



McVAY DRILLING COMPANY
P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

HOBBS OCD

MAY 19 2015

Well Name and Num: Slick Mesa 27 State #3H
Location: Sec 27, T21S, R34E
Operator: Marshall & Winston
Drilling Contractor: McVay Drilling Company

RECEIVED

30-025-42172

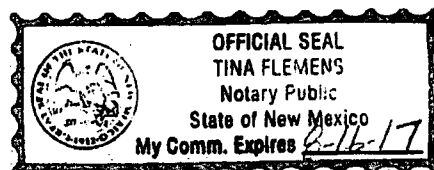
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.50	250	1.07	7864	32.23	10140	90.60	12992
1.00	600	0.79	8350	35.42	10203	90.50	13277
0.25	900	1.20	8850	49.60	10360	90.50	13468
0.59	1385	2.02	9350	64.10	10454	90.60	13563
0.78	1750	1.60	9834	84.00	10560	90.60	13658
1.12	2250	13.70	10074	89.90	10635	89.40	14038
0.53	2700	27.40	10201	89.40	10728	88.70	14134
1.50	3350	44.80	10288	89.80	10822	88.30	14324
2.99	3925	57.10	10383	89.90	11010	87.80	14513
2.00	4305	61.80	10418	90.08	11481	87.40	14609
2.44	4497	75.30	10510	90.10	11575	86.70	14704
2.40	4995	89.60	10675	91.10	11858	85.30	14862
1.27	5490	94.00	10780	89.00	12046		
1.24	5914	93.10	10927	89.30	12195		
0.88	6360	91.20	10730	88.90	12423		
0.11	6900	5.90	9901	89.50	12613		
0.47	7395	16.40	10028	90.10	12802		

By: Mark A. Gamm

Subscribed and sworn to before me this 8th day of January, 2015

Tina Flemens
Notary Public, Lea County, New Mexico



MAY 26 2015

HOBBS OCD

MAY 19 2015

RECEIVED

MARSHALL & WINSTON

Grama Ridge

Lea County, NM (Grid North)

Slick Mesa 27 State #3H

VH - Job #321114-KW-1379

Survey: Gyro

Regulatory Survey Report (Grid Nort

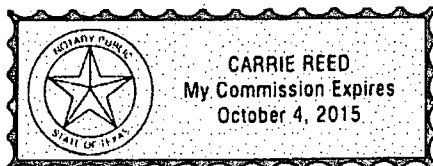
This survey is correct to the best of my knowledge and is supported by actual field data.

Jamie Northamer

Notarized this date 31st of December, 2014.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Regulatory Survey Report (Grid North)

Company:	MARSHALL & WINSTON	Local Co-ordinate Reference:	Well Slick Mesa 27 State #3H
Project:	Grama Ridge	TVD Reference:	Mean Sea Level (System)
Site:	Lea County, NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Slick Mesa 27 State #3H	North Reference:	Grid
Wellbore:	VH - Job #321114-KW-1379	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321114-KW-1379	Database:	MID_Regulatory

Project:	Grama Ridge		
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:	Lea County, NM (Grid North)				
Site Position:		Northing:	526,476.03 usft	Latitude:	32° 26' 39.707 N
From:	Lat/Long	Easting:	769,600.80 usft	Longitude:	103° 27' 33.883 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.47 °

Well:	Slick Mesa 27 State #3H, Horizontal:					
Well Position	+N-S	0.0 usft	Northing:	525,981.21 usft	Latitude:	32° 26' 34.800 N
	+E-W	0.0 usft	Easting:	769,731.96 usft	Longitude:	103° 27' 32.400 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	0.0 usft

Wellbore	VH - Job #321114-KW-1379				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/29/2014	7.12	60.32	48,439

Design:	VH - Job #321114-KW-1379				
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	357.01	

Survey Program		Date 12/14/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	9,783.0	Gyro (VH - Job #321114-KW-1379)	KSRG	Keeper Gyro

Survey	MD	Inc	Azi	TVD	N/S	E/W	Closure Azimuth	Closure Distance
	(usft)	(°)	(grid_north_azim)	(usft)	(usft)	(usft)	(°)	(usft)
	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.0
	100.0	0.34	201.70	100.0	-0.3	-0.1	201.70	0.3
	200.0	0.43	204.84	200.0	-0.9	-0.4	202.82	1.0
	300.0	0.30	203.87	300.0	-1.5	-0.6	203.52	1.6
	400.0	0.45	218.44	400.0	-2.0	-1.0	205.80	2.3
	500.0	0.47	227.07	500.0	-2.6	-1.5	209.99	3.0
	600.0	0.48	215.24	600.0	-3.2	-2.1	212.38	3.8
	700.0	0.44	235.85	700.0	-3.8	-2.6	214.51	4.6
	800.0	0.25	207.02	800.0	-4.2	-3.0	215.72	5.2
	900.0	0.45	198.42	900.0	-4.8	-3.3	214.24	5.8
	1,000.0	0.38	217.02	1,000.0	-5.4	-3.6	213.43	6.5
	1,100.0	0.31	187.27	1,100.0	-5.9	-3.7	212.01	7.0

Regulatory Survey Report (Grid North)

Company:	MARSHALL & WINSTON	Local Co-ordinate Reference:	Well Slick Mesa 27 State #3H
Project:	Grama Ridge	TVD Reference:	Mean Sea Level (System)
Site:	Lea County, NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Slick Mesa 27 State #3H	North Reference:	Grid
Wellbore:	VH - Job #321114-KW-1379	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321114-KW-1379	Database:	MID_Regulatory

