10933.00	90.90	268.50	8789.61	-81.10	-2680.50	2681.06	0.87	95.00	-0.84	-0.21	8825.0	35.4	8822.7	33.1	268.3
58	11027.00	90.60	269.10	8788.38	-83.07	-2774.47	2775.05	0.71	94.00	-0.32	0.64	8825.0	36.6	8821.1	32.7	268.3
59	11122.00	91.30	268.50	8786.81	-85.06	-2869.43	2870.02	0.97	95.00	0.74	-0.63	8825.0	38.2	8819.4	32.6	268.3
60	11217.00	90.60	268.70	8785.23	-87.38	-2964.39	2965.00	0.77	95.00	-0.74	0.21	8825.0	39.8	8817.7	32.5	268.3
61	11312.00	89.90	269.00	8784.82	-89.28	-3059.37	3059.99	0.80	95.00	-0.74	0.32	8825.0	40.2	8816.1	31.2	268.3
62	11408.00	90.70	268.60	8784.31	-91.29	-3155.35	3155.98	0.93	96.00	0.83	-0.42	8825.0	40.7	8814.4	30.0	268.3
63	11503.00	90.20	268.30	8783.57	-93.86	-3250.31	3250.96	0.61	95.00	-0.53	-0.32	8825.0	41.4	8812.7	29.1	268.3
64	11597.00	90.50	267.20	8782.99	-97.55	-3344.23	3344.91	1.21	94.00	0.32	-1.17	8825.0	42.0	8811.0	28.0	268.3
65	11692.00	91.80	267.30	8781.09	-102.11	-3439.10	3439.81	1.37	95.00	1.37	0.11	8825.0	43.9	8809.4	28.3	268.3
66	11784.00	91.30	267.50	8778.60	-106.28	-3530.97	3531.71	0.59	92.00	-0.54	0.22	8825.0	46.4	8807.7	29.1	268.3
67	11837.00	91.30	267.50	8777.39	-108.59	-3583.91	3584.67	0.00	53.00	0.00	0.00	8825.0	47.6	8806.8	29.4	268.3
68	11971.00	91.10	267.00	8774.59	-115.02	-3717.73	3718.53	0.40	134.00	-0.15	-0.37	8825.0	50.4	8804.4	29.9	268.2
69	12066.00	91.60	266.40	8772.35	-120.49	-3812.54	3813.39	0.82	95.00	0.53	-0.63	8825.0	52.6	8802.8	30.4	268.2
70	12252.00	92.50	266.00	8765.70	-132.81	-3998.01	3998.95	0.53	186.00	0.48	-0.22	8825.0	59.3	8799.5	33.8	268.1
71	12344.00	92.20	266.60	8761.92	-138.74	-4089.74	4090.72	0.73	92.00	-0.33	0.65	8825.0	63.1	8797.9	36.0	268.1
72	12437.00	91.30	266.70	8759.08	-144.17	-4182.54	4183.56	0.97	93.00	-0.97	0.11	8825.0	65.9	8796.2	37.2	268.0
73	12534.00	90.30	266.70	8757.73	-149.75	-4279.37	4280.43	1.03	97.00	-1.03	0.00	8825.0	67.3	8794.5	36.8	268.0
74	12623.00	91.40	265.80	8756.41	-155.57	-4368.16	4369.27	1.60	89.00	1.24	-1.01	8825.0	68.6	8793.0	36.6	268.0
PTB	12676.00	91.40	265.80	8755.11	-159.45	-4421.01	4422.14	0.00	53.00	0.00	0.00	8825.0	69.9	8792.0	36.9	267.9

Survey Report

MIN. CURVATURE CALCULATIONS (SPE-3362)

TARGET TOP @ 0' VS
TARGET AZIMUTH
FORMATION DIP ANGLE

8825.0
269.54
90

PROPOSED
FINAL
ANGLE

OPERATOR: Devon Energy
WELL: Arcturus 18 Fed #2H
LOCATION: Eddy Co, New Mexico
RIG: McVay #10
Directional Drillers: Brad Long
MWD Engineers: Cameron Giacobbe/Weston Graham

