

30-015-41194

NM OIL CONSERVATION
ARTESTA DISTRICT

FEB 23 2015

RECEIVED

OCCIDENTAL PERMIAN LTD.

Pierce Crossing Bone Spring, East
Eddy County, NM
Cedar Canyon 23 #2H
DH - Job #320814-MPH-1024

Survey: MWD

SDI Survey Report

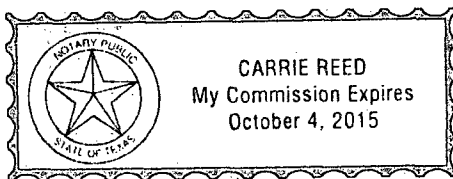
This survey is correct to the best of my knowledge and is supported by actual field data.

Rubenstein

Notarized this date 27th of October, 2014.

Carrie Reed

Notary Signature
County of Midland
State of Texas



SDI
SDI Survey Report

Company:	OCCIDENTAL PERMIAN LTD.	Local Co-ordinate Reference:	Well Cedar Canyon 23 #2H
Project:	Pierce Crossing Bone Spring, East	TVD Reference:	Mean Sea Level (System)
Site:	Eddy County, NM	MD Reference:	Mean Sea Level (System)
Well:	Cedar Canyon 23 #2H	North Reference:	Grid
Wellbore:	DH - Job #320814-MPH-1024	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320814-MPH-1024	Database:	EDM-Regulatory

Project	Pierce Crossing Bone Spring, East		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Eddy County, NM				
Site Position:		Northing:	445,863.68 usft	Latitude:	32° 13' 31.114 N
From:	Lat/Long	Easting:	608,483.24 usft	Longitude:	103° 58' 57.079 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.19 °

Well	Cedar Canyon 23 #2H, Horizontal					
Well Position	+N/-S	0.0 usft	Northing:	435,728.87 usft	Latitude:	32° 11' 50.597 N
	+E/-W	0.0 usft	Easting:	615,130.46 usft	Longitude:	103° 57' 40.104 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	0.0 usft

Wellbore	DH - Job #320814-MPH-1024				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/18/2014	7.38	60.02	48,266

Design:		DH - Job #320814-MPH-1024			
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.0	0.0	0.0	89.43	

Survey Program		Date 10/21/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
499.0	13,430.0	MWD (DH - Job #320814-MPH-1024)	MWD	MWD

Survey									
MD	Inc	Azi (azimuth)	TVD	N/S	E/W	Closure Azimuth	Closure Distance		
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°)	(usft)		
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0		
499.0	0.44	89.09	499.0	0.0	1.9	89.09	1.9		
603.0	0.35	91.02	603.0	0.0	2.6	89.32	2.6		
696.0	0.44	129.34	696.0	-0.2	3.2	93.59	3.2		
789.0	0.35	96.03	789.0	-0.5	3.8	96.94	3.8		
882.0	0.62	139.89	882.0	-0.9	4.4	101.30	4.4		
974.0	0.53	121.87	974.0	-1.5	5.0	106.33	5.3		
1,069.0	0.44	146.74	1,069.0	-2.0	5.6	109.73	6.0		
1,163.0	0.62	173.99	1,163.0	-2.8	5.9	115.69	6.5		
1,258.0	0.79	199.48	1,258.0	-3.9	5.7	124.72	6.9		
1,352.0	0.79	215.12	1,352.0	-5.1	5.1	134.89	7.2		
1,447.0	1.14	194.64	1,446.9	-6.5	4.5	145.50	7.9		

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Wellbore:	DH - Job #320814-MPH-1024	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320814-MPH-1024	Database:	EDM-Regulatory