Survey								
MD (usft)	Inc (°)	Azi (grid_north_azim)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200.0	0.44	168.08	1,200.0	-8.6	-3.8	208.51	7.5	
1,300.0	0.44	170.59	1,300.0	-7.3	-3.4	205.08	8.1	
1,400.0	0.38	167.98	1,400.0	-8.0	-3.3	202.33	8.7	
1,500.0	0.67	150.90	1,500.0	-8.9	-3.0	198.38	9.4	
1,600.0	0.99	136.79	1,599.9	-10.0	-2.1	191.70	10.2	
1,700.0	0.98	136.25	1,699.9	-11.3	-0.9	184.53	11.3	
1,800.0	1.00	129.58	1,799.9	-12.4	0.4	178.29	12.4	
1,900.0	1.00	118.74	1,899.9	-13.4	1.8	172.32	13.5	
2,000.0	1.27	96.79	1,999.9	-14.0	3.7	165.28	14.4	
2,100.0	1.20	93.64	2,099.9	-14.2	5.8	157.66	15.3	
2,200.0	0.96	94.14	2,199.8	-14.3	7.7	151.68	16.2	
2,300.0	1.10	96.25	2,299.8	-14.5	9.5	146.71	17.3	
2,400.0	0.73	97.18	2,399.8	-14.6	11.1	142.89	18.4	
2,500.0	0.68	80.57	2,499.8	-14.6	12.3	139.94	19.1	
2,600.0	0.75	83.57	2,599.8	-14.5	13.5	136.89	19.8	
2,700.0	0.43	74.62	2,699.8	-14.3	14.5	134.48	20.4	
2,800.0	0.35	78.00	2,799.8	-14.1	15.2	132.88	20.7	
2,900.0	0.48	71.77	2,899.8	-13.9	15.9	131.21	21.1	
3,000.0	1.19	62.52	2,999.8	-13.3	17.2	127.71	21.8	
3,100.0	2.10	64.28	3,099.7	-12.0	19.8	121.31	23.2	
3,200.0	2.41	65.28	3,199.7	-10.4	23.4	113.93	25.5	
3,300.0	2.54	63.86	3,299.6	-8.5	27.3	107.34	28.5	
3,400.0	2.68	66.99	3,399.5	-6.6	31.4	101.90	32.1	
3,500.0	2.62	64.89	3,499.4	-4.7	35.6	97.57	35.9	
3,600.0	2.95	66.15	3,599.2	-2.7	40.0	93.89	40.1	
3,700.0	3.26	65.16	3,699.1	-0.5	45.0	90.62	45.0	
3,800.0	3.32	66.11	3,798.9	1.9	50.2	87.86	50.2	
3,900.0	2.85	60.94	3,898.8	4.3	55.0	85.57	55.2	
4,000.0	2.49	51.67	3,998.7	6.8	58.9	83.40	59.3	
4,100.0	2.25	42.73	4,098.6	9.6	61.9	81.19	62.7	
4,200.0	2.14	40.19	4,198.5	12.5	64.5	79.05	65.7	
4,300.0	2.17	40.94	4,298.4	15.3	66.9	77.10	68.8	
4,400.0	2.08	40.61	4,398.4	18.1	69.3	75.34	71.7	
4,500.0	2.12	36.51	4,498.3	21.0	71.6	73.66	74.6	
4,600.0	2.20	38.56	4,598.2	24.0	73.9	72.02	77.7	
4,700.0	2.84	32.50	4,698.1	27.7	76.5	70.12	81.3	
4,800.0	2.81	24.49	4,798.0	32.0	78.9	67.89	85.1	
4,900.0	2.03	27.41	4,897.9	35.8	80.7	66.05	88.3	
5,000.0	1.63	25.30	4,997.9	38.7	82.1	64.77	90.8	
5,100.0	1.60	25.60	5,097.8	41.3	83.3	63.67	93.0	
5,200.0	1.39	31.08	5,197.8	43.5	84.6	62.76	95.1	
5,300.0	1.40	30.11	5,297.8	45.6	85.8	61.99	97.2	
5,400.0	1.24	36.12	5,397.7	47.6	87.1	61.35	99.2	
5,500.0	1.36	55.39	5,497.7	49.1	88.7	61.02	101.4	

Regulatory Survey Report (Grid North)

Company:	MARSHALL & WINSTON	Local Co-ordinate Reference:	Well Slick Mesa 27 State #3H
Project:	Grama Ridge	TVD Reference:	Mean Sea Level (System)
Site:	Lea County, NM (Grid North)	MD Reference:	Mean Sea Level (System)
Well:	Slick Mesa 27 State #3H	North Reference:	Grid
Wellbore:	VH - Job #321114-KW-1379	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #321114-KW-1379	Database:	MID: Regulatory

