SANDIA REPORT
SAND2024-13085
Printed September 2024

Sandia National Laboratories

Analysis of Rig Parameter Data Using Drilling Process Modeling Constraints:

Volume 4: Utah FORGE Well 78B-32

David W. Raymond, Melanie B. Schneider, Adam J. Foris and Jaiden E. Norton

Prepared by
Sandia National Laboratories
Albuquerque, New Mexico
87185 and Livermore,
California 94550

Issued by Sandia National Laboratories, operated for the United States Department of Energy by National Technology & Engineering Solutions of Sandia, LLC.

Available to DOE and DOE contractors from
U.S. Department of Energy
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831

Telephone: (865) 576-8401
Facsimile: (865) 576-5728
E-Mail: reports@osti.gov
Online ordering: http://www.osti.gov/scitech

Available to the public from
U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Rd
Alexandria, VA 22312

Telephone: (800) 553-6847
Facsimile: (703) 605-6900
E-Mail: orders@ntis.gov
Online order: https://classic.ntis.gov/help/order-methods/

ABSTRACT

Drill rig parameter measurements are routinely used during deep well construction to monitor and guide drilling conditions for improved performance and reduced costs. While insightful into the drilling process, these measurements are of reduced value without a standard to aid in data evaluation and decision making. In the main body of this work (Volume 1), a method is demonstrated whereby rock reduction model constraints are used to interpret drilling response parameters; the method could be applied in real-time to improve decision-making in the field and to further discern technology performance during post-drilling evaluations. Drilling parameters are evaluated using laboratory-validated rock reduction models for predicting the phenomenological response of drag bits (Detournay and Defourny, 1992) in computational algorithms. The method presented has applicability to development of advanced analytics on future geothermal wells using real-time electronic data recording for improved performance and reduced drilling costs. A drilling cost model is also used to show the tradeoff between rate of penetration and bit life and the influence on interval drilling costs.

Details of the bit specifications and performance are cataloged in an independent volume, documented under separate cover, for each of the four wells, and include Volume 2: Utah FORGE 16A(78)-32; Volume 3: Utah FORGE 56-32; Volume 4: Utah FORGE 78B-32 and Volume 5: Utah FORGE 16B(78)-32.

This page left blank

ACKNOWLEDGEMENTS

The authors are indebted to Utah FORGE, Frontier Drilling, Nabors, Pason, NOV, Baker Hughes, Ulterra Drilling Technologies, Smith International, Scout, GeoGuidance and others for permission to use information in preparing this work. The sponsorship of the US Department of Energy Geothermal Technologies Office (DOE/EERE/GTO) is gratefully acknowledged. In particular, funding for drilling activities at the FORGE site was provided by the U.S. DOE under grant DE-EE0007080 "Enhanced Geothermal System Concept Testing and Development at the Milford City, Utah FORGE Site."

This page left blank

CONTENTS

LIST OF FIGURES

LIST OF TABLES

EXECUTIVE SUMMARY

The United States Department of Energy has sponsored development of geothermal well construction at the Utah Frontier Observatory for Research in Geothermal Energy (FORGE). Drill rig parameter data were acquired by drilling contractor Frontier Drilling and evaluated for four wells: 1) Utah FORGE 16A(78)-32, a directional injection well with vertical depth to a kick-off point at 5892 ft and a 65 degree tangent to a measured depth of 10987 ft and, 2) Utah FORGE 56-32, a vertical monitoring well to a depth of 9145 ft, 3) Utah FORGE 78B-32, a vertical well drilled to a depth of 9500 ft, and 4) Utah FORGE 16B(78)-32, a directional production well drilled vertically to a kick-off point at 5269 ft, and a 65 degree tangent to a measured depth of 10947 ft. Sandia National Labs has accessed, cataloged, evaluated and recorded drill bit performance information used on the four Utah FORGE wells herein.

The subject drilling program has resulted in a large database of bit performance and durability records for drilling hot, hard rock characteristic of geothermal reservoirs. The majority of the Utah FORGE wells were drilled almost exclusively with Polycrystalline Diamond Compact (PDC) drill bits. The characteristic features of PDC bits and cutters are accordingly reviewed. While synthetic diamond cutter materials and bit design methodologies have improved over time, the recent success of these types of bits in hard rock formations may also be attributed to monitoring of drilling system response parameters using electronic data recorders on the surface rig for preferential performance and bit health monitoring.

Drill rig parameter measurements are routinely used during deep well construction to monitor and guide drilling conditions for improved performance and reduced costs. While insightful into the drilling process, these measurements are of reduced value without a standard to aid in data evaluation and decision making. In the main body of this work (Volume 1), a method is demonstrated whereby rock reduction model constraints are used to interpret drilling response parameters; the method could be applied in real-time to improve decision-making in the field and to further discern technology performance during post-drilling evaluations. Drilling parameters are evaluated using laboratory-validated rock reduction models for predicting the phenomenological response of drag bits (Detournay and Defourny, 1992) in computational algorithms. The method presented has applicability to development of advanced analytics on future geothermal wells using real-time electronic data recording for improved performance and reduced drilling costs.

Bit program and performance summaries are tabulated and presented for each well. These summaries include bit manufacturer model references, drilling system penetration rates, and overall bit lives. Representative drilling parameter data are evaluated to illustrate parameter use to monitor bit response, wear, and cutting structure damage. These bits failed by both normal wear and tear and drilling dynamic dysfunctions resulting in chipped and worn cutters, cutter shear and ring outs. Nevertheless, exemplar bit penetration rates easily exceeded 100 ft/hr and produced several 100 feet of hole construction. The tradeoff between rate of penetration and bit life is addressed with a drilling cost model using representative drilling cost parameters.

Details of the bit specifications and performance are cataloged in an independent volume, documented under separate cover, for each of the four wells, and include Volume 2: Utah FORGE 16A(78)-32; Volume 3: Utah FORGE 56-32; Volume 4: Utah FORGE 78B-32 and Volume 5: Utah FORGE 16B(78)-32. Bottom hole assembly information and daily drilling reports are also included.

This page left blank

ACRONYMS AND DEFINITIONS

Abbreviation	Definition
BHA	Bottom Hole Assembly
DOE	Department of Energy
EDR	Electronic Data Recording
FORGE	Frontier Observatory for Research in Geothermal Energy
GTO	Geothermal Technology Office
ROP	Rate of Penetration
WOB	Weight on Bit

This page left blank

1. BACKGROUND AND INTRODUCTION

Geothermal drilling is difficult as the rock is hot, hard, and often fractured. Wellbore construction costs have historically dominated the cost of geothermal energy development and have been an impediment to widespread development of geothermal energy. Technology improvements are needed to enable improved access and reduced drilling costs.

One technology improvement that can be applied to geothermal wellbore construction is the use of polycrystalline diamond compact (PDC) drill bits. Research and development on PDC drill bits has been sponsored by the United States Department of Energy for years resulting in improved diamond formulations, bonding techniques, bit designs, and hardening features that comprise the state of the art in the drilling industry. The oil and gas industry has benefited widely from these developments as the bits are routinely used to drill the majority of oil and gas wells worldwide. While the geothermal industry has benefited from incidental use of PDC bits for geothermal drilling, recent use of PDC bits at the DOE-sponsored Utah FORGE site has resulted in significant data for evaluation to address the efficacy of PDC bits for geothermal drilling.

1.1. Utah FORGE

The DOE-sponsored program, Utah Frontier Observatory for Research in Geothermal Energy (FORGE) was implemented to foster the development and demonstration of technologies supporting commercial applications of geothermal energy. The site is located near Milford, Utah (Moore, 2019). US DOE sponsorship of the FORGE activities de-risks developing technology for accessing deep geothermal reserves on a broad scale. One of the primary obstacles to commercial geothermal development is high drilling costs. The FORGE campaign applies state-of-the-art drilling technology to demonstrate well construction and completion activities on a utility scale. Multiple wells are planned over the life of the FORGE program. Well 16A(78)-32 is a directional well. Well 56-32 is a vertical monitoring well. Well 78B-32 is a vertical monitoring well. Well 16B(78)-32 is a directional well. These four wells were drilled with the top-drive, triple shown in Figure 1-1.

Figure 1-1. Frontier Rig 16 used to drill wells 16A(78)-32, 56-32, 78B-32 and 16B(78)-32.

1.2. Sandia Role

With a long legacy of programmatic research pertaining to the development of synthetic diamond drill bit technology, Sandia is participating with DOE/EERE/GTO and the Utah FORGE drilling program to provide evaluations of the rock reduction technologies used at Utah FORGE. Although not expressly involved in the day-to-day decisions associated with the drilling program, the Sandia team has accessed electronic data recording services to review drilling system performance. This effort has primarily been focused on monitoring and evaluation of multiple parameters to identify areas where improved productivity and cost savings can be realized via improved drilling performance. Drilling response parameters have been compared to rock reduction model constraints that have been proven in the laboratory to identify possible performance enhancement areas.

The methods used have been exercised in a post-processing manner. To provide the greatest benefit to the drilling process, a method is needed to enable the intuitive interpretation of response parameters and is amenable to implementation in computational algorithms for real-time evaluation. A method is demonstrated whereby drilling response parameters may be interpreted for improved drilling performance. This analysis is not an exhaustive assessment but rather an overview of representative bit performance that demonstrates the application of the approach using rock reduction constraints. Drilling data from the Utah FORGE site have been used for the analyses.

2. FORGE WELL 78B-32

2.1. Well Program

Utah FORGE Well 78B-32 was drilled vertically to a depth of 9500 ft. The well profile is shown in Figure 2-1.

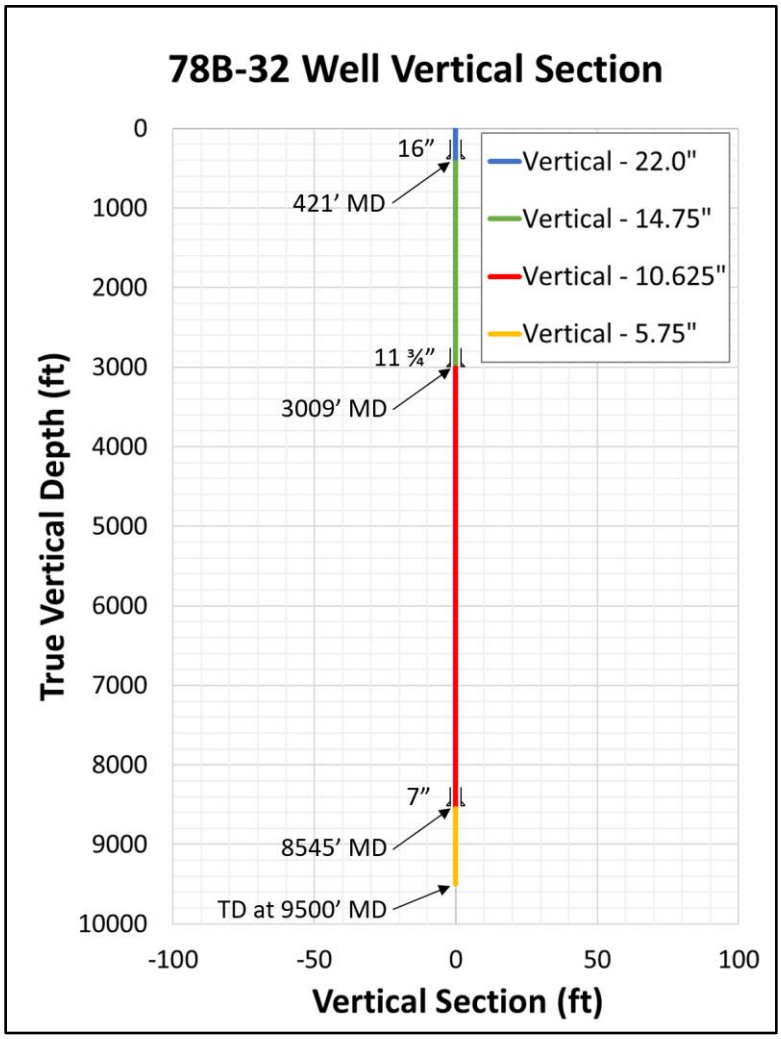


Figure 2-1. Utah FORGE Well 78B-32 Profile.

2.2. Drilling Parameter Data Acquisition

Pason US DataHub service was used to access Electronic Data Recording.

2.3. Drilling Narrative

Well 78B-32 bit runs comprised the following:

- 22” Surface Hole
  - Bit Run #1 (Frontier Bit #1) drilled 22” hole from 128’ to 421’.

    - 16” diameter casing was set and cemented.
    - Bit Run #_ (Frontier Bit #_) drilled out the cement to 416’
- 14-3/4” Vertical Hole
    - Bit Run #2 (Frontier Bit #2) drilled 14-3/4” hole from 421’ to 433’.
    - Bit Run #3 (Frontier Bit #3) drilled 14-3/4” hole from 433’ to 2699’.
    - Bit Run #4 (Frontier Bit #4) drilled 14-3/4” hole from 2699’ to 3009’.
    - 11-3/4” diameter casing was set and cemented.
    - Bit Run #5 (Frontier Bit #_) was used to drill out the cement.
- 10-5/8” Vertical Hole
    - Bit Run #6 (Frontier Bit #6) drilled 10-5/8” vertical hole from 3009’ to 3651’.
    - Bit Run #7 (Frontier Bit #7) drilled 10-5/8” vertical hole from 3651’ to 5761’.
    - Bit Run #8 (Frontier Bit #8) drilled 10-5/8” vertical hole from 5761’ to 5821’.
    - Bit Run #9 (Frontier Bit #9) drilled 10-5/8” vertical hole from 5821’ to 6700’.
- 8-3/4” Core Hole
    - Bit Run #10 (Frontier Bit #10) drilled 8-3/4” core hole from 6700’ to 6728’.
    - Bit Run #11 (Frontier Bit #11) drilled 8-3/4” core hole from 6728’ to 6742’.
- 10-5/8” Vertical Hole
    - Bit Run #12 (Frontier Bit #12) drilled 10-5/8” vertical hole from 6740’ to 6742’.
    - Bit Run #13 (Frontier Bit #13) drilled 10-5/8” vertical hole from 6742’ to 7613’.
    - Bit Run #14 (Frontier Bit #14) drilled 10-5/8” vertical hole from 7613’ to 8500’.
    - Bit Run #15 (Frontier Bit #15) drilled 10-5/8” vertical hole from 8500’ to 8530’.
- 5-¾” Vertical Hole
    - Bit Run #16 (Frontier Bit #16) drilled 5-¾” vertical hole from 8530’ to 8555’.
    - Bit Run #17 (Frontier Bit #16) drilled 5-¾” vertical hole from 8555’ to 9500’.

2.4. Bit Program & Performance Summary

The bit program and resulting performance experienced on FORGE 45-32 are shown in Table 2-1 and Figure 2-2. Individual bit run summaries and processed data for FORGE well 16B(78)-32 is summarized in Section 3. A bit run summary is included for each bit along with BHA component information where pre-drill and post-drill images are included when available. The EDR data acquired for each bit was taken at a rate of one sample per second. This data is processed for each drill-ahead bit and includes 1) Reduction parameters (WOB, Torque on Bit, Bit Speed, and ROP vs. Depth, 2) Depth of cut per revolution vs. Depth, 3) Specific Energy and Drilling Strength vs. Depth, 4) Specific Energy vs. Drilling Strength (the linear regression does not account for the scatter due to sliding), 5)

Rotary Speed Components (Top Drive, Motor and Bit) vs. depth, and 6) Rotary Torque components (Top Drive, Motor and Bit) vs. depth.

Table 2-1. FORGE well 78B-32 Bit Summary

Bit Run No.	Manufacturer	Type	Serial No	BHA	Bit Dia.	Depth Start (ft)	Depth End (ft)	Total Footage (ft)	Time on Bottom (hrs)	Net ROP (ft/hr)
1	Smith	XR-C	-	1	22	128	421	293	4	84
2	BAKER	GT-C1	-	2	14.75	421	433	12	1	16
3	ReedHycalog	TKC66	A279635	3	14.75	433	2699	2266	10	239
4	ReedHycalog	TKC63	A279636	4	14.75	2699	3009	310	9	36
5	VAREL	VM-1	-	5	10.625	3009	3009	0	2	0
6	ReedHycalog	TKC83	A279637	6	10.625	3009	3651	642	13	50
7	ReedHycalog	TKC83	A279639	7	10.625	3651	5761	2110	28	76
8	ReedHycalog	TKC83	A279690	8	10.625	5761	5821	60	1	100
9	ReedHycalog	TKC83	A279692	9	10.625	5821	6700	879	11	81
10	HALLBTN	FC3843	13340636	10	8.75	6700	6728	28	2	19
11	HALLBTN	FC3843	12958459	11	8.75	6700	6740	40	1	44
12	BAKER	MYR547	1116990	12	10.625	6740	6742	2	1	3
13	ReedHycalog	TKC83	A279638	13	10.625	6742	7613	871	10	89
14	ReedHycalog	TKC83	A279691	14	10.625	7613	8500	887	10	89
15	HALLBTN	FC3843	13206404	15	10.625	8500	8530	30	3	11
16	-	Various	-	16	5.75	8530	8555	25	-	-
17	ReedHycalog	TKC63	A279641	17	5.75	8555	9500	945	8	121

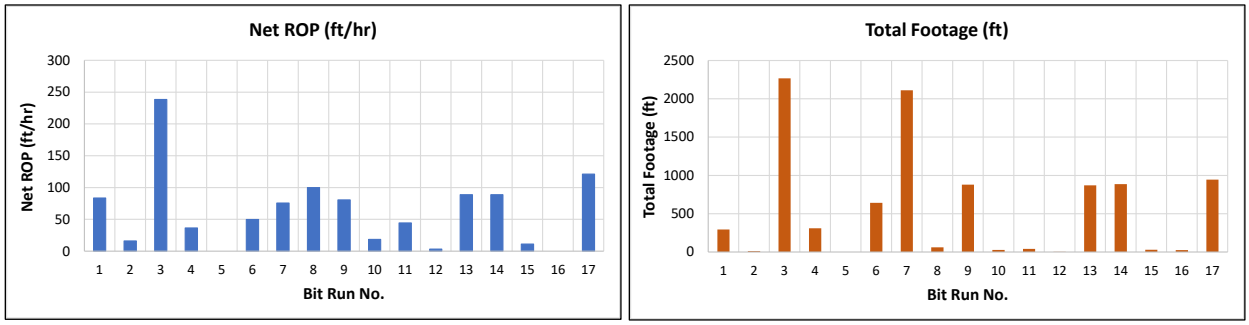


Figure 2-2. Utah FORGE Well 78B-32 Bit Program and Performance summary.

Individual bit run summaries and processed data for FORGE well 78B-32 is summarized in Section 3.

2.5. Depth vs Days Summary

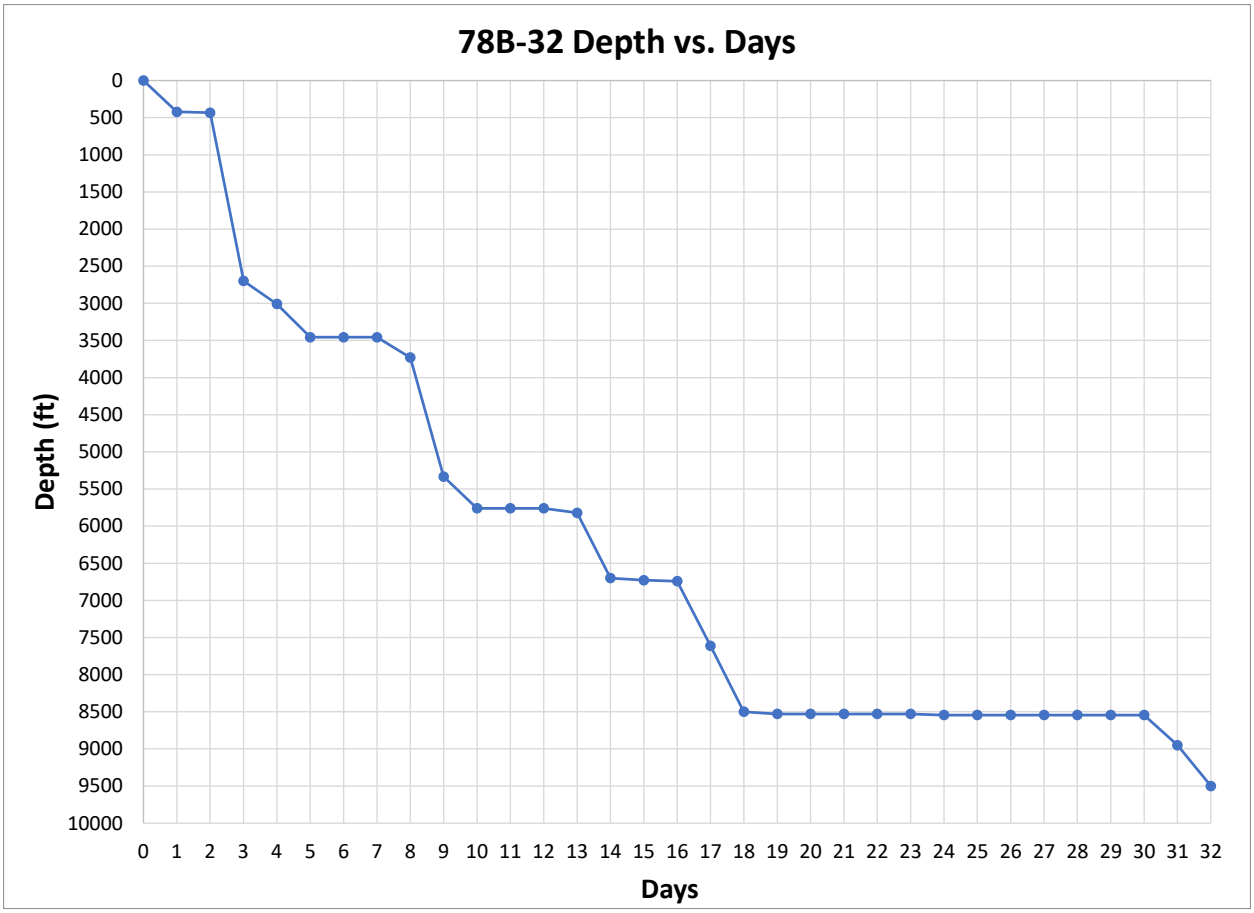


Figure 2-3. Depth vs Days Summary for Utah FORGE Well 78B-32.

3. BIT RUN SUMMARIES AND PROCESSED DATA

A.1.1. Bit-01

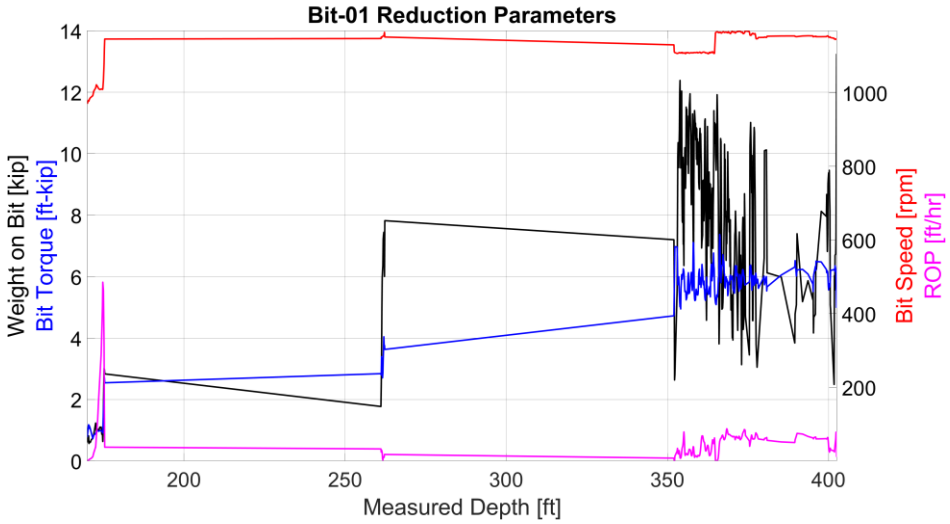
Table 3-1: Bit 1 run summary.

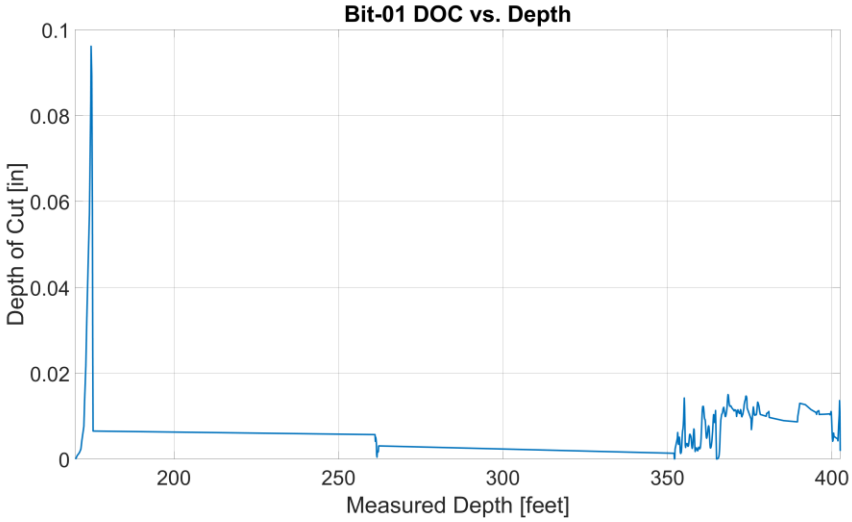
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
1	6/28/2021	22	Smith	XR-C	
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	128	421	293	4	84

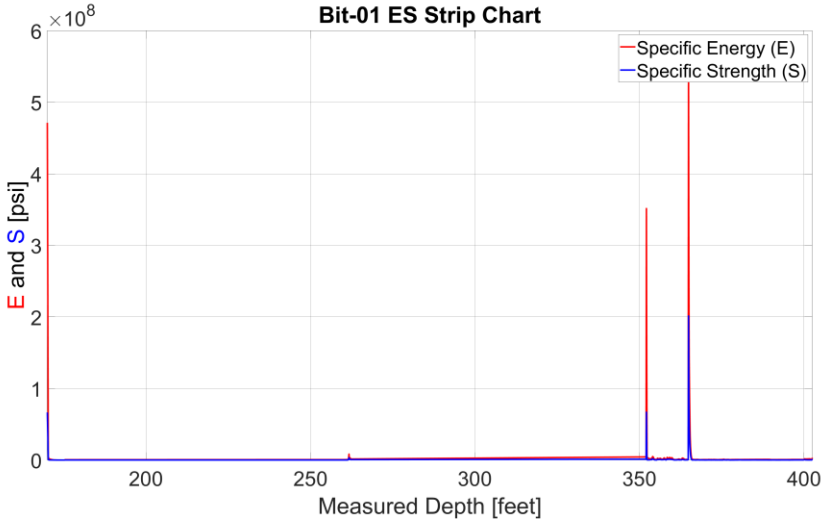
Table 3-2: Bit 1 motor summary.

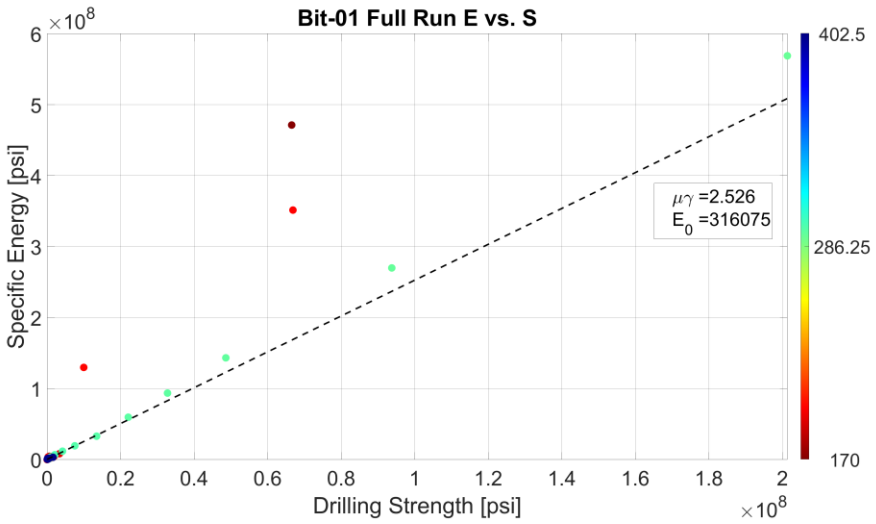
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
1					

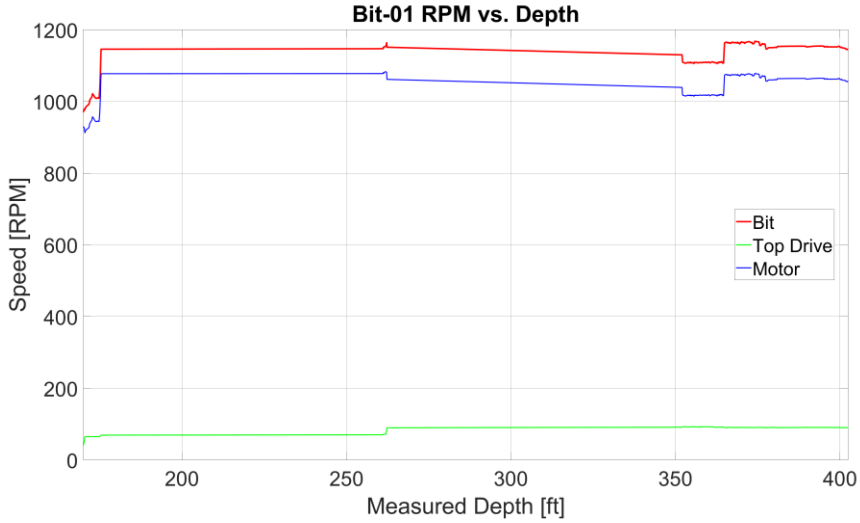
Bit Run Figures:

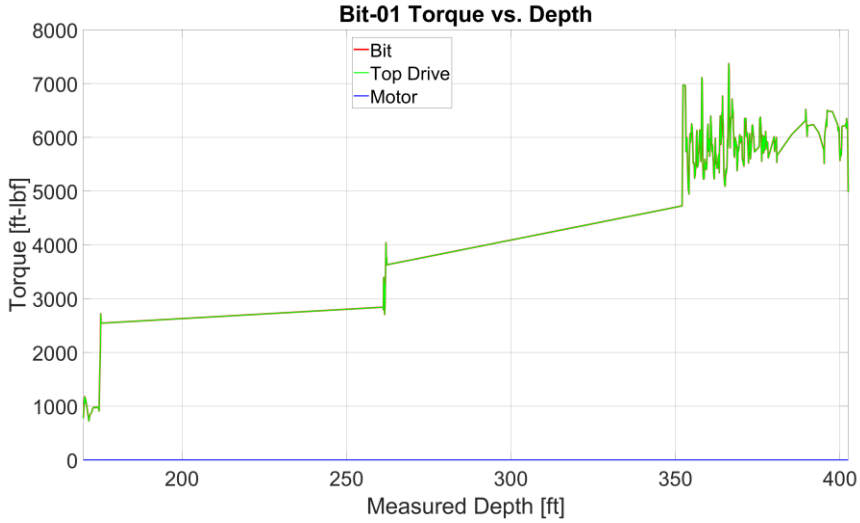







Bit-01 Full Run E vs. S
×10^8
Specific Energy [psi]
Drilling Strength [psi]
×10^8
μγ =2.526
E0 =316075
402.5
286.25
170


Bit-01 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-01 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.2. Bit-02

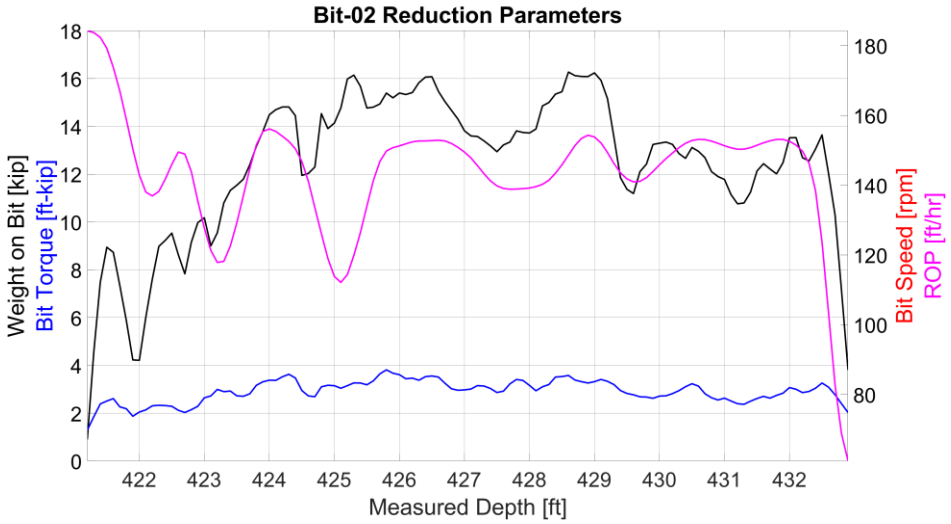
Table 3-3: Bit 2 run summary.

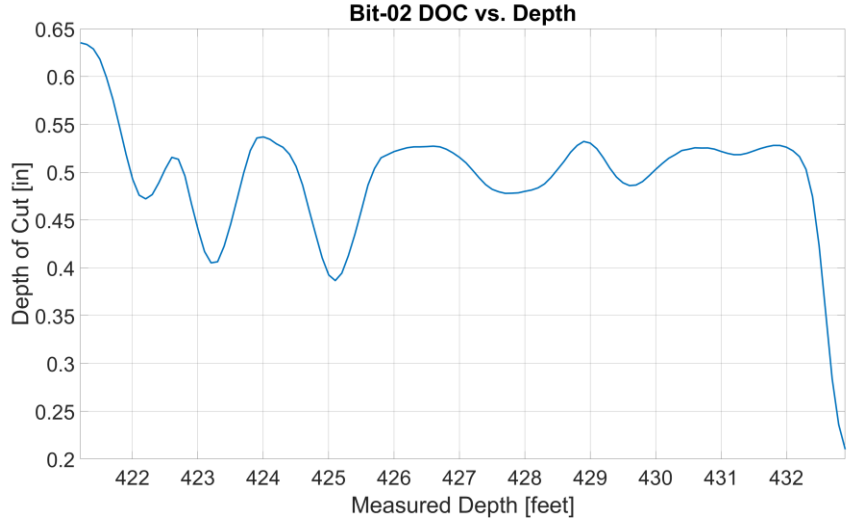
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
2	6/29/2021	14.75	BAKER	GT-C1	
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	421	433	12	1	16

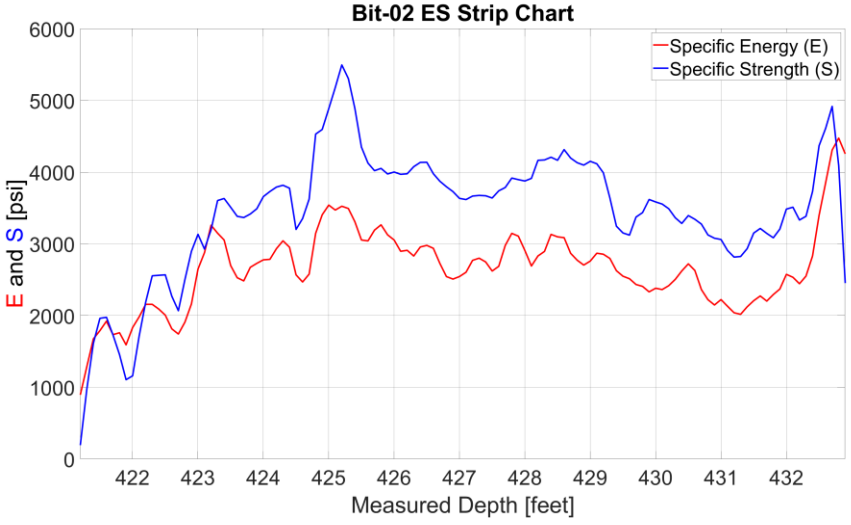
Table 3-4: Bit 2 motor summary.

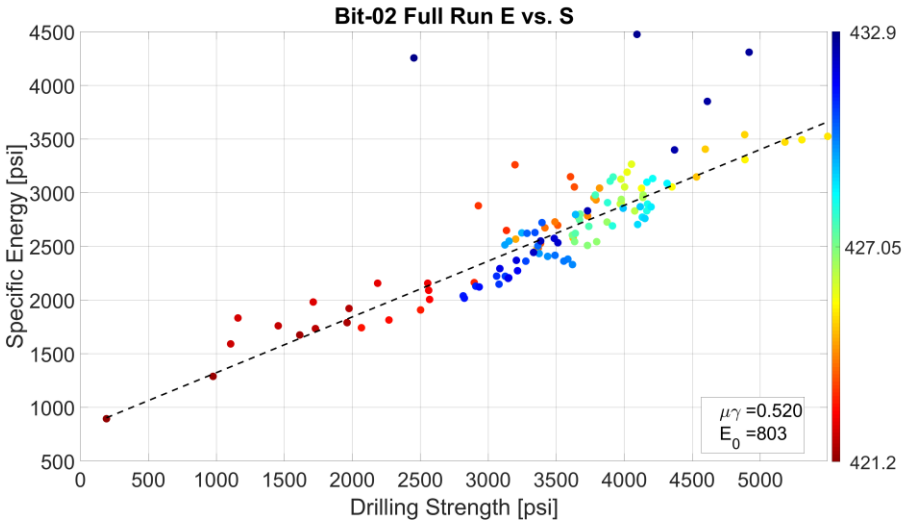
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
2					

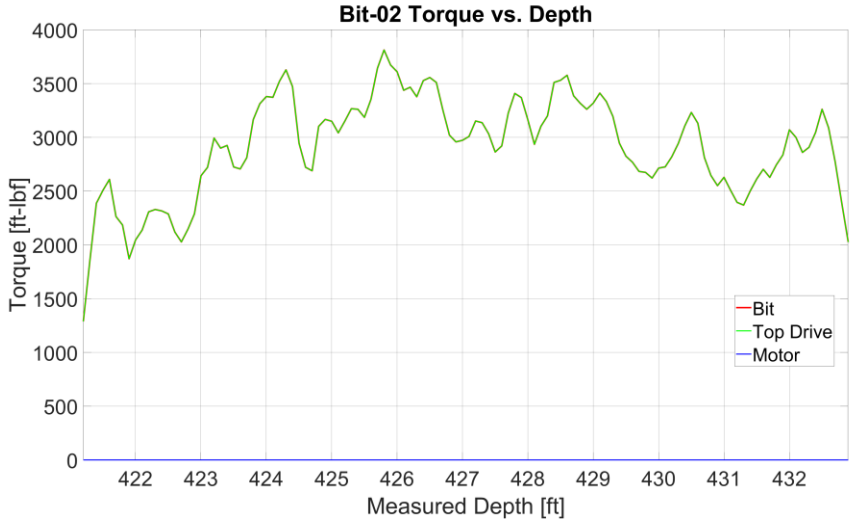
Bit Run Figures:

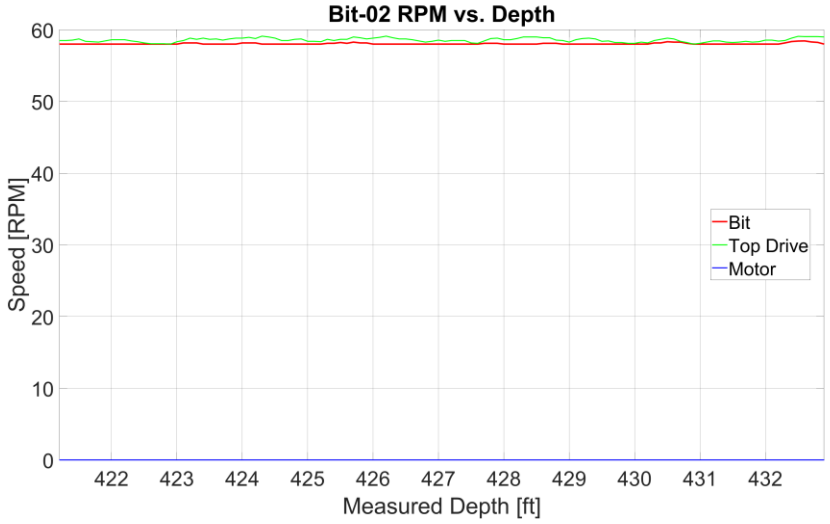







Bit-02 Full Run E vs. S
Specific Energy [psi]
Drilling Strength [psi]
μγ =0.520
E0 =803
432.9
427.05
421.2


Bit-02 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-02 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.3. Bit-03

Table 3-5: Bit 3 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
3	6/30/2021	14.75	ReedHycalog	TKC66-A4	A279635
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	433	2699	2266	9.5	238.6

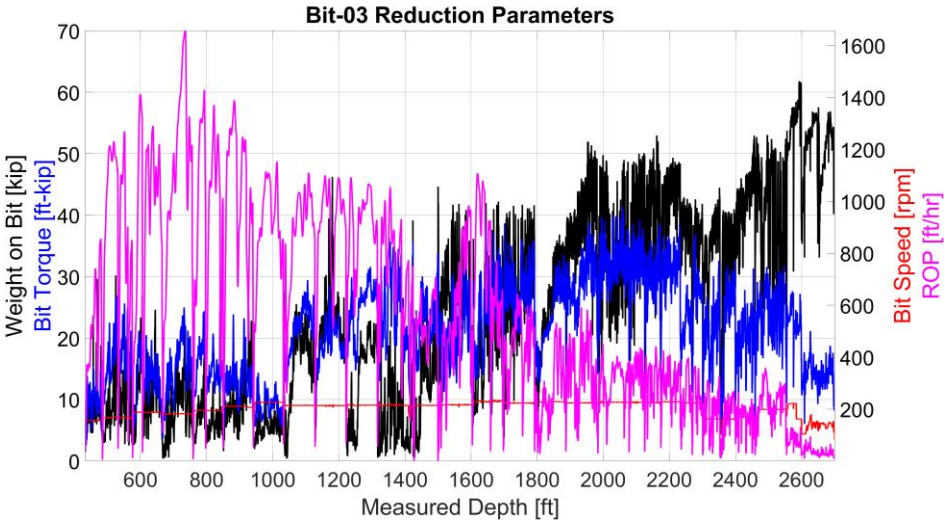
Table 3-6: Bit 3 motor summary.

