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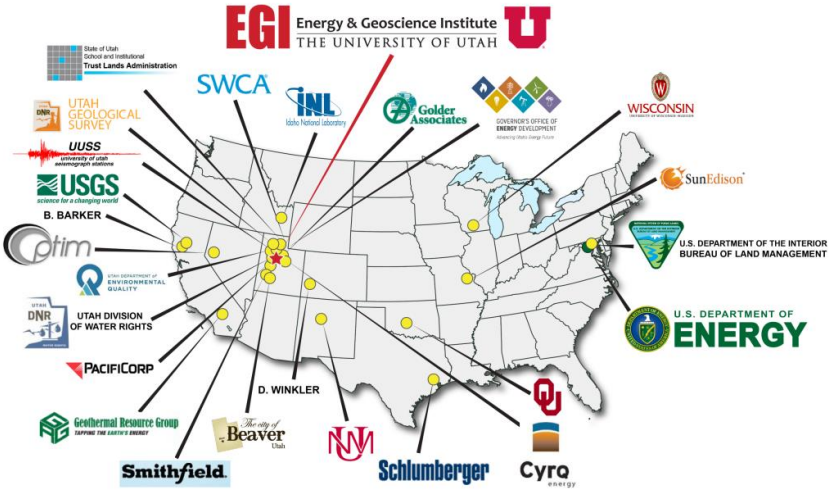
End of Well Report

Seismic Monitoring Wells

68-32



Prepared by:

Geothermal Resource Group, Inc.

for

University of Utah (UofU)

Prepared By:	Sam Abraham	Vice President – Operations (GRG)
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	W. M. Rickard	President (GRG)
Approved By:		

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Summary

Well 68-32, drilled vertically to a depth of 1,000 ft., is the shallow seismic monitoring well of the exploration program in the Utah Frontier Observatory for Research in Geothermal Energy (FORGE) Enhanced Geothermal System (EGS) prospect area (FORGE Deep Well Site). The project is administered by the U.S. Department of Energy and managed by the University of Utah (U of U). As part of the activities for the FORGE project and based on discussions with DOE and others, the University of Utah drilled 68-32 (one of 2) seismic monitoring hole to host seismic monitoring instruments to collect data during injection in Well 58-32.

Achieved Well Objectives

The achieved objectives for the shallow monitoring hole 68-32 were:

- Drilled and completed the seismic monitoring well to 1,000 ft MD GL.
- Installed geophones
- Wellbore and surface equipment prepared to monitor the seismic signatures during testing and injection.
- The shallow monitoring hole (68-32) was drilled towards the western portion of the FORGE footprint (Figure 1)
- Geophones were run and sanded in place with the bottom of tool string at 924’
- Geophones were tested with a check shot in the barefoot section of Well 58-32 prior to the beginning of the planned injection program
- Two different geophone types were installed in the hole for comparison.

Health and Safety Program

The health and safety of all personal, and maintaining a clean, non-hazardous work environment (HSE), were the top priority during drilling and testing operations. The objective was to comply with the safety and environmental standards of the U of U.

On location, the project HSE plan was implemented, including:

- Daily safety meetings were held prior to each shift, addressing the importance of proper and safety conscious crew behavior
- Operation specific safety meetings with all personnel involved to identify safety risks and relevant precautions prior to specific tasks such as casing running, cementing, and logging
- Clear identification of muster areas at the location and clear lines communication for all personnel

No LTIs were reported during operations, no environmental hazards or any environmental impact were observed and there were no major or catastrophic service quality incidents.

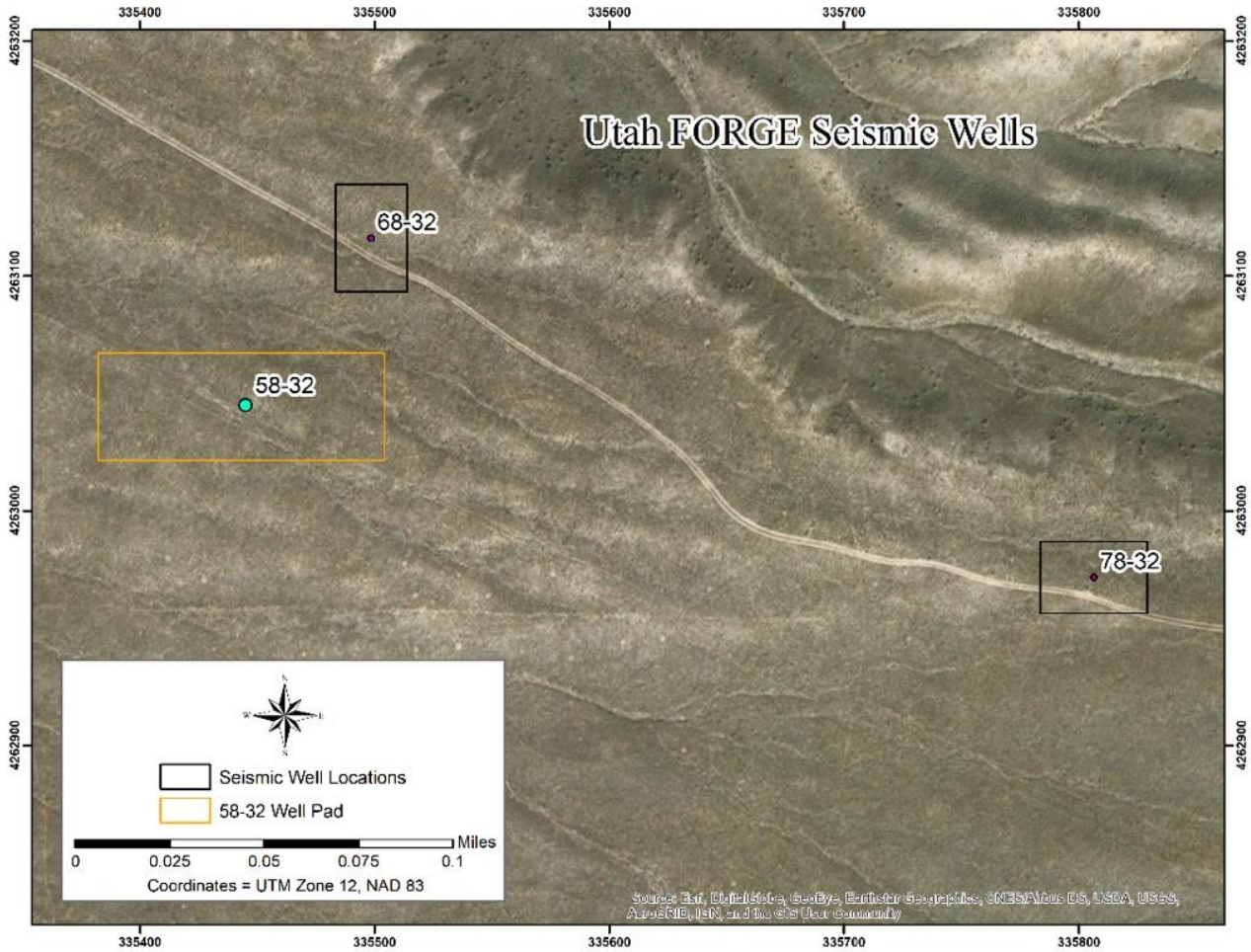


Figure 1: Drilling locations, well 68-32 and well 78-32

Well Data

All depth measurements are referred to the rotary Kelly bushing (RKB), which is 5.70 ft above ground level, unless otherwise stated.

Area:	Milford, Utah
Field:	FORGE, Utah
Operator:	University of Utah
Drilling Rig:	Hydro Resources Schramm T200XD # 10031
Drilling Project Manager	Geothermal Resource Group
Well Name:	68-32
Well Type:	Shallow Monitoring Well
Wellhead Location:	Lat/Long: 38.501591, -112.886654 UTM E 335781.1, N 4262993.8 Elevation: 5456.25 ft ASL
Coordinate Reference System:	WGS84 UTM Zone 11
Rotary Table Height (ft):	5.70 ft above GL.
Total Depth (ft):	1,000 ft.

Casing Properties and Well Profiles

Installed Casing Properties

The casing program for the shallow hole are shown in Table 1 and well profile is shown in Figure 2.

Section	Hole Size (”)	Casing Size (”)	Specifications	Nominal ID / Drift ID / Coupling OD (”)	Setting Depth (ft)	Remarks
Conductor	24	14	Welded	13.25	68.7	Pre-set, with a dry hole digger and cemented in place
Surface	8.5	5.5	17#, K-55, BTC	5.00/ 4.767/ 6.050	981	Cemented in place to surface, not drilled out, top of cement at float collar/wiper plug 932’