Survey								
MD (usft)	Inc. (°)	Azi (grid_north_azim)	TVD (usft)	N/S (usft)	E/W (usft)	Closure Azimuth (°)	Closure Distance (usft)	
5,600.0	1.22	65.78	5,597.7	50.2	90.6	61.00	103.6	
5,700.0	1.19	68.85	5,697.7	51.0	92.6	61.13	105.7	
5,800.0	1.21	65.89	5,797.6	51.9	94.5	61.25	107.8	
5,900.0	1.03	65.92	5,897.6	52.6	96.3	61.33	109.7	
6,000.0	0.97	69.02	5,997.6	53.3	97.9	61.43	111.5	
6,100.0	0.96	75.80	6,097.6	53.8	99.5	61.59	113.1	
6,200.0	1.02	75.82	6,197.6	54.3	101.2	61.80	114.8	
6,300.0	0.69	81.41	6,297.6	54.6	102.6	62.00	116.2	
6,400.0	0.55	75.45	6,397.6	54.8	103.7	62.16	117.3	
6,500.0	0.40	67.16	6,497.5	55.0	104.5	62.23	118.1	
6,600.0	0.45	45.56	6,597.5	55.4	105.1	62.19	118.8	
6,700.0	0.53	42.60	6,697.5	56.1	105.7	62.08	119.8	
6,800.0	0.56	23.23	6,797.5	56.8	106.2	61.84	120.4	
6,900.0	0.37	25.07	6,897.5	57.6	106.5	61.60	121.1	
7,000.0	0.35	349.71	6,997.5	58.2	106.6	61.38	121.4	
7,100.0	0.32	313.03	7,097.5	58.7	106.3	61.11	121.4	
7,200.0	0.48	314.71	7,197.5	59.2	105.8	60.80	121.2	
7,300.0	0.61	327.91	7,297.5	59.9	105.2	60.36	121.1	
7,400.0	0.70	325.57	7,397.5	60.9	104.6	59.82	121.0	
7,500.0	0.66	318.98	7,497.5	61.8	103.9	59.26	120.9	
7,600.0	0.63	320.22	7,597.5	62.6	103.2	58.73	120.7	
7,700.0	0.80	325.93	7,697.5	63.6	102.4	58.14	120.6	
7,800.0	0.81	318.35	7,797.5	64.6	101.7	57.56	120.5	
7,900.0	0.65	320.83	7,897.5	65.5	101.0	57.04	120.3	
8,000.0	0.64	320.95	7,997.5	66.3	100.3	56.51	120.2	
8,100.0	0.54	301.34	8,097.5	67.0	99.5	56.04	120.0	
8,200.0	0.28	307.79	8,197.5	67.4	98.9	55.72	119.7	
8,300.0	0.16	104.52	8,297.5	67.5	98.9	55.66	119.7	
8,400.0	0.11	98.92	8,397.5	67.5	99.1	55.75	119.9	
8,500.0	0.56	120.95	8,497.5	67.2	99.6	55.99	120.1	
8,600.0	1.55	110.27	8,597.4	66.5	101.3	56.72	121.2	
8,700.0	1.80	105.65	8,697.4	65.6	104.1	57.78	123.0	
8,800.0	2.03	109.13	8,797.3	64.6	107.2	58.94	125.2	
8,900.0	1.87	104.19	8,897.3	63.6	110.5	60.07	127.5	
9,000.0	2.06	99.61	8,997.2	62.9	113.9	61.08	130.1	
9,100.0	2.24	101.36	9,097.2	62.2	117.5	62.10	133.0	
9,200.0	2.17	94.78	9,197.1	61.7	121.3	63.06	136.1	
9,300.0	2.15	93.30	9,297.0	61.4	125.1	63.85	139.4	
9,400.0	2.25	104.72	9,396.9	60.8	128.9	64.74	142.5	
9,500.0	2.38	117.98	9,496.9	59.3	132.6	65.89	145.3	
9,600.0	2.90	122.66	9,596.8	57.0	136.6	67.35	148.0	
9,700.0	2.28	125.30	9,696.6	54.5	140.3	68.78	150.5	
9,783.0	1.56	137.19	9,779.6	52.7	142.4	69.70	151.9	