START: 07-18-2011 @ 8:239' MD
FINISH:
JOB #: D062048JSNJV
Bit to Survey 53'
VERTICAL SECTION AZIMUTH: 269.54
TOTAL CORRECTION: 7.52'



TARGET BOTTOM @ 0' VS
TARGET AZIMUTH
FORMATION DIP ANGLE

8870.0
269.54
1.01

STATION	SURVEY						VERT	DLS/				TARGET	ABOVE	TARGET	ABOVE	+RIGHT
NUMBER	DEPTH	INC	AZMTH	TVD	N-S	E-W	SECTION	100	C.L	B / D	Walk	TOP	BELOW	BOTTOM	BELOW	CLOSURE
												TVD	TOP	TVD	BOTTOM	BEARING
Tie-In	8200.00	0.54	45.96	8189.22	33.45	-287.19	286.91	0.00				8825.0	635.8	8864.9	675.7	276.6
1	8239.00	6.50	244.30	8228.14	32.62	-289.05	288.78	17.99	39.00	15.28	414.51	8825.0	596.9	8864.9	636.8	276.4
2	8271.00	8.70	244.90	8259.86	30.81	-292.87	292.62	6.88	32.00	6.88	1.87	8825.0	565.1	8864.8	605.0	276.0
3	8303.00	12.70	246.10	8291.30	28.35	-298.28	298.05	12.52	32.00	12.50	3.75	8825.0	533.7	8864.7	573.4	275.4
4	8334.00	16.30	249.70	8321.30	25.46	-305.48	305.27	11.97	31.00	11.61	11.61	8825.0	503.7	8864.6	543.3	274.8
5	8363.00	19.40	253.00	8348.91	22.64	-313.91	313.71	11.24	29.00	10.69	11.38	8825.0	476.1	8864.5	515.6	274.1
6	8397.00	23.10	254.70	8380.59	19.23	-325.74	325.58	11.03	34.00	10.88	5.00	8825.0	444.4	8864.3	483.7	273.4
7	8428.00	26.40	256.90	8408.74	16.06	-338.33	338.19	11.05	31.00	10.65	7.10	8825.0	416.3	8864.0	455.3	272.7
8	8458.00	29.20	256.90	8435.27	12.89	-351.95	351.84	9.33	30.00	9.33	0.00	8825.0	389.7	8863.8	428.5	272.1
9	8493.00	32.00	258.20	8465.40	9.06	-369.35	369.26	8.22	35.00	8.00	3.71	8825.0	359.6	8863.5	398.1	271.4
10	8524.00	34.50	258.60	8491.32	5.64	-386.00	385.94	8.10	31.00	8.06	1.29	8825.0	333.7	8863.2	371.9	270.8
11	8556.00	37.90	259.10	8517.14	1.99	-404.54	404.51	10.66	32.00	10.63	1.56	8825.0	307.9	8862.9	345.7	270.3
12	8589.00	40.70	260.60	8542.67	-1.68	-425.11	425.11	8.96	33.00	8.48	4.55	8825.0	282.3	8862.5	319.8	269.8
13	8621.00	41.80	260.80	8566.73	-5.09	-445.93	445.96	3.46	32.00	3.44	0.62	8825.0	258.3	8862.1	295.4	269.3
14	8650.00	43.50	261.40	8588.06	-8.13	-465.34	465.39	6.03	29.00	5.86	2.07	8825.0	236.9	8861.8	273.7	269.0
15	8684.00	46.20	261.90	8612.16	-11.61	-489.07	489.14	8.01	34.00	7.94	1.47	8825.0	212.8	8861.4	249.2	268.6
16	8716.00	48.50	262.40	8633.84	-14.82	-512.38	512.48	7.28	32.00	7.19	1.56	8825.0	191.2	8861.0	227.1	268.3
17	8745.00	50.20	262.80	8652.73	-17.65	-534.20	534.32	5.95	29.00	5.86	1.38	8825.0	172.3	8860.6	207.8	268.1
18	8778.00	52.10	263.70	8673.43	-20.67	-559.72	559.87	6.14	33.00	5.76	2.73	8825.0	151.6	8860.1	186.7	267.9
