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NM OIL CONSERVATION
ARTESIA DISTRICT

DEC 03 2014

RECEIVED

OCCIDENTAL PERMIAN LTD.

Pierce Crossing Bone Spring, East
Eddy County, NM
Cedar Canyon 27 State Com #4H
DH - Job #320714-MPH-903

Survey: MWD - Tie-In @ 466' by MS

SDI Survey Report

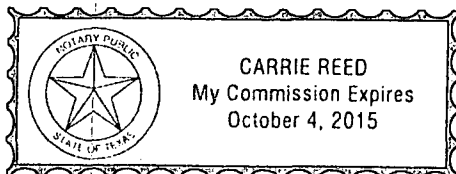
This survey is correct to the best of my knowledge and is supported by actual field data.

Leubart

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 27 State Com #4H
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 27 State Com #4H	North Reference:	Grid
Wellbore:	DH - Job #320714-MPH-903	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320714-MPH-903	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
From:	Lat/Long	Easting:	608,483.24 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 13' 31.114 N
		Longitude:	103° 58' 57.079 W
		Grid Convergence:	0.19 °

Well	Cedar Canyon 27 State Com #4H, Horizontal		
Well Position	+N/-S	0.0 usft	Northing: 434,347.04 usft
	+E/-W	0.0 usft	Easting: 614,117.48 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 11' 36.956 N
		Longitude:	103° 57' 51.948 W
		Ground Level:	0.0 usft

Wellbore	DH - Job #320714-MPH-903		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	7/18/2014	7.39
			Dip Angle
			(°)
			60.02
			Field Strength
			(nT)
			48,272

Design	DH - Job #320714-MPH-903		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			89.95

Survey Program	Date: 10/21/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
604.0	13,587.0	MWD - Tie-In @ 466' by MS (DH - Job #32)	MWD
			Description
			MWD

Survey									
MD	Inc	Azi (azimuth)	TVD	N/S	E/W	Closure Azimuth	Closure Distance		
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°)	(usft)		
466.0	0.57	292.20	466.0	0.4	-2.0	281.31	2.0		
604.0	1.67	321.24	604.0	2.2	-3.9	299.77	4.5		
696.0	1.85	321.15	695.9	4.4	-5.7	308.02	7.2		
789.0	1.85	317.72	788.9	6.7	-7.6	311.37	10.2		
882.0	2.02	324.05	881.8	9.1	-9.6	313.65	13.3		
974.0	0.97	0.96	973.8	11.2	-10.5	316.87	15.4		
1,069.0	0.70	342.24	1,068.8	12.6	-10.7	319.67	16.5		
1,163.0	1.23	314.91	1,162.8	13.9	-11.6	320.11	18.1		
1,257.0	1.49	320.18	1,256.7	15.5	-13.1	319.85	20.3		
1,352.0	1.32	319.74	1,351.7	17.3	-14.6	319.86	22.6		
1,446.0	1.23	337.58	1,445.7	19.0	-15.7	320.57	24.7		
1,541.0	1.14	353.23	1,540.7	20.9	-16.2	322.32	26.4		

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Wellbore:	DH - Job #320714-MPH-903	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320714-MPH-903	Database:	EDM-Regulatory

