



Apache Corporation

Eddy County, NM (NAD 83 NME)
Cedar Lake Federal CA
302H

OH / Job #61481
Survey: Phoenix MWD Surveys

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 09 2018

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NM OIL CONSERVATION
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Anticollision Report

03 August, 2017

Please provide signature
page for directional survey





Phoenix Technology Services LP

Anticollision Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well 302H
Project:	Eddy County, NM (NAD 83 NME)	TVD Reference:	RKB @ 3967.50usft (Trinidad 436)
Reference Site:	Cedar Lake Federal CA	MD Reference:	RKB @ 3967.50usft (Trinidad 436)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	302H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH / Job #61481	Database:	Compass 5000 GCR
Reference Design:	Survey: Phoenix MWD Surveys	Offset TVD Reference:	Reference Datum

Reference	Survey: Phoenix MWD Surveys
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD Interval 100.00usft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 1,669.76 us
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic
Casing Method:	Not applied

Survey Program **Date** 8/3/2017

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
721.00	9,785.00	Phoenix MWD Surveys (OH / Job #61481)	MWD+HDGM	OWSG Rev.2 MWD + HDGM

Summary

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Cedar Lake Federal CA						
301H - OH / Job #61480 - Surveys (Trinidad 436)	600.00	601.11	26.25	25.27	26.627 CC	
301H - OH / Job #61480 - Surveys (Trinidad 436)	4,729.03	4,728.98	41.94	13.30	1.465 Level 3, ES SF	

Offset Design Cedar Lake Federal CA - 301H - OH / Job #61480 - Surveys (Trinidad 436)											Offset Site Error:	0.00 usft
Survey Program: 57-SPT_GTD, 721-MWD+HDGM											Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Highside Toolface		Offset Wellbore Centre		Distance		Minimum Separation	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	(usft)		
600.00	600.00	601.11	600.11	0.00	0.99	-25.04	7.83	26.25	25.27	0.99	26.627 CC	
700.00	700.00	701.07	700.06	0.19	1.13	-172.15	6.84	26.85	25.55	1.30	20.681	
800.00	799.99	801.05	800.03	0.50	1.23	-170.69	5.43	27.73	26.00	1.73	18.072	
900.00	899.98	900.96	899.92	0.86	1.39	-166.11	3.91	28.81	26.57	2.24	12.843	
1,000.00	999.98	1,000.80	999.78	1.22	1.62	-155.81	2.83	30.31	27.48	2.83	10.723	
1,100.00	1,099.97	1,100.68	1,099.63	1.58	1.88	-154.07	2.43	32.15	28.69	3.45	9.306	
1,200.00	1,199.97	1,200.58	1,199.52	1.92	2.17	175.50	2.30	34.01	29.93	4.08	8.329	
1,300.00	1,299.97	1,300.54	1,299.48	2.27	2.47	64.84	2.21	35.40	30.67	4.73	7.479	
1,400.00	1,399.97	1,400.58	1,399.51	2.61	2.79	69.74	2.07	36.45	31.06	5.39	6.757	
1,500.00	1,499.96	1,500.59	1,499.51	2.95	3.12	75.62	1.90	37.36	31.29	6.07	6.158	
1,600.00	1,599.95	1,600.60	1,599.51	3.30	3.48	89.15	1.74	38.37	31.62	6.75	5.685	
1,700.00	1,699.94	1,700.62	1,699.53	3.65	3.80	96.37	1.75	39.58	32.14	7.44	5.322	
1,800.00	1,799.92	1,800.64	1,799.54	4.00	4.14	96.07	2.06	40.76	32.63	8.13	5.014	
1,900.00	1,899.90	1,900.59	1,899.48	4.35	4.48	92.99	2.38	41.91	33.08	8.82	4.749	
2,000.00	1,899.88	2,000.58	1,899.46	4.71	4.82	83.10	2.65	42.85	33.33	9.52	4.500	
2,100.00	2,099.87	2,100.58	2,099.46	5.06	5.17	80.50	2.89	43.54	33.31	10.22	4.258	
2,200.00	2,199.87	2,200.57	2,199.44	5.42	5.52	95.02	2.91	44.41	33.48	10.93	4.064	
2,300.00	2,299.87	2,300.55	2,299.42	5.77	5.87	113.88	2.88	45.56	33.92	11.63	3.918	
2,400.00	2,399.86	2,400.62	2,399.49	6.13	6.22	127.26	2.87	46.70	34.36	12.34	3.784	
2,500.00	2,499.86	2,500.67	2,499.53	6.48	6.58	142.83	2.83	47.78	34.71	13.05	3.659	
2,600.00	2,599.86	2,600.67	2,599.54	6.84	6.93	165.25	2.73	48.74	34.98	13.76	3.542	
2,700.00	2,699.86	2,700.67	2,699.53	7.19	7.28	-160.72	2.53	49.75	35.29	14.46	3.439	
2,800.00	2,799.86	2,800.68	2,799.54	7.54	7.64	-141.51	2.27	50.82	35.65	15.17	3.351	
2,900.00	2,899.86	2,900.78	2,899.64	7.89	7.99	-139.06	1.93	51.84	35.97	15.87	3.267	
3,000.00	2,999.86	3,000.75	2,999.60	8.24	8.34	-138.37	1.49	52.89	36.32	16.57	3.192	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation