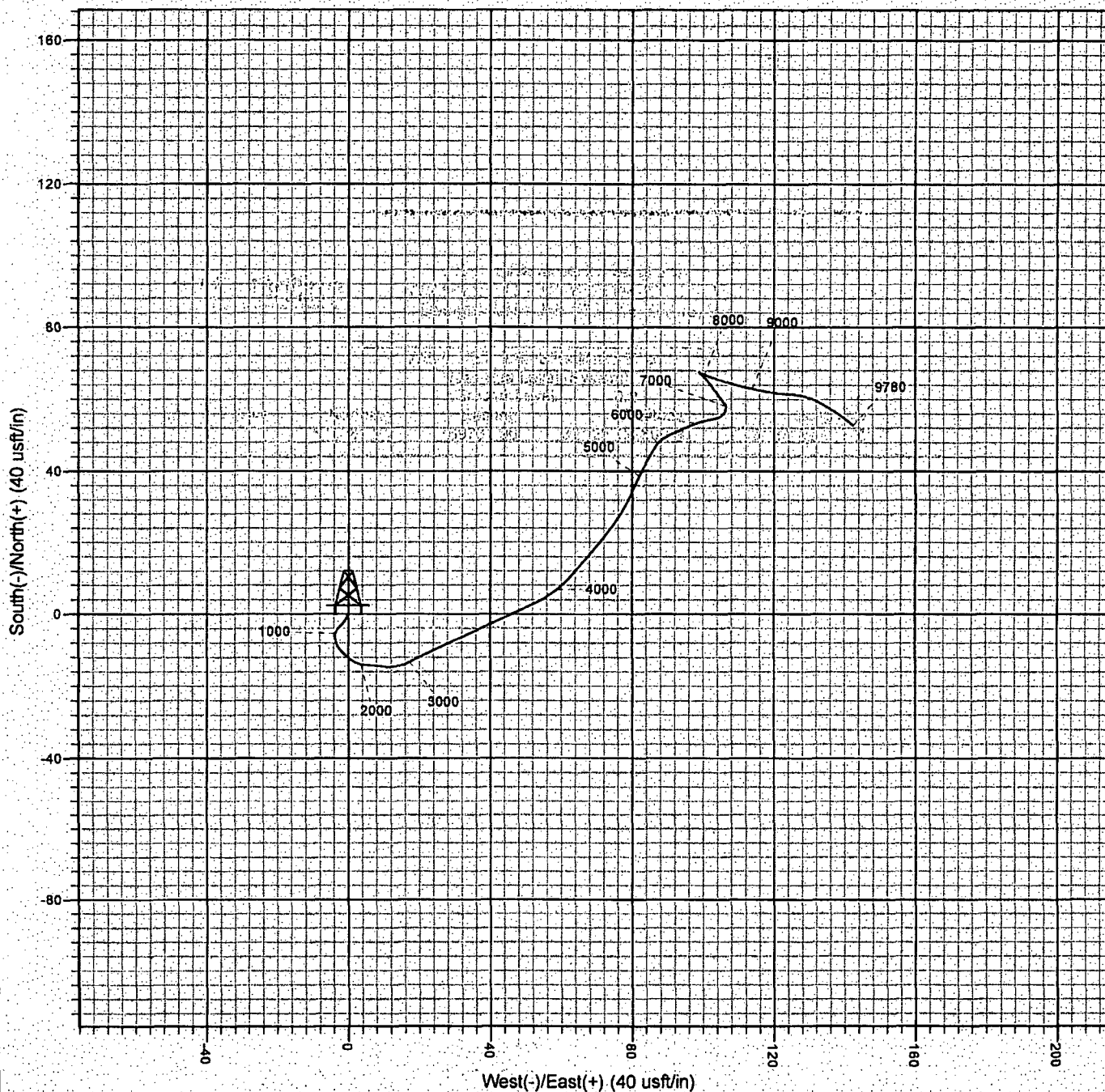


Scientific Drilling

Project: Grama Ridge
Lea County, NM (Grid North)
Well: Slick Mesa 27 State #3H
Wellbore: VH - Job #321114-KW-1379
Design: VH - Job #321114-KW-1379

WELL DETAILS: Slick Mesa 27 State #3H
Mean Sea Level (System)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	525981.21	769731.96	32° 26' 34.800 N	103° 27' 32.400 W	



PROJECT DETAILS: Grama Ridge	SITE DETAILS: Lea County, NM (Grid North)
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 26' 39.707 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 103° 27' 33.883 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.0
Zone: New Mexico East 3001	Convergence: 0.47
System Datum: Mean Sea Level	Local North: Grid



Marshall & Winston Inc.

Lea County, NM (NAD27)

Slick Mesa State 27

3H

Wellbore #1 Job #1412613

Design: Surveys (McVay 10)

Standard Survey Report

05 January, 2015



Company:	Marshall & Winston, Inc.	Local Co-ordinate Reference:	Well 3H
Project:	Lea County, NM (NAD27)	TVD Reference:	RKB @ 3716.00usft (McVay 10)
Site:	Slick Mesa State 27	MD Reference:	RKB @ 3716.00usft (McVay 10)
Well:	3H	North Reference:	Grid
Wellbore:	Wellbore #1 Job #1412613	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 10)	Database:	Compass 5000 GCR

Project:	Lea County, NM (NAD27)		
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: Slick Mesa State 27						
Site Position:		Northing:	525,967.90 usft	Latitude:	32° 26' 34.66155 N	
From:	Map	Easting:	769,815.50 usft	Longitude:	103° 27' 31.42654 W	
Position Uncertainty:		0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.47 °

Well:	3H					
Well Position	+N/-S	0.00 usft	Northing:	525,967.90 usft	Latitude:	32° 26' 34.66155 N
	+E/-W	0.00 usft	Easting:	769,815.50 usft	Longitude:	103° 27' 31.42654 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,698.00 usft

Wellbore #1 Job #1412613					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	12/23/2014	7.11	60.32	48,405

Design:	Surveys (McVay 10)				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	357.01	

Survey Program		Date	1/5/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	9,700.00	Scientific Gyro Surveys (Wellbore #1 Job #	Scientific Gyro	Scientific Drilling Intl. Standard Wireline Keeper	
9,795.00	10,579.00	Isys MWD Survey (Wellbore #1 Job #1412	MWD	MWD - Standard	
10,598.00	14,917.00	Phoenix MWD Surveys (Wellbore #1 Job #	PHX+MWD+IGRF	PHX+OWSG MWD + IGRF or WMM	

Survey:	Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
	Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
	(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	100.00	0.34	201.70	100.00	-0.28	-0.11	-0.27	0.34	0.34	0.00
	200.00	0.43	204.84	200.00	-0.89	-0.38	-0.87	0.09	0.09	3.14
	300.00	0.30	203.87	300.00	-1.47	-0.64	-1.44	0.13	-0.13	-0.97
	400.00	0.45	216.44	399.99	-2.03	-0.98	-1.97	0.17	0.15	12.57
	500.00	0.47	227.07	499.99	-2.62	-1.51	-2.54	0.09	0.02	10.63
	600.00	0.48	215.24	599.99	-3.24	-2.06	-3.13	0.10	0.01	-11.83
	700.00	0.44	235.65	699.98	-3.80	-2.61	-3.66	0.17	-0.04	20.41
	800.00	0.25	207.02	799.98	-4.21	-3.03	-4.05	0.25	-0.19	-28.63