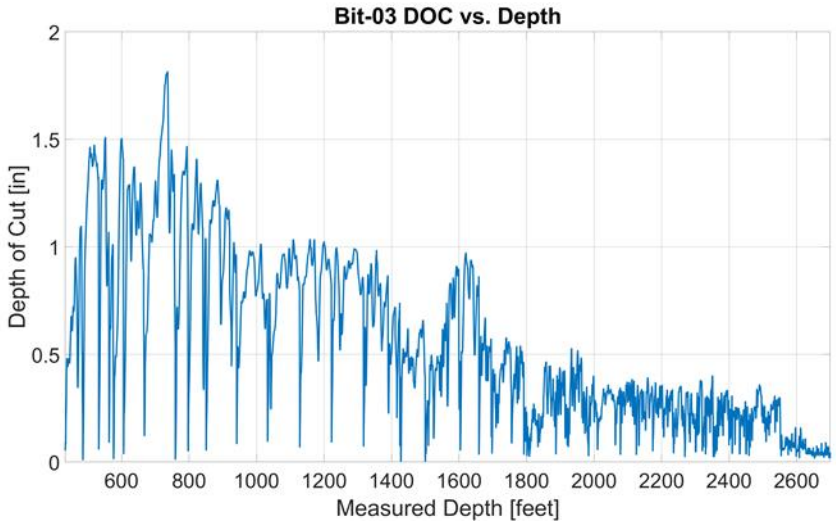
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
3	RSS	9.625	5/6	4	0.12

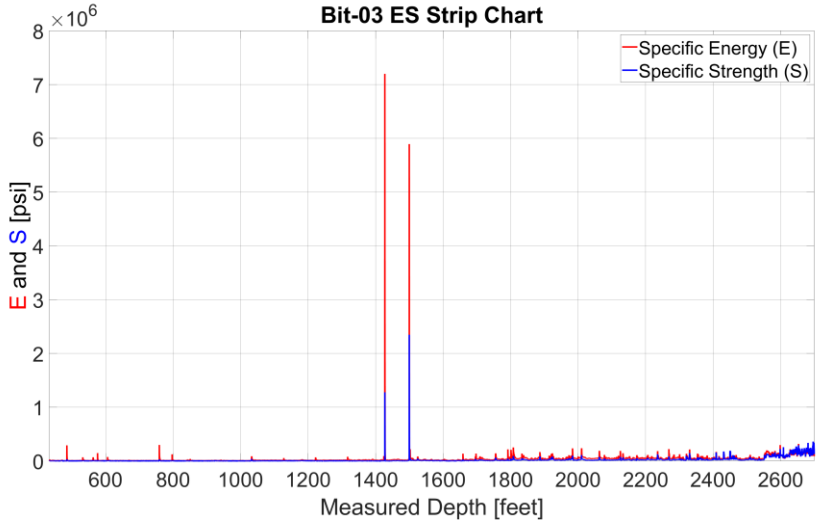
Images:

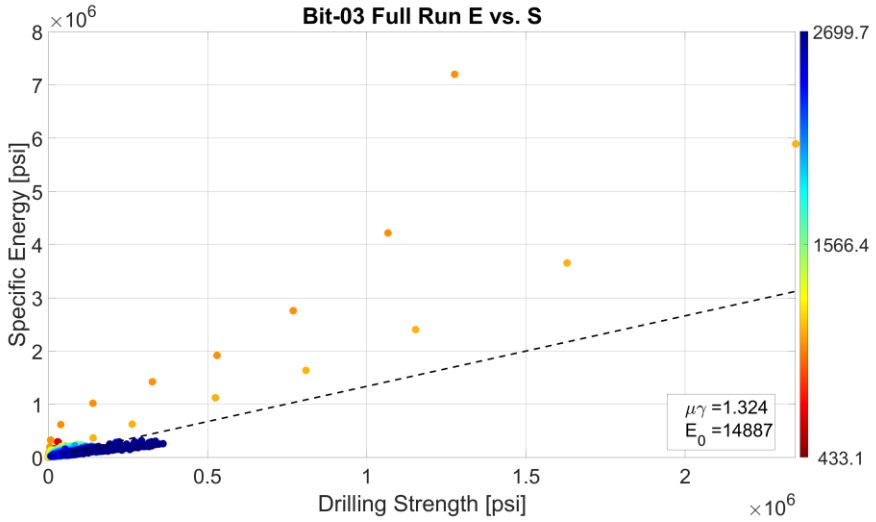
Figure 3-1. Pre-drill photo of bit #3.

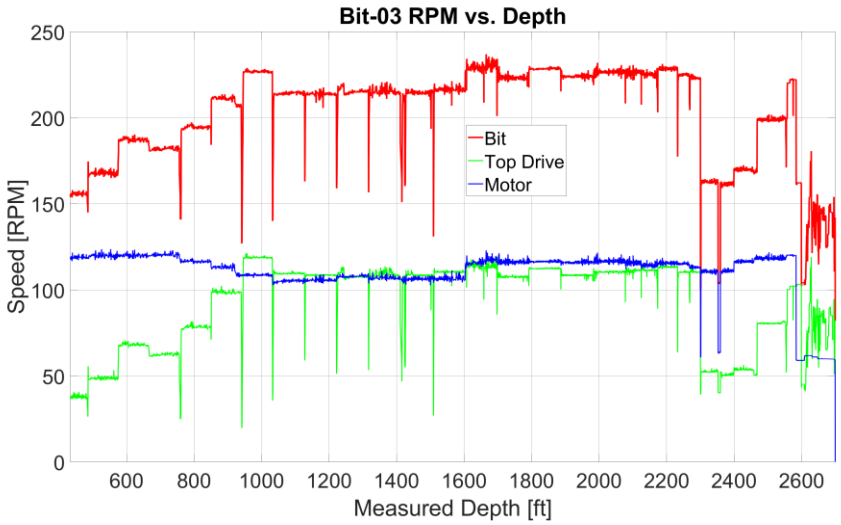
Bit Run Figures:

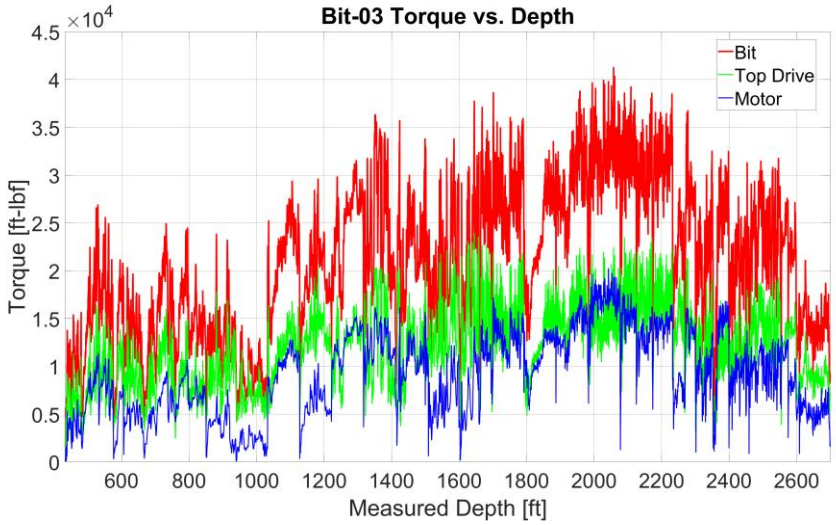







Bit-03 Full Run E vs. S
×10^6
Specific Energy [psi]
Drilling Strength [psi]
×10^6
μγ =1.324
E0 =14887
2699.7
1566.4
433.1


Bit-03 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-03 Torque vs. Depth
×10^4
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.4. Bit-04

Table 3-7: Bit 4 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
4	6/30/2021	14.75	ReedHycalog	TKC63-A2	A279636
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	2700	3009	309	8.5	36.4

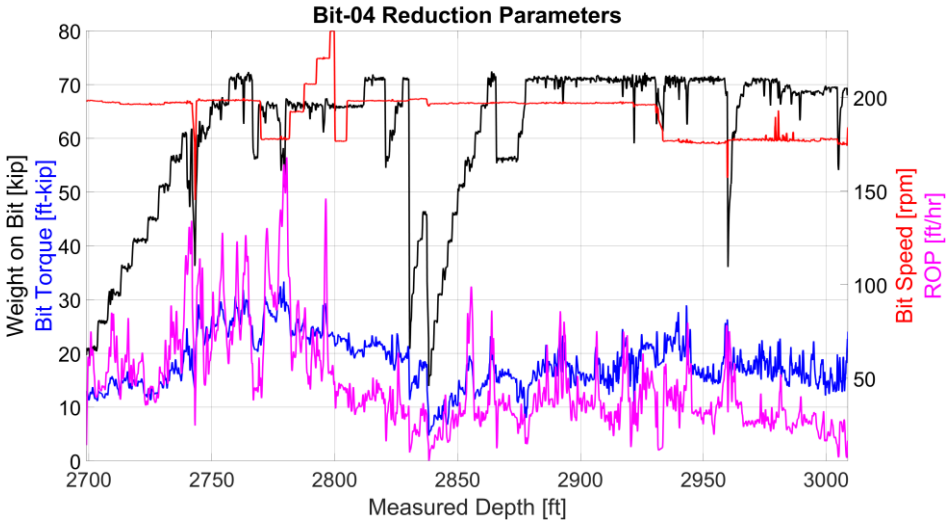
Table 3-8: Bit 4 motor summary.

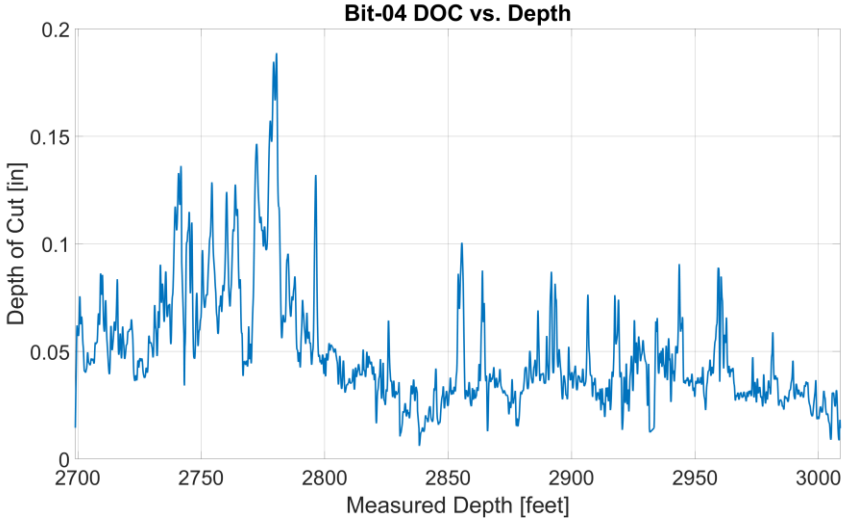
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
4	RSS	9.625	5/6	4	0.12

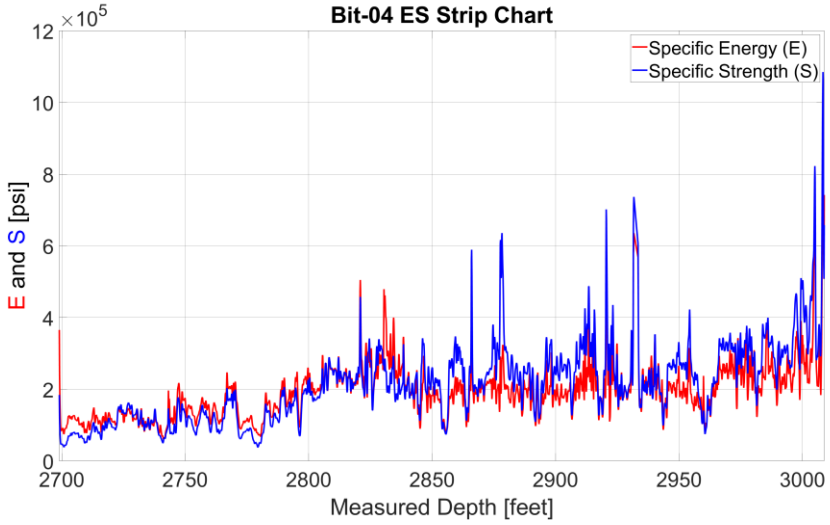
Images:

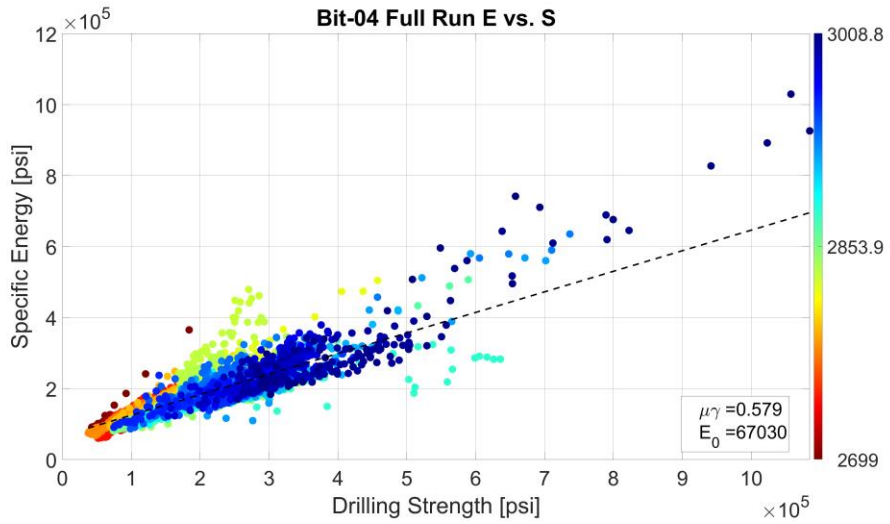
Figure 3-2. Post-drill photo of bit #4.

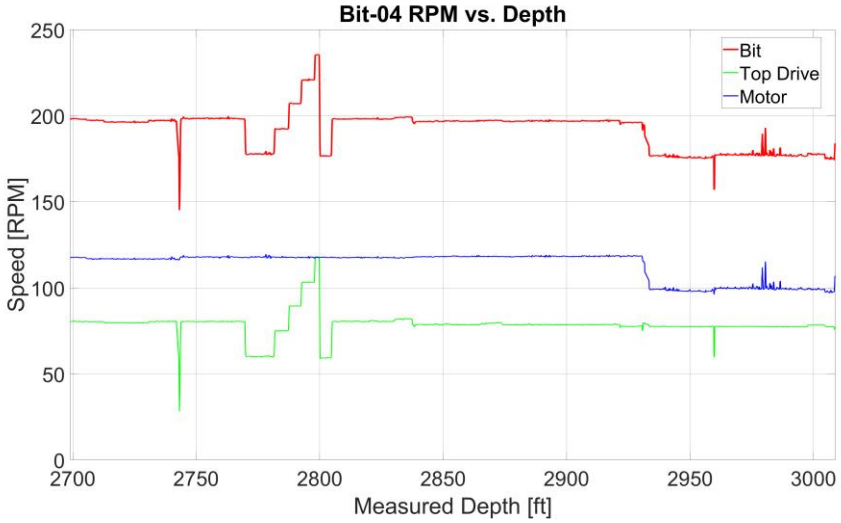
Bit Run Figures:

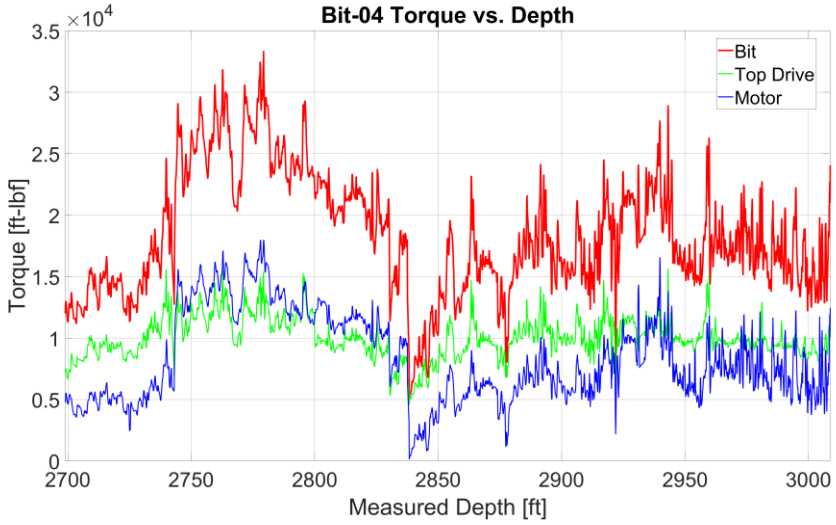







Bit-04 Full Run E vs. S
×10^5
12
10
8
6
4
2
0
Specific Energy [psi]
0 1 2 3 4 5 6 7 8 9 10
×10^5
Drilling Strength [psi]
3008.8
2853.9
2699
μγ =0.579
E0 =67030


Bit-04 RPM vs. Depth
250
200
150
100
50
0
Speed [RPM]
2700 2750 2800 2850 2900 2950 3000
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-04 Torque vs. Depth
×10^4
3.5
3
2.5
2
1.5
1
0.5
0
Torque [ft-lbf]
2700 2750 2800 2850 2900 2950 3000
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.5. Bit-05

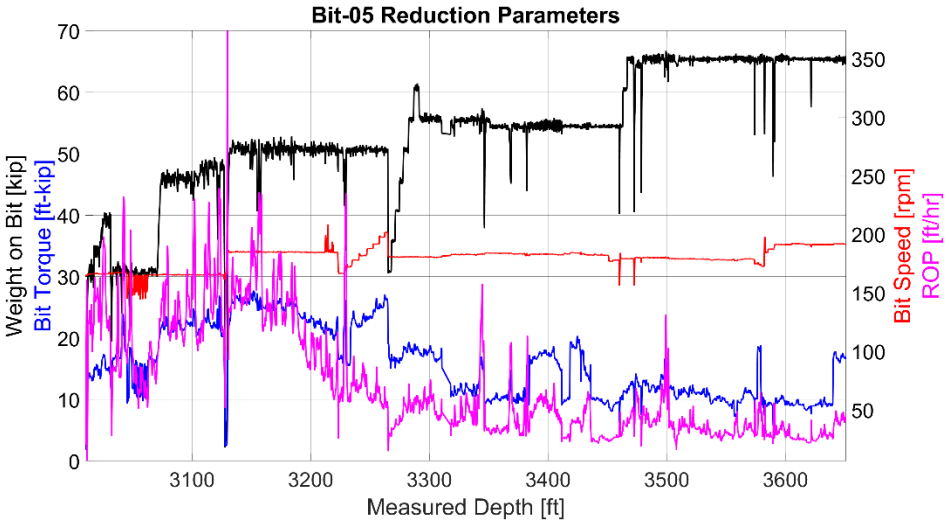
Table 3-9: Bit 5 run summary.

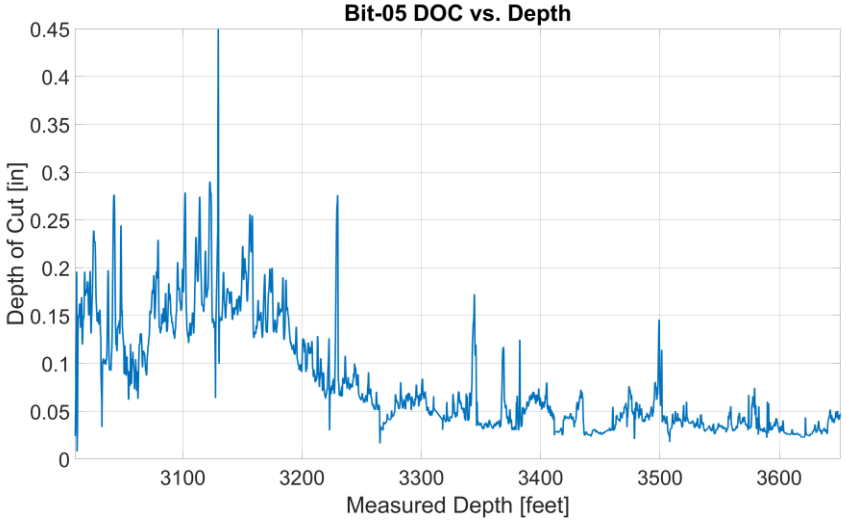
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
5	7/2/2021	10.625	VAREL	VM-1	
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	3009	3009	0	2	0

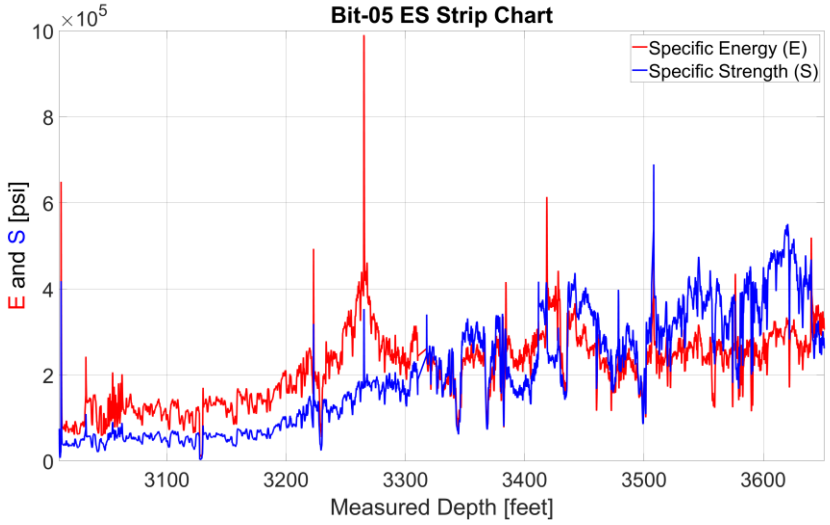
Table 3-10: Bit 5 motor summary.

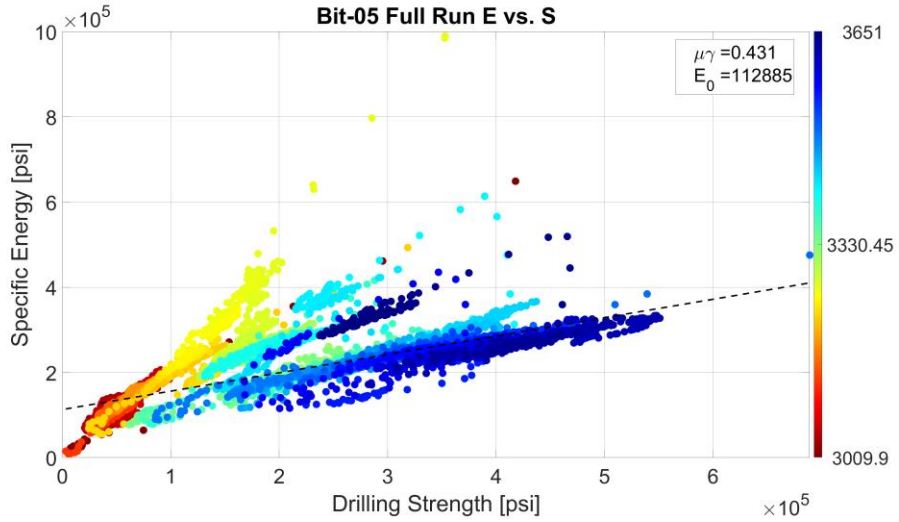
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
5					

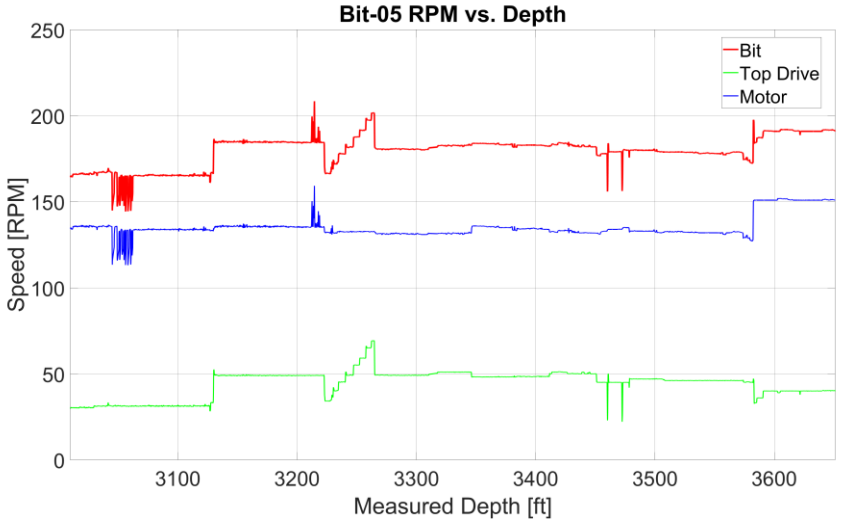
Bit Run Figures:

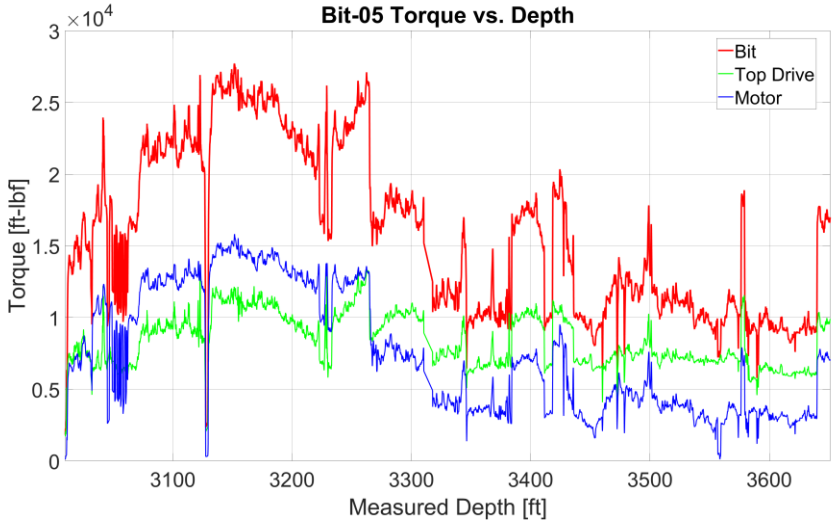







Bit-05 Full Run E vs. S
$\mu\gamma$ =0.431
E_0 =112885
Specific Energy [psi]
Drilling Strength [psi]
×10^5
3651
3330.45
3009.9


Bit-05 RPM vs. Depth
Bit
Top Drive
Motor
Speed [RPM]
Measured Depth [ft]


Bit-05 Torque vs. Depth
×10^4
Bit
Top Drive
Motor
Torque [ft-lbf]
Measured Depth [ft]

A.1.6. Bit-06

Table 3-11: Bit 6 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
6	7/4/2021	10.625	ReedHycalog	TKC83-C1	A279637
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	3009	3651	642	12.9	49.8

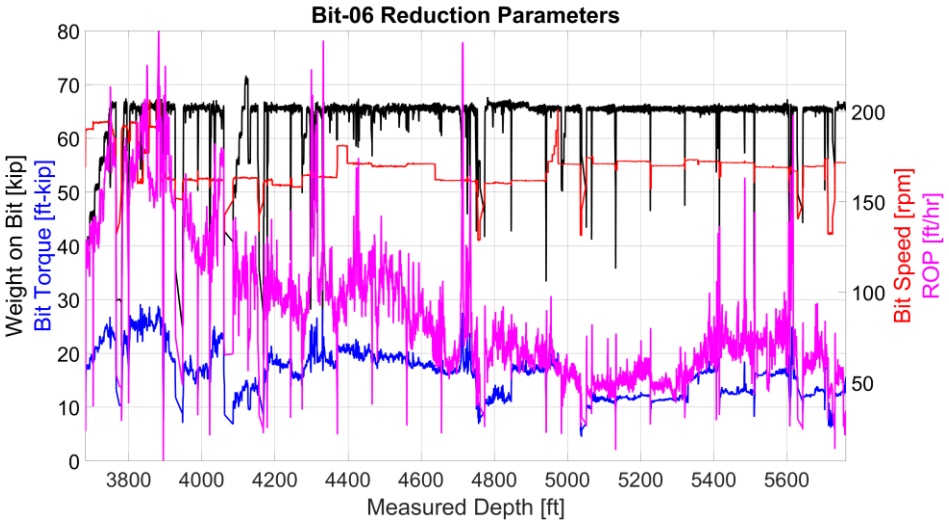
Table 3-12: Bit 6 motor summary.

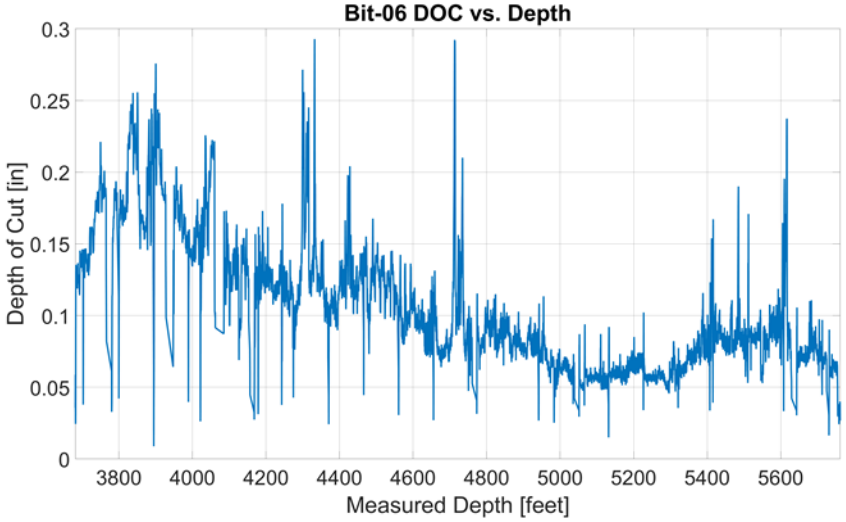
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
6	RSS	8.5	7/8	5.9	0.16

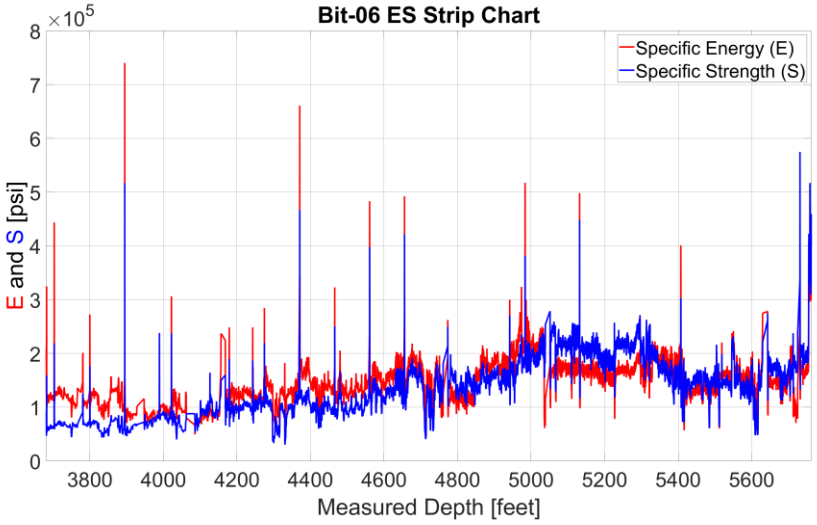
Images:

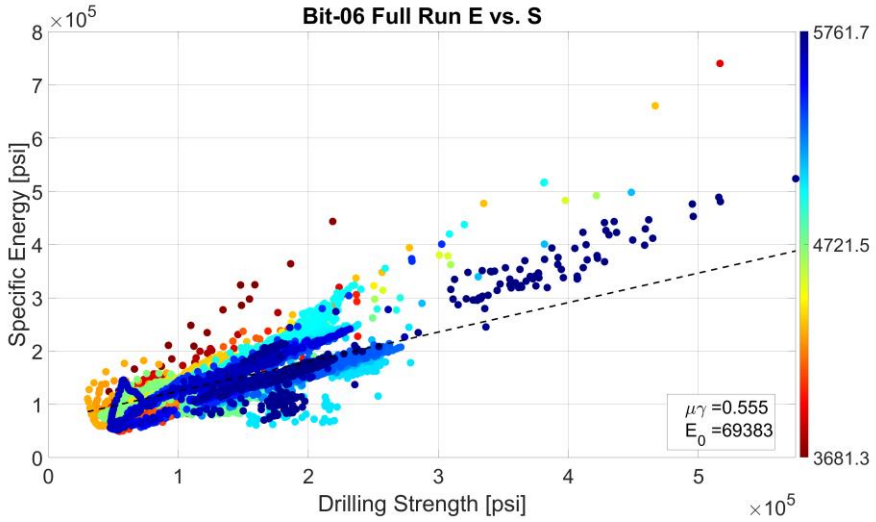
Figure 3-3. Pre-drill photo of bit #6.

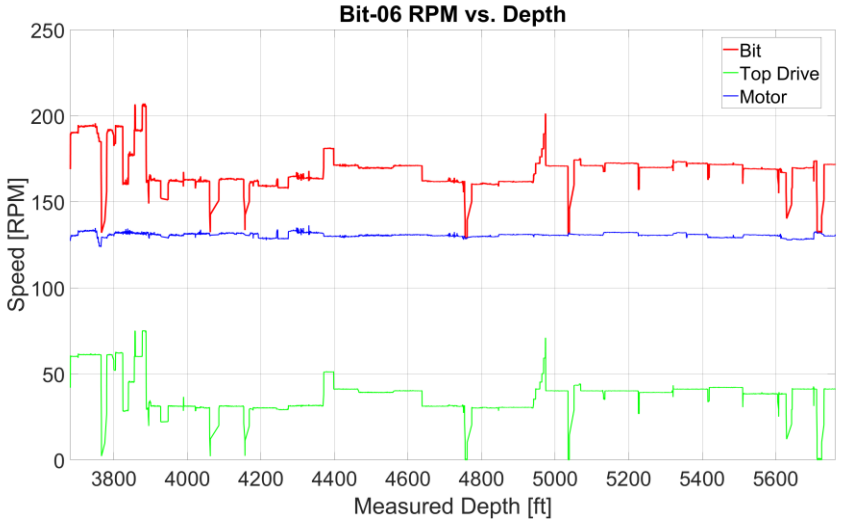
Bit Run Figures:

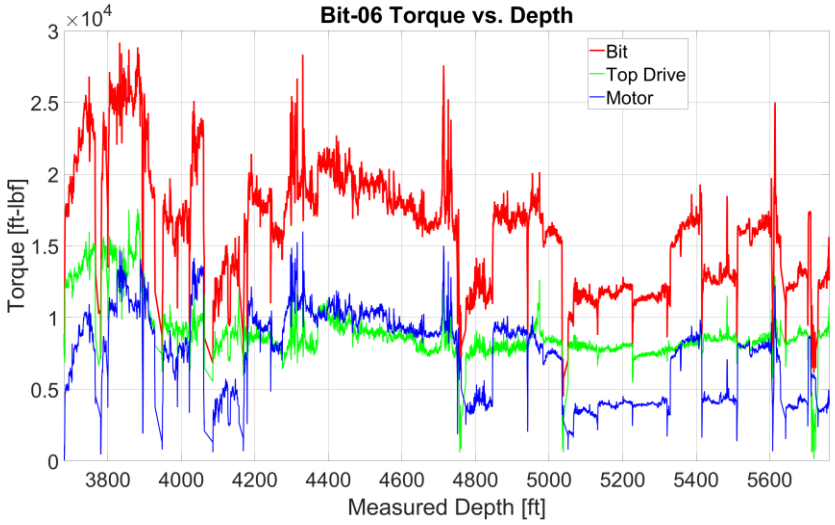







Bit-06 Full Run E vs. S
×10^5
Specific Energy [psi]
Drilling Strength [psi]
×10^5
μγ =0.555
E0 =69383
5761.7
4721.5
3681.3


Bit-06 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-06 Torque vs. Depth
×10^4
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.7. Bit-07

Table 3-13: Bit 7 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
7	7/5/2021	10.625	ReedHycalog	TKC83-C1	A279639
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	3651	5761	2110	27.9	75.6

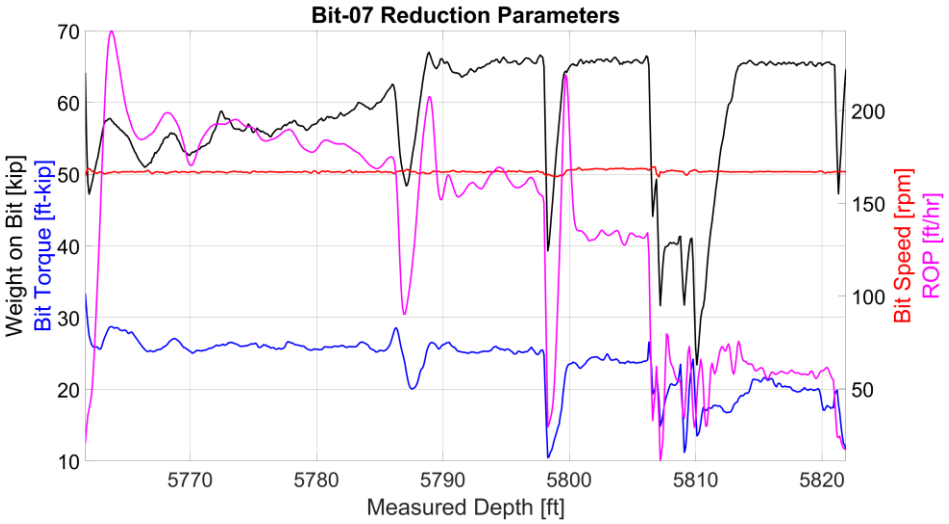
Table 3-14: Bit 7 motor summary.

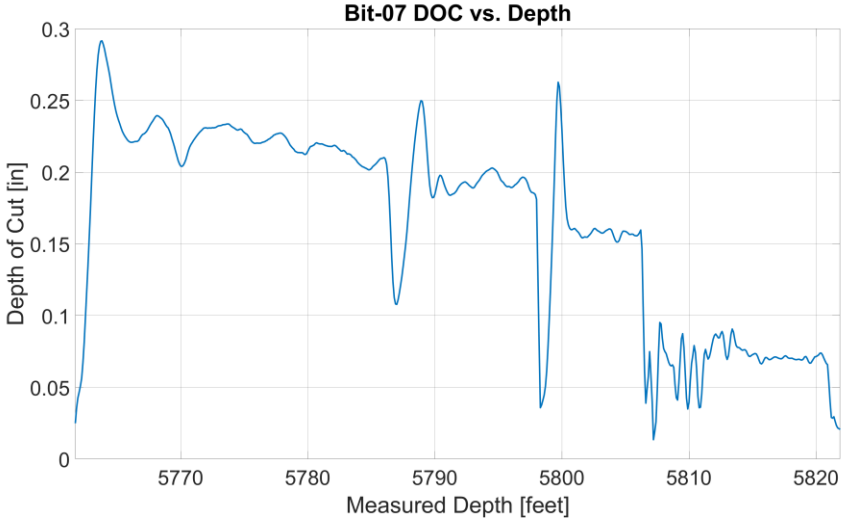
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
7	FBH	8	7/8	4	0.16
Motor Bend Angle (°)	**Motor Bit to Bend (ft)**				
1.5	11.5				

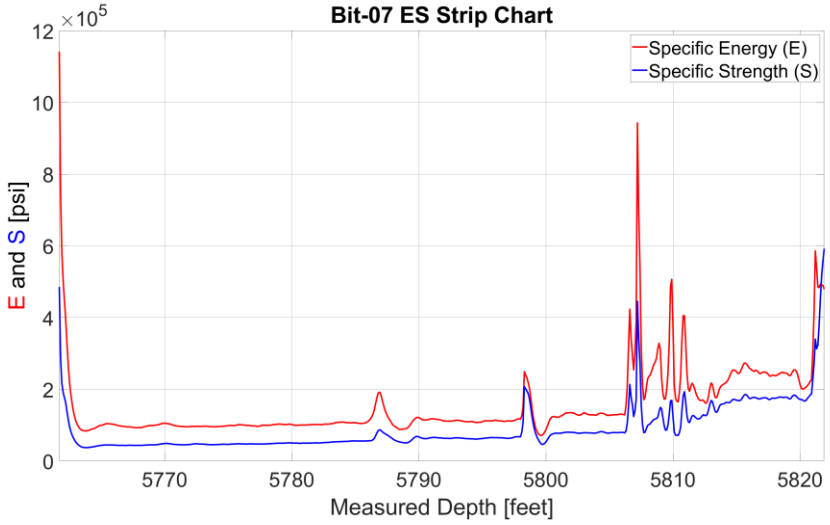
Images:

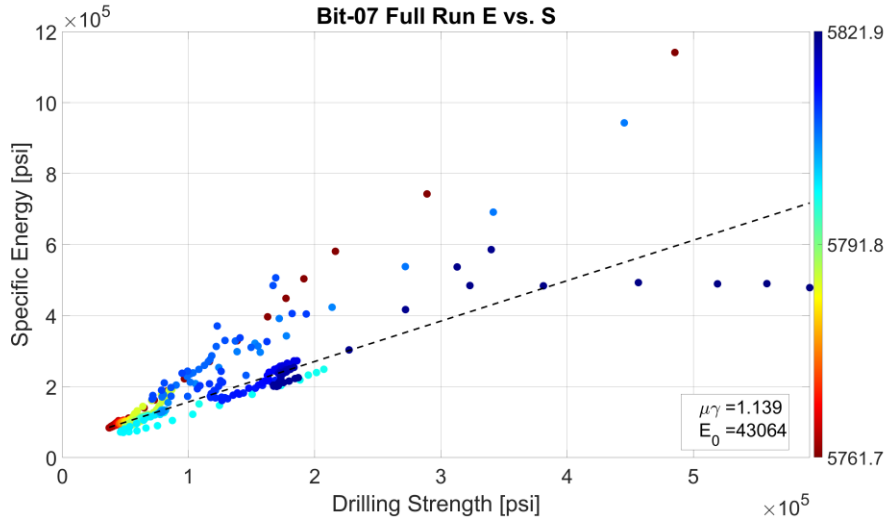
Figure 3-4. Post-Drill Photo of Bit #7.

