Confidentiality Requested:
☑ Yes ☐ No

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1250437

Form ACO-1
August 2013
Form must be Typed
Form must be Signed
All blanks must be Filled

WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # 35053
Name: Tapstone Energy, LLC
Address 1: PO BOX 1608
Address 2:
City: OKLAHOMA CITY State: OK Zip: 73101 + 1608
Contact Person: Monica Aguilar
Phone: (405) 702-5457
CONTRACTOR: License # 34500
Name: Nomac Drilling, LLC
Wellsite Geologist: Tammy Alcorn
Purchaser: Atlas Gas Pipeline

Designate Type of Completion:

☑ New Well ☐ Re-Entry ☐ Workover

☑ Oil ☐ WSW ☐ SWD ☐ SIOW
☐ Gas ☐ D&A ☐ ENHR ☐ SIGW
☐ OG ☐ GSW ☐ Temp. Abd.
☐ CM *(Coal Bed Methane)*
☐ Cathodic ☐ Other *(Core, Expl., etc.)*:

If Workover/Re-entry: Old Well Info as follows:

Operator:
Well Name:
Original Comp. Date: Original Total Depth:

☐ Deepening ☐ Re-perf. ☐ Conv. to ENHR ☐ Conv. to SWD
☐ Plug Back ☐ Conv. to GSW ☐ Conv. to Producer

☐ Commingled Permit #:
☐ Dual Completion Permit #:
☐ SWD Permit #:
☐ ENHR Permit #:
☐ GSW Permit #:

2/27/2015	3/13/2015	4/1/2015
Spud Date or Recompletion Date	Date Reached TD	Completion Date or Recompletion Date

API No. 15 - 15-077-22129-01-00
Spot Description:
NW NE NE NE Sec. 7 Twp. 35 S. R. 8 ☐ East ☑ West
200 Feet from ☑ North / ☐ South Line of Section
460 Feet from ☑ East / ☐ West Line of Section

Footages Calculated from Nearest Outside Section Corner:
☑ NE ☐ NW ☐ SE ☐ SW

GPS Location: Lat: *(e.g. xx.xxxxx)* , Long: *(e.g. -xxx.xxxxx)*
Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84
County: Harper
Lease Name: Duke 18-35-8 Well #: 1H
Field Name:
Producing Formation: Mississippi Lime
Elevation: Ground: 1230 Kelly Bushing: 1252
Total Vertical Depth: 4873 Plug Back Total Depth: 11924
Amount of Surface Pipe Set and Cemented at: 822 Feet
Multiple Stage Cementing Collar Used? ☐ Yes ☑ No
If yes, show depth set: Feet
If Alternate II completion, cement circulated from:
feet depth to: w/ sx cmt.

Drilling Fluid Management Plan
(Data must be collected from the Reserve Pit)

Chloride content: ppm Fluid volume: bbls
Dewatering method used:
Location of fluid disposal if hauled offsite:
Operator Name:
Lease Name: License #:
Quarter Sec. Twp. S. R. ☐ East ☐ West
County: Permit #:

AFFIDAVIT

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

KCC Office Use ONLY

☑ **Confidentiality Requested**
Date: 05/15/2015
☑ **Confidential Release Date:** 05/14/2017
☑ **Wireline Log Received**
☐ **Geologist Report Received**
☐ **UIC Distribution**
ALT ☑ **I** ☐ **II** ☐ **III** **Approved by:** NAOMI JAMES **Date:** 05/21/2015

[redacted]

1250437

Operator Name: Tapstone Energy, LLC Lease Name: Duke 18-35-8 Well #: 1H

Sec. 7 Twp. 35 S. R. 8 ☐ East ☑ West County: Harper

INSTRUCTIONS: Show important tops of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed.

Final Radioactivity Log, Final Logs run to obtain Geophysical Data and Final Electric Logs must be emailed to kcc-well-logs@kcc.ks.gov. Digital electronic log files must be submitted in LAS version 2.0 or newer AND an image file (TIFF or PDF).

Drill Stem Tests Taken ☐ Yes ☑ No
(Attach Additional Sheets)

Samples Sent to Geological Survey ☐ Yes ☑ No

Cores Taken ☐ Yes ☑ No

Electric Log Run ☑ Yes ☐ No

List All E. Logs Run:

MWD/Gamma Ray

☑ Log Formation (Top), Depth and Datum ☐ Sample

Name	Top	Datum
Base Heebner	3550	-2298
Lansing	3850	-2598
Cottage Grove	4145	-2890
Oswego Limestone	4515	-3204
Cherokee Group	4687	-3322
Verdigris Limestone	4764	-3364
Mississippi Lime	5064	-3498

CASING RECORD ☑ New ☐ Used
Report all strings set-conductor, surface, intermediate, production, etc.

Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives
Surface	12.250	9.625	36.0	822	Cl A	490	.125#/sx Ploy-E-Flake, 2% CC
Intermediate	8.750	7.000	26.0	5310	CL A, CL H	230	.4% Halad 9
Liner	6.125	4.500	11.6	11934	None	0	None

ADDITIONAL CEMENTING / SQUEEZE RECORD

Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
☐ Perforate ☐ Protect Casing ☐ Plug Back TD ☐ Plug Off Zone	-			
	-			

Did you perform a hydraulic fracturing treatment on this well? ☑ Yes ☐ No *(If No, skip questions 2 and 3)*

Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? ☑ Yes ☐ No *(If No, skip question 3)*

Was the hydraulic fracturing treatment information submitted to the chemical disclosure registry? ☑ Yes ☐ No *(If No, fill out Page Three of the ACO-1)*

Shots Per Foot	PERFORATION RECORD - Bridge Plugs Set/Type Specify Footage of Each Interval Perforated	Acid, Fracture, Shot, Cement Squeeze Record *(Amount and Kind of Material Used)*	Depth

TUBING RECORD: Size: 2.875 Set At: 5061 Packer At: 5061

Liner Run: ☑ Yes ☐ No

Date of First, Resumed Production, SWD or ENHR. 5/6/2015

Producing Method: ☐ Flowing ☐ Pumping ☑ Gas Lift ☐ Other *(Explain)*

Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity

DISPOSITION OF GAS: ☐ Vented ☑ Sold ☐ Used on Lease *(If vented, Submit ACO-18.)*

METHOD OF COMPLETION: ☑ Open Hole ☐ Perf. ☐ Dually Comp. *(Submit ACO-5)* ☐ Commingled *(Submit ACO-4)* ☐ Other *(Specify)*

PRODUCTION INTERVAL: 5310-11934

Form	ACO1 - Well Completion
Operator	Tapstone Energy, LLC
Well Name	Duke 18-35-8 1H
Doc ID	1250437

Casing

Purpose Of String	Size Hole Drilled	Size Casing Set	Weight	Setting Depth	Type Of Cement	Number of Sacks Used	Type and Percent Additives
Surface	12.250	9.625	36.0	822	Cl A	490	.125#/sx Ploy-E-Flake, 2% CC
Intermediate	8.750	7.000	26.0	5310	CL A, CL H	230	.4% Halad 9
Liner	6.125	4.500	11.6	11934	None	0	None

1.0 Real-Time Job Summary

1.1 Job Event Log

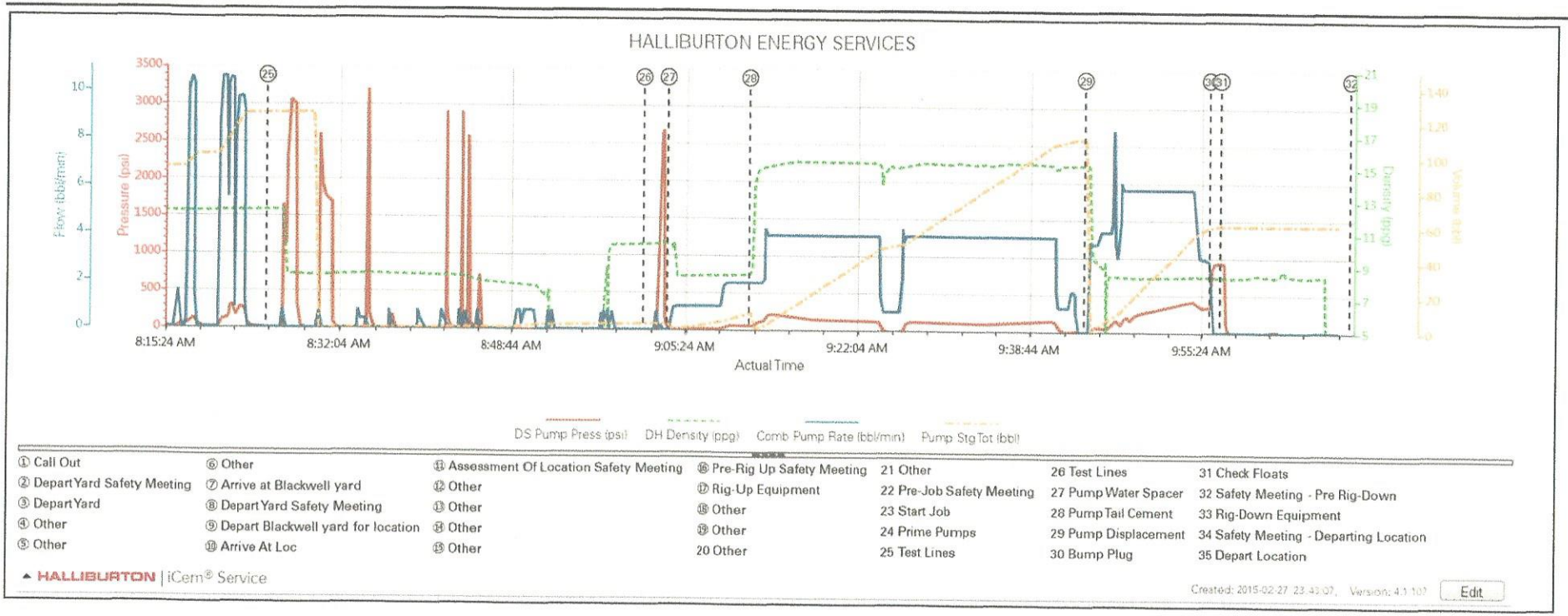
Type	Seq. No.	Activity	Graph Label	Date	Time	Source	DS Pump Press (psi)	DH Density (ppg)	Comb Pump Rate (bbl/min)	Pump Stg Tot (bbl)	Comments
Event	1	Call Out	Call Out	2/27/2015	06:00:00	USER					no on location time yet
Event	2	Depart Yard Safety Meeting	Depart Yard Safety Meeting	2/27/2015	07:45:00	USER					meeting with crew in yard, one hand riding with me & one with Thompson in the pump
Event	3	Depart Yard Safety Meeting	Depart Yard	2/27/2015	08:00:00	USER					head to Blackwell to get bulk trucks
Event	4	Other	Other	2/27/2015	10:00:00	USER					called Blackwell bulk plant to check on trucks, not loaded yet.
Event	5	Other	Other	2/27/2015	11:28:00	USER					pump truck broke down on side of hwy, called mechanics & Kenworth to get it fixed, limped it into Smokey Pokey @ why 51 & I-35
Event	6	Other	Other	2/27/2015	13:15:00	USER					after many phone calls to Kenworth, Cory Niles & ARS we left pump truck there & all of us continued to Blackwell in the pickup..
Event	7	Arrive at Dock	Arrive at Blackwell yard	2/27/2015	14:30:00	USER					arrived in Blackwell, waiting on bulk trucks to be loaded
Event	8	Depart Yard Safety Meeting	Depart Yard Safety Meeting	2/27/2015	16:44:00	USER					bulk trucks are loaded, have a safety meeting with drivers after they have pretrip inspections done on equipment
Event	9	Depart Yard Safety	Depart Blackwell yard for	2/27/2015	17:00:00	USER					set up JM, head to location.