Phoenix Technology Services LP

Anticollision Report



Company: Apache Corporation
 Project: Eddy County, NM (NAD 83 NME)
 Reference Site: Cedar Lake Federal CA
 Site Error: 0.00 usft
 Reference Well: 302H
 Well Error: 0.00 usft
 Reference Wellbore: OH / Job #61481
 Reference Design: Survey: Phoenix MWD Surveys

Local Co-ordinate Reference: Well 302H
 TVD Reference: RKB @ 3967.50usft (Trinidad 436)
 MD Reference: RKB @ 3967.50usft (Trinidad 436)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: Compass 5000 GCR
 Offset TVD Reference: Reference Datum

Offset Design Cedar Lake Federal CA - 301H - OH / Job #61480 - Surveys (Trinidad 436)														Offset Site Error: 0.00 usft
Survey Program: 57-SPT_GTD, 721-MWD+HDGM														Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
3,100.00	3,099.85	3,100.79	3,099.64	8.59	8.69	-130.09	-45.20	0.89	54.03	36.77	17.27	3.129		
3,200.00	3,199.84	3,200.83	3,199.68	8.93	9.04	-125.00	-45.36	0.09	55.08	37.12	17.96	3.068		
3,300.00	3,299.83	3,300.82	3,299.66	9.28	9.39	-126.29	-45.50	-0.87	56.19	37.53	18.66	3.012		
3,400.00	3,399.82	3,400.90	3,399.74	9.63	9.73	-128.19	-45.55	-1.83	57.29	37.94	19.35	2.960		
3,500.00	3,499.81	3,500.85	3,499.68	9.98	10.08	-132.34	-45.57	-2.88	58.49	38.44	20.05	2.917		
3,600.00	3,599.79	3,600.92	3,599.75	10.33	10.43	-134.30	-45.48	-3.99	60.05	39.30	20.75	2.894		
3,700.00	3,699.76	3,700.73	3,699.55	10.68	10.78	-153.92	-45.55	-4.75	62.14	40.69	21.45	2.897		
3,800.00	3,799.75	3,800.73	3,799.55	11.04	11.13	80.11	-45.82	-5.14	63.05	40.89	22.16	2.845		
3,900.00	3,899.71	3,900.75	3,899.58	11.38	11.49	59.82	-46.04	-5.48	62.36	39.50	22.86	2.728		
4,000.00	3,999.68	4,000.89	3,999.52	11.73	11.84	25.10	-46.18	-5.88	60.08	38.51	23.55	2.551		
4,100.00	4,099.61	4,100.49	4,099.32	12.07	12.20	23.43	-46.52	-5.83	57.64	33.40	24.24	2.378		
4,200.00	4,199.58	4,200.44	4,199.26	12.41	12.55	19.48	-47.00	-6.08	55.28	30.34	24.94	2.217		
4,300.00	4,299.51	4,300.38	4,299.20	12.75	12.91	15.52	-47.49	-6.39	52.83	27.20	25.64	2.061		
4,400.00	4,399.48	4,400.44	4,399.25	13.09	13.27	15.38	-48.00	-6.55	50.28	23.93	26.33	1.909		
4,500.00	4,499.41	4,500.40	4,499.22	13.44	13.62	16.50	-48.33	-6.57	47.40	20.37	27.03	1.754		