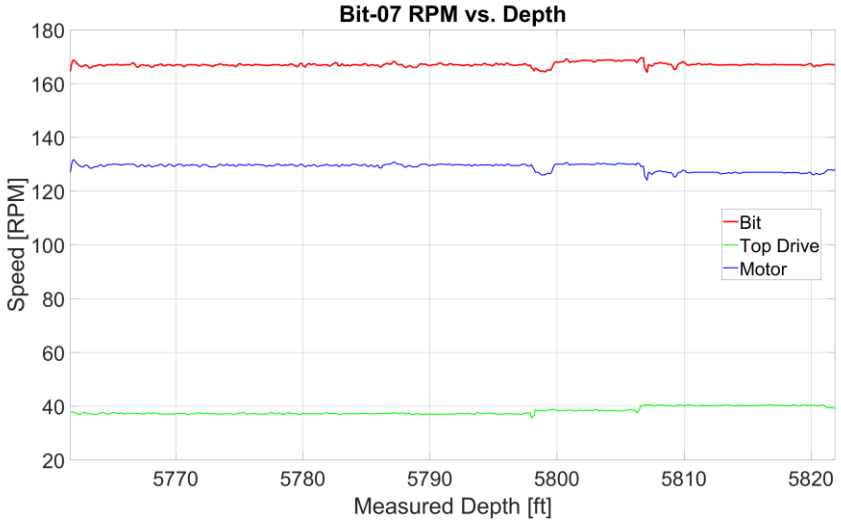
Bit Run Figures:

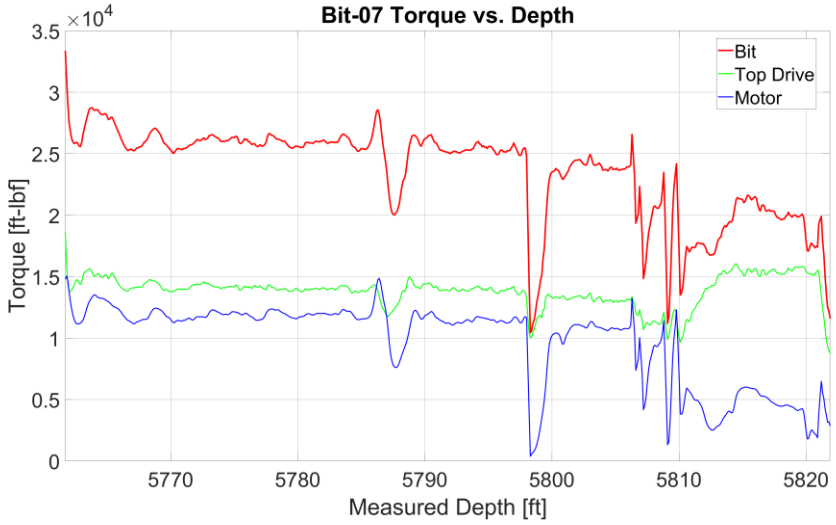







Bit-07 Full Run E vs. S
×10^5
Specific Energy [psi]
Drilling Strength [psi]
×10^5
μγ =1.139
E0 =43064
5821.9
5791.8
5761.7


Bit-07 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-07 Torque vs. Depth
×10^4
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.8. Bit-08

Table 3-15: Bit 8 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
8	7/7/2021	10.625	ReedHycalog	TKC83-D1	A279690
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	5761	5821	60	0.6	100.0

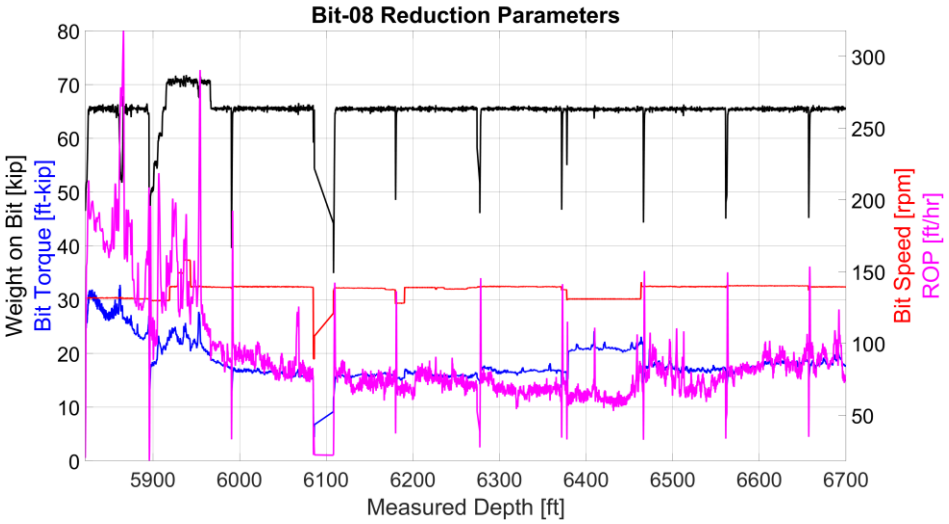
Table 3-16: Bit 8 motor summary.

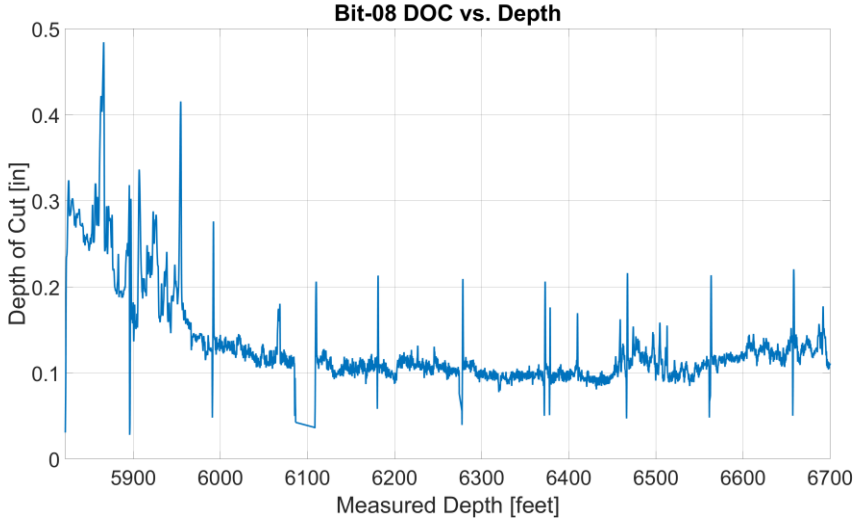
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
8	FBH	8	7/8	4	0.16
Motor Bend Angle (°)	**Motor Bit to Bend (ft)**				
1.25	8.74				

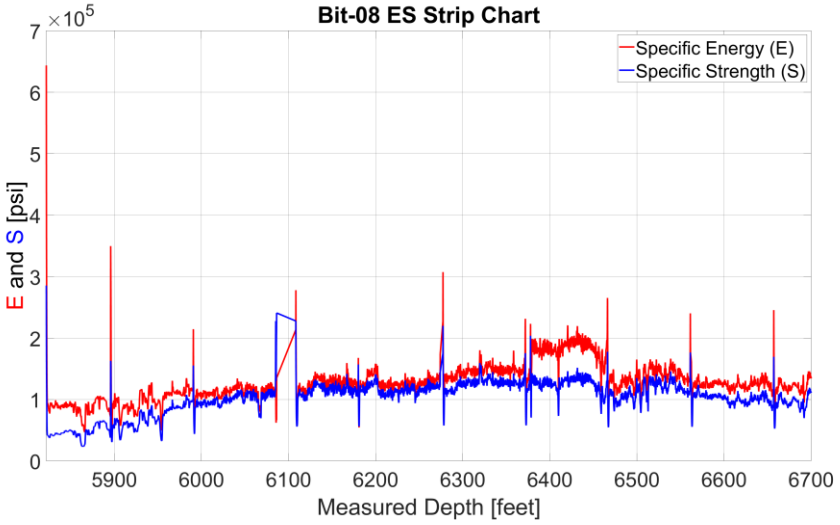
Images:

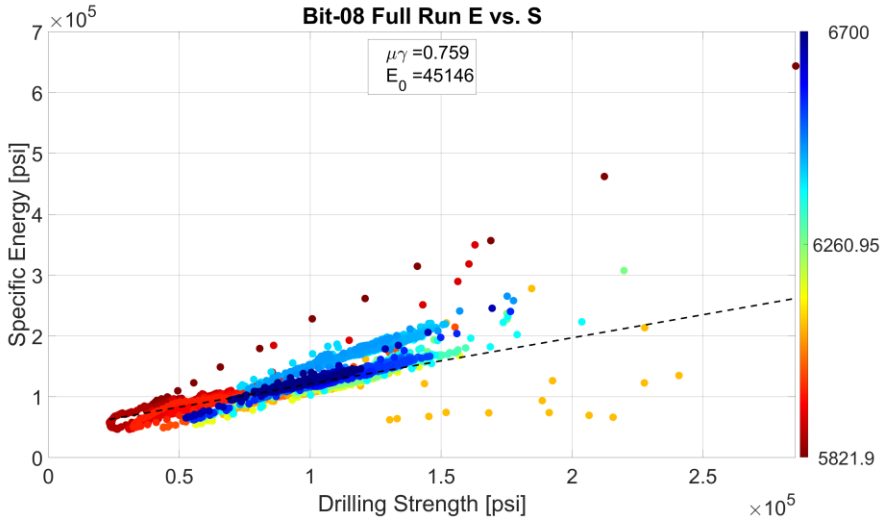
Figure 3-5. Post-Drill Photo of Bit #8.

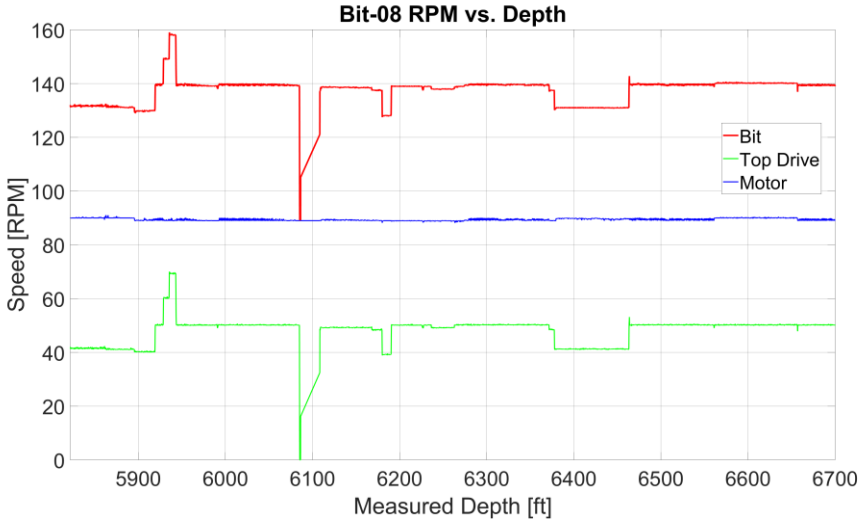
Bit Run Figures:

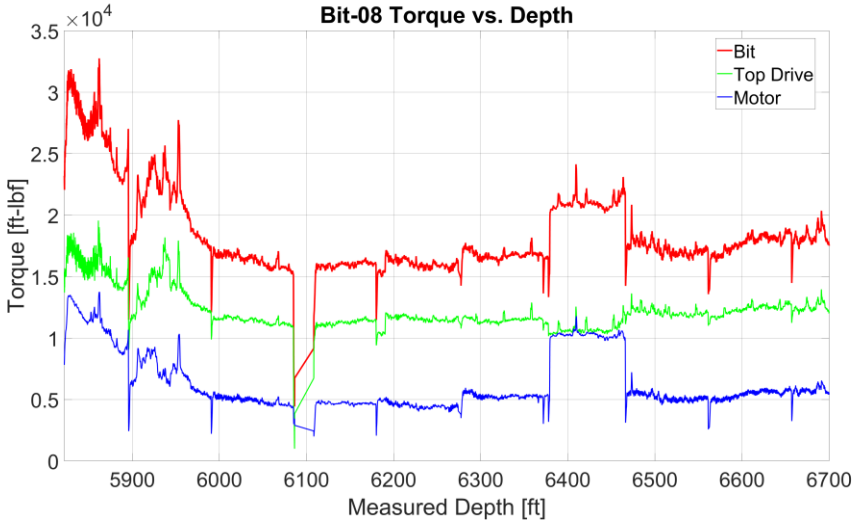







Bit-08 Full Run E vs. S
$\mu\gamma$ =0.759
E_0 =45146
Specific Energy [psi]
Drilling Strength [psi]
×10^5
6700
6260.95
5821.9


Bit-08 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-08 Torque vs. Depth
×10^4
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.9. Bit-09

Table 3-17: Bit 9 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
9	7/10/2021	10.625	ReedHycalog	TKC82-D1	A279692
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	5821	6700	879	10.9	80.6

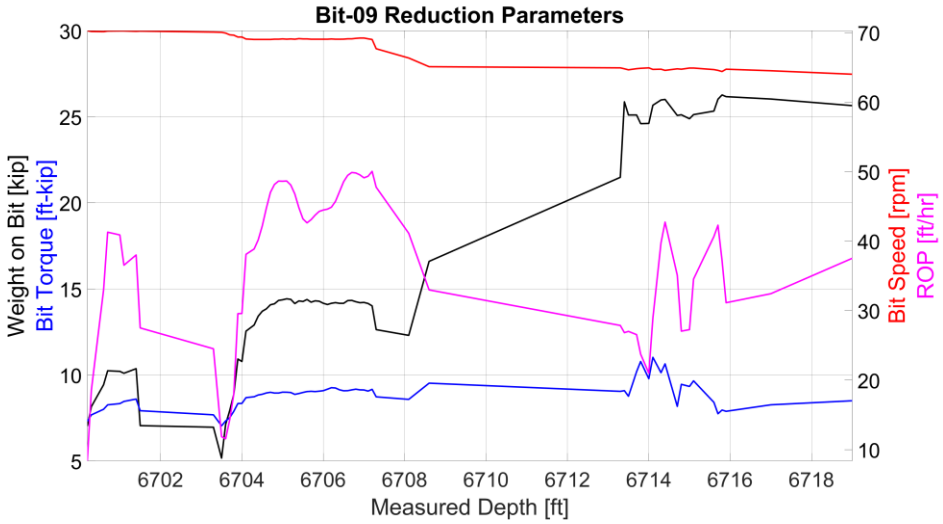
Table 3-18: Bit 9 motor summary.

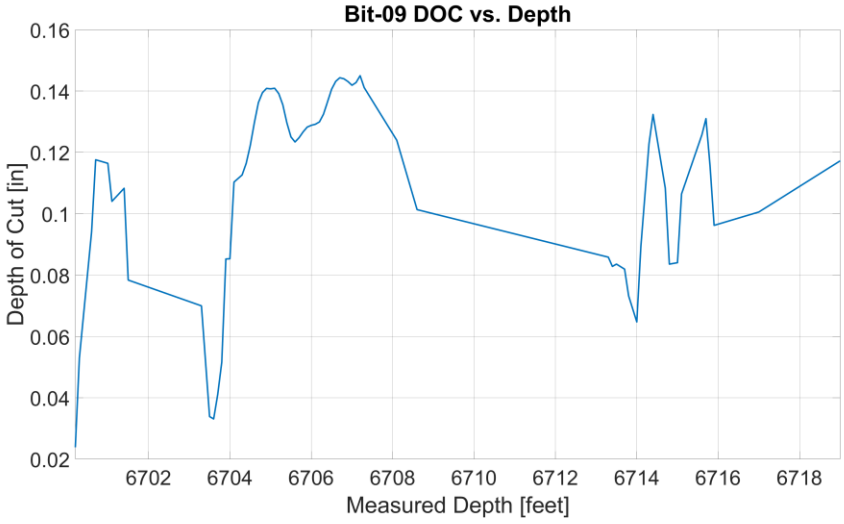
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
8	FBH	0	-	0	0.11
Motor Bend Angle (°)	**Motor Bit to Bend (ft)**				
1.5	-				

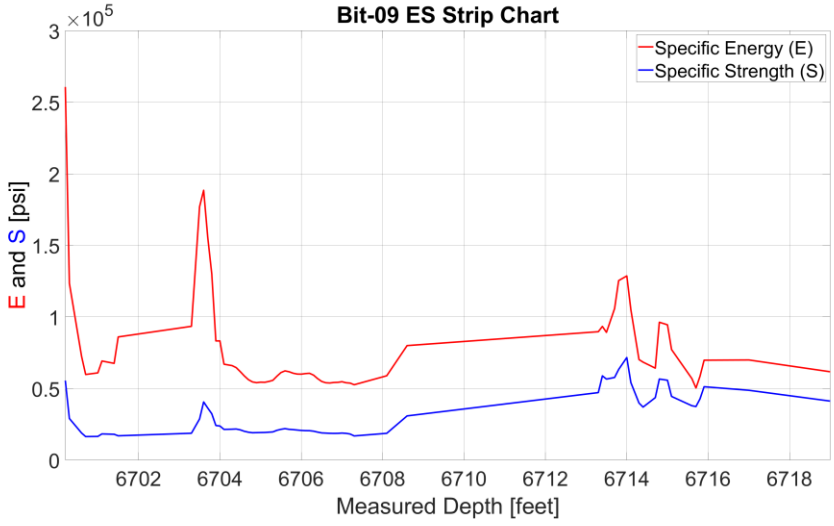
Images:

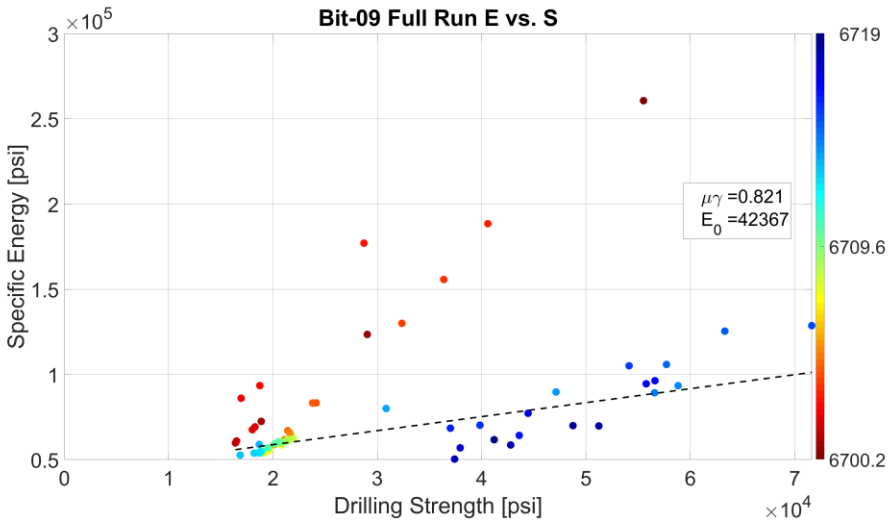
Figure 3-6. Post-Drill Photo of Bit #9.

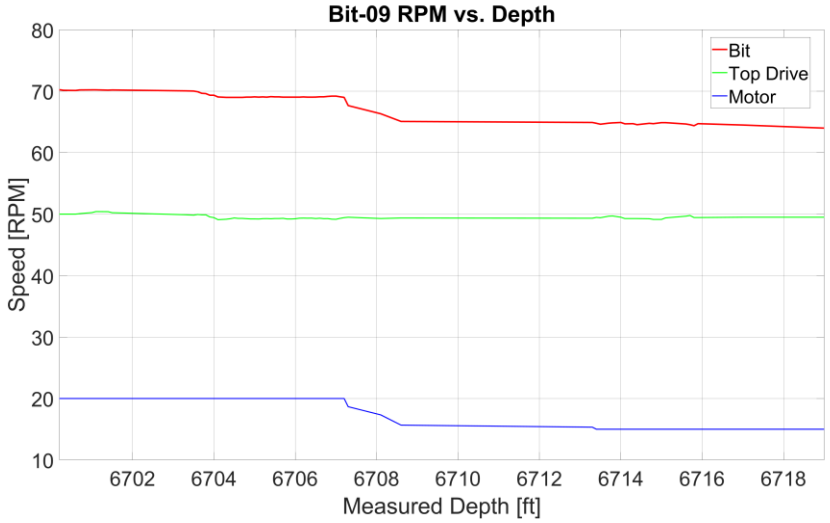
Bit Run Figures:

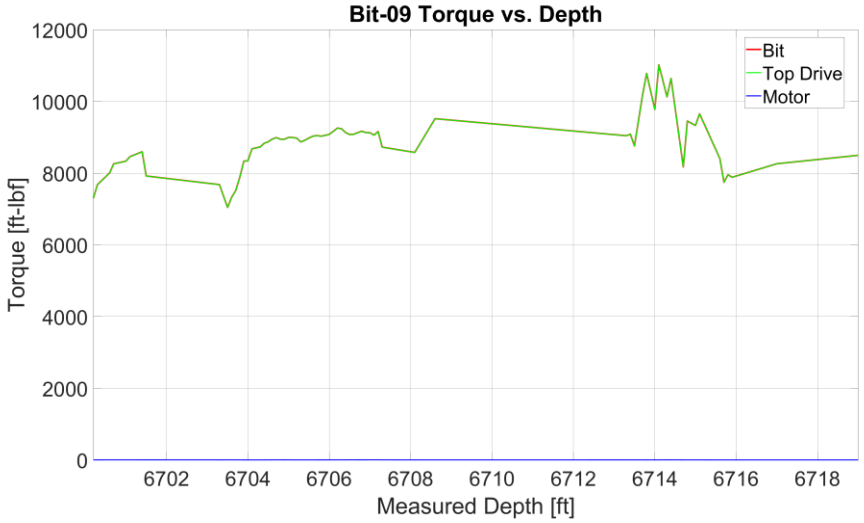







Bit-09 Full Run E vs. S
×10^5
3
2.5
2
1.5
1
0.5
Specific Energy [psi]
0
1
2
3
4
5
6
7
×10^4
Drilling Strength [psi]
μγ =0.821
E0 =42367
6719
6709.6
6700.2


Bit-09 RPM vs. Depth
80
70
60
50
40
30
20
10
Speed [RPM]
6702
6704
6706
6708
6710
6712
6714
6716
6718
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-09 Torque vs. Depth
12000
10000
8000
6000
4000
2000
0
Torque [ft-lbf]
6702
6704
6706
6708
6710
6712
6714
6716
6718
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.10. Bit-10

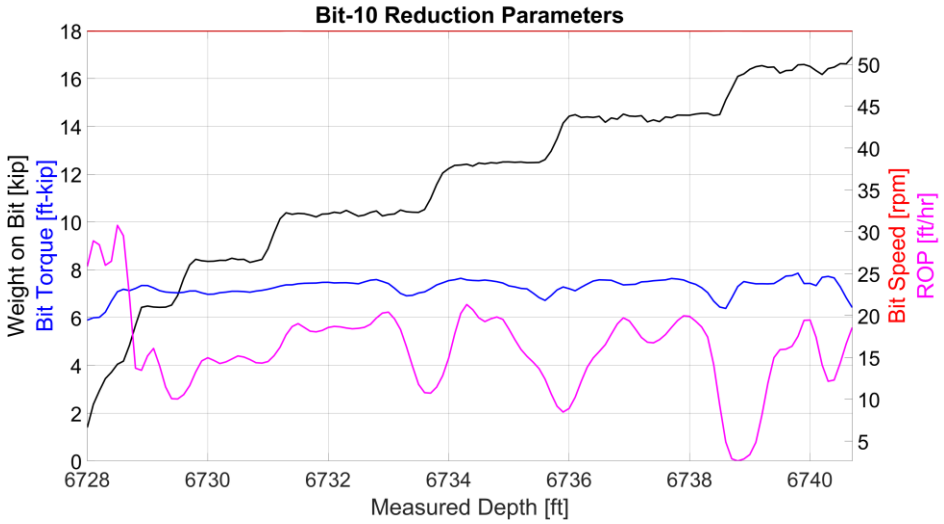
Table 3-19: Bit 10 run summary.

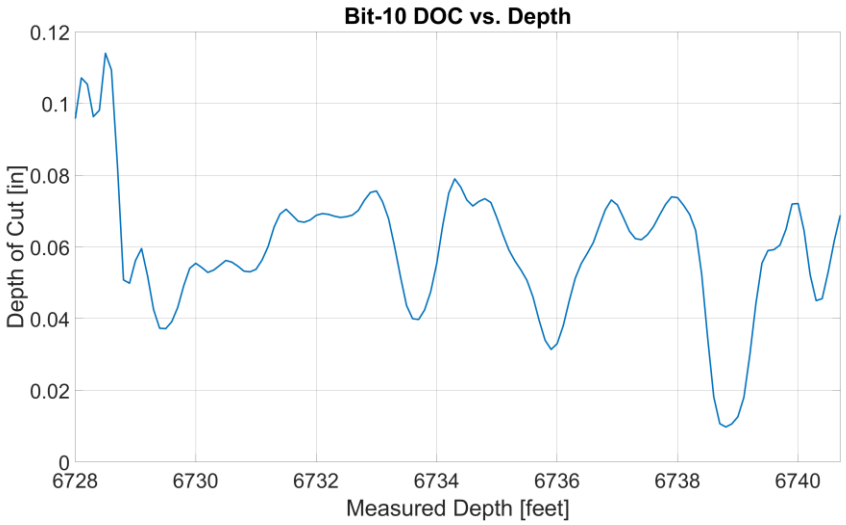
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
10	7/11/2021	8.75	Halliburton	FC3843	13340636
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	6700	6728	28	1.5	18.7

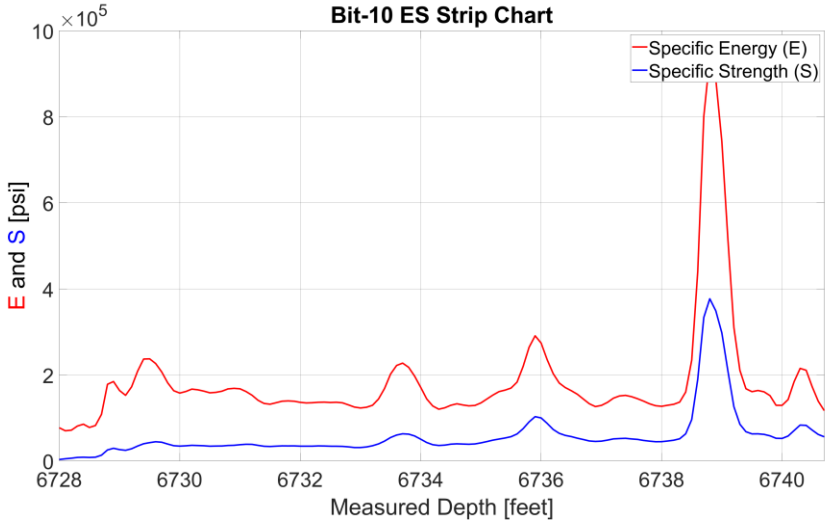
Table 3-20: Bit 10 motor summary.

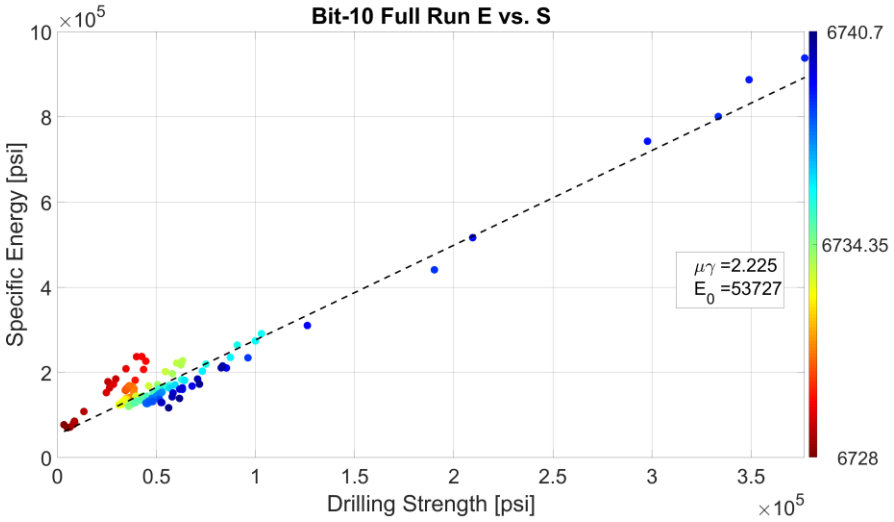
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
10	-	0	-	0	0

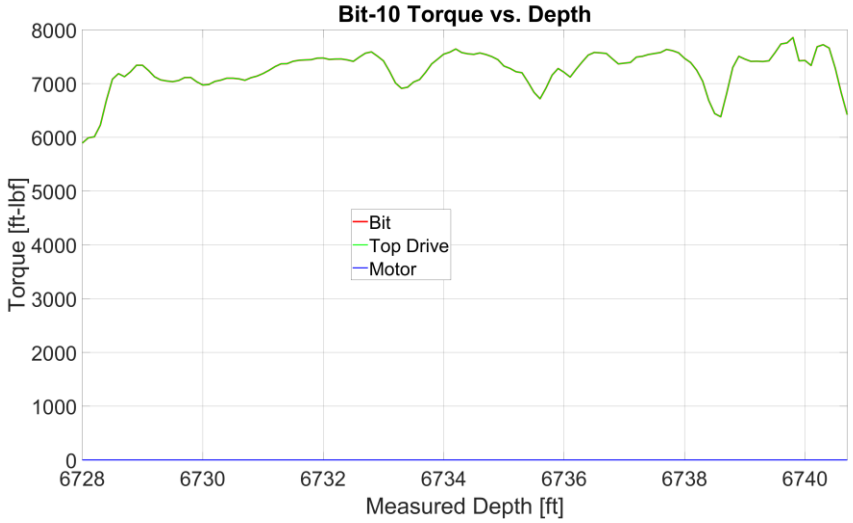
Bit Run Figures:

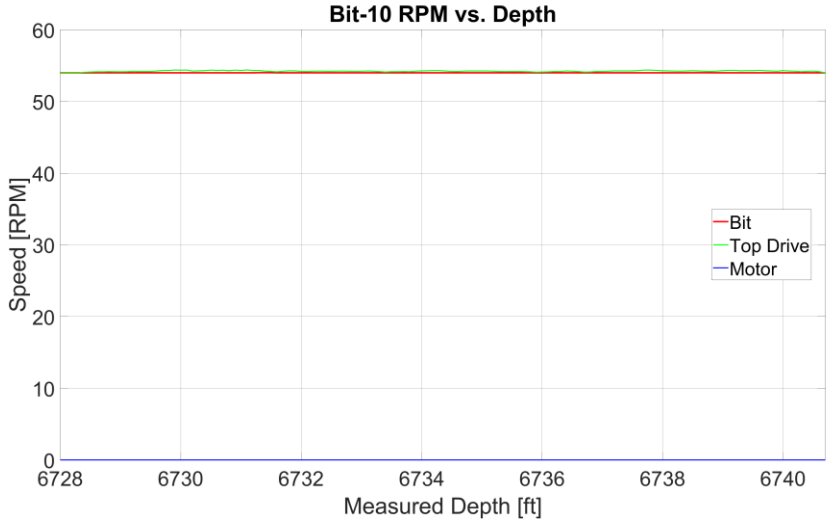







Bit-10 Full Run E vs. S
×10^5
Specific Energy [psi]
Drilling Strength [psi]
×10^5
μγ =2.225
E0 =53727
6740.7
6734.35
6728


Bit-10 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-10 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.11. Bit-11

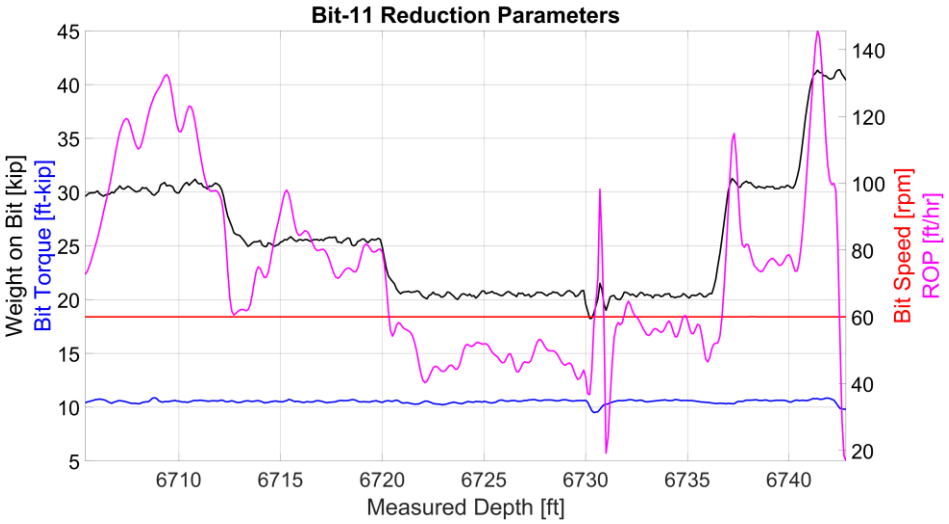
Table 3-21: Bit 11 run summary.

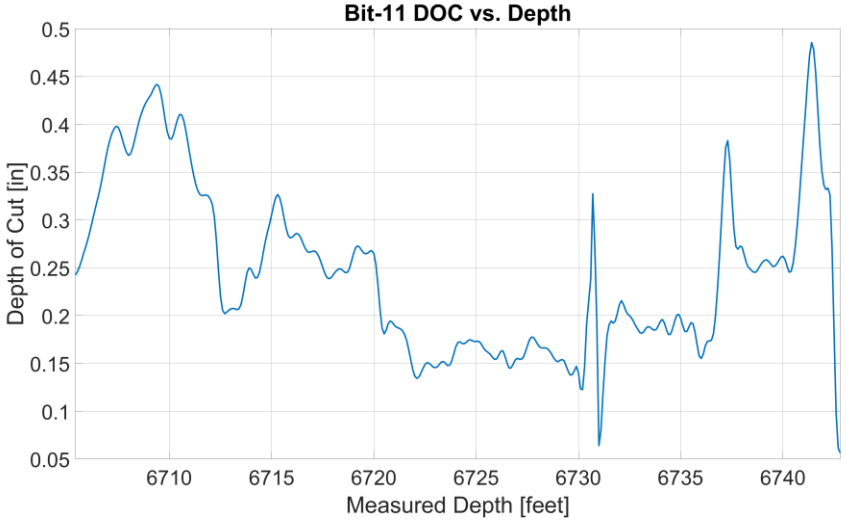
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
11	7/12/2021	8.75	Halliburton	FC3843	12958459
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	6700	6740	40	0.9	44.4

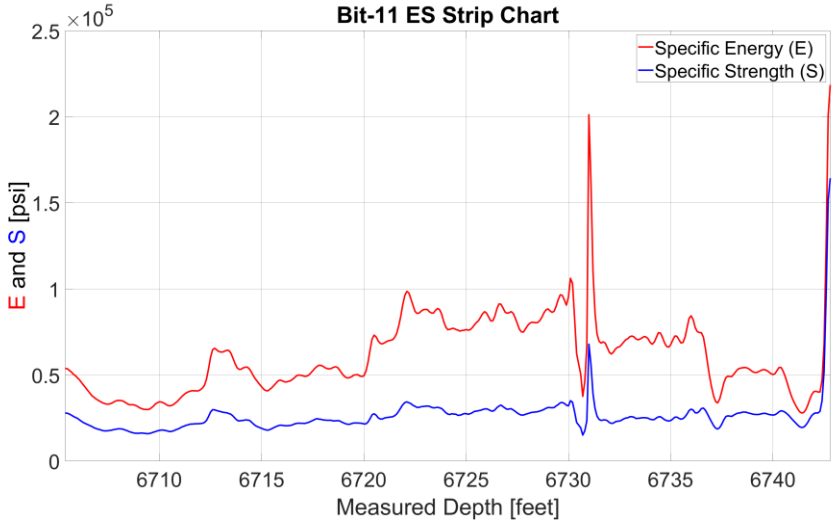
Table 3-22: Bit 11 motor summary.

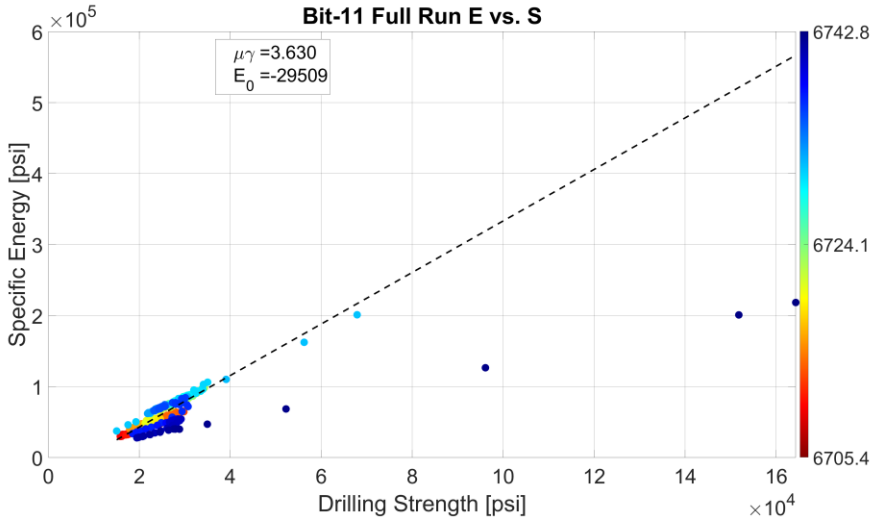
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
11	-	0	-	0	0

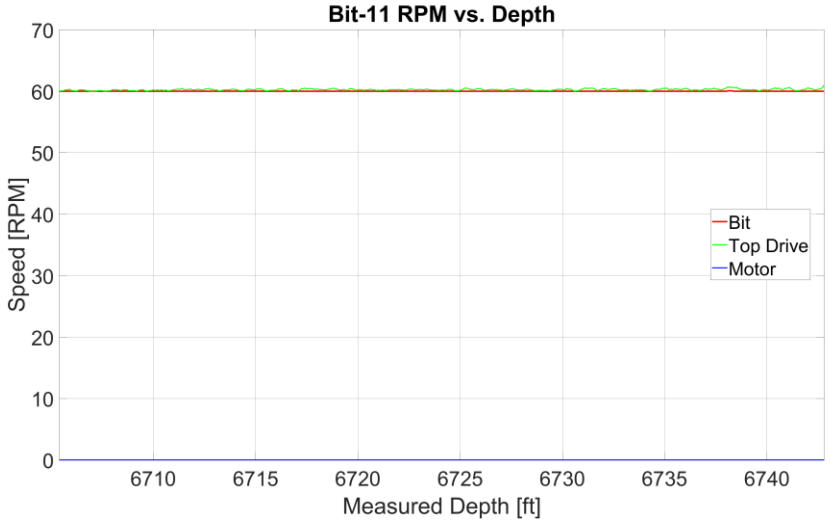
Bit Run Figures:

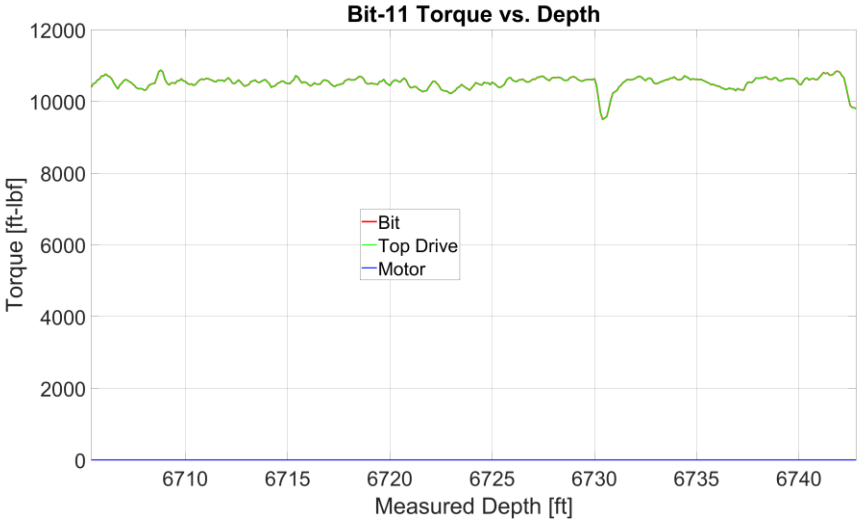







Bit-11 Full Run E vs. S
$\mu\gamma$ =3.630
E_0 =-29509
Specific Energy [psi]
Drilling Strength [psi]
×10^5
×10^4
6742.8
6724.1
6705.4


Bit-11 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-11 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.12. Bit-12

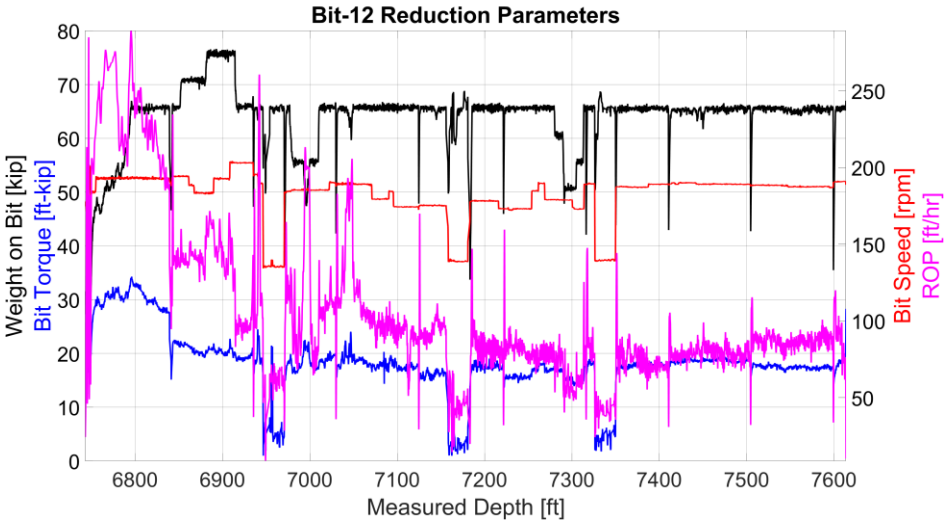
Table 3-23: Bit 12 run summary.