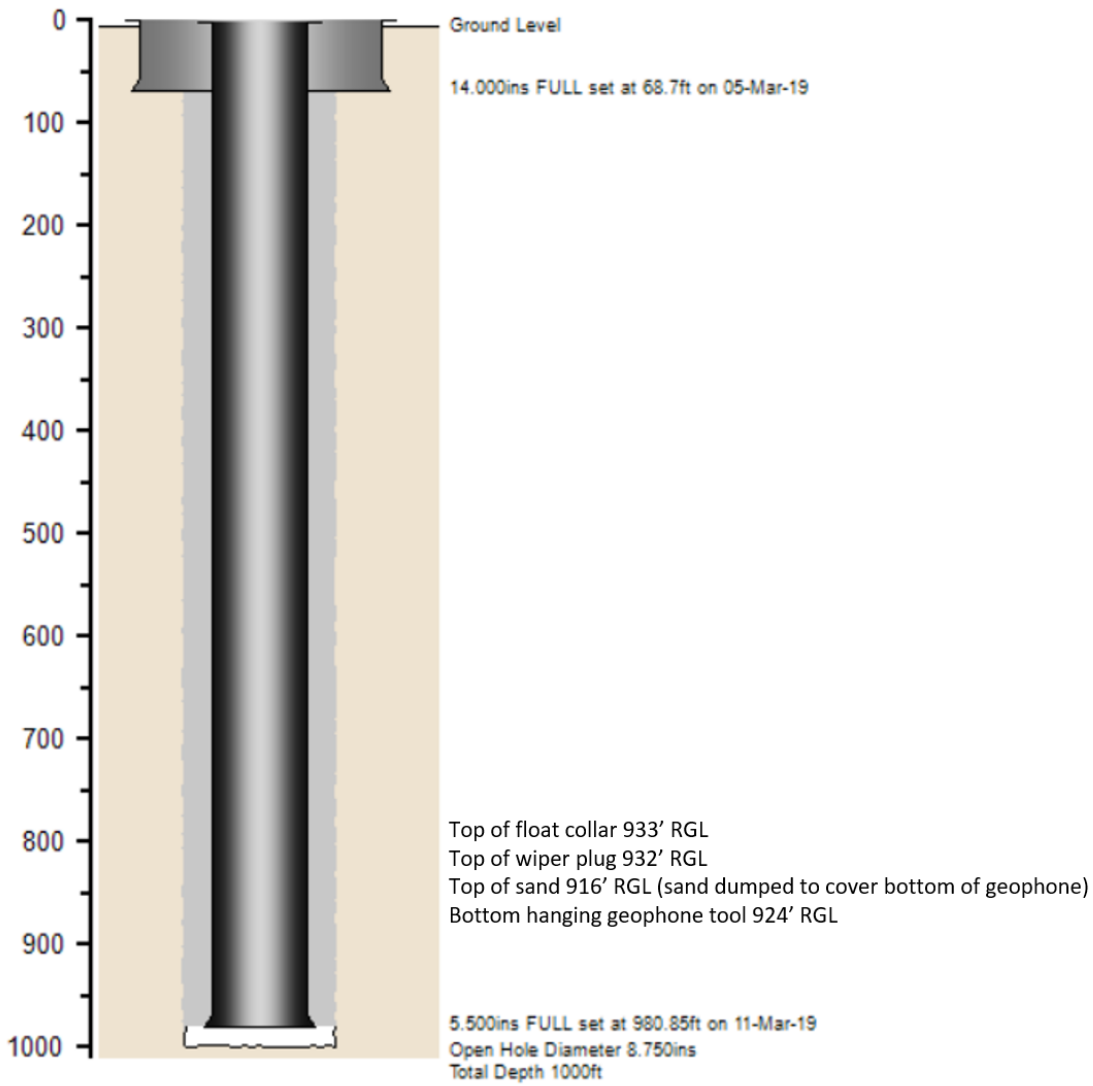


Figure 2: 68-32 well schematic.

Drilling Summary

University of Utah had obtained the necessary permit from Utah Division of Water Rights for drilling and rig mobilization and demobilization, and the necessary environmental clearance for drilling of 68-32. Operations were conducted in daylight hours only.

Conductor (preset)

The road to the rig was graded by Rollins Construction and two 500 bbl baker tanks were spotted on location. The conductor drilling rig was contracted by University of Utah, arriving on location at 19:00 hours on 4 March 2019. The conductor was set at 63 ft (from GL) in a 24" hole drilled with conductor drilling rig on 5 March 2019 and cemented in place using a tremie pipe and concrete pump truck to surface with 6.5 cubic yards with 50% excess volume.

Rig mobilization and Rig up

Hydro Resources Rig # 10031 (model: Schramm T200xd Portable Top Head drilling rig) was contracted by the University of Utah, on a turn-key contract to drill and complete the 1000 ft well. The rig) was mobilized, rigged-up on 68-32 pad and accepted on day rate at 6:00 hours on 9 March 2019.

Drilling 8-3/4" hole Section and running 5-1/2" Casing

A pre-spud meeting was held on 9 March 2019 at 12:30 hours and drilling began at 13:00 hours on 9 March. The 8-3/4" hole was drilled to 1000 ft in one day with one 8-3/4" bit run and full returns using a fresh water, low solids, non-dispersed mud system. At the planned hole total depth of 1000 ft, the well a wiper trip was completed to clean and condition the hole. The hole was circulated clean, with full returns, and the drill string was pulled out of the hole. A safety meeting was held prior to the running of the 5-1/2" casing to 978 ft. The cementing was done by Propetro after rig up and a safety meeting. The primary cement job was as follows: pumped 20 bbls of cement flush with green dye, cemented with 81.6 bbls of 15.8 ppg of Portland cement slurry with 2% calcium chloride and ¼#/sack of Flocele. The cement was displaced with 21.6 barrels of water, with full returns at surface. After waiting on cement, the top of cement was found 30 ft RKB.

The 5-1/2" casing was cut off above the rotating head and prepared for wellhead installation. Installed weld on well head and 2" outlet valve on the 5-1/2" casing (Figure 3). Ran wireline in the well, tagged up at 928 ft RKB. Installed well head cap and 2" valve and secured the well. Following this on 12 March, the rig was rigged down and moved to the pad for the planned second seismic monitoring hole.

Installation of seismic monitoring instruments

On 26 March operations commenced to prepare for running instruments on wireline into hole. First 1.5" PVC with wiper plug were run in the hole and used to blow 5-1/2" casing dry. A 50 lb sack of swimming pool sand was dumped in the dry well and twoseismic instruments were run in the well using the provided deploying spools. When the instrument tagged bottom, one 50 lb bag of swimming pool sand, the cables were secured together with zip ties every 50 ft as they were removed them from the spools and a waterproof cap assembly was installed with cables threaded through the supply line. Telemetry construction completed at 68-32 monitoring well on March 27 at 8:00 hours, after the signal tower was installed at site (Figure 3).

Figure 3: Surface completion of seismic monitoring well 68-32.

Lithology

Ryan Gall from the Utah Geologic Survey collected the cutting samples every 10 ft and prepared the final lithologic log for the well 68-32 shown in the following pages.

Utah Geological Survey
Lithologic Log

Well ID: 68-32

Page 1 of 6

Well Location: Beaver County, UT

UTM: x 335451.5 m, y 4263042.9 m NAD 83 Zone 12 N

N/S ____ ft, E/W ____ ft from ____ Corner, Sec ____, T ____ N/S R ____ E/W, SLBM USM

Start Date 3/9/2019 Completion Date 3/10/2019 Driller T. Curtis, Hydro Resources

Borehole Diameter: 14" from 0 to 69; 8 3/4" from 69 to 1000; ____ from ____ to ____

Casing Type & Diameter: 13 3/8" from 0 to 69; 5 1/2", K-55 from 69 to 1000; ____ from ____ to ____

Screen Type & Diameter: ____ from ____ to ____; ____ from ____ to ____

Ground Elevation: 1684.31' NAVD88

Logged By: R. Gall

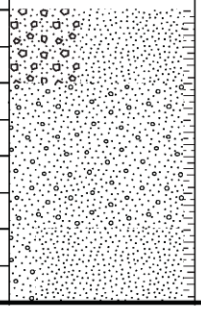
Water Level Information

Static Water Level ____

Water Level Date ____

Measured From ____

Gravel	ang - angular	qtz - quartz
Coarse & medium sand	cly - clay	sbang - subangular
Fine and very fine sand	crs - coarse	sbrnd - subrounded
Clay and silt	f - fine	slt - silt
Rhyolite	fldspr - feldspar	snd - sand
Granite	grvl - gravel	tr - trace
Diorite	m - medium	vf - very fine

DEPTH (FT)	LITHOLOGY	DRILLING NOTES	LITHOLOGY DESCRIPTION
10, 20, 30, 40, 50, 60, 70, 80, 90		Spud @ 1200 hrs 3/9/2019	0-60- No samples collected.
			All sand and gravel, unless otherwise noted, is dominantly felsic (>85% quartz and k-feldspar) with minor mafic grains (amphibole and biotite).
			60-70- 40% ang grvl. 60% ang f snd. Subordinate cly.
			70-80- 15% ang crs snd. 85% sbang m snd. Subordinate cly.
			80-90- 99% ang crs snd. 1% sbang m-f snd. Subordinate cly.
			90-100- 15% crs ang snd. 85% sbang-sbrnd m-f snd. Subordinate cly.

Well ID: 68-32 Page 2 of 6

DEPTH	LITHOLOGY	DRILLING NOTES	LITHOLOGY DESCRIPTION
			100-110- 60% ang crs snd. 40% sbang m-f sbang snd. Subordinate cly.
110			110-120- 25% ang grvl. 15% ang crs snd. 60% ang-sbang m snd. Subordinate cly.
120			120-130- 60% ang grvl. 40% sbrnd vf snd. Subordinate cly.
130			130-140- 55% ang grvl. 45% sbrnd vf snd. Subordinate cly.
140			140-150- 25% ang grvl. 75% sbrnd vf snd. Subordinate cly.
150		150' @ 1415 hrs 3/9/2019	150-160- 5% ang crs snd. 95% ang m-f snd. Subordinate cly.
160			160-170- 45% ang grvl. 55% sbang-sbrnd f-vf snd. Subordinate cly.
170			170-180- 25% ang grvl. 75% sbang-sbrnd f-vf snd. Subordinate cly.
180			180-190- 30% ang grvl. 60% ang crs snd. 10% sbang m snd. Subordinate cly.
190			190-200- 80% ang grvl, 20% sbang f snd. Subordinate cly.
200			200-210- 5% ang grvl. 35% ang crs snd. 60% sbang m snd. Subordinate cly.
210			210-220- 15% ang grvl. 85% sbang f snd. Subordinate cly.
220			220-230- 50% ang crs snd. 50% ang-sbang f snd. Subordinate cly.
230			230-240- 15% ang crs snd. 20% ang-sbang m snd. 65% ang-sbrnd vf snd. Subordinate cly.
240			240-250- 10% ang crs-m snd. 90% sbrnd vf snd. Subordinate cly.
250		250' @ 1530 hrs 3/9/2019	250-260- 5% ang crs snd. 80% ang-sbang m snd. 15% f-vf sbrnd snd. Subordinate cly.
260			260-270- 60% ang crs snd. 40% sbrnd f snd. Subordinate cly.
270			270-280- 15% ang crs snd. 15% ang m snd. 70% ang-sbrnd f snd. Subordinate cly.
280			280-290- 40% ang crs snd. 50% sbrnd m snd. 10% sbrnd f snd. Subordinate cly.
290			290-300- 25% ang grvl. 40% ang crs snd. 35% ang m snd. Subordinate cly.

