



PHOENIX
TECHNOLOGY SERVICES

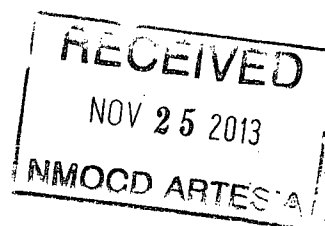
November 22, 2013

Oil Conservation Division
State of New Mexico
811 S. First St.
Artesia, New Mexico 88210

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
Crow Federal #18H
Eddy County, NM
API #30-015-40992
Job No. 1311163



Enclosed please find the Survey Data Certification, and the original Plat and one copy of the Survey Report performed on the above referenced Well by Phoenix Technology Services, Inc. (P-5 No. 664171). Other information required by your office is as follows:

Name & Title of Surveyor	Drainhole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Brad Hill	18H	532	10,742	11/07/13	11/07/13	MWD

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

Sonya Thomas

Sonya Thomas
Operations Administrator

Certified mail receipt number: 7011 1570 0001 4365 0250

Phoenix Technology Services
SURVEY DATA CERTIFICATION

RECEIVED

NOV 25 2013



PHOENIX
TECHNOLOGY SERVICES

PHOENIX JOB NUMBER

1311163

OPERATOR

Apache Corporation

WELL NAME

Grow Federal #18H

COUNTY & STATE

Eddy County, NM

API WELL NUMBER

30-015-40992

PROPOSED DIRECTION

86.13

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
450 ft	450.00 ft	0.10	2.43	0.55	0.08	Surface

FIRST SURVEY	FIRST SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
Gyro	532 ft	0.00	241.80

SURVEY INSTRUMENT

TYPE

Phoenix MWD

LAST SURVEY	LAST SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
7-Nov-13	10,742 ft	88.9	87.5

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED TD SURVEY	PROJECTED TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
7-Nov-13	10,795 ft	88.9	87.5

Brad Hill

PRINT YOUR NAME ABOVE

Brad Hill

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED

7.26

DECLINATION OR GRID

GRID

11/7/2013

TODAY'S DATE

MWD SUPERVISOR 1

Brad Hill

DIRECTIONAL DRILLER 1

Joe Paup

MWD SUPERVISOR 2

Daryl Robles

DIRECTIONAL DRILLER 2

Ken Smith

1805 Brittmore Road

Houston, Texas 77043

(713)3370609 (Voice), (713)337-0599 (Fax)

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720
DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

RECEIVED

NOV 25 2013

WOOD ARTESIA

Form C-102
Revised August 1, 2011
Submit one copy to appropriate District Office

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-40992	Pool Code 46831 26770	Pool Name Fren Cedar Lake; Glorietta-Yeso
Property Code 308711	Property Name CROW FEDERAL	Well Number 18H
OGRID No. 873	Operator Name APACHE CORPORATION	Elevation 3838'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
L	9	17-S	31-E		1805	SOUTH	110	WEST	EDDY

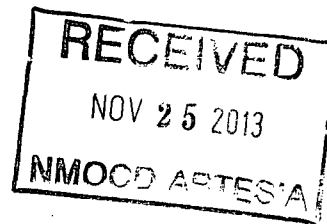
Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
I	9	17-S	31-E		1805	SOUTH	330	EAST	EDDY

Dedicated Acres 11.0	Joint or Infill	Consolidation Code	Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

CORNER COORDINATES TABLE A) Y=672852.6 N, X=638365.7 E B) Y=672888.0 N, X=643646.5 E C) Y=671532.5 N, X=638373.2 E D) Y=671567.1 N, X=643654.3 E	GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=672017.6 N X=638480.4 E LAT.=32° 8' 46.649" N LONG.=103° 88' 24.24" W LAT.=32° 50' 48" N LONG.=103° 52' 57" W BOTTOM HOLE LOCATION Y=672048.6 N X=643321.5 E	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>Sorina L. Flores</i> 8/15/12 Signature Date <i>Sorina L. Flores</i> Printed Name <i>sorina.flores@apachecorp.com</i> E-mail Address
DETAIL 3844.3' 3845.7' 600' 3833.5' 3854.2' GRID AZ = 89° 37' 58" HORIZ. DIST. = 4842.4' 110' S.L. SEE DETAIL 1805' B.H. 330'		SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. MAY 18, 2012 Date of Survey Signature & Seal of Professional Surveyor: <i>Donald J. Eidson</i> 5/13/2012 Certificate Number: 3239 AF JWSC W.O.: 12.11.0479