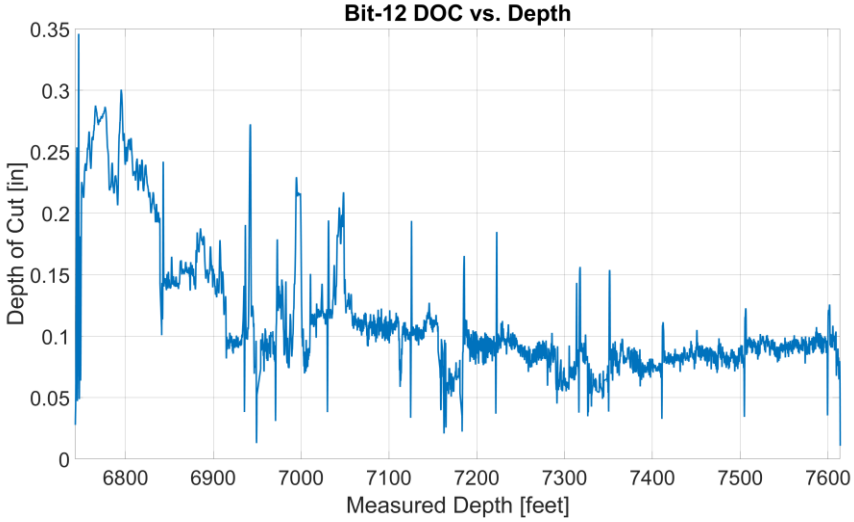
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
12	7/13/2021	10.625	Unknown	MYR547	1116990
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	6740	6742	2	0.6	3.3

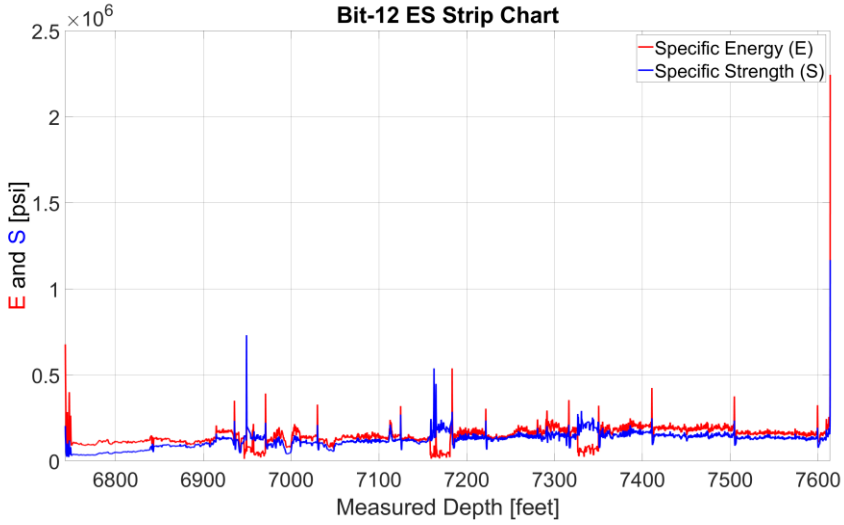
Table 3-24: Bit 12 motor summary.

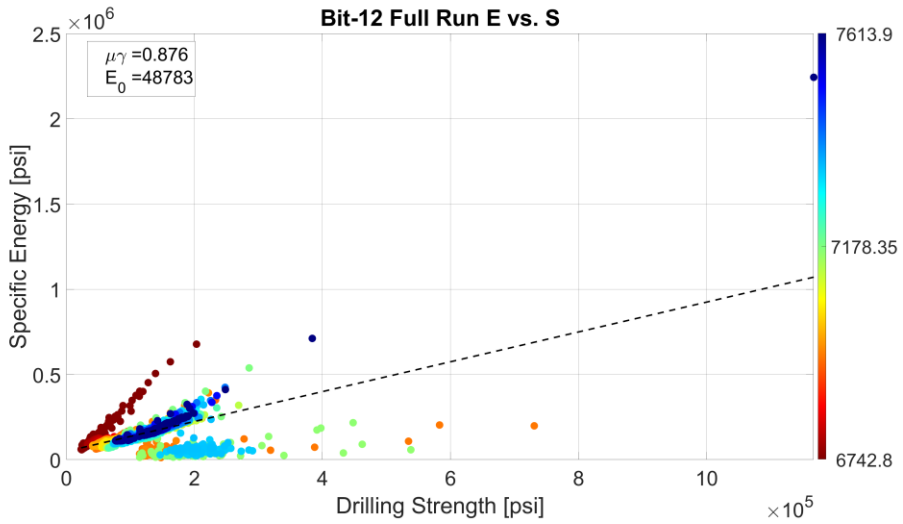
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
12	FBH	0	-	0	0

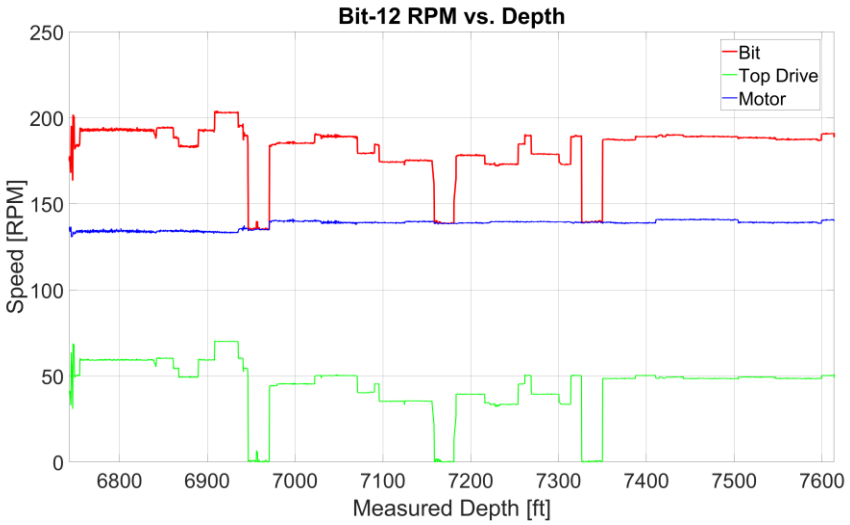
Bit Run Figures:

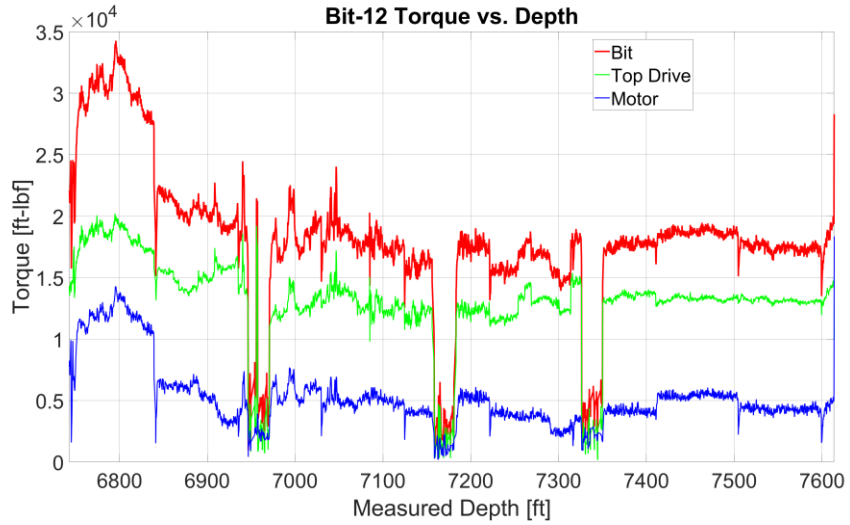







Bit-12 Full Run E vs. S
×10^6
μγ =0.876
E0 =48783
Specific Energy [psi]
Drilling Strength [psi]
×10^5
7613.9
7178.35
6742.8


Bit-12 RPM vs. Depth
Bit
Top Drive
Motor
Speed [RPM]
Measured Depth [ft]


Bit-12 Torque vs. Depth
×10^4
Bit
Top Drive
Motor
Torque [ft-lbf]
Measured Depth [ft]

A.1.13. Bit-13

Table 3-25: Bit 13 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No.
13	7/14/2021	10.625	ReedHycalog	TKC83-C1	A279638
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	6742	7613	871	9.8	88.9

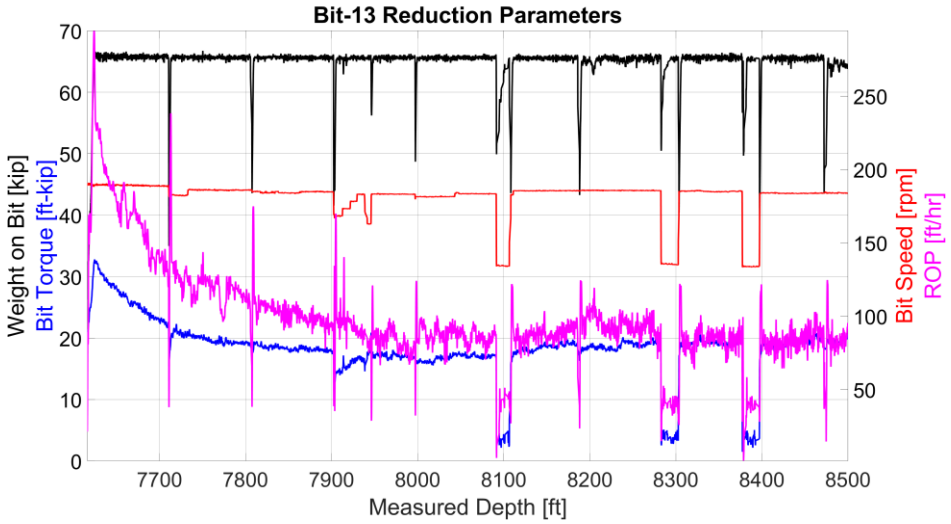
Table 3-26: Bit 13 motor summary.

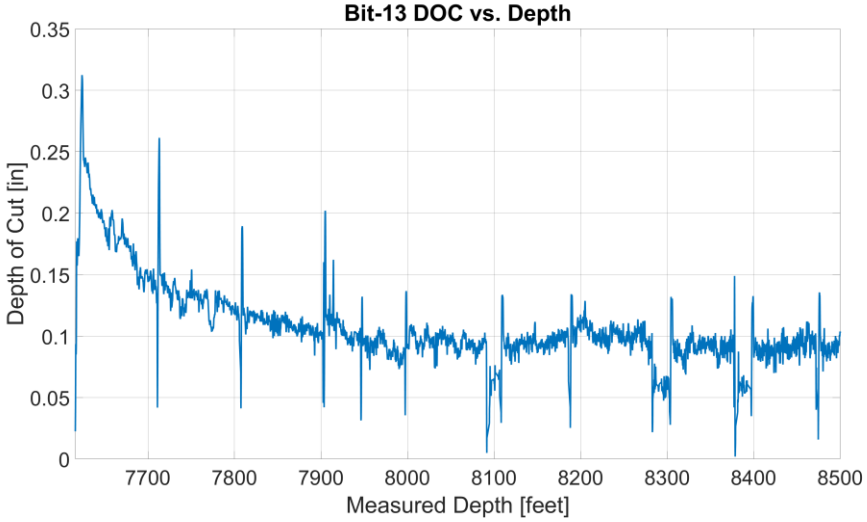
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
13	FBH	8	7/8	4	0.16
Motor Bend Angle (°)	**Motor Bit to Bend (ft)**				
1.15	11				

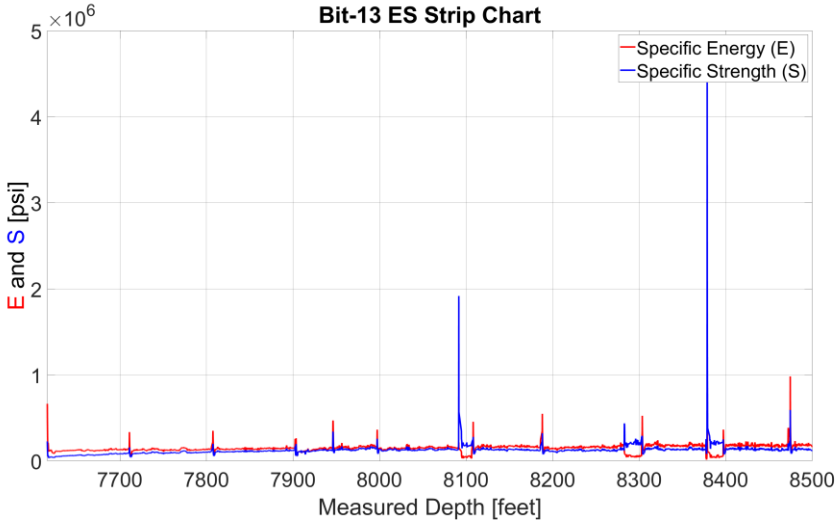
Images:

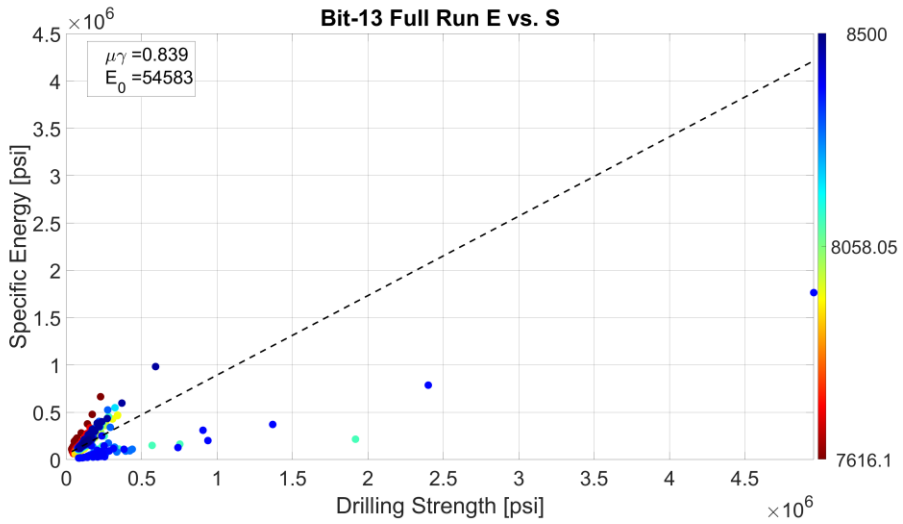
Figure 3-7. Post-drill photo of bit #13.

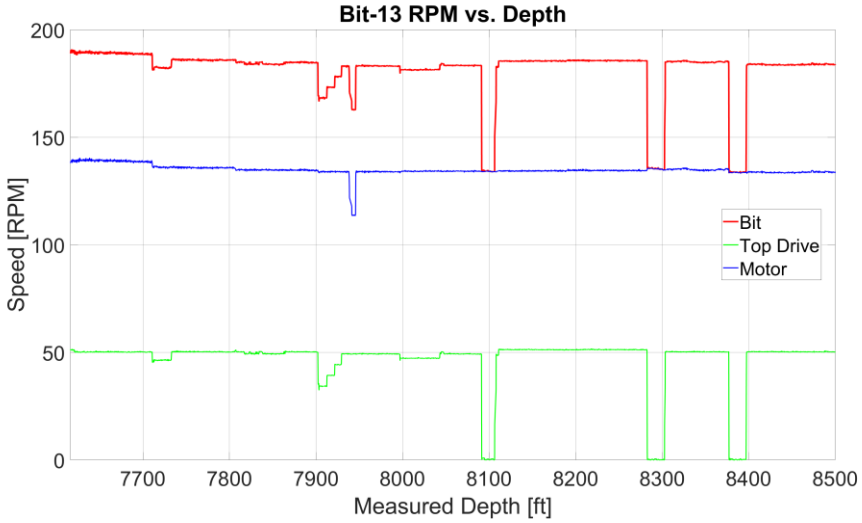
Bit Run Figures:

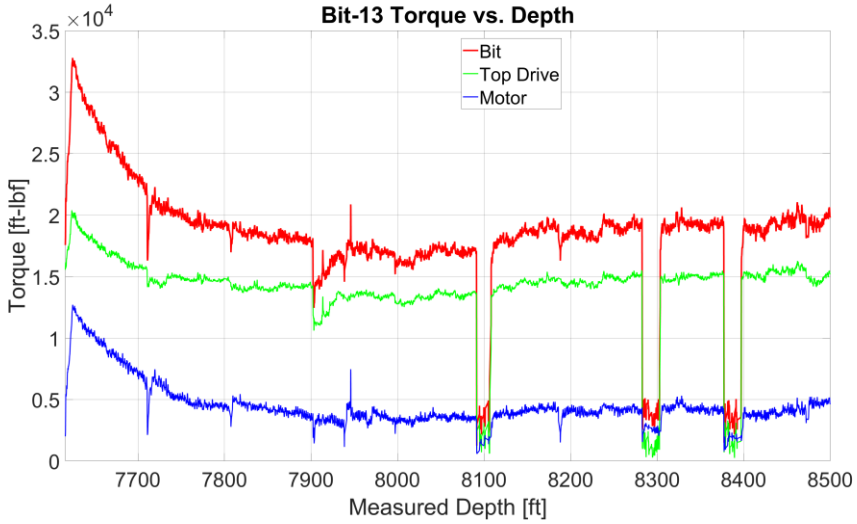







Bit-13 Full Run E vs. S
×10^6
μγ =0.839
E0 =54583
Specific Energy [psi]
Drilling Strength [psi]
×10^6
8500
8058.05
7616.1


Bit-13 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-13 Torque vs. Depth
×10^4
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.14. Bit-14

Table 3-27: Bit 14 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No.
14	7/16/2021	10.625	ReedHycalog	TKC83-B2	A279691
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	7613	8500	887	10.0	88.7

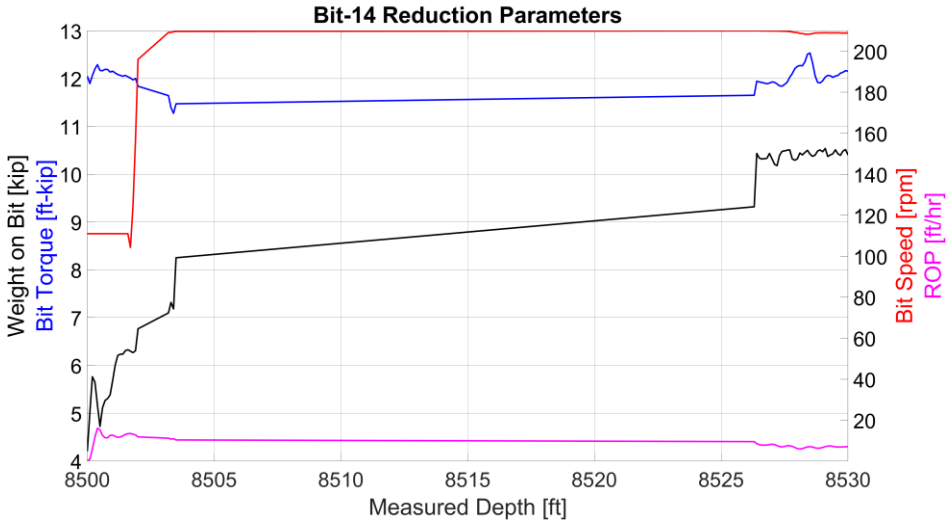
Table 3-28: Bit 14 motor summary.

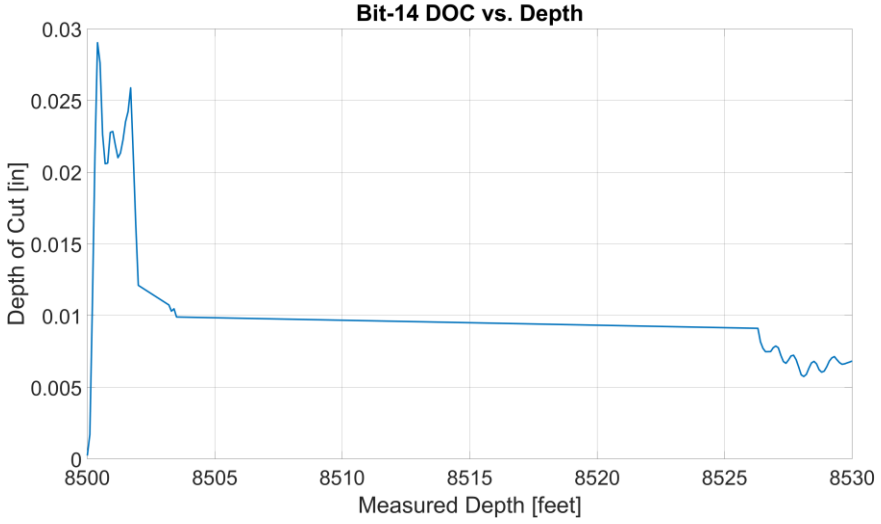
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
14	FBH	8	7/8	4	0.16
Motor Bend Angle (°)	**Motor Bit to Bend (ft)**				
1.5	11				

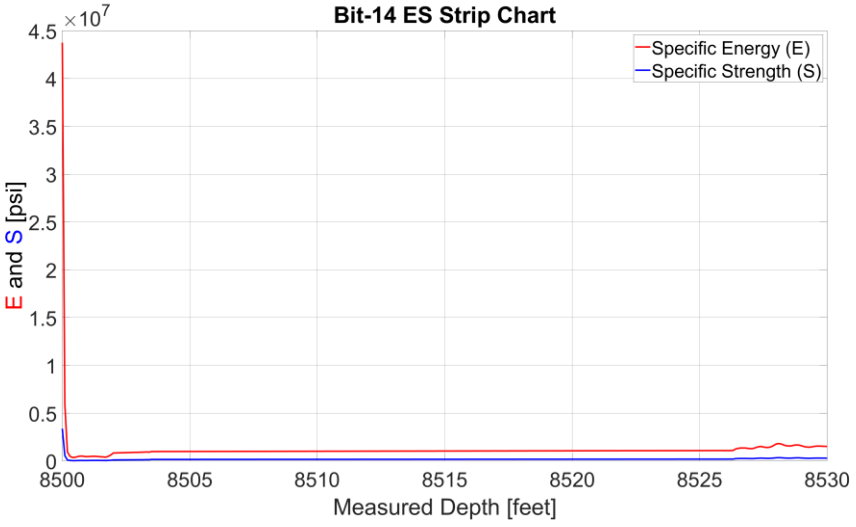
Images:

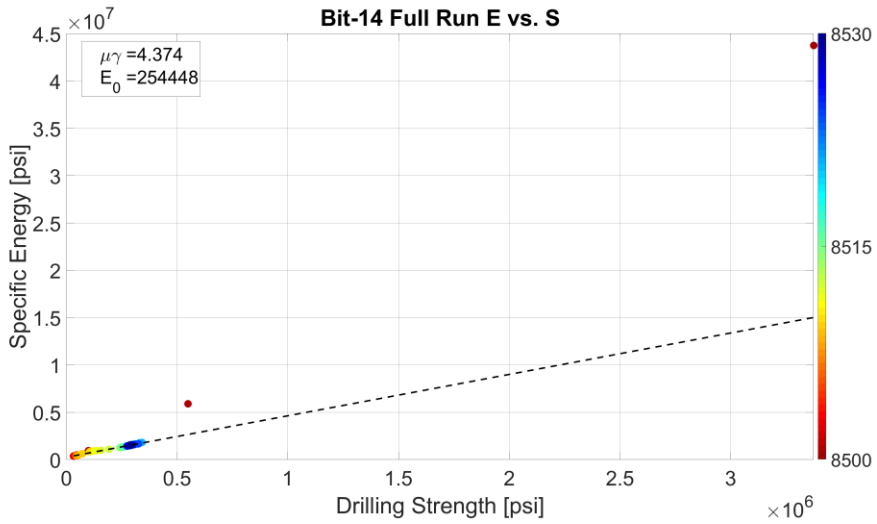
Figure 3-8. Pre-drill photo of bit #14.

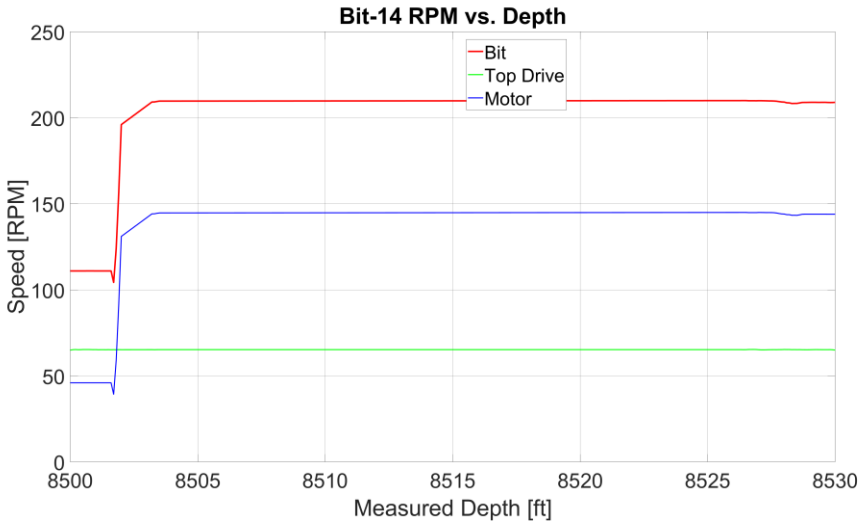
Bit Run Figures:

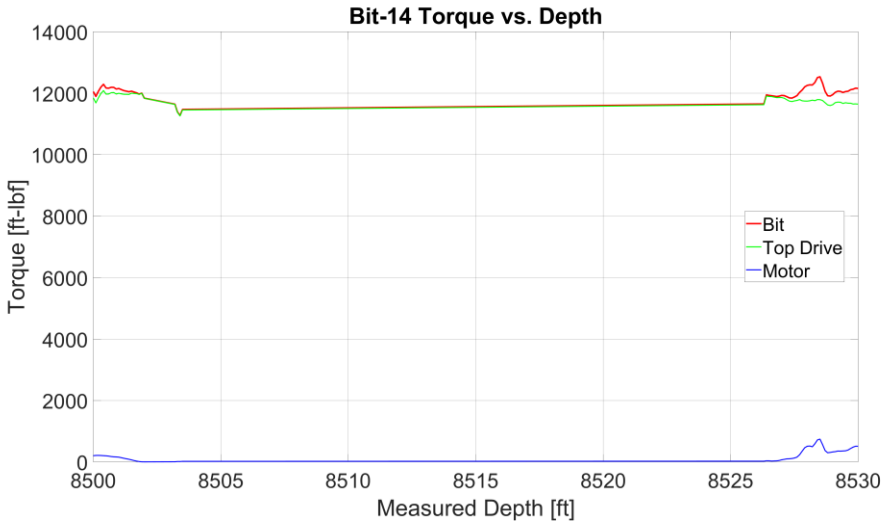







Bit-14 Full Run E vs. S
×10^7
μγ =4.374
E0 =254448
Specific Energy [psi]
Drilling Strength [psi]
×10^6
8530
8515
8500


Bit-14 RPM vs. Depth
Bit
Top Drive
Motor
Speed [RPM]
Measured Depth [ft]


Bit-14 Torque vs. Depth
Bit
Top Drive
Motor
Torque [ft-lbf]
Measured Depth [ft]

A.1.15. Bit-15

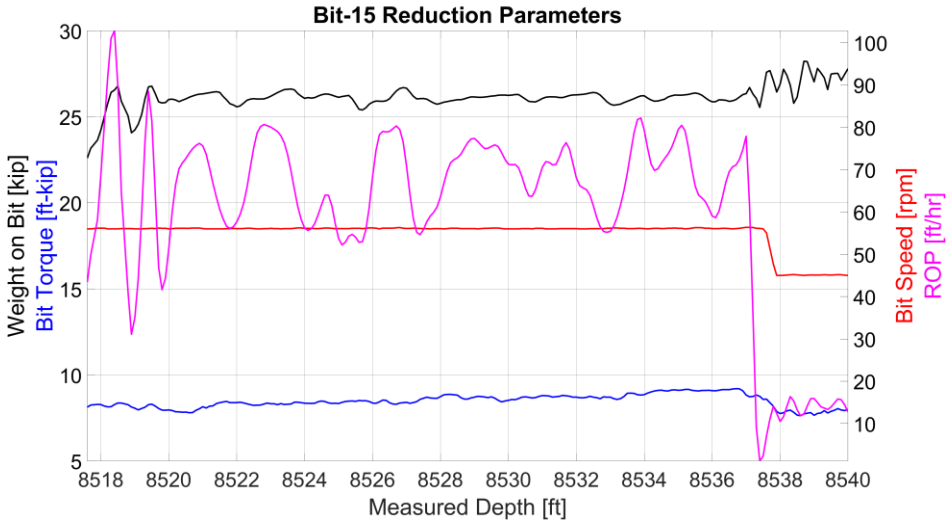
Table 3-29: Bit 15 run summary.

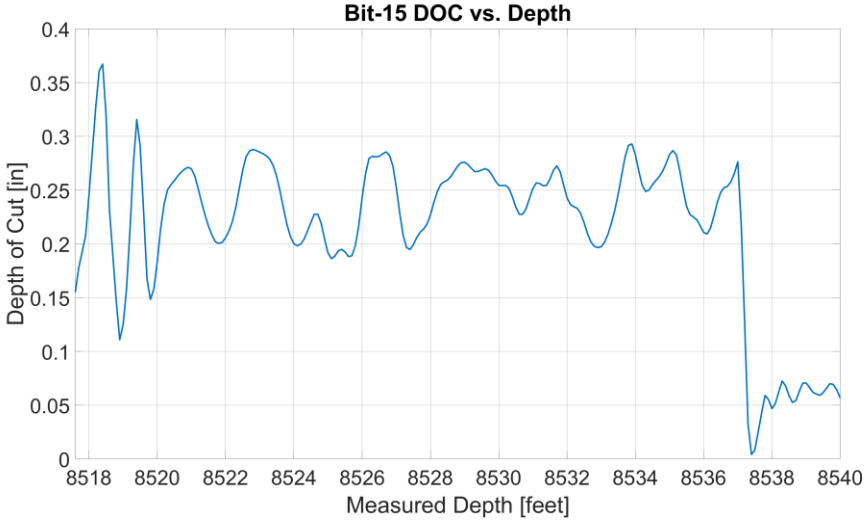
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
15	7/17/2021	8.75	Halliburton	HC3843	13206404
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	8500	8530	30	2.7	10.7

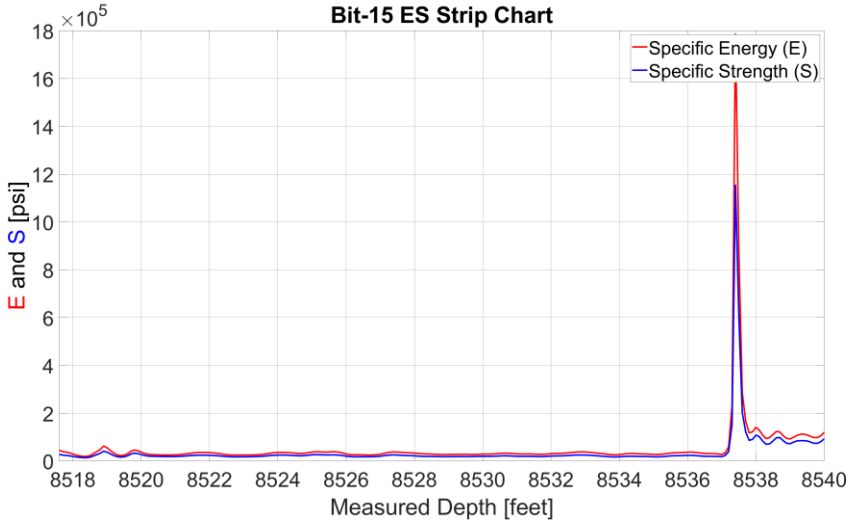
Table 3-30: Bit 15 motor summary.

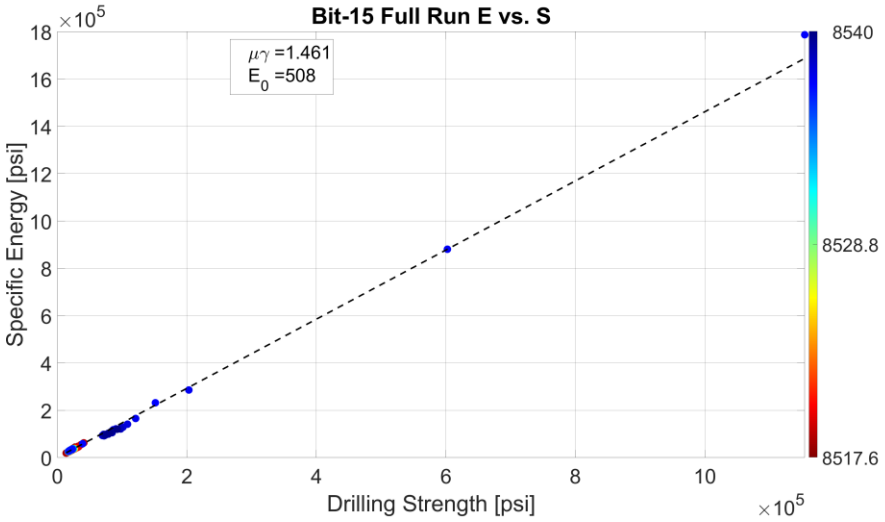
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
15	-	0	-	0	0

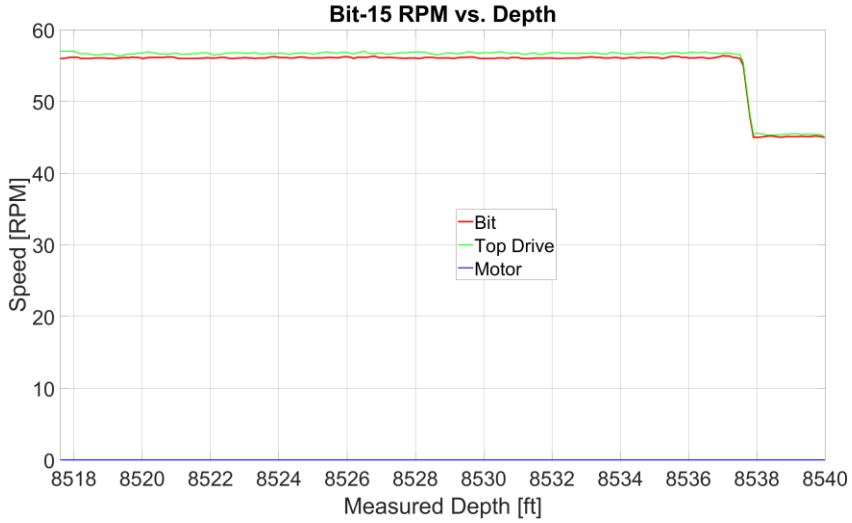
Bit Run Figures:

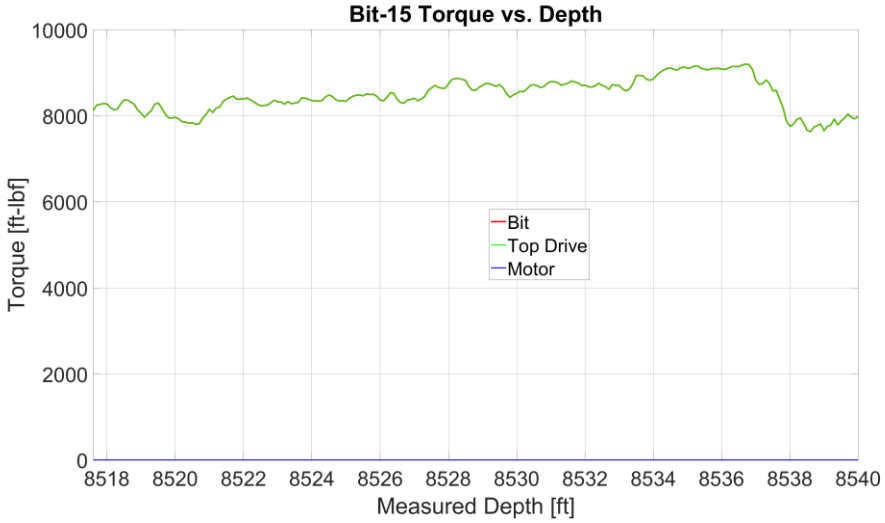







Bit-15 Full Run E vs. S
$\mu\gamma$ =1.461
E_0 =508
Specific Energy [psi]
Drilling Strength [psi]
×10^5
8540
8528.8
8517.6


Bit-15 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-15 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.16. Bit-16

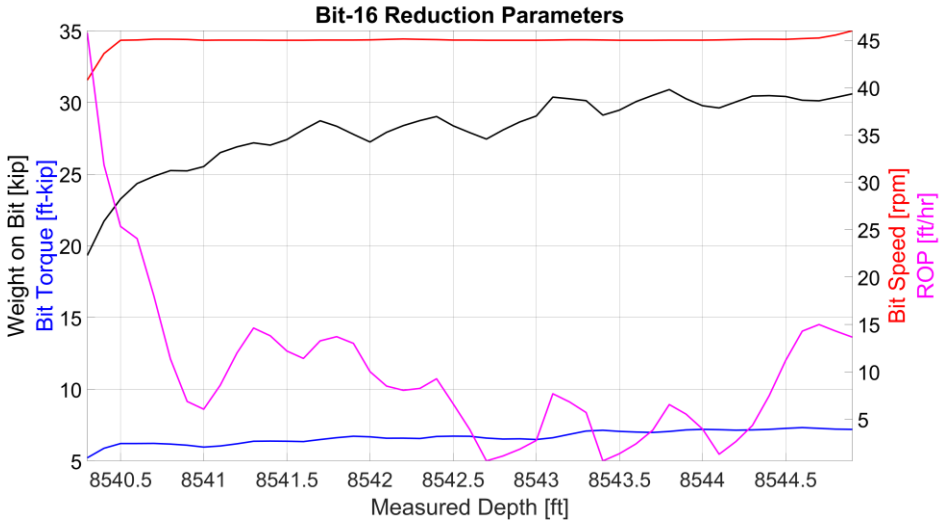
Table 3-31: Bit 16 run summary.