		Meeting	location				O/L time set at 0100
Event	10	Arrive At Loc	Arrive At Loc	2/27/2015	19:00:00	USER	all personal & equipment on location safely
Event	11	Assessment Of Location Safety Meeting	Assessment Of Location Safety Meeting	2/27/2015	19:10:00	USER	rig still drilling, talked with c/m about job figures & water supply. he said they still had a little over 100 ft to drill.
Event	12	Other	Other	2/27/2015	19:45:00	USER	got directions to town from c/m, drove into town to eat diner, rig still drilling.
Event	13	Other	Other	2/27/2015	22:15:00	USER	got back to location, rig pulling drill pipe
Event	14	Other	Other	2/27/2015	22:40:00	USER	hotshot driver showed up with 9.625" swage
Event	15	Other	Other	2/28/2015	01:00:00	USER	rig picking up casing & putting shoe joint & floats together
Event	16	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	2/28/2015	01:40:00	USER	meeting with crew about rigging up in the snow & ice conditions, slow and easy
Event	17	Rig-Up Equipment	Rig-Up Equipment	2/28/2015	02:00:00	USER	rig-up all iron & hoses on ground
Event	18	Other	Other	2/28/2015	02:40:00	USER	rig started pulling casing back out of the hole, talked with c/m-said some theads looked bad. might have to swap out a piece of casing
Event	19	Other	Other	2/28/2015	05:00:00	USER	rig running casing back in the hole
Event	20	Other	Other	2/28/2015	06:22:00	USER	rig hand came to get the head out of the trailer
Event	21	Other	Other	2/28/2015	07:12:00	USER	raise standpipe & rig up floor

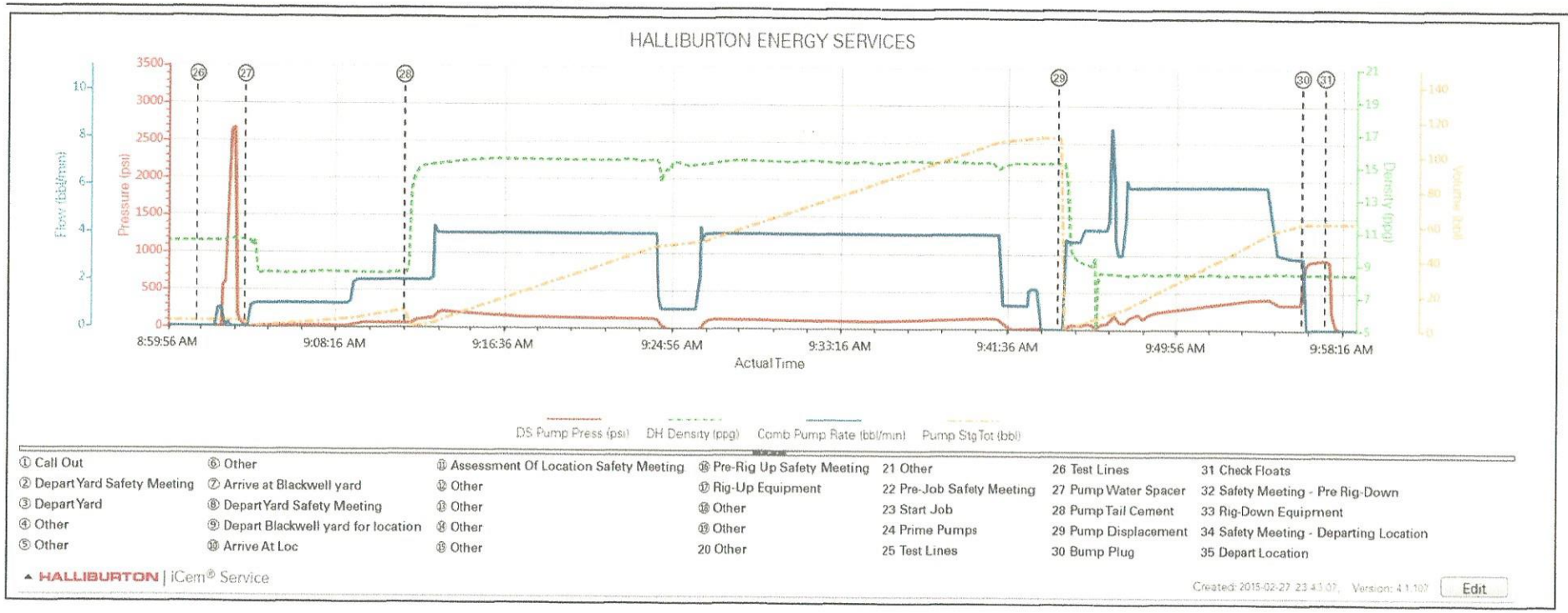
Event	22	Pre-Job Safety Meeting	Pre-Job Safety Meeting	2/28/2015	07:52:04	USER					pre-job safety meeting with all hands on location in dog house
Event	23	Start Job	Start Job	2/28/2015	08:12:41	COM8					
Event	24	Prime Pumps	Prime Pumps	2/28/2015	08:12:52	COM8					waited till last min to prime up due to the weather being 15* & snowing
Event	25	Test Lines	Test Lines	2/28/2015	08:25:25	COM8	3500.00				test lines to 2500 psi
Event	26	Test Lines	Test Lines	2/28/2015	09:01:32	COM8	3500.00				had a ice block in the lines, removed & retested to 2500 psi
Event	27	Pump Spacer 1	Pump Water Spacer	2/28/2015	09:03:53	COM8	65.00	8.33	2.00	10.0	pump 10 bls of water spacer
Event	28	Pump Tail Cement	Pump Tail Cement	2/28/2015	09:11:44	COM8	191.00	15.2	4.00	110.0	pump 110 bls of cement
Event	29	Pump Displacement	Pump Displacement	2/28/2015	09:44:13	COM8	255.00	8.33	6.00	60.0	pump 60 bls of water displacement, got 30 bls of cement back to surface
Event	30	Bump Plug	Bump Plug	2/28/2015	09:56:26	COM8	380.00	8.33	3.00	60.0	bumped on calculated
Event	31	Check Floats	Check Floats	2/28/2015	09:57:30	USER	939.00	8.33	0.00	60.0	floats holding, got 0.5 bls back
Event	32	Safety Meeting - Pre Rig-Down	Safety Meeting - Pre Rig-Down	2/28/2015	10:10:00	USER					meeting with crew about rigging down in ice & snow conditions, take breaks as needed
Event	33	Rig-Down Equipment	Rig-Down Equipment	2/28/2015	10:30:00	USER					rig down all iron & hoses, c/m said take head with us
Event	34	Safety Meeting - Departing Location	Safety Meeting - Departing Location	2/28/2015	11:30:00	USER					meeting with crew & service leader on location about road conditions & SWA
Event	35	Depart Location	Depart Location	2/28/2015	12:00:00	USER					