19	8810.00	54.90	264.40	8692.47	-23.33	-585.30	585.47	8.92	32.00	8.75	2.19	8825.0	132.5	8859.7	167.2	267.7
20	8842.00	57.80	264.80	8710.20	-25.84	-611.82	612.01	9.12	32.00	9.06	1.25	8825.0	114.8	8859.2	149.0	267.6
21	8874.00	59.90	266.20	8726.75	-27.98	-639.12	639.32	7.56	32.00	6.56	4.37	8825.0	98.3	8858.7	132.0	267.5
22	8905.00	61.80	267.30	8741.85	-29.52	-666.15	666.36	6.87	31.00	6.13	3.55	8825.0	83.2	8858.3	116.4	267.5
23	8937.00	63.60	267.90	8756.52	-30.71	-694.56	694.78	5.87	32.00	5.63	1.87	8825.0	68.5	8857.8	101.2	267.5
24	8969.00	67.70	269.00	8769.72	-31.49	-723.69	723.92	13.19	32.00	12.81	3.44	8825.0	55.3	8857.2	87.5	267.5
25	9001.00	71.40	269.00	8780.89	-32.01	-753.66	753.90	11.56	32.00	11.56	0.00	8825.0	44.1	8856.7	75.8	267.6
26	9033.00	74.40	267.10	8790.30	-33.06	-784.23	784.47	10.96	32.00	9.38	-5.94	8825.0	34.7	8856.2	65.9	267.6
27	9065.00	76.90	267.50	8798.23	-34.52	-815.19	815.44	7.91	32.00	7.81	1.25	8825.0	26.8	8855.6	57.4	267.6
28	9097.00	79.60	267.90	8804.75	-35.77	-846.49	846.75	8.53	32.00	8.44	1.25	8825.0	20.3	8855.1	50.3	267.6
29	9128.00	81.90	268.70	8809.73	-36.68	-877.07	877.34	7.84	31.00	7.42	2.58	8825.0	15.3	8854.5	44.8	267.6
30	9160.00	84.40	269.20	8813.55	-37.26	-908.84	909.11	7.97	32.00	7.81	1.56	8825.0	11.5	8854.0	40.4	267.7
31	9192.00	85.60	268.90	8816.34	-37.79	-940.71	940.98	3.86	32.00	3.75	-0.94	8825.0	8.7	8853.4	37.1	267.7
32	9224.00	86.80	269.00	8818.46	-38.38	-972.63	972.91	3.76	32.00	3.75	0.31	8825.0	6.5	8852.8	34.4	267.7
33	9255.00	87.50	269.10	8820.00	-38.89	-1003.59	1003.87	2.28	31.00	2.26	0.32	8825.0	5.0	8852.3	32.3	267.8
34	9286.00	88.70	269.20	8821.03	-39.35	-1034.57	1034.85	3.88	31.00	3.87	0.32	8825.0	4.0	8851.8	30.7	267.8
35	9318.00	88.70	269.30	8821.75	-39.77	-1066.56	1066.84	0.31	32.00	0.00	0.31	8825.0	3.2	8851.2	29.4	267.9
36	9350.00	89.60	269.60	8822.23	-40.08	-1098.55	1098.84	2.96	32.00	2.81	0.94	8825.0	2.8	8850.6	28.4	267.9
37	9381.00	89.80	269.40	8822.39	-40.35	-1129.55	1129.84	0.91	31.00	0.65	-0.65	8825.0	2.6	8850.1	27.7	268.0
38	9413.00	89.90	269.30	8822.47	-40.71	-1161.55	1161.84	0.44	32.00	0.31	-0.31	8825.0	2.5	8849.5	27.0	268.0
39	9445.00	90.00	268.90	8822.50	-41.21	-1193.55	1193.84	1.29	32.00	0.31	-1.25	8825.0	2.5	8849.0	26.5	268.0
40	9458.00	90.40	268.10	8822.28	-42.86	-1256.52	1256.83	1.42	63.00	0.63	-1.27	8825.0	2.7	8847.8	25.6	268.0
41	9572.00	90.20	268.60	8821.95	-44.70	-1320.50	1320.81	0.84	64.00	-0.31	0.78	8825.0	3.1	8846.7	24.8	268.1

