

Final PvA - Rev8

PB Energy

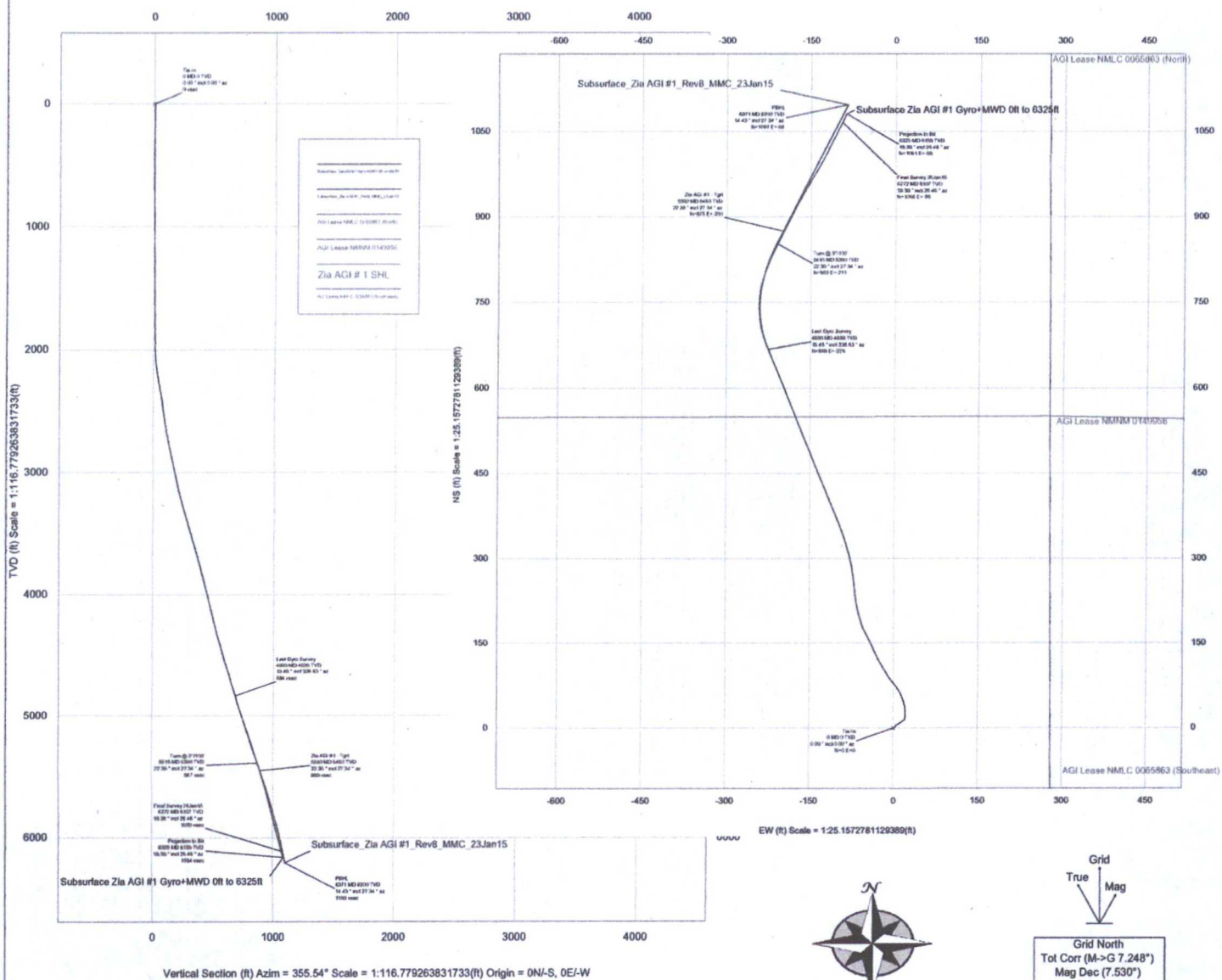
PATHFINDER
A Schlumberger Company

Borehole:	Well:	Field:	Structure:
Original Borehole	Zia AGI #1	NM Lea County (NAD 83)	PD 107

Gravity & Magnetic Parameters				Surface Location				Wellbore Data			
Model:	HDGM 2014	Dip:	80.45°	Date:	03-Jan-2015	Lat:	N 32 36 40.25	North:	59880.5015	Grid Conv:	8.2817°
MagDec:	7.53°	FB:	48843.384mT	Gravity FB:	988.566mg (9.8865 Based)	Lon:	W 103 48 40.82	East:	702076.5015	Scale Fact:	8.88993865
										Plot:	Gyro-MWD DR to 6325R