2.0 Attachments

2.1 TAPSTONE ENERGY, DUKE 18-35-8 Case 1-Custom Results.png

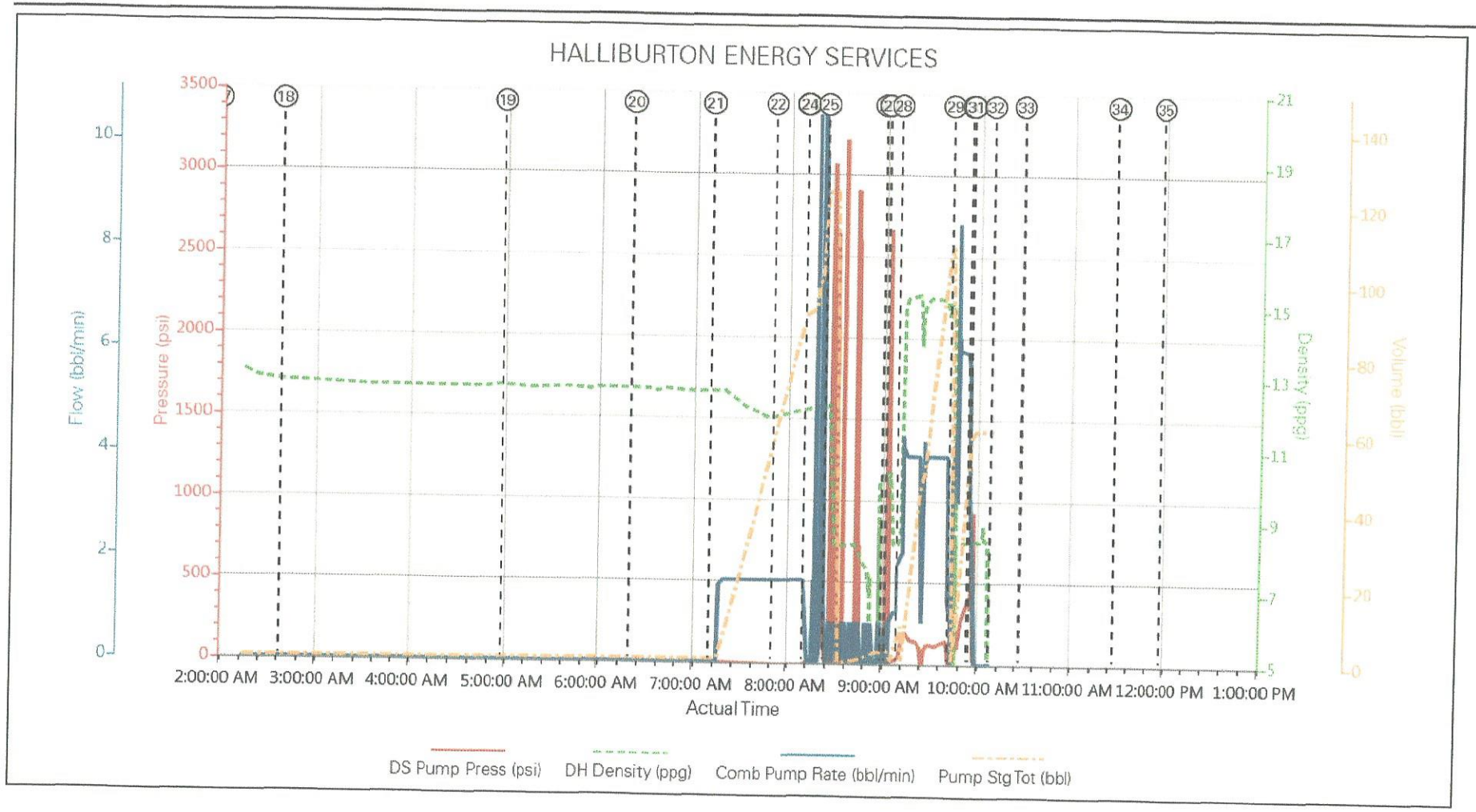


2.2 TAPSTONE ENERGY, DUKE 18-35-8 Case 1-Custom Results (1).png



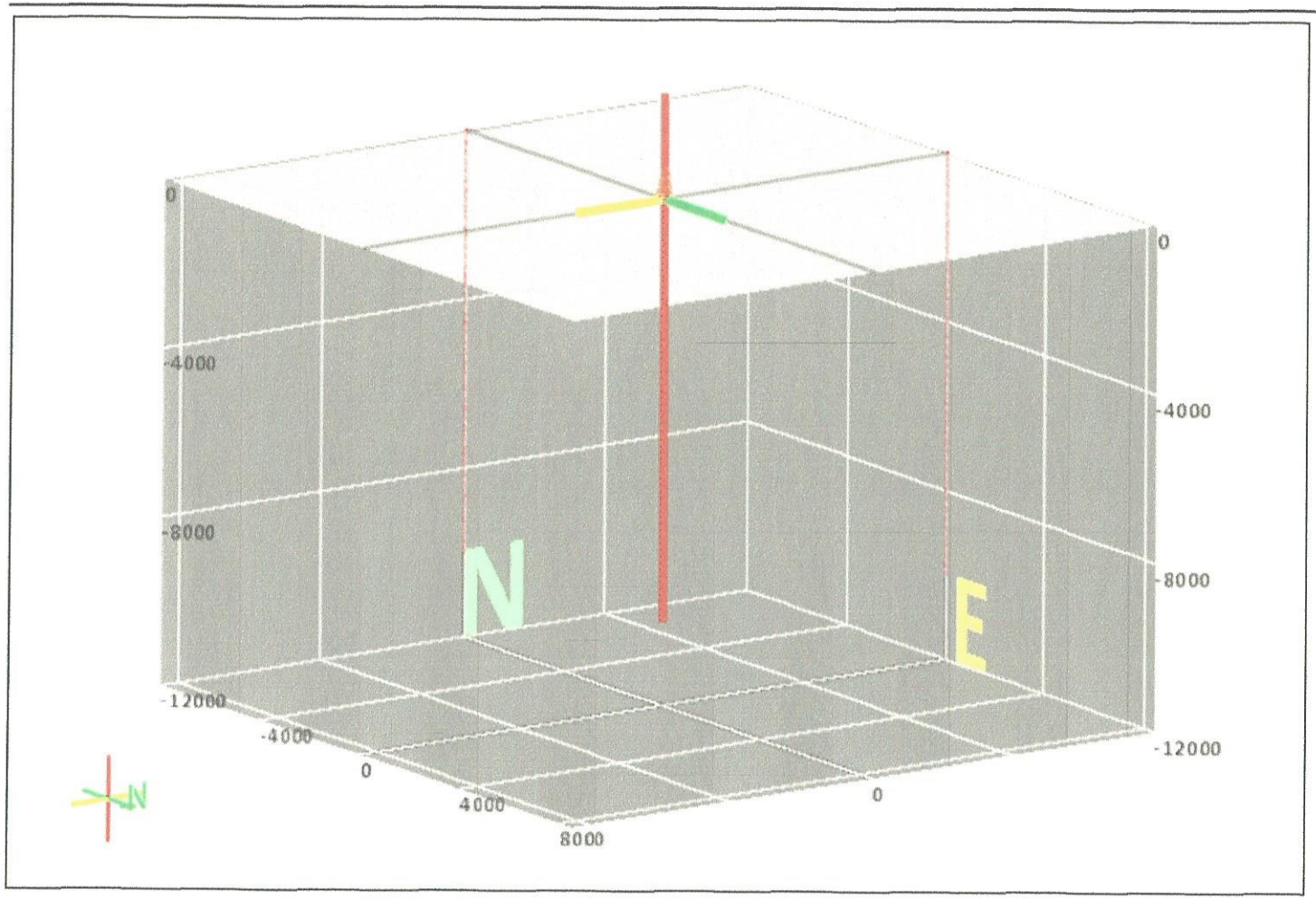
3.0 Custom Graphs

3.1 Custom Graph



4.0 Appendix

4.1 3D Wellbore Schematic



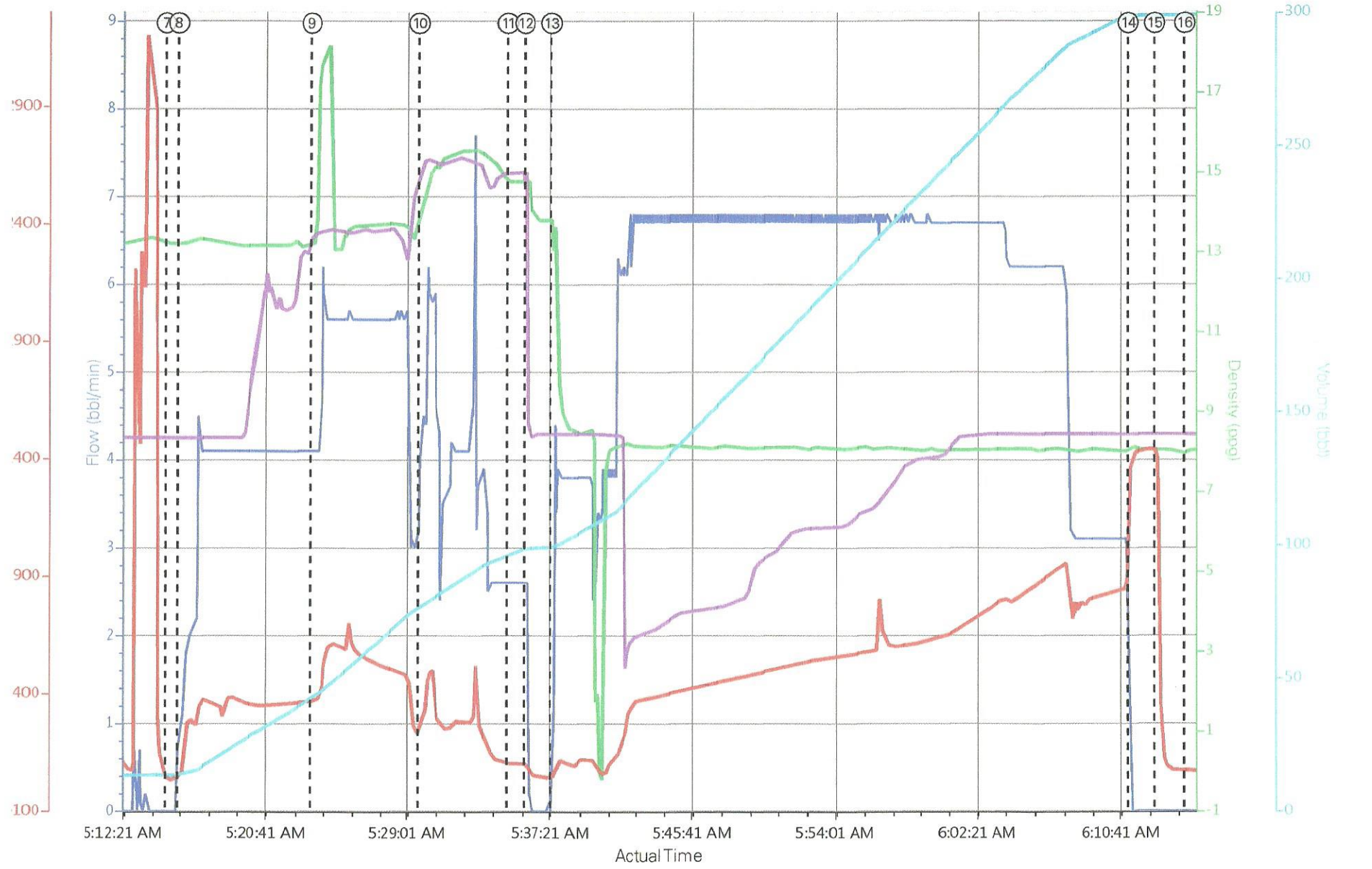
..0 Real-Time Job Summary

.1 Job Event Log

Type	Seq. No.	Activity	Graph Label	Date	Time	Source	Comb Pump Rate (bbl/min)	DH Density (ppg)	PS Pump Press (psi)	Recirc Density (ppg)	Comb Pump Total (bbl)	Comments
Event	1	Arrive At Loc	Arrive At Loc	3/4/2015	15:00:00	USER						requested on loc 3/5 @ 0200 arrived early in case of bad weather
Event	2	Pre-Rig Up Safety Meeting	Pre-Rig Up Safety Meeting	3/5/2015	02:30:00	USER						discussed possible icy slick spots
Event	3	Rig-Up Equipment	Rig-Up Equipment	3/5/2015	02:40:00	USER						
Event	4	Pre-Job Safety Meeting	Pre-Job Safety Meeting	3/5/2015	04:40:00	USER	0.00	3.81	-2.00	0.00	0.0	reviewed jsa discussed high pressure lines and red zone
Event	5	Prime Pumps	Prime Pumps	3/5/2015	04:48:31	COM5	0.00	3.78	-3.00	0.00	0.0	
Event	6	Test Lines	Test Lines	3/5/2015	05:07:33	COM5	0.00	3.89	3.00	8.35	11.6	low 300 psi high 3000 psi good test
Event	7	Drop Bottom Plug	Drop Bottom Plug	3/5/2015	05:15:00	USER	0.00	13.21	31.00	8.34	13.5	plug left head
Event	8	Pump Spacer 1	Pump Spacer 1	3/5/2015	05:15:45	COM5	0.80	13.20	174	8.35	13.7	10 bbls mud flush III @ 4 bpm
Event	9	Pump Lead Cement	Pump Lead Cement	3/5/2015	05:23:27	COM5	4.10	13.22	368.00	13.58	42.9	37.6 bbls scaled @ 13.6 ppg @ 5.5 bpm
Event	10	Pump Tail Cement	Pump Tail Cement	3/5/2015	05:29:51	COM5	4.10	14.01	278.00	15.62	76.4	19 bbls scaled @ 15.6 @ 4.4 bpm
Event	11	Shutdown	Shutdown	3/5/2015	05:35:00	USER	2.60	14.78	102.00	14.97	96.5	
Event	12	Drop Top Plug	Drop Top Plug	3/5/2015	05:36:00	USER	2.30	14.77	100.00	8.69	99.0	plug left head
Event	13	Pump Displacement	Pump Displacement	3/5/2015	05:37:35	COM5	0.80	13.07	860	8.44	99.2	200 bbls fresh water @ 7 bpm with 170 gone slowed rate to 3 bpm
Event	14	Bump Plug	Bump Plug	3/5/2015	06:11:18	COM5	0.00	8.03	1430	8.43	299.0	bumped @ 860 psi went up tp 1430 psi