4,600.00	4,599.35	4,600.22	4,599.04	13.78	13.97	17.37	-48.97	-6.60	44.83	17.10	27.73	1.617		
4,700.00	4,699.30	4,700.32	4,699.14	14.12	14.33	34.46	-49.47	-6.50	42.16	13.73	28.43	1.483 Level 3		
4,729.03	4,728.30	4,728.98	4,727.78	14.23	14.43	86.76	-49.45	-7.07	41.94	13.30	28.64	1.465 Level 3 ES SF		
4,800.00	4,799.89	4,787.13	4,785.57	14.48	14.66	124.29	-48.15	-13.58	48.08	17.07	29.01	1.588		
4,900.00	4,895.19	4,879.01	4,875.08	14.83	14.95	156.77	-43.42	-32.25	83.36	55.25	28.11	2.965		
5,000.00	4,984.96	4,937.37	4,929.82	15.19	15.14	165.06	-38.51	-51.80	151.27	125.04	25.22	5.768		
5,100.00	5,064.32	4,977.31	4,966.10	15.81	15.27	163.85	-34.99	-68.14	237.68	213.93	23.74	10.011		
5,200.00	5,133.72	5,005.02	4,991.06	16.13	15.37	160.34	-32.90	-80.00	331.73	310.14	21.59	15.367		
5,300.00	5,187.16	5,018.00	5,000.91	16.82	15.41	-175.02	-32.18	-84.78	430.78	415.38	15.38	28.016		
5,400.00	5,223.86	5,009.69	4,994.35	17.70	15.38	12.81	-32.65	-81.59	530.35	517.36	12.99	40.834		
5,500.00	5,242.79	4,989.96	4,976.61	18.82	15.31	13.81	-34.07	-73.09	628.84	615.93	10.91	57.483		
5,600.00	5,249.07	4,961.35	4,951.68	20.14	15.22	11.86	-36.34	-61.47	719.68	709.48	10.20	70.540		
5,700.00	5,254.05	4,953.00	4,944.09	21.59	15.19	9.43	-37.09	-58.02	812.96	803.05	9.91	82.038		
5,800.00	5,259.35	4,929.69	4,922.75	23.19	15.11	6.68	-39.19	-48.90	906.99	897.28	9.71	93.385		
5,900.00	5,264.24	4,918.17	4,912.05	24.89	15.08	3.48	-40.19	-44.73	1,001.85	992.27	9.59	104.516		
6,000.00	5,268.82	4,889.00	4,884.60	26.71	14.98	0.93	-42.64	-35.19	1,097.76	1,087.71	10.05	109.261		
6,100.00	5,273.66	4,889.00	4,884.60	28.58	14.98	-2.77	-42.64	-35.19	1,193.40	1,182.44	10.96	108.687		
6,200.00	5,278.89	4,889.00	4,884.60	30.51	14.98	-4.07	-42.64	-35.19	1,289.74	1,277.79	11.94	107.995		
6,300.00	5,283.56	4,889.00	4,884.60	32.49	14.98	-2.50	-42.64	-35.19	1,386.56	1,374.18	12.38	111.979		
6,400.00	5,286.41	4,889.00	4,884.60	34.50	14.98	-0.55	-42.64	-35.19	1,483.33	1,470.51	12.82	115.698		
6,500.00	5,286.08	4,865.81	4,862.45	36.56	14.90	0.57	-44.40	-28.57	1,579.18	1,565.69	13.50	117.018		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