Well ID: 68-32 Page 3 of 6

DEPTH	LITHOLOGY	DRILLING NOTES	LITHOLOGY DESCRIPTION
			300-310- 65% ang crs snd. 35% ang m snd. Subordinate cly.
310			310-320- 10% ang crs snd. 90% sbang f snd. Subordinate cly.
320			320-330- 5% ang crs snd. 45% sbang-sbrnd m snd. 50% sbrnd f-vf snd. Subordinate cly.
330			330-340- 50% ang crs snd. 50% sbang m-f snd. Subordinate cly.
340			340-350- 10% ang crs snd. 15% sbang m snd. 75% sbang f snd. Subordinate cly.
350		350' @ 1700 hrs 3/9/2019	350-360- 15% ang crs snd. 70% sbang m snd. 15% sbang-sbrnd f-vf snd. Subordinate cly.
360			360-370- 15% ang crs snd. 40% sbang m snd. 45% sbrnd-sbang f-vf snd. Subordinate cly.
370			370-380- 30% ang crs snd. 50% sbang m snd. 20% sbrnd f snd. Subordinate cly.
380			380-390- 15% ang crs snd. 80% sbang m snd. 5% sbang f snd. Subordinate cly.
390			390-400- 30% ang crs snd. 70% sbang-ang m-f snd. Subordinate cly.
400		400' @ 1745 hrs 3/9/2019	400-410- Tr crs snd. 100% sbrnd f snd. Subordinate cly.
410			410-420- 5% ang crs snd. 95% sbrnd f snd. Subordinate cly.
420			420-430- 5% ang crs snd. 95% sbrnd f snd. Subordinate cly.
430			430-440- 5% ang crs snd. 20% sbang-ang m snd. 75% sbrnd f snd. Subordinate cly.
440			440-450- 60% ang crs snd. 10% sbang m snd. 30% sbrnd f-vf snd. Subordinate cly.
450			450-460- 5% ang crs snd. 15% ang m snd. 80% ang-sbrnd f snd. Subordinate cly.
460			460-470- 5% ang crs snd. 20% ang-sbang m snd. 75% sbang-sbrnd snd. Subordinate cly.
470			470-480- Tr grvl. 45% ang crs snd. 15% ang-sbang m snd. 40% sbrnd f snd. Subordinate cly.
480			480-490- 10% ang crs snd. 30% sbang m snd. 60% sbrnd-sbang snd. Subordinate cly.
490			490-500- 15% ang crs snd. 65% sbang-sbrnd m snd. 20% sbrnd f snd. Subordinate cly.

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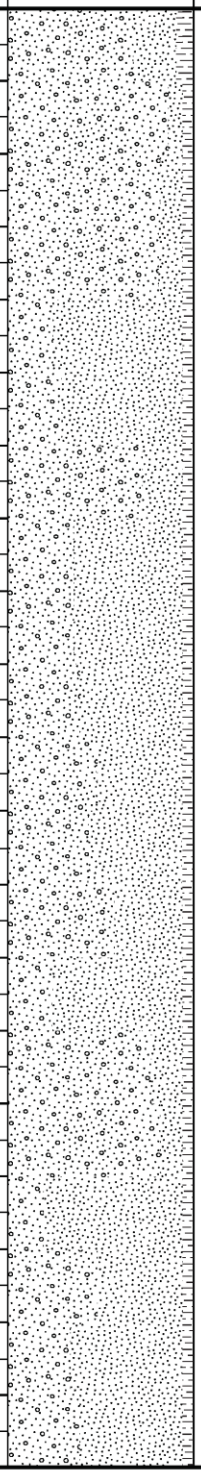
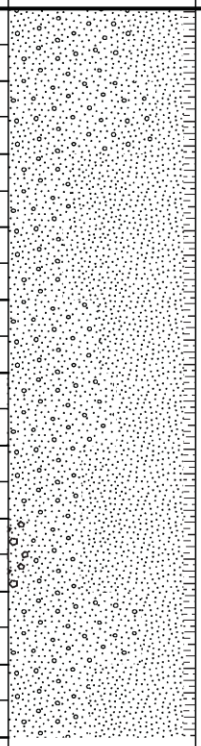
DEPTH	LITHOLOGY	DRILLING NOTES	LITHOLOGY DESCRIPTION
510 520 530 540 550 560 570 580 590 600 610 620 630 640 650 660 670 680 690		550' @ 1945 hrs 3/9/2019 Cease drilling for generator maintenance @ 2030 hrs. Night shift time drilling due to cement transport delay. 3/9/2019	500-510- 70% ang crs snd. 30% sbang-sbrnd m-f snd. Subordinate cly. 510-520- 40% ang crs snd. 50% sbang m snd. 10% sbrnd f snd. Subordinate cly. 520-530- 85% ang crs snd. 15% sbang m-f snd. Subordinate cly. 530-540- 45% ang crs snd. 45% sbang m snd. 10% sbrnd f-vf snd. Subordinate cly. 540-550- 25% ang crs snd. 70% sbang-sbrnd f snd. Subordinate cly. 550-560- 10% ang crs snd. 20% ang m snd. 70% sbang-sbrnd f snd. Subordinate cly. 560-570- 15% ang crs snd. 60% ang m snd. 25% ang-sbang f-vf snd. Subordinate cly. 570-580- 15% ang crs snd. 20% ang m snd. 65% ang-sbang f snd. Subordinate cly. 580-590- 15% ang crs snd. 20% ang m snd. 65% ang-sbang f snd. Subordinate cly. 590-600- 40% ang crs snd. 60% sbang f-vf snd. Subordinate cly. 600-610- 5% ang crs snd. 45% ang m snd. 50% sbang f snd. Subordinate cly. 610-620- Tr ang crs snd. 45% ang m snd. 50% sbang f snd. Subordinate cly. 620-630- 20% ang crs snd. 40% ang m snd. 40% ang-sbang f-vf snd. Subordinate cly. 630-640- 25% ang crs snd. 75% sbang f-vf snd. Subordinate cly. 640-650- 45% ang crs snd. 35% ang m snd. 20% sbang f-vf snd. Subordinate cly. 650-660- 60% ang crs snd. 30% ang m snd. 10% sbang vf-f snd. Subordinate cly. 660-670- 10% ang crs snd. 10% ang m snd. 80% sbang f-vf snd. Subordinate cly. 670-680- 30% ang crs snd. 20% ang m snd. 50% f-vf ang snd. Subordinate cly. 680-690- 15% ang crs snd. 20-% ang m snd. 65% sbang f-vf snd. Subordinate cly. 690-700- 15% ang crs snd. 25% ang m snd. 60% sbang f-vf snd. Subordinate cly.

Well ID: 68-32 Page 5 of 6

DEPTH	LITHOLOGY	DRILLING NOTES	LITHOLOGY DESCRIPTION
		700' @ 0800 hrs 3/10/2019	700-710- 25% ang crs snd. 40% ang m snd. 35% sbang f-vf snd. Subordinate cly.
710			710-720- 10% ang crs snd. 30% ang m snd. 60% ang-sbang f-vf snd. Subordinate cly.
720			720-730- 5% ang crs snd. 25% ang m snd. 70% sbang vf-f snd. Subordinate cly.
730			730-740- 10% ang grvl. 5% ang crs snd. 15% ang m snd. 70% ang-sbang f-vf snd. Subordinate cly.
740			740-750- 5% ang grvl. 25% ang crs snd. 45% ang m snd. 25% sbang f snd. Subordinate cly.
750			750-760- 25% ang crs snd. 45% ang m snd. 30% sbang f-vf snd. Subordinate cly.
760			760-770- 5% ang grvl. 5% ang crs snd. 20% ang m snd. 70% ang-sbang f-vf snd. Subrodinate cly.
770		770' @ 1000 hrs 3/10/2019	770-780- Tr grvl. 50% ang crs snd. 50% ang m snd. 10% sbang f snd. Subordinate cly.
780			780-790- 35% ang crs snd. 45% ang m snd. 30% ang-sbang f-vf snd. Suboridinate cly.
790			790-800- 20% ang crs snd. 30% ang m snd. 50% sbang f-vf snd. Subordinate cly.
800		Rig maintenance @ 1030 hrs 3/10/2019	800-810- 40% ang crs snd. 40% ang m snd. 20% sbang f-vf snd. Subordinate cly.
810			810-820- 30% ang crs snd. 20% ang m snd. 50% sbang f-vf snd. Subordinate cly.
820			820-830- 15% ang crs snd. 35% ang m snd. 50% sbang f-vf snd.Subordinate cly.
830			830-840- 20% ang crs snd. 20% ang m snd. 60% sbang f-vf snd.Subordinate cly.
840			840-850- 30% ang crs snd. 50% ang md snd. 20% sbang vf snd. Subordinate cly.
850			850-860- 15% ang crs snd. 15% ang m snd. 70% sbang f-vf snd. Subordinate cly.
860		860' @ 1130 hrs 3/10/2019	860-870- 5% ang crs snd. 15% ang m snd. 80% sbang f-vf snd. Subordinate cly.
870			870-880- 10% ang crs snd. 45% ang m snd. 45% sbang f-vf snd. Subordinate cly.
880			880-890- 20% ang crs snd. 20% ang m snd. 60% sbang f-vf snd. Subordinate cly.
890			890-900- 5% ang crs snd. 10% ang m snd. 85% sbang-ang f-vf snd. Subordinate cly.