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,635.0	0.88	14.32	1,634.7	22.6	-16.1	324.49	27.7	
1,730.0	0.97	35.15	1,729.6	23.9	-15.4	327.14	28.5	
1,824.0	1.14	56.07	1,823.6	25.1	-14.2	330.47	28.8	
1,918.0	1.32	78.39	1,917.6	25.8	-12.4	334.40	28.6	
2,013.0	2.29	83.67	2,012.6	26.3	-9.4	340.27	27.9	
2,107.0	2.20	90.52	2,106.5	26.5	-5.8	347.74	27.1	
2,201.0	1.49	112.32	2,200.4	26.0	-2.8	353.81	26.1	
2,296.0	1.32	174.63	2,295.4	24.4	-1.6	356.32	24.5	
2,390.0	1.32	156.09	2,389.4	22.3	-1.0	357.36	22.4	
2,485.0	1.85	118.21	2,484.4	20.6	0.8	2.12	20.6	
2,579.0	1.41	108.72	2,578.3	19.5	3.2	9.30	19.8	
2,674.0	1.67	135.17	2,673.3	18.2	5.3	16.20	18.9	
2,768.0	2.29	140.53	2,767.2	15.8	7.4	25.28	17.4	
2,863.0	0.70	129.72	2,862.2	13.9	9.1	33.16	16.6	
2,957.0	0.09	284.50	2,956.2	13.6	9.5	34.89	16.5	
3,051.0	0.14	283.34	3,050.2	13.6	9.3	34.28	16.5	
3,142.0	0.09	342.94	3,141.2	13.7	9.2	33.72	16.5	
3,237.0	0.26	304.27	3,236.2	13.9	9.0	32.77	16.5	
3,331.0	0.44	290.47	3,330.2	14.1	8.4	30.81	16.5	
3,426.0	0.44	292.23	3,425.2	14.4	7.8	28.29	16.4	
3,520.0	0.09	148.97	3,519.2	14.5	7.5	27.25	16.3	
3,614.0	0.79	252.07	3,613.2	14.2	6.9	25.82	15.8	
3,709.0	2.64	267.27	3,708.1	13.9	4.1	16.31	14.5	
3,803.0	4.75	266.66	3,801.9	13.6	-2.0	351.73	13.7	
3,898.0	6.07	269.12	3,896.5	13.3	-10.9	320.56	17.2	
3,992.0	6.07	268.94	3,990.0	13.1	-20.9	302.15	24.6	
4,087.0	5.98	268.76	4,084.5	12.9	-30.8	292.73	33.4	
4,182.0	5.98	271.75	4,178.9	13.0	-40.7	287.65	42.7	
4,276.0	5.72	274.21	4,272.5	13.5	-50.3	284.97	52.1	
4,371.0	6.68	268.41	4,366.9	13.6	-60.5	282.70	62.1	
4,465.0	6.24	268.85	4,460.3	13.4	-71.1	280.66	72.4	
4,560.0	5.80	268.15	4,554.8	13.1	-81.1	279.20	82.1	
4,654.0	6.49	269.32	4,648.2	12.9	-91.1	278.07	92.0	
4,749.0	6.77	267.62	4,742.6	12.6	-102.1	277.05	102.9	
4,843.0	6.77	267.27	4,835.9	12.1	-113.2	276.12	113.8	
4,938.0	6.60	266.57	4,930.3	11.5	-124.2	275.30	124.7	
5,032.0	6.24	265.51	5,023.7	10.8	-134.7	274.59	135.1	
5,127.0	5.98	264.63	5,118.2	9.9	-144.8	273.93	145.1	
5,221.0	5.72	266.30	5,211.7	9.2	-154.3	273.41	154.6	
5,316.0	4.75	267.09	5,306.3	8.7	-163.0	273.05	163.2	
5,411.0	3.61	270.79	5,401.0	8.5	-169.9	272.87	170.1	
5,505.0	2.73	273.86	5,494.9	8.7	-175.1	272.85	175.3	
5,599.0	2.46	273.69	5,588.8	9.0	-179.3	272.87	179.6	
5,694.0	1.85	286.96	5,683.7	9.6	-182.8	273.00	183.1	