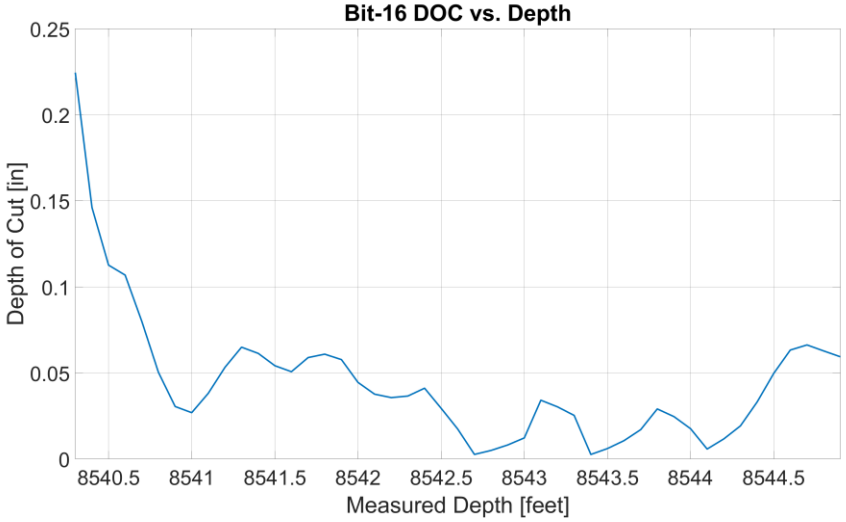
Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
16	7/17/2021	5.75	-	Various	-
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	8530	8555	25	-	-

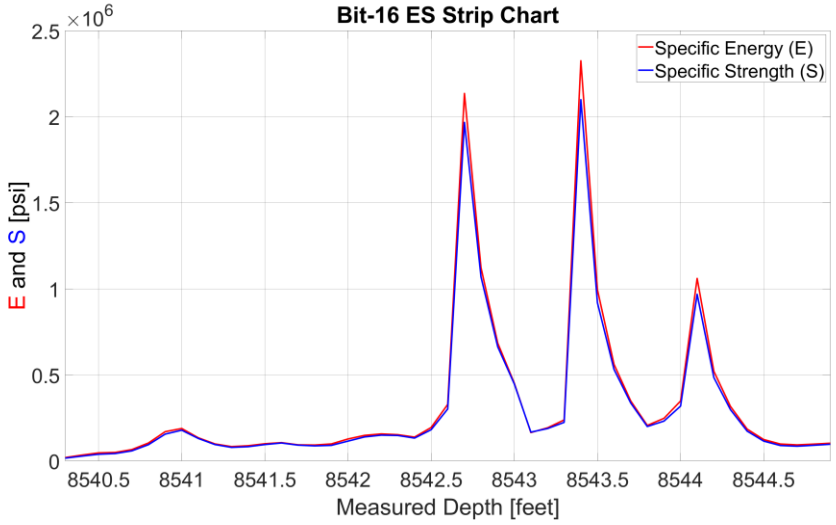
Table 3-32: Bit 16 motor summary.

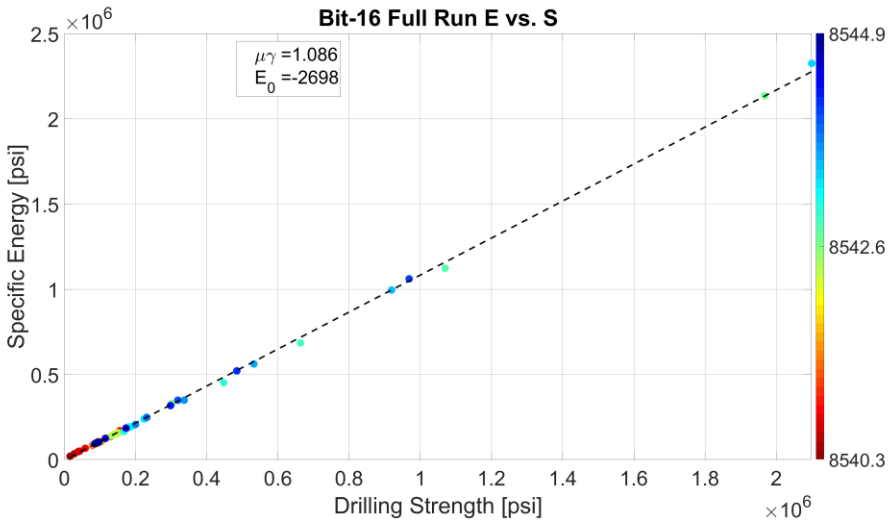
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
16	-	0	-	0	0

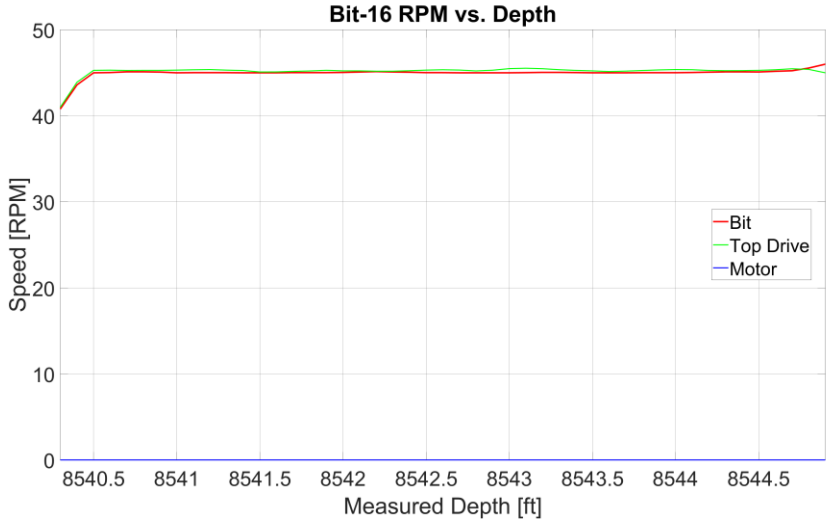
Bit Run Figures:

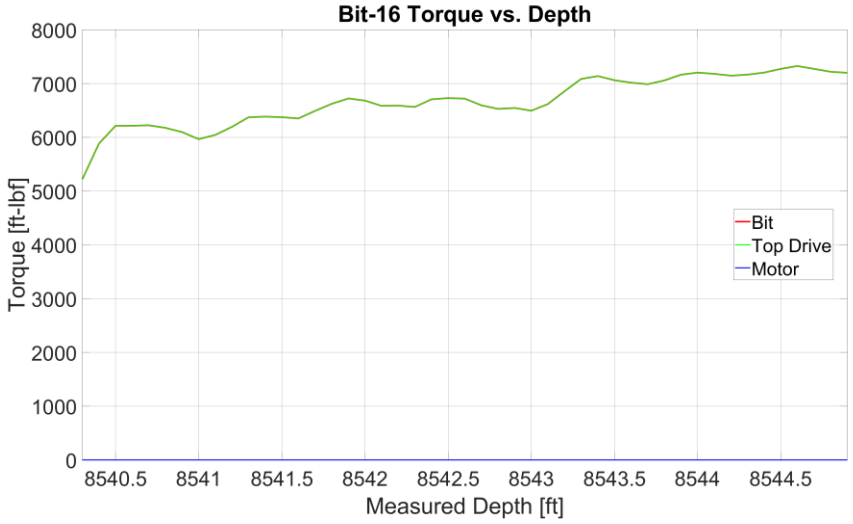







Bit-16 Full Run E vs. S
$\mu\gamma$ =1.086
E_0 =-2698
Specific Energy [psi]
Drilling Strength [psi]
×10^6
8544.9
8542.6
8540.3


Bit-16 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-16 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

A.1.17. Bit-17

Table 3-33: Bit 17 run summary.

Run No.	Run Date	Bit Diameter (in)	Manufacturer	Type	Serial No
17	7/28/2021	5.75	ReedHycalog	TKC63-C2	A279641
BHA No.	**Depth Start (ft)**	**Depth End (ft)**	**Total Footage (ft)**	**Time on Bottom (hrs)**	**Net ROP (ft/hr)**
-	8555	9500	945	7.8	121.2

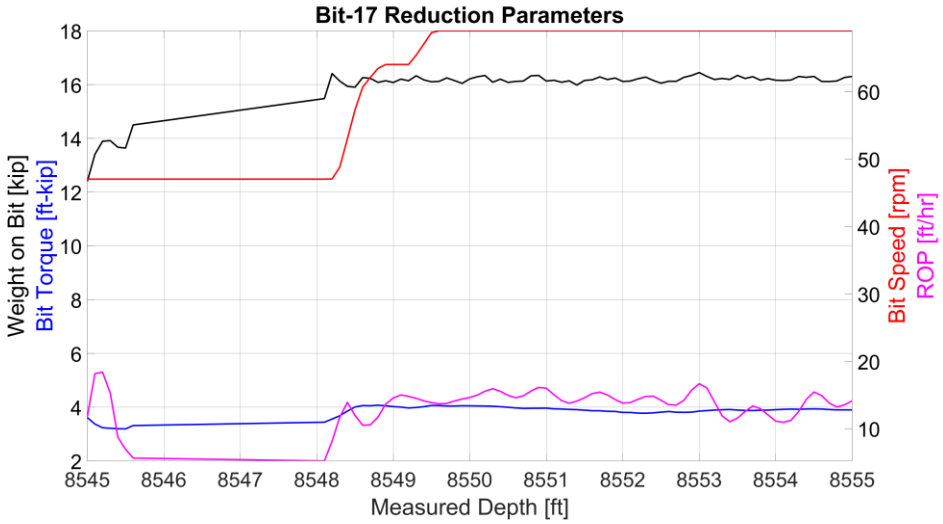
Table 3-34: Bit 17 motor summary.

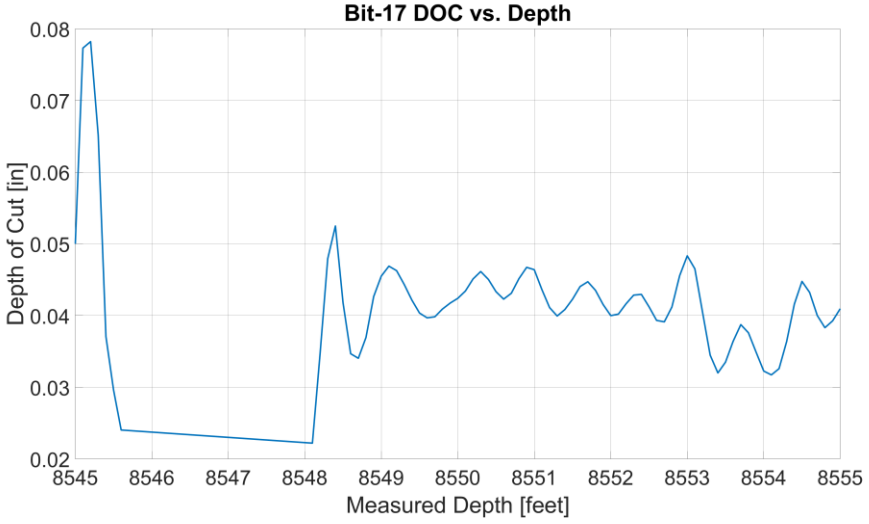
Run No.	Steering Type	Motor Size (in)	Motor Lobe Config	Motor Stage Count	Motor Rev/Gal
17	-	0	-	0	0.56

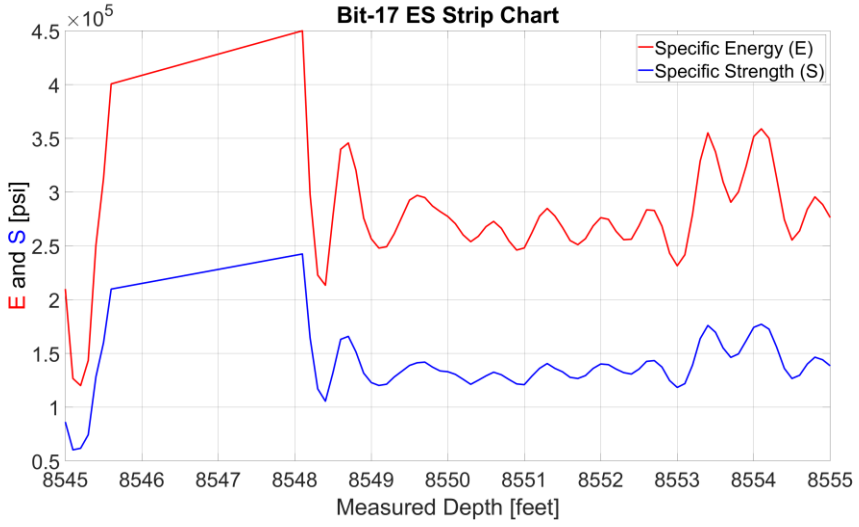
Images:

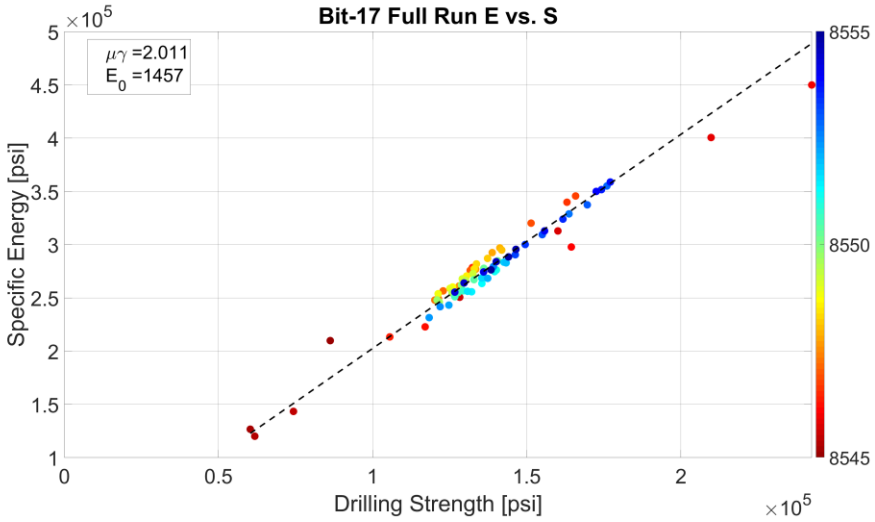
Figure 3-9. Post drill photo of bit #17.

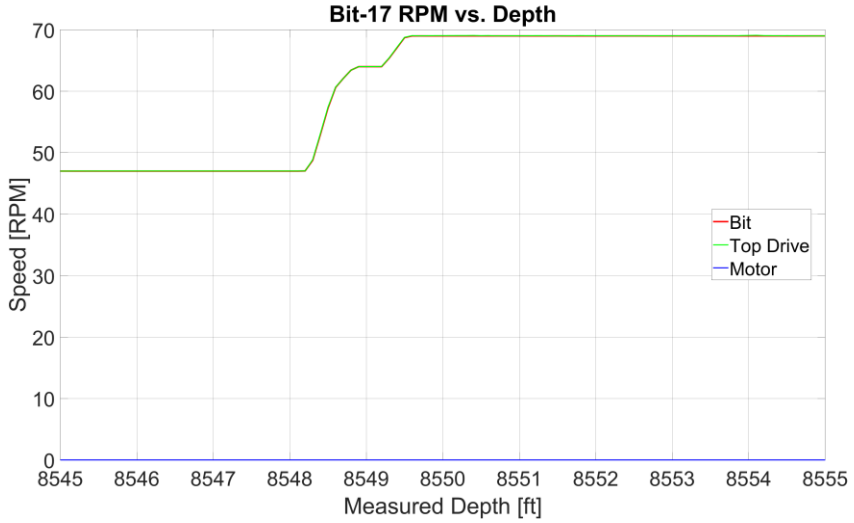
Bit Run Figures:

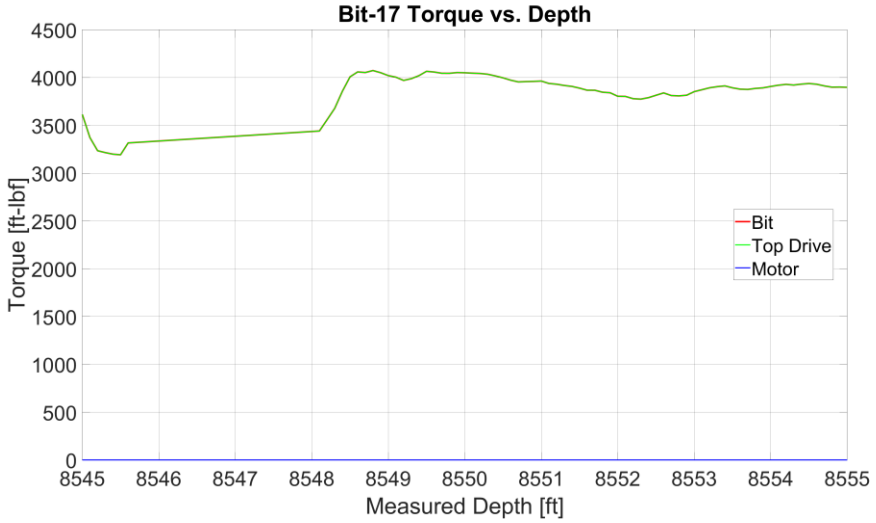







Bit-17 Full Run E vs. S
$\mu\gamma$ =2.011
E_0 =1457
Specific Energy [psi]
Drilling Strength [psi]
×10^5
8555
8550
8545


Bit-17 RPM vs. Depth
Speed [RPM]
Measured Depth [ft]
Bit
Top Drive
Motor


Bit-17 Torque vs. Depth
Torque [ft-lbf]
Measured Depth [ft]
Bit
Top Drive
Motor

REFERENCES

[1] Moore, J. D., Characteristics of the Utah FORGE Site, https://gdr.openei.org/submissions/1209, ARMA2019_JMoore-FORGE.pdf, (2019).

[2] Glowka, D. A., Development of a Method for Predicting the Performance and Wear of PDC Drill Bits, SAND86-1745, (1987).

[3] Detournay, E., Defourny, P., "A Phenomenological Model for the Drilling Action of Drag Bits," Int. J. Rock Mech. Min. Sci. & Geomech. Abstr., Vol. 29, No.1, (1992) 13-23.

[4] Raymond, D., "PDC Bits Demonstrate Benefit Over Conventional Hard-Rock Drill Bits," Geothermal Resources Council Transactions, Vol. 25, (2001) 125-132.

[5] Raymond, D., et al, "PDC Bits Outperform Conventional Bit in Geothermal Drilling Project," Geothermal Resources Council Transactions, Vol. 36, (2012) 307-315.

[6] Bourgoyne, A.J.T., Chenevert , M.E. & Millheim, K.K., 1986. SPE Textbook Series, Volume 2: Applied Drilling Engineering, Society of Petroleum Engineers.

[7] Winkler, D., and Swearingen, L., "Summary of Drilling Activities: Well 16A(78)-32," Mar 2021.

[8] Stevenson, M., et al, "FORGE 16A(78)-32 Drill Bit Analysis," January 2021.

[9] Stevenson, M., et al, "FORGE 56-32 Drill Bit Performance," 02/27/2021.

[10] ReedHycalog, Drill Bit Performance, FORGE 56-32 - Complete Well , Feb 27, 2021 (received).

[11] Scientific Drilling, End of Well Report, Utah FORGE 16B(78)-32, June 2023.

This page left blank

APPENDIX A. DAILY DRILLING REPORTS

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 1 **Report For 27-Jun-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	128	**Last Casing:**		**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):		**Next Casing:**	24.000 at 129	**RKB Elevation (ft):**	30.40	---		---	---
Proposed TD (ft):	9500	**Last BOP Test:**		**Job Reference RKB (ft):**		---		---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**		**Working Interest:**		**Totals:**		---	---
Average ROP (ft/hr):						**Well Cost ($):**			---
Drilling Days (act./plan):	1/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	1/30	**Days On Location:**			1
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	12 / 144	**Service:**	8 / 96	**Other:**	1 / 12	**Total:**	24 / 288

Safety Summary: No incidents or events reported. 0 days since LTI. Conducted Safety Meeting.

Current Operations: Finished drilling 22 in hole to 421 ft
Circulating hole clean at 421 ft.

Planned Operations: POH and run 16 in casing and cement in place.
Nipple up and test 20 in BOP.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	6:00	6.00	128	WOD	Wait on daylight.	
6:00	9:00	3.00	128	RIGU	Pre-Spud Inspection.	
9:00	16:00	7.00	128	1-01	Cut and removed conductor pipe at 4" above ground level. Rigged up cellar pump. Set pipe racks in place. Strapped 105 joints of 5" drill pipe 9 joints of 5" HWDP and readied for pick up. Mixed spud mud.	
16:00	17:00	1.00	128	10-341	Pick up and make up 5 stands of 5" HWDP.	
17:00	22:30	5.50	128	10-341	Pick up 114 joints of 5" drill pipe and rack back in derrick.	
22:30	0:00	1.50	128	3-34-3	Make up 22" surface hole assembly.	

Management Summary

Waited on Day Light and conducted Pre-Spud Rig Inspection.
Strapped, OD, ID and Fishing Neck of HWDP.
Picked up 5 stands of HWDP and stood back in Derrick.
Picked up 114 joints (38 Stands) of 5" DP and stood back in derrick.
Cleaned and strapped 16 in Casing.
Made up Directional tools.

Comments

Rig on "Day Rate" at 0900 hours of June 27,2021.
Note: Spoke to Jim Goddard with Department of Water Resources. Jim had received our start casing, cementing, and BOP testing schedule and waived witnessing of the 20 in BOP test provided testing to be done by a 3rd party. Results to be documented and sent to DWR.
Fuel on hand 7,637.

Activities prior to Rig Move/ Spud

June 8, 2021
- Drill 36" hole from surface to 100'. All material was alluvium (decomposed granite). Experienced no hole cave or sluff.
- weld lifting eyes on 24", move all dirt out of the way and prep to run conductor and cement same in the morning

June 9, 2021
- Check hole for fill / clean out to 100' / welding 3 joints of 24", ½" wall. 125.5#/ft conductor casing / set on bottom / pull rig forward / center and level conductor (102' total)
- From surface pour 14 cu. Yds (2 trucks) in annulus. Cement came to within 33' of surface.
Cement is 4000 psi mix with ¾" rock
- Prep 14" casing for mouse hole. Will top off conductor cement @ 8:00 tomorrow morning prior to drilling service hole. Crew released for the day. No accidents, incidents or injuries

June 10, 2021
- Dump 6 cu. Yds of 4000 psi w/ ¾ rock ready mix around conductor bringing the level from 33'bgl to 5'bgl. Used another 2 cu yds to cement tower foundation on 78-32
- Let cement around conductor thicken
- Drill 26" mouse hole to 75' bgl
- Weld 3 each 25' long 14" line pipe pieces for the mouse hole and lower in the ground
- Cement the mouse shuck with 7 cu. Yds of 4000 psi mix w/ ¾" rock. Level 5' bgl
- Using excavator dig hole for cellar and install 10'OD x 5' deep cellar ring
- Pour 1 foot of 4000 psi, w/ ¾" rock in bottom of cellar

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 1 **Report For 27-Jun-21**

- Clean up site and release Wyoming Casing

June 21,2021
- With H&B move company man quarters, tool pusher quarters, septic system, fresh water system, power distribution panel and generator from 56-32 to 78B-32 and rig up same. Move Command center from 16A to 78B-32 and rig up same

June 22, 2021
- MSE training with all 4 Frontier crews,and 3 pushers, 3 GRG supervisors, 2 GRG office staff, 1 mud man, 2 mud loggers, 2 solids control

June 23, 2021
- MSE training with all contractors

June 24, 2021
- Tear down and move everything off 56-32 location except for subbase, On 78B-32 set and rig up pump package and mud pits, solids equipment, SCR and motor package, derrick, tool house. Removed monkey board from derrick and welder cut all racking fingers out of board and re-install to accept 5.5" drill pipe

June 25,2021
- Hold JSA with all crews involved with rig move, On 56-32 rig down subbase and load out same, clean location and call for dumpster pick up, 56-32 completed. On 78B-32 set matting boards and build subbase, install drawworks, hang derrick and string blocks,welder completed modifing racking board to accommodate 5.5" drill pie, install modified racking board and raise A-Legs, set mud loggers trailer, set solids equipment, unload 16", set 2 mud coolers, received 1st load of diesel, finish setting top dog houses and hanging wind walls, rig up Pason NOTE: Spoke to Jim Goddard with Department of Water Resources Jim had received messages of our start casing, cementing and BOP testing schedule and waived witnessing of the 20" BOP test provided testing be done by a 3rd party and results be documented and sent to DWR

June 26, 2021
- Raise derrick and unbridal
- Rig up Top drive, mud coolers, fill tanks w/ water prepare to PUDP

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Mud Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
1	1	Smith	XR-C	22.000	128														

Jets: 28 28 28 **Out:** 421 **Grade:** **Cutter:** / **Dull:** / **Wear:** **Brgs:** **Gge:** **Pull:**

BHA - No. 1 - BIT, BS, XO, MWD, XO, MONEL, FLOAT, OTHER, XO, HWDP = 314.30

Rig Information

Equipment Problems:
Location Condition:
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):	
Shaker No 1:	60	60	60	60		
Shaker No 2:	60	60	60	60	Centrifuge 1: 4	Centrifuge 2: 4
Shaker No 3:	60	60	60	60		

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Diesel (OBM)		1,000	735	7,372	7,637	6,637

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Mixing chemicals, pinch points, running casing / BHA

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:** 0

☐ **BOP Test** ☐ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	56 degF	**Bar. Pressure:**	29.87
Wind Speed/Dir:	10 / SE	**Wind Gusts:**	12

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 2 **Report For 28-Jun-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---		
Measured Depth (ft):	421	**Last Casing:**	16.000 at 416	**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**		**Actual ($)**	
Vertical Depth (ft):		**Next Casing:**	11.750 at 3,300	**RKB Elevation (ft):**	30.40	---		---		---	
Proposed TD (ft):	9500	**Last BOP Test:**	28-Jun-21	**Job Reference RKB (ft):**		---		---		---	
Hole Made (ft) / Hrs:	293 / 4.0	**Next BOP Test:**	19-Jul-21	**Working Interest:**		**Totals:**		---		---	
Average ROP (ft/hr):	73.25					**Well Cost ($):**				---	
Drilling Days (act./plan):	2/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	2/30	**Days On Location:**				2	
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	4 / 48	**Other:**	3 / 36	**Total:**		24 / 288	

Safety Summary: No incidents or events reported. Conducted BOP Test, Crown Check, Safety Meeting.

Current Operations: Testing out choke manifold at report time.

Planned Operations:
Test casing along with BOPE.
Pick up 8" drill collars.
Trip in the hole with tri-cone bit.
Drill out shoe track and 10 ft of new formation to perform LOT
Pull out of the hole and lay down tricone bit
Make up 14 3/4" BHA with PDC and continue drilling 14 3/4" section.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	1:00	1.00	128	3-34-3	Make up 22" surface hole assembly.	
1:00	1:30	0.50	128	03-051	Filled pipe and hole.	
1:30	5:00	3.50	421	03-021	Drilled 22" hole from 128' to 421'.	
5:00	5:30	0.50	421	03-051	Circulated well bore clean.	
5:30	6:00	0.50	421	3-27	Wiped hole f/ 421' t/ 100' with no issues. No fill on bottom.	
6:00	6:30	0.50	421	3-6-2	Pull out of the hole f/ 421'	
6:30	7:00	0.50	421	3-34-4	Lay down NMDC and bit	
7:00	8:00	1.00	421	4-56	Rig up casing crew.	
8:00	10:00	2.00	421	4-12-1	Rigged up and Ran 9 joints of 16" k-55 64# BTC casing (382.89') of total casing. Landed out with 33' landing joint. Shoe set at 416' KB. Float collar at 372' KB.	
10:00	11:00	1.00	421	4-56	Rig down casing crew	
11:00	12:30	1.50	421	4-12-1	Land casing with well head 3' below ground level.	
12:30	13:00	0.50	421	5-56	RIH with stab-in and stab into float collar at 378	
13:00	14:30	1.50	421	5-56	Rig up cement crew	
14:30	16:00	1.50	421	5-99	Pressure test to 1500 psi, Pump 20 bbl fresh water, pump 50 bbls of sepiolite, pump 5 bbl of fresh water, pump 13 bbl od sodium silkicate, pump 5 bbls fresh water, Mix and pump 146 bbl of 13.88 RC Theremelite w/ 2% CC, displace w/ 6 bbls fresh water, check floats CIP @ 16:00	
16:00	16:30	0.50	421	5-56	Rig down cement crew	
16:30	17:00	0.50	421	5-6-2	POH with stab-in	
17:00	0:00	7.00	421	1-14	Installed BOP as followed. 16" x 20" 2M DSA, 20" 2M spacer spool, 20" 2M x 20" 3M DSA, 20" 3M mud cross, 20" 3M X 20" 2M DSA, 20" 2M double gates, 20" 2M annular, 20" 2M flow spool.	

Management Summary

Drilled 22" hole from 128' to 421'. Circulated hole clean. Wiped hole from 421' to 100'.
Pulled out laying down tools.
Rigged up and ran 9 joints of 65 ppf, K-55 16" Buttress casing setting shoe at 416' KB.
Ran in the hole with stab-in tool.
Rigged up Resource cementing and cemented casing in place CIP @ 16:00.
Rigged down Resource cementing.
Pulled out of the hole with stab-in tool.
Installed 20" BOPE. Nippled up BOPE.

Comments

Good cement to surface.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 2 **Report For 28-Jun-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
28-Jun-21 05:15 at Depth 421 ft Mud Pits																				
8.90	51	19	22	12.2	1	9	11	0	89	2.5		800	120	0	9	16	25	85	85	10.0

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
1	1	Smith	XR-C	22.000	128	293	3.5	83.7	250.0	15	90	7	9	800	576	142	161	75	524

Jets: 28 28 28 **Out:** 421 **Grade:** **Cutter:** 1 / 1 **Dull:** NO / NO **Wear:** A **Brgs:** 0 **Gge:** 0 **Pull:** TD

BHA - No. 1 - BIT, BS, XO, MWD, XO, MONEL, FLOAT, OTHER, XO, HWDP = 314.30

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
128	421	80.0	120.0	15	30	75	80	3	8	650	800	1,100

Annular Velocity: **Drill Collars:** 37.9 **Drill Pipe:** 34.7

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 85 **Pick Up:** 100 **Slack Off:** 78 **Drag Avg/Max:** 3 / 5

Hours on BHA: **Since Inspection:** 3.5 **Total:** **Jars:**

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	241.0	0.69	358.3	241.0	1.5	1.5	N 1.5	W 0.0	0.286
MWD	337.0	1.04	359.5	337.0	2.9	2.9	N 2.9	W 0.1	0.365

Rig Information

Equipment Problems: None
Location Condition: Good.
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	60	60	60	60
Shaker No 2:	60	60	60	60
Shaker No 3:	60	60	60	60

Equipment Usage (Hrs):
Desander: 4 **Desilter:** 4 **Degasser:** 0
Centrifuge 1: 4 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Diesel (OBM)		7,637	940		6,697	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Running casing, cementing casing, Nipple up, Pinch points

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☑ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	66 degF	**Bar. Pressure:**	29.96
Wind Speed/Dir:	8 / NNE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 3 **Report For 29-Jun-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	433	**Last Casing:**	16.000 at 416	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	433	**Next Casing:**	11.750 at 3,300	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	29-Jun-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	12 / 1.5	**Next BOP Test:**	19-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	8.0			**LOT (lbs/gal):**	19.20	**Well Cost ($):**			---
Drilling Days (act./plan):	3/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	3/30	**Days On Location:**			3
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	4 / 48	**Other:**	3 / 36	**Total:**	24 / 288

Safety Summary: No incidents or events reported. Conducted BOP Test, Crown Check, Safety Meeting.

Current Operations: Picked up RSS and ran in the hole. Drilled 14 3/4" hole section from 433' to 1,524' (report time)

Planned Operations: Drill 14 3/4" section.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	3:00	3.00	421	3-15	Installed inner and outer choke and kill valves. Installed choke and kill lines. Torqued all flanges.	
3:00	6:00	3.00	421	3-15	Attempted to Test BOPE system to 300 psi low to 1,000 psi high. First Low test of 300 psi testing against the pipe rams held. Stepped pressure up to 1,000 psi and pressure bleed back down to 500 psi. Attempted to pressure back up to 1,000 psi, pressure bleed back down to 500 psi. Inspected all surface equipment for leaks. No leaks were found. Decision was made to test choke manifold while allowing more time for cement to set. Tested out all valves on choke manifold to 300 psi low for 5 mins and 1,000 psi high for 10 mins.	
6:00	9:00	3.00	421	2-14	Nipple up Flow nipple w/ rotating head to flow line	
9:00	10:00	1.00	421	2-14	Walk catwalk into place and raise V-Door	
10:00	11:30	1.50	421	3-34-3	Set racks and move and strap 15 each 8" DCS	
11:30	14:30	3.00	421	3-34-3	Pick up 15 each 8" DCS and stand back in Derrick	
14:30	16:30	2.00	421	3-15	Test Blind rams to 250 psi for 5 min low & 1000 psi for 10 min high / test good / PU stand of drill pipe and test pipe rams to 250 psi for 5 min & 1000 psi for 10 min test good, test bag to 250 psi for 5 min low & 1000 psi high for 10 min	
16:30	18:00	1.50	421	3-34-3	PU 14-3/4" bit, bit sub, 3 stands of DCS and 1 stand of HWDP and RIH to drill float, cement and shoe	
18:00	18:30	0.50	421	2-14	Installed rotating rubber bushing to bearing assembly. Installed rotating rubber.	
18:30	19:30	1.00	421	3-28	Drilled out shoe track from 370' to 416'. Good cement Throughout shoe track.	
19:30	20:00	0.50	421	SERV	Serviced rig.	
20:00	20:45	0.75	421	3-28	Cleaned out rat hole to 421'. Drilled new formation to 433'	
20:45	21:00	0.25	421	3-5-1	Circulated hole clean for FIT.	
21:00	22:00	1.00	421	3-46	Performed FIT.	
22:00	23:30	1.50	421	3-6-2	Pulled out of the hole from 433' to surface. Broke out bit along with bit sub.	
23:30	0:00	0.50	421	3-98	Held detailed safety meeting with all involved personal on picking up BHA.	

Management Summary

Installed inner and outer choke and kill valves.
Torqued up all breaks on BOPE.
Attempted to test BOPE. High pressure test leaked off. Decision was made to allow more time for cement to set.
Tested out choke manifold.
Nippled up riser and installed flowline.
Walked catwalk into place and raised V-Door.
Set racks in place. Strapped 15-8" drill collars. Picked up 5 stands of 8" drill collars and racked back in the derrick.
Tested out BOPE. Good test.
Made up 14 3/4" slick assembly.
Tripped in the hole.
Drilled out shoe track from 370' to 416'.
Drilled new formation to 433'.
Circulated hole clean.
Performed FIT to a 1 psi/ft. Good test.
Pulled out of the hole.
Held detailed safety meeting with all involved personal on picking up BHA.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 3 **Report For 29-Jun-21**

Comments

Test out all BOPE to 300 psi low and 1,000 psi high. All test good.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	19.20

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
29-Jun-21 21:00 at Depth 436 ft Mud Pits, Type: Spud Mud																				
8.60	36	8	7	18.8	1	11.5	5	0	95	0.5	0.6	900	240		4	6	11	85	97	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Bicarb - 50#SK	10	---	Desco CF - 25#SK	3	---
Engineering - EACH	1	---	perdiem - OTHER	1	---
wraps - OTHER	2	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
2	1	BAKER	GT-C1	14.750	360	93	1.5	62.0	80.0	10	50	3	9	450	184	194	289	76	388

Jets: 18 18 18 **Out:** 433 **Grade:** **Cutter:** 1 / 1 **Dull:** NO / NO **Wear:** A **Brgs:** 0 **Gge:** **Pull:** BHA

BHA - No. 3 - BIT, OTHER, STAB, MWD, 4 OTHER, MMTR, RR, FLOAT, 2 OTHER, DC, XO, HWDP = 956.61

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas (Units) at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
422	436													

Formation Name: Alluvium (sand-cobbles)

Lithology: 100% Alluvium (granitic)

Rig Information

Equipment Problems: None.

Location Condition: Good.

Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	60	60	60	60
Shaker No 2:	60	60	60	60
Shaker No 3:	60	60	60	60

Equipment Usage (Hrs): **Desander:** 0 **Desilter:** 0

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		6,697	477		6,220	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Covered pinch points, testing, handling BHA

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☑ **BOP Test** ☑ **Crownamatic Check**

Daily Drilling Report

Well ID: Forge 78B-32

Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32

Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 3 **Report For 29-Jun-21**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	61 degF	**Bar. Pressure:**	29.94
Wind Speed/Dir:	4 / NW	**Wind Gusts:**	1

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 4 **Report For 30-Jun-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	2699	**Last Casing:**	16.000 at 416	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	2699	**Next Casing:**	11.750 at 3,300	**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	29-Jun-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	2,266 / 15.0	**Next BOP Test:**	19-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):	151.07			**LOT (lbs/gal):**	0.58	**Well Cost ($):**		---
Drilling Days (act./plan):	4/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	4/30	**Days On Location:**		4
Pers/Hrs:	**Operator:** 3 / 36	**Contractor:**	14 / 168	**Service:**	4 / 48	**Other:** 3 / 36	**Total:**	24 / 288

Safety Summary: No incidents or events reported. Conducted Safety Meeting.

Current Operations: Pulled out of the hole from 951' to Surface.
Changed bit. Tipped in the hole to 2,699'.
Drilled 14 3/4" hole section from 2,699' to 2,818' (report time)

Planned Operations: Drill 14 3/4" section to casing point.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	3:30	3.50	433	3-34-3	Picked up 14 3/4" RSS BHA to 433'.	
3:30	4:15	0.75	665	3-2-3	Drilled 14 3/4" hole from 433' to 665' with full returns.	
4:15	4:30	0.25	665	03-051	Circulated hole clean to rack back HWDP and place 3 stands of 8" drill collars into BHA.	
4:30	5:30	1.00	665	3-34-3	Pulled out of the hole from 665' to 389'. Racked back 3 stands of HWDP. Installed 3 stands of 8" drill collars into the BHA. Tripped in the hole to 665'.	
5:30	6:00	0.50	858	3-2-3	Drilled 14 3/4" hole from 665' to 858 with full returns.	
6:00	10:00	4.00	2,077	3-2-3	Drilled 14-3/4" hole from 858' to 2,077' with full returns.	
10:00	10:30	0.50	2,077	SERV	Serviced rig / torqued saver sub	
10:30	11:00	0.50	2,232	3-2-3	Drilled 14-3/4" hole from 2,077' to 2,232' with full returns.	
11:00	11:30	0.50	2,232	REPR	Rig blacked out/ cleaned #2 generator radiator due to overheating.	X
11:30	12:30	1.00	2,359	3-2-3	Drilled 14-3/4" hole from 2,232' to 2,359' with full returns.	
12:30	13:30	1.00	2,359	REPR	Rig Repair cleaned #1 generator radiator due to overheating.	X
13:30	14:00	0.50	2,399	3-2-3	Drilled 14-3/4" hole from 2,359' to 2,399' with full returns.	
14:00	15:30	1.50	2,399	REPR	Rig Repairs cleaned #3 generator radiator due to overheating.	X
15:30	21:15	5.75	2,399	3-2-3	Drilled 14-3/4" hole from 2,399' to 2,699' with full returns.	
21:15	22:00	0.75	2,399	3-5-1	Circulate hole clean. Pump 15 bbl slug.	
22:00	0:00	2.00	2,399	3-6-4	Pull out of the hole from 2,699' to 951'. Tight hole encountered from 2,351' to 1,799' 50-100k over string weight. Extended trip time due to tight connections and using rig tongs. Removed rotating rubber at 850'.	

Management Summary

Picked up 14 3/4" RSS BHA to 433'.
Drilled 14 3/4" hole from 433' to 665' with full returns.
Circulated hole clean.
Pulled out of the hole from 665' to 389'.
Racked back 3 stands of HWDP.
Installed 3 stands of 8" drill collars into the BHA.
Tripped in the hole to 665'.
Drilled 14 3/4" hole from 665' to 2,077' with full returns. Serviced rig.
Drilled 14-3/4" hole from 2,077' to 2,232' with full returns. Circulated while cleaning radiator on gen #2 due to overheating.
Drilled 14-3/4" hole from 2,232' to 2,359' with full returns. Circulated while cleaning radiator on gen #1 due to overheating.
Drilled 14-3/4" hole from 2,359' to 2,399' with full returns. Circulated while cleaning radiator on gen #3 due to overheating.
Drilled 14-3/4" hole from 2,399' to 2,699' with full returns. Circulated hole clean. Tripped out of the hole to 951'.

Comments

BOPE test results emailed DWR (Jim Goddard).