Apache Corporation

Eddy County, NM (NAD27 NME)

Crow Federal

#18H

WB1/Job #1311163

Survey: Phoenix MWD Surveys

Phoenix Final Survey Report

07 November, 2013



Company:	Apache Corporation	Local/Co-ordinate/Reference:	Well: #18H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3849.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3849.00usft (Capstar 114)
Well:	#18H	North Reference:	Grid
Wellbore:	WB1/Job #1311163	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR/DB

Project:	Eddy County, NM (NAD27 NME)		
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:	Crow Federal		
Site Position:		Northing:	671,130.90 usft
From:	Map	Easting:	643,906.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 38.92796 N
		Longitude:	103° 51' 53.16689 W
		Grid Convergence:	0.25 °

Well	#18H				
Well Position	+N/-S	0.00 usft	Northing:	672,017.60 usft	Latitude: 32° 50' 47.93560 N
	+E/-W	0.00 usft	Easting:	638,480.40 usft	Longitude: 103° 52' 56.72745 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level: 3,838.00 usft

Wellbore					
WB1/Job #1311163					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	09/04/13	7.50	60.65	48,731

Design	Surveys (Capstar 114)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	86.13	

Survey Program	Date	11/07/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
532.00	10,795.00	Phoenix MWD Surveys (WB1/Job #131116)	MWD	MWD - Standard

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
450.00	0.10	2.43	450.00	0.55	-0.08	-0.04	0.00
Tie on to Gyro							
532.00	0.00	241.80	532.00	0.62	-0.07	-0.03	0.12
First Phoenix MWD Survey							
651.00	0.40	15.80	651.00	1.02	0.04	0.11	0.34
737.00	1.50	354.90	736.99	2.43	0.02	0.19	1.32
822.00	2.80	2.30	821.92	5.61	0.01	0.38	1.56
908.00	4.30	358.90	907.76	10.94	0.03	0.77	1.76
993.00	4.70	0.90	992.49	17.60	0.02	1.21	0.51
1,081.00	4.80	9.80	1,080.19	24.84	0.71	2.38	0.84
1,166.00	4.20	13.70	1,164.93	31.37	2.05	4.16	0.79
1,252.00	4.10	16.40	1,250.71	37.37	3.66	6.18	0.26



