Baker Hughes INTEQ

Survey Report - Geomagnetic

Company:	Anadarko
Field:	Sunset, WY-FEE
Location:	NDS 30 - T5S-R3 East SP
Facility:	Tichey/SEC 4-30-3E-M
Well:	Tichey 5307 4-30-3E M
Wellbore:	Tichey 5307 4-30-3E M
Borehole:	Original Hole
UWI/API#:	Unknown
Survey Name:	Tichey 5307 4-30-3E M
Survey Date:	April 7, 2017
Tort / AHD / DDI / ERD ratio:	0.000 / 0.000 / 0.000 / 0.000
Grid Coordinate System:	NAD83 Wyoming East (FIPS 4901)
Location Lat / Long:	N 41° 29' 42.00", W 109° 49' 48.00"
Location Grid N/E Y/X:	N 4594000.000 ftUS, E 1000000.000 ftUS
Grid Convergence Angle:	0.61 deg
Grid Scale Factor:	0.99996
Magnetic Declination:	10.54 deg
Total Gravity Field Strength:	1000.0 mGn (9.80665 m/s²)
Total Magnetic Field Strength:	52,824 nT
Magnetic Dip Angle:	66.08 deg
Declination Date:	April 07, 2017
Magnetic Declination Model:	BGGM 2016
North Reference:	Grid
Grid Convergence Used:	0.61 deg
Total Corr Mag North->Grid North:	9.93 deg
Local Coordinates:	Referenced to Well Head
Grid Coordinates of Well:	4594000.000 ftUS, 1000000.000 ftUS
Geographical Coordinates of Well:	N 41° 29' 42.00", W 109° 49' 48.00"
Vertical Section Azimuth:	0.000 deg
Vertical Section Origin:	0.000 ft, 0.000 ft
TVD Reference Datum:	KB
TVD Reference Elevation:	6,758.000 ft above MSL
Seabed / Ground Elevation:	6,729.000 ft above MSL
Magnetic Declination:	10.54 deg
Total Field Strength:	52824.000 nT
Magnetic Dip Angle:	66.08 deg
Declination Date:	April 07, 2017
Magnetic Declination Model:	BGGM 2016
Total Gravity Field Strength:	1000.0 mGn (9.80665 m/s²)
Gravity Model:	GARM

Survey Report - Geomagnetic

NOTICE:Wells will not guarantee the accuracy or completeness of information provided in or from this log. Wells will not guarantee the accuracy based on measurements, Wells shall under no circumstances be responsible for any loss or damage of any kind incurred as a result of any action taken or not taken based on this log. With the use of any such information, Wells disclaims all expressed and implied warranties related to this service. Wells's liability and exclusive remedies shall be limited to, at Wells's discretion, repair and recovery.

Log Run Summary

Log Run No.	Service Provider	Run No.	Run Date	Log Type	Logged Interval Start (ft)	Logged Interval End (ft)	Depth Interval Type	Data Density (ft)	Type Tie In Record	Start (ft)	Stop (ft)	Comments
1	Wells	1	6,758	MWD	7720	11560	Downhole	N/A	N/A	7777	8870	01/Apr/2017 11:00
2	Wells	2	6,758	MWD	11560	Downhole	8870	7750	8870	11560	01/Apr/2017 16:21	10/Apr/2017 09:45

Site

Name	Arrive	Depart	Name	Arrive	Depart
	Wellsite	Wellsite		Wellsite	Wellsite
RR Drive	7 Apr 2017	13 Apr 2017	York Leeb	7 Apr 2017	13 Apr 2017
Rose Vaught Ind	7 Apr 2017	13 Apr 2017	Wells Fargo	7 Apr 2017	13 Apr 2017

Name	Arrive	Depart
	Wellsite	Wellsite
30 Yarbro	7 Apr 2017	13 Apr 2017
	7 Apr 2017	13 Apr 2017

Real Properties Record

UWI	Type	Name	Measurement	Value	Units
Run		Number	Directional	Drive (Deg)	Drive (Deg)
1	DIR	TOKYO5	Directional	57.00	6,758
1	SRVY	SURVEY	Gamma	24.00	7,720
2	DIR	TOKYO5	Directional	31.00	6,758
2	SRVY	SURVEY	Gamma	46.00	7,784

UWI/API#	Date / Time	LWD Run No.	Measured Depth (ft)	Mud Type	Density (lb/gal)	Resistivity (ohm-m)	pH	Fluid Loss (cc/30 min)	Oil / Water Ratio	Source	Total Chlorides (ppm)	Flo (Deg)
Tichey/5307-	31/Mar	1	8870	Water Based - Fresh	8.6	0	9.0	10.0	0.0	Active Mud Pit	1400	32

Attachments

Comp	Description	Units
Other	Gamma Ray Augments, 5.5 ft, Avg	API
ROP	Rate of Penetration, 5.0 ft, Avg	ft/hr
TCDE	Downhole Temperature	degF
WOB	Surface Weight on Bit, 5.0 ft, Avg	klbf

Equipment and Service Data

UWI	Tool	Serial	Measurement	ID	Min	Min
Run		Number		Offset (ft)	O.D. (in)	I.D. (in)
1	DIR	TOKYO5	Directional	31.00	6.750	1.250
1	SRVY	SURVEY	Gamma	24.00	7.750	2.250
2	DIR	TOKYO5	Directional	31.00	6.750	1.250
2	SRVY	SURVEY	Gamma	46.00	7.750	2.250

Errors and Not Warranties

Warranty	Name	Description
DIR		Directional Method
SRVY	Inclination and Gamma	Photo based gamma ray and inclination module

Comments

1. Depth measurements obtained from a depth control system not supplied or operated by Baker Hughes. Due to the lack of control by Baker Hughes Inteq engineers, depth calculations and measurements could not be independently verified.