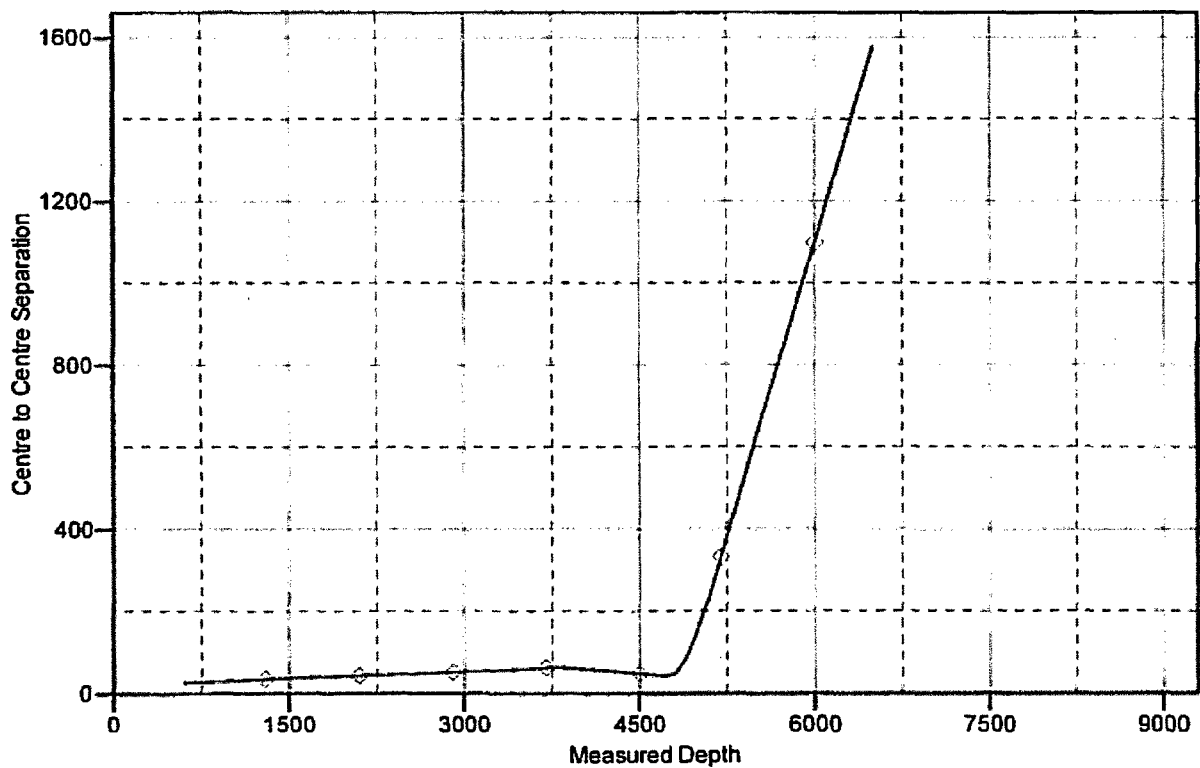
Company: Apache Corporation
Project: Eddy County, NM (NAD 83 NME)
Reference Site: Cedar Lake Federal CA
Site Error: 0.00 usft
Reference Well: 302H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #61481
Reference Design: Survey: Phoenix MWD Surveys

Local Co-ordinate Reference: Well 302H
TVD Reference: RKB @ 3967.50usft (Trinidad 436)
MD Reference: RKB @ 3967.50usft (Trinidad 436)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Reference Depths are relative to RKB @ 3967.50usft (Trinidad 436)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 302H
Coordinate System Is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface Is: 0.25°