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.58

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 4 **Report For 30-Jun-21**

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
30-Jun-21 21:00 at Depth 2,697 ft Mud Pits, Type: Low Solids Non-Dispersed																				
9.10	42	14	13	9.4	1	10	9	0	91	12.5	4.2	800	120		3	7	11	110	118	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	20	---	Desco CF - 25#SK	1	---
DMA - 50#SK	5	---	Drispac LV - 50#SK	5	---
Engineering - EACH	1	---	FlowZan - 25#SK	10	---
Gel - 100#SK	70	---	Micro C - 50#SK	50	---
pallets - OTHER	13	---	perdiem - OTHER	1	---
Trucking - EACH	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
2	1	BAKER	GT-C1	14.750	360	166	3	55.3	1,	40	80	15	9	950	3050	409	1361	754	1829
Jets: 18 18 18					**Out:** 433		**Grade:**	**Cutter:**	1 / 1	**Dull:**	NO / NO		**Wear:** A	**Brgs:** 0	**Gge:**		**Pull:** BHA		
3	1	NOV	TKC66	14.750	433	2,266	15	151.1					9	950	3050	281	645	357	1259
Jets: 15 15 15 15 16 16					**Out:** 2699		**Grade:**	**Cutter:**	3 / 1	**Dull:**	LT / CT		**Wear:** N	**Brgs:** X	**Gge:**		**Pull:** PR		

BHA - No. 3 - BIT, OTHER, STAB, MWD, 4 OTHER, MMTR, RR, FLOAT, 2 OTHER, DC, XO, HWDP = 956.61

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
433	2,699	174.3	1,300.0	40	65	70	120	13	22	950	1,050	3,150

Annular Velocity: **Drill Collars:** 197.7 **Drill Pipe:** 128.2

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 125 **Pick Up:** 150 **Slack Off:** 100 **Drag Avg/Max:** 10 / 15

Slow Circulation Data:

Pump 1:	35 spm	95 psi	45 spm	210 psi	60 spm	375 psi
Pump 2:	35 spm	95 psi	45 spm	210 psi	60 spm	375 psi
Pump 3:	35 spm	95 psi	45 spm	210 psi	60 spm	375 psi

Hours on BHA: **Since Inspection:** 9 **Total:** 9 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 9 / 0 **Tripping:** 3 / 0 ☐ **Wear Bushing Installed**

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	545.0	0.17	93.9	545.0	4.8	4.8	N 4.8	E 0.2	0.513
MWD	731.0	0.07	271.8	731.0	4.8	4.8	N 4.8	E 0.4	0.129
MWD	822.0	0.12	37.4	822.0	4.8	4.8	N 4.8	E 0.4	0.187
MWD	914.0	0.15	342.6	914.0	5.0	5.0	N 5.0	E 0.4	0.138
MWD	1,005.0	0.47	187.3	1,005.0	4.8	4.8	N 4.8	E 0.3	0.670
MWD	1,101.0	0.19	350.9	1,101.0	4.5	4.5	N 4.5	E 0.3	0.682

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 4 **Report For 30-Jun-21**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
0	430	0	430	0	0						9.10			
Formation Name:														
Lithology:	100% Alluvium													
430	2,430	430	2,430	0	0									
Formation Name:														
Lithology:	100% Alluvium													
2,440	2,630	2,430	2,440	0	0									
Formation Name:	60% Clay, 40% Alluvium													
Lithology:	90% Clay 10% Alluvium													
2,630	2,650	2,440	2,570	0	0									
Formation Name:	90% Clay 10% Alluvium													
Lithology:	100% Alluvium													
2,650	2,670	2,570	2,580	0	0									
Formation Name:	70% Clay, 30% Rhyolite													
Lithology:	10-50% Rhyolite 50-90% Alluvium													
2,670	2,700	2,580	2,640	0	0									
Formation Name:	90$ Rhyolite, 10% Clay													
Lithology:	100% Alluvium													

Rig Information

Equipment Problems: Generators overheating. cleaned radiators on all 3 gens.
Location Condition: Good.
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	60	60	60	60
Shaker No 2:	60	60	60	60
Shaker No 3:	60	60	60	60

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		6,220	1,624	3,500	8,096	1,876

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Trip hazards, pinch points, Working at heights.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☐ **BOP Test** ☐ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.94
Wind Speed/Dir:	10 / W	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 5 **Report For 01-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	2699	**Last Casing:**	16.000 at 416	**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	2699	**Next Casing:**	11.750 at 3,300	**RKB Elevation (ft):**	30.40	---		---	---
Proposed TD (ft):	9500	**Last BOP Test:**	29-Jun-21	**Job Reference RKB (ft):**		---		---	---
Hole Made (ft) / Hrs:	310 / 22.75	**Next BOP Test:**	19-Jul-21	**Working Interest:**		**Totals:**		---	---
Average ROP (ft/hr):	13.63			**LOT (lbs/gal):**	0.58	**Well Cost ($):**			---
Drilling Days (act./plan):	5/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	5/30	**Days On Location:**			5
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 148	**Service:**	4 / 48	**Other:**	3 / 36	**Total:**	24 / 268

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Cleaned and cleared rig floor. Rigged up and ran 11 3/4" casing to 2,800' (report time)

Planned Operations:
Run 11 3/4" casing to set depth.
Rig down Casing crew.
Run in the hole with stab-in tool.
Circulate and cement 11 3/4" casing.
Nipple down 20" BOPE.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	2:00	2.00	2,699	3-6-2	Pulled out of the hole from 951' to Surface. Broke out bit and inspected MWD. No visible wear on roller reamer or stabs. Motor had minimal movement in bearing assembly. cleaned and cleared rig floor.	
2:00	4:00	2.00	2,699	3-6-1	Make up 14 3/4" Bit and trip in the hole with BHA to 951'.	
4:00	5:15	1.25	2,699	10-6-3	Trip in the hole from 951' to 2,699'.	
5:15	15:30	10.25	3,009	3-2-3	Drilled 14-3/4" hole from 2,699' to 3,009' with full returns.	
15:30	16:00	0.50	3,009	3-2-3	After making a hook ROP dropped from 15'/hour to 0'/hour. Perform step test from 5K to 30K no ROP / No change in diff pressure and no pressure loss and no hook load change but found excessive amounts of metal on ditch magnet mix dry job.	
16:00	19:30	3.50	3,009	3-6-2	Pulled out of the hole from 3,009' to 951' with no issues. hoe taking proper fill. Stopped and removed rotating rubber at 1,100'.	
19:30	0:00	4.50	3,009	3-6-2	Racked back HWDP. Racked back 8" drill collars. Laid out Cubic sensor, Diffuser sub, along with float sub. Pulled up and broke out bit. laid out the remaining RSS tools. (Note: Bit was 3.75" under gage, 3.5" of the center of the bit was washed out with 4 jets missing. RSS had signs of wear below the pads approximately .25" wide by .25" deep. No signs of wear on the stabilizers or roller reamer. Motor had approximately .25" of play in bearing assembly.	

Management Summary

Pulled out of the hole from 951' to Surface.
Picked up 14 3/4" PDC bit.
Tripped in the hole to 2,699'.
Drilled 14-3/4" hole from 2,699' to 3,009' with full returns. Decision was made to pull out of the hole at 3,009' due to low ROP.
Pulled out of the hole from 3,009' to surface.
Laid out RSS assembly. cleaned and cleared rig floor for casing run.

Comments

Bit was 3.75" under gage with 3.5" of the center of the bit was washed out with 4 jets missing. RSS had signs of wear below the pads approximately 0.25" wide by 0.25" deep. No signs of wear on the stabilizers or roller reamer.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.58

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
01-Jul-21 20:00 at Depth 3,009 ft Mud Pits, Type: Low Solids Non-Dispersed																				
9.00	42	14	15	7.8	1	11	9	0	92	1	3.2	800	120		5	9	16	116	109	

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 5 **Report For 01-Jul-21**

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	20	---	Engineering - EACH	1	---
Gel - 100#SK	96	---	perdiem - OTHER	1	---
Zanflow - 25#SK	5	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Mud Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
3	1	NOV	TKC66	14.750	433	2,266	9	251.8								267	572	301	1118
Jets: 15 15 15 15 16 16					**Out:** 2699		**Grade:**	**Cutter:**	3 / 1	**Dull:**	LT / CT	**Wear:** N	**Brgs:** X	**Gge:**		**Pull:** PR			
4	1	NOV	TKC63	14.750	2699	310	10.25	30.2	75.0	40	188	15	9	900	2560	267	572	301	1118
Jets: 15 15 15 15 16 16					**Out:** 3009		**Grade:**	**Cutter:**	4 / 8	**Dull:**	RG / CR	**Wear:** A	**Brgs:** X	**Gge:**	3.75	**Pull:** PR			

BHA - No. 4 - BIT, OTHER, STAB, MWD, 4 OTHER, MMTR, RR, FLOAT, 2 OTHER, DC, XO, HWDP = 956.61

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
2,699	3,009	30.2	80.0	40	70	188	220	15	21	900	950	2,587

Annular Velocity: **Drill Collars:** 199.3 **Drill Pipe:** 129.3

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 145 **Pick Up:** 165 **Slack Off:** 135 **Drag Avg/Max:** 10 / 15

Slow Circulation Data:

Pump 1:	30 spm	95 psi	45 spm	210 psi	60 spm	350 psi
Pump 2:	30 spm	95 psi	45 spm	210 psi	60 spm	350 psi
Pump 3:	30 spm	95 psi	45 spm	210 psi	60 spm	350 psi

Hours on BHA: **Since Inspection:** 19.25 **Total:** 19.25 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 19.25 / 10.25 **Tripping:** 11 / 8 ☐ **Wear Bushing Installed**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
2,650	2,670	2,650	2,670	0	0	0	0	0	0		9.00			
Formation Name: 1050% Rhyolite 50-90% Granite														
Lithology:														
2,670	2,700	2,670	2,700	0	0	0	0	0	0		9.00			
Formation Name:														
Lithology: 100% Granite														
2,700	3,000	2,700	3,000	0	0	0	0	0	0		9.00			
Formation Name:														
Lithology: 100% Granite														

Rig Information

Equipment Problems: Generators having issues with over heating with higher pump rates.
Location Condition: Good
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):	
Shaker No 1:	60	60	60	60		
Shaker No 2:	60	60	60	60	**Centrifuge 1:** 14 (Solids Removal)	**Centrifuge 2:** 14
Shaker No 3:	60	60	60	60		

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,096	2,844		5,252	

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 5 **Report For 01-Jul-21**

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, Tripping pipe, Rigging up and running casing.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	70 degF	**Bar. Pressure:**	29.83
Wind Speed/Dir:	6 / NNW	**Wind Gusts:**	1

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 6 **Report For 02-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	3009	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	3009	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	29-Jun-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	19-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):						**Well Cost ($):**		---
Drilling Days (act./plan):	6/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	6/30	**Days On Location:**		6
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	4 / 48	**Other:**	7 / 84	**Total:** 28 / 336

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Installing 13 5/8" 5M BOPE. (report time)

Planned Operations: Nipple up 13 5/8" 5M BOPE. Test BOPE.
Run in the hole and lay down 5" drill pipe.
Pick up and rack back 5.5" drill pipe.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:30	0.50	3,009	3-97	Cleaned and cleared rig floor of 14 3/4" handling tools.	
0:30	1:00	0.50	3,009	10-98	Hold detailed safety meeting with Wyoming Casing Service/Rig crew along with GRG representative.	
1:00	2:00	1.00	3,009	CASE	Rig up 11 3/4" casing running equipment.	
2:00	8:30	6.50	3,009	CASE	Run 11 3/4", 54 lbs/ft, J-55 BTC casing as follows:. Float Shoe, 2-joints, Float collar followed by 71-joints. Landed out with 31' landing joint to set depth of 2,989.99' Total casing ran 2,958.99' Shoe set 2,984.70 KB. Float Collar 2,903.97' KB.	
8:30	9:00	0.50	3,009	CASE	Rig down casing crew	
9:00	9:30	0.50	3,009	SERV	Service rig	
9:30	11:30	2.00	3,009	CMTP	Install valve in wellhead, rig up pumps in cellar, 4 bolt BOP	
11:30	12:30	1.00	3,009	TRPI	Trip in hole with stab-in	
12:30	13:30	1.00	3,009	CIRC	Circulate bottoms upo	
13:30	14:30	1.00	3,009	CMTP	Rig up cement crew and held JSA	
14:30	16:30	2.00	3,009	CMTP	Pump 2 bbl water, pressure test lines to 3000 psi, pump 52 bbls fresh water, @ 6bpm, 20 bbl mud clean, @ 6 bpm, 10 bbl fresh water @ 6bpm-HT--HSLD atr 6 bpm, , mix and pump 315 bbl RC-Thermalite (cement to surface at 300 bbl, Displace with 3 bbl water and 47 bbl drilling mud, check floats, CIP @ 16:00	
16:30	18:00	1.50	3,009	CMTP	Un-sting and trip out of the hole with stab-in to surface.	
18:00	21:00	3.00	3,009	BOPO	Nipple down 21-1/4" BOPE and set out.	
21:00	23:45	2.75	3,009	WELLHD	Installed temporary 11 3/4" x 13 5/8 " SOW flange. Test to 1,000 psi. Good test.	
23:45	0:00	0.25	3,009	2-14	Installed 13 5/8" 5M BOPE stack.	

Management Summary

Cleaned and cleared rig floor.
Held safety meeting.
Rigged up and ran 11 3/4" casing with shoe depth of 2,899.99' KB.
Rigged down casing crew.
Ran in the hole with stab-in tool.
Rigged up Resource cementing and cemented casing with 315 bbl RC-Thermalite cement. Had good cement to surface. CIP @ 16:00.
Rigged down Resource cementing.
Pulled out of the hole with stab-in tool.
Nippled down 21-1/4" BOPE.
Installed temporary 11 3/4" x 13 5/8 " SOW flange. Test to 1,000 psi. Good test.
Installed 13 5/8" 5m BOPE stack.

Comments

CIP @ 1600 HRS.
Good cement to surface.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 6 **Report For 02-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.58
FULL	11.750	0		2,990		INT1	14.750	54	J-55	

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
02-Jul-21 16:00 at Depth 3,009 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.90	43	43	29	7.8	1	10.5	7	93	0	0.5	2.8	900	120		5	9	16	109	118	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	perdiem - OTHER	1	---

Rig Information

Equipment Problems: Replaced HYD hose on top drive.
Location Condition: Good.
Transport: Received 2- 10 5/8" nov bit's. Sent 2-14 3/4" used bits back to NOV. sent in 20" double gate along with spacer spools.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):	
Shaker No 1:	60	60	60	60		
Shaker No 2:	60	60	60	60	**Centrifuge 1:** 6 (Solids Removal)	**Centrifuge 2:** 6 (Solids Removal)
Shaker No 3:	60	60	60	60		

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel				3,500	3,500	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Running casing, Cementing, Handling BOPE.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	70 degF	**Bar. Pressure:**	29.82
Wind Speed/Dir:	8 / SSE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 7 **Report For 03-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	3009	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	3009	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):				**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	7/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	7/30	**Days On Location:**			7
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	4 / 48	**Other:**	7 / 84	**Total:**	28 / 336

Safety Summary: No incidents or events reported. Conducted BOP Test, Crown Check, Safety Meeting.

Current Operations:
Picked up 5.5" drill pipe from 740' to 2,900'.
Filled Pipe.
Drilled out shoe track from 2,902' to 2,989'.

Planned Operations:
Perform FIT.
Pull out of the hole.
Pick up 10 5/8" RSS assembly.
Trip in the hole.
Drill 10 5/8" hole.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	7:00	7.00	3,009	2-14	Installed BOP as followed. 11.75" x 13 5/8" 2M Spacer spool. 13 5/8" 5M mud cross, 5M Double gates, 13 5/8" 5M Annular, 13 5/8" Riser with rotating head. Installed inner and outer choke and kill valves. Installed choke and kill lines. Torqued all flanges. (Note: removed variable 3.5"x 5" ram blocks and installed 5.5" ram blocks)	
7:00	11:30	4.50	3,009	2-15	#1 Test Blind rams, check valve, casing and 3 choke valves to 250 low pressure for 5 min and 1000 psi high pressure for 30 min, #2 Test pipe rams, outside kill side mud cross and 3 choke valves to 250 psi low pressure for 5 min and 1000 psi high pressure for 10 min, #3Test Bag, inside kill mud cross and 3 choke valves to 250 psi low pressure for 5 min and 1000 psi high pressure for 10 min #4 Test HCR valve to 250 psi low pressure for 5 min and 1000 psi high pressure for 10 min #5 Test inside choke side mud cross valve to 250 psi for 5 min and 1000 psi for 10 min. All test are good	
11:30	15:00	3.50	3,009	3-34-2	RIH with 5 stands of 5" HWDP and 20 stands of 5" DP / POH laying down DP and transporting to 16A for inspection / excessive over torque.	
15:00	17:30	2.50	3,009	4-34-2	RIH with same 5 stands of HWDP and remaining 18 stands of 5" drill pipe / Laid down 54 joints of 5" drill pipe and 15 joints of 5" HWDP and transport to 16A for inspection / excessive over torque Note: When laying down 5" DP every 3rd joint that had not been serviced (due to making only 2 trips) was extremely over torqued (55-70K) more than double max torque due to extreme drilling parameters. SD-80 unable to break so manual tongs were utilized teamed by 2 air tuggers to break the connection and ultimately had to go to a 4 part break line after the torque cylinder was destroyed.	
17:30	18:00	0.50	3,009	SERV	Serviced rig.	
18:00	21:00	3.00	3,009	OTHER	Rebuild I-BOP with new 6 5/8" X 6 5/8" sub. Installed 6 5/8" X 5.5" X/O lower Valve. Installed saver sub. Installed torque clamps.	
21:00	23:00	2.00	3,009	3-34-1	Transport 5.5" HWDP along with 71-joints of 5.5" drill pipe from 16A location to rig site. Load racks and strap same.	
23:00	0:00	1.00	3,009	3-34-3	Make up 10 5/8" drill out assembly as followed. 10 5/8" Mill Tooth. 8 1/8" Junk Basket. 3-Stands of 8" DC. 5-Stands of 5.5" HWDP.	

Management Summary

Nipple up and test 13 5/8' 5M BOPE.
Ran in the hole with 5" HWDP and 5" drill pipe to 2,327'.
Laid out 5" drill pipe to HWDP.
Ran in the hole with remaining 18 stands of drill pipe and laid out same.
Serviced rig.
Changed out saver sub.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 7 **Report For 03-Jul-21**

Transported 5.5" drill pipe from 16A to rig site.
Loaded racks with 5.5" drill pipe, strapped same.
Made up 10 5/8" drill out assembly.

Comments

Test out all BOPE to 300 psi low and 1,000 psi high, all test good.
Pressure test results were sent to Jim Goddard (State Engineer)

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.58
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
03-Jul-21 14:00 at Depth 3,009 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.80	41	15	9	8.8	1	10	6	0	94	0.25	2.1	800	120		3	6	8	85	85	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	perdiem - OTHER	1	---
Trucking - EACH	1	---			

Bit/BHA/Workstring Information

BHA - No. 5 - BIT, JUNK, 9 DC, XO, 15 HWDP = 739.12

Rig Information

Equipment Problems: None.
Location Condition: Good.
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	60	60	60	60
Shaker No 2:	60	60	60	60
Shaker No 3:	60	60	60	60

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,752			8,752	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5"	114	19.5	S-135	4.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Cementing, laying down drill pipe, forklift operations.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☑ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.78
Wind Speed/Dir:	10 / S	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 8 **Report For 04-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	3456	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	3009	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	447 / 10.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	42.57			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	8/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	8/30	**Days On Location:**			8
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	2 / 24	**Total:**	25 / 300

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Drilling 10 5/8" hole section at 3,628'.

Planned Operations: Drill 10 5/8" hole section to 3,622'. Possibly trip to pick up conventional assembly with 1.5 deg motor due to build in angle.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	4:00	4.00	3,009	3-34-1	Picked up 5.5" drill pipe from 740' to 2,900'.	
4:00	4:15	0.25	3,009	3-5-1	Lined up mud pumps and shakers. Filled pipe.	
4:15	6:00	1.75	3,009	3-28	Drilled out shoe track from 2,902' to 2,989'. Good cement in shoe track from 2,922' to shoe. Observed 4' off good cement outside of the shoe. Cleaned out rat hole from 2,989' to 3,009'.	
6:00	7:00	1.00	3,009	3-46	Perform FIT. Gradient of 0.61 psi/ft with EQM of 11.7 ppg	
7:00	9:30	2.50	3,009	3-6-4	POH and lay down junk sub and bit. Junk basket had nine pieces of metal, small in size 0.5" by .5".	
9:30	10:00	0.50	3,009	4-34-3	Picked up Directional Tools and PDC	
10:00	11:00	1.00	3,009	OTHER	Repaired depth tracker in crown with Pason	
11:00	12:00	1.00	3,009	4-34-3	Picked up directional Tools and PDC	
12:00	12:30	0.50	3,009	SERV	Serviced Rig.	
12:30	13:30	1.00	3,009	OTHER	Broke off TIW and saver sub / welded saver sub to TIW and reinstalled same.	
13:30	16:00	2.50	3,009	TRPI	Triped in hole to 3,009'. torqued every connection to 42K on 5.5" drill pipe.	
16:00	0:00	8.00	3,456	3-2-3	Drilled 10 5/8" section from 3,009' to 3,456'. Performed rotary step from 3,230' to 3,260'. Performed weight on bit step test from 3,265' to 3,291'.	

Management Summary

Picked up 5.5" drill pipe from 740' to 2,900'.
Lined up mud pumps and shakers. Filled pipe.
Drilled out shoe track from 2,902' to 2,989'.
Performed FIT.
Pulled out of the hole and laid out bit and junk basket. Found a few small pieces of bit debris in junk basket from last 14 3/4" bit run.
Picked up 10 5/8" RSS assembly.
Repaired depth tracker in crown with Pason.
Continued picking up 10 5/8" RSS assembly.
Broke off TIW and saver sub and tack welded saver sub to TIW and reinstalled same.
Tripped in hole to 3,009'.
Drilled 10 5/8" section from 3,009' to 3,456'.

Comments

Observed 70' of good cement throughout shoe track.
4' of good cement outside of shoe track.
Torque all 5.5" drill pipe to 42K.
Performed rotary step from 3,230' to 3,260'.
Performed weight on bit step test from 3,265' to 3,291'.
Pumped 100 bbl's of fresh water down at 3,430' with ROP increased 85-95% once water hit the bit. ROP dropped back down once water cleared the

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 8 **Report For 04-Jul-21**

bit.
Lost communication with MWD at 3,346'. Trouble shoot communication issues.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
04-Jul-21 20:30 at Depth 3,341 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.70	39	9	10	9.4	1	10.5	6	0	94	0.25	1.6	900	250		4	5	11	105	114	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Bicarb - 50#SK	12	---	caustic Soda - 50#SK	2	---
DeFoam 14 - GAL	2	---	Desco CF - 25#SK	2	---
Engineering - EACH	1	---	FlowZan - 25#SK	6	---
pallets - OTHER	1	---	perdiem - OTHER	1	---

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
5	1	VAREL	VM-1	10.625	3009	0	1.5	0.0		10	50	6	9	600	1300	107	88	31	285
Jets: 28 28 28					Out: 3009		Grade:	Cutter:	1 / 1	Dull:	WT / NO		Wear: A		Brgs: 0	Gge:		Pull: BHA	
6	1	NOV	TKC83	10.625	3009	282	8	35.2					9	800	2330	278	596	278	991
Jets: 12 12 12 12 12 12 13 13					Out:		Grade:	Cutter:	/	Dull:	/		Wear:		Brgs:	Gge:		Pull:	

BHA - No. 6 - BIT, OTHER, STAB, MWD, 4 OTHER, MMTR, RR, FLOAT, 2 OTHER, DC, XO, HWDP = 966.88

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
3,009	3,456	35.0	150.0	55	65	45	65	7	9	800	815	2,181

Annular Velocity: **Drill Collars:** 478.5 **Drill Pipe:** 231.5

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 185 **Pick Up:** 195 **Slack Off:** 175 **Drag Avg/Max:** 5 / 10

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 27.25 **Total:** 27.25 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 10 / **Tripping:** 8 / ☐ **Wear Bushing Installed**

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 8 **Report For 04-Jul-21**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
2,700	3,040													
Formation Name:														
Lithology:	100% Granite													
3,040	3,190													
Formation Name:														
Lithology:	60-100% Hornblende Quartz Monzodiorite, 0-40% Granite													
3,190	3,330													
Formation Name:														
Lithology:	100% Granite													
3,330	3,380													
Formation Name:														
Lithology:	100% Quartz Monzodiorite													
3,380	3,420													
Formation Name:														
Lithology:	100% Granodiorite													
3,420	3,470													
Formation Name:														
Lithology:	100% Quartz Monzodiorite													

Rig Information

Equipment Problems: None.
Location Condition: Good.
Transport: Received 7" float equipment.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):	
Shaker No 1:	60	60	60	60		
Shaker No 2:	120	120	80	80	**Centrifuge 1:** 12 (Solids Removal)	**Centrifuge 2:** 12 (Solids Removal)
Shaker No 3:	120	120	80	80		

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,752	1,711	3,502	10,543	1,791

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5	194	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Tripping pipe, Handling BHA, House keeping, Trip hazards.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.78
Wind Speed/Dir:	9 / SW	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 9 **Report For 05-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	3730	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	3009	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	274 / 14.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	19.57			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	9/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	9/30	**Days On Location:**			9
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	6 / 72	**Total:**	29 / 348

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Drilling 10 5/8" hole section at 4,260'.

Planned Operations: Drill 10 5/8" hole section.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	5:00	5.00	3,582	3-2-3	Drilled 10 5/8" section from 3,456' to 3,582'. Pumped 100 bbl's of fresh water down at 3,557', ROP increased 85-95% once water hit the bit. ROP dropped back down once water cleared the bit. Reduced pump rate from 800 to 775 per Texas A&M advisor.	
5:00	5:30	0.50	3,582	3-5-1	Circulated while discussing survey of 3.75 deg with team. Decision was made to drill 40' of new hole and take a check shoot.	
5:30	6:00	0.50	3,602	3-2-3	Drilled 10 5/8" section from 3,582' to 3,602'.	
6:00	7:30	1.50	3,651	3-2-3	Drilled 10-5/8" hole from 3,602' to 3,651'.	
7:30	8:00	0.50	3,651	CIRC	Take check shot and confirm steerable not working / circ and pump slug	
8:00	12:00	4.00	3,651	3-6-4	POH to change out directional assembly.	
12:00	13:30	1.50	3,651	4-34-4	Lay down rotary steerable assembly and bit	
13:30	14:30	1.00	3,651	4-34-3	Picked up 1.5 deg bent assembly	
14:30	16:00	1.50	3,651	3-6-3	RIH to shoe	
16:00	21:30	5.50	3,651	OTHER	Transferred mud from 78B-32 to sump @ 58-32 / cleaned pits / filled pits with water to prepare for change over.	
21:30	22:00	0.50	3,651	3-6-3	RIH from 2900' to 3,645'.	
22:00	23:00	1.00	3,651	3-5-1	Filled pipe and change hole over to fresh water with a total of 3,800 strokes at 486 gpm.	
23:00	23:30	0.50	3,681	3-2-3	Slide drill 10 5/8" hole from 3,651' to 3,681'.	
23:30	0:00	0.50	3,730	3-2-3	Drilled 10-5/8" hole from 3,681' to 3,730'	

Management Summary

Drilled 10 5/8" section from 3,456' to 3,582'.
Circulated while discussing survey of 3.75 deg with team.
Drilled 10 5/8" section from 3,582' to 3,651'.
Took check shot and confirm steerable not working.
Circulated and pumped slug.
Pulled out of the hole to change out directional assembly.
Laid down rotary steer-able assembly and bit.
Picked up 1.5 deg bent assembly.
Tripped in the hole to 2,900'.
Transferred mud from 78B-32 to sump @ 58-32 / cleaned pits / filled pits with water to prepare for change over.
Tripped in the hole from 2900' to 3,645'.
Filled pipe and change hole over to fresh water.
Slide drilled 10 5/8" hole with water from 3,651' to 3,681'.
Drilled 10-5/8" hole from 3,681' to 3,730'.

Comments

Performed weight on bit step test at 3,711'.
Performed RPM step test at 3,820'.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 9 **Report For 05-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
05-Jul-21 23:00 at Depth 3,651 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	0	9	1	0	99	0	0	600	120		1	1	1	90	114	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	40	---	Engineering - EACH	1	---
FlowZan - 25#SK	22	---	pallets - OTHER	2	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
6	1	NOV	TKC83	10.625	3009	387	15	25.8	65.0	65	40	8	9	800	2495	278	596	278	991
Jets: 12 12 12 12 12 12 13 13					**Out:** 3651			**Grade:**	**Cutter:**	1 / 1	**Dull:**	WT / NO	**Wear:** A		**Brgs:** X	**Gge:** 0		**Pull:** DTF	
7	1	NOV	TKC83	10.625	3651	79	1	79.0	79.0	55	60	11	8	800	2510	278	569	265	945
Jets: 13 13 12 12 12 12 12 12					**Out:**			**Grade:**	**Cutter:**	/	**Dull:**	/	**Wear:**		**Brgs:**	**Gge:**		**Pull:**	

BHA - No. 7 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 960.36

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
3,651	3,730	130.0	157.0	45	65	60	60	12	14	800	830	2,460

Annular Velocity: **Drill Collars:** 478.0 **Drill Pipe:** 231.0

Comments: Slide drilled 10 5/8" hole from 3,651' to 3,681'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 196 **Pick Up:** 199 **Slack Off:** 190 **Drag Avg/Max:** 5000 / 8000

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 35.25 **Total:** 35.25 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 18 / **Tripping:** 14 / ☐ **Wear Bushing Installed**

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	3,384.0	0.76	228.4	3,384.0	4.2	4.1	N 4.1	E 0.9	0.794
MWD	3,480.0	2.55	232.0	3,479.9	2.7	2.4	N 2.4	W 1.3	1.867
MWD	3,575.0	3.93	223.2	3,574.8	5.3	-1.3	S 1.3	W 5.2	1.539
MWD	3,642.0	3.93	218.3	3,641.6	9.4	-4.7	S 4.7	W 8.2	0.498
MWD	3,737.0	1.10	218.9	3,736.5	13.4	-8.0	S 8.0	W 10.8	2.979

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 9 **Report For 05-Jul-21**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
3,520	3,560													
Formation Name:														
Lithology:	20-60% Quartz Monzodiorite 40-80% Granodiorite													
3,570	3,580													
Formation Name:														
Lithology:	100% Quartz Monzodiorite													
3,590	3,630													
Formation Name:														
Lithology:	20% Quartz Monzodiorite 80% Grandodiorite													
3,640	3,730													
Formation Name:														
Lithology:	100% Quartz Monzodiorite													
3,330	3,380													
Formation Name:														
Lithology:	100% Quartz Monzodiorite													
3,380	3,420													
Formation Name:														
Lithology:	100% Granodiorite													
3,420	3,510													
Formation Name:														
Lithology:	100% Quartz Monzodiorite													

Rig Information

Equipment Problems: None.
Location Condition: Good.
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	100	100	100	100
Shaker No 2:	120	120	80	80
Shaker No 3:	120	120	80	80

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 10 (Solids Removal) **Centrifuge 2:** 10 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		10,543	2,147	0	8,396	-2,147

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5	194	24.7	S-135	5.5REG					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Tripping pipe, Handling BHA, Cleaning mud pits, LOTO.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	72 degF	**Bar. Pressure:**	29.84
Wind Speed/Dir:	10 / ENE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 10 **Report For 06-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	5334	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	5333	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	1,604 / 23.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	69.74			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	10/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	10/30	**Days On Location:**			10
Pers/Hrs:	**Operator:** 3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	4 / 48	**Total:**	27 / 324

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Drilling 10 5/8" hole section at 5,717'. (report time)

Planned Operations: Drill 10 5/8" hole section until ROP drops below 30 ft/hr.
Trip out of the hole for new bit.
Continue to drill 10 5/8" hole section to coring point (6,700')

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:30	0.50	3,765	3-2-3	Drilled 10-5/8" hole from 3,730' to 3,765'	
0:30	0:45	0.25	3,780	3-2-3	Slide drill 10 5/8" hole from 3,765' to 3,780'.	
0:45	1:30	0.75	3,927	3-2-3	Drilled 10-5/8" hole from 3,780' to 3,927'.	
1:30	2:00	0.50	3,947	3-2-3	Slide drill 10 5/8" hole from 3,927' to 3,947'.	
2:00	3:00	1.00	4,060	3-2-3	Drilled 10-5/8" hole from 3,947' to 4,060'.	
3:00	3:30	0.50	4,085	3-2-3	Slide drill 10 5/8" hole from 4,060' to 4,085'.	
3:30	4:15	0.75	4,153	3-2-3	Drilled 10-5/8" hole from 4,085' to 4,153'. Performed weight on bit step test at 4,099' per Texas A&M advisor 50-70k.	
4:15	4:45	0.50	4,168	3-2-3	Slide drill 10 5/8" hole from 4,153' to 4,168'.	
4:45	11:45	7.00	4,753	3-2-3	Drilled 10-5/8" hole from 4,168' to 4,753	
11:45	12:15	0.50	4,773	3-2-3	Slide drill 10-5/8" hole from 4,753' to 4,773'.	
12:15	16:30	4.25	5,036	3-2-3	Drilled 10-5/8" hole from 4,773' to 5,036'.	
16:30	17:00	0.50	5,036	SERV	Serviced Rig.	
17:00	17:30	0.50	5,036	OTHER	Replaced stroke counter on # 2 mud pump.	
17:30	18:15	0.75	5,051	3-2-3	Slide drill 10-5/8" hole from 5,036' to 5,051'.	
18:15	0:00	5.75	5,334	3-2-3	Drilled 10-5/8" hole from 5,051' to 5,334'. Dump and diluted system with 200 bbl's of fresh water while drilling ahead at 5,166'.	

Management Summary

Drilled 10 5/8" section from 3,730' to 5,036'.
Serviced rig.
Replaced stroke counter on # 2 mud pump.
Drilled 10 5/8" section from 5,036' to 5,334'.

Comments

Performed weight on bit step test at 4,099'.
Dump and diluted system with 200 bbl's of fresh water while drilling ahead at 5,166'.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
06-Jul-21 18:00 at Depth 5,051 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.40	26	0	1	0	1	11	3	0	97	0.01	0.6	600	120		1	1	1	97	109	

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 10 **Report For 06-Jul-21**

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	80	---	caustic Soda - 50#SK	2	---
Engineering - EACH	1	---	pallets - OTHER	4	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
7 1	NOV	TKC83	10.625	3651	1,683	24	70.1	175.0	65	40	8	8	820	2160	285	605	289	1005

Jets: 13 13 12 12 12 12 12 12 **Out:** **Grade:** **Cutter:** / **Dull:** / **Wear:** **Brgs:** **Gge:** **Pull:**

BHA - No. 7 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 960.36

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
3,730	5,334	65.0	175.0	65	70	40	80	8	9	820	830	2,680

Annular Velocity: **Drill Collars:** 478.5 **Drill Pipe:** 247.2

Comments:
Slide drill 10 5/8" hole from 3,765' to 3,780'.
Slide drill 10 5/8" hole from 3,927' to 3,947'.
Slide drill 10 5/8" hole from 4,060' to 4,085'.
Slide drill 10 5/8" hole from 4,153' to 4,168'.
Slide drill 10-5/8" hole from 4,753' to 4,773'.
Slide drill 10-5/8" hole from 5,036' to 5,051'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 236 **Pick Up:** 255 **Slack Off:** 220 **Drag Avg/Max:** 10 / 15

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 58.25 **Total:** 58.25 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 41 / **Tripping:** 14 / ☐ **Wear Bushing Installed**

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	3,832.0	1.11	93.7	3,831.5	13.6	-8.8	S 8.8	W 10.4	2.065
MWD	3,927.0	1.83	89.4	3,926.5	11.9	-8.8	S 8.8	W 8.0	0.766
MWD	4,022.0	3.01	85.3	4,021.4	9.5	-8.6	S 8.6	W 4.0	1.255
MWD	4,117.0	1.92	159.4	4,116.3	9.9	-9.9	S 9.9	W 0.9	3.259
MWD	4,181.0	1.19	199.7	4,180.3	11.5	-11.5	S 11.5	W 0.8	1.987
MWD	4,213.0	0.99	220.1	4,212.3	12.1	-12.0	S 12.0	W 1.1	1.354
MWD	4,308.0	0.86	209.3	4,307.3	13.4	-13.3	S 13.3	W 1.9	0.229
MWD	4,403.0	0.40	258.7	4,402.3	14.2	-14.0	S 14.0	W 2.6	0.708
MWD	4,498.0	0.66	264.5	4,497.3	14.5	-14.1	S 14.1	W 3.5	0.279
MWD	4,593.0	1.33	319.3	4,592.2	14.1	-13.3	S 13.3	W 4.8	1.148
MWD	4,688.0	1.75	318.6	4,687.2	13.1	-11.4	S 11.4	W 6.4	0.443
MWD	4,783.0	1.48	0.5	4,782.2	11.7	-9.1	S 9.1	W 7.4	1.246
MWD	4,879.0	1.68	339.3	4,878.1	10.2	-6.5	S 6.5	W 7.9	0.641
MWD	4,974.0	1.65	322.9	4,973.1	10.1	-4.1	S 4.1	W 9.2	0.498
MWD	5,069.0	0.45	52.1	5,068.1	10.1	-2.8	S 2.8	W 9.7	1.794
MWD	5,164.0	0.21	25.9	5,163.1	9.7	-2.4	S 2.4	W 9.3	0.292
MWD	5,259.0	0.57	255.7	5,258.1	10.0	-2.4	S 2.4	W 9.7	0.762

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 10 **Report For 06-Jul-21**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
3,990	4,770	3,989	4,769											
Formation Name:														
Lithology:	100% Quartz Monzodiorite													
4,770	4,790	4,769	4,789											
Formation Name:														
Lithology:	60-80% Granite, 20-40% Quartz Monzodiorite													
4,790	5,333	4,789	5,332											
Formation Name:														
Lithology:	100% Quartz Monzodiorite													

Rig Information

Equipment Problems: None.
Location Condition: Good.
Transport:

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	Desander: 0	Desilter: 0	Degasser: 0
Shaker No 2:	120	120	120	120	Centrifuge 1: 24 (Solids Removal)		Centrifuge 2: 24 (Solids Removal)
Shaker No 3:	120	120	120	120			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,396	1,858		6,538	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Forklift operations, House keeping, Proper lifting techniques.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

☐ BOP Test ☑ Crownamatic Check

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	8 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 11 **Report For 07-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	5761	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**		**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	5760	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---		---	---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---		---	---
Hole Made (ft) / Hrs:	427 / 12.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**		---	---
Average ROP (ft/hr):	35.58			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	11/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	11/30	**Days On Location:**			11
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	5 / 60	**Total:**	28 / 336

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Changing out motor from 1.5 deg, 0.111 rev/gal to 1.25 deg, 0.116 rev/gal.

Planned Operations:
Swap out motor from 0.111 rev/gal to 0.116 rev/gal.
Trip in the hole to 2,946'.
Wait on SCR electrician to arrive from Vernal, estimated arrival time 0900 HRS.
Troubleshoot issues with traction A motor on drawworks and repair.
Trip in the hole to 5,761'.
Continue to drill 10-5/8" hole section from 5,761' to 6,700' (coring depth)

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	4:30	4.50	5,628	3-2-3	Drilled 10-5/8" hole from 5,334' to 5,628'.	
4:30	5:00	0.50	5,628	3-2-3	Slide drill 10 5/8" hole from 5,628' to 5,643'.	
5:00	7:30	2.50	5,761	3-2-3	Drilled 10-5/8" hole from 5,628' to 5,761'	
7:30	11:00	3.50	5,761	3-6-4	ROP dropped to 30%, POH for Bit	
11:00	12:30	1.50	5,761	10-6-2	POH w/BHA / found 2 jets plugged with motor rubber and bit DBR'd. NOTE: no over torqued connections.	
12:30	13:00	0.50	5,761	10-344	Lay down NMDC, Motor and bit.	
13:00	15:30	2.50	5,761	CUTDL	Slipped and Cut drilling line while waiting on Schlumberger tools to arrive. Note: Dumped and diluted system with 250 bbl's of fresh water.	
15:30	16:00	0.50	5,761	SERV	Serviced rig while waiting on Schlumberger tools to arrive.	
16:00	19:00	3.00	5,761	3-34-1	Picked up 5.5" drill pipe and standing back in derrick while waiting on Schlumberger tools to arrive. Motor arrived on location at 19:10 HRS.	
19:00	19:30	0.50	5,761	3-34-3	Strap Motor prior to picking up.	
19:30	22:30	3.00	5,761	3-34-3	Picked up 1.50 deg bent assembly. Scribe Motor. Run in the hole with BHA to 1,042'.	
22:30	23:30	1.00	5,761	3-6-3	Ran in the hole from 1,042' to 2,946'. Installed TIW valve in sting. Picked up and racked back 6 stands of 5.5" drill pipe.	
23:30	0:00	0.50	5,761	3-34-1	Picked up and racked back 6 stands of 5.5" drill pipe out of the mouse hole.	

Management Summary

Drilled 10-5/8" hole from 5,334' to 5,761'.
Tripped out of the hole from 5,761' to surface due to low ROP.
Laid down NMDC, Motor and bit.
Slipped and Cut drilling line.
Serviced rig.
Picked up and racked back 5 stands of drill pipe while waiting on Schlumberger tools to arrive.
Motor arrived on location at 19:10 HRS.
Picked up 1.25 deg bent assembly and tripped in the hole to 2,926'.
Picked up and racked back 6 stands of 5.5" drill pipe.