Phoenix Technology Services

Phoenix Final Survey Report



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #18H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3849.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3849.00usft (Capstar 114)
Well:	#18H	North Reference:	Grid
Wellbore:	WB1/Job #1311163	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	
1,337.00	4.00	8.90	1,335.49	43.22	4.98	7.88	0.63	
1,423.00	4.30	11.30	1,421.27	49.34	6.07	9.39	0.40	
1,508.00	3.60	358.50	1,506.07	55.14	6.63	10.33	1.32	
1,594.00	3.70	354.40	1,591.89	60.60	6.29	10.36	0.32	
1,679.00	3.70	359.70	1,676.72	66.07	6.01	10.45	0.40	
1,765.00	3.80	359.50	1,762.53	71.69	5.97	10.79	0.12	
1,851.00	3.70	4.30	1,848.35	77.31	6.15	11.35	0.38	
1,936.00	3.70	3.20	1,933.17	82.78	6.51	12.08	0.08	
2,022.00	3.60	7.30	2,019.00	88.23	7.01	12.94	0.32	
2,107.00	4.00	349.90	2,103.81	93.80	6.82	13.14	1.43	
2,193.00	4.00	344.00	2,189.60	99.63	5.47	12.18	0.48	
2,279.00	3.80	354.30	2,275.41	105.35	4.36	11.46	0.85	
2,364.00	3.60	358.00	2,360.23	110.82	3.99	11.46	0.37	
2,450.00	3.70	357.20	2,446.05	116.29	3.76	11.60	0.13	
2,535.00	3.60	359.90	2,530.88	121.70	3.62	11.83	0.23	
2,621.00	3.60	357.20	2,616.71	127.10	3.48	12.05	0.20	
2,707.00	3.40	0.50	2,702.55	132.35	3.37	12.30	0.33	
2,792.00	3.60	359.40	2,787.39	137.53	3.37	12.64	0.25	
2,877.00	3.50	358.60	2,872.23	142.80	3.28	12.91	0.13	
2,966.00	3.50	359.70	2,961.06	148.23	3.20	13.19	0.08	
3,052.00	3.40	1.10	3,046.91	153.40	3.23	13.58	0.15	
3,137.00	3.60	3.80	3,131.75	158.59	3.46	14.15	0.30	
3,219.00	3.80	5.60	3,213.58	163.86	3.89	14.94	0.28	
3,305.00	3.90	3.60	3,299.38	169.61	4.35	15.79	0.19	
3,390.00	4.10	5.90	3,384.18	175.52	4.85	16.68	0.30	
3,463.00	4.10	6.20	3,456.99	180.71	5.40	17.58	0.03	
3,559.00	4.10	5.70	3,552.75	187.54	6.11	18.75	0.04	
3,644.00	4.00	2.60	3,637.53	193.52	6.55	19.59	0.28	
3,730.00	4.00	2.30	3,723.32	199.52	6.80	20.25	0.02	
3,815.00	4.00	2.10	3,808.12	205.44	7.03	20.88	0.02	
3,901.00	3.90	3.30	3,893.91	211.36	7.31	21.56	0.15	
3,987.00	3.60	4.40	3,979.73	216.97	7.68	22.31	0.36	
4,072.00	4.40	4.70	4,064.52	222.88	8.16	23.18	0.94	
4,158.00	4.40	3.00	4,150.27	229.46	8.60	24.07	0.15	
4,243.00	4.30	2.50	4,235.02	235.90	8.91	24.81	0.13	
4,329.00	4.10	1.00	4,320.79	242.20	9.10	25.43	0.27	
4,415.00	3.90	1.00	4,406.58	248.20	9.21	25.94	0.23	
4,503.00	3.90	2.90	4,494.38	254.18	9.41	26.55	0.15	
4,589.00	3.90	1.40	4,580.18	260.02	9.63	27.16	0.12	
4,674.00	3.90	358.90	4,664.98	265.80	9.65	27.56	0.20	
4,763.00	4.30	348.80	4,753.75	272.10	8.94	27.28	0.93	
4,851.00	4.40	346.70	4,841.50	278.62	7.52	26.31	0.21	
4,940.00	3.60	343.60	4,930.28	284.63	5.95	25.14	0.93	
5,026.00	3.80	343.60	5,016.10	289.95	4.38	23.94	0.23	
5,111.00	2.90	341.40	5,100.96	294.69	2.90	22.78	1.07	