MIN CURVATURE CALCULATIONS (SPE-3362)

PROPOSED
FINAL
ANGLE 90



CUDD
DRILLING & MEASUREMENT
SERVICES

START:	07-18-2011 @ 8,239' MD
FINISH:	
JOB #:	D062048JSNJV.
Bit to Survey	53
VERTICAL SECTION AZIMUTH:	269.54
TOTAL CORRECTION.	7.52

STATION SURVEY												TOP	BELOW	BOTTOM	BELOW	CLOSURE	-LEFT
NUMBER	DEPTH	INC	AZMTH	TVD	N-S	E-W	VERT. SECTION	DLS/ 100	C.L	B / D	Walk	TVD	TOP	TVD	BOTTOM	BEARING	PLAN
42	9635.00	90.70	268.60	8821.45	-46.24	-1383.48	1383.80	0.79	63.00	0.79	0.00	8825.0	3.5	8845.6	24.2	268.1	-35.1
43	9699.00	89.90	268.70	8821.12	-47.75	-1447.46	1447.79	1.26	64.00	-1.25	0.16	8825.0	3.9	8844.5	23.4	268.1	-36.1
44	9762.00	90.20	269.10	8821.06	-48.96	-1510.44	1510.79	0.79	63.00	0.48	0.63	8825.0	3.9	8843.4	22.3	268.1	-36.8
45	9826.00	90.70	269.00	8820.56	-50.02	-1574.43	1574.78	0.80	64.00	0.78	-0.16	8825.0	4.4	8842.2	21.7	268.2	-37.4
46	9889.00	91.10	268.60	8819.57	-51.34	-1637.41	1637.77	0.90	63.00	0.63	-0.63	8825.0	5.4	8841.1	21.6	268.2	-38.2
47	9985.00	91.00	268.80	8817.81	-53.52	-1733.37	1733.74	0.23	96.00	-0.10	0.21	8825.0	7.2	8839.4	21.6	268.2	-39.6
48	10080.00	91.70	267.90	8815.57	-56.25	-1828.30	1828.70	1.20	95.00	0.74	-0.95	8825.0	9.4	8837.8	22.2	268.2	-41.6
49	10175.00	91.30	268.20	8813.09	-59.48	-1923.22	1923.63	0.53	95.00	-0.42	0.32	8825.0	11.9	8836.1	23.0	268.2	-44.0
50	10271.00	92.30	267.20	8810.07	-63.33	-2019.09	2019.53	1.47	96.00	1.04	-1.04	8825.0	14.9	8834.4	24.3	268.2	-47.1
51	10366.00	92.00	267.90	8806.51	-67.39	-2113.93	2114.41	0.80	95.00	-0.32	0.74	8825.0	18.5	8832.7	26.2	268.2	-50.4
52	10461.00	92.00	268.30	8803.19	-70.54	-2208.82	2209.32	0.42	95.00	0.00	0.42	8825.0	21.8	8831.1	27.9	268.2	-52.8
53	10556.00	91.30	269.30	8800.46	-72.53	-2303.76	2304.27	1.28	95.00	-0.74	1.05	8825.0	24.5	8829.4	28.9	268.2	-54.0
54	10648.00	92.40	268.90	8797.49	-73.97	-2395.70	2396.22	1.27	92.00	1.20	-0.43	8825.0	27.5	8827.8	30.3	268.2	-54.7
55	10743.00	91.40	268.30	8794.34	-76.29	-2490.62	2491.15	1.23	95.00	-1.05	-0.63	8825.0	30.7	8826.1	31.7	268.2	-56.3
56	10838.00	91.70	268.70	8791.77	-78.78	-2585.55	2586.10	0.53	95.00	0.32	0.42	8825.0	33.2	8824.4	32.6	268.3	-58.0
57	10933.00	90.90	268.50	8789.61	-81.10	-2680.50	2681.06	0.87	95.00	-0.84	-0.21	8825.0	35.4	8822.7	33.1	268.3	-59.6
