



November 18, 2015

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

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 19 2016

Dear District 2 - Artesia

RECEIVED

Attention: Regulatory Department

Re: Apache Corporation
Crow Federal #51H
Eddy County, NM
API #30-015-43327
Job No. 1514486

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	Drain Hole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Bernard Caldwell	51H	5,076	9,841	10/22/15	10/27/15	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,

Leslie Alvarado

Leslie Alvarado
Operations Administrator

Certified mail receipt number: 7015 0640 0000 9907 5180

Phoenix Technology Services
SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1514486

ENERGY COMPANY

Apache Corp

WELL NAME

Crow Federal # 51H

COUNTY & STATE

Eddy, NM

API WELL NUMBER

30-015-43327

PROPOSED DIRECTION

81.96

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
4,893.00 ft	4,892.49 ft	0.70°	27.33°	26.33 ft	8.86 ft	GYRO

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
22-Oct-15	5,076.00 ft	3.20°	56.4°

SURVEY INSTRUMENT
TYPE
Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
27-Oct-15	9,841.00 ft	90.90°	90.2°

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

PROJECTED	PROJECTED		
TD SURVEY	TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
27-Oct-15	9,906.00 ft	90.90°	90.2°

Bernard Caldwell

PRINT YOUR NAME ABOVE

B. Caldwell

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED	
	7.35
DECLINATION OR GRID	GRID

27-Oct-15

TODAY'S DATE

MWD SUPERVISOR 1

Bernard Caldwell

DIRECTIONAL DRILLER 1

David Eddins

MWD SUPERVISOR 2

Steven Poer

DIRECTIONAL DRILLER 2

Brad Jones

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

NM OIL CONSERVATION
ARTESIA DISTRICT
JAN 29 2015
RECEIVED

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

NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 31 2015

Form C-102

Revised August 1, 2011

Submit one copy to appropriate
District Office

RECEIVED

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-43327	Pool Code 26770	Pool Name Frenj, Glorieta - Yeso
Property Code 313404	Property Name CROW FEDERAL COM	Well Number 51H
OGRID No. 873	Operator Name APACHE CORPORATION	Elevation 3876'

Surface Location

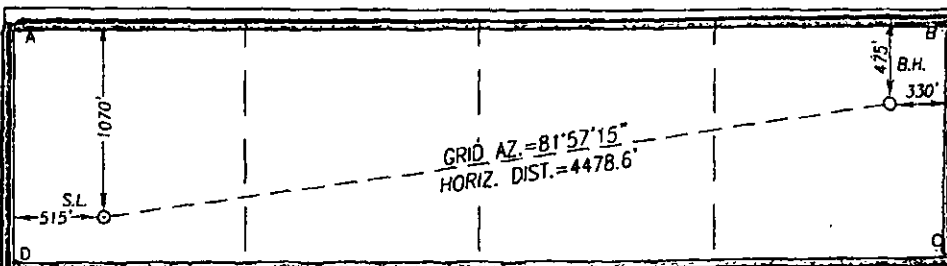
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
D	9	17-S	31-E		1070	NORTH	515	WEST	EDDY

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
A	9	17-S	31-E		475	NORTH	330	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
160			

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



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.