Event	15	Check Floats	Check Floats	3/5/2015	06:12:50	USER	0.00	8.09	1361.00	8.43	299.0	floats held 1 bbl back
Event	16	End Job	End Job	3/5/2015	06:14:35	COM5	0.00	7.99	69.00	8.43	299.0	
Event	17	Pre-Rig Down Safety Meeting	Pre-Rig Down Safety Meeting	3/5/2015	06:24:00	USER	0.00	-0.13	66.00	8.42	299.0	discussed icy areas and pinch points
Event	18	Rig-Down Equipment	Rig-Down Equipment	3/5/2015	06:30:00	USER	0.00	-0.58	64.00	8.42	299.0	
Event	19	Safety Meeting - Departing Location	Safety Meeting - Departing Location	3/5/2015	07:20:00	USER						make sure to use journey managment
Event	20	Depart Location	Depart Location	3/5/2015	07:30:00	USER						

TAPSTONE DUKE18-35-8 INTERMEDIATE



At Loc	③ Rig-Up Equipment	⑤ Prime Pumps	⑦ Drop Bottom Plug	⑨ Pump Lead Cement	⑪ Shutdown	⑬ Pump Displacement	⑮ Check Floats
; Up Safety Meeting	④ Pre-Job Safety Meeting	⑥ Test Lines	⑧ Pump Spacer 1	⑩ Pump Tail Cement	⑫ Drop Top Plug	⑭ Bump Plug	⑯ End Job

HALLIBURTON

Cementing Job Summary

The Road to Excellence Starts with Safety

Sold To #: 372073	**Ship To #:** 3645774	**Quote #:** 0022007149	**Sales Order #:** 0902182626
Customer: TAPSTONE ENERGY LLC		**Customer Rep:**	
Well Name: DUKE 18-35-8	**Well #:** 1H		**API/UWI #:** 15-077-22129-01
Field: UNDESIGNATED	**City (SAP):** WALDRON	**County/Parish:** HARPER	**State:** KANSAS
Legal Description: NW NE NE NE-7-35S-8W-200FNL-460FEL			
Contractor: NOMAC		**Rig/Platform Name/Num:** NOMAC 07	
Job BOM: 7522			
Well Type: HORIZONTAL OIL			
Sales Person: HALAMERICA\HX25353		**Srvc Supervisor:** Ronald Youngblood	

Job

Formation Name					
Formation Depth (MD)	**Top**		**Bottom**		
Form Type			**BHST**		
Job depth MD	5312ft		**Job Depth TVD**	4795	
Water Depth			**Wk Ht Above Floor**	4	
Perforation Depth (MD)	**From**		**To**		

Well Data

Description	New / Used	Size in	ID in	Weight lbm/ft	Thread	Grade	Top MD ft	Bottom MD ft	Top TVD ft	Bottom TVD ft
Casing	3	9.625	8.921	36	LTC	J-55	0	800		
Casing	3	7	6.276	26	LTC	P-110	0	5311	0	4795
Open Hole Section			8.75				800	5312	800	4795

Tools and Accessories

Type	Size in	Qty	Make	Depth ft	Type	Size in	Qty	Make
Guide Shoe	7			5272	**Top Plug**	7	1	HES
Float Shoe	7	1	HES	5311	**Bottom Plug**	7	1	HES
Float Collar	7	1	HES	5227	**SSR plug set**	7		HES
Insert Float	7				**Plug Container**	7		HES
Stage Tool	7				**Centralizers**	7		HES

Miscellaneous Materials

Gelling Agt		**Conc**		**Surfactant**		**Conc**		**Acid Type**		**Qty**		**Conc**	
Treatment Fld		**Conc**		**Inhibitor**		**Conc**		**Sand Type**		**Size**		**Qty**	

Fluid Data

Stage/Plug #: 1

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
1	Mud Flush III (Liquid)	Mud Flush III	10	bbl	8.33			5	
41 gal/bbl		FRESH WATER							

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
2	Lead Cement	ECONOCEM (TM) SYSTEM	140	sack	13.6	1.506		5	7.3
0.40 %		HALAD(R)-9, 50 LB (100001617)							

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
3	Tail Cement	HALCEM (TM) SYSTEM	90	sack	15.6	1.19		5	5.36
0.40 %		HALAD(R)-9, 50 LB (100001617)							

Fluid #	Stage Type	Fluid Name	Qty	Qty UoM	Mixing Density lbm/gal	Yield ft3/sack	Mix Fluid Gal	Rate bbl/min	Total Mix Fluid Gal
4	Displacement	Displacement	200.4	bbl	8.33			5	

Cement Left In Pipe	**Amount**	84 ft		**Reason**	Shoe Joint
Mix Water:	pH 7	**Mix Water Chloride:**	<1000	**Mix Water Temperature:**	44
Cement Temperature:	44	**Plug Displaced by:**	Fresh Water	**Disp. Temperature:**	
Plug Bumped?	Yes	**Bump Pressure:**	740	**Floats Held?**	Yes
Cement Returns:	0	**Returns Density:**		**Returns Temperature:**	

Comment Top of Tail 4721 ft - Top of Lead 3318 ft Top of Mud Flush 2945 ft

HALLIBURTON

Summary Report

Crew: _____

Job Start Date: 3/4/2015

Sales Order #: 0902182626
WO #: 0902182626
PO/AFE #: NA

Customer:	TAPSTONE ENERGY LLC	**Field:**	UNDESIGNATED	**Job Type:**	CMT INTERMEDIATE CASING BOM
UWI / API Number:	15-077-22129-01	**County/Parish:**	HARPER	**Service Supervisor:**	Ronald Youngblood
Well Name:	DUKE 18-35-8	**State:**	KANSAS		
Well No:	1H	**Latitude:**	37.020863		
		Longitude:	-98.220192	**Cust Rep Name:**	
		Sect / Twn / Rng:	7/35/8	**Cust Rep Phone #:**	

Remarks:

The Information Stated Herein Is Correct	Customer Representative Signature	Date
	Customer Representative Printed Name	

TOPOGRAPHIC LAND SURVEYORS

6709 NORTH CLASSEN BLVD., OKLA. CITY, OKLA. 73116 * LOCAL (405) 843-4847 * OUT OF STATE (800) 654-3219
Certificate of Authorization No. LS-99, Exp. Dec. 31, 2015

HARPER County, Kansas

200'FNL – 460'FEL Section 7 Township 35S Range 8W P.M.

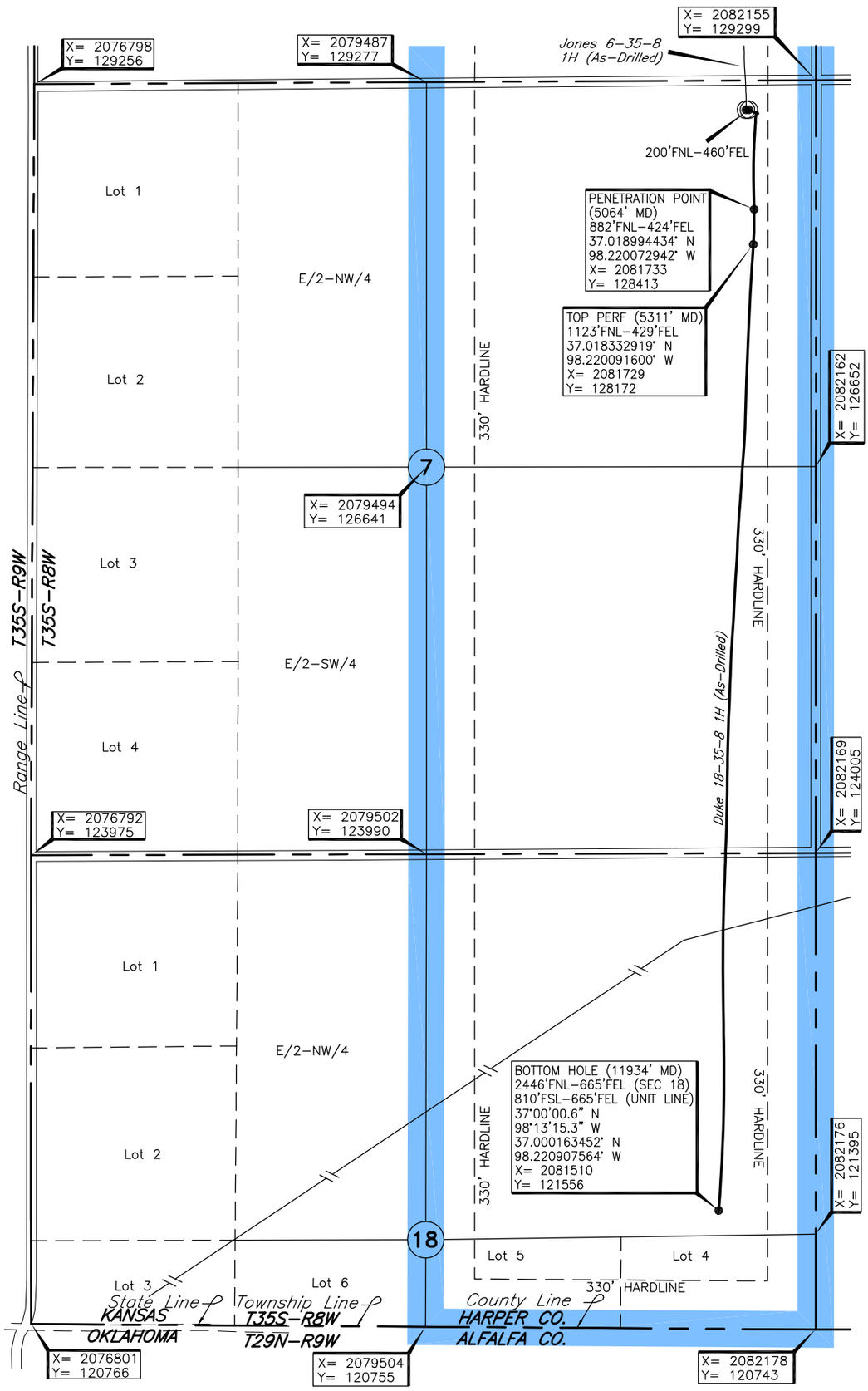
TOPOGRAPHIC N EST. 1958

GRID
NAD-27
KS SOUTH
US Feet

Note:
3.280833 Ft.=1 Meter

Scale:
1"= 1000'

0' 500' 1000'



Operator: TAPSTONE ENERGY

Lease Name: DUKE 18-35-8 Well No.: 1H

Topography & Vegetation Loc. fell in brushy pasture Reference Stakes or Alternate Location

Good Drill Site? Yes Stakes Set None

Best Accessibility to Location From North off county road

Distance & Direction from Hwy Jct or Town From Waldron, KS, go ±1.0 mi. North, then ±2.0 mi. West to the NE Cor. of Sec. 7-T35S-R8W

ELEVATION: 1230' Gr. at Stake

A boundary survey of the said section(s) shown hereon was not performed per the request of the operator shown hereon.

This information was gathered with a GPS receiver with ±1 foot Horiz./Vert. accuracy.