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Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
5,788.0	1.06	330.64	5,777.7	10.8	-184.7	273.34	185.0	
5,883.0	1.06	336.18	5,872.7	12.3	-185.5	273.81	185.9	
5,977.0	0.88	336.26	5,966.7	13.8	-186.1	274.24	186.6	
6,072.0	0.97	336.79	6,061.7	15.2	-186.7	274.65	187.4	
6,166.0	0.70	340.75	6,155.6	16.5	-187.2	275.03	188.0	
6,260.0	0.53	320.44	6,249.6	17.4	-187.7	275.28	188.5	
6,355.0	0.53	328.27	6,344.6	18.1	-188.2	275.48	189.1	
6,449.0	0.51	306.40	6,438.6	18.7	-188.8	275.65	189.7	
6,544.0	0.44	262.44	6,533.6	18.9	-189.5	275.69	190.4	
6,638.0	0.44	245.74	6,627.6	18.7	-190.2	275.61	191.1	
6,733.0	0.62	247.67	6,722.6	18.3	-191.0	275.49	191.9	
6,827.0	0.53	216.21	6,816.6	17.8	-191.7	275.30	192.5	
6,921.0	0.79	228.33	6,910.6	17.0	-192.5	275.05	193.2	
7,016.0	1.41	250.75	7,005.6	16.2	-194.0	274.77	194.7	
7,111.0	2.11	250.48	7,100.5	15.2	-196.8	274.42	197.4	
7,205.0	0.53	240.46	7,194.5	14.4	-198.8	274.15	199.3	
7,299.0	1.06	204.69	7,288.5	13.4	-199.5	273.85	200.0	
7,394.0	1.32	214.18	7,383.5	11.7	-200.5	273.35	200.9	
7,488.0	1.93	242.49	7,477.5	10.1	-202.5	272.86	202.8	
7,533.0	3.08	182.46	7,522.4	8.5	-203.3	272.41	203.4	
7,617.0	13.45	154.07	7,605.5	-2.5	-199.1	269.27	199.1	
7,712.0	8.88	154.24	7,698.6	-19.1	-191.1	264.30	192.0	
7,806.0	6.60	148.27	7,791.8	-30.2	-185.1	260.73	187.5	
7,900.0	3.96	149.06	7,885.4	-37.6	-180.6	258.24	184.4	
7,995.0	2.81	146.42	7,980.2	-42.3	-177.6	256.59	182.6	
8,089.0	3.08	135.87	8,074.1	-46.1	-174.5	255.21	180.5	
8,184.0	4.66	107.57	8,168.9	-49.1	-169.1	253.82	176.1	
8,278.0	14.86	89.03	8,261.4	-50.0	-153.4	251.93	161.3	
8,373.0	23.39	89.56	8,351.1	-49.7	-122.3	247.89	132.0	
8,467.0	31.48	87.18	8,434.4	-48.3	-79.0	238.55	92.6	
8,562.0	41.15	85.69	8,510.9	-44.7	-22.9	207.14	50.3	
8,656.0	51.18	85.95	8,575.9	-39.8	44.6	131.75	59.8	
8,750.0	60.50	87.53	8,628.6	-35.5	122.2	106.18	127.2	
8,813.0	64.89	87.71	8,657.5	-33.1	178.1	100.54	181.2	
8,845.0	67.71	87.53	8,670.4	-31.9	207.4	98.75	209.8	
8,876.0	70.87	88.17	8,681.3	-30.8	236.3	97.43	238.3	
8,908.0	73.60	89.29	8,691.1	-30.2	266.8	96.45	268.5	
8,939.0	75.71	89.91	8,699.3	-30.0	296.7	95.76	298.2	
8,971.0	77.29	89.38	8,706.8	-29.8	327.8	95.19	329.2	
9,002.0	80.28	89.47	8,712.8	-29.5	358.2	94.70	359.4	
9,034.0	82.48	89.82	8,717.6	-29.3	389.8	94.29	390.9	
9,065.0	84.68	90.17	8,721.1	-29.3	420.7	93.98	421.7	
9,097.0	86.61	90.43	8,723.5	-29.4	452.6	93.72	453.5	
9,128.0	87.93	90.43	8,725.0	-29.7	483.5	93.51	484.4	