Company:	Marshall & Winston, Inc.	Local Co-ordinate Reference:	Well 3H
Project:	Lea County, NM (NAD27)	TVD Reference:	RKB @ 3716.00usft (McVay 10)
Site:	Slick Mesa State 27	MD Reference:	RKB @ 3716.00usft (McVay 10)
Well:	3H	North Reference:	Grid
Wellbore:	Wellbore #1 Job #1412913	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 10)	Database:	Compass 5000 GCR

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)
900.00	0.45	198.42	899.98	-4.78	-3.25	-4.60	0.21	0.20	-8.60
1,000.00	0.38	217.02	999.98	-5.42	-3.58	-5.22	0.15	-0.07	18.60
1,100.00	0.31	167.27	1,099.98	-5.95	-3.72	-5.74	0.30	-0.07	-49.75
1,200.00	0.44	168.06	1,199.97	-6.59	-3.58	-6.39	0.13	0.13	0.79
1,300.00	0.44	170.59	1,299.97	-7.34	-3.44	-7.15	0.02	0.00	2.53
1,400.00	0.38	167.98	1,399.97	-8.04	-3.30	-7.86	0.06	-0.06	-2.61
1,500.00	0.67	150.90	1,499.96	-8.88	-2.95	-8.71	0.33	0.29	-17.08
1,600.00	0.99	136.79	1,599.95	-10.02	-2.07	-9.90	0.38	0.32	-14.11
1,700.00	0.98	136.25	1,699.94	-11.27	-0.89	-11.20	0.01	-0.01	-0.54
1,800.00	1.00	129.58	1,799.92	-12.44	0.37	-12.44	0.12	0.02	-6.67
1,900.00	1.00	118.74	1,899.91	-13.42	1.81	-13.49	0.19	0.00	-10.84
2,000.00	1.27	96.79	1,999.89	-13.97	3.68	-14.14	0.51	0.27	-21.95
2,100.00	1.20	93.64	2,099.87	-14.16	5.82	-14.45	0.10	-0.07	-3.15
2,200.00	0.96	94.14	2,199.85	-14.29	7.70	-14.67	0.24	-0.24	0.50
2,300.00	1.10	96.25	2,299.83	-14.46	9.49	-14.93	0.15	0.14	2.11
2,400.00	0.73	97.18	2,399.82	-14.64	11.08	-15.20	0.37	-0.37	0.93
2,500.00	0.68	80.57	2,499.81	-14.62	12.29	-15.24	0.21	-0.05	-16.61
2,600.00	0.75	83.57	2,599.80	-14.45	13.53	-15.14	0.08	0.07	3.00
2,700.00	0.43	74.62	2,699.80	-14.28	14.54	-15.02	0.33	-0.32	-8.95
2,800.00	0.35	78.00	2,799.80	-14.12	15.20	-14.89	0.08	-0.08	3.38
2,900.00	0.48	71.77	2,899.79	-13.92	15.90	-14.73	0.14	0.13	-6.23
3,000.00	1.19	62.52	2,999.78	-13.31	17.22	-14.19	0.72	0.71	-9.25
3,100.00	2.10	64.28	3,099.74	-12.04	19.79	-13.05	0.91	0.91	1.76
3,200.00	2.41	65.28	3,199.66	-10.36	23.35	-11.57	0.31	0.31	1.00
3,300.00	2.54	63.86	3,299.57	-8.51	27.25	-9.92	0.14	0.13	-1.42
3,400.00	2.68	66.99	3,399.47	-6.62	31.39	-8.25	0.20	0.14	3.13
3,500.00	2.62	64.89	3,499.36	-4.73	35.61	-6.58	0.11	-0.06	-2.10
3,600.00	2.95	66.15	3,599.24	-2.72	40.04	-4.81	0.34	0.33	1.26
3,700.00	3.26	65.16	3,699.09	-0.49	44.97	-2.83	0.31	0.31	-0.99
3,800.00	3.32	66.11	3,798.93	1.88	50.20	-0.74	0.08	0.08	0.95
3,900.00	2.85	60.94	3,898.78	4.26	55.02	1.38	0.55	-0.47	-5.17
4,000.00	2.49	51.67	3,998.67	6.81	58.90	3.73	0.56	-0.36	-9.27
4,100.00	2.25	42.73	4,098.59	9.60	61.93	6.36	0.44	-0.24	-8.94
4,200.00	2.14	40.19	4,198.52	12.47	64.47	9.09	0.15	-0.11	-2.54
4,300.00	2.17	40.94	4,298.45	15.33	65.91	11.82	0.04	0.03	0.75
4,400.00	2.08	40.61	4,398.38	18.14	69.34	14.49	0.09	-0.09	-0.33
4,500.00	2.12	38.51	4,498.31	21.00	71.62	17.24	0.16	0.04	-4.10
4,600.00	2.20	38.56	4,598.24	23.99	73.91	20.10	0.11	0.08	2.05
4,700.00	2.94	32.50	4,698.14	27.65	76.49	23.62	0.79	0.74	-6.06
4,800.00	2.81	24.49	4,798.01	32.04	78.88	27.89	0.42	-0.13	-8.01
4,900.00	2.03	27.41	4,897.92	35.85	80.71	31.59	0.79	-0.78	2.92
5,000.00	1.63	25.30	4,997.87	38.71	82.14	34.37	0.41	-0.40	-2.11
5,100.00	1.60	25.60	5,097.83	41.25	83.35	36.85	0.03	-0.03	0.30