DATUM: NAD-27
LAT: 37°01'15.1"N
LONG: 98°13'12.7"W
LAT: 37.020867017° N
LONG: 98.220196218° W
STATE PLANE COORDINATES: (US Feet)
ZONE: KS SOUTH
X: 2081695
Y: 129095

Invoice # 241773 Date of Drawing: Mar. 16, 2015
238766 Date Staked: Jan. 08, 2015 JP

FINAL AS-DRILLED PLAT

AS-DRILLED INFORMATION
FURNISHED BY TAPSTONE ENERGY

MWD SURVEYS

Customer: Tapstone Energy
Well: Duke 18-35-8 1H
Field/Block: Mississippi Lime
Co./Parish: Harper Co.
State: KS

PGS Job #: LKS6117215
MWD Operator: Ken Mitchell
Directional Driller: Kyle Underwood
Date of First Survey: March 1, 2015
Date of Last Survey: March 13, 2015

Total Correction: 4.19 East Grid

Vertical Section Plane: 181.66 Nominal Dip Angle: 65.04 Magnetic Field Strength: 0.515

	Measured Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	Coordinates +N / -S	Coordinates +E / -W	Closure Dist.	Closure Angle	DLS	Mtr Yield	Temp (°F)	Vib/Shk Color	Date	Time	Flow Rate	Hz	Watts	S/N	Comments
	Survey's are tied into:	Assume Vertical at Casing Shoe @ 822'						Date Received:		02/28/15										
	Company:																			
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
1	842.00	0.20	121.80	842.00	0.74	-0.77	1.25	1.47	121.80	0.02	0.00	66 °F	Green	03/01/15	5:32	528 (gpm)				
2	905.00	0.50	92.80	905.00	0.80	-0.85	1.62	1.82	117.61	0.54	0.00	70 °F	Green	03/01/15	6:04	528 (gpm)				
3	968.00	1.00	107.60	967.99	0.96	-1.03	2.42	2.62	113.00	0.84	0.00	72 °F	Green	03/01/15	6:36	528 (gpm)				
4	1031.00	1.50	122.40	1,030.98	1.53	-1.63	3.64	3.99	114.19	0.94	0.00	72 °F	Green	03/01/15	7:08	605 (gpm)				
5	1095.00	1.90	106.90	1,094.95	2.23	-2.39	5.36	5.87	114.05	0.95	0.00	75 °F	Green	03/01/15	7:36	605 (gpm)				
6	1221.00	3.20	115.20	1,220.82	4.19	-4.50	10.54	11.46	113.10	1.07	0.00	79 °F	Green	03/01/15	8:33	605 (gpm)				
7	1284.00	4.00	111.20	1,283.70	5.63	-6.04	14.18	15.41	113.07	1.33	0.00	81 °F	Green	03/01/15	8:58	605 (gpm)				
8	1378.00	4.40	113.90	1,377.44	8.09	-8.69	20.53	22.29	112.93	0.47	0.00	86 °F	Green	03/01/15	9:41	605 (gpm)				
9	1473.00	4.10	114.50	1,472.18	10.78	-11.57	26.95	29.33	113.23	0.32	0.00	90 °F	Green	03/01/15	10:23	605 (gpm)				
10	1568.00	3.80	113.70	1,566.96	13.28	-14.24	32.93	35.88	113.39	0.32	0.00	93 °F	Green	03/01/15	11:03	605 (gpm)				
11	1663.00	3.20	107.70	1,661.78	15.20	-16.32	38.34	41.66	113.05	0.74	0.00	95 °F	Green	03/01/15	11:43	605 (gpm)				
12	1757.00	3.30	111.30	1,755.63	16.83	-18.10	43.36	46.98	112.65	0.24	0.00	99 °F	Green	03/01/15	12:20	605 (gpm)				
13	1850.00	3.30	100.70	1,848.48	18.15	-19.56	48.48	52.28	111.98	0.66	0.00	102 °F	Green	03/01/15	13:01	605 (gpm)				
14	1944.00	2.60	104.60	1,942.35	19.05	-20.60	53.20	57.05	111.17	0.77	0.00	104 °F	Green	03/01/15	13:39	605 (gpm)				
15	2038.00	1.60	122.60	2,036.29	20.21	-21.85	56.37	60.46	111.19	1.26	0.00	106 °F	Green	03/01/15	14:19	605 (gpm)				
16	2133.00	1.70	130.70	2,131.25	21.78	-23.48	58.56	63.09	111.85	0.27	0.00	109 °F	Green	03/01/15	15:10	605 (gpm)				
17	2226.00	0.90	139.40	2,224.22	23.19	-24.94	60.08	65.05	112.54	0.88	0.00	111 °F	Green	03/01/15	15:48	605 (gpm)				
18	2412.00	0.80	96.20	2,410.20	24.37	-26.19	62.32	67.60	112.79	0.34	0.00	113 °F	Green	03/01/15	16:47	605 (gpm)				
19	2600.00	0.80	333.20	2,598.20	23.32	-25.16	63.03	67.87	111.76	0.75	0.00	115 °F	Green	03/01/15	17:52	605 (gpm)				
20	2787.00	1.10	316.40	2,785.17	20.91	-22.69	61.21	65.28	110.34	0.22	0.00	118 °F	Green	03/01/15	19:26	605 (gpm)				
21	2975.00	1.40	310.10	2,973.13	18.21	-19.91	58.20	61.51	108.88	0.18	0.00	117 °F	Green	03/01/15	22:35	605 (gpm)				
22	3163.00	1.60	305.60	3,161.06	15.32	-16.90	54.31	56.88	107.28	0.12	0.00	75 °F	Green	03/01/15	23:52	605 (gpm)				
23	3350.00	1.00	313.60	3,348.01	12.77	-14.25	51.01	52.96	105.61	0.33	0.00	86 °F	Green	03/02/15	1:06	605 (gpm)				
24	3538.00	0.70	190.80	3,536.00	12.81	-14.25	49.61	51.61	106.03	0.80	0.00	93 °F	Green	03/02/15	2:30	605 (gpm)				
25	3726.00	0.80	191.80	3,723.99	15.23	-16.66	49.12	51.87	108.74	0.05	0.00	100 °F	Green	03/02/15	3:52	400 (gpm)				
26	3913.00	0.50	102.50	3,910.98	16.67	-18.12	49.65	52.85	110.05	0.50	0.00	106 °F	Green	03/02/15	5:58	605 (gpm)				
27	4006.00	1.90	181.60	4,003.96	18.29	-19.75	50.00	53.76	111.55	2.01	9.30	106 °F	Green	03/02/15	9:03	457 (gpm)				
28	4038.00	3.80	182.90	4,035.92	19.88	-21.34	49.94	54.30	113.13	5.94	5.90	104 °F	Green	03/02/15	9:52	457 (gpm)				
29	4069.00	5.40	184.40	4,066.82	22.36	-23.82	49.77	55.18	115.57	5.18	5.10	97 °F	Green	03/02/15	17:56	457 (gpm)				
30	4100.00	7.60	185.00	4,097.61	25.87	-27.31	49.48	56.52	118.90	7.10	7.10	97 °F	Green	03/02/15	19:08	457 (gpm)				
31	4130.00	11.30	184.70	4,127.20	30.79	-32.22	49.07	58.70	123.29	12.33	15.70	97 °F	Green	03/02/15	20:55	457 (gpm)				
32	4162.00	15.50	186.80	4,158.32	38.18	-39.59	48.30	62.46	129.34	13.21	14.50	100 °F	Green	03/02/15	22:01	457 (gpm)				
33	4194.00	20.30	185.10	4,188.77	47.98	-49.37	47.30	68.38	136.23	15.09	16.00	104 °F	Green	03/02/15	23:18	457 (gpm)				
34	4225.00	23.80	183.40	4,217.49	59.61	-60.98	46.45	76.66	142.70	11.48	23.70	108 °F	Green	03/03/15	0:56	457 (gpm)				
35	4257.00	27.20	182.20	4,246.37	73.38	-74.74	45.79	87.65	148.50	10.75	19.10	109 °F	Green	03/03/15	2:25	457 (gpm)				
36	4289.00	29.90	181.60	4,274.48	88.67	-90.02	45.29	100.77	153.29	8.48	18.00	111 °F	Green	03/03/15	3:38	457 (gpm)				
37	4320.00	32.40	182.40	4,301.01	104.70	-106.04	44.72	115.09	157.13	8.17	28.10	113 °F	Green	03/03/15	5:02	457 (gpm)				
38	4351.00	33.50	183.90	4,327.02	121.56	-122.88	43.79	130.45	160.38	4.42	15.60	117 °F	Green	03/03/15	6:09	520 (gpm)				
39	4383.00	34.80	184.60	4,353.50	139.50	-140.79	42.46	147.05	163.22	4.24	14.50	118 °F	Green	03/03/15	7:07	520 (gpm)				
40	4415.00	36.60	183.90	4,379.49	158.16	-159.41	41.08	164.62	165.55	5.77	20.00	120 °F	Green	03/03/15	7:51	520 (gpm)				
41	4447.00	38.60	183.40	4,404.84	177.67	-178.90	39.84	183.28	167.45	6.32	22.40	120 °F	Green	03/03/15	8:37	520 (gpm)				
42	4477.00	40.50	182.80	4,427.97	196.76	-197.97	38.81	201.74	168.91	6.46	21.50	120 °F	Green	03/03/15	9:32	520 (gpm)				
43	4508.00	41.90	181.90	4,451.30	217.18	-218.37	37.97	221.65	170.14	4.90	21.70	124 °F	Green	03/03/15	10:20	520 (gpm)				
44	4539.00	43.70	182.30	4,474.04	238.24	-239.42	37.20	242.29	171.17	5.87	22.70	124 °F	Green	03/03/15	11:16	520 (gpm)				
45	4570.00	45.20	182.30	4,496.17	259.95	-261.11	36.33	263.62	172.08	4.84	24.00	124 °F	Green	03/03/15	12:11	520 (gpm)				
46	4602.00	47.40	182.00	4,518.28	283.08	-284.23	35.46	286.43	172.89	6.91	20.00	126 °F	Green	03/03/15	13:07	520 (gpm)				
47	4633.00	49.50	181.60	4,538.84	306.28	-307.41	34.73	309.37	173.55	6.84	21.20	127 °F	Green	03/03/15	13:55	520 (gpm)				
48	4664.00	52.00	180.90	4,558.45	330.28	-331.41	34.21	333.17	174.11	8.25	28.40	129 °F	Green	03/03/15	15:07	520 (gpm)				

MWD SURVEYS

Customer: Tapstone Energy
Well: Duke 18-35-8 1H
Field/Block: Mississippi Lime
Co./Parish: Harper Co.
State: KS

PGS Job #: LKS6117215
MWD Operator: Ken Mitchell
Directional Driller: Kyle Underwood
Date of First Survey: March 1, 2015
Date of Last Survey: March 13, 2015

PRODIRECTIONAL

Total Correction: 4.19 East Grid

Vertical Section Plane: 181.66 Nominal Dip Angle: 65.04 Magnetic Field Strength: 0.515