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,541.0	0.79	188.23	1,540.9	-8.1	4.2	152.74	9.1	
1,635.0	0.79	211.78	1,634.9	-9.3	3.7	158.09	10.0	
1,730.0	1.06	207.30	1,729.9	-10.6	3.0	164.30	11.0	
1,824.0	1.06	202.55	1,823.9	-12.2	2.3	169.53	12.4	
1,919.0	0.97	193.50	1,918.9	-13.8	1.7	172.86	13.9	
2,013.0	0.88	187.00	2,012.9	-15.3	1.5	174.56	15.3	
2,108.0	0.53	182.51	2,107.9	-16.4	1.3	175.32	16.5	
2,202.0	0.88	199.13	2,201.9	-17.6	1.1	176.45	17.6	
2,297.0	0.70	156.67	2,296.8	-18.8	1.1	176.71	18.8	
2,391.0	1.23	136.46	2,390.8	-20.0	2.0	174.29	20.1	
2,486.0	1.41	137.78	2,485.8	-21.6	3.5	170.84	21.9	
2,580.0	1.41	128.11	2,579.8	-23.2	5.2	167.42	23.8	
2,675.0	1.93	124.16	2,674.7	-24.8	7.4	163.36	25.9	
2,769.0	1.67	139.71	2,768.7	-26.8	9.6	160.24	28.4	
2,864.0	1.41	133.30	2,863.7	-28.6	11.4	158.35	30.8	
2,958.0	1.49	121.61	2,957.6	-30.1	13.2	156.22	32.8	
3,049.0	1.23	144.28	3,048.6	-31.5	14.8	154.78	34.8	
3,144.0	1.14	131.01	3,143.6	-32.9	16.1	153.89	36.7	
3,238.0	1.23	138.22	3,237.6	-34.3	17.5	152.94	38.5	
3,333.0	1.32	285.17	3,332.6	-34.8	17.1	153.76	38.7	
3,427.0	3.25	287.63	3,426.5	-33.7	13.5	158.08	36.3	
3,522.0	5.36	284.03	3,521.2	-31.8	6.7	168.13	32.5	
3,616.0	6.60	286.14	3,614.7	-29.2	-2.8	185.42	29.3	
3,711.0	6.24	285.79	3,709.1	-26.3	-13.0	206.29	29.3	
3,805.0	6.16	285.61	3,802.5	-23.5	-22.8	224.04	32.7	
3,899.0	5.89	284.56	3,896.0	-21.0	-32.3	237.00	38.5	
3,994.0	5.63	284.73	3,990.5	-18.6	-41.5	245.91	45.5	
4,088.0	6.42	283.94	4,084.0	-16.1	-51.1	252.48	53.6	
4,183.0	6.42	283.59	4,178.4	-13.6	-61.4	257.51	62.9	
4,277.0	6.51	284.12	4,271.8	-11.1	-71.7	261.23	72.5	
4,372.0	6.24	283.68	4,366.2	-8.5	-81.9	264.06	82.3	
4,466.0	6.33	281.74	4,459.7	-6.3	-91.9	266.10	92.2	
4,561.0	6.42	281.39	4,554.1	-4.1	-102.3	267.68	102.4	
4,655.0	6.24	281.66	4,647.5	-2.1	-112.4	268.94	112.4	
4,749.0	6.33	280.69	4,740.9	-0.1	-122.5	269.96	122.5	
4,844.0	6.33	281.48	4,835.4	1.9	-132.8	270.83	132.8	
4,938.0	6.33	280.51	4,928.8	3.9	-143.0	271.57	143.0	
5,033.0	6.16	281.74	5,023.2	5.9	-153.1	272.21	153.2	
5,127.0	6.07	283.15	5,116.7	8.1	-162.9	272.83	163.1	
5,222.0	5.72	280.95	5,211.2	10.1	-172.4	273.35	172.7	
5,316.0	5.36	282.27	5,304.8	11.9	-181.3	273.76	181.7	
5,411.0	6.24	278.14	5,399.3	13.6	-190.8	274.08	191.3	
5,505.0	6.07	278.67	5,492.7	15.1	-200.7	274.29	201.3	
5,600.0	5.63	274.98	5,587.2	16.2	-210.3	274.41	211.0	

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Wellbore:	DH - Job #320814-MPH-1024	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320814-MPH-1024	Database:	EDM-Regulatory