Company:	Marshall & Winston Inc.	Local Co-ordinate Reference:	Well 3H
Project:	Lea County NM (NAD27)	TVD Reference:	RKB @ 3716.00usft (McVay 10)
Site:	Slick Mesa State 27	MD Reference:	RKB @ 3716.00usft (McVay 10)
Well:	3H	North Reference:	Grid
Wellbore:	Wellbore #1 Job #1412813	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 10)	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)	
5,200.00	1.39	31.08	5,197.80	43.55	84.58	39.08	0.25	-0.21	5.48	
5,300.00	1.40	30.11	5,297.77	45.84	85.82	41.11	0.03	0.01	-0.97	
5,400.00	1.24	36.12	5,397.74	47.57	87.07	42.97	0.21	-0.18	6.01	
5,500.00	1.36	55.39	5,497.72	49.12	88.68	44.43	0.45	0.12	19.27	
5,600.00	1.22	65.78	5,597.69	50.23	90.63	45.44	0.27	-0.14	10.39	
5,700.00	1.19	68.85	5,697.67	51.05	92.57	46.15	0.07	-0.03	3.07	
5,800.00	1.21	65.89	5,797.65	51.85	94.50	46.85	0.07	0.02	-2.96	
5,900.00	1.03	65.92	5,897.63	52.65	96.28	47.58	0.18	-0.18	0.03	
6,000.00	0.97	69.02	5,997.61	53.32	97.90	48.14	0.08	-0.06	3.10	
6,100.00	0.96	75.80	6,097.60	53.83	99.50	48.56	0.11	-0.01	6.78	
6,200.00	1.02	75.82	6,197.58	54.25	101.17	48.90	0.06	0.06	0.02	
6,300.00	0.69	81.41	6,297.57	54.56	102.83	49.13	0.34	-0.33	5.59	
6,400.00	0.55	75.45	6,397.57	54.77	103.69	49.29	0.15	-0.14	-5.98	
6,500.00	0.40	67.18	6,497.56	55.03	104.48	49.50	0.16	-0.15	-8.29	
6,600.00	0.45	45.56	6,597.56	55.44	105.08	49.88	0.17	0.05	-21.60	
6,700.00	0.53	42.60	6,697.56	56.05	105.67	50.46	0.08	0.08	-2.96	
6,800.00	0.56	23.23	6,797.55	56.84	106.18	51.23	0.19	0.03	-19.37	
6,900.00	0.37	25.07	6,897.55	57.58	106.51	51.95	0.19	-0.19	1.84	
7,000.00	0.35	349.71	6,997.55	58.18	106.59	52.54	0.22	-0.02	-35.36	
7,100.00	0.32	313.03	7,097.54	58.67	106.33	53.04	0.21	-0.03	-36.68	
7,200.00	0.48	314.71	7,197.54	59.15	105.83	53.55	0.16	0.16	1.68	
7,300.00	0.61	327.91	7,297.54	59.90	105.25	54.33	0.18	0.13	13.20	
7,400.00	0.70	325.57	7,397.53	60.85	104.82	55.31	0.09	0.09	-2.34	
7,500.00	0.66	318.98	7,497.52	61.79	103.90	56.29	0.09	-0.04	-6.59	
7,600.00	0.63	320.22	7,597.52	62.65	103.17	57.18	0.03	-0.03	1.24	
7,700.00	0.80	325.93	7,697.51	63.65	102.43	58.22	0.18	0.17	5.71	
7,800.00	0.61	318.35	7,797.50	64.62	101.68	59.23	0.21	-0.19	-7.58	
7,900.00	0.65	320.83	7,897.50	65.46	100.97	60.11	0.05	0.04	2.48	
8,000.00	0.64	320.95	7,997.49	66.34	100.26	61.02	0.01	-0.01	0.12	
8,100.00	0.54	301.34	8,097.49	67.01	99.50	61.73	0.22	-0.10	-19.61	
8,200.00	0.28	307.79	8,197.48	67.41	98.91	62.16	0.26	-0.26	6.45	
8,300.00	0.16	104.52	8,297.48	67.52	98.85	62.28	0.43	-0.12	156.73	
8,400.00	0.11	98.92	8,397.48	67.47	99.08	62.21	0.05	-0.05	-5.60	
8,500.00	0.56	120.95	8,497.48	67.21	99.60	61.92	0.46	0.45	22.03	
8,600.00	1.55	110.27	8,597.46	66.49	101.28	61.11	1.01	0.99	-10.68	
8,700.00	1.80	105.65	8,697.42	65.60	104.06	60.08	0.28	0.25	-4.62	
8,800.00	2.03	109.13	8,797.36	64.59	107.25	58.91	0.26	0.23	3.48	
8,900.00	1.87	104.19	8,897.31	63.61	110.50	57.76	0.23	-0.16	-4.94	
9,000.00	2.06	99.61	8,997.25	62.91	113.86	56.89	0.25	0.19	-4.58	
9,100.00	2.24	101.36	9,097.18	62.23	117.55	56.01	0.19	0.18	1.75	
9,200.00	2.17	94.78	9,197.10	61.68	121.35	55.27	0.26	-0.07	-6.58	
9,300.00	2.15	93.30	9,297.03	61.42	125.11	54.81	0.06	-0.02	-1.48	
9,400.00	2.25	104.72	9,396.96	60.81	128.88	54.01	0.45	0.10	11.42	