	Measured Depth	Inc.	Azm.	T.V.D.	Coordinates Ver. Sect.	+N / -S	+E / -W	Closure Dist.	Angle	DLS	Mtr Yield	Temp (°F)	Vib/Shk Color	Date	Time	Flow Rate	Hz	Watts	S/N	Comments
49	4696.00	53.90	180.90	4,577.73	355.82	-356.95	33.81	358.55	174.59	5.94	21.00	127 °F	Green	03/03/15	15:51	520 (gpm)				
50	4727.00	56.00	180.50	4,595.53	381.19	-382.32	33.50	383.79	174.99	6.86	23.60	129 °F	Green	03/03/15	16:39	520 (gpm)				
51	4758.00	57.70	179.90	4,612.48	407.14	-408.28	33.41	409.64	175.32	5.72	22.10	129 °F	Green	03/03/15	17:17	520 (gpm)				
52	4789.00	60.00	179.70	4,628.52	433.65	-434.80	33.51	436.09	175.59	7.44	22.00	129 °F	Green	03/03/15	18:07	520 (gpm)				
53	4820.00	62.00	179.60	4,643.55	460.75	-461.92	33.67	463.14	175.83	6.46	16.70	129 °F	Green	03/03/15	18:47	520 (gpm)				
54	4850.00	62.90	179.60	4,657.42	487.33	-488.51	33.86	489.68	176.04	3.00	0.00	129 °F	Green	03/03/15	19:36	520 (gpm)				
55	4881.00	63.40	179.40	4,671.42	514.96	-516.17	34.10	517.29	176.22	1.71	0.00	129 °F	Green	03/03/15	20:32	520 (gpm)				
56	4912.00	63.90	178.80	4,685.18	542.72	-543.94	34.54	545.04	176.37	2.37	0.00	129 °F	Green	03/03/15	21:10	520 (gpm)				
57	4943.00	64.20	178.70	4,698.75	570.55	-571.81	35.15	572.89	176.48	1.01	0.00	129 °F	Green	03/03/15	22:00	520 (gpm)				
58	4975.00	64.50	178.40	4,712.60	599.36	-600.65	35.88	601.72	176.58	1.26	0.00	129 °F	Green	03/03/15	22:46	520 (gpm)				
59	5006.00	65.00	178.60	4,725.82	627.35	-628.68	36.61	629.74	176.67	1.72	0.00	129 °F	Green	03/03/15	23:44	520 (gpm)				
60	5037.00	66.00	178.30	4,738.68	655.52	-656.88	37.37	657.94	176.74	3.34	0.00	127 °F	Green	03/04/15	0:57	520 (gpm)				
61	5068.00	68.00	178.60	4,750.79	684.01	-685.40	38.14	686.46	176.81	6.51	25.00	127 °F	Green	03/04/15	2:07	520 (gpm)				
62	5099.00	71.50	179.60	4,761.52	713.06	-714.48	38.60	715.52	176.91	11.69	18.10	127 °F	Green	03/04/15	3:18	520 (gpm)				
63	5130.00	74.00	179.90	4,770.71	742.64	-744.08	38.73	745.09	177.02	8.12	16.80	127 °F	Green	03/04/15	4:51	520 (gpm)				
64	5161.00	76.20	180.20	4,778.68	772.59	-774.03	38.70	775.00	177.14	7.16	17.50	127 °F	Green	03/04/15	6:08	520 (gpm)				
65	5193.00	79.30	181.20	4,785.47	803.85	-805.30	38.32	806.21	177.28	10.16	20.30	127 °F	Green	03/04/15	7:49	520 (gpm)				
66	5224.00	82.80	181.80	4,790.29	834.47	-835.91	37.51	836.75	177.43	11.45	19.70	127 °F	Green	03/04/15	9:23	520 (gpm)				
67	5255.00	86.20	182.20	4,793.26	865.32	-866.74	36.44	867.51	177.59	11.04	22.00	127 °F	Green	03/04/15	10:53	520 (gpm)				
68	5376.00	89.30	184.20	4,798.01	986.16	-987.44	29.69	987.88	178.28	3.05	0.00	122 °F		03/06/15	1:20	230 (gpm)	4	17	23	APS EM first survey in Lateral
69	5407.00	89.50	184.20	4,798.34	1,017.13	-1,018.35	27.42	1,018.72	178.46	0.65	0.00	122 °F		03/06/15	2:20	230 (gpm)	4	14	20	Downlink to 14 Watts
70	5440.00	90.20	183.40	4,798.42	1,050.11	-1,051.28	25.23	1,051.58	178.63	3.22	0.00	124 °F		03/06/15	3:10	230 (gpm)	4	14	20	
71	5471.00	90.20	183.70	4,798.32	1,081.09	-1,082.22	23.31	1,082.47	178.77	0.97	0.00	124 °F		03/06/15	3:55	230 (gpm)	4	14	18	
72	5503.00	90.50	182.80	4,798.12	1,113.08	-1,114.17	21.50	1,114.37	178.89	2.96	0.00	124 °F		03/06/15	4:35	230 (gpm)	4	14	18	
73	5566.00	90.70	183.10	4,797.46	1,176.06	-1,177.08	18.25	1,177.22	179.11	0.57	0.00	126 °F		03/06/15	5:25	245 (gpm)	4	14	25	
74	5598.00	90.90	183.00	4,797.01	1,208.04	-1,209.03	16.55	1,209.14	179.22	0.70	0.00	126 °F		03/06/15	6:08	245 (gpm)	4	14	24	
75	5658.00	90.60	183.00	4,796.23	1,268.02	-1,268.94	13.41	1,269.01	179.39	0.50	0.00	131 °F		03/06/15	6:57	274 (gpm)	4	14	20	
76	5689.00	90.70	182.60	4,795.88	1,299.01	-1,299.90	11.90	1,299.96	179.48	1.33	0.00	131 °F		03/06/15	7:27	274 (gpm)	4	14	14	
77	5750.00	89.90	182.80	4,795.56	1,360.00	-1,360.84	9.02	1,360.87	179.62	1.35	0.00	131 °F		03/06/15	8:33	274 (gpm)	4	17	7.4	Downlink to 17 watts due to SNR
78	5780.00	90.00	182.70	4,795.58	1,390.00	-1,390.80	7.58	1,390.82	179.69	0.47	0.00	131 °F		03/06/15	9:10	274 (gpm)	4	17	11	
79	5841.00	89.30	182.10	4,795.96	1,450.99	-1,451.75	5.03	1,451.75	179.80	1.51	0.00	131 °F		03/06/15	10:13	274 (gpm)	4	17	9.2	
80	5871.00	89.40	182.10	4,796.30	1,480.99	-1,481.72	3.93	1,481.73	179.85	0.33	0.00	131 °F		03/06/15	10:45	274 (gpm)	4	17	8.3	
81	5931.00	89.80	182.30	4,796.72	1,540.98	-1,541.68	1.63	1,541.68	179.94	0.75	0.00	133 °F		03/06/15	11:43	274 (gpm)	4	17	8.8	
82	5962.00	89.90	182.90	4,796.80	1,571.98	-1,572.65	0.22	1,572.65	179.99	1.96	0.00	133 °F		03/06/15	12:11	274 (gpm)	4	17	7.2	
83	6022.00	89.40	182.60	4,797.16	1,631.97	-1,632.58	-2.66	1,632.58	180.09	0.97	0.00	133 °F		03/06/15	14:45	274 (gpm)	4	17	9	
84	6052.00	89.40	182.50	4,797.48	1,661.96	-1,662.54	-3.99	1,662.55	180.14	0.33	0.00	135 °F		03/06/15	15:19	271 (gpm)	4	17	8.9	
85	6114.00	89.90	181.90	4,797.86	1,723.96	-1,724.50	-6.37	1,724.51	180.21	1.26	0.00	135 °F		03/06/15	16:20	271 (gpm)	4	17	9	
86	6144.00	90.00	182.50	4,797.88	1,753.96	-1,754.47	-7.52	1,754.49	180.25	2.03	0.00	137 °F		03/06/15	16:57	271 (gpm)	4	17	7.9	
87	6206.00	89.20	181.40	4,798.32	1,815.95	-1,816.44	-9.63	1,816.46	180.30	2.19	0.00	137 °F		03/06/15	18:05	271 (gpm)	4	17	15	
88	6236.00	89.30	181.70	4,798.71	1,845.95	-1,846.42	-10.44	1,846.45	180.32	1.05	0.00	137 °F		03/06/15	18:45	271 (gpm)	2.5	20	15	Downlink to tool due to low SNR. Set Freq to 2.5.Wattst to 20
89	6297.00	89.30	181.50	4,799.45	1,906.94	-1,907.39	-12.15	1,907.43	180.36	0.33	0.00	137 °F		03/06/15	19:45	271 (gpm)	2.5	20	9.7	
90	6328.00	89.40	181.40	4,799.81	1,937.94	-1,938.38	-12.93	1,938.42	180.38	0.46	0.00	140 °F		03/06/15	20:25	271 (gpm)	2.5	20	9.7	
91	6389.00	89.00	181.80	4,800.66	1,998.94	-1,999.35	-14.64	1,999.41	180.42	0.93	0.00	140 °F		03/06/15	21:45	271 (gpm)	2.5	20	9.7	
92	6420.00	89.20	181.20	4,801.14	2,029.93	-2,030.34	-15.45	2,030.40	180.44	2.04	0.00	137 °F		03/06/15	22:30	271 (gpm)	2.5	20	10	
93	6450.00	89.60	181.60	4,801.46	2,059.93	-2,060.33	-16.18	2,060.39	180.45	1.89	0.00	140 °F		03/06/15	23:10	271 (gpm)	2.5	20	10	
94	6512.00	89.80	181.90	4,801.78	2,121.93	-2,122.30	-18.07	2,122.37	180.49	0.58	0.00	142 °F		03/07/15	0:10	271 (gpm)	2.5	17	9.7	Back down watts to 17 to conserve batt life.
95	6572.00	89.50	182.80	4,802.15	2,181.92	-2,182.24	-20.53	2,182.34	180.54	1.58	0.00	142 °F		03/07/15	1:15	271 (gpm)	2.5	17	11	
96	6603.00	89.30	182.60	4,802.47	2,212.92	-2,213.21	-21.99	2,213.32	180.57	0.91	0.00	142 °F		03/07/15	2:00	271 (gpm)	2.5	17	10	
97	6662.00	89.80	183.00	4,802.94	2,271.90	-2,272.14	-24.88	2,272.27	180.63	1.09	0.00	140 °F		03/07/15	3:20	271 (gpm)	2.5	17	8.8	
98	6693.00	89.90	183.20	4,803.02	2,302.89	-2,303.09	-26.55	2,303.24	180.66	0.72	0.00	140 °F		03/07/15	4:00	271 (gpm)	2.5	17	10	
99	6754.00	90.30	183.70	4,802.91	2,363.86	-2,363.98	-30.22	2,364.17	180.73	1.05	0.00	142 °F		03/07/15	5:10	271 (gpm)	2.5	17	10	

MWD

SURVEYS

Customer: Tapstone Energy
Well: Duke 18-35-8 1H
Field/Block: Mississippi Lime
Co./Parish: Harper Co.
State: KS