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Site:	Eddy County, NM	MD Reference:	Mean Sea Level (System)
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Wellbore:	DH - Job #320714-MPH-903	Survey Calculation Method:	Minimum Curvature
Design:	DH - Job #320714-MPH-903	Database:	EDM-Regulatory

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)
9,223.0	88.29	91.05	8,728.1	-30.9	578.5	93.06	579.3
9,318.0	87.93	90.96	8,731.2	-32.5	673.4	92.77	674.2
9,412.0	90.40	90.96	8,732.6	-34.1	767.4	92.55	768.1
9,507.0	89.43	90.70	8,732.8	-35.5	862.4	92.36	863.1
9,601.0	89.96	90.52	8,733.3	-36.5	956.3	92.19	957.0
9,695.0	88.29	88.41	8,734.7	-35.6	1,050.3	91.94	1,050.9
9,790.0	89.43	88.50	8,736.6	-33.1	1,145.3	91.65	1,145.7
9,884.0	87.23	88.50	8,739.3	-30.6	1,239.2	91.41	1,239.6
9,979.0	88.37	88.59	8,743.0	-28.2	1,334.1	91.21	1,334.4
10,073.0	88.20	88.94	8,745.8	-26.2	1,428.0	91.05	1,428.3
10,168.0	87.85	88.50	8,749.1	-24.0	1,522.9	90.90	1,523.1
10,262.0	87.76	88.68	8,752.7	-21.7	1,616.8	90.77	1,617.0
10,357.0	88.11	88.85	8,756.1	-19.7	1,711.8	90.66	1,711.9
10,451.0	88.11	88.33	8,759.2	-17.4	1,805.7	90.55	1,805.8
10,546.0	87.93	87.80	8,762.5	-14.2	1,900.6	90.43	1,900.6
10,640.0	87.93	87.80	8,765.9	-10.6	1,994.4	90.30	1,994.5
10,735.0	88.29	89.29	8,769.0	-8.2	2,089.4	90.22	2,089.4
10,829.0	88.11	89.20	8,771.9	-6.9	2,183.3	90.18	2,183.3
10,924.0	87.93	89.38	8,775.2	-5.7	2,278.2	90.14	2,278.2
11,019.0	87.32	89.56	8,779.2	-4.9	2,373.1	90.12	2,373.2
11,113.0	91.10	90.00	8,780.5	-4.5	2,467.1	90.10	2,467.1
11,208.0	91.36	90.50	8,778.4	-4.9	2,562.1	90.11	2,562.1
11,302.0	90.92	90.35	8,776.5	-5.6	2,656.1	90.12	2,656.1
11,397.0	90.66	90.17	8,775.2	-6.0	2,751.1	90.13	2,751.1
11,491.0	89.87	90.52	8,774.8	-6.6	2,845.1	90.13	2,845.1
11,586.0	90.04	91.31	8,774.9	-8.1	2,940.1	90.16	2,940.1
11,680.0	89.60	91.93	8,775.2	-10.8	3,034.0	90.20	3,034.0
11,775.0	88.55	91.58	8,776.7	-13.7	3,129.0	90.25	3,129.0
11,869.0	88.64	92.54	8,779.0	-17.1	3,222.9	90.30	3,222.9
11,963.0	87.85	92.28	8,781.9	-21.0	3,316.7	90.36	3,316.8
12,058.0	87.23	90.08	8,786.0	-23.0	3,411.6	90.39	3,411.7
12,152.0	87.14	90.00	8,790.6	-23.0	3,505.5	90.38	3,505.6
12,247.0	86.79	90.00	8,795.6	-23.0	3,600.4	90.37	3,600.4
12,341.0	86.35	89.47	8,801.2	-22.6	3,694.2	90.35	3,694.3
12,436.0	88.29	89.20	8,805.7	-21.5	3,789.1	90.33	3,789.2
12,530.0	88.37	88.76	8,808.4	-19.8	3,883.0	90.29	3,883.1
12,624.0	87.41	88.41	8,811.9	-17.5	3,976.9	90.25	3,977.0
12,719.0	88.64	87.89	8,815.2	-14.4	4,071.8	90.20	4,071.9
12,813.0	91.80	87.89	8,814.8	-11.0	4,165.8	90.15	4,165.8
12,908.0	91.98	87.53	8,811.7	-7.2	4,260.6	90.10	4,260.6
13,002.0	91.98	87.36	8,808.4	-3.0	4,354.5	90.04	4,354.5
13,097.0	89.16	87.45	8,807.5	1.3	4,449.4	89.98	4,449.4
13,192.0	88.90	86.83	8,809.1	6.0	4,544.2	89.92	4,544.2
13,286.0	88.29	87.09	8,811.4	11.0	4,638.1	89.86	4,638.1
13,381.0	87.23	87.27	8,815.1	15.7	4,732.9	89.81	4,732.9