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
5,694.0	6.51	271.64	5,680.7	16.8	-220.3	274.36	220.9	
5,788.0	6.16	271.28	5,774.1	17.0	-230.6	274.23	231.3	
5,883.0	5.72	270.58	5,868.6	17.2	-240.5	274.09	241.1	
5,977.0	5.36	269.88	5,962.2	17.2	-249.5	273.95	250.1	
6,072.0	5.80	273.57	6,056.7	17.5	-258.8	273.88	259.4	
6,166.0	6.60	272.51	6,150.2	18.1	-268.9	273.84	269.5	
6,261.0	6.33	272.51	6,244.6	18.5	-279.6	273.79	280.2	
6,355.0	5.89	270.41	6,338.0	18.8	-289.6	273.71	290.2	
6,450.0	6.16	270.76	6,432.5	18.9	-299.6	273.61	300.2	
6,544.0	6.24	270.41	6,526.0	19.0	-309.7	273.51	310.3	
6,638.0	5.72	268.91	6,619.5	19.0	-319.5	273.39	320.1	
6,733.0	5.28	267.51	6,714.0	18.7	-328.6	273.25	329.1	
6,827.0	4.66	267.33	6,807.7	18.3	-336.7	273.11	337.2	
6,922.0	4.66	264.96	6,902.4	17.8	-344.4	272.96	344.9	
7,016.0	3.25	268.74	6,996.1	17.4	-350.9	272.84	351.3	
7,111.0	2.11	257.75	7,091.0	17.0	-355.3	272.73	355.7	
7,205.0	0.44	275.33	7,185.0	16.6	-357.4	272.66	357.7	
7,300.0	0.53	249.31	7,280.0	16.5	-358.1	272.64	358.5	
7,394.0	1.32	207.65	7,374.0	15.4	-359.0	272.46	359.4	
7,489.0	2.11	176.78	7,468.9	12.7	-359.5	272.02	359.7	
7,583.0	0.44	216.70	7,562.9	10.7	-359.6	271.70	359.7	
7,678.0	0.62	265.57	7,657.9	10.3	-360.3	271.64	360.4	
7,773.0	0.35	250.98	7,752.9	10.2	-361.1	271.62	361.2	
7,867.0	0.53	262.06	7,846.9	10.0	-361.8	271.59	361.9	
7,962.0	0.70	256.34	7,941.9	9.8	-362.8	271.55	362.9	
7,991.0	0.70	271.72	7,970.9	9.8	-363.1	271.55	363.3	
8,086.0	1.41	271.72	8,065.9	9.9	-364.9	271.55	365.0	
8,181.0	1.93	274.01	8,160.8	10.0	-367.7	271.56	367.8	
8,275.0	1.14	107.02	8,254.8	9.8	-368.3	271.53	368.5	
8,370.0	9.23	93.83	8,349.4	9.1	-359.8	271.44	359.9	
8,464.0	17.67	83.37	8,440.7	10.2	-338.1	271.73	338.2	
8,559.0	28.23	83.11	8,528.1	14.6	-301.4	272.77	301.7	
8,654.0	40.36	85.40	8,606.4	19.8	-248.2	274.55	249.0	
8,685.0	44.32	85.66	8,629.3	21.4	-227.4	275.37	228.4	
8,717.0	48.28	85.84	8,651.4	23.1	-204.3	276.45	205.6	
8,749.0	51.18	86.36	8,672.1	24.8	-179.9	277.83	181.6	
8,780.0	54.52	86.54	8,690.8	26.3	-155.3	279.61	157.5	
8,812.0	57.68	86.89	8,708.7	27.8	-128.8	282.18	131.7	
8,844.0	59.79	86.89	8,725.3	29.3	-101.5	286.10	105.6	
8,875.0	62.43	86.98	8,740.2	30.7	-74.4	292.46	80.5	
8,907.0	64.89	87.33	8,754.4	32.2	-45.7	305.12	55.9	
8,939.0	66.57	88.03	8,767.6	33.3	-16.6	333.57	37.2	
8,970.0	68.06	88.91	8,779.6	34.1	12.0	19.41	36.2	
9,002.0	70.00	89.35	8,791.0	34.6	41.9	50.48	54.3	

SDI
SDI Survey Report

Company:	OCCIDENTAL PERMIAN LTD.	Local Co-ordinate Reference:	Well Cedar Canyon 23 #2H
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Site:	Eddy County, NM	MD Reference:	Mean Sea Level (System)
Well:	Cedar Canyon 23 #2H	North Reference:	Grid
Wellbore:	DH - Job #320814-MPH-1024	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320814-MPH-1024	Database:	EDM-Regulatory