Critical Points

Comments	Survey MD(ft)	Inclination(deg)	Azimuth(deg)	TVD(ft)	Sub-Sea TVD	VS(ft)	NS(ft)	EW(ft)	Latitude(deg)	Longitude(deg)	Easting(ftUS)	Northing(ftUS)	Closure(ft)	Closure Azimuth(deg)	DLS	Tool
Tie-In	4930.00	18.45	336.63	4838.05	1266.05	683.49	667.96	-225.83	N 32 38 46.873	W 103 48 42.626	701850.68	599268.42	705.11	341.32	0.35	102.31
Turn @ 3°/100'	5514.52	22.35	27.34	5389.90	1817.90	868.89	853.05	-211.35	N 32 38 48.703	W 103 48 42.446	701865.16	599453.49	878.84	346.08	3.00	0.00
Zia AGI #1 - Tgt	5579.50	22.35	27.34	5450.00	1878.00	887.90	875.00	-200.00	N 32 38 48.920	W 103 48 42.312	701876.51	599475.44	897.57	347.12	0.00	-180.00
PBHL	6370.50	14.43	27.34	6200.00	2628.00	1099.84	1096.51	-85.46	N 32 38 51.106	W 103 48 40.959	701991.04	599696.94	1099.84	355.54	1.00	



Target Description		Shape	Dimension	Latitude	Longitude	North	East	TVD	VS(ft)	NS(ft)	EW(ft)
Zia AGI #1 SHL		Point	N/A	N 32 36 40.25	W 103 48 40.82	59880.50	702076.50	0.00	0.00	0.00	0.00
AGI Lease NMLC 0055863 (North)		Polyline	N/A	N 32 47 39.87	W 105 48 36.84	655906.93	87486.48	3072.00	104900.12	67910.06	-614628.94
AGI Lease NMLC 0149055		Polyline	N/A	N 32 47 39.87	W 105 48 36.84	655906.93	87486.48	3072.00	104900.12	67910.06	-614628.94
AGI Lease NMLC 0055863 (South)		Polyline	N/A	N 32 47 39.87	W 105 48 36.84	655906.93	87486.48	3072.00	104900.12	67910.06	-614628.94

CONTROLLED	
Drawn by	Subsurface Zia AGI #1 Gyro-MWD DR to 6325R
Reviewed by	
Drawn by	4/3
Date	20-Jan-2015
1. Originator	Geoscientist
2. QA/QC Admin	Geoscientist
3. QA/QC Manager	Geoscientist
4. QA/QC	Geoscientist
5. QA/QC	Geoscientist
6. QA/QC	Geoscientist
7. QA/QC	Geoscientist
8. QA/QC	Geoscientist
9. QA/QC	Geoscientist
10. QA/QC	Geoscientist

Subsurface Zia AGI #1 Gyro+MWD 0ft to 6325ft Survey Geodetic Report

(Non-Def Survey)

Report Date:	January 26, 2015 - 09:56 AM	Survey / DLS Computation:	Minimum Curvature / Lubinski
Client:	Zia	Vertical Section Azimuth:	355.543 ° (Grid North)
Field:	NM Lea County (NAD 83)	Vertical Section Origin:	0.000 ft, 0.000 ft
Structure / Slot:	Subsurface Zia AGI #1 / AGI # 1	TVD Reference Datum:	RKB
Well:	Subsurface Zia AGI #1	TVD Reference Elevation:	3572.000 ft above MSL
Borehole:	Original Borehole	Seabed / Ground Elevation:	3547.000 ft above MSL
UWI / API#:	Unknown / Unknown	Magnetic Declination:	7.530 °
Survey Name:	Subsurface Zia AGI #1 Gyro+MWD 0ft to 6325ft	Total Gravity Field Strength:	998.5064mgm (9.80665 Based)
Survey Date:	January 03, 2015	Gravity Model:	GARM
Tort / AHD / DDI / ERD Ratio:	67.070 ° / 1163.714 ft / 4.911 / 0.192	Total Magnetic Field Strength:	48645.384 nT
Coordinate Reference System:	NAD83 New Mexico State Plane, Eastern Zone, US Feet	Magnetic Dip Angle:	60.656 °
Location Lat / Long:	N 32° 38' 40.25280", W 103° 48' 40.02301"	Declination Date:	January 03, 2015
Location Grid N/E Y/X:	N 598600.500 IUS, E 702076.500 IUS	Magnetic Declination Model:	HDGM 2014
CRS Grid Convergence Angle:	0.2817 °	North Reference:	Grid North
Grid Scale Factor:	0.99993868	Grid Convergence Used:	0.2817 °
Version / Patch:	2.7.1043.0	Total Corr Mag North→Grid North:	7.2479 °