58	11027.00	90.60	269.10	8788.38	-83.07	-2774.47	2775.05	0.71	94.00	-0.32	0.64	8825.0	36.6	8821.1	32.7	268.3	-60.8
59	11122.00	91.30	268.50	8786.81	-85.06	-2869.43	2870.02	0.97	95.00	0.74	-0.63	8825.0	38.2	8819.4	32.6	268.3	-62.0
60	11217.00	90.60	268.70	8785.23	-87.38	-2964.39	2965.00	0.77	95.00	-0.74	0.21	8825.0	39.8	8817.7	32.5	268.3	-63.6
61	11312.00	89.90	269.00	8784.82	-89.28	-3059.37	3059.99	0.80	95.00	-0.74	0.32	8825.0	40.2	8816.1	31.2	268.3	-64.7
62	11408.00	90.70	268.60	8784.31	-91.29	-3155.35	3155.98	0.93	96.00	0.83	-0.42	8825.0	40.7	8814.4	30.0	268.3	-66.0
63	11503.00	90.20	268.30	8783.57	-93.86	-3250.31	3250.96	0.61	95.00	-0.53	-0.32	8825.0	41.4	8812.7	29.1	268.3	-67.8
64	11597.00	90.50	267.20	8782.99	-97.55	-3344.23	3344.91	1.21	94.00	0.32	-1.17	8825.0	42.0	8811.0	28.0	268.3	-70.7
65	11692.00	91.80	267.30	8781.09	-102.11	-3439.10	3439.81	1.37	95.00	1.37	0.11	8825.0	43.9	8809.4	28.3	268.3	-74.5
66	11784.00	91.30	267.50	8778.60	-106.28	-3530.97	3531.71	0.59	92.00	-0.54	0.22	8825.0	46.4	8807.7	29.1	268.3	-77.9
67	11837.00	91.30	267.50	8777.39	-108.59	-3583.91	3584.67	0.00	53.00	0.00	0.00	8825.0	47.6	8806.8	29.4	268.3	-79.8
68	11971.00	91.10	267.00	8774.59	-115.02	-3717.73	3718.53	0.40	134.00	-0.15	-0.37	8825.0	50.4	8804.4	29.9	268.2	-85.2
69	12066.00	91.60	266.40	8772.35	-120.49	-3812.54	3813.39	0.82	95.00	0.53	-0.63	8825.0	52.6	8802.8	30.4	268.2	-89.9
70	12252.00	92.50	266.00	8765.70	-132.81	-3998.01	3998.95	0.53	186.00	0.48	-0.22	8825.0	59.3	8799.5	33.8	268.1	-100.7
71	12344.00	92.20	266.60	8761.92	-138.74	-4089.74	4090.72	0.73	92.00	-0.33	0.65	8825.0	63.1	8797.9	36.0	268.1	-105.9
72	12437.00	91.30	266.70	8759.08	-144.17	-4182.54	4183.56	0.97	93.00	-0.97	0.11	8825.0	65.9	8796.2	37.2	268.0	-110.6
73	12534.00	90.30	266.70	8757.73	-149.75	-4279.37	4280.43	1.03	97.00	-1.03	0.00	8825.0	67.3	8794.5	36.8	268.0	-115.4
74	12623.00	91.40	265.80	8756.41	-155.57	-4368.16	4369.27	1.60	89.00	1.24	-1.01	8825.0	68.6	8793.0	36.6	268.0	-120.5
PTB	12676.00	91.40	265.80	8755.11	-159.45	-4421.01	4422.14	0.00	53.00	0.00	0.00	8825.0	69.9	8792.0	36.9	267.9	-124.0
76																	
77																	
78																	