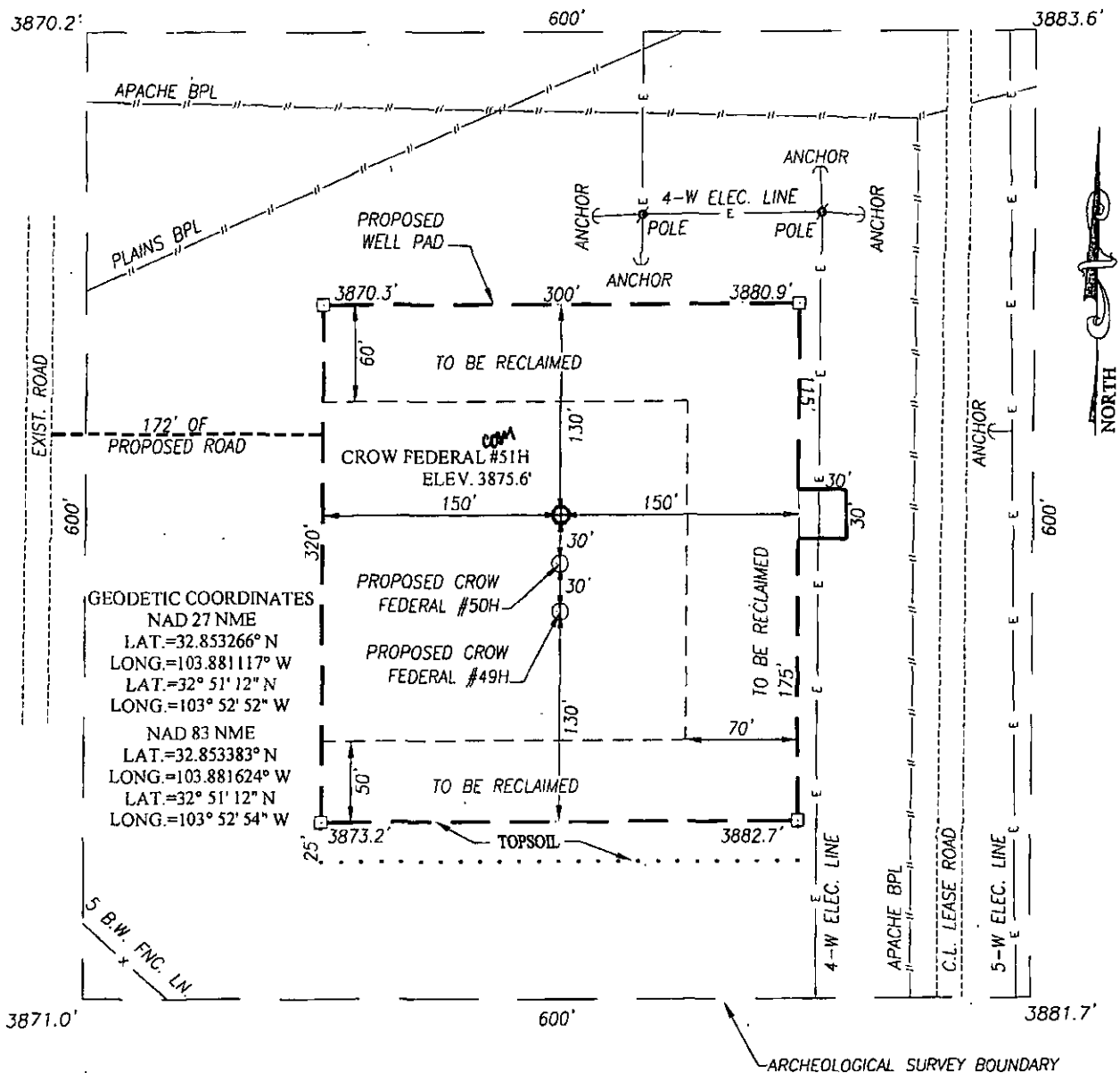
Sorina L Flores 2/5/15
Signature Date
Sorina L Flores
Printed Name
Sorina.Flores@apachecorp.com
E-mail Address

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.

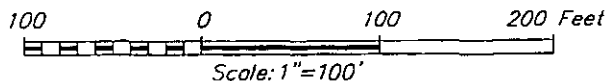
Date of Survey AUGUST 21, 2014
Signature of Registered Professional Surveyor:
Ronald J. Eidson
Certificate Number 3239 Gary G. Eidson 12641
Ronald J. Eidson 3239
LSL REL W.O.: 14.11.0880 JWSC W.O.: 15.12.0132

GEODETIC COORDINATES NAD 27 NME	CORNER COORDINATES TABLE NAD 27 NME	BOTTOM HOLE LOCATION NAD 27 NME
SURFACE LOCATION Y=674426.6 N X=638871.7 E LAT.=32.853266° N LONG.=103.881117° W LAT.=32° 51' 12" N LONG.=103° 52' 52" W	A - Y=675492.7 N, X=638350.7 E B - Y=675530.4 N, X=643632.5 E C - Y=674209.2 N, X=643639.5 E D - Y=674172.6 N, X=638358.2 E	Y=675053.2 N X=643305.1 E LAT.=32.854935° N LONG.=103.866671° W LAT.=32° 51' 18" N LONG.=103° 52' 00" W
GEODETIC COORDINATES NAD 83 NME	CORNER COORDINATES TABLE NAD 83 NME	BOTTOM HOLE LOCATION NAD 83 NME
SURFACE LOCATION Y=674490.6 N X=680050.3 E LAT.=32.853383° N LONG.=103.881624° W LAT.=32° 51' 12" N LONG.=103° 52' 54" W	A - Y=675556.7 N, X=679529.3 E B - Y=675594.6 N, X=684811.1 E C - Y=674273.4 N, X=684818.1 E D - Y=674236.7 N, X=679536.8 E	Y=675117.3 N X=684483.7 E LAT.=32.855052° N LONG.=103.867178° W LAT.=32° 51' 18" N LONG.=103° 52' 02" W



DIRECTIONS TO CROW FEDERAL #51H:

FROM THE INTERSECTION OF US HWY. #82 AND CO. RD. #221 (SKELLY ROAD), GO NORTH APPROX. 1.3 MILES. TURN RIGHT AND GO NORTHEAST APPROX. 0.5 MILES. FOLLOW ROAD BEND RIGHT AND GO EAST APPROX. 0.6 MILES. TURN LEFT AND GO NORTH APPROX. 0.5 MILES. TURN RIGHT AND GO EAST APPROX. 0.9 MILES. TURN RIGHT AND GO SOUTH APPROX. 300 FEET TO PROPOSED ROAD SURVEY. FOLLOW STAKED ROAD 172 FEET EAST TO THE LOCATION.