Comments

Found 2 jets plugged with rubber the stator section of the motor.
Bit was DBR'd.
No over torqued connections.
Dumped and diluted system with 250 bbl's of fresh water while out of the hole.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 11 **Report For 07-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
07-Jul-21 16:00 at Depth 5,761 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	9.5	2	0	98	0.01	0	800	120		1	1	1	95	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	1	---	Engineering - EACH	1	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
7	1	NOV	TKC83	10.625	3651	2,110	31.5	67.0	165.0	65	40	9	8	820	2550	285	605	289	1005
Jets: 13 13 12 12 12 12 12 12					**Out:** 5761			**Grade:**	**Cutter:**	4 / 8	**Dull:**	RO / LT	**Wear:** S	**Brgs:** X	**Gge:** 3		**Pull:** PR		
8	1	NOV	TCK83	10.625	5761														
Jets: 13 13 12 12 12 12 12 12					**Out:** 5761			**Grade:**	**Cutter:**	0 / 0	**Dull:**	NO / NO	**Wear:** A	**Brgs:** X	**Gge:** 0		**Pull:** BHA		

BHA - No. 8 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 962.49

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
5,334	5,761	57.0	70.0	60	65	40	45	9	10	810	830	2,550

Annular Velocity: **Drill Collars:** 478.5 **Drill Pipe:** 247.2

Comments: Slide drill 10 5/8" hole from 5,628' to 5,643'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 248 **Pick Up:** 257 **Slack Off:** 235 **Drag Avg/Max:** 10 / 15

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi			
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi			
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi			

Hours on BHA: **Since Inspection:** 65.75 **Total:** 65.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 48.5 / **Tripping:** 22 / ☐ **Wear Bushing Installed**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
5,334	5,761	5,333	5,760											

Formation Name:

Lithology: 100% Granodiorite

Rig Information

Equipment Problems: Traction motor A on drawworks kicking SCR breaker. Electrician in route to troubleshoot.

Location Condition: Good.

Transport: Received 8" 1.25 deg motor along with RSS tool. Back hauled 2 dirty motors along with dirty RSS tool.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	**Desander:** 0	**Desilter:** 0	**Degasser:** 0
Shaker No 2:	120	120	120	120	**Centrifuge 1:** 24 (Solids Removal)		**Centrifuge 2:** 24 (Solids Removal)
Shaker No 3:	120	120	120	120			

Bulk Inventory

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 11 **Report For 07-Jul-21**

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		6,538	2,452	4,459	8,545	2,007

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Forklift operations, Handling BHA, Tripping pipe.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	8 / SW	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 12 **Report For 08-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	5761	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	5760	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):				**LOT (lbs/gal):**	11.70	**Well Cost ($):**		---
Drilling Days (act./plan):	12/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	12/30	**Days On Location:**		12
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	2 / 24	**Total:** 25 / 300

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Waiting on SCR technician to arrive.

Planned Operations:
Wait on SCR technician to arrive.
troubleshoot SCR.
Trip in the hole.
Drill 10-5/8" hole section from 5,761' to 6,700' (coring depth).

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	1:00	1.00	5,761	3-34-1	Continue picking up and racking back 6 stands of 5.5" drill pipe out of the mouse hole.	
1:00	2:00	1.00	5,761	3-5-1	Tripped in one stand to 3,030'. Circulate bottoms up to cool wellbore while waiting on electrician to arrive to troubleshoot issue with drawworks A traction motor. Max temperature observed at the flow line was 105 deg.	
2:00	6:00	4.00	5,761	3-34-3	Tripped out of the hole from 2,946' to Surface. break out bit and swap motor from 1.5 deg, .111 rev to 1.25 deg .166 rev. Note: first motor arrived on location at 1915 HRS on 7-7. No paper work was provided with the motor when it arrived. Motor was made up and ran in the hole to 2,946'. Second motor arrived at 0100 HRS on 7-8. Once paper work was provided to the on-site GRG supervisor it was discovered that the first motor ran in the hole was a low speed high torque motor with a .111 rev. conversation was had with GRG team and decision was made to pull out of the hole and swap motors to the high speed low torque .166 rev that was delivered at 0100 HRS while waiting on electrician to arrive to troubleshoot drawworks A traction motor.	X
6:00	6:30	0.50	5,761	3-34-4	Lay down MWD, NMDC and motor	X
6:30	11:30	5.00	5,761	9-32	Waiting on Schlumberger to rebuild MWD	X
11:30	13:00	1.50	5,761	3-34-3	Picked up Directional tools and RIH with same.	X
13:00	14:00	1.00	5,761	OTHER	Changed Pason sensor in crown.	
14:00	15:00	1.00	5,761	3-34-3	RIH to 1135'.	X
15:00	0:00	9.00	5,761	REPR	Repair Rig / Work on rig SCR system. Electrician was unable to locate issue with drawwork traction motor A. Wait on SCR tech to arrive.	X

Management Summary

Continued picking up and racking back 6 stands of 5.5" drill pipe out of the mouse hole.
Tripped in one stand to 3,030'. Circulate bottoms up to cool wellbore while waiting on electrician to arrive to troubleshoot issue with drawworks A traction motor.
Tripped out of the hole from 2,946' to Surface. break out bit and swap motor from 1.5 deg, .111 rev to 1.25 deg 0.166 rev/gal.
Laid down MWD, NMDC and motor.
Rebuild MWD.
Picked up Directional tools and RIH with same.
Changed Pason sensor in crown.
RIH to 1135'.
Repair Rig / Work on rig SCR system.

Comments

Total hours of NPT on daily report 13 due to Schlumberger 12.0 HRS.
Total hours for well to Schlumberger 16.5 HRS.
Total hours of NPT on daily report 13 due to Frontier 9 HRS.
Total hours for well to Schlumberger 9.0 HRS.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 12 **Report For 08-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
08-Jul-21 15:30 at Depth 5,761 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	700	120		1	1	1	95	95	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	perdiem - OTHER	1	---

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
8	1	NOV	TCK83	10.625	5761														

Jets: 13 13 12 12 12 12 12 12 **Out:** 5761 **Grade:** **Cutter:** 0 / 0 **Dull:** NO / NO **Wear:** A **Brgs:** X **Gge:** 0 **Pull:** BHA

BHA - No. 9 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 962.49

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** **Pick Up:** **Slack Off:** **Drag Avg/Max:** /

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 65.75 **Total:** 65.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 48.5 / **Tripping:** 28 / ☐ **Wear Bushing Installed**

Rig Information

Equipment Problems: Traction motor A on drawwoks tripping SCR breaker.

Location Condition: Good.

Transport: Received 7" wellhead, 2- X/O from Dynasty.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):

Desander: 0 **Desilter:** 0 **Degasser:** 0

Centrifuge 1: 24 (Solids Removal) **Centrifuge 2:** 24 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,545	449		8,096	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Forklift operations, LOTO, Working with electrician.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	78 degF	**Bar. Pressure:**	29.98
Wind Speed/Dir:	10 / SW	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 13 **Report For 09-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	5761	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	5760	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):				**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	13/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	13/30	**Days On Location:**			13
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	24 / 0	**Total:**	47 / 276

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Waitting on SCR technician to arrive.

Planned Operations: Wait on SCR technician to arrive.
troubleshoot SCR.
Trip in the hole.
Drill 10-5/8" hole section from 5,761' to 6,700' (coring depth).

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:00	24.00	5,761	REPR	Wait on SCR technician to arrive.	X

Management Summary

Waited on SCR technician to arrive.

Comments

Total hours of NPT on daily report 14 due to Frontier 24 HRS.
Total hours of NPT on Frontier to date 33 HRS.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
09-Jul-21 14:00 at Depth 5,761 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	800	120		1	1	1	90	90	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	perdiem - OTHER	1	---

Bit/BHA/Workstring Information

BHA - No. 9 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 962.49

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** **Pick Up:** **Slack Off:** **Drag Avg/Max:** /

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 65.75 **Total:** 65.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 48.5 / **Tripping:** 28 / ☐ Wear Bushing Installed

Rig Information

Equipment Problems: Traction motor A on drawwoks tripping SCR breaker.

Location Condition: Good.

Transport: Received 2 loads of 7" casing.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 13 **Report For 09-Jul-21**

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	Desander: 0	Desilter: 0	Degasser: 0
Shaker No 2:	120	120	120	120	Centrifuge 1: 24 (Solids Removal)		Centrifuge 2: 24 (Solids Removal)
Shaker No 3:	120	120	120	120			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,096	720		7,376	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Forklift operations, LOTO, Working with electrician.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	66 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	5 / SW	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 14 **Report For 10-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	5821	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	5820	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	60 / 8.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	7.06			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	14/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	14/30	**Days On Location:**			14
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 38	**Total:**	26 / 314

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations:	Staged in the hole cooling the directional drilling assembly. Drilled 10-5/8" hole section from 5821' to 6,107'.
Planned Operations:	Drill 10-5/8" hole section to 6,700' (coring depth).
Toolpusher:	Steve Caldwell , Justin Bristol
Wellsite Supervisors:	Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	10:00	10.00	5,761	REPR	Wait on SCR technician to arrive.	X
10:00	13:00	3.00	5,761	REPR	Diagnose issues with SCR house and repair same. Rig back on Dayrate @ 13:00 hours on 7/10/2021 Note: SCR tech found two bare wires between SCR bays causing system to short out.	X
13:00	15:30	2.50	5,761	10-6-3	RIH to bottom / fill pipe	
15:30	16:30	1.00	5,821	3-2-3	Drill 10-5/8" hole from 5,761' to 5,821'. Dumped and diluted 100 bbl's of fresh water while drilling ahead. Note: Observed pressure spike while drilling ahead at 5,806' along with motor stall. Pressure reached 4,158 psi at surface blowing pop-off on mud pump. Picked up off bottom and rest pop off. Once back on bottom differential pressure fell to 198 psi and continued dropping. large pieces of rubber observed at the shakers from stator indicating motor failed. Upon discussion with Schlumberger, it was discovered that the motor in the hole had a temperature rating of 208 deg. Max temperature on bottom was 300 deg.	
16:30	19:30	3.00	5,821	3-6-4	Trip out of the hole from 5,821' to surface with no issues. Dumped and diluted 100 bbl's of fresh water while tripping out of the hole.	X
19:30	22:00	2.50	5,821	3-6-2	Rack back HWDP along with 8' drill collars. Broke out bit and laid out motor. Note: Motor rotated with no resistance, no fluid in motor. Bit had 2 plugged jets with stator rubber. Stabilizer above the motor at 41' was 3/4" under-gagged.	X
22:00	0:00	2.00	5,821	3-6-1	Picked up new (NOV) motor 1.5 deg, 0.111 rev. Picked up new 10-5/8" NOV bit. Picked up new top 10-3/8" stab. Made up and scribed tools. Tripped in the hole with BHA to 1,000'.	X

Management Summary

Waited on SCR technician to arrive.
Diagnose issues with SCR house and repaired same. Rig back on Dayrate @ 13:00 hours on 7/10/2021.
RIH to bottom / fill pipe.
Drill 10-5/8" hole from 5,761' to 5,821'.
Tripped out of the hole from 5,821' due to motor failure.
Laid out motor and bit.
Picked up new (NOV) motor 1.5 deg and 0.111 rev.
Picked up new 10-5/8" NOV bit.
Picked up new top 10-3/8" stab.

Comments

Note: Observed pressure spike along with motor stall while drilling ahead at 5,806'. Pressure reached 4,158 psi at surface blowing pop-off on mud pump. Picked up off bottom and rest pop off. Once back on bottom differential pressure fell to 198 psi and continued dropping. large pieces of rubber observed at the shakers from stator indicating motor failed. Upon discussion with Schlumberger, it was discovered that the motor in the hole had a temperature rating of 208 deg. Max temperature on bottom was 300 deg while tripping in the hole.

Total hours of NPT on daily report 15 due to Frontier 13 HRS.
Total hours of NPT on Frontier to date 46 HRS.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 14 **Report For 10-Jul-21**

Total hours of NPT on daily report 15 due to Schlumberger 7.5 HRS.
Total hours for well to date for Schlumberger 24 HRS.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
10-Jul-21 19:30 at Depth 5,821 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	9.5	2	0	98	0.01	0	800	120		1	1	1	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	perdiem - OTHER	1	---

Bit/BHA/Workstring Information

No Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
8 2	NOV	TCK83	10.625	5761	60	1	60.0	65.0	65	40	16	8	800	3000	278	576	269	957

Jets: 13 13 12 12 12 12 12 12 **Out:** 5821 **Grade:** **Cutter:** 1 / 3 **Dull:** WT / NO **Wear:** S **Brgs:** X **Gge:** 0 **Pull:** DMF

BHA - No. 9 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 962.49

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
5,761	5,821	40.0	65.0	65	65	40	40	16	16	800	800	3,000

Annular Velocity: **Drill Collars:** 478.5 **Drill Pipe:** 247.2

Comments: Tripped out of the hole due to motor failure.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 231 **Pick Up:** 245 **Slack Off:** 225 **Drag Avg/Max:** 3 / 5

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 66.75 **Total:** 66.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 49.5 / **Tripping:** 37 / ☐ Wear Bushing Installed

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
4,790	5,821	4,789	5,820	0	0	0	0	0	0	0.00	8.30			

Formation Name:

Lithology: 100% Granodiorite

Rig Information

Equipment Problems: SCR tech found two wires shorted out on SCR system.

Location Condition: Good.

Transport: Received 2 loads of 7" casing.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	**Desander:** 0	**Desilter:** 0	**Degasser:** 0
Shaker No 2:	120	120	120	120	**Centrifuge 1:** 24 (Solids Removal)		**Centrifuge 2:** 24 (Solids Removal)
Shaker No 3:	120	120	120	120			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		7,376			7,376	

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 14 **Report For 10-Jul-21**

Water / Fluids Inventory

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, forklift operations, LOTO, working in the heat.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	76 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	10 / NE	**Wind Gusts:**	3
Comments:	Smoky		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 15 **Report For 11-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	6700	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	6699	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	879 / 14.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	60.62			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	15/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	15/30	**Days On Location:**			15
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted BOP Drill, Crown Check, Safety Meeting.

Current Operations: Held safety meeting with all involved personal on picking up coring assembly.
Made up 8-3/4" coring assembly.
Picked up 15 joints of 5.5" drill pipe.
Tripping in the hole with 8-3/4" coring assembly at 4,000'.

Planned Operations: Trip in the hole with 8-3/4" coring assembly.
Core 8-3/4" hole from 6,700'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	1:15	1.25	5,821	3-6-3	Tripped in the hole from 1,000' to 3,245'.	X
1:15	1:30	0.25	5,821	3-5-1	Broke circulation at 3,245' to cool tools. Max temp observed at MWD was 189 deg. Max temp at surface was 103 deg.	X
1:30	2:00	0.50	5,821	3-6-3	Tripped in the hole from 3,245' to 4,192'.	X
2:00	2:15	0.25	5,821	3-5-1	Broke circulation at 4,192' to cool tools. Max temp observed at MWD was 214 deg. Max temp at surface was 107 deg.	X
2:15	2:45	0.50	5,821	3-6-3	Tripped in the hole from 4,192' to 5,200'.	X
2:45	3:00	0.25	5,821	3-5-1	Broke circulation at 5,200' to cool tools. Max temp observed at MWD was 222 deg. Max temp at surface was 109 deg.	X
3:00	3:15	0.25	5,821	3-6-3	Tripped in the hole from 5,200' to 5,710'.	X
3:15	3:30	0.25	5,821	3-5-1	Broke circulation at 5,710' to cool tools. Washed down from 5,710' to 5,821' Max temp observed at MWD was 254 deg. Max temp at surface was 135 deg.	X
3:30	6:00	2.50	6,087	3-2-3	Drill 10-5/8" hole from 5,821' to 6,087' Performed WOB step test @ 5,900'. Performed RPM step test @ 5,920'.	
6:00	6:30	0.50	6,108	3-2-3	Slide Drill from 6,087' to 6,108'	
6:30	14:00	7.50	6,561	3-2-3	Drill 10-5/8" hole from 6,108' to 6,561' with 65K WOB, 800 GPM and 40-50 surface RPM, Dump 180 bbl from active system and add 150 bbl fresh water to system	
14:00	14:30	0.50	6,561	SERV	Service rig and top drive while circulating on bottom with 1 pump to keep MWD cool	
14:30	16:00	1.50	6,700	3-2-3	Drill 10-5/8" hole from 6,561' to 6,700' with 65K WOB, 820 GPM and 51 surface RPM with no losses or hole issues: MWD temp has risen from 170F to 176F in the last 500' of drilling	
16:00	16:30	0.50	6,700	3-5-1	Circulate bottoms up while allowing weight to drill off	
16:30	20:00	3.50	6,700	10-6-4	Trip out of the hole from 6,700' to BHA. 30-40k over-pull.	
20:00	23:30	3.50	6,700	3-34-4	Racked back HWDP along with 8' drill collars. Laid out all dir tools. Motor drained good with minimal movement in bearing assembly. Sleeve stab on motor had one blade completely worn off .	
23:30	0:00	0.50	6,700	OTHER	Cleaned and cleared rig floor. Laid out 15 joints of 5.5" drill pipe on racks and strapped same.	

Management Summary

Staged in the hole from 1.000' to 5,821'.
Drilled 10-5/8" hole from 5,821' to 6,700' (core point).
Circulated bottoms up.
Tripped out of the hole from 6,700' to BHA.
Racked back HWDP along with 8' drill collars. Laid out all directional tools.
Cleaned and cleared rig floor.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 15 **Report For 11-Jul-21**

Laid out 15 joints of 5.5" drill pipe on racks.

Comments

Total hours of NPT on daily report 15 due to Schlumberger 3.5 HRS.
Total hours for well to Schlumberger 27.5 HRS.
Total hours of NPT on Frontier to date 46 HRS.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
11-Jul-21 16:30 at Depth 6,700 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	900	120		1	1	1	114	123	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	2	---	Engineering - EACH	1	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Mud Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
9	1	NOV	TKC83	10.625	5821	879	12	73.2	165.0	65	50	15	8	800	2670	278	576	269	957

Jets: 13 13 12 12 12 12 12 12 **Out:** 6700 **Grade:** **Cutter:** 3 / 6 **Dull:** LT / WT **Wear:** S **Brgs:** X **Gge:** 0 **Pull:** BHA

BHA - No. 10 - BIT, MMTR, STAB, MWD, 2 OTHER, STAB, MONEL, 3 OTHER, DC, XO, HWDP = 963.16

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
5,821	6,700	75.0	165.0	65	75	50	70	15	17	800	820	2,670

Annular Velocity: **Drill Collars:** 478.5 **Drill Pipe:** 247.2

Comments: Slide Drill from 6,087' to 6,108'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 247 **Pick Up:** 265 **Slack Off:** 237 **Drag Avg/Max:** 10 / 15

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 78.75 **Total:** 78.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 61.5 / **Tripping:** 49 / ☐ **Wear Bushing Installed**

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 15 **Report For 11-Jul-21**

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	5,354.0	1.12	247.8	5,353.1	11.4	-2.8	S 2.8	W 11.0	0.590
MWD	5,499.0	1.46	260.8	5,498.0	14.7	-3.7	S 3.7	W 14.2	0.308
MWD	5,545.0	2.01	268.4	5,544.0	16.0	-3.8	S 3.8	W 15.6	1.293
MWD	5,640.0	1.97	247.9	5,639.0	19.3	-4.5	S 4.5	W 18.7	0.745
MWD	5,736.0	1.56	198.0	5,734.9	21.6	-6.3	S 6.3	W 20.7	1.598
MWD	5,832.0	1.57	189.1	5,830.9	23.1	-8.9	S 8.9	W 21.3	0.256
MWD	5,927.0	1.77	197.9	5,925.8	24.8	-11.5	S 11.5	W 21.9	0.344
MWD	6,022.0	1.47	189.1	6,020.8	26.7	-14.1	S 14.1	W 22.6	0.410
MWD	6,117.0	1.10	155.5	6,115.8	27.6	-16.2	S 16.2	W 22.4	0.867
MWD	6,307.0	1.06	132.5	6,305.7	27.9	-19.0	S 19.0	W 20.4	0.227
MWD	6,402.0	1.07	123.7	6,400.7	27.6	-20.1	S 20.1	W 19.0	0.173
MWD	6,497.0	0.71	100.2	6,495.7	27.2	-20.7	S 20.7	W 17.6	0.532
MWD	6,592.0	0.88	33.2	6,590.7	26.2	-20.2	S 20.2	W 16.7	0.935
MWD	6,635.0	0.77	56.7	6,633.7	25.6	-19.8	S 19.8	W 16.2	0.820

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
5,820	6,700	5,819	6,699											

Formation Name:
Lithology: 100% Granodionite

Rig Information

Equipment Problems: None
Location Condition: Good.
Transport: Received 7 loads of water to frack tanks.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	Desander: 0	Desilter: 0	Degasser: 0
Shaker No 2:	120	120	120	120	Centrifuge 1: 24 (Solids Removal)		Centrifuge 2: 24 (Solids Removal)
Shaker No 3:	120	120	120	120			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel	GAL	7,375	2,336	4,500	9,539	2,164

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, working in the heat, good communication.
BOP	15	All crews to stations in 80 sec.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.

☐ BOP Test ☑ Crownamatic Check

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	72 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	8 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 16 **Report For 12-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	6728	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	6727	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	28 / 3.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	8.0			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	16/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	16/30	**Days On Location:**			16
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations:
Tripped in the hole with 8-3/4" core assembly to 6,728' .
Fill pipe and established circulation.
Cut core from 6,728' to 6,740'.
Tripped out of the hole from 6,740' to 1,300' at report time.

Planned Operations:
Trip out of the hole with core assembly.
Make up 10-5/8" TCI bit.
Trip in the hole to 6,740'.
Open 8-3/4" hole from 6,700' to 6,740' to 10-5/8"
Trip out of the hole.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:30	0.50	6,700	SAFE	Held safety meeting with all involved personal on picking up coring assembly.	
0:30	3:00	2.50	6,700	3-34-3	Made up 8-3/4" coring assembly as followed. 8-3/4" x 4" core bit. Stabilizer 8-15/32" Core barrel 7-1/4" Stabilizer 8-15/32" Lower sub Upper sub Float sub X/O 10-5/8" roller reamer 1-stand 8" drill collars 5-stands HWDP	
3:00	4:30	1.50	6,700	3-34-1	Picked up 15 joints of 5.5" drill pipe from pipe rack and trip in the hole.	
4:30	8:00	3.50	6,700	3-6-3	Tripped in the hole with 8-3/4" core assembly. Filling pipe every 1,000'.	
8:00	8:30	0.50	6,700	3-4	Tag bottom while circulating @ 400 GPM, drop ball and slow pump to 300 GPM, ball seated	
8:30	10:00	1.50	6,728	3-4	Cut core from 6700' to 6728'	
10:00	15:30	5.50	6,728	3-4	POH with core @ controlled speed	
15:30	18:00	2.50	6,728	3-4	Laid down Reamer, X/O, Float sub. Break down core barrel and collect core. Recovered 12' of core.	
18:00	20:00	2.00	6,728	3-34-4	Run in the hole with 5-stands of 8" drill collars. Remove lifting sub that belonged to Schlumberger and replace with lifting subs that belong to Frontier. Rack 8" drill collars back in derrick.	
20:00	21:00	1.00	6,728	3-4	Made up 8-3/4" coring assembly as followed. 8-3/4" x 4" core bit. Stabilizer 8-15/32". Core barrel 7-1/4" (dressed with aluminum barrel). Stabilizer 8-15/32". Lower sub. Upper sub. Float sub. X/O. 5-stands HWDP.	
21:00	0:00	3.00	6,728	3-4	Tripped in the hole with 8-3/4" core assembly to 5,623' at report time . Filling pipe every 1,000'.	

Management Summary

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 16 **Report For 12-Jul-21**

Held safety meeting with all involved personal on picking up coring assembly.
Made up 8-3/4" coring assembly.
Picked and racked back 5 stands of drill pipe.
Tripped in the hole with 8-3/4" core assembly.
Tag bottom while circulating @ 400 GPM, dropped ball and slowed pump to 300 GPM, ball seated.
Cut core from 6,700' to 6,728'.
Tripped out of the hole with core from 6,728'.
Tripped in the hole with 8" collars, removed Schlumberger lifter and replaced with rig lifter.
Made up 8-3/4" coring assembly.
Tripped in the hole with 8-3/4" core assembly.

Comments

First core run recovered 12' of core.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
12-Jul-21 16:00 at Depth 2,728 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	800	120		1	1	1	89	99	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	perdiem - OTHER	1	---

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
10	1	HALLB1	FC3843	8.750	6700	28	1.5	18.7	59.0	22	50	9	8	300	75	54	22	4	70
Jets: 17 17 17 17 17 17 17 17					**Out:** 6728		**Grade:**	**Cutter:**	8 / 4	**Dull:**	RO / WT	**Wear:** S	**Brgs:** X	**Gge:** 0		**Pull:** BHA			
11	1	H&P	FC3843	8.750	6723	12	1	12.0	25.0	14	55	7	8	281	0	51	19	3	61
Jets: 17 17 17 17 17 17 17 17					**Out:**		**Grade:**	**Cutter:**	/	**Dull:**	/	**Wear:**	**Brgs:**	**Gge:**		**Pull:**			

BHA - No. 12 - CORBIT, STAB, CORE, STAB, 2 OTHER, FLOAT, XO, 15 HWDP = 509.79

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
6,700	6,728	25.0	59.0	22	30	50	50	10	12	309	400	75

Annular Velocity: **Drill Collars:** 250.0 **Drill Pipe:** 175.0

Comments: Cored from 6700' to 6,728'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 217 **Pick Up:** 225 **Slack Off:** 210 **Drag Avg/Max:** 5 / 8

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 80.25 **Total:** 80.25 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 63 / **Tripping:** 61 / ☐ **Wear Bushing Installed**

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 16 **Report For 12-Jul-21**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
6,700	6,728	6,699	6,727											

Formation Name:
Lithology: 100% Granodiorite

Rig Information

Equipment Problems: None.
Location Condition: Good.
Transport: Received SDI dir tools.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 24 (Solids Removal) **Centrifuge 2:** 24 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		9,639	847		8,792	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, working in the heat, good communication.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Clear	**Visibility:**	10
Air Temperature:	74 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	6 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 17 **Report For 13-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	6742	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	6741	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	14 / 10.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	1.33			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	17/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	17/30	**Days On Location:**			17
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations:
Made up 10-5/8" directional assembly and tripped in the hole to 1,036'.
Slip and cut drilling line.
Trip in the hole from 1,036' to 3,100'.
Shallow tested MWD tool @ 3,100'.
Tripped in the hole from 3,100' to 4,100'.
(Stage in hole and circulate every 1,000')

Planned Operations:
Continue to trip in the hole to 6,742'.
Drill 10-5/8" hole section from 6,742'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	1:00	1.00	6,728	3-4	Tripped in the hole with 8-3/4" core assembly to 6,728' . Filling pipe every 1,000'.	
1:00	1:30	0.50	6,728	3-5-1	Filled pipe and established circulation. Record up and down weights. Tagged bottom while circulating @ 400 GPM, dropped ball and slowed pump to 300 GPM, ball seated.	
1:30	2:30	1.00	6,740	3-4	Cut core from 6,728' to 6,740'. Core barrel jammed up at 6,738', drilled down to 6,740' with no change. Decision was made to pull out of the hole.	
2:30	6:00	3.50	6,740	3-4	Tripped out with core assembly from 6,740' to 1,300'.	
6:00	7:00	1.00	6,740	3-4	Tripped out with core assembly from 1,300' to BHA	
7:00	8:00	1.00	6,740	3-34-4	Laid down core and coring assembly / Recovered 9.5' of core	
8:00	9:00	1.00	6,740	3-34-3	Made up bit and bit sub / pick up reamer at 30' off the bit	
9:00	14:30	5.50	6,740	3-6-3	RIH with clean out run to open hole to 10-5/8"	
14:30	15:00	0.50	6,740	SERV	Serviuce rig and change tong dies in SD80	
15:00	16:00	1.00	6,740	3-21	Open 8-3/4" core hole to 10-5/8" from 6,700' to 6,740'	
16:00	16:30	0.50	6,742	3-2-1	Drilled 10-5/8" hole from 6,740' to 6,742'.	
16:30	17:00	0.50	6,742	3-5-1	Circulated hole clean @ 6,742'.	
17:00	20:00	3.00	6,742	3-6-4	Tripped out of the hole from 6,742' to BHA.	
20:00	21:30	1.50	6,742	3-6-2	Racked back HWDP along with 8' drill collars. Broke out bit and laid out.	
21:30	0:00	2.50	6,742	3-34-3	Picked up 1.15 deg bent motor 0.166 rev/gal. Scribe Motor. Make up dir assembly.	

Management Summary

Tripped in the hole with 8-3/4" core assembly to 6,728' .
Filled pipe and established circulation.
Dropped ball.
Cut core from 6,728' to 6,740'.
Tripped out with core assembly from 6,740' to BHA.
Laid down core and coring assembly.
Made up 10-5/8" TCI bit and tripped in the hole to 6,700'.
Serviced rig.
Open 8-3/4" core hole to 10-5/8" from 6,700' to 6,740'.
Drilled 10-5/8" hole from 6,740' to 6,742'.
Circulated hole clean @ 6,742'.
Tripped out of the hole from 6,742' to BHA.
Racked back HWDP along with 8' drill collars.
Laid out bit.
Picked up 1.15 deg bent motor 0.166 rev/gal. Scribe Motor. Make up drilling assembly.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 17 **Report For 13-Jul-21**

Comments

Core barrel jammed at 6,738', drilled down to 6,740' with no change. Decision was made to pull out of the hole.
Recovered 9.5' of core.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
13-Jul-21 16:30 at Depth 6,742 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	9.5	1	0	99	0.01	0	800	120		1	1	1	104	124	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	1	---	Engineering - EACH	1	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
11	1	H&P	FC3843	8.750	6723	24	2	12.0	25.0	14	55	7	8	320	75	58	25	5	80
Jets: 17 17 17 17 17 17 17 17					Out:		Grade:	Cutter:	1 / 1	Dull:	WT / NO	Wear: S	Brgs: X	Gge: 0		Pull: BHA			
12	1	BAKER	MX-1	10.625	6740	2	1	2.0	5.0	21	61	11	8	800	1275	279	578	270	959
Jets: 20 20 20					Out: 6742		Grade:	Cutter:	1 / 3	Dull:	WT / NO	Wear: G	Brgs: 0	Gge: 0		Pull: BHA			

BHA - No. 13 - BIT, DC, RR, DC, XO, HWDP = 845.73

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
6,728	6,740	20.0	25.0	14	16	55	55	7	8	400	320	75
Annular Velocity: Drill Collars: 250.0 Drill Pipe: 175.0												
6,740	6,742	3.0	5.0	21	25	61	61	11	11	800	829	
Annular Velocity: Drill Collars: 478.0 Drill Pipe: 247.0												

Miscellaneous Drilling Parameters

Hook Loads (lbs):	**Off Bottom Rotate:** 217	**Pick Up:** 225	**Slack Off:** 210	**Drag Avg/Max:** 5 / 8			
Slow Circulation Data:							
Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi	
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi	
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi	
Hours on BHA:	**Since Inspection:** 81.25	**Total:** 81.25	**Jars:** 0				
Hours on Casing/Liner:	**Rotating:** 64 /	**Tripping:** 75 /	☐ Wear Bushing Installed				

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
6,728	6,742	6,727	6,741											

Formation Name:
Lithology: 100% Granodiorite

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Received 6 loads of water.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 17 **Report For 13-Jul-21**

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	Desander: 0	Desilter: 0	Degasser: 0
Shaker No 2:	120	120	120	120	Centrifuge 1: 18 (Solids Removal)		Centrifuge 2: 18 (Solids Removal)
Shaker No 3:	120	120	120	120			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,792	901		7,891	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, working in the heat, good communication. Forklift operations.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	10
Air Temperature:	70 degF	**Bar. Pressure:**	29.87
Wind Speed/Dir:	4 / SE	**Wind Gusts:**	2
Comments:	Light rain.		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 18 **Report For 14-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	7613	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	7611	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	871 / 17.75	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	49.07			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	18/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	18/30	**Days On Location:**			18
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 360	**Total:**	26 / 636

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Waiting on hydraulic hose for top drive to arrive.

Planned Operations:
Install topdrive hydraulic service link hose.
Pull out of the hole from 6,599' to BHA.
Swap out motor and bit.
Trip in the hole to 7,613'.
Continue to drill 10-5/8" hole section from 7,613'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	2:00	2.00	6,742	3-34-3	Made up 10-5/8" directional assembly and trip in the hole to 1,036'.	
2:00	3:30	1.50	6,742	CUTDL	Slipped and cut drilling line.	
3:30	8:30	5.00	6,742	3-6-3	Tripped in the hole from 1,036' to 4,100'. Shallow test MWD tool @ 3,100' Filling pipe and breaking circulation every 1,000' from 3,100' to 6,742'. Once on bottom when filling pipe got pipe stuck. Work loose shortly afterwards	
8:30	10:30	2.00	6,946	3-2-3	Rotate drilling 10-5/8" hole from 6,742' to 6,946'	
10:30	11:00	0.50	6,970	3-2-3	Slide drilling 10-5/8" hole from 6,946' to 6,970'.	
11:00	13:00	2.00	7,158	3-2-3	Rotate drilling 10-5/8" hoe from 6,970' to 7,158'	
13:00	13:30	0.50	7,183	3-2-3	Slide drilling 10-5/8" hole from 7,158' to 7,183'	
13:30	15:45	2.25	7,316	3-2-3	Rotary drilling 10-5/.8" hole from 7,183' to 7,316' preforming step down test on WOB and RPM in an attempt to lower vibration on MWD	
15:45	16:00	0.25	7,316	SERV	Service Rig	
16:00	16:15	0.25	7,326	3-2-3	Rotate drilling 10-5/8" hoe from 7,316' to 7,326"	
16:15	17:00	0.75	7,350	3-2-3	Slide drilling 10-5/8" hole from 7,326' to 7,350'.	
17:00	18:00	1.00	7,424	3-2-3	Rotate drilling 10-5/8" hoe from 7,350' to 7,424'.	
18:00	20:30	2.50	7,613	3-2-3	Rotate drilling 10-5/8" hoe from 7,424' to 7,613'.	
20:30	21:00	0.50	7,613	OTHER	While drilling ahead at 7,613' differential pressure jumped from 350 psi to 1,199 psi. Killed mud pumps and picked up off bottom. Brought pumps back online at 830 GPM slacked back off to bottom. Differential pressure jumped up to 1,000 psi with 25k weight on bit and would not drill off. Killed mud pumps and picked up off bottom. Brought pumps back online at 830 GPM slacked back off to bottom. Differential pressure jumped up to 1,356 psi with 30k weight on bit and would not drill off. Decision was made to trip out of the hole.	
21:00	22:00	1.00	7,613	3-6-3	Tripped out of the hole from 7,613' to 6,559'.	
22:00	0:00	2.00	7,613	REPR	While tripping out of the hole service loop came into contact with top drive damaging the main hydraulic return line. Wait on hydraulic hose to arrive. Pump down the string to cool tools every hour at 300 gpm.	X

Management Summary

Made up 10-5/8" directional assembly and trip in the hole to 1,036'.
Slipped and cut drilling line.
Tripped in the hole from 1,036' to 6,742'.
Filled pipe and broke circulation every 1,000' from 3,100' to 6,742'.
Drilled 10-5/8" hole from 6,742' to 7,316'.
Serviced rig.
Drilled 10-5/8" hole from 7,316' to 7,613'.
Tripped out of the hole due to high mud motor differential pressure. POH from 7,613' to 6,559'.
Found damaged top drive hydraulic service link hose.
Wait on hydraulic hose for top drive to arrive.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 18 **Report For 14-Jul-21**

Comments

While tripping out of the hole service loop came into contact with top drive damaging the main hydraulic return line. Waited on hydraulic hose to arrive.
Pump down the string to cool tools every 45 mins at 300 gpm max temperature observed at tools 245 deg.
Total hours of NPT on report 2.0 HRS
Total hours of NPT on Frontier to date 48 HRS.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
14-Jul-21 18:00 at Depth 7,423 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	700	120		1	1	1	113	112	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	1	---	Engineering - EACH	1	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
13	1	NOV	TKC83	10.625	6742	871	12.5	69.7	105.0	65	45	13	8	830	2630	289	620	300	1030

Jets: 12 12 12 12 12 12 13 13 **Out:** **Grade:** **Cutter:** / **Dull:** / **Wear:** **Brgs:** **Gge:** **Pull:**

BHA - No. 14 - BIT, MMTR, STAB, MONEL, 2 OTHER, STAB, MONEL, OTHER, DC, XO, HWDP = 1035.59

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
6,742	7,613	75.0	110.0	65	70	45	45	13	18	830	850	

Annular Velocity: **Drill Collars:** 478.0 **Drill Pipe:** 247.0

Comments: Slide drilling 10-5/8" hole from 6,946' to 6,970'.
Slide drilling 10-5/8" hole from 7,158' to 7,183'.
Slide drilling 10-5/8" hole from 7,326' to 7,350'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 285 **Pick Up:** 310 **Slack Off:** 265 **Drag Avg/Max:** 5 / 10

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 93.75 **Total:** 93.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 66.5 / **Tripping:** 83 / ☐ Wear Bushing Installed

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	6,675.0	1.18	44.2	6,673.7	24.9	-19.3	S 19.3	W 15.7	1.149
MWD	6,770.0	1.25	26.0	6,768.7	22.9	-17.7	S 17.7	W 14.6	0.412

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
6,742	7,613	6,741	7,612	0	0									

Formation Name:

Lithology: 100% Granodiorite

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 18 **Report For 14-Jul-21**

Rig Information

Equipment Problems:	Leaking house on top drive.
Location Condition:	Good.
Transport:	Received 7 loads of water.

Solids Control Information

Screen Sizes:	**Top**	**Middle 1**	**Middle 2**	**Bottom**
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 24 (Solids Removal) **Centrifuge 2:** 24 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		7,891	2,344	2,700	8,247	356

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, working in the heat, good communication.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	10
Air Temperature:	72 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	6 / SE	**Wind Gusts:**	2
Comments:	Light rain.		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 19 **Report For 15-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	7613	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	7611	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 9.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	0.0			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	19/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	19/30	**Days On Location:**			19
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Tripped in the hole from 2,613' to 7,072'.
Filled pipe and broke circulation every 1,000'.
Took weight at 7,072'. Work string free with 90k in over-pull. Ream from 7,072' to 7,231'.

Planned Operations: Ream from 7,231' to 7,613' as needed.
Drilled 10-5/8" hole to 8,500'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	8:00	8.00	7,613	REPR	Waited on hydraulic hose to arrive. Pumping down the string to cool tools every hour at 300 gpm.	X
8:00	13:00	5.00	7,613	3-6-4	POH from 6,559' to 629'	
13:00	16:30	3.50	7,613	3-6-2	Racked back HWDP along with 8' drill collars. Laid out motor, bit, stabs. Motor took a high amount of torque to drain 45 kft/lbs. Bit had 3-plugged jets with pieces of rubber from the stator bit was also DBR'ed. Motor Stabilizer was 0.5" under-gauged Stabilizer above the motor was 0.75" under-gauged. Top Stabilizer was 1.25" under-gauged.	
16:30	22:30	6.00	7,613	3-34-3	Picked up new (Bico) motor 1.5 deg, 0.160 rev/gal. Picked up new 10-5/8" NOV bit. Picked up 1- Re-Run Roller Reamers 10-3/8" stab placed at 39.53'. Picked up new 10-1/2" spiral stab placed at 100.82'. Placed cubic sensors at 50.96', 132.86'. Made up and scribed tools. Tripped in the hole with BHA to 1,000'.	
22:30	23:30	1.00	7,613	3-6-3	Tripped in the hole from 1,000' to 2,613'.	
23:30	0:00	0.50	7,613	SERV	Serviced rig. Adjusted service loop.	

Management Summary

Waited on hydraulic hose to arrive.
Installed new top-drive service link hydraulic hose.
Tripped out of the hole from 6,559' to BHA.
Racked back HWDP along with 8' drill collars.
Laid out motor, bit, stabs.
Made up 10-5/8" directional assembly.
Tripped in the hole from 1,000' to 2,613'.
Serviced rig. Adjusted service loop.

Comments

Motor took a high amount of torque to drain 45 kft/lbs. Bit had 3-plugged jets with pieces of rubber from the stator bit was also DBR'ed.
Motor Stabilizer was 0.5" under-gauged
Stabilizer above the motor was 0.75" under-gauged.
Top Stabilizer was 1.25" under-gauged.

Total hours of NPT on report 8.0 HRS
Total hours of NPT on Frontier to date 56 HRS.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 19 **Report For 15-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
15-Jul-21 16:00 at Depth 7,613 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	700	120		1	1	1	86	87	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Other - EACH	1	---
perdiem - OTHER	1	---	Trucking - EACH	1	---

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
13	1	NOV	TKC83	10.625	6742	871	12.5	0.0	0.0	0	0	13	8	830	2730	289	620	300	1030

Jets: 12 12 12 12 12 12 13 13 **Out:** 7613 **Grade:** **Cutter:** 8 / 3 **Dull:** RO / BT **Wear:** S **Brgs:** X **Gge:** 2 **Pull:** DMF

BHA - No. 14 - BIT, MMTR, STAB, MONEL, 2 OTHER, STAB, MONEL, OTHER, DC, XO, HWDP = 1035.59

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** **Pick Up:** **Slack Off:** **Drag Avg/Max:** /

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	6,865.0	1.46	26.2	6,863.7	20.8	-15.7	S 15.7	W 13.6	0.221
MWD	6,960.0	1.09	38.8	6,958.6	18.7	-13.9	S 13.9	W 12.5	0.486
MWD	7,056.0	1.57	206.0	7,054.6	19.0	-14.3	S 14.3	W 12.5	2.754
MWD	7,151.0	1.92	193.9	7,149.6	21.7	-17.1	S 17.1	W 13.5	0.533
MWD	7,246.0	1.38	197.6	7,244.5	24.3	-19.7	S 19.7	W 14.2	0.579
MWD	7,341.0	0.83	203.9	7,339.5	26.0	-21.4	S 21.4	W 14.8	0.592
MWD	7,436.0	0.89	200.9	7,434.5	27.4	-22.7	S 22.7	W 15.4	0.079
MWD	7,531.0	0.95	208.9	7,529.5	28.9	-24.1	S 24.1	W 16.0	0.149

Rig Information

Equipment Problems: Parted HYD hose on Service loop.
Location Condition: Good.
Transport: Received 2 loads of 7" casing, 1-10-5/8" PDC bit.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 24 (Solids Removal) **Centrifuge 2:** 24 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,247			8,247	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 19 **Report For 15-Jul-21**

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, Working at heights. Looking up while tripping pipe.