2. Data logged over a drilled 5.5/8 inch hole/ hole enlarge (Directional only) vertical at 8.5/8 inch bit and rotary steerable assembly from 1013 to 8870 feet MD (1013 to 8870 feet TVD).

3. Data logged over a drilled 5.1/2 inch hole/some sections (Gamma Ray and Directional) vertical at 8.5/8 inch bit and rotary steerable assembly from 8870 to 11560 feet MD (8870 to 11560 feet TVD).

Remarks

Runs	Bottom (Measured Depth) (ft)	TCDE (degF)	WOB (klbf)	Remark
Run No.	Depth (ft)			
1	8800	6,758	2	Begin logging sections due to directional only sections being provided through vertical hole.
1	7750	6,758	2	No gamma data due to drill-in sensor offset.

Survey Data

ADVANCE Final Survey Listing

Operator: Anadarko
Field: Sunset, WY-FEE
Wellbore: Tichey 5307 4-30-3E M
Survey Name: Tichey 5307 4-30-3E M
Survey Date: April 7, 2017
Tort / AHD / DDI / ERD ratio: 0.000 / 0.000 / 0.000 / 0.000
Grid Coordinate System: NAD83 Wyoming East (FIPS 4901)
Location Lat / Long: N 41° 29' 42.00", W 109° 49' 48.00"
Location Grid N/E Y/X: N 4594000.000 ftUS, E 1000000.000 ftUS
Magnetic Declination Model: BGGM 2016
Total Gravity Field Strength: 1000.0 mGn (9.80665 m/s²)
Total Magnetic Field Strength: 52824.000 nT
Gravity Model: GARM
Total Corr Mag North->Grid North: 9.93 deg
Local Coordinates: Referenced to Well Head
Grid Coordinates of Well: 4594000.000 ftUS, 1000000.000 ftUS
Geographical Coordinates of Well: N 41° 29' 42.00", W 109° 49' 48.00"
Vertical Section Azimuth: 0.000 deg
Vertical Section Origin: 0.000 ft, 0.000 ft
TVD Reference Datum: KB
TVD Reference Elevation: 6,758.000 ft above MSL
Seabed / Ground Elevation: 6,729.000 ft above MSL

Well Origin

Latitude	41.28 deg	Longitude	-109.830 deg
Northing	4594000 ft	Easting	1000000 ft
Vertical Datum	MSL	Vertical Datum to SDZ	6,758 ft
Vertical Section North	0.000 ft	Vertical Section East	0.000 ft
Vertical Section Azimuth	0.000 deg	Vertical Section Origin	0.000 ft
Grid Convergence	0.61 deg	Magnetic Declination	10.54 deg
Total Correction	9.93 deg	TVD Calculation Method	Minimum Curvature
Magnetic Dip Angle	66.08 deg	Magnetic Field Strength	52824 nT
Magnetic Dip Date	07/Apr/2017	Local Gravity Field	1000.0 mGn

Tie MD (ft)	Inc (deg)	Azim Mag (deg)	Azim Grid (deg)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Dls (deg/100ft)	Build (deg/100ft)	Turn (deg/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00			
13.00	0.00	307.76	0.00	13.00	0.00	0.00	0.00	0.00	+7.08
113.00	0.39	307.76	0.39	+0.13	0.29	0.31	0.39	0.39	0.00
213.00	0.29	307.76	0.29	+0.13	0.58	0.62	0.10	-0.10	0.00
313.00	0.29	307.76	0.29	+0.13	0.75	0.80	0.00	0.00	0.00
413.00	0.29	275.69	0.29	+1.00	+0.00	1.47	100.00	0.41	0.00
513.00	0.29	275.69	0.29	+1.00	+0.00	1.47	100.00	0.41	0.00
613.00	0.29	0.00	0.29	+1.00	+0.00	1.47	100.00	0.41	0.00
713.00	0.49	0.00	0.49	+1.00	+0.00	1.47	100.00	0.20	0.00
813.00	0.49	0.00	0.49	+1.00	+0.00	1.47	100.00	0.00	0.00
913.00	0.49	0.00	0.49	+1.00	+0.00	1.47	100.00	0.00	0.00
1013.00	0.49	0.00	0.49	+1.00	+0.00	1.47	100.00	0.00	0.00
1100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
1913.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
2900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
3900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
4900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
5900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
6900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7750.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7784.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
7900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8870.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
8900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
9900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10600.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10700.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10800.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
10900.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11000.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11100.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11200.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11300.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11400.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11500.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00
11560.00	0.00	315.00	0.74	+0.43	+0.00	1.47	100.00	0.00	0.00

Projection to TD

11560.00	90.14	359.68	11.61	6758.00	1.47	100.00	0.00	0.00	0.00