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #18H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3849.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3849.00usft (Capstar 114)
Well:	#18H	North Reference:	Grid
Wellbore:	WB1/Job #1311163	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)
5,197.00	1.20	350.60	5,186.90	297.64	2.06	22.14	2.01
5,282.00	1.40	357.30	5,271.88	299.56	1.86	22.08	0.30
5,368.00	1.40	354.60	5,357.85	301.65	1.72	22.07	0.08
5,453.00	1.30	350.60	5,442.83	303.64	1.46	21.95	0.16
5,539.00	0.20	68.00	5,528.82	304.66	1.44	22.00	1.48
5,625.00	0.20	80.80	5,614.82	304.74	1.73	22.29	0.05
5,668.00	0.20	87.60	5,657.82	304.75	1.88	22.44	0.06
5,711.00	3.60	97.30	5,700.79	304.58	3.29	23.84	7.91
5,754.00	8.60	95.20	5,743.53	304.12	7.84	28.34	11.64
5,796.00	13.60	91.10	5,784.74	303.74	15.91	36.37	12.04
5,839.00	18.40	90.10	5,826.06	303.63	27.75	48.18	11.18
5,882.00	23.40	90.50	5,866.22	303.54	43.09	63.48	11.63
5,925.00	28.80	91.90	5,904.82	303.13	61.99	82.31	12.64
5,967.00	34.50	92.90	5,940.56	302.19	84.00	104.21	13.63
6,010.00	39.60	92.80	5,974.86	300.90	109.87	129.93	11.86
6,053.00	44.70	92.50	6,006.73	299.57	138.68	158.59	11.87
6,096.00	49.70	92.10	6,035.94	298.31	170.20	189.95	11.65
6,138.00	54.60	91.30	6,061.70	297.33	203.34	222.94	11.76
6,181.00	60.40	90.60	6,084.80	296.74	239.58	259.07	13.56
6,224.00	65.00	90.10	6,104.51	296.51	277.78	297.16	10.75
6,267.00	68.90	90.30	6,121.35	296.37	317.34	336.62	9.08
6,310.00	75.00	90.10	6,134.66	296.23	358.21	377.38	14.19
6,352.00	80.90	89.70	6,143.43	296.30	399.26	418.35	14.08
6,396.00	86.80	88.90	6,148.14	296.84	442.99	462.01	13.53
6,438.00	88.40	88.70	6,149.90	297.72	484.94	503.93	3.84
6,481.00	89.50	89.30	6,150.69	298.47	527.92	546.87	2.91
6,567.00	89.60	89.20	6,151.36	299.59	613.91	632.74	0.16
6,652.00	88.30	87.20	6,152.92	302.26	698.85	717.66	2.81
6,738.00	88.90	88.70	6,155.02	305.34	784.77	803.59	1.88
6,824.00	90.30	90.70	6,155.62	305.79	870.76	889.41	2.84
6,909.00	90.00	89.40	6,155.40	305.71	955.76	974.21	1.57
6,995.00	90.50	89.30	6,155.02	306.69	1,041.75	1,060.07	0.59
7,080.00	89.20	90.00	6,155.25	307.21	1,126.75	1,144.91	1.74
7,166.00	87.60	90.20	6,157.65	307.06	1,212.71	1,230.67	1.87
7,251.00	87.50	89.60	6,161.28	307.21	1,297.63	1,315.41	0.71
7,337.00	87.00	89.40	6,165.41	307.96	1,383.53	1,401.16	0.63
7,423.00	87.50	88.80	6,169.53	309.31	1,469.42	1,486.94	0.91
7,508.00	87.80	89.00	6,173.02	310.94	1,554.33	1,571.77	0.42
7,594.00	87.80	88.90	6,176.32	312.51	1,640.25	1,657.61	0.12
7,679.00	87.20	90.30	6,180.03	313.10	1,725.17	1,742.37	1.79
7,765.00	87.40	90.10	6,184.08	312.80	1,811.07	1,828.05	0.33
7,850.00	87.70	89.80	6,187.71	312.88	1,895.99	1,912.79	0.50
7,936.00	87.60	89.10	6,191.24	313.70	1,981.92	1,998.57	0.82
8,022.00	87.50	88.90	6,194.92	315.20	2,067.83	2,084.38	0.26

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #18H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3849.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3849.00usft (Capstar 114)
Well:	#18H	North Reference:	Grid
Wellbore:	WB1/Job #1311163	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR DB