Survey									
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)		
9,033.0	72.81	89.88	8,800.9	34.8	71.3	64.00	79.3		
9,065.0	74.66	90.14	8,809.9	34.7	102.0	71.19	107.7		
9,096.0	76.50	90.32	8,817.6	34.6	132.0	75.30	136.5		
9,127.0	78.26	90.93	8,824.3	34.3	162.3	78.06	165.8		
9,159.0	79.67	91.46	8,830.5	33.6	193.7	80.15	196.6		
9,191.0	81.34	91.64	8,835.7	32.8	225.2	81.72	227.6		
9,222.0	83.01	92.16	8,840.0	31.8	255.9	82.92	257.9		
9,254.0	85.21	92.69	8,843.3	30.4	287.7	83.96	289.3		
9,285.0	87.41	93.48	8,845.2	28.8	318.6	84.84	319.9		
9,317.0	88.72	94.01	8,846.3	26.7	350.5	85.65	351.5		
9,348.0	88.99	93.75	8,846.9	24.6	381.4	86.31	382.2		
9,380.0	88.99	93.75	8,847.5	22.5	413.3	86.89	414.0		
9,411.0	89.08	92.69	8,848.0	20.7	444.3	87.33	444.8		
9,505.0	90.04	91.37	8,848.8	17.4	538.2	88.15	538.5		
9,600.0	89.78	91.90	8,848.9	14.7	633.2	88.67	633.4		
9,695.0	89.16	92.08	8,849.8	11.4	728.1	89.10	728.2		
9,789.0	89.16	91.37	8,851.2	8.6	822.1	89.40	822.1		
9,884.0	88.37	91.55	8,853.2	6.1	917.0	89.62	917.0		
9,978.0	87.85	91.11	8,856.3	4.0	1,010.9	89.78	1,011.0		
10,073.0	90.31	88.38	8,857.8	4.4	1,105.9	89.77	1,105.9		
10,167.0	89.96	87.86	8,857.6	7.5	1,199.9	89.64	1,199.9		
10,262.0	89.87	87.94	8,857.8	11.0	1,294.8	89.52	1,294.8		
10,356.0	88.37	87.07	8,859.2	15.0	1,388.7	89.38	1,388.8		
10,451.0	88.29	86.54	8,862.0	20.3	1,483.5	89.21	1,483.6		
10,545.0	88.55	86.63	8,864.6	25.9	1,577.3	89.06	1,577.5		
10,640.0	88.64	87.94	8,866.9	30.4	1,672.2	88.96	1,672.4		
10,734.0	88.64	88.30	8,869.1	33.5	1,766.1	88.91	1,766.4		
10,829.0	88.99	90.84	8,871.1	34.2	1,861.1	88.95	1,861.4		
10,923.0	89.25	91.20	8,872.5	32.6	1,955.0	89.05	1,955.3		
11,018.0	89.25	91.37	8,873.8	30.4	2,050.0	89.15	2,050.2		
11,112.0	88.90	90.93	8,875.3	28.5	2,144.0	89.24	2,144.2		
11,207.0	88.72	90.23	8,877.3	27.6	2,238.9	89.29	2,239.1		
11,301.0	88.37	90.23	8,879.6	27.2	2,332.9	89.33	2,333.1		
11,396.0	88.90	91.90	8,881.9	25.4	2,427.9	89.40	2,428.0		
11,490.0	89.25	91.90	8,883.4	22.3	2,521.8	89.49	2,521.9		
11,585.0	89.34	90.93	8,884.6	20.0	2,616.8	89.56	2,616.8		
11,679.0	89.43	90.84	8,885.6	18.5	2,710.7	89.61	2,710.8		
11,774.0	89.25	89.79	8,886.7	18.0	2,805.7	89.63	2,805.8		
11,868.0	89.25	90.84	8,887.9	17.5	2,899.7	89.65	2,899.8		
11,963.0	89.16	91.64	8,889.3	15.4	2,994.7	89.70	2,994.7		
12,057.0	89.08	90.67	8,890.7	13.5	3,088.7	89.75	3,088.7		
12,152.0	88.81	85.75	8,892.4	16.5	3,183.6	89.70	3,183.6		
12,246.0	89.43	86.98	8,893.9	22.5	3,277.4	89.61	3,277.4		
12,341.0	89.69	88.30	8,894.6	26.4	3,372.3	89.55	3,372.4		
12,435.0	90.04	88.65	8,894.8	28.9	3,466.3	89.52	3,466.4		