PGS Job #: LKS6117215
MWD Operator: Ken Mitchell
Directional Driller: Kyle Underwood
Date of First Survey: March 1, 2015
Date of Last Survey: March 13, 2015

ProDirectional

Total Correction: 4.19 East Grid

Vertical Section Plane: 181.66 Nominal Dip Angle: 65.04 Magnetic Field Strength: 0.515

	Measured Depth	Inc.	Azm.	T.V.D.	Coordinates Ver. Sect.	+N / -S	+E / -W	Closure Dist.	Angle	DLS	Mtr Yield	Temp (°F)	Vib/Shk Color	Date	Time	Flow Rate	Hz	Watts	S/N	Comments
100	6784.00	91.00	184.60	4,802.57	2,393.83	-2,393.90	-32.39	2,394.12	180.78	3.80	0.00	142 °F		03/07/15	6:10	271 (gpm)	2.5	17	10	
101	6844.00	88.90	183.80	4,802.62	2,453.77	-2,453.73	-36.79	2,454.01	180.86	3.75	0.00	142 °F		03/07/15	7:53	271 (gpm)	2.5	17	10	
102	6874.00	88.90	182.80	4,803.20	2,483.75	-2,483.68	-38.51	2,483.98	180.89	3.33	0.00	142 °F		03/07/15	8:39	271 (gpm)	2.5	17	7.8	
103	6934.00	89.00	183.50	4,804.30	2,543.72	-2,543.58	-41.81	2,543.92	180.94	1.18	0.00	142 °F		03/07/15	10:00	271 (gpm)	2.5	17	9.9	
104	6964.00	89.20	183.50	4,804.77	2,573.70	-2,573.52	-43.64	2,573.89	180.97	0.67	0.00	145 °F		03/07/15	10:39	271 (gpm)	2.5	17	9.9	
105	7026.00	89.80	184.60	4,805.31	2,635.64	-2,635.36	-48.02	2,635.80	181.04	2.02	0.00	147 °F		03/07/15	11:53	271 (gpm)	2.5	17	9.9	
106	7056.00	90.20	184.90	4,805.31	2,665.60	-2,665.25	-50.50	2,665.73	181.09	1.67	0.00	145 °F		03/07/15	12:41	271 (gpm)	2.5	17	9.7	
107	7117.00	89.70	184.60	4,805.37	2,726.51	-2,726.05	-55.56	2,726.61	181.17	0.96	0.00	147 °F		03/07/15	14:15	271 (gpm)	2.5	17	9.5	
108	7178.00	89.10	183.30	4,806.00	2,787.46	-2,786.90	-59.76	2,787.54	181.23	2.35	0.00	145 °F		03/07/15	15:58	271 (gpm)	2.5	17	11	
109	7239.00	89.40	183.40	4,806.80	2,848.42	-2,847.79	-63.32	2,848.49	181.27	0.52	0.00	147 °F		03/07/15	17:25	271 (gpm)	2.5	17	9.9	
110	7299.00	89.80	182.50	4,807.22	2,908.41	-2,907.70	-66.41	2,908.46	181.31	1.64	0.00	147 °F		03/07/15	19:15	271 (gpm)	2.5	17	9.9	
111	7360.00	88.10	181.90	4,808.34	2,969.39	-2,968.65	-68.75	2,969.44	181.33	2.96	0.00	147 °F		03/07/15	21:10	271 (gpm)	2.5	17	11	
112	7420.00	89.00	183.10	4,809.86	3,029.36	-3,028.57	-71.37	3,029.41	181.35	2.50	0.00	147 °F		03/07/15	23:00	271 (gpm)	2.5	17	11	
113	7483.00	88.50	182.30	4,811.23	3,092.34	-3,091.48	-74.33	3,092.38	181.38	1.50	0.00	147 °F		03/08/15	0:50	271 (gpm)	2.5	17	10	
114	7514.00	88.80	183.20	4,811.96	3,123.32	-3,122.44	-75.82	3,123.36	181.39	3.06	0.00	147 °F		03/08/15	1:40	271 (gpm)	2.5	17	9.8	
115	7577.00	87.80	183.30	4,813.83	3,186.27	-3,185.31	-79.39	3,186.30	181.43	1.60	0.00	147 °F		03/08/15	4:15	271 (gpm)	2.5	17	10	
116	7608.00	87.80	183.20	4,815.02	3,217.24	-3,216.24	-81.15	3,217.26	181.45	0.32	0.00	149 °F		03/08/15	5:10	271 (gpm)	2.5	17	9.7	
117	7671.00	88.40	183.00	4,817.11	3,280.18	-3,279.11	-84.55	3,280.20	181.48	1.00	0.00	149 °F		03/08/15	7:18	271 (gpm)	2.5	17	11	
118	7703.00	88.70	182.90	4,817.92	3,312.16	-3,311.06	-86.20	3,312.18	181.49	0.99	0.00	142 °F		03/08/15	16:47	271 (gpm)	2.5	17	9.9	
119	7765.00	88.50	183.10	4,819.43	3,374.13	-3,372.95	-89.44	3,374.14	181.52	0.46	0.00	147 °F		03/08/15	18:05	271 (gpm)	2.5	24	9.4	Downlink to 24 watts due to low SNR while rotating
120	7828.00	88.50	183.10	4,821.08	3,437.09	-3,435.84	-92.85	3,437.09	181.55	0.00	0.00	147 °F		03/08/15	19:45	271 (gpm)	2.5	24	10	
121	7891.00	89.10	183.10	4,822.40	3,500.05	-3,498.73	-96.25	3,500.06	181.58	0.95	0.00	147 °F		03/08/15	21:30	271 (gpm)	2.5	24	6.7	
122	7954.00	89.20	183.50	4,823.34	3,563.02	-3,561.62	-99.88	3,563.02	181.61	0.65	0.00	149 °F		03/08/15	23:00	271 (gpm)	2.5	24	10	
123	8017.00	89.90	183.30	4,823.83	3,625.99	-3,624.51	-103.62	3,625.99	181.64	1.16	0.00	149 °F		03/09/15	0:40	271 (gpm)	2.5	24	9	
124	8080.00	89.80	183.90	4,824.00	3,688.95	-3,687.38	-107.57	3,688.95	181.67	0.97	0.00	149 °F		03/09/15	1:50	271 (gpm)	2.5	24	8.8	
125	8143.00	89.70	182.50	4,824.27	3,751.93	-3,750.28	-111.09	3,751.93	181.70	2.23	0.00	151 °F		03/09/15	3:15	271 (gpm)	2.5	24	9	
126	8206.00	89.40	181.10	4,824.77	3,814.92	-3,813.25	-113.07	3,814.92	181.70	2.27	0.00	149 °F		03/09/15	4:55	271 (gpm)	2.5	24	9	
127	8269.00	88.70	182.30	4,825.81	3,877.91	-3,876.21	-114.94	3,877.91	181.70	2.20	0.00	151 °F		03/09/15	6:00	271 (gpm)	2.5	24	7.6	
128	8331.00	88.70	181.90	4,827.22	3,939.89	-3,938.15	-117.21	3,939.90	181.70	0.64	0.00	151 °F		03/09/15	7:32	271 (gpm)	2.5	24	11	
129	8394.00	89.70	181.90	4,828.10	4,002.89	-4,001.11	-119.30	4,002.89	181.71	1.59	0.00	151 °F		03/09/15	9:10	271 (gpm)	2.5	24	11	
130	8457.00	89.80	182.50	4,828.37	4,065.88	-4,064.06	-121.71	4,065.89	181.72	0.97	0.00	151 °F		03/09/15	10:08	271 (gpm)	2.5	20	10	Downlink to 20 Watts
131	8520.00	90.00	182.60	4,828.48	4,128.88	-4,127.00	-124.52	4,128.88	181.73	0.35	0.00	153 °F		03/09/15	11:11	281 (gpm)	2.5	20	11	
132	8583.00	89.90	181.90	4,828.54	4,191.87	-4,189.95	-126.99	4,191.88	181.74	1.12	0.00	151 °F		03/09/15	12:46	281 (gpm)	2.5	20	11	
133	8647.00	89.10	181.60	4,829.10	4,255.87	-4,253.92	-128.95	4,255.87	181.74	1.33	0.00	153 °F		03/09/15	14:21	281 (gpm)	2.5	20	10	
134	8710.00	89.10	181.10	4,830.09	4,318.86	-4,316.89	-130.43	4,318.86	181.73	0.79	0.00	154 °F		03/09/15	15:26	281 (gpm)	2.5	20	11	
135	8773.00	89.00	181.10	4,831.13	4,381.85	-4,379.87	-131.64	4,381.85	181.72	0.16	0.00	154 °F		03/09/15	16:31	264 (gpm)	2.5	20	11	
136	8836.00	88.90	181.30	4,832.28	4,444.84	-4,442.85	-132.96	4,444.84	181.71	0.35	0.00	156 °F		03/09/15	17:25	264 (gpm)	2.5	20	9.9	
137	8899.00	89.20	180.20	4,833.33	4,507.82	-4,505.83	-133.78	4,507.82	181.70	1.81	0.00	154 °F		03/09/15	18:45	264 (gpm)	2.5	20	11	
138	8963.00	89.50	180.70	4,834.06	4,571.80	-4,569.83	-134.29	4,571.80	181.68	0.91	0.00	154 °F		03/09/15	20:45	264 (gpm)	2.5	20	10	
139	9026.00	89.80	180.30	4,834.44	4,634.78	-4,632.82	-134.83	4,634.78	181.67	0.79	0.00	154 °F		03/09/15	21:50	264 (gpm)	2.5	20	10	
140	9089.00	89.90	180.60	4,834.60	4,697.77	-4,695.82	-135.33	4,697.77	181.65	0.50	0.00	154 °F		03/09/15	22:55	264 (gpm)	2.5	20	8.5	
141	9151.00	89.80	180.80	4,834.77	4,759.76	-4,757.82	-136.09	4,759.76	181.64	0.36	0.00	154 °F		03/10/15	0:10	264 (gpm)	2.5	20	9	
142	9215.00	89.60	181.10	4,835.10	4,823.76	-4,821.81	-137.15	4,823.76	181.63	0.56	0.00	156 °F		03/10/215	1:15	264 (gpm)	2.5	20	10	
143	9278.00	89.40	181.50	4,835.65	4,886.75	-4,884.79	-138.58	4,886.75	181.63	0.71	0.00	156 °F		03/10/15	2:35	264 (gpm)	2.5	20	9.6	
144	9341.00	89.60	181.50	4,836.20	4,949.75	-4,947.76	-140.23	4,949.75	181.62	0.32	0.00	154 °F		03/10/15	4:30	264 (gpm)	2.5	20	8.4	
145	9403.00	89.50	181.70	4,836.69	5,011.75	-5,009.74	-141.96	5,011.75	181.62	0.36	0.00	154 °F		03/10/15	5:40	264 (gpm)	2.5	20	11	
146	9466.00	89.40	182.10	4,837.29	5,074.74	-5,072.70	-144.05	5,074.74	181.63	0.65	0.00	156 °F		03/10/15	7:03	281 (gpm)	2.5	20	11	
147	9498.00	89.50	181.20	4,837.60	5,106.74	-5,104.68	-144.97	5,106.74	181.63	2.83	0.00	158 °F		03/10/15	7:40	281 (gpm)	2.5	20	9.7	
148	9560.00	89.50	181.70	4,838.14	5,168.74	-5,166.66	-146.54	5,168.74	181.62	0.81	0.00	158 °F		03/10/15	8:44	281 (gpm)	2.5	20	10	
149	9591.00	89.70	181.60	4,838.36	5,199.74	-5,197.65	-147.43	5,199.74	181.62	0.72	0.00	158 °F		03/10/15	9:19	281 (gpm)	2.5	20	10	
150	9655.00	89.70	182.60	4,838.69	5,263.73	-5,261.60	-149.77	5,263.74	181.63	1.56	0.00	158 °F		03/10/15	10:33	281 (gpm)	2.5	20	11	