Well ID: 68-32 Page 6 of 6

DEPTH	LITHOLOGY	DRILLING NOTES	LITHOLOGY DESCRIPTION
910 920 930 940 950 960 970 980 990 1000		920' @ 1215 hrs 3/10/2019 Reach 1000' TD @ 1400 hrs 3/10/2019	900-910- 30% ang crs snd. 35% ang m snd. 35% sbang f-vf snd. Subordinate cly. 910-920- 15% ang crs snd. 70% ang m snd. 15% sbang f-vf snd. Subordinate cly. 920-930- 15% ang crs snd. 20% ang m snd. 65% sbang f-vf snd. Subordinate cly. 930-940- 15% ang crs snd. 15% ang m snd. 70% sbang f-vf snd. Subordinate cly. 940-950- 20% ang crs snd. 30% ang m snd. 50% sbang f-vf snd. Subordinate cly. 950-960- 25% ang crs snd. 35% ang m snd. 40% sbang f-vf snd. Subordinate cly. 960-970- 20% ang crs snd. 20% ang m snd. 60% sbang f-vf snd. Subordinate cly. 970-980- 10% ang grvl. 20% ang crs snd. 10% ang m snd. 60% ang f-vf snd. Subordinate cly. 980-990- 30% ang crs snd. 40% ang m snd. 30% sbang f-vf snd. Subordinate cly. 990-1000- 15% ang crs snd. 30% ang m snd. 55% sbang f snd. Subordinate cly. TD bottoms up- Tr grvl. 40% ang crs snd. 40% ang m snd. 20% sbang vf snd. Subordinate cly.

APPENDICES

1. Daily Drilling Reports
2. Operations Activity Detail Report
3. Operations Time Graph
4. Bit report
5. Casing report
6. Surveys
7. Instrument Installation Procedure provided by VLF

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 1 **Report For 01-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**	---
Measured Depth (ft):	0	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.** / **AFE ($)**	**Actual ($)**
Vertical Depth (ft):	0	**Last Casing:**		**RKB Elevation (ft):**	0.00	--- / ---	---
Proposed TD (ft):	1000	**Next Casing:**	14.000 at 60			--- / ---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**	--- / ---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**	---

Drilling Days (act./plan): 0/0 **Flat Days (act./plan):** 0/0 **Total Days (act./plan):** 0/0 **Days On Location:** 1

Current Ops: Waiting on daylight and remainder of loads for rig up.

Planned Ops: Continue unloading equipment.

Toolpusher: **Supervisors:** Randy Baldwin **Tel No.:**

Comments: 3 loads of the rig arrived on Feb 28.

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
6:00	18:00	12.00	0	1-39	Rollins graded road to rig. Spotted 2 each 500 bbl baker tanks. Unloaded 45 joints of 5-1/2" 17# casing and 21 joints of 9-5/8" 36# casing on 58 pad.	
18:00	0:00	6.00	0	2-99	Waiting on day ligth	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 1 **Cont:** 0 **Serv:** 0 **Othr:** 1

Total Personnel: 2 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 2 **Report For 02-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	0	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	0	**Last Casing:**		**RKB Elevation (ft):**	0.00	---		---	---
Proposed TD (ft):	1000	**Next Casing:**	14.000 at 60			---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**			2

Current Ops: Waiting on daylight.

Planned Ops: Continue moving rig to location.

Toolpusher: **Supervisors:** Randy Baldwin **Tel No.:**

Comments:

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	0	2-99	Waiting on day light	
6:00	18:00	12.00	0	1-39	Received and unloaded 4 more loads of the rig	
18:00	0:00	6.00	0	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 1 **Cont:** 0 **Serv:** 0 **Othr:** 0

Total Personnel: 1 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 3 **Report For 03-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**	---
Measured Depth (ft):	0	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.** / **AFE ($)**	**Actual ($)**
Vertical Depth (ft):	0	**Last Casing:**		**RKB Elevation (ft):**	0.00	--- / ---	---
Proposed TD (ft):	1000	**Next Casing:**	14.000 at 60			--- / ---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:** ---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**	---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**	3

Current Ops: Waiting on daylight.

Planned Ops: Continue moving rig and begin to set up.

Toolpusher: **Supervisors:** Randy Baldwin **Tel No.:**

Comments:

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	0	2-99	Waiting on daylight.	
6:00	18:00	12.00	0	1-39	Waiting on rest of the rig from Colorado.	
18:00	0:00	6.00	0	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 1 **Cont:** 0 **Serv:** 0 **Othr:** 0

Total Personnel: 1 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 4 **Report For 04-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	0	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	0	**Last Casing:**		**RKB Elevation (ft):**	0.00	---		---	---
Proposed TD (ft):	1000	**Next Casing:**	14.000 at 60			---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**			4

Current Ops: Waiting on Daylight

Planned Ops: Drill conductor holes. Run and cement 60 ft of 14" conductor on both pads.

Toolpusher: **Supervisors:** Randy Baldwin **Tel No.:**

Comments:

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	0	2-99	Waiting on daylight.	
6:00	19:00	13.00	0	1-39	3 Hydroresource hands arrived. Rollins graded dirt road. Received and unloaded an additional 45 joints of 5-1/2" 17# casing. Total of approx 4,000 ft of 5-1/2" and approx 800 ft 9-5/8" casings. Received and unloaded 120 ft of 14" 0.375" thick conductor pipe. Rollins put 160 bbls of water in each of the baker tanks on each location. Conductor drilling rig arrived on location at 19:00 hrs.	
19:00	0:00	5.00	0	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI:		**Days Since:**	
Med:		**1st Aid:**	
Accident Description:			
Oper:	1	**Cont:**	3
Serv:	0	**Othr:**	0
Total Personnel:	4	**Hours:**	0

Environment

Cum. Water Hauled:	0.000	acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 5 **Report For 05-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	69	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	69	**Last Casing:**	14.000 at 69	**RKB Elevation (ft):**	0.00	---		---	---
Proposed TD (ft):	1000	**Next Casing:**	5.500 at 1,000			---		---	---
Hole Made (ft) / Hrs:	69 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**			5

Current Ops: Waiting on daylight.

Planned Ops: Start rigging up.

Toolpusher: **Supervisors:** Randy Baldwin **Tel No.:**

Comments: Still need mud pits and mud pump. Should be here Wednesday or Thursday depending on weather.

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	0	2-99	Waiting on daylight.	
6:00	18:00	12.00	69	1-39	Received 4 more rig loads. Drilled 24" hole to 63 ft ground level on both pads. Installed 14",3/8" wall thickness casing to 63 ft ground level. 70 ft KB. Cement with tremie pipe and concrete pump truck to surface with 6.5 cu yards on both pads.	
18:00	0:00	6.00	69	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI:		**Days Since:**	
Med:		**1st Aid:**	
Accident Description:			
Oper:	1	**Cont:**	3
Serv:	0	**Othr:**	3
Total Personnel:	7	**Hours:**	0

Environment

Cum. Water Hauled:	0.000	acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 6 **Report For 06-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	69	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	69	**Last Casing:**	14.000 at 69	**RKB Elevation (ft):**	0.00	---		---	---
Proposed TD (ft):	1000	**Next Casing:**	5.500 at 1,000			---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**			6

Current Ops: Waiting on daylight.

Planned Ops: Continue to rig up.

Toolpusher: Tyler Curtis **Supervisors:** Randy Baldwin **Tel No.:**

Comments: Mud pump will be here Thursday. 5 additional personnel showed up today for a total of 8 to rig up. Will be 2 each 3 men crews while

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	69	2-99	Waiting on Daylight.	
6:00	18:00	12.00	69	1-39	Spotted rig sub base over well. Backed up rig onto sub base. Raised rig legs. Raised derrick. Spotted dog house, generator house, storage connex, fuel tank, light plants and mud pits.	
18:00	0:00	6.00	69	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI:		**Days Since:**	
Med:		**1st Aid:**	
Accident Description:			
Oper:	1	**Cont:**	8
Serv:	0	**Othr:**	0
Total Personnel:	9	**Hours:**	0

Environment

Cum. Water Hauled:	0.000	acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 7 **Report For 07-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	69	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	69	**Last Casing:**	14.000 at 69	**RKB Elevation (ft):**	0.00	---		---	---
Proposed TD (ft):	1000	**Next Casing:**	5.500 at 1,000			---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**			7

Current Ops: Waiting on daylight.

Planned Ops: Continue rigging up.

Toolpusher: Tyler Curtis **Supervisors:** Randy Baldwin **Tel No.:**

Comments:

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	69	2-99	Waiting on daylight.	
6:00	18:00	12.00	69	1-39	Weld on well head. Installed rotating head. Installed shaker and gas buster. Spotted mud pump and pipe handler. Rigged up rig floor. Received 2 loads of water.	
18:00	0:00	6.00	69	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI:		**Days Since:**	
Med:		**1st Aid:**	
Accident Description:			
Oper:	1	**Cont:**	8
Serv:	1	**Othr:**	0
Total Personnel:	10	**Hours:**	0

Environment

Cum. Water Hauled:	0.000	acre-ft

Rig/Weather Information

No Rig Information for this report.

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 8 **Report For 08-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	69	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	69	**Last Casing:**	14.000 at 69	**RKB Elevation (ft):**	5.70	---		---	---
Proposed TD (ft):	1000	**Next Casing:**	5.500 at 1,000			---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	0/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	0/0	**Days On Location:**			8

Current Ops: Waiting on daylight.

Planned Ops: Finish rigging up. Have pre-spud meeting. Mix spud mud. Start drilling 8-3/4" hole.