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12,530.0	89.60	87.59	8,895.1	32.0	3,561.2	89.49	3,561.3	
12,624.0	89.69	87.24	8,895.7	36.2	3,655.1	89.43	3,655.3	
12,719.0	89.69	87.68	8,896.2	40.4	3,750.0	89.38	3,750.2	
12,814.0	89.78	87.59	8,896.7	44.4	3,844.9	89.34	3,845.2	
12,908.0	89.25	87.07	8,897.5	48.7	3,938.8	89.29	3,939.1	
13,003.0	89.34	86.63	8,898.6	54.0	4,033.7	89.23	4,034.0	
13,097.0	89.69	88.12	8,899.4	58.3	4,127.6	89.19	4,128.0	
13,192.0	89.69	87.59	8,899.9	61.8	4,222.5	89.16	4,222.9	
13,286.0	89.34	87.15	8,900.7	66.1	4,316.4	89.12	4,316.9	
13,371.0	89.52	86.01	8,901.6	71.2	4,401.2	89.07	4,401.8	
Last MWD Survey								
13,430.0	89.52	86.01	8,902.1	75.3	4,460.1	89.03	4,460.7	
Projection to Bit								

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		N/S (usft)	E/W (usft)		
13,371.0	8,901.6	71.2	4,401.2	Last MWD Survey	
13,430.0	8,902.1	75.3	4,460.1	Projection to Bit	



KB @ 2951.0usft (H&P 474)
Gr: 2927.0

Cedar Canyon 23 2H
Eddy County, NM (NAD 27 NME)
Northing: 435701.40
Easting: 615130.60
Design #4



Scientific Drilling

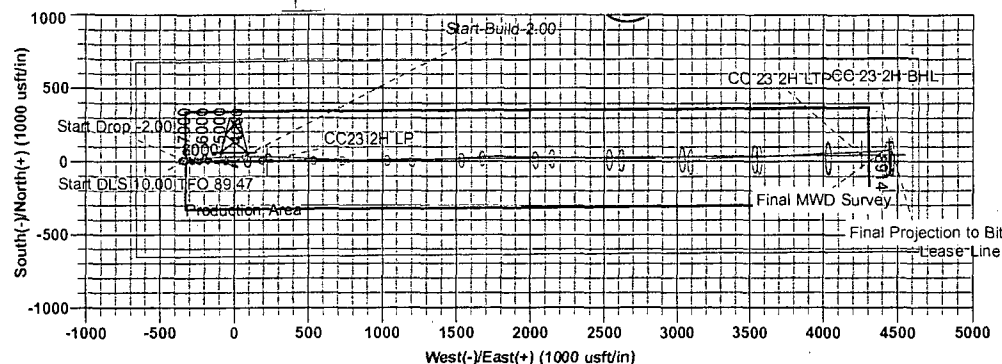
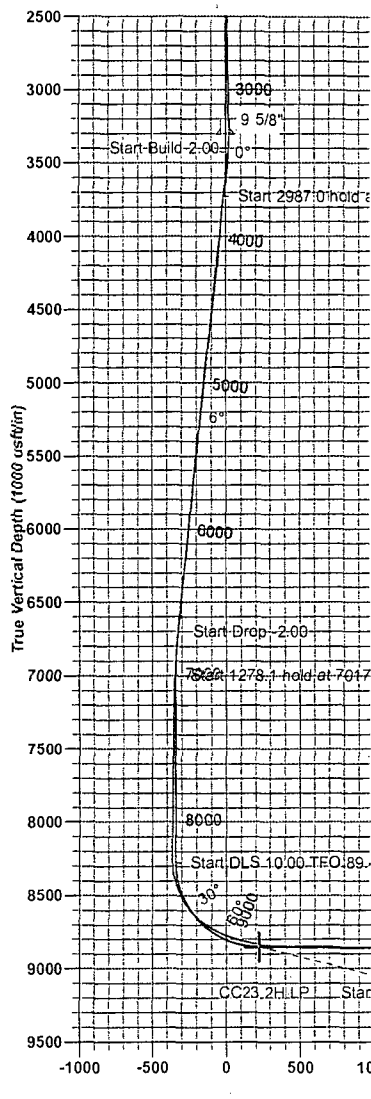
Start 5789.1 hold at 10732.7.MD



Azimuths to Grid North
True North: -0.20°
Magnetic North: 7.35°

TD at 16672.2 at 16521.9 MD Field
Strengthen: 44386.5snT
Dip Angle: 60.05°
Date: 3/14/2013
Model: IGRF2010

To convert Magnetic North to Grid, Add 7.35°
To convert True North to Grid, Subtract 0.20°



DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
CC23 2H LP	8851.0	5.2	220.8	435706.60	615351.39	32° 11' 50.369 N	103° 57' 37.534 W
CC 23 2H LTP	8911.0	42.4	4260.3	435743.80	619390.90	32° 11' 50.596 N	103° 56' 50.521 W
CC 23 2H BHL	8914.0	44.2	4460.3	435745.64	619590.87	32° 11' 50.607 N	103° 56' 48.194 W

WELL DETAILS Cedar Canyon 23 2H							
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Ground Level	
0.0	0.0	435701.40	615130.60	32° 11' 50.325 N	103° 57' 40.103 W	2927.0	

SECTION DETAILS							
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00
3430.0	0.00	0.00	3430.0	0.0	0.0	0.00	0.00
3730.0	6.00	270.00	3729.5	0.0	-15.7	2.00	270.00
6717.0	6.00	270.00	6700.1	0.0	-327.9	0.00	0.00
7017.5	0.00	0.00	7000.0	0.0	-343.6	2.00	180.00
8295.6	0.00	0.00	8278.1	0.0	-343.6	0.00	0.00
9187.1	89.15	89.47	8851.0	5.2	220.8	10.00	89.47
13227.2	89.15	89.47	8911.0	42.4	4260.3	0.00	0.00
13427.2	89.15	89.47	8914.0	44.2	4460.3	0.00	0.00

SITE DETAILS:							
Cedar Canyon 23 2H							
Site Centre Northing: 435701.40							
Easting: 615130.60							
Positional Uncertainty: 0.0							
Convergence: 0.20							
Local North: Grid							

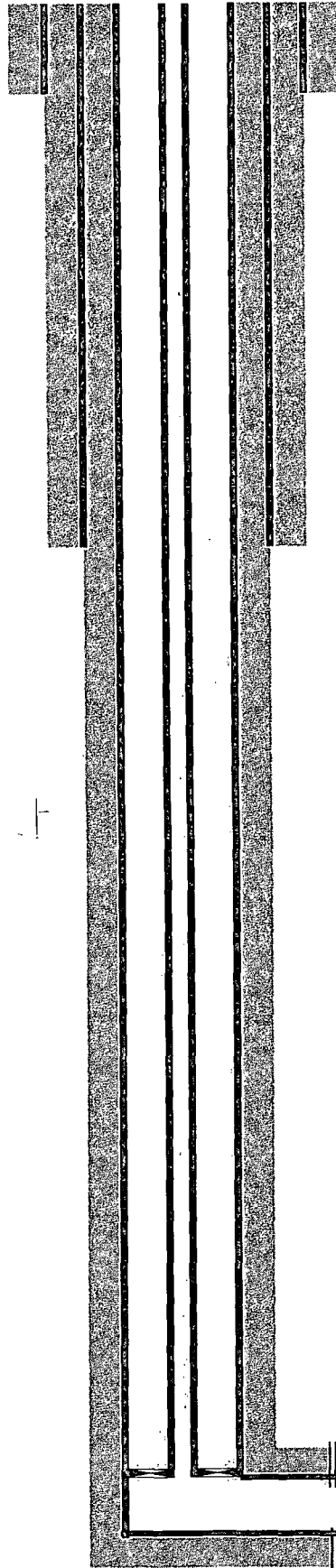
PROJECT DETAILS:							
Eddy County, NM (NAD 27 NME)							
Geodetic System: US State Plane 1927 (Exact solution)							
Datum: NAD 1927 (NADCON CONUS)							
Ellipsoid: Clarke 1866							
Zone: New Mexico East 3001							
System Datum: Mean Sea Level							

CASING DETAILS							
TVD	MD	Size					
435.0	435.0	13-5/8					
3310.3	10.0	9-5/8					
8914.0	27.2	5-1/2					

Judge Fletcher
14:51, September 02 2014

Scientific Drilling Int'l
633 Rankin Cir
Houston, Tx 77073

OXY USA INC.
Cedar Canyon 23 Com. 2H
API No. 30-015-41194



14-3/4" hole @ 470'
11-3/4" csg @ 467'
w/ 721sx-TOC-Surf-Circ.

10-5/8" hole @ 3024'
8-5/8" csg @ 3020'
w/ 1120sx-TOC-Surf-Circ.

7-7/8" hole @ 13430'
5-1/2" csg @ 13421'
w/ 1360sx-TOC-Surf-Circ.

2-7/8" tbg & pkr @ 8300'

Perfs @ 9195-13220'

TD- 13430'M 8902'V