Local Coord Referenced To: Structure Reference Point

Comments	MD (ft)	Incl (°)	Azim Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS (°/100ft)	Northing (ft)	Easting (ft)	Latitude (N/S ° ' '')	Longitude (E/W ° ' '')
Tie-In	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	598600.50	702076.50	N 32 38 40.25	W 103 48 40.02
	100.00	0.38	166.92	100.00	-0.33	-0.32	0.08	0.38	598600.18	702076.58	N 32 38 40.25	W 103 48 40.02
	200.00	0.40	159.10	200.00	-0.99	-0.97	0.27	0.06	598599.53	702076.77	N 32 38 40.24	W 103 48 40.02
	300.00	0.42	163.34	299.99	-1.68	-1.65	0.50	0.04	598598.85	702077.00	N 32 38 40.24	W 103 48 40.02
	400.00	0.20	157.69	399.99	-2.21	-2.16	0.68	0.22	598598.34	702077.18	N 32 38 40.23	W 103 48 40.02
	500.00	0.08	20.04	499.99	-2.31	-2.26	0.77	0.26	598598.24	702077.27	N 32 38 40.23	W 103 48 40.01
	600.00	0.28	356.70	599.99	-2.00	-1.95	0.78	0.21	598598.55	702077.28	N 32 38 40.23	W 103 48 40.01
	700.00	0.35	1.68	699.99	-1.45	-1.40	0.77	0.08	598599.10	702077.27	N 32 38 40.24	W 103 48 40.01
	800.00	0.44	24.05	799.99	-0.81	-0.74	0.94	0.18	598599.76	702077.44	N 32 38 40.25	W 103 48 40.01
	900.00	0.47	34.96	899.99	-0.16	-0.06	1.33	0.09	598600.44	702077.83	N 32 38 40.25	W 103 48 40.01
	1000.00	0.49	38.92	999.98	0.47	0.61	1.83	0.04	598601.11	702078.33	N 32 38 40.26	W 103 48 40.00
	1100.00	0.51	43.65	1099.98	1.08	1.27	2.41	0.05	598601.77	702078.91	N 32 38 40.27	W 103 48 39.99
	1200.00	0.50	38.66	1199.97	1.69	1.93	2.99	0.05	598602.43	702079.49	N 32 38 40.27	W 103 48 39.99
	1300.00	0.50	33.62	1299.97	2.35	2.63	3.50	0.04	598603.13	702080.00	N 32 38 40.28	W 103 48 39.98
	1400.00	0.56	38.03	1399.97	3.06	3.38	4.04	0.07	598603.88	702080.54	N 32 38 40.29	W 103 48 39.98
	1500.00	0.74	45.46	1499.96	3.83	4.22	4.80	0.20	598604.72	702081.30	N 32 38 40.29	W 103 48 39.97
	1600.00	1.25	54.91	1599.94	4.81	5.30	6.16	0.53	598605.80	702082.66	N 32 38 40.30	W 103 48 39.95
	1700.00	1.83	57.53	1699.91	6.11	6.78	8.40	0.58	598607.28	702084.90	N 32 38 40.32	W 103 48 39.92
	1800.00	2.18	59.82	1799.85	7.69	8.60	11.39	0.36	598609.10	702087.89	N 32 38 40.34	W 103 48 39.89
	1900.00	2.31	59.21	1899.77	9.41	10.59	14.76	0.13	598611.08	702091.26	N 32 38 40.36	W 103 48 39.85
	2000.00	2.65	44.97	1999.68	11.80	13.25	18.13	0.70	598613.75	702094.63	N 32 38 40.38	W 103 48 39.81
	2100.00	5.49	6.04	2099.43	18.01	19.65	20.27	3.81	598620.15	702096.77	N 32 38 40.45	W 103 48 39.78
	2200.00	9.20	355.77	2198.60	30.72	32.38	20.18	3.92	598632.88	702096.68	N 32 38 40.57	W 103 48 39.79
	2300.00	11.82	340.10	2296.93	48.59	49.99	16.10	3.85	598650.49	702092.80	N 32 38 40.75	W 103 48 39.83
	2400.00	10.12	327.06	2395.11	66.19	67.00	7.84	3.00	598667.49	702084.34	N 32 38 40.92	W 103 48 39.93
	2500.00	9.09	321.64	2493.71	80.47	80.57	-1.84	1.37	598681.06	702074.66	N 32 38 41.05	W 103 48 40.04
	2600.00	10.29	324.58	2592.29	94.68	94.04	-11.92	1.30	598694.53	702064.58	N 32 38 41.18	W 103 48 40.16
	2700.00	12.26	331.39	2690.36	112.03	110.64	-22.18	2.37	598711.13	702054.32	N 32 38 41.35	W 103 48 40.28
	2800.00	12.82	334.56	2787.97	132.08	129.98	-32.03	0.89	598730.47	702044.47	N 32 38 41.54	W 103 48 40.39
	2900.00	12.70	334.53	2885.50	152.70	149.92	-41.53	0.12	598750.41	702034.98	N 32 38 41.74	W 103 48 40.50
	3000.00	12.55	334.23	2983.08	173.08	169.63	-50.98	0.16	598770.12	702025.53	N 32 38 41.93	W 103 48 40.61