Toolpusher: Tyler Curtis **Supervisors:** Randy Baldwin **Tel No.:**

Comments:

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	69	2-99	Waiting on daylight.	
6:00	18:00	12.00	69	1-39	Spotted mud pit. Fabricated new pump discharge and suction lines. Rigged up lights, hand rails, fuel lines, and electrical lines. Filled pit with water.	
18:00	0:00	6.00	69	2-99	Waiting on daylight.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI:		**Days Since:**	
Med:		**1st Aid:**	
Accident Description:			
Oper:	1	**Cont:**	8
Serv:	0	**Othr:**	1
Total Personnel:	10	**Hours:**	0

Environment

Cum. Water Hauled:	0.000	acre-ft

Rig/Weather Information

Equipment Problems: 3-09 Repair light plant generator = 1.5 hrs

Location Condition:

Transport Status:

No Weather Information for this report.

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 9 **Report For 09-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	636	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	636	**Last Casing:**	14.000 at 69	**RKB Elevation (ft):**	5.70	---	---		---
Proposed TD (ft):	1000	**Next Casing:**	5.500 at 1,000			---	---		---
Hole Made (ft) / Hrs:	567 / 9.5	**Last BOP Test:**				**Totals:**	---		---
Average ROP (ft/hr):	59.72	**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	1/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	1/0	**Days On Location:**			9

Current Ops: Continue time drilling to 680 ft.

Planned Ops: Drill ahead to casing point at 1,000 ft. Wait on cementers.

Toolpusher: Tyler Curtis **Supervisors:** Randy Baldwin, Roger Almond **Tel No.:**

Comments: Timed drill. Cementers won't be here until Tuesday morning.

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	6:00	6.00	69	2-99	Waiting on daylight.	
6:00	12:30	6.50	69	1-01	Rigged up. Prepared to spud.	
12:30	13:00	0.50	69	4-98	Held Pre-Spud safety meeting.	
13:00	20:00	7.00	537	3-2-1	Rotary drilled 8-3/4" hole from 69 ft to 537 ft with full returns. ROP=60 ft/hr. WOB= 1k. RPM=60. SPM=60. SPP=500 psi. GPM=420	
20:00	21:30	1.50	537	8-8	Worked on light plant generator. Light plant overheated and shut down.	X
21:30	0:00	2.50	636	3-2-1	Rotary drilled 8-3/4" hole from 537 ft to 636 ft with full returns. ROP=60 ft/hr. WOB= 1k. RPM=65. SPM=60. SPP=500 psi. GPM=420.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4				Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow	Press	J.Vel	P.Drp	HHP	JIF
1 1	BAKER	DS616M	8.750	20	20	20	20	636	9.5	66.9	1,000	60		8.70	420	550	73	42	10	138

DepthOut: 1,000 **Cutter:Inner/Outer:** 1/1 **Dull:Maj/Oth:** WT/NO **WearLoc:** A **Brgs:** N **Gauge:** 1 **Pull:** TD

BHA - No. 1 - BIT, BS, 15 DC, XO = 454.00

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out
09-Mar-19 18:00	8.70	36														/ /	/

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.
69-636	60.0 / 100.0	1,000	60		420	199.6	182.8	600

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 2 **Cont:** 8 **Serv:** 0 **Othr:** 2

Total Personnel: 12 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Surveys

MD	Inc.	Azim.	TVD	NS	EW
140	0.2				
290	0.6				
490	0.7				

Rig/Weather Information

Equipment Problems:

Location Condition:

Transport Status:

Sky: Partly Cloudy **Vis.:** 9 **Temp:** 39 **Pressure:** 29.91 **Wind:** 7 **Gusts:** 10

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 10 **Report For 10-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	1000	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	1000	**Last Casing:**	14.000 at 69	**RKB Elevation (ft):**	5.70	---	---		---
Proposed TD (ft):	1000	**Next Casing:**	5.500 at 1,000			---	---		---
Hole Made (ft) / Hrs:	364 / 15.0	**Last BOP Test:**				**Totals:**	---		---
Average ROP (ft/hr):	24.27	**Next BOP Test:**				**Well Cost ($):**			---

Drilling Days (act./plan): 2/0 **Flat Days (act./plan):** 0/0 **Total Days (act./plan):** 2/0 **Days On Location:** 10

Current Ops: Tripped into hole. Washed and cleaned out 4' of fill. Circulated to clean hole for casing. Pulled out of hole.

Planned Ops: Finish pulling out of hole. Rig up and run 5-1/2" casing. Rig and pump cement. Wait on cement.

Toolpusher: Tyler Curtis, Kollins. **Supervisors:** Randy Baldwin, Roger Almond **Tel No.:**

Comments:

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	15:00	15.00	1,000	3-2-1	Time drilled 8-3/4" hole from 636' to 1,000' with full returns. ROP=28 ft/hr. WOB= 1k. RPM=65. SPM=60. SPP=500 psi. GPM=420. Survey @ 776' Inc 0.6*, 986', Inc 1.8*.	
15:00	20:00	5.00	1,000	4-5-1	Circulated hole. Dug displacement ditch for cement job.	
20:00	21:00	1.00	1,000	4-27	Wiper trip to 600'. No tight or over pull spots on trip.	
21:00	0:00	3.00	1,000	4-5-1	Circulated while load casing on trailer.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4				Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow	Press	J.Vel	P.Drp	HHP	JIF
1 1	BAKER	DS616M	8.750	20	20	20	20	1,000	24.5	40.8	1,000	65		8.80	450	500	78	48	13	161

DepthOut: 1,000 **Cutter:Inner/Outer:** 1/1 **Dull:Maj/Oth:** WT/NO **WearLoc:** A **Brgs:** N **Gauge:** 1 **Pull:** TD

BHA - No. 1 - BIT, BS, 15 DC, XO = 454.00

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out
10-Mar-19 18:00	8.80	37														/ /	/

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.
636-1000	24.0 / 100.0	1,000	65		450	213.9	195.9	500

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 2 **Cont:** 8 **Serv:** 0 **Othr:** 0

Total Personnel: 10 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Rig/Weather Information

Equipment Problems:

Location Condition:

Transport Status:

Sky: Partly Cloudy **Vis.:** 10 **Temp:** 49 **Pressure:** 29.15 **Wind:** 11 **Gusts:** 15

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 11 **Report For 11-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	1000	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	1000	**Last Casing:**	5.500 at 981	**RKB Elevation (ft):**	5.70	---		---	---
Proposed TD (ft):	1000	**Next Casing:**				---		---	---
Hole Made (ft) / Hrs:	0 / 1.5	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):	0.0	**Next BOP Test:**				**Well Cost ($):**			---

Drilling Days (act./plan): 3/0 **Flat Days (act./plan):** 0/0 **Total Days (act./plan):** 3/0 **Days On Location:** 11

Current Ops: Cut off 5-1/2" casing. Ran wire line to tag cement at 24' from ground level. Moving rig to 78-32 well site. Rig is 80% moved at 6am. ...

Planned Ops: Weld on well head and test. Dump sand inside 5-1/2" casing and check with wire line. Finish moving out rig and begin rigging up on ...

Toolpusher: Tyler Curtis, Kollins. **Supervisors:** Randy Baldwin, Roger Almond **Tel No.:**

Comments: While wait on cement rig crews rigged down rig and moved out equipment. Top of cement was found at 30' from RKB at midnight

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	1:00	1.00	1,000	10-5-1	Circulated while load 5-1/2" casing on trailer.	
1:00	2:00	1.00	1,000	11-6-3	RIH with drill pipe to 996'.	
2:00	5:00	3.00	1,000	11-5-1	Circulated hole clean for 5-1/2" casing. Washed and clean out 4' of soft fill and ...	
5:00	6:00	1.00	1,000	10-6-4	Pulled out of the hole with drill pipe.	
6:00	7:30	1.50	1,000	3-6-2	Pulled of the hole with the BHA, break out bit and crossovers subs and lay down.	
7:30	9:00	1.50	1,000	4-12-1	Prepare rig floor to run casing. Move out drill pipe and DCs. Set in casing trailer.	
9:00	9:15	0.25	1,000	4-98	Held safety meeting to run 5-1/2" casing to 978' .	
9:15	12:30	3.25	1,000	4-12-1	Drifted and ran 5-1/2" casing to 978'.	
12:30	13:00	0.50	1,000	4-56	Rig up to cement casing. Held safety meeting. Rigged up cementing lines.	
13:00	15:00	2.00	1,000	CMTP	Performed primary cement job. Pumped 20 bbls of 8.33 ppg @ 4.0 bpm cement flush ...	
15:00	0:00	9.00	1,000	6-13	Waited on cement. Check top of cement @ 20:00 hrs. Cement at 30' from RKB. ...	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4				Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press		J.Vel	P.Drp	HHP	JIF
1 1	BAKER	DS616M	8.750	20	20	20	20	1,000	24.5	34.0	1,000	65		8.80	450	700	78	48	13	161

DepthOut: 1,000 **Cutter:Inner/Outer:** 1/1 **Dull:Maj/Oth:** WT/NO **WearLoc:** A **Brgs:** N **Gauge:** 1 **Pull:** TD

BHA - No. 1 - BIT, BS, 15 DC, XO = 454.00

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 2 **Cont:** 8 **Serv:** 9 **Othr:** 0

Total Personnel: 19 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Rig/Weather Information

Equipment Problems:

Location Condition:

Transport Status:

Sky: Partly Cloudy **Vis.:** 10 **Temp:** 45 **Pressure:** 30.01 **Wind:** 9 **Gusts:** 12

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 12 **Report For 12-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	1000	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	1000	**Last Casing:**	5.500 at 981	**RKB Elevation (ft):**	5.70	---		---	---
Proposed TD (ft):	1000	**Next Casing:**				---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---

Drilling Days (act./plan): 4/0 **Flat Days (act./plan):** 0/0 **Total Days (act./plan):** 4/0 **Days On Location:** 12

Current Ops: FINAL REPORT FOR 68-32: RIG RELEASED for Rigging up on 78-32 well site.