SDI

SDI Survey Report

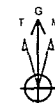
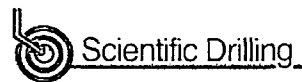
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13,416.2	87.26	87.34	8,816.8	17.3	4,768.0	89.79	4,768.0	
13,436.7	87.28	87.38	8,817.8	18.3	4,788.5	89.78	4,788.5	
13,475.0	87.32	87.45	8,819.6	20.0	4,826.7	89.76	4,826.7	
13,528.0	86.17	87.18	8,822.6	22.5	4,879.5	89.74	4,879.6	
Last MWD Survey								
13,587.0	86.17	87.18	8,826.5	25.4	4,938.3	89.71	4,938.4	
Projection to Bit								

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
13,528.0	8,822.6	22.5	4,879.5	Last MWD Survey	
13,587.0	8,826.5	25.4	4,938.3	Projection to Bit	



Cedar Canyon 27 State Com 4H
Eddy County, New Mexico
Northing: 434342.30
Easting: 609349.00
Side Track #1



To convert a Magnetic Direction to a Grid Direction Add 1.2°
To convert a True Direction to a Grid Direction Subtract 1.2°

Altitude in Grid North
True North: -0.15°
Magnetic North: 1.20°
Magnetic Field
Strength: 48248.2 nT
Declination: 0.15°
Date: 2023.03.10
Source: IGRF2015