Ladder Plot



LEGEND

OH, OH / Job #61480, Surveys (Trinidad 436) VO



Phoenix Technology Services LP Anticollision Report



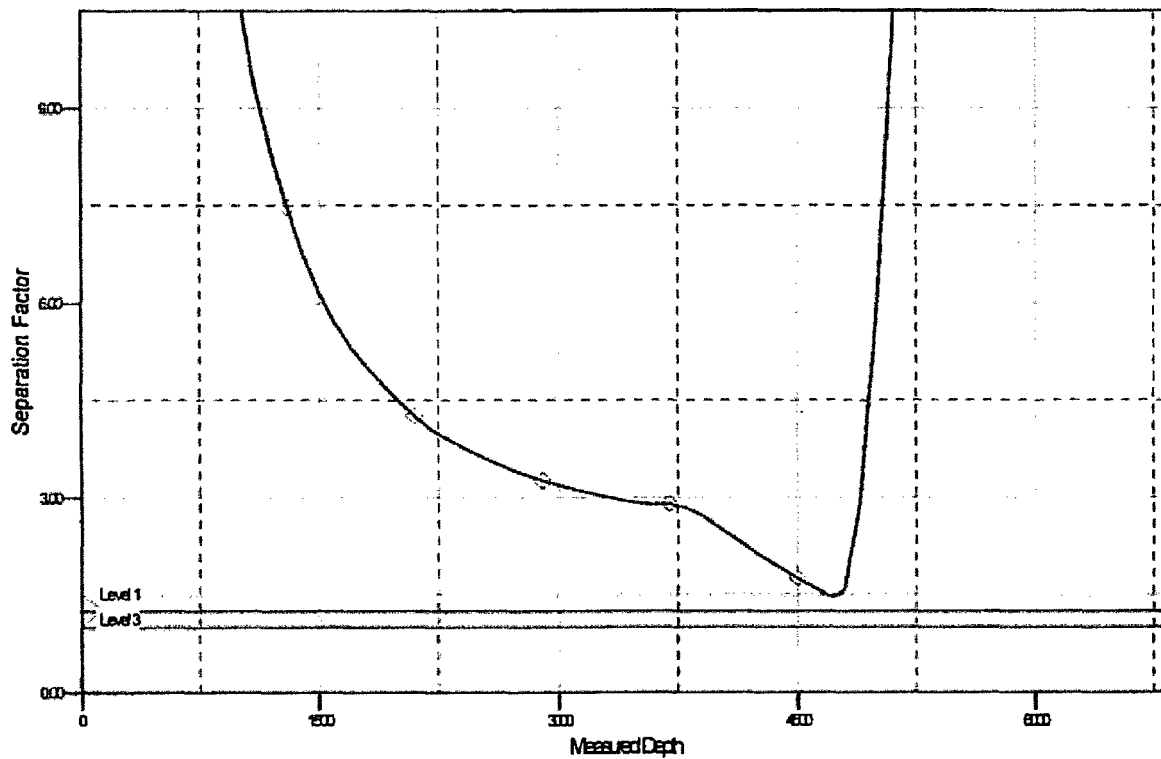
Company: Apache Corporation
Project: Eddy County, NM (NAD 83 NME)
Reference Site: Cedar Lake Federal CA
Site Error: 0.00 usft
Reference Well: 302H
Well Error: 0.00 usft
Reference Wellbore: OH / Job #61481
Reference Design: Survey: Phoenix MWD Surveys

Local Co-ordinate Reference: Well 302H
TVD Reference: RKB @ 3967.50usft (Trinidad 436)
MD Reference: RKB @ 3967.50usft (Trinidad 436)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Reference Datum

Reference Depths are relative to RKB @ 3967.50usft (Trinidad 436)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: 302H
Coordinate System is US State Plane 1983, New Mexico Eastern Zone
Grid Convergence at Surface is: 0.25°