Planned Ops: Move rig to 78-32 well site and rig up.

Toolpusher: Tyler Curtis, Kollins. **Supervisors:** Randy Baldwin, Roger Almond **Tel No.:**

Comments: Rig was 95% cleared off location at 18:00 hrs. The two frac-tanks with displaced mud were left. Still need to top off 24 ft of 5-1/2" X ...

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	0:30	0.50	1,000	6-35	Cutoff 5-1/2" casing at above rotating head. Laid down cut off section.	
0:30	2:30	2.00	1,000	1-01	Ready mast and lay over mast. Rig down and load out rig floor. Jack down mast section and move out.	
2:30	3:30	1.00	1,000	6-35	Cut off conductor pipe and remove rotating head. Ran wire line and found top of cement at 24' from ground level.	
3:30	6:00	2.50	1,000	1-01	Clean up location with back hoe.	
6:00	9:00	3.00	1,000	6-35	Prepared 5-1/2" casing for well head. Weld on well head and 2" side outlet valve.	
9:00	10:00	1.00	1,000	3-58	Run wire line to 928' tagged up.	
10:00	10:30	0.50	1,000	6-35	Install well head cap and 2" valve to secure well.	
10:30	0:00	13.50	1,000	1-01	Continue to move rig equipment to 78-32 well site. Set in mud pits, water tank, spot mask section jack up and raise mast. Set in floor section. Doghouse/parts house combo house. Set in light plant. Set in mud pump. Rig up hoses and flow lines. Truck over mud from Baker tanks to mud pits.	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI: **Days Since:**

Med: **1st Aid:**

Accident Description:

Oper: 2 **Cont:** 8 **Serv:** 0 **Othr:** 1

Total Personnel: 11 **Hours:** 0

Environment

Cum. Water Hauled: 0.000 acre-ft

Rig/Weather Information

Equipment Problems:

Location Condition:

Transport Status:

Sky: Cloudy **Vis.:** 10 **Temp:** 55 **Pressure:** 29.52 **Wind:** 14 **Gusts:** 18

Daily Drilling Report

GRG

Well ID: Forge 68-32 **Job ID: Original** **Well Name: 68-32**

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Report No: 13 **Report For 26-Mar-19**

Operator:	University of Utah	**Rig:**	#10031	**Spud Date:**	09-Mar-19	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	1000	**Working Interest:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	1000	**Last Casing:**	5.500 at 981	**RKB Elevation (ft):**	5.70	---		---	---
Proposed TD (ft):	1000	**Next Casing:**				---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Last BOP Test:**				**Totals:**		---	---
Average ROP (ft/hr):		**Next BOP Test:**				**Well Cost ($):**			---
Drilling Days (act./plan):	4/0	**Flat Days (act./plan):**	0/0	**Total Days (act./plan):**	4/0	**Days On Location:**			12

Current Ops: Project completed

Planned Ops: Hook up surface receivers

Toolpusher: Tyler Curtis, Kollins. **Supervisors:** Randy Baldwin, Roger Almond **Tel No.:**

Comments: Prior to 3/26 operation ran 1.5" PVC to wiper plug and blew 5.5" dry NOTE; Casing tally shows Top of float collar @ 933.22 from ...

Operations Summary

From	To	Elapsed	End MD(ft)	Code	Operations Description	Non-Prod
0:00	8:00	8.00	1,000	SEPTRT	Prior to 3/26 operation ran 1.5" PVC to wiper plug and blew 5.5" dry	
8:00	16:00	8.00	1,000	SEPTRT	Dump 1 each 50# sack of swimming pool sand in dry well, changed instrument springs due to tight fit, Ran instrument in well using deploying spools sent to project, once instrument tagged bottom dump 1 each 50# bag of swimming pool sand, relaxed cables in well bore, removed them from spools, installed water proof cap assembly with cables threaded through supply line NOTE: installed zip ties every 50'	

Bit/BHA Information

No/Run	Make	Model	Diam	Jets 1-4	Dist	Hrs	ROP	WOB	RPM	Torq	MudWt	Flow Press	J.Vel	P.Drp	HHP	JIF

No Bit Information for this report.

BHA - None

Mud Reports

Date/Time	Dens.	Vis.	PV	YP	Filt.	Cake	pH	Solids	Oil	Water	Sand	LGS	Cl	Ca	CaCl	Gels	Temp In/Out

No Mud Records for this report.

Drilling Parameters

Depth	ROP Av/Mx	WOB	RPM	Torque	Flow	AV:DC	AV:DP	Press.

No Drilling Parameters Records for this report.

Mud Log

Depth	Gas:Back	Max	Conn	Trip	Pore Pres.

No Mud Log Information for this report.

Inventory

Item	Used	Invent.	Item	Used	Invent.

No Inventory Records for this report.

Safety Information

LTI:		**Days Since:**	
Med:		**1st Aid:**	
Accident Description:			
Oper:	1	**Cont:**	0
Serv:	0	**Othr:**	0
Total Personnel:	1	**Hours:**	0

Environment

Cum. Water Hauled:	0.000	acre-ft

Rig/Weather Information

Equipment Problems:

Location Condition:

Transport Status:

No Weather Information for this report.

Operations Activity Detail

GRG

Well ID: Forge 68-32

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Rpt. No.	Date	Time	To	Hrs	End MD	Ops Code	Activity Description	Non-Prod.
1	01-Mar-19	06:00	18:00	12	0	1-39	Rollins graded road to rig. Spotted 2 each 500 bbl baker tanks. Unloaded 45 joints of 5-1/2" 17# casing and 21 joints of 9-5/8" 36# casing on 58 pad.	
		18:00	00:00	6	0	2-99	Waiting on day ligth	
2	02-Mar-19	00:00	06:00	6	0	2-99	Waiting on day light	
		06:00	18:00	12	0	1-39	Received and unloaded 4 more loads of the rig	
		18:00	00:00	6	0	2-99	Waiting on daylight.	
3	03-Mar-19	00:00	06:00	6	0	2-99	Waiting on daylight.	
		06:00	18:00	12	0	1-39	Waiting on rest of the rig from Colorado.	
		18:00	00:00	6	0	2-99	Waiting on daylight.	
4	04-Mar-19	00:00	06:00	6	0	2-99	Waiting on daylight.	
		06:00	19:00	13	0	1-39	3 Hydroresource hands arrived. Rollins graded dirt road. Received and unloaded an additional 45 joints of 5-1/2" 17# casing. Total of approx 4,000 ft of 5-1/2" and approx 800 ft 9-5/8" casings. Received and unloaded 120 ft of 14" 0.375" thick conductor pipe. Rollins put 160 bbls of water in each of the baker tanks on each location. Conductor drilling rig arrived on location at 19:00 hrs.	
		19:00	00:00	5	0	2-99	Waiting on daylight.	
5	05-Mar-19	00:00	06:00	6	0	2-99	Waiting on daylight.	
		06:00	18:00	12	68.7	1-39	Received 4 more rig loads. Drilled 24" hole to 63 ft ground level on both pads. Installed 14",3/8" wall thickness casing to 63 ft ground level. 70 ft KB. Cement with tremie pipe and concrete pump truck to surface with 6.5 cu yards on both pads.	
		18:00	00:00	6	68.7	2-99	Waiting on daylight.	
6	06-Mar-19	00:00	06:00	6	68.7	2-99	Waiting on Daylight.	
		06:00	18:00	12	68.7	1-39	Spotted rig sub base over well. Backed up rig onto sub base. Raised rig legs. Raised derrick. Spotted dog house, generator house, storage connex, fuel tank, light plants and mud pits.	
		18:00	00:00	6	68.7	2-99	Waiting on daylight.	
7	07-Mar-19	00:00	06:00	6	68.7	2-99	Waiting on daylight.	
		06:00	18:00	12	68.7	1-39	Weld on well head. Installed rotating head. Installed shaker and gas buster. Spotted mud pump and pipe handler. Rigged up rig floor. Received 2 loads of water.	
		18:00	00:00	6	68.7	2-99	Waiting on daylight.	
8	08-Mar-19	00:00	06:00	6	68.7	2-99	Waiting on daylight.	
		06:00	18:00	12	68.7	1-39	Spotted mud pit. Fabricated new pump discharge and suction lines. Rigged up lights, hand rails, fuel lines, and electrical lines. Filled pit with water.	
		18:00	00:00	6	68.7	2-99	Waiting on daylight.	
9	09-Mar-19	00:00	06:00	6	68.7	2-99	Waiting on daylight.	
		06:00	12:30	6.5	68.7	1-01	Rigged up. Prepared to spud.	
		12:30	13:00	0.5	68.7	4-98	Held Pre-Spud safety meeting.	
		13:00	20:00	7	537	3-2-1	Rotary drilled 8-3/4" hole from 69 ft to 537 ft with full returns. ROP=60 ft/hr. WOB= 1k. RPM=60. SPM=60. SPP=500 psi. GPM=420	
		20:00	21:30	1.5	537	8-8	Worked on light plant generator. Light plant overheated and shut down.	X
		21:30	00:00	2.5	636	3-2-1	Rotary drilled 8-3/4" hole from 537 ft to 636 ft with full returns. ROP=60 ft/hr. WOB= 1k. RPM=65. SPM=60. SPP=500 psi. GPM=420.	