RKB @ 2647.0ustf (8220)
Gr @ 2923.0

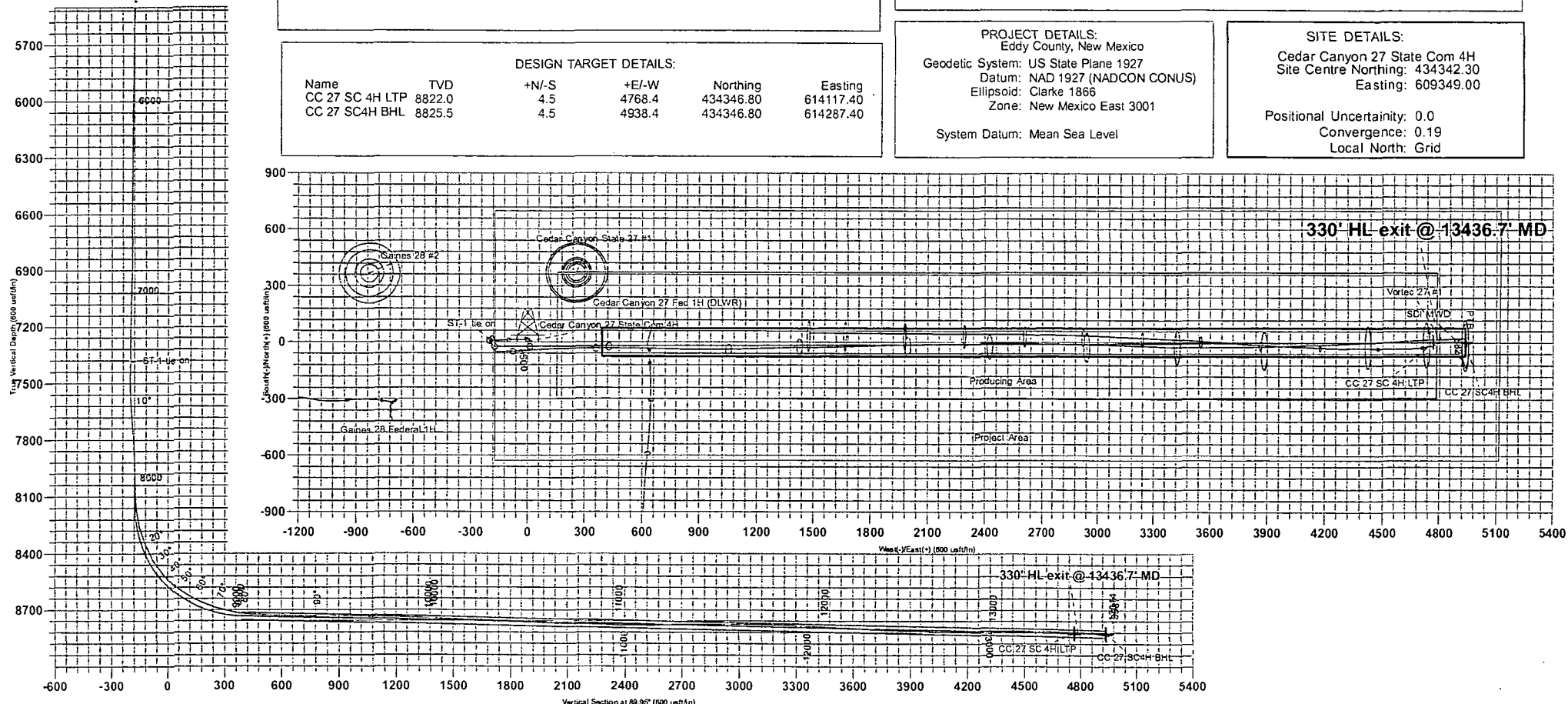
SECTION DETAILS:									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	Target
7400.0	1.35	216.67	7389.5	11.6	-200.6	0.00	0.00	-200.6	
7692.4	6.00	139.58	7681.3	-2.8	-192.7	2.00	-90.00	-192.7	
7812.4	6.00	139.58	7800.6	-12.3	-184.6	0.00	0.00	-184.6	
8112.4	0.00	0.00	8100.1	-24.3	-174.4	2.00	180.00	-174.4	
8172.8	0.00	0.00	8160.4	-24.3	-174.4	0.00	0.00	-174.4	
9061.2	88.84	89.68	8733.3	-21.1	386.9	10.00	89.68	386.9	
13613.6	88.84	89.68	8825.5	4.5	4938.4	0.00	0.00	4938.4	CC 27 SC4H BHL

WELL DETAILS: Cedar Canyon 27 State Com 4H				
Ground Level: 2923.0				
Latitude				
+N/-S	+E/-W	Northing	Easting	Longitude
0.0	0.0	434342.30	609349.00	32° 11' 37.068 N 103° 58' 47.441 W