APACHE CORPORATION

CROW FEDERAL #51H WELL
LOCATED 1070 FEET FROM THE NORTH LINE
AND 515 FEET FROM THE WEST LINE OF SECTION 9,
TOWNSHIP 17 SOUTH, RANGE 31 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO

PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwscbiz
TBPLS# 10021000

Survey Date: 8/21/14	CAD Date: 12/17/14	Drawn By: LSL
W.O. No.: 14131401	Rev.:	Rel. W.O.: 14110880

Sheet 1 of 1



NM OIL CONSERVATION
ARTESIA DISTRICT
JAN 19 2016

RECEIVED

Apache Corporation

**Eddy County, NM (NAD27 NME)
Crow Federal
#51H**

OH / 1514486

Survey: Phoenix MWD Surveys

Standard Survey Report

18 November, 2015



Company:	Apache Corporation	Local Co-ordinate Reference:	Well #51H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3887.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3887.00usft (Capstar 114)
Well:	#51H	North Reference:	Grid
Wellbore:	OH / 1514486	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR

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		
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Site Position:		Northing:	671,130.90 usft	Latitude:	32° 50' 38.92796 N
From:	Map	Easting:	643,906.80 usft	Longitude:	103° 51' 53.16689 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.25 °

Well	#51H				
Well Position	+N/-S	0.00 usft	Northing:	674,426.60 usft	Latitude: 32° 51' 11.75629 N
	+E/-W	0.00 usft	Easting:	638,871.70 usft	Longitude: 103° 52' 52.01984 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level: 3,876.00 usft

Wellbore	OH / 1514486				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	10/14/2015	7.60	60.80	48,571

Design	Surveys (Capstar 114)				
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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	81.96

Survey Program		Date	11/18/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	4,893.00	Scientific Gyro Surveys (OH / 1514486)	NS-GYRO-MS	North sensing gyrocompassing m/s	
4,893.00	9,906.00	Phoenix MWD Surveys (OH / 1514486)	PHX+MWD+HDGM	PHX+OWSG MWD + HDGM	

Survey	Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
	4,893.00	0.70	27.33	4,892.49	26.33	8.86	12.46	0.00	0.00	0.00
Tie In to Scientific Gyro	5,076.00	3.20	56.40	5,075.37	30.15	13.63	17.71	1.43	1.37	15.89
First Phoenix MWD Survey	5,119.00	7.40	52.00	5,118.18	32.52	16.81	21.19	9.81	9.77	-10.23
	5,162.00	12.10	48.40	5,160.55	37.22	22.37	27.35	11.02	10.93	-8.37
	5,205.00	17.00	47.80	5,202.15	44.44	30.40	36.32	11.40	11.40	-1.40
	5,247.00	22.40	50.00	5,241.68	53.71	41.09	48.19	12.98	12.86	5.24
	5,290.00	27.90	51.10	5,280.59	65.31	55.20	63.79	12.84	12.79	2.56