First Aid Treatments:	0	Medical Treatments:	0	Lost Time Incidents:	0	Days Since LTI:

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	10
Air Temperature:	70 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	8 / SE	**Wind Gusts:**	2
Comments:	Light rain with some wind.		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 20 **Report For 16-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8500	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8498	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	887 / 18.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	49.28			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	20/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	20/30	**Days On Location:**			20
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Tripped out of the hole from 4,000' to BHA with no issues.
Racked back HWDP. Laid out 15X8" drill collars and all directional tools.

Planned Operations: Finish laying out directional tools.
Make up 8-3/4" coring assembly.
Trip in the hole to 8,500'.
Cut core from 8,500'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:30	0.50	7,613	3-6-3	Tripped in the hole from 2,613' to 3,145'.	
0:30	0:45	0.25	7,613	3-5-1	Broke circulation at 3,145' to cool tools. Shallow tested tools.	
0:45	1:15	0.50	7,613	3-6-3	Tripped in the hole from 3,145' to 4,129'.	
1:15	1:30	0.25	7,613	3-5-1	Broke circulation at 4,129' to cool tools. Max temp observed at MWD was 201 deg. Max temp at surface was 98 deg.	
1:30	2:00	0.50	7,613	3-6-3	Tripped in the hole from 4,129' to 5,078'.	
2:00	2:15	0.25	7,613	3-5-1	Broke circulation at 5,078' to cool tools. Max temp observed at MWD was 228 deg. Max temp at surface was 98 deg.	
2:15	2:30	0.25	7,613	3-6-3	Tripped in the hole from 5,078' to 6,025'.	
2:30	3:00	0.50	7,613	3-5-1	Broke circulation at 6,025' to cool tools. Max temp observed at MWD was 260 deg. Max temp at surface was 103 deg.	
3:00	3:30	0.50	7,613	3-6-3	Tripped in the hole from 6,025 to 6,974'.	
3:30	4:00	0.50	7,613	3-5-1	Broke circulation at 6,974' to cool tools. Max temp observed at MWD was 292 deg. Max temp at surface was 108 deg.	
4:00	4:15	0.25	7,613	3-6-3	Tripped in the hole from 6,974' to 7,072'.	
4:15	6:00	1.75	7,613	3-3	Took weight at 7,072'. Work string free with 90k in over-pull. Ream from 7,072' to 7,231'.	
6:00	8:00	2.00	7,613	3-3	Ream from 7,231' to 7,260'. Ran one stand from 7,260' to 7,340'. Ream from 7,260' to 7,613'.	
8:00	13:00	5.00	8,091	3-2-3	Rotate drilling 10-5/8" hole from 7,613' to 8,091' Conduct RPM step test @ 35,40,45,50 Conduct GPM step test at 700,800,900 GPM Best results were what we were running 50 RPM 800 GPM Conducted a water sweep test showing less ROP	
13:00	13:45	0.75	8,111	3-2-3	Slid Drill from 8,091' to 8,111'.	
13:45	16:15	2.50	8,282	3-2-3	Rotate drilling 10-5/8" hole from 8,111' to 8,282'	
16:15	16:45	0.50	8,303	3-2-3	Slide drill from 8,282' to 8,303'.	
16:45	18:00	1.25	8,377	3-2-3	Rotate drill from 8,303' to 8,377'.	
18:00	18:30	0.50	8,395	3-2-3	Slide drill from 8,377' to 8,395'.	
18:30	20:00	1.50	8,500	3-2-3	Rotate drill from 8,395' to 8,500' (Core point).	
20:00	20:30	0.50	8,500	3-5-1	Circulate bottoms up at 8,500'.	
20:30	0:00	3.50	8,500	3-6-4	Tripped out of the hole from 8,500' to 4,000' with no issues.	

Management Summary

Tripped in the hole from 2,613' to 7,072'.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 20 **Report For 16-Jul-21**

Breaking circulation every 1,000' to cool tools.
Reamed from 7,707' to 7,613'.
Drilled 10-5/8" hole from 7,613' to 8,500' (Core point).
Circulated bottoms up at 8,500'.
Tripped out of the hole from 8,500' to 4,000'.

Comments

Slid Drill from 8,091' to 8,111'.
Slide Drill from 8,282' to 8,303'.
Slide Drill from 8,377' to 8,395'.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
16-Jul-21 20:15 at Depth 8,500 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	11	2	0	98	0.01	0	700	120		1	1	1	118	130	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	4	---	Engineering - EACH	1	---
Other - EACH	1	---	perdiem - OTHER	1	---

Bit/BHA/Workstring Information

No Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
14 1	NOV	TCK83	10.625	7613	887	12	73.9	230.0	65	50	16	8	830	2750	289	620	300	1030

Jets: 12 12 12 12 12 12 13 13 **Out:** **Grade:** **Cutter:** / **Dull:** / **Wear:** **Brgs:** **Gge:** **Pull:**

BHA - No. 15 - BIT, MMTR, STAB, 2 OTHER, MONEL, 2 OTHER, STAB, MONEL, 2 OTHER, DC, XO, HWDP = 1049.30

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
7,613	8,500	73.9	230.0	65	70	50	53	16	18	800	830	2,750

Annular Velocity: **Drill Collars:** 478.0 **Drill Pipe:** 247.0

Comments: Slid Drill from 8,091' to 8,111'.
Slide Drill from 8,282' to 8,303'.
Slide Drill from 8,377' to 8,395'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 302 **Pick Up:** 330 **Slack Off:** 250 **Drag Avg/Max:** 15 / 20

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 105.75 **Total:** 105.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 82.5 / **Tripping:** 99 / ☐ **Wear Bushing Installed**

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 20 **Report For 16-Jul-21**

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	7,639.0	0.74	209.6	7,637.5	30.5	-25.5	S 25.5	W 16.8	0.195
MWD	7,830.0	1.62	212.6	7,828.4	34.5	-28.9	S 28.9	W 18.8	0.462
MWD	7,925.0	1.87	235.7	7,923.4	37.2	-30.9	S 30.9	W 20.9	0.778
MWD	8,020.0	1.85	235.7	8,018.4	40.1	-32.6	S 32.6	W 23.4	0.021
MWD	8,116.0	1.52	279.6	8,114.3	42.2	-33.3	S 33.3	W 25.9	1.351
MWD	8,211.0	1.76	291.6	8,209.3	43.3	-32.5	S 32.5	W 28.5	0.440
MWD	8,306.0	1.49	275.6	8,304.2	44.5	-31.9	S 31.9	W 31.1	0.553
MWD	8,402.0	0.87	250.9	8,400.2	46.0	-32.0	S 32.0	W 33.0	0.821
MWD	8,428.0	1.39	249.8	8,426.2	46.4	-32.1	S 32.1	W 33.5	2.002

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
7,613	8,500	7,612	8,498											

Formation Name:
Lithology: 100% Granodiorite

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Received 8.75" core bit along with 10-5/8" NOV PDC bit. Received 2-loads of 7" casing.,

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 24 (Solids Removal) **Centrifuge 2:** 24 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,247			8,247	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, good communication, Forklift operations.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition: Cloudy
Air Temperature: 70 degF
Wind Speed/Dir: 8 / SSE
Comments: Light rain.
Visibility: 7
Bar. Pressure: 29.84
Wind Gusts: 2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 21 **Report For 17-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	8530	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	8528	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	30 / 7.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):	4.0			**LOT (lbs/gal):**	11.70	**Well Cost ($):**		---
Drilling Days (act./plan):	21/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	21/30	**Days On Location:**		21
Pers/Hrs: **Operator:**	0 / 0	**Contractor:**	0 / 0	**Service:**	0 / 0	**Other:**	0 / 0	**Total:** 0 / 0

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Made up 8-3/4" core assembly.
Tripped in the hole with 8-3/4" core assembly to 6,495'.

Planned Operations: Trip in the hole with 8-3/4" core assembly to 8,530'.
Core from 8,530' to 8,560'.
Trip out of the hole with core assembly.
Make up 10-5/8" reaming assembly.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	2:00	2.00	8,500	3-6-4	Tripped out of the hole from 4,000' to BHA with no issues.	
2:00	7:00	5.00	8,500	3-34-4	Racked back HWDP. Laid out 15-8" drill collars and all directional tools. Motor had approximately .5" of squat in bearing assembly. Kick pad was wore smooth. Roller reamer above the motor had heavy wear on all buttons, 2 of the rollers had bad bearings. Top Stabilizer was .75" under-gauged.	
7:00	8:30	1.50	8,500	3-4	Picked up 8-3/4" Coring assembly / RIH 5 HWDP	
8:30	9:00	0.50	8,500	3-4	Pick up 18 jts of 5.5" drill pipe to replace DCS and Directional Tools	
9:00	13:30	4.50	8,500	3-4	RIH to 8,500' filling pipe every 20 stands with 8-3/4" core head	
13:30	17:30	4.00	8,530	3-4	Drop ball and core from 8,500' to 8,530'. No over-pull observed when pulling off bottom.	
17:30	23:00	5.50	8,530	3-6-4	Tripped out of the hole from 8,530' with core assembly.	
23:00	0:00	1.00	8,530	3-4	Handled BHA. Laid out core barrel. Recovered 23.7' of core. 50% 2-3" in length with the other 50% 9-12" in length. Note: Inner barrel assembly was pushed up inside of core barrel approximately 3".	

Management Summary

Tripped out of the hole from 4,000' with BHA and no issues.
Racked back HWDP. Laid out 15X8" drill collars and all directional tools.
Picked up 8-3/4" Coring assembly.
Tripped in the hole to 8,500' filling pipe every 1,000'.
Cored from 8,500' to 8,530'.
Tripped out of the hole from 8,530' with core assembly.
Handled BHA. Laid out core barrel. Recovered 23.7' of core. 50% 2-3" in length with the other 50% 9-12" in length.

Comments

Drilling assembly motor had approximately .5" of squat in bearing assembly.
Kick pad was wore smooth.
Roller reamer above the motor had heavy wear on all buttons and 2 of the rollers had bad bearings.
Top Stabilizer was .75" under-gauged.
After core run laid out the core barrel.
Recovered 23.7' of core.
50% 2-3" in length with the other 50% 9-12" in length.
Note: The inner barrel assembly was pushed up inside of core barrel approximately 3".

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 21 **Report For 17-Jul-21**

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
17-Jul-21 15:45 at Depth 8,517 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	29	2	1	32	1	10	2	0	98	0.01		800	120		2	2	2	81	109	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	2	---	Engineering - EACH	1	---
Other - EACH	1	---	perdiem - OTHER	1	---
polyvis - 5GAL	12	---	TORKease concentrate - 5GAL	6	---

Bit/BHA/Workstring Information

No Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
14 1	NOV	TCK83	10.625	7613	887	12	73.9	230.0	65	50		8	800	2750	278	576	269	957
Jets: 12 12 12 12 12 12 13 13	**Out:** 8500	**Grade:**	**Cutter:** 3 / 2	**Dull:** WT / LT	**Wear:** S	**Brgs:** X	**Gge:** 0	**Pull:** CP										
15 1	HALLB1	FC3843	8.750	8500														
Jets: 17 17 17 17 17 17 17 17	**Out:** 8530	**Grade:**	**Cutter:** 1 / 1	**Dull:** WT / NO	**Wear:** S	**Brgs:** 0	**Gge:** 0	**Pull:** BHA										

BHA - No. 16 - CORBIT, STAB, CORE, STAB, 2 OTHER, FLOAT, XO, 15 HWDP = 509.79

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
8,500	8,530	8.0	14.0	8	10	65	65	11	12	290	290	10

Annular Velocity: **Drill Collars:** 230.0 **Drill Pipe:** 197.0

Comments: Cored from 8,500' to 8,530'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 273 **Pick Up:** 285 **Slack Off:** 265 **Drag Avg/Max:** 10 / 15

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi			
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi			
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi			

Hours on BHA: **Since Inspection:** 109.75 **Total:** 109.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 86.5 / **Tripping:** 113 / ☐ **Wear Bushing Installed**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
8,500	8,530	8,498	8,528											

Formation Name:

Lithology: 100% Granodiorite

Rig Information

Equipment Problems: None to report.

Location Condition: Good.

Transport: Received 1-load of 7" casing. Back hauled 1 load of 8" dir tools.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):

Desander: 0 **Desilter:** 0 **Degasser:** 0

Centrifuge 1: 24 (Solids Removal) **Centrifuge 2:** 24 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel						

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 21 **Report For 17-Jul-21**

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Handling BHA, good communication, Forklift operations.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly cloudy	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	7 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 24 **Report For 20-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8540	**Last Casing:**	11.750 at 2,990	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8438	**Next Casing:**	7.000 at 8,500	**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 9.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	0.0			**LOT (lbs/gal):**	11.70	**Well Cost ($):**			---
Drilling Days (act./plan):	24/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	24/30	**Days On Location:**			24
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Tripped in the hole with 10-5/8" clean out assembly to 8,540'.
Drilled 10-5/8" hole from 8,540' to 8,545'.
Circulated surface to surface strokes to clean the well bore prior to running casing.
Pull out of the hole laying down 5.5" drill pipe from 8,545' to 6,300'.

Planned Operations: Lay out 5.5" drill string.
Rig up and run 7" casing.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	1:00	1.00	8,540	CUTDL	Slipped and cut drilling line.	
1:00	4:00	3.00	8,540	3-6-3	Tripped in the hole with 10-5/8" clean out assembly from 2,900' to 8,514'. Filled pipe and broke circulation. Filled pipe every 3,000'. Strapped all drill pipe while running in the hole.	
4:00	5:00	1.00	8,540	OPEN	Opened 8-3/4" core hole to 10-5/8" from 8,514' to 8,540'.	
5:00	6:00	1.00	8,540	3-5-1	Circulated surface to surface strokes to cool well bore prior to logs.	
6:00	10:00	4.00	8,540	3-6-4	Tripped out of the hole for Schlumberger logs.	
10:00	21:30	11.50	8,540	LOG	Rigged up Schlumberger . Ran UBI log. Rigged down loggers.	
21:30	22:00	0.50	8,540	3-6-1	Made up 10-5/8" clean out assembly with TCI bit.	
22:00	0:00	2.00	8,540	3-6-3	Tripped in the hole with 10-5/8" clean out assembly to 4,657'. Filled pipe very 3,000'.	

Management Summary

Slipped and cut drilling line.
Tripped in the hole with 10-5/8" clean out assembly from 2,900' to 8,514'.
Opened 8-3/4" core hole to 10-5/8" from 8,514' to 8,540'.
Circulated surface to surface strokes to cool well bore prior to logs.
Tripped out of the hole for Schlumberger logs.
Rigged up Schlumberger .
Ran UBI log.
Rigged down loggers.
Made up 10-5/8" clean out assembly with TCI bit.
Tripped in the hole with 10-5/8" clean out assembly to 4,657'

Comments

Strapped all drill pipe on trip in and compared to tally. Tally was good.
Five foot was drilled to fit casing and provide 13' of rat hole.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 24 **Report For 20-Jul-21**

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
20-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	38	2	2	34	1	10	2	0	98	0.01		800	120		2	2	2	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Other - EACH	1	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
12	2	BAKER	MX-1	10.625	8415	26	1	26.0	75.0	23	50	13	8	800	1300	279	578	270	959
Jets: 20 20 20					Out:		Grade:	Cutter:	/	Dull:	/		Wear:		Brgs:		Gge:		Pull:	
12	3	BAKER	MX-1	10.625	8540														
Jets: 20 20 20					Out:		Grade:	Cutter:	/	Dull:	/		Wear:		Brgs:		Gge:		Pull:	

BHA - No. 20 - BIT, BS, 15 HWDP = 469.42

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 271 **Pick Up:** 285 **Slack Off:** 265 **Drag Avg/Max:** 5 / 10

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 114.75 **Total:** 114.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 92.5 / **Tripping:** 149 / ☐ **Wear Bushing Installed**

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Back hauled 8" dir tools.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 18 (Solids Removal) **Centrifuge 2:** 18 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		6,697		3,702	10,399	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Rigging up loggers. Forklift operations. Working in weather.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	8
Air Temperature:	72 degF	**Bar. Pressure:**	29.98
Wind Speed/Dir:	7 / SE	**Wind Gusts:**	3
Comments:	Light rain during the day.		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 25 **Report For 21-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,532	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	5 / 2.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):	2.0					**Well Cost ($):**		---
Drilling Days (act./plan):	25/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	25/30	**Days On Location:**		25
Pers/Hrs: **Operator:**	4 / 36	**Contractor:**	14 / 168	**Service:**	8 / 96	**Other:**	4 / 36	**Total:** 30 / 336

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Running 7" casing to 2,514'.

Planned Operations: Run 7" casing to set depth of 8,531'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	2:00	2.00	8,540	3-6-3	Tripped in the hole with 10-5/8" clean out assembly to 8,540'. Filled pipe very 3,000'.	
2:00	2:30	0.50	8,540	3-2-1	Drilled 10-5/8" hole from 8,540' to 8,545'. Note: Five foot was drilled to fit casing and provide 13' of rat hole.	
2:30	3:30	1.00	8,540	3-5-1	Circulated surface to surface strokes to clean the wellbore prior to running casing.	
3:30	6:00	2.50	8,540	3-34-2	Pull out of the hole laying down 5.5" drill pipe from 8,545' to 6,300'.	
6:00	14:00	8.00	8,540	3-34-2	Pull out of the hole laying down 5.5" drill pipe from 6,300' to HWDP, Lay down HWDP	
14:00	17:00	3.00	8,540	4-12-1	Changed out IBOP valve for CRT. Install saver sub. Laid down all handling tools.	
17:00	18:00	1.00	8,540	OTHER	Removed 5.5" ram blocks. Installed Frontiers 5" ram blocks back into double gate.	
18:00	21:00	3.00	8,540	OTHER	Load racks with 7" casing. Cleaned threads on casing and prep to run.	
21:00	23:30	2.50	8,540	4-12-1	Held detailed safety meeting with all involved personal. Rigged up Wyoming Casing Service. Rigged up Silixa. Loaded out floor with Silixa centralizes.	
23:30	0:00	0.50	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing as followed. 7"- float shoe. 2-joints of 7", 41#, T-110SS. 7"- float collar at report time. Note: Casing was ran with torque turn system. All joints were torqued to manufactures recommendation of 17,070 FT/LBS.	

Management Summary

Tripped in the hole with 10-5/8" clean out assembly to 8,540'.
Drilled 10-5/8" hole from 8,540' to 8,545'.
Circulated surface to surface strokes to clean the wellbore prior to running casing.
Pulled out of the hole laying down 5.5" drill pipe.
Laid out all BHA.
Changed out IBOP valve for CRT. Install saver sub. Laid down all handling tools.
Removed 5.5" ram blocks. Installed Frontiers 5" ram blocks into double gate.
Load racks with 7" casing. Cleaned threads on casing and prepared to run.
Held detailed safety meeting with all involved personal. Rigged up Wyoming Casing Service. Rigged up Silixa.
Loaded out floor with Silixa centralizes.
Ran 7", 41#, T-110SS, Tenaris casing.

Comments

Five foot was drilled to fit casing and provide 13' of rat hole.
BHA on fiber optics was placed to be landed at 8,389' top of third full joint.
All 7" casing joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0		8,532		PROD		41		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 25 **Report For 21-Jul-21**

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
21-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	38	2	2	34	1	10	2	0	98	0.01		800	12		2	2	2	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Gel - 100#SK	10	---
Micro C - 50#SK	17	---	Other - EACH	1	---
perdiem - OTHER	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
12	2	BAKER	MX-1	10.625	8415	26	1												
Jets: 20 20 20					**Out:**		**Grade:**	**Cutter:** /		**Dull:** /			**Wear:**		**Brgs:**		**Gge:**		**Pull:**	
12	3	BAKER	MX-1	10.625	8540	5	0.5	10.0	25.0	25	45	7	8	820	1800	286	607	290	1007
Jets: 20 20 20					**Out:** 8545		**Grade:**	**Cutter:** 2 / 3		**Dull:** WT / CT			**Wear:** S		**Brgs:** 0		**Gge:** 0		**Pull:** TD	

BHA - No. 20 - BIT, BS, 15 HWDP = 469.42

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Back hauled 4 loads of 5.5" drill pipe.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 12 (Solids Removal) **Centrifuge 2:** 12 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		9,404	898		8,506	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Laying down drill pipe. Forklift operations. Rigging up and running casing.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly cloudy	**Visibility:**	8
Air Temperature:	70 degF	**Bar. Pressure:**	29.98
Wind Speed/Dir:	7 / SE	**Wind Gusts:**	2
Comments:	Light rain during the day.		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 26 **Report For 22-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,532	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):						**Well Cost ($):**			---
Drilling Days (act./plan):	26/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	26/30	**Days On Location:**			26
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	8 / 96	**Other:**	3 / 36	**Total:**	28 / 336

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Pulled out of the hole with 7" casing from 5,477' to 1,212' removing damaged fiber optic cable'.

Planned Operations: Continue pulling 7" casing and fiber optic cable.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	6:00	6.00	8,540	4-12-1	Run 7", 41#, T-110SS, Tenaris casing from 94' to 2,514'. Note: BHA on fiber optics was placed at 8,389' top of third full joint. Stopped and tested continuity every 15 joints while running casing. All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS.	
6:00	15:00	9.00	8,540	4-12-1	Run 7", 41#, T-110SS, Tenaris casing from 2,514'. to 6,178'.	
15:00	15:30	0.50	8,540	4-12-1	Stopped to test fibers AT 6,178'. Breakage in fiber optic cable detected; decision was made to continue running in hole with remaining intact fiber/casing and monitor for cable quality.	
15:30	16:00	0.50	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 6,178' to 6,517'.	
16:00	18:30	2.50	8,540	4-12-1	Stopped at joint 6,517' to run Fiber optic tests- the measured fiber length shortened by approximately 500ft on the fibers. Meeting was held to decide plan moving forth; the decision was made to run 5 more joints in the hole and assess the fiber quality afterwards.	
18:30	19:15	0.75	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 6,517' to 6,753'.	
19:15	20:30	1.25	8,540	4-12-1	Tested fibers; fibers shortened by 500ft. The decision was made to pull casing out of hole.	
20:30	0:00	3.50	8,540	4-99	Pull out of the hole with 7" casing from 6,753' to 5,447'. Note: While pulling the first joint of 7" casing fiber optic got cut pulling through the bushings.	

Management Summary

Ran 7", 41#, T-110SS, Tenaris casing with fiber optic cable from 94' to 6,178' testing cable approximately every 650'.
When testing fiber optic cable at 6,178' breakage in fiber optic cable was detected approximately 800' up from cable BHA.
Continued running in the hole with the 7"casing from 6,178' to 6,517'. Retest cable and OTDR tests results indicated continuity fiber length had shortened by approximately additional 500 ft.
Ran 7" casing from 6,517' to 6,753'. Cable test indicated fiber optic cable continuity had shortened by another 500 ft.
During conference call decision was made to pull the casing out of hole.
Pulled out of the hole with 7" casing removing fiber optic cable from 6,753' to 5,447' at report time.

Comments

Tested out fiber optic cable every 15 joints while running 7" casing.
Tested fibers at 6,178'. Breakage in fiber optic cable detected.
Decision was made to continue running in hole with remaining intact fiber/casing and monitor for cable quality.
Tested fibers at 6,517'.
The measured fiber length shortened by approximately 500ft on the fibers.
Meeting was held to decide plan moving forward, Decision was made to run 5 more joints in the hole to 6,753' and assess the fiber quality.
Test indicated fibers had shortened another 500 ft. Decision was made to pull the casing out of hole to determine cause of continuing cable failure.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 26 **Report For 22-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0		8,532		PROD		41		

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
22-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	38	2	2	34	1	10	2	0	98	0.01	0	800	120		2	2	2	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	80	---	Engineering - EACH	1	---
Gel - 100#SK	4	---	Other - EACH	1	---
pallets - OTHER	2	---	perdiem - OTHER	1	---
polyvis - 5GAL	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
12	2	BAKER	MX-1	10.625	8415	28	3	9.3											

Jets: 20 20 20 **Out:** 8417 **Grade:** **Cutter:** / **Dull:** / **Wear:** **Brgs:** **Gge:** **Pull:**

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Back hauled 4 loads of 5.5" pipe.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs):
Desander: 0 **Desilter:** 0 **Degasser:** 0
Centrifuge 1: 8 (Solids Removal) **Centrifuge 2:** 8 (Solids Removal)

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,506			8,506	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
5.5"	258	24.7	S-135	5.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Running 7" casing. Laying out 7" casing.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	10
Air Temperature:	68 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	5 / SE	**Wind Gusts:**	2
Comments:	Light rain		

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 27 **Report For 23-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,532	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):						**Well Cost ($):**			---
Drilling Days (act./plan):	27/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	27/30	**Days On Location:**			27
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	8 / 96	**Other:**	3 / 36	**Total:**	28 / 336

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Ran 7", 41#, T-110SS, Tenaris casing from 2,380' to 3,722'. Install splice on fiber-optic cable at 3,722'.

Planned Operations: Run 7" casing to set depth of 8,531'.
Circulate to cool well bore prior to cement job.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	6:00	6.00	8,540	4-99	Pulled out of the hole with 7" casing from 5,477' to 1,212'. Note: Fiber-optic cable was broke from 3,017' down to 1,212' in multiple place ranging from 40' to 160' foot sections.	
6:00	7:30	1.50	8,540	4-99	Pulled out of hole with 7" casing from 1212' to 120' NOTE: Fiber optic had no breaks from 1212' to 120'	
7:30	10:00	2.50	8,540	WOO	Waited on Orders while Silixa measured and determines usable length of fiber optic. Determined 3,686' of usable fiber-optic.	
10:00	18:00	8.00	8,540	WOE	Silixa shipping a 5,000' cable from Montana to splice / Continue wiring 3,686' piece to BHA	
18:00	20:00	2.00	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 94' to 685'. Note: BHA on fiber optics was placed at 8,389' top of third full joint. All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Pumped through shoe track to verify no blockage. Remaining joints were not filled.	
20:00	20:30	0.50	8,540	4-99	Performed continuity test on fiber optics at 6,85'. Test was good.	
20:30	21:45	1.25	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 685' to 1,376'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
21:45	22:00	0.25	8,540	4-99	Performed continuity test on fiber optics at 1,376'. Test was good.	
22:00	23:15	1.25	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 1,376' to 2,060'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
23:15	23:30	0.25	8,540	4-98	Performed continuity test on fiber optics at 2,060'. Test was good.	
23:30	0:00	0.50	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 2,060' to 2,380'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	

Management Summary

Pulled out of the hole with 7" casing from 5,477' to 120'.
Multiple breaks in fiber-optic cable from 3,017' to 1,212'.
Removed Silixa Fiber-optic BHA from casing.
Waited on Orders while Silixa measured usable length of fiber-optic cable. Determined 3,686' of usable fiber-optic cable.
Installed fiber-optic BHA on casing.
Ran 7", 41#, T-110SS, Tenaris casing from 94' to 2,380.
Performed continuity test on fiber optics every 15-joints while running 7" casing.

Comments

Fiber-optic cable was broke from 3,017' up to 1,212' in multiple places ranging from 40' to 160' sections.
Silixa shipped 5,000' of fiber-optic cable from Montana.
Cable arrived on location at 0030 hrs on 7-24-2021.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 27 **Report For 23-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0		8,532		PROD		41		

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
23-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	38	2	2	34	1	10	2	0	98	0.01	0	800	120		2	2	2	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Other - EACH	1	---
perdiem - OTHER	1	---	Trucking - EACH	1	---

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** **Pick Up:** **Slack Off:** **Drag Avg/Max:** /

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 114.75 **Total:** 114.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 92.5 / **Tripping:** 197 / ☐ **Wear Bushing Installed**

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Back hauled remaining 5.5" drill pipe. Back hauled roller reamers along with cubic sensors.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	120	120	120	120	**Desander:** 0	**Desilter:** 0	**Degasser:** 0
Shaker No 2:	120	120	120	120			
Shaker No 3:	120	120	120	120			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		7,791	621		7,170	

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Laying out 7" casing. Running 7" casing. hand and body placement.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	10
Air Temperature:	70 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	8 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 28 **Report For 24-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):						**Well Cost ($):**		---
Drilling Days (act./plan):	28/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	28/30	**Days On Location:**		28
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	14 / 168	**Other:**	2 / 24	**Total:** 33 / 396

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Circulated at 16 bbl's per min to cool well bore.
Cemented 7" casing in place with 126 bbl's of cement to surface.

Planned Operations: Wait on cement.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:45	0.75	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 2,380' to 2,742'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
0:45	1:00	0.25	8,540	4-99	Performed continuity test on fiber optics at 2,742'. Test was good.	
1:00	2:00	1.00	8,540	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 2,742' to 3,428'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
2:00	2:15	0.25	8,545	4-99	Performed continuity test on fiber optics at 3,428'. Test was good.	
2:15	2:30	0.25	8,545	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 3,428' to 3,722'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
2:30	9:00	6.50	8,545	4-99	Installed new spool of fiber-optic cable on to unit. Ran fiber-optic cable to rig floor. Spliced on new fiber-optic cable at 3,722'.	
9:00	10:00	1.00	8,545	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 3,711' to 4,117'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
10:00	10:30	0.50	8,545	4-99	Performed continuity test on fiber optics at 4,117'. Test was good.	
10:30	11:30	1.00	8,545	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 4,117' to 4,803'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
11:30	12:00	0.50	8,545	4-99	Performed continuity test on fiber optics at 4,803'. Test was good.	
12:00	13:00	1.00	8,545	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 4,803' to 5,480'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
13:00	13:30	0.50	8,545	4-99	Performed continuity test on fiber optics at 5,480'. Test was good.	
13:30	15:00	1.50	8,545	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 5,480' to 6,161'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
15:00	15:15	0.25	8,545	4-99	Performed continuity test on fiber optics at 6,161'. Test was good.	
15:15	16:00	0.75	8,545	4-12-1	Run 7", 41#, T-110SS, Tenaris casing from 6,161' to 6,614'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
16:00	16:15	0.25	8,545	4-99	Performed continuity test on fiber optics at 6,614'. Test was good.	

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 28 **Report For 24-Jul-21**

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
16:15	17:00	0.75	8,545	4-12-1	Run 7", 41#, T-110SS, Tenaris casing from 6,614' to 7,070'. Note: Floats failed at 6,795' while running casing gained 81k in hook load. All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
17:00	17:30	0.50	8,545	4-99	Performed continuity test on fiber optics at 7,070'. Test indicated one of the five fiber-optic had failed at 4,000' from surface. Decision was made to run in one joint to 7,106' and circulate bottoms up.	
17:30	19:00	1.50	8,545	3-5-1	Circulated bottoms up at 7,106'. Max surface flow temperature was 99 degrees Fahrenheit. Static temperature reading at 6,966' with fiber-optic cable was 359 degrees Fahrenheit.	
19:00	19:45	0.75	8,545	4-12-1	Run 7", 41#, T-110SS, Tenaris casing from 7,070' to 7,812'. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling.	
19:45	20:00	0.25	8,545	4-99	Performed continuity test on fiber optics at 7,812'. Test indicated all five fiber-optic cables failed from 4,500' to 7,812'. Static temperature was 240 degrees Fahrenheit at 4,500'.	
20:00	21:15	1.25	8,545	4-12-1	Ran 7", 41#, T-110SS, Tenaris casing from 7,812' to set depth of 8,508'. Shoe set at 8,508' KB. Float collar at 8,414' KB. Note: All joints were torqued to manufactures optimum recommendation of 17,070 FT/LBS. Ran all 15-joints without filling. Thread locked last 3 joints in the hole below landing joint.	
21:15	21:30	0.25	8,545	4-99	Performed continuity test on fiber optics at 8,508'. Test indicated all five fiber-optic cables failed from 3,933' to 8508'. Static temperature was 208 degrees Fahrenheit at 3,933'.	
21:30	22:30	1.00	8,545	4-99	Rigged down CRT tool. Rigged up cement head. Broke circulation.	
22:30	0:00	1.50	8,545	3-5-1	Circulated at 16 bbl's per min to cool well bore. Mixed and pumped 4ppb Micro C while circulating.Cleaned and cleared floor while circulating.	

Management Summary

Ran 7", 41#, T-110SS, Tenaris casing from 2,380' to 3,722'.
Installed new spool of fiber-optic cable on unit. Ran fiber-optic cable to rig floor.
Spliced on new fiber-optic cable at 3,722'.
Ran 7", 41#, T-110SS, Tenaris casing from 3,711' to set depth of 8,508'.
Rigged down CRT tool.
Rigged up cement head.
Broke circulation.
Circulated at 16 bbl's per min to cool well bore.
Mixed and pumped 4ppb Micro C while circulating.
Cleaned and cleared floor while circulating.

Comments

Splice on new fiber-optic cable at 3,722'.
Performed continuity test on fiber optics every 15 joints while running casing.
Floats failed at 6,795' while running empty casing.
Performed continuity test on fiber optics at 7,070'.
Test indicated one of the five fiber-optic had failed at 4,000' from surface.
Performed continuity test on fiber optics at 7,812'.
Test indicated all five fiber-optic cables failed from 4,500' to 7,812'.
Static temperature was 240 degrees Fahrenheit at 4,500'.
Performed continuity test on fiber optics at 8,508'.
Test indicated all five fiber-optic cables failed from 3,933' to 8508'.
Static temperature was 208 degrees Fahrenheit at 3,933'.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 28 **Report For 24-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0		8,509				41		

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
24-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	38	2	2	34	1	10	2	0	98	0.01		800	120		2	2	2	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Other - EACH	1	---
perdiem - OTHER	1	---			

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** **Pick Up:** **Slack Off:** **Drag Avg/Max:** /

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 114.75 **Total:** 114.75 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 92.5 / **Tripping:** 197 / ☐ **Wear Bushing Installed**

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: Received all 3.5" drill pipe anlong with handling tools and BHA.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs): **Desander:** 0 **Desilter:** 0 **Degasser:** 0

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		7,170			7,170	

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Running 7" casing. hand and body placement. Cementing.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Cloudy	**Visibility:**	10
Air Temperature:	68 degF	**Bar. Pressure:**	28.97
Wind Speed/Dir:	10 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 29 **Report For 25-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):						**Well Cost ($):**			---
Drilling Days (act./plan):	29/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	29/30	**Days On Location:**			29
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations:
Waited on cement.
Bled back 4 bbl's from casing to cement truck.
Slacked off casing and monitored for 5 mins.
Removed cement head and lines.
Cut Silixa fiber-optic cable.
Raised rotating head extension and made rough cut on 7" casing.

Planned Operations: Finish nippling down 13-5/8 BOPE. Install the 7" 10K wellhead, nipple up and test the 7-1/16" 10K BOP's.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	2:30	2.50	8,545	3-5-1	Circulated at 16 bbl's per min to cool well bore. Mixed and pumped 4ppb Micro C while circulating. Cleaned and cleared floor while circulating.	
2:30	6:00	3.50	8,545	5-12-2	Held safety meeting with all involved personal. Swapped lines to cement truck. Pumped cement as followed. Fill lines, pressure tested lines to 5,500 psi. Pumped 100 bbls of fresh water spacer@ 5 bpm. Pumped 20 bbls of RC Mud cleaner spacer @ 5 bpm. Pumped 10 bbls of fresh water spacer @ 5 bpm. Mixed and pumped 809 bbls of 12.7 ppg RC ThermaLite-HT cement @ 8 bpm. Note: Last 80 bbls of cement has 1.3% of retarder. Dropped top plug and displaced with 273 bbls of fresh water. Bumped plug with 500 psi over circulating pressure at 3385 psi. CIP at 06:16 HRS on 7-25-2021.	
6:00	12:00	6.00	8,545	3-13	Waited on cement while holding between 2800 psi and 3000 psi pressure on inside of casing. Cement fell to 95' below KB.	
12:00	13:00	1.00	8,545	5-12-2	Mixed and pump 6 bbls of neat cement filling annulus from 95' to surface / CIP 13:00	
13:00	0:00	11.00	8,545	3-13	Waited on cement. Monitored cement samples while waiting on cement. Monitored temperature at 3,998' with Silixa fiber-optic cable. Monitored casing pressure with Resources Cementing. Bleeding pressure Note: Temperature at 4,200' monitored with Silixa cable at 197 degrees fahrenheit. at 1100 hrs final temp at 0000 hrs reached 208 degrees fahrenheit.	

Management Summary

Circulated at 16 bbl's per min to cool well bore.
Held safety meeting with all involved personal. Swapped lines to cement truck.
Pumped cement as per pump schedule.
Waited on cement .
Cement fell to 95' below KB.
Mixed and pump 6 bbl's of neat cement while waiting on cement.

Comments

Bumped plug with 3385 psi, (500 psi over displacement pressure). CIP at 06:16 HRS on 7-25-2021.
Had 126 bbl's of good cement to surface.
Held pressure on casing and bled back as necessary for thermal expansion.
Cement fell to 95' below KB.
Topped out with 6 bbls of neat cement. CIP at 13:00 7-25-2021. WOC.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 29 **Report For 25-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD		41	T-110S	

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
25-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	38	2	2	34	1	10	2	0	98	0.01		800	120		2	2	2	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Micro C - 50#SK	100	---
Other - EACH	1	---	perdiem - OTHER	1	---

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: None to report.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs): Desander: 0 Desilter: 0 Degasser: 0

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel						

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews.Pumping Cement. Nippling down BOP. forklift operations.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly cloudy	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	10 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 30 **Report For 26-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	03-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):						**Well Cost ($):**			---
Drilling Days (act./plan):	30/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	30/30	**Days On Location:**			30
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	6 / 72	**Other:**	3 / 36	**Total:**	26 / 312

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations:
Tested casing along with BOPE.
Made up 5-3/4" TCI clean out assembly.
Picked up 4-3/4" drill collars to 900'.
Picked up 3.5" drill pipe from 900' to 1,500' at report time.

Planned Operations:
Trip in the hole with 5-3/4" clean out assembly to top of float collar.
Slip and cut drilling line.
Test annular along with pipe rams.
Drill out shoe track.
Clean out cement to 8,545'.
Perform xLOT.
Pull out of the hole and pick up 5 3/4" Directional Drilling Assembly.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	3:00	3.00	8,545	3-13	Waited on cement. Monitored cement samples while waiting on cement. Monitored temperature at 3,998' with Silixa fiber-optic cable. Monitored casing pressure with Resources Cementing. Bleeding pressure as needed to maintain 2,700 psi on float collar.	
3:00	6:00	3.00	8,545	6-14	Bled back 4 bbl's from casing to cement truck. Slacked off casing and monitored for 5 mins. Removed cement head and lines. Cut Silixa fiber-optic cable. Raised rotating head extension and made rough cut on 7" casing. Laid out rotating head. Raised annular and made rough cut on 7" casing. Laid out annular.	
6:00	12:00	6.00	8,545	6-14	Remove double gate BOP and strip out fiber optic / Remove Drilling spool and strip out fiber optic / Extension spool 11"3000 X 13-5/8" 5000 and 7" cemented together / cut extension spool in half and chip out cement in lower half of spool while protecting the fiber optic.	
12:00	13:00	1.00	8,545	6-14	Rig up power tongs underneath substructure and back out landing joint removing the casing collar with it.	
13:00	14:00	1.00	8,545	6-14	Installed 7" riser nipple on the well head and torqued the well head to 17,070 ft/lbs to the 7" casing.	
14:00	15:00	1.00	8,545	6-14	Removed the riser nipple and install well head side valves with companion flanges	
15:00	21:30	6.50	8,545	6-14	Installed drilling spool w/ 2ea 2" 10K valves and 1- 2" 10K check valve on the kill side with a 2" 1502, and 1ea 4"10K manual valve and a 4" 10K hydraulic valve on the choke side / Installed 7-1/16" 10 K double gate BOP, Installed 7-16" 10K X 7-1/16" 15K crossover spool / installed 7-1/16" 10K annular BOP w/ 7-1/16" 15K lower flange and 7-1/16" 10K upper flange / installing 7-1/16" 10K riser nipple. Installed turn buckles. Function test BOP.	
21:30	23:00	1.50	8,545	3-15	Rigged up pump truck to well head. Attempted to test truck prior to starting test. Unable to get a good test on the pump truck. Pressure leaking at the truck losing approximately 600 psi every 30 mins.	
23:00	0:00	1.00	8,545	3-15	Removed Pason transducer from stand-pipe and installed on 2" 10K valve on well head to monitor casing pressure. Tested casing along with inside choke valve