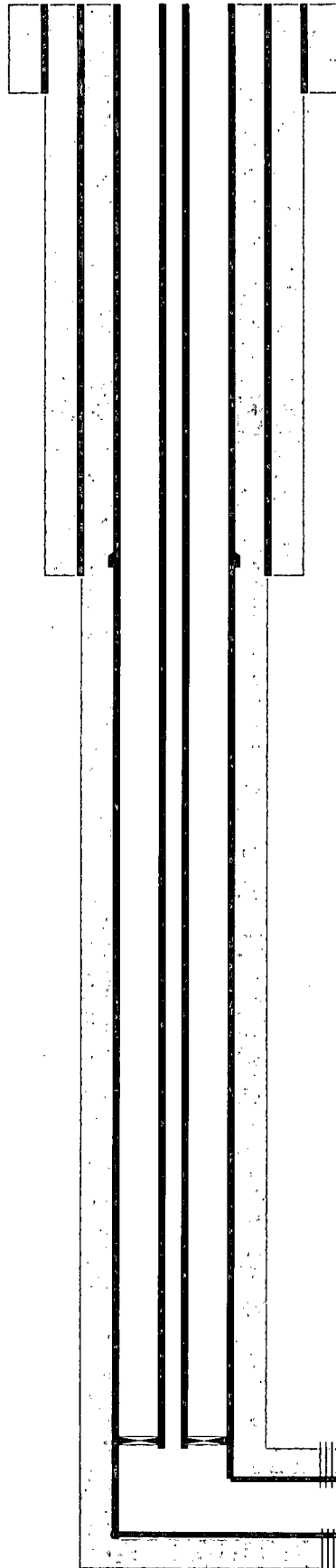
DESIGN TARGET DETAILS:				
Name	TVD	+N/-S	+E/-W	Easting
CC 27 SC 4H LTP	8822.0	4.5	4768.4	614117.40
CC 27 SC4H BHL	8825.5	4.5	4938.4	614287.40

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

SITE DETAILS:
Cedar Canyon 27 State Com 4H
Site Centre Northing: 434342.30
Easting: 609349.00
Positional Uncertainty: 0.0
Convergence: 0.19
Local North: Grid



OXY USA INC.
Cedar Canyon 27 State Com. 4H
API No. 30-015-42063



14-3/4" hole @ 504'
11-3/4" csg @ 464'
w/ 910sx-TOC-Surf-Circ

Ext. Csg. Pkr @ 3186'

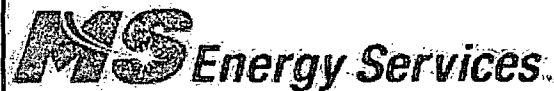
10-5/8" hole @ 3115'
8-5/8" csg @ 3115'
w/ 880sx-TOC-Surf-Circ

7-7/8" hole @ 13587'
5-1/2" csg @ 13585'
w/ 1620sx-TOC-Surf-Circ

2-7/8" tbg & pkr @ 8152'

Perfs @ 9110-13340'

TD- 13587' M 8826' V



Job Number: SVM0-140965
 Company: OXY USA, Inc.
 Lease/Well: Cedar Canyon 27 State Com 4H
 Location: Eddy County, NM
 Rig Name: H&P #620
 RKB: 25'
 G.L. or M.S.L.: GL

State/Country: New Mexico/USA
 Declination: 7.21°
 Grid: East To Grid North
 File name: S:\2014SU-1\OXYMOICEDARC-1\27STAT-1\4H.SVY
 Date/Time: 21-Jul-14 12:20
 Curve Name: Surface - 466' M.D. (Rate Gyro) (API 30-015-42063)

MS SURVEY

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method
 Vertical Section Plane :00
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

We hereby certify that our survey data from
 Surface MD to 466' MD is, to the best of
 our knowledge a true and accurate account of the
 well bore.
 Daniel West 7/21/14
 MS Energy Services Date

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C.L.O.S.U.R.E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
127.00	.26	246.42	127.00	-.12	-.26	-.12	.29	246.42	.20
220.00	.22	313.93	220.00	-.08	-.59	-.08	.59	262.63	.29
312.00	.23	283.68	312.00	.09	-.89	.09	.90	275.78	.13
405.00	.48	282.54	405.00	.22	-1.45	.22	1.47	278.57	.27

Last Survey Depth Recorded									
466.00	.57	292.20	465.99	.39	-1.98	.39	2.02	281.10	.21