MWD SURVEYS

Customer: Tapstone Energy
Well: Duke 18-35-8 1H
Field/Block: Mississippi Lime
Co./Parish: Harper Co.
State: KS

PGS Job #: LKS6117215
MWD Operator: Ken Mitchell
Directional Driller: Kyle Underwood
Date of First Survey: March 1, 2015
Date of Last Survey: March 13, 2015

PRODIRECTIONAL

Total Correction: 4.19 East Grid

Vertical Section Plane: 181.66 Nominal Dip Angle: 65.04 Magnetic Field Strength: 0.515

	Measured Depth	Inc.	Azm.	T.V.D.	Coordinates Ver. Sect.	+N / -S	+E / -W	Closure Dist.	Angle	DLS	Mtr Yield	Temp (°F)	Vib/Shk Color	Date	Time	Flow Rate	Hz	Watts	S/N	Comments
151	9720.00	89.50	182.20	4,839.15	5,328.73	-5,326.55	-152.50	5,328.73	181.64	0.69	0.00	158 °F		03/10/15	18:30	281 (gpm)	2.5	20	11	
152	9781.00	89.80	181.50	4,839.52	5,389.73	-5,387.51	-154.47	5,389.73	181.64	1.25	0.00	151 °F		03/10/15	20:40	281 (gpm)	2.5	20	7.7	
153	9841.00	89.70	182.20	4,839.78	5,449.72	-5,447.48	-156.40	5,449.72	181.64	1.18	0.00	153 °F		03/10/15	21:50	281 (gpm)	2.5	20	9.8	
154	9902.00	89.80	181.30	4,840.05	5,510.72	-5,508.45	-158.27	5,510.72	181.65	1.48	0.00	153 °F		03/11/15	0:10	281 (gpm)	2.5	20	11	
155	9963.00	89.90	180.30	4,840.21	5,571.72	-5,569.44	-159.12	5,571.72	181.64	1.65	0.00	154 °F		03/11/15	2:25	281 (gpm)	2.5	20	8.7	Changed downlink to time to custom 2 (every 30 min)
156	10023.00	89.80	180.80	4,840.36	5,631.70	-5,629.44	-159.69	5,631.70	181.62	0.85	0.00	156 °F		03/11/15	3:45	281 (gpm)	2.5	20	8.7	
157	10083.00	89.90	180.10	4,840.52	5,691.69	-5,689.44	-160.16	5,691.69	181.61	1.18	0.00	156 °F		03/11/15	6:23	281 (gpm)	2.5	24	11	Power up to 24 Watts due to low SNR @ 2.4 while rotating
158	10144.00	89.70	179.90	4,840.73	5,752.66	-5,750.44	-160.16	5,752.67	181.60	0.46	0.00	156 °F		03/11/15	7:53	264 (gpm)	2.5	24	8.9	
159	10204.00	89.50	180.40	4,841.15	5,812.64	-5,810.44	-160.32	5,812.65	181.58	0.90	0.00	156 °F		03/11/15	8:47	264 (gpm)	2.5	20	10	Downlink to 20 watts after moving BOP clamp to existing well. SNR @ 9.2 while rotating
160	10264.00	88.50	179.40	4,842.20	5,872.60	-5,870.42	-160.22	5,872.61	181.56	2.36	0.00	156 °F		03/11/15	11:10	264 (gpm)	2.5	20	9.5	
161	10324.00	88.90	179.60	4,843.56	5,932.54	-5,930.41	-159.69	5,932.56	181.54	0.75	0.00	156 °F		03/11/15	12:43	264 (gpm)	2.5	17	9.4	Downlink to 17 watts
162	10354.00	89.10	179.80	4,844.09	5,962.52	-5,960.40	-159.54	5,962.54	181.53	0.94	0.00	156 °F		03/11/15	13:36	264 (gpm)	2.5	17	10	
163	10414.00	87.80	179.00	4,845.71	6,022.45	-6,020.37	-158.91	6,022.47	181.51	2.54	0.00	156 °F		03/11/15	15:38	264 (gpm)	2.5	17	9.3	
164	10475.00	87.90	179.60	4,848.00	6,083.36	-6,081.33	-158.16	6,083.38	181.49	1.00	0.00	156 °F		03/11/15	17:03	264 (gpm)	2.5	17	10	
165	10535.00	87.80	179.50	4,850.25	6,143.27	-6,141.28	-157.69	6,143.31	181.47	0.24	0.00	158 °F		03/11/15	19:00	264 (gpm)	2.5	17	8.3	
166	10596.00	87.70	178.70	4,852.64	6,204.16	-6,202.23	-156.73	6,204.21	181.45	1.32	0.00	158 °F		03/11/15	21:10	264 (gpm)	2.5	17	8.2	
167	10659.00	88.10	178.90	4,854.95	6,267.04	-6,265.17	-155.42	6,267.10	181.42	0.71	0.00	158 °F		03/12/15	0:40	264 (gpm)	2.5	17	10	
168	10722.00	87.80	179.30	4,857.20	6,329.94	-6,328.12	-154.43	6,330.01	181.40	0.79	0.00	158 °F		03/12/15	1:45	264 (gpm)	2.5	17	11	Downlink to 14 Watts. Switch to Custom 1 (every 15 min)
169	10785.00	88.60	179.00	4,859.18	6,392.85	-6,391.08	-153.49	6,392.93	181.38	1.36	0.00	156 °F		03/12/15	4:50	264 (gpm)	2.5	12	9.6	Downlink to 12 Watts.
170	10816.00	88.80	179.00	4,859.89	6,423.81	-6,422.07	-152.95	6,423.89	181.36	0.65	0.00	158 °F		03/12/15	5:32	264 (gpm)	2.5	12	9.2	
171	10879.00	89.30	179.70	4,860.93	6,486.75	-6,485.06	-152.24	6,486.84	181.34	1.37	0.00	158 °F		03/12/15	7:38	264 (gpm)	2.5	12	10	
172	10911.00	89.30	179.30	4,861.32	6,518.72	-6,517.05	-151.96	6,518.83	181.34	1.25	0.00	158 °F		03/12/15	8:27	264 (gpm)	2.5	12	10	
173	10974.00	89.40	179.00	4,862.04	6,581.66	-6,580.04	-151.02	6,581.78	181.31	0.50	0.00	158 °F		03/12/15	9:40	264 (gpm)	2.5	12	9.7	
174	11036.00	88.90	179.30	4,862.96	6,643.59	-6,642.03	-150.10	6,643.73	181.29	0.94	0.00	158 °F		03/12/15	10:55	264 (gpm)	2.5	12	10	
175	11099.00	89.00	180.70	4,864.11	6,706.55	-6,705.02	-150.10	6,706.70	181.28	2.23	0.00	158 °F		03/12/15	13:25	264 (gpm)	2.5	12	9.9	
176	11162.00	89.50	180.50	4,864.94	6,769.54	-6,768.01	-150.76	6,769.69	181.28	0.85	0.00	158 °F		03/12/15	16:32	264 (gpm)	2.5	12	10	
177	11194.00	89.50	180.50	4,865.22	6,801.53	-6,800.01	-151.04	6,801.68	181.27	0.00	0.00	160 °F		03/12/15	17:31	264 (gpm)	2.5	12	10	
178	11257.00	89.60	181.60	4,865.71	6,864.52	-6,862.99	-152.20	6,864.68	181.27	1.75	0.00	160 °F		03/12/15	18:45	264 (gpm)	2.5	12	9.9	
179	11320.00	89.60	181.80	4,866.15	6,927.52	-6,925.96	-154.07	6,927.68	181.27	0.32	0.00	160 °F		03/12/15	20:10	264 (gpm)	2.5	12	10	Downlink to 8 Watts.
180	11383.00	89.70	181.70	4,866.53	6,990.52	-6,988.93	-155.99	6,990.67	181.28	0.22	0.00	160 °F		03/12/15	21:30	264 (gpm)	2.5	8	10	
181	11446.00	90.00	181.90	4,866.70	7,053.52	-7,051.90	-157.97	7,053.67	181.28	0.57	0.00	162 °F		03/12/15	22:30	264 (gpm)	2.5	8	11	
182	11477.00	90.00	182.50	4,866.70	7,084.52	-7,082.88	-159.16	7,084.67	181.29	1.94	0.00	162 °F		03/12/15	23:10	264 (gpm)	2.5	8	11	
183	11540.00	88.80	182.40	4,867.36	7,147.51	-7,145.82	-161.85	7,147.65	181.30	1.91	0.00	160 °F		03/13/15	1:50	264 (gpm)	2.5	8	11	
184	11603.00	88.80	181.90	4,868.68	7,210.49	-7,208.76	-164.22	7,210.63	181.30	0.79	0.00	162 °F		03/13/15	3:00	264 (gpm)	2.5	6	11	Downlink to 6 Watts.
185	11666.00	88.70	183.40	4,870.05	7,273.46	-7,271.67	-167.13	7,273.59	181.32	2.39	0.00	162 °F		03/13/15	4:15	264 (gpm)	2.5	6	11	
186	11729.00	88.80	183.70	4,871.43	7,336.41	-7,334.54	-171.03	7,336.53	181.34	0.50	0.00	160 °F		03/13/15	7:23	264 (gpm)	2.5	6	9.9	
187	11761.00	88.90	183.60	4,872.07	7,368.39	-7,366.47	-173.06	7,368.50	181.35	0.44	0.00	160 °F		03/13/15	8:01	264 (gpm)	2.5	6	8.4	
188	11824.00	89.50	183.70	4,872.95	7,431.34	-7,429.33	-177.07	7,431.44	181.37	0.97	0.00	160 °F		03/13/15	10:18	264 (gpm)	2.5	6	11	
189	11887.00	89.80	184.40	4,873.33	7,494.29	-7,492.17	-181.52	7,494.37	181.39	1.21	0.00	160 °F		03/13/15	11:53	264 (gpm)	2.5	6	9.3	
TD	11934.00	89.80	184.40	4,873.50	7,541.23	-7,539.03	-185.13	7,541.31	181.41	0.00										

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Date of Last Survey: March 13, 2015

Total Correction: 4.19 East Grid

Vertical Section Plane: 181.66 Nominal Dip Angle: 65.04 Magnetic Field Strength: 0.515

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