Survey							
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
8,107.00	89.10	90.00	6,197.44	316.02	2,152.78	2,169.20	2.28
8,193.00	89.10	89.40	6,198.79	316.47	2,238.77	2,255.02	0.70
8,278.00	89.30	89.00	6,199.97	317.65	2,323.75	2,339.89	0.53
8,364.00	89.40	88.60	6,200.95	319.46	2,409.73	2,425.79	0.48
8,449.00	89.20	89.60	6,201.99	320.79	2,494.71	2,510.67	1.20
8,535.00	90.00	89.60	6,202.59	321.39	2,580.70	2,596.51	0.93
8,620.00	88.70	90.10	6,203.55	321.61	2,665.70	2,681.32	1.64
8,704.00	89.00	90.60	6,205.24	321.10	2,749.68	2,765.08	0.69
8,789.00	89.50	91.00	6,206.35	319.91	2,834.66	2,849.79	0.75
8,877.00	89.70	90.90	6,206.97	318.46	2,922.65	2,937.48	0.25
8,966.00	90.30	90.80	6,206.97	317.13	3,011.64	3,026.17	0.68
9,051.00	88.50	90.50	6,207.86	316.17	3,096.62	3,110.90	2.15
9,137.00	88.20	90.10	6,210.33	315.72	3,182.59	3,196.64	0.58
9,225.00	88.30	89.60	6,213.02	315.95	3,270.54	3,284.41	0.58
9,310.00	88.00	89.50	6,215.76	316.62	3,355.50	3,369.21	0.37
9,396.00	88.30	89.30	6,218.54	317.52	3,441.45	3,455.03	0.42
9,482.00	88.60	89.10	6,220.87	318.72	3,527.41	3,540.87	0.42
9,568.00	88.50	90.30	6,223.04	319.17	3,613.38	3,626.68	1.40
9,653.00	88.80	90.60	6,225.05	318.50	3,698.35	3,711.41	0.50
9,739.00	88.70	90.20	6,226.92	317.90	3,784.33	3,797.15	0.48
9,828.00	89.00	89.30	6,228.71	318.29	3,873.31	3,885.96	1.07
9,916.00	89.20	88.20	6,230.09	320.21	3,961.27	3,973.85	1.27
10,002.00	88.20	89.30	6,232.04	322.08	4,047.23	4,059.74	1.73
10,087.00	88.00	89.10	6,234.86	323.27	4,132.17	4,144.57	0.33
10,173.00	88.00	88.80	6,237.86	324.85	4,218.11	4,230.41	0.35
10,258.00	88.40	88.40	6,240.53	326.92	4,303.04	4,315.29	0.67
10,343.00	88.40	88.40	6,242.90	329.29	4,387.97	4,400.19	0.00
10,430.00	88.40	87.70	6,245.33	332.25	4,474.89	4,487.11	0.80
10,514.00	88.60	87.90	6,247.53	335.48	4,558.80	4,571.04	0.34
10,603.00	88.70	87.70	6,249.63	338.89	4,647.71	4,659.98	0.25
10,690.00	88.90	87.60	6,251.45	342.46	4,734.62	4,746.93	0.26
10,742.00	88.90	87.50	6,252.45	344.68	4,786.56	4,798.91	0.19
Last Phoenix MWD Survey							
10,795.00	88.90	87.50	6,253.47	346.99	4,839.50	4,851.88	0.00
Projection to Bit							

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #18H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3849.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3849.00usft (Capstar 114)
Well:	#18H	North Reference:	Grid
Wellbore:	WB1/Job #1311163	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	GCR/DB

Survey Annotations					
	Measured	Vertical	Local Coordinates		Comment
	Depth (usft)	Depth (usft)	+N/-S (usft)	+E/-W (usft)	
	450.00	450.00	0.55	-0.08	Tie-on to Gyro
	532.00	532.00	0.62	-0.07	First Phoenix MWD Survey
	10,742.00	6,252.45	344.68	4,786.56	Last Phoenix MWD Survey
	10,795.00	6,253.47	346.99	4,839.50	Projection to Bit

Checked By: _____ Approved By: _____ Date: _____