Separation Factor Plot



LEGEND

OH, OH / Job #61480, Surveys (Trinidad 436) VO



Company: APACHE CORPORATION
Lease/Well: CEDAR LAKE FEDERAL CA/#302H
API: 30-015-43560
Rig Name: TRINIDAD 463
State/County: NEW MEXICO/EDDY
VS-Azi: 89.58 Degrees
Latitude: 32.86565, Longitude: -103.86505
Grid North = True North -0.25 degs (NAD 27)
Grid Correction Applied = -0.25 degs



FIELD COPY ONLY (NOT DEFINITIVE)

Depth Reference : RKB = 17 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS

Error Model: VESSI_GYROFLEX.IPM

Filename: e-line gyro-de_01.ut

Minimum Curvature Method

Report Date/Time: 7/25/2017 / 09:27

VES Survey International

Midland, TX

432-563-5444

Christopher Hair

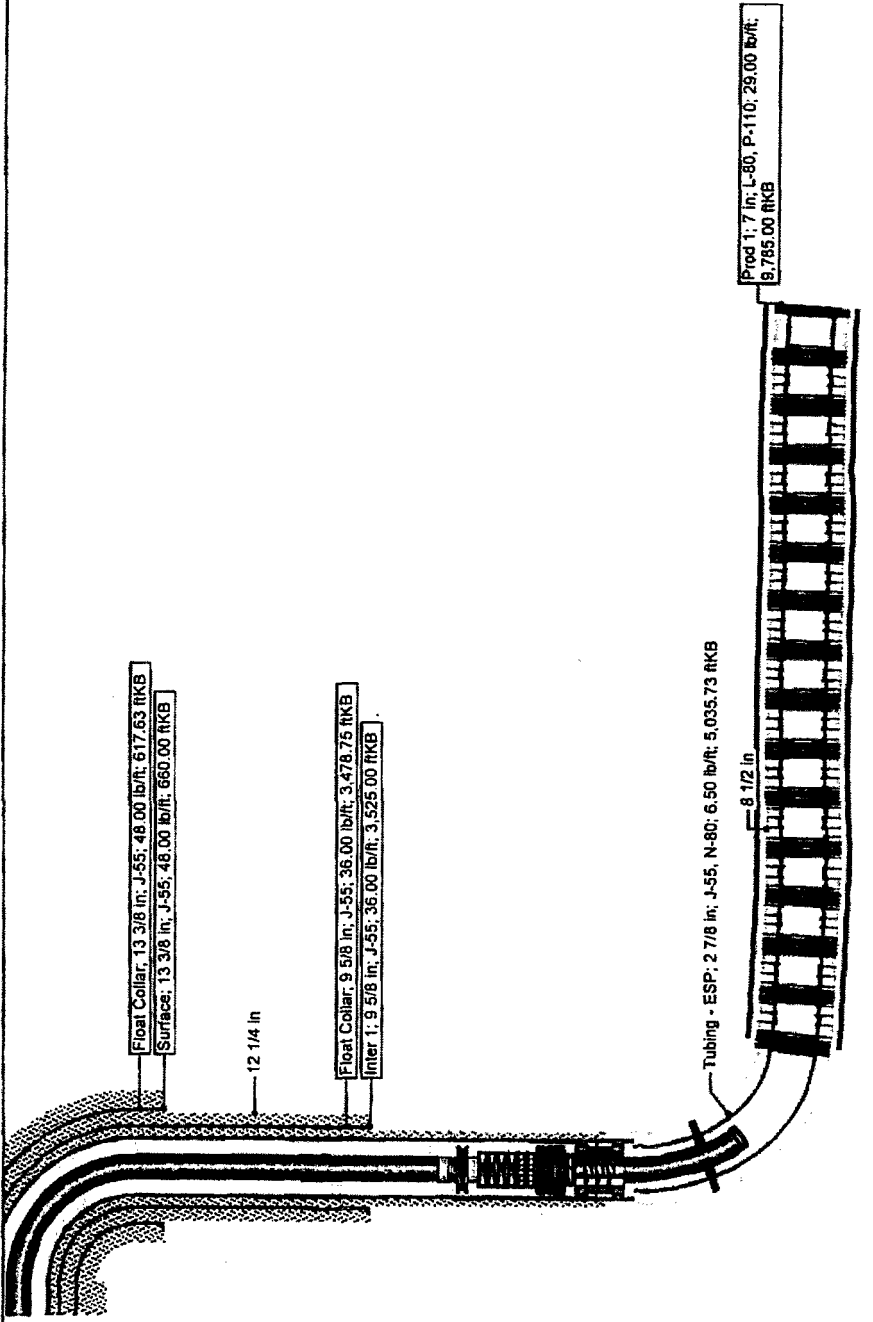
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	----
60.00	0.27	209.70	60.00	-0.12	-0.07	-0.07	0.14	209.70	0.45
120.00	0.04	233.75	120.00	-0.26	-0.15	-0.16	0.30	211.25	0.39
180.00	0.34	193.30	180.00	-0.44	-0.21	-0.22	0.49	205.67	0.52
240.00	0.19	93.04	240.00	-0.62	-0.15	-0.16	0.64	193.84	0.70
300.00	0.22	79.30	300.00	-0.60	0.06	0.06	0.61	174.07	0.10
360.00	0.13	71.92	360.00	-0.56	0.24	0.24	0.61	156.67	0.16
420.00	0.13	12.87	420.00	-0.48	0.32	0.32	0.57	145.97	0.21
480.00	0.14	37.38	480.00	-0.35	0.38	0.38	0.52	132.84	0.10
540.00	0.16	21.75	540.00	-0.22	0.46	0.45	0.50	115.57	0.07
600.00	0.56	8.60	600.00	0.15	0.53	0.53	0.55	74.36	0.68