	3100.00	12.52	341.29	3080.71	193.71	189.68	-59.18	1.53	598790.17	702017.33	N 32 38 42.13	W 103 48 40.70
	3200.00	14.08	347.49	3178.02	216.26	211.83	-65.29	2.11	598812.31	702011.21	N 32 38 42.35	W 103 48 40.77
	3300.00	16.43	353.63	3274.50	242.44	237.76	-69.49	2.85	598838.25	702007.01	N 32 38 42.61	W 103 48 40.82
	3400.00	16.72	353.21	3370.35	270.95	266.10	-72.76	0.31	598866.58	702003.74	N 32 38 42.89	W 103 48 40.86
	3500.00	16.98	347.74	3466.06	299.79	294.66	-77.57	1.61	598895.14	701998.94	N 32 38 43.17	W 103 48 40.91
	3600.00	17.42	343.25	3561.59	328.89	323.26	-84.98	1.40	598923.74	701991.52	N 32 38 43.46	W 103 48 41.00
	3700.00	16.91	339.42	3657.14	357.48	351.21	-94.41	1.24	598951.69	701982.10	N 32 38 43.73	W 103 48 41.11
	3800.00	15.28	336.48	3753.22	383.91	376.91	-104.78	1.82	598977.39	701971.73	N 32 38 43.99	W 103 48 41.23
	3900.00	15.27	337.56	3849.69	408.89	401.16	-115.06	0.28	599001.64	701961.44	N 32 38 44.23	W 103 48 41.35
	4000.00	15.11	337.53	3946.19	433.81	425.38	-125.07	0.16	599025.85	701951.44	N 32 38 44.47	W 103 48 41.46
	4100.00	15.16	337.23	4042.72	458.62	449.48	-135.11	0.09	599049.95	701941.39	N 32 38 44.71	W 103 48 41.58
	4200.00	14.80	337.67	4235.93	507.76	497.22	-154.94	0.19	599079.69	701921.57	N 32 38 45.18	W 103 48 41.81
	4300.00	15.46	337.75	4332.46	532.61	521.37	-164.84	0.66	599121.84	701911.67	N 32 38 45.42	W 103 48 41.92
	4400.00	16.51	337.83	4428.59	558.83	546.87	-175.25	1.05	599147.33	701901.26	N 32 38 45.67	W 103 48 42.04
	4500.00											
	4600.00	17.32	337.80	4524.26	586.55	573.81	-186.24	0.81	599174.27	701890.28	N 32 38 45.94	W 103 48 42.17
	4700.00	17.92	337.51	4619.57	615.35	601.81	-197.75	0.61	599202.27	701878.77	N 32 38 46.22	W 103 48 42.30
	4800.00	18.22	336.93	4714.64	644.80	630.40	-209.76	0.35	599230.86	701866.76	N 32 38 46.50	W 103 48 42.44
	4900.00	18.36	336.80	4809.59	674.53	659.26	-222.09	0.15	599259.72	701854.43	N 32 38 46.79	W 103 48 42.58
Last Gyro Survey	4930.00	18.45	336.63	4838.05	683.49	667.96	-225.83	0.35	599268.42	701850.68	N 32 38 46.87	W 103 48 42.63
	5030.00	17.90	343.92	4933.08	713.52	697.26	-236.37	2.34	599297.71	701840.15	N 32 38 47.16	W 103 48 42.75
	5123.00	19.62	354.67	5021.16	743.14	726.55	-241.78	4.14	599327.00	701834.74	N 32 38 47.45	W 103 48 42.81
	5216.00	19.71	5.07	5108.76	774.23	757.73	-241.84	3.76	599358.18	701834.67	N 32 38 47.76	W 103 48 42.81
	5309.00	19.49	15.62	5196.40	804.28	788.30	-236.28	3.81	599388.75	701840.24	N 32 38 48.06	W 103 48 42.74
	5401.00	20.33	23.73	5282.92	832.78	817.72	-225.71	3.14	599418.16	701850.80	N 32 38 48.35	W 103 48 42.62
	5493.00	21.03	26.15	5368.99	861.08	847.16	-212.00	1.20	599447.61	701864.51	N 32 38 48.65	W 103 48 42.45
	5586.00	20.19	26.63	5456.04	889.18	876.49	-197.46	0.92	599476.93	701879.06	N 32 38 48.93	W 103 48 42.28
	5678.00	18.91	27.47	5542.73	915.43	903.91	-183.46	1.42	599504.35	701893.05	N 32 38 49.21	W 103 48 42.12
	5770.00	18.52	28.97	5629.87	940.28	929.92	-169.51	0.67	599530.36	701907.00	N 32 38 49.46	W 103 48 41.95
	5863.00	17.50	30.25	5718.31	964.10	954.92	-155.31	1.18	599555.36	701921.20	N 32 38 49.71	W 103 48 41.78
	5955.00	16.88	31.17	5806.20	986.33	978.30	-141.43	0.74	599578.74	701935.08	N 32 38 49.94	W 103 48 41.62
	6047.00	17.90	28.57	5894.00	1009.04	1002.15	-127.75	1.39	599602.58	701948.76	N 32 38 50.17	W 103 48 41.46