Company:	Marshall & Winston Inc.	Local Co-ordinate Reference:	Well 3H
Project:	Lea County, NM (NAD27)	TVD Reference:	RKB @ 3716.00usft (McVay 10)
Site:	Slick Mesa State 27	MD Reference:	RKB @ 3716.00usft (McVay 10)
Well:	3H	North Reference:	Grid
Wellbore:	Wellbore #1 Job #1412613	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 10)	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)	
9,500.00	2.38	117.98	9,496.88	59.34	132.61	52.34	0.55	0.13		13.26
9,600.00	2.90	122.86	9,596.77	56.99	136.57	49.79	0.57	0.52		4.88
9,700.00	2.28	125.30	9,696.67	54.47	140.32	47.08	0.63	-0.62		2.44
9,795.00	0.97	93.30	9,791.63	53.33	142.86	45.82	1.83	-1.38		-33.68
9,858.00	5.89	342.91	9,854.52	56.39	142.25	48.90	9.99	7.81		-175.22
9,890.00	8.62	341.68	9,886.26	60.24	141.01	52.80	8.54	8.53		-3.84
9,922.00	11.61	342.38	9,917.76	65.59	139.28	58.23	9.35	9.34		2.19
9,953.00	14.16	337.99	9,947.98	72.08	136.92	64.84	8.81	8.23		-14.16
9,983.00	16.44	333.94	9,976.91	79.29	133.67	72.21	8.39	7.60		-13.50
10,015.00	19.52	329.90	10,007.35	87.99	129.00	81.14	10.38	9.63		-12.63
10,047.00	23.04	328.32	10,037.16	97.95	123.03	91.39	11.14	11.00		-4.94
10,078.00	26.29	329.02	10,065.33	109.00	116.31	102.78	10.53	10.48		2.26
10,108.00	29.81	331.31	10,091.80	121.24	109.31	115.37	12.27	11.73		7.63
10,140.00	32.01	335.88	10,119.26	135.96	102.02	130.45	10.05	6.88		14.28
10,172.00	33.59	340.27	10,146.16	152.04	95.57	146.84	8.92	4.94		13.72
10,203.00	35.35	344.67	10,171.72	168.76	90.30	163.82	9.83	5.68		14.19
10,235.00	38.87	346.78	10,197.24	187.47	85.55	182.75	11.70	11.00		6.59
10,266.00	41.33	348.01	10,220.95	206.96	81.20	202.44	8.34	7.94		3.97
10,297.00	44.23	350.12	10,243.70	227.63	77.22	223.29	10.43	9.35		6.81
10,328.00	47.66	351.17	10,265.25	249.61	73.60	245.43	11.33	11.06		3.39
10,360.00	49.59	352.75	10,286.41	273.38	70.25	269.34	7.08	6.03		4.94
10,391.00	53.82	351.17	10,305.61	297.46	66.84	293.57	14.22	13.65		-5.10
10,423.00	58.92	351.52	10,323.33	323.80	62.83	320.08	15.96	15.94		1.09
10,454.00	64.10	351.87	10,338.11	350.75	58.90	347.20	16.74	16.71		1.13
10,485.00	70.35	352.05	10,350.11	379.03	54.91	375.65	20.17	20.16		0.58
10,516.00	76.06	352.23	10,359.06	408.42	50.85	405.21	18.43	18.42		0.58
10,548.00	81.43	352.40	10,365.30	439.51	46.86	436.48	16.79	16.78		0.53
10,579.00	88.20	352.23	10,368.10	470.09	42.53	467.23	21.85	21.84		-0.55
Tie-in to Iays Surveys										
10,588.00	89.50	348.30	10,368.49	488.81	39.32	486.09	21.78	6.84		-20.68
First Phoenix Survey										
10,633.00	89.90	349.40	10,368.67	523.15	32.55	520.74	3.34	1.14		3.14
10,728.00	89.40	348.40	10,369.25	616.37	14.26	614.78	1.18	-0.53		-1.05
10,822.00	89.80	349.70	10,369.91	708.65	-3.59	707.87	1.45	0.43		1.38
10,916.00	90.00	351.40	10,370.07	801.37	-19.03	801.27	1.82	0.21		1.81
11,010.00	89.90	355.20	10,370.15	894.71	-29.99	895.06	4.04	-0.11		4.04
11,104.00	90.30	355.40	10,369.99	988.40	-37.69	989.02	0.48	0.43		0.21
11,198.00	89.30	356.80	10,370.32	1,082.17	-44.09	1,083.00	1.83	-1.06		1.49
11,293.00	89.60	356.10	10,371.23	1,176.99	-49.97	1,177.99	0.80	0.32		-0.74
11,387.00	90.30	354.50	10,371.31	1,270.67	-57.67	1,271.95	1.86	0.74		-1.70
11,481.00	90.80	353.60	10,370.41	1,364.16	-67.41	1,365.81	1.10	0.53		-0.96
11,575.00	90.10	355.30	10,369.67	1,457.71	-76.51	1,459.71	1.96	-0.74		1.81
11,669.00	90.70	0.80	10,369.01	1,551.61	-79.70	1,553.66	5.89	0.64		5.85
11,763.00	90.90	0.00	10,367.70	1,645.60	-79.05	1,647.49	0.88	0.21		-0.85