HORIZONTAL DISPLACEMENT IS
0.65 FEET AT 74.36 DEGREES

Well Info
 Legal Well Name: CEDAR LAKE FEDERAL CA 302H
 AP/Surface Loc: 301543560
 Spud Date: 17/04/2017
 Original Drilling Rig Release: 8/04/2017
 Country: United States
 State/Province: New Mexico
 Target Formation: Paddock
 Field Name: Cedar Lake Golieta-
 Yaso
 Surface Legal Location: E-03-17S-31E 1855 FNL 173 FNL
 North/South Distance (ft):
 East/West Distance (ft):
 East/West Reference:
 Bottom Hole Location:
 Bottom Hole Legal Location: H-02-17S-31E 1850.6 FNL 333.3
 CEDAR LAKE FEDERAL CA 302H - Original Hole
 North-South Distance (ft):
 East-West Distance (ft):
 East-West Reference:
 Original KB Elevation (ft): 3,907.9
 Original Elevation (ft): 3,951.0

Stage Number	Top Depth (ft)	Bottom Depth (ft)	Top Measurement Method	Return at Surface
1	147.60	680.00	147.60	680.00
2	147.60	680.00	147.60	680.00
3	147.60	680.00	147.60	680.00
4	147.60	680.00	147.60	680.00
5	147.60	680.00	147.60	680.00
6	147.60	680.00	147.60	680.00
7	147.60	680.00	147.60	680.00
8	147.60	680.00	147.60	680.00
9	147.60	680.00	147.60	680.00
10	147.60	680.00	147.60	680.00
11	147.60	680.00	147.60	680.00
12	147.60	680.00	147.60	680.00
13	147.60	680.00	147.60	680.00
14	147.60	680.00	147.60	680.00
15	147.60	680.00	147.60	680.00
16	147.60	680.00	147.60	680.00
17	147.60	680.00	147.60	680.00
18	147.60	680.00	147.60	680.00
19	147.60	680.00	147.60	680.00
20	147.60	680.00	147.60	680.00
21	147.60	680.00	147.60	680.00
22	147.60	680.00	147.60	680.00
23	147.60	680.00	147.60	680.00
24	147.60	680.00	147.60	680.00
25	147.60	680.00	147.60	680.00
26	147.60	680.00	147.60	680.00
27	147.60	680.00	147.60	680.00
28	147.60	680.00	147.60	680.00
29	147.60	680.00	147.60	680.00
30	147.60	680.00	147.60	680.00
31	147.60	680.00	147.60	680.00
32	147.60	680.00	147.60	680.00
33	147.60	680.00	147.60	680.00
34	147.60	680.00	147.60	680.00
35	147.60	680.00	147.60	680.00
36	147.60	680.00	147.60	680.00
37	147.60	680.00	147.60	680.00
38	147.60	680.00	147.60	680.00
39	147.60	680.00	147.60	680.00
40	147.60	680.00	147.60	680.00
41	147.60	680.00	147.60	680.00
42	147.60	680.00	147.60	680.00
43	147.60	680.00	147.60	680.00
44	147.60	680.00	147.60	680.00