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #51H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3887.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3887.00usft (Capstar 114)
Well:	#51H	North Reference:	Grid
Wellbore:	OH / 1514486	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,332.00	33.30	52.00	5,316.73	78.59	71.95	82.23	12.90	12.86	2.14
5,375.00	38.70	53.50	5,351.50	93.86	92.07	104.29	12.72	12.56	3.49
5,418.00	43.40	54.50	5,383.92	110.44	114.92	129.23	11.04	10.93	2.33
5,460.00	48.00	55.80	5,413.25	127.61	139.58	156.06	11.17	10.95	3.10
5,503.00	52.30	57.20	5,440.80	145.81	167.11	185.86	10.31	10.00	3.26
5,546.00	57.80	57.30	5,465.42	164.87	196.74	217.87	12.79	12.79	0.23
5,589.00	62.60	57.30	5,486.79	185.02	228.13	251.77	11.16	11.16	0.00
5,631.00	67.00	57.40	5,504.66	205.52	260.12	286.31	10.48	10.48	0.24
5,674.00	71.30	57.90	5,519.96	227.01	294.06	322.93	10.06	10.00	1.16
5,717.00	75.30	58.90	5,532.32	248.59	329.14	360.67	9.57	9.30	2.33
5,759.00	79.70	59.40	5,541.41	269.61	364.33	398.46	10.54	10.48	1.19
5,803.00	83.80	59.80	5,547.72	291.64	401.88	438.72	9.36	9.32	0.91
5,846.00	87.80	59.00	5,550.87	313.46	438.79	478.32	9.49	9.30	-1.86
5,888.00	88.70	59.10	5,552.15	335.05	474.79	516.99	2.16	2.14	0.24
6,017.00	88.90	61.50	5,554.85	398.95	586.81	636.84	1.87	0.16	1.86
6,144.00	88.80	64.10	5,557.40	456.98	699.73	756.77	2.05	-0.08	2.05
6,272.00	87.50	67.90	5,561.54	509.01	816.58	879.75	3.14	-1.02	2.97
6,400.00	86.90	72.20	5,567.79	552.62	936.73	1,004.81	3.39	-0.47	3.36
6,528.00	87.00	76.40	5,574.61	587.20	1,059.75	1,131.46	3.28	0.08	3.28
6,656.00	88.30	81.40	5,579.86	611.81	1,185.21	1,259.13	4.03	1.02	3.91
6,784.00	90.20	85.80	5,581.53	626.07	1,312.36	1,387.03	3.74	1.48	3.44
6,911.00	90.30	90.00	5,580.98	630.73	1,439.25	1,513.32	3.31	0.08	3.31
7,039.00	90.60	91.50	5,579.97	629.05	1,567.23	1,639.81	1.20	0.23	1.17
7,167.00	89.70	91.80	5,579.64	625.36	1,695.17	1,765.98	0.74	-0.70	0.23
7,295.00	88.80	92.20	5,581.31	620.90	1,823.08	1,892.01	0.77	-0.70	0.31
7,423.00	87.10	91.10	5,585.89	617.21	1,950.94	2,018.09	1.58	-1.33	-0.86
7,551.00	86.90	90.80	5,592.59	615.09	2,078.75	2,144.35	0.28	-0.16	-0.23
7,679.00	86.80	89.10	5,599.63	615.21	2,206.55	2,270.91	1.33	-0.08	-1.33
7,807.00	89.00	88.80	5,604.32	617.55	2,334.44	2,397.86	1.73	1.72	-0.23
7,936.00	89.60	89.40	5,605.89	619.58	2,463.41	2,525.85	0.66	0.47	0.47
8,064.00	89.80	89.60	5,606.56	620.69	2,591.40	2,652.74	0.22	0.16	0.16
8,192.00	88.50	89.60	5,608.46	621.59	2,719.38	2,779.59	1.02	-1.02	0.00
8,320.00	88.60	90.10	5,611.70	621.92	2,847.34	2,906.34	0.40	0.08	0.39
8,448.00	88.90	90.50	5,614.49	621.25	2,975.31	3,032.95	0.39	0.23	0.31
8,577.00	88.70	89.50	5,617.19	621.25	3,104.28	3,160.66	0.79	-0.16	-0.78
8,705.00	88.90	89.90	5,619.87	621.92	3,232.25	3,287.46	0.35	0.16	0.31
8,832.00	89.10	90.30	5,622.09	621.70	3,359.23	3,413.16	0.35	0.16	0.31
8,960.00	89.60	90.90	5,623.54	620.36	3,487.21	3,539.70	0.61	0.39	0.47
9,088.00	89.70	90.80	5,624.32	618.46	3,615.20	3,666.16	0.11	0.08	-0.08
9,216.00	88.30	89.70	5,626.56	617.90	3,743.17	3,792.80	1.39	-1.09	-0.86
9,344.00	88.40	89.70	5,630.24	618.57	3,871.11	3,919.58	0.08	0.08	0.00
9,472.00	88.30	90.00	5,633.93	618.91	3,999.06	4,046.32	0.25	-0.08	0.23
9,600.00	89.20	90.10	5,636.72	618.80	4,127.03	4,173.01	0.71	0.70	0.08

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #51H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3887.00usft (Capstar 114)
Site:	Crow Federal	MD Reference:	KB @ 3887.00usft (Capstar 114)
Well:	#51H	North Reference:	Grid
Wellbore:	OH / 1514486	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,728.00	90.50	90.00	5,637.06	618.68	4,255.03	4,299.73	1.02	1.02	-0.08	
9,841.00	90.90	90.20	5,635.68	618.49	4,368.02	4,411.59	0.40	0.35	0.18	
Final Phoenix MWD Survey										
9,906.00	90.90	90.20	5,634.66	618.26	4,433.01	4,475.91	0.00	0.00	0.00	
Projection to TD										

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
4,893.00	4,892.49	26.33	8.86	Tie In to Scientific Gyro	
5,076.00	5,075.37	30.15	13.63	First Phoenix MWD Survey	
9,841.00	5,635.68	618.49	4,368.02	Final Phoenix MWD Survey	
9,906.00	5,634.66	618.26	4,433.01	Projection to TD	