Company:	Marshall & Winston Inc.	Local Co-ordinate Reference:	Well 3H
Project:	Lea County NM (NAD27)	TVD Reference:	RKB @ 3716.00usft (McVay 10)
Site:	Slick Mesa State 27	MD Reference:	RKB @ 3716.00usft (McVay 10)
Well:	3H	North Reference:	Grid
Wellbore:	Wellbore #1 Job #1412613	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 10)	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)	
11,858.00	91.10	359.80	10,366.04	1,740.59	-79.21	1,742.35	0.30	0.21	-0.21	
11,952.00	89.40	359.90	10,365.63	1,834.58	-79.46	1,836.23	1.81	-1.81	0.11	
12,046.00	89.00	359.70	10,366.94	1,928.57	-79.79	1,930.11	0.48	-0.43	-0.21	
12,140.00	89.30	358.90	10,368.34	2,022.55	-80.93	2,024.02	0.91	0.32	-0.85	
12,233.00	89.00	358.60	10,369.72	2,115.52	-82.96	2,116.97	0.46	-0.32	-0.32	
12,328.00	88.80	358.30	10,371.54	2,210.47	-85.53	2,211.92	0.38	-0.21	-0.32	
12,423.00	88.90	358.20	10,373.45	2,305.41	-88.43	2,306.88	0.15	0.11	-0.11	
12,518.00	89.40	357.50	10,374.86	2,400.33	-92.00	2,401.86	0.91	0.53	-0.74	
12,613.00	89.50	357.10	10,375.77	2,495.22	-96.47	2,496.85	0.43	0.11	-0.42	
12,707.00	89.60	356.80	10,376.51	2,589.08	-101.47	2,590.85	0.34	0.11	-0.32	
12,802.00	90.10	356.60	10,376.76	2,683.92	-106.94	2,685.85	0.57	0.53	-0.21	
12,897.00	90.40	356.10	10,376.34	2,778.73	-112.99	2,780.84	0.61	0.32	-0.53	
12,992.00	90.60	355.70	10,375.51	2,873.48	-119.78	2,875.82	0.47	0.21	-0.42	
13,087.00	90.20	355.70	10,374.85	2,968.21	-126.90	2,970.79	0.42	-0.42	0.00	
13,182.00	90.40	355.10	10,374.35	3,062.91	-134.52	3,065.75	0.67	0.21	-0.63	
13,277.00	90.50	354.90	10,373.61	3,157.54	-142.80	3,160.69	0.24	0.11	-0.21	
13,372.00	90.50	354.30	10,372.78	3,252.12	-151.74	3,255.60	0.63	0.00	-0.63	
13,468.00	90.50	354.50	10,371.94	3,347.65	-161.11	3,351.50	0.21	0.00	0.21	
13,563.00	90.60	353.70	10,371.03	3,442.14	-170.87	3,446.37	0.85	0.11	-0.84	
13,658.00	90.60	353.90	10,370.03	3,536.58	-181.13	3,541.22	0.21	0.00	0.21	
13,753.00	89.80	353.40	10,369.70	3,631.00	-191.64	3,636.05	0.99	-0.84	-0.53	
13,848.00	89.90	352.80	10,369.95	3,725.31	-203.05	3,730.83	0.64	0.11	-0.63	
13,943.00	89.70	352.60	10,370.28	3,819.54	-215.12	3,825.56	0.30	-0.21	-0.21	
14,038.00	89.40	352.10	10,371.03	3,913.69	-227.77	3,920.24	0.61	-0.32	-0.53	
14,134.00	88.70	351.50	10,372.62	4,008.70	-241.46	4,015.83	0.96	-0.73	-0.63	
14,229.00	88.70	351.20	10,374.77	4,102.59	-255.75	4,110.35	0.32	0.00	-0.32	
14,324.00	88.30	350.70	10,377.26	4,196.38	-270.68	4,204.78	0.67	-0.42	-0.53	
14,419.00	88.00	350.70	10,380.33	4,290.08	-286.03	4,299.16	0.32	-0.32	0.00	
14,513.00	87.80	349.90	10,383.77	4,382.67	-301.85	4,392.45	0.88	-0.21	-0.85	
14,609.00	87.40	349.50	10,387.79	4,477.04	-319.00	4,487.59	0.59	-0.42	-0.42	
14,704.00	86.70	348.70	10,392.68	4,570.20	-336.94	4,581.56	1.12	-0.74	-0.84	
14,799.00	85.90	348.10	10,398.81	4,663.07	-356.01	4,675.29	1.05	-0.84	-0.63	
14,862.00	85.30	347.20	10,403.65	4,724.43	-369.44	4,737.27	1.71	-0.95	-1.43	
Final Phoenix Survey										
14,917.00	85.30	347.20	10,408.15	4,777.88	-381.59	4,791.28	0.00	0.00	0.00	
Projection to TD										

Company:	Marshall & Winston, Inc.	Local Co-ordinate Reference:	Well 3H
Project:	Lea County, NM (NAD27)	TVD Reference:	RKB @ 3716.00usft (McVay 10)
Site:	Slick Mesa State 27	MD Reference:	RKB @ 3716.00usft (McVay 10)
Well:	3H	North Reference:	Grid
Wellbore:	Wellbore #1 Job #1412613	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (McVay 10)	Database:	Compass 5000 GCR

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,579.00	10,368.10	470.09	42.53	Tie-in to Isys Surveys
10,598.00	10,368.49	488.81	39.32	First Phoenix Survey
14,862.00	10,403.65	4,724.43	-369.44	Final Phoenix Survey
14,917.00	10,408.15	4,777.88	-381.59	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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