45	147.60	680.00	147.60	680.00
46	147.60	680.00	147.60	680.00
47	147.60	680.00	147.60	680.00
48	147.60	680.00	147.60	680.00
49	147.60	680.00	147.60	680.00
50	147.60	680.00	147.60	680.00
51	147.60	680.00	147.60	680.00
52	147.60	680.00	147.60	680.00
53	147.60	680.00	147.60	680.00
54	147.60	680.00	147.60	680.00
55	147.60	680.00	147.60	680.00
56	147.60	680.00	147.60	680.00
57	147.60	680.00	147.60	680.00
58	147.60	680.00	147.60	680.00
59	147.60	680.00	147.60	680.00
60	147.60	680.00	147.60	680.00
61	147.60	680.00	147.60	680.00
62	147.60	680.00	147.60	680.00
63	147.60	680.00	147.60	680.00
64	147.60	680.00	147.60	680.00
65	147.60	680.00	147.60	680.00
66	147.60	680.00	147.60	680.00
67	147.60	680.00	147.60	680.00
68	147.60	680.00	147.60	680.00
69	147.60	680.00	147.60	680.00
70	147.60	680.00	147.60	680.00
71	147.60	680.00	147.60	680.00
72	147.60	680.00	147.60	680.00
73	147.60	680.00	147.60	680.00
74	147.60	680.00	147.60	680.00
75	147.60	680.00	147.60	680.00
76	147.60	680.00	147.60	680.00
77	147.60	680.00	147.60	680.00
78	147.60	680.00	147.60	680.00
79	147.60	680.00	147.60	680.00
80	147.60	680.00	147.60	680.00
81	147.60	680.00	147.60	680.00
82	147.60	680.00	147.60	680.00
83	147.60	680.00	147.60	680.00
84	147.60	680.00	147.60	680.00
85	147.60	680.00	147.60	680.00
86	147.60	680.00	147.60	680.00
87	147.60	680.00	147.60	680.00
88	147.60	680.00	147.60	680.00
89	147.60	680.00	147.60	680.00
90	147.60	680.00	147.60	680.00
91	147.60	680.00	147.60	680.00
92	147.60	680.00	147.60	680.00
93	147.60	680.00	147.60	680.00
94	147.60	680.00	147.60	680.00
95	147.60	680.00	147.60	680.00
96	147.60	680.00	147.60	680.00
97	147.60	680.00	147.60	680.00
98	147.60	680.00	147.60	680.00
99	147.60	680.00	147.60	680.00
100	147.60	680.00	147.60	680.00

NEW DEV - CEDAR LAKE FEDERAL CA 302H - Original Hole, 12/28/2017 10:28:26 AM
 Directional schematic (actual)



Simulation Jobs
 Top Depth (ft): 5,403
 Top Depth (ft): 5,403
 Top Depth (ft): 5,403
 Bottom Depth (ft): 9,485

Perforations or Slotted
 Top Depth (ft): 5,403
 Top Depth (ft): 5,403
 Bottom Depth (ft): 9,485

Kick Offs & Key Depths
 Type: Kick Off
 Top Depth (ft): 5,403
 Bottom Depth (ft): 9,485