Operations Activity Detail

GRG

Well ID: Forge 68-32

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Rpt. No.	Date	Time	To	Hrs	End MD	Ops Code	Activity Description	Non-Prod.
10	10-Mar-19	00:00	15:00	15	1000	3-2-1	Time drilled 8-3/4" hole from 636' to 1,000' with full returns. ROP=28 ft/hr. WOB= 1k. RPM=65. SPM=60. SPP=500 psi. GPM=420. Survey @ 776' Inc 0.6*, 986', Inc 1.8*.	
		15:00	20:00	5	1000	4-5-1	Circulated hole. Dug displacement ditch for cement job.	
		20:00	21:00	1	1000	4-27	Wiper trip to 600'. No tight or over pull spots on trip.	
		21:00	00:00	3	1000	4-5-1	Circulated while load casing on trailer.	
11	11-Mar-19	00:00	01:00	1	1000	10-5-1	Circulated while load 5-1/2" casing on trailer.	
		01:00	02:00	1	1000	11-6-3	RIH with drill pipe to 996'.	
		02:00	05:00	3	1000	11-5-1	Circulated hole clean for 5-1/2" casing. Washed and clean out 4' of soft fill and circulated hole with full returns.	
		05:00	06:00	1	1000	10-6-4	Pulled out of the hole with drill pipe.	
		06:00	07:30	1.5	1000	3-6-2	Pulled of the hole with the BHA, break out bit and crossovers subs and lay down.	
		07:30	09:00	1.5	1000	4-12-1	Prepare rig floor to run casing. Move out drill pipe and DCs. Set in casing trailer.	
		09:00	09:15	0.25	1000	4-98	Held safety meeting to run 5-1/2" casing to 978' .	
		09:15	12:30	3.25	1000	4-12-1	Drifted and ran 5-1/2" casing to 978'.	
		12:30	13:00	0.5	1000	4-56	Rig up to cement casing. Held safety meeting. Rigged up cementing lines.	
		13:00	15:00	2	1000	CMTP	Performed primary cement job. Pumped 20 bbls of 8.33 ppg @ 4.0 bpm cement flush with green dye. Pumped 81.6 bbls of 15.8 ppg Portland cement @ 3.5 bpm. Cleared cement from cement line with 8.33 ppg fresh water. Pumped displacement water and casing wiper plug with 21.6 bbls of 8.33 ppg fresh water@ 3.0 bpm. Bumped plug with 1,400 psi. Float held and release psi. CIP @ 14:40 hrs. Rigged down cementers.	
		15:00	00:00	9	1000	6-13	Waited on cement. Check top of cement @ 20:00 hrs. Cement at 30' from RKB. Moved pipe handling equipment, mud pits, water tank.	
12	12-Mar-19	00:00	00:30	0.5	1000	6-35	Cutoff 5-1/2" casing at above rotating head. Laid down cut off section.	
		00:30	02:30	2	1000	1-01	Ready mast and lay over mast. Rig down and load out rig floor. Jack down mast section and move out.	
		02:30	03:30	1	1000	6-35	Cut off conductor pipe and remove rotating head. Ran wire line and found top of cement at 24' from ground level.	
		03:30	06:00	2.5	1000	1-01	Clean up location with back hoe.	
		06:00	09:00	3	1000	6-35	Prepared 5-1/2" casing for well head. Weld on well head and 2" side outlet valve.	
		09:00	10:00	1	1000	3-58	Run wire line to 928' tagged up.	
		10:00	10:30	0.5	1000	6-35	Install well head cap and 2" valve to secure well.	
		10:30	00:00	13.5	1000	1-01	Continue to move rig equipment to 78-32 well site. Set in mud pits, water tank, spot mask section jack up and raise mast. Set in floor section. Doghouse/parts house combo house. Set in light plant. Set in mud pump. Rig up hoses and flow lines. Truck over mud from Baker tanks to mud pits.	
13	26-Mar-19	00:00	08:00	8	1000	SEPTRT	Prior to 3/26 operation ran 1.5" PVC to wiper plug and blew 5.5" dry	
		08:00	16:00	8	1000	SEPTRT	Dump 1 each 50# sack of swimming pool sand in dry well, changed instrument springs due to tight fit, Ran	

Operations Activity Detail

GRG

Well ID: Forge 68-32

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Rpt. No.	Date	Time	To	Hrs	End MD	Ops Code	Activity Description	Non-Prod.
							instrument in well using deploying spools sent to project, once instrument tagged bottom dump 1 each 50# bag of swimming pool sand, relaxed cables in well bore, removed them from spools, installed water proof cap assembly with cables threaded through supply line NOTE: installed zip ties every 50'	
		Total Hours:		298				

Operations Time Graph

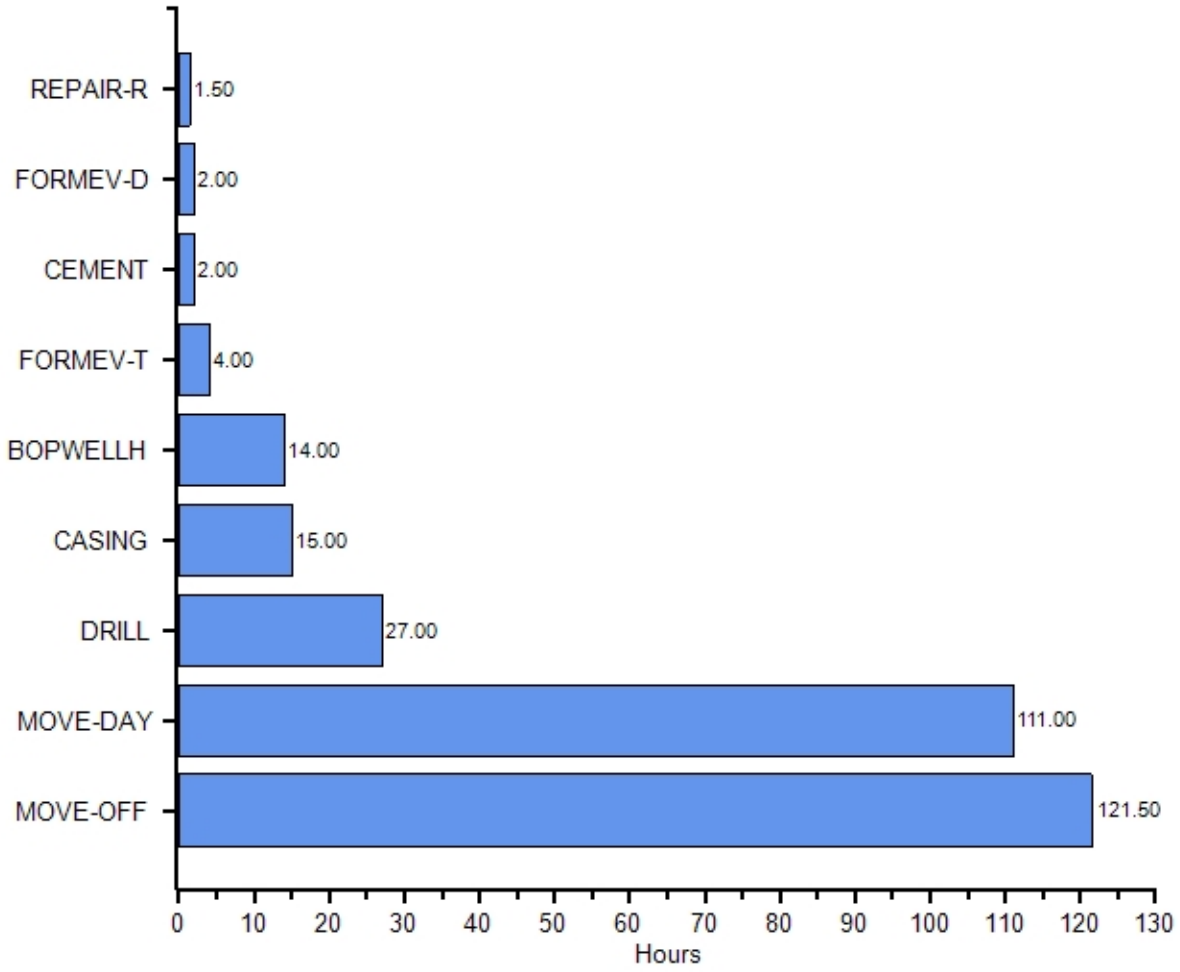
Well ID: Forge 68-32

GRG

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Operations Analysis Type: Analysis by Group Totals



Operations Time Details

Description	Time (hrs)	%
MOVE-OFF	121.50	40.8%
MOVE-DAY	111.00	37.2%
DRILL	27.00	9.1%
CASING	15.00	5.0%
BOPWELLH	14.00	4.7%
FORMEV-T	4.00	1.3%
CEMENT	2.00	0.7%
FORMEV-D	2.00	0.7%
REPAIR-R	1.50	0.5%
Total Time:	**298.00 hrs**	

Bit Summary Report

Well ID: Forge 68-32

GRG

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

No	Run No	Diam	Manuf.	Model	Serial No	Nozzles - 1/32 in							TFA	Date/Time In	Depth - ft In	Depth - ft Out	Hole Made	Hrs	ROP	WOB	RPM	Flow	MWt	Grading In	Grading Out	Grading Major	Grading Loc	Grading Brg	Grading Gge	Grading Oth	Grading Pull
Well ID: Forge 68-32																																**Well Name: 68-32**
1	1	8.750	BAKER	DS616M AC1	A220225	20	20	20	20	20	20			1.841	09-Mar-19 11:00	69	1000	931	24.5	34.0	1000	65	450	8.80	1	1	WT	A	N	1	NO	TD
Bit Run Comments: New PDC bit																																
												Report No:	9	Date:	09-Mar-19		636	9.5	66.9	1000	60	420	8.70	Jet Vel:		73.2	P. Drop:		41.7		
												Report No:	10	Date:	10-Mar-19		364	15.0	40.8	1000	65	450	8.80	Jet Vel:		78.4	P. Drop:		48.4		
												Report No:	11	Date:	11-Mar-19				34.0	1000	65	450	8.80	Jet Vel:		78.4	P. Drop:		48.4		