Comments	MD (ft)	Incl (°)	Azlm Grid (°)	TVD (ft)	VSEC (ft)	NS (ft)	EW (ft)	DLS ("/100ft)	Northing (ftUS)	Easting (ftUS)	Latitude (N/S ° ° °)	Longitude (E/W ° ° °)
	6140.00	18.68	26.37	5982.30	1033.82	1028.05	-114.30	1.13	599628.48	701962.21	N 32 38 50.43	W 103 48 41.30
Final Survey 26Jan15	6232.00	18.52	26.77	6069.49	1058.98	1054.30	-101.17	0.23	599654.73	701975.34	N 32 38 50.69	W 103 48 41.15
	6272.00	18.38	26.46	6107.43	1069.82	1065.62	-95.50	0.43	599666.05	701981.01	N 32 38 50.80	W 103 48 41.08
Projection to Bit	6325.00	18.38	26.46	6157.73	1084.16	1080.58	-88.05	0.00	599681.01	701988.45	N 32 38 50.95	W 103 48 40.99

Survey Type: Non-Def Survey

Survey Error Model: ISCWSA Rev 0 *** 3-D 95.000% Confidence 2.7955 sigma

Survey Program:

Description	Part	MD From (ft)	MD To (ft)	EOU Freq (ft)	Hole Size (in)	Casing Diameter (in)	Survey Tool Type	Borehole / Survey
	1	0.000	25.000	Accl Sins	30.000	30.000	SLB_NSG+MSHOT-Depth Only	Original Borehole / Subsurface Zia AGI #1 Gyro+MWD 0ft to 6325ft
	1	25.000	4930.000	Accl Sins	30.000	30.000	SLB_NSG+MSHOT	Original Borehole / Subsurface Zia AGI #1 Gyro+MWD 0ft to 6325ft
	1	4930.000	6272.000	Accl Sins	30.000	30.000	SLB_MWD-STD	Original Borehole / Subsurface Zia AGI #1 Gyro+MWD 0ft to 6325ft
	1	6272.000	6325.000	Accl Sins	30.000	30.000	SLB_BLIND+TREND	Original Borehole / Subsurface Zia AGI #1 Gyro+MWD 0ft to 6325ft