Casing Information Report

GRG

Well ID: Forge 68-32

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Casing Information

Run Date/Time:	11-Mar-19 12:30		
		Leak Off Test (lbs/gal):	
Well Section:	INT1	**String Type:**	FULL
String Top MD (ft):	2.00	**String Top TVD (ft):**	2.00
Casing Shoe MD (ft):	980.85	**Casing Shoe TVD (ft):**	981.00
String Nominal OD (ins):	5.500	**String Nominal ID (ins):**	4.892
Bit Diameter (ins):	8.750	**Avg. Open Hole Diam. (ins):**	8.800
Centralizers: No:	12	**Manufacturer/Type:**	Bows
Depths:	88,178, 266, 355, 444, 533, 622, 710, 799, 888, 933, 973		
Hanger Type:		**Manufacturer:**	
Comments:	Transferred from Casing Tally Detail on 11-Mar-19 03:05		

String Component Details

No. Items	Item Type	Length (ft)	O.D.(ins)	I.D. (ins)	Weight (lbs)	Grade	Connection	Torque (ft lbs)
1	SHOE	2.00	6.000	4.892			BUTT	
1	JOINT	44.58	5.500	4.892	17.0	K-55	BUTT	
1	FLOAT	1.05	6.000	4.892			BUTT	
21	JOINT	933.22	5.500	4.892	17.0	K-55	BUTT	
Total Items:	24	980.85						

Directional Survey Report

GRG

Well ID: Forge 68-32

Well Name: 68-32

Sect: 26 Town: 26S Rng: 9W County: Beaver State: UT

Survey Type	Meas. Depth (ft)	Inc. (deg)	Azimuth (deg)	TVD (ft)	Coordinates N-S (ft)	Coordinates E-W (ft)	Closure (ft)	Vertical Section (ft)	Dog Leg Severity (deg/100)
Wellbore:	**Original Wellbore**			**Plane of Vertical Section:**	**0**				
** TieIn	0.0	0.00	0	0.0	0.0	0.0		0.0	
MSS	140.0	0.20							
MSS	290.0	0.60							
MSS	490.0	0.70							
MMS	776.0	0.50							
MMS	986.0	1.80							

Calculations using Minimum Curvature Method

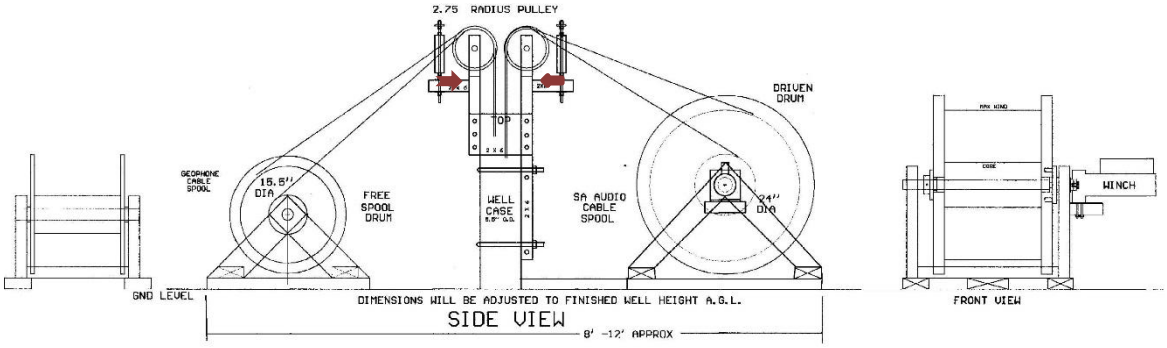
Borehole Installation Process

VLF Designs
1621 Bella Vista Dr
Jackson, mo. 63755
573-204-1286
Vlfdesigns1@gmail.com

All of the necessary parts for the installation have been provided in the crate or previous shipment of cable takeout parts. The crate can be easily opened by removing all the green screws around the bottom of the crate that secure the crate to the pallet. Once the screws have been removed, lift the crate top off the pallet.

The wire rolls and other parts have been secured to the pallet with various types of fasteners. Remove the sensor first by cutting the green wire ties at either end. Do not remove the black cable tie around the sensor. Lift the sensor free of the pallet and set aside. Then remove the casing top pulley system by removing the wood screws holding it to the pallet. Set it aside for now. Remove the screws holding the cable rolls down. The winch drum and cable weighs about 140 pounds . you will need 2 people to lift it off the pallett. The geophone cable spool weighs about 50 pounds and may be lifted by one person. Transport all the materials to the well site.

Place the two cable spools 6-8ft from the observation well casing in opposite directions. Orient the reels so that the cable will spool from the top of the rolls toward the well. Using the 12 " nails, spike the rolls to the ground. Note: On the winch spool it may be necessary to place a 2X8 between the well casing and the winch spool. Secure the spool to the 2x8 with the wood screws provided. Cut a 5-1/2" semicircle radius out of the end of the 2x8 that will be against the well. This will keep it from sliding off the casing.



Clamp the pulley system lightly to the casing so that the top u-bolt is almost even with the top of the casing.(This is a temporary position for the pulley assembly so that the guides can be lowered.) Orient the pulley system so that the cables from the rolls will be approximately centered on the pulleys. Remove the 2) 3/8" x 8" top carriage bolts from the cable guide assemblies (red arrows). This will allow the cable guides to pivot out of the way. Remove the aluminum keeper plates from the top of the threaded rods. This will allow the cables to slide between the guide rollers.

Carry the sensor toward the casing. You will need two people for this portion of the project. One will hold the cable to prevent the sensor from sliding down the hole. The other will cut the black cable tie while holding the spring loaded push rod against the sensor. The spring loaded rod will attempt to push free of the sensor. The springs that are in the spring loaded rod push out with about 10 pounds of pressure. Gently lower the sensor into the hole and allow the spring loaded rod to expand against the side of the hole. Verify that the sensor will easily slide down the hole. If necessary remove the sensor and replace both springs with the shorter springs in the spare parts kit, and retry. Once the sensor is in the hole a few feet below the end of the

casing, pivot the cable guides back up and replace the carriage bolts in the main clamp assembly. Once the cable is in place replace the keeper bar and tighten the nuts that hold it in place. The guide roller elevations can be adjusted by moving the nuts on the threaded rod. Do not overtighten the nuts, as this will cause the guide rollers to bind. Do the same procedure for the other pulley. When the cables are in position, loosen the u bolts and slide the pulley assembly down on the casing so that the casing is even with the top of the side boards on the pulley assembly. (the bottom of the pullies will be 6-8" above the end of the casing.) Before engaging the winch, make sure that all of the hardware on the pulley assembly and u-bolt clamps have been tightened.

The winch requires 120VAC at a maximum of 11 amps. It will draw considerably less while lowering the sensor. The winch has a load brake which will keep the cable from free spooling into the well. After you have lowered approximately 50 ft of cable in to the well cable tie the 2 sensor cables together with 2 cable ties approximately 2" apart. Do this about every fifty feet. Continue to lower the sensor and cables until the cable goes slack. Check the temperature of the winch motor occasionally and allow it to cool down if necessary. It has a circuit breaker to protect against overload.

Once the sensor has reached the bottom of the hole allow excess cable to spiral into the casing until no more cable is accepted. Remove the fixed end of the cable from the wooden reels. Fish it through the neoprene bushing the 4" elbows and the reducing fittings. Slide the neoprene bushing over the well casing and tighten the hose clamps. If the casing is too large and prying the bushing on to it does not work, cut 4 small ¾" cuts in the bottom bead of the bushing under the hose clamp, so that it will slip more easily over the end of the pipe. You can cement the pipe parts together or simply push them together until refusal. Cut a small length off the flexible conduit to connect the tee to the reducer. Feed the ground wire and the 2 signal cables through the reducer and tee assembly. The ground wire exits the tee assembly through the cord seal. Leave enough ground wire to reach the ground clamp. Feed the signal cables and ground wire through the flexible conduit after cutting the conduit to the desired length. A male adapter has been provided for the other end of the flex conduit. The flex conduit should be glued into the male adapter for a watertight connection.

Attach the ground clamp to the well and the ground wire to one of the lugs on the clamp. The other lug is for the antenna mast for the solar panel and antenna.

Once the wires are inside the vault, cut to length leaving 5-6 ft of slack cable and strip back about 2-3 inches of wire and remove approx. ¼" of insulation from each wire. The geophone cable has three pairs and the accelerometer cable has three pairs and three additional wires. The ground wire from the casing is attached to the lug on the side where the sensor cables attach. If the recorder has a ground lug, attach a short piece of wire between the lug on the recorder and the other copper lug on the preamp box. Make the connections according to the wiring diagram provided. Note that the shields on the geophone cable should be terminated as shown. On the accelerometer cable, twist all of the shield drain wires and the white single conductor together and tie down under the analog gnd position on the terminal block. Follow the color coding on the drawing attached to the back inside of the preamp box in order to have proper polarity signals that will match those of the geophones.

If you accidentally reverse polarity of the power , the circuit is protected with a self resetting poly fuse. Once activated it takes a couple of minutes to reset, (once the misconnection

is fixed!). Plug the umbilical cables into the recorder and you should begin recording data in about 30 seconds. (The accelerometer goes through a self calibration cycle which can last up to 30 seconds before data will appear on the output.) The gain switches for the geophone have been set in the 0dB (all open) position. If you need additional gain, close the switches for the desired gain. All three channels should be set identically.

(PS: Ch1=Z, Ch2 =N-S and CH3 = E-W on both sensors in case you forgot!) a positive voltage= ground motion up, toward the North and toward the East. Of course it goes without saying that the orientation of the horizontal components is not known at the bottom of the well. It will need to be determined from teleseisms or other sources.

Once the sensor is operating, pour about ½ bag of dry clean pool sand into the hole. this will fill the annulus between the sensor and the casing and help to couple high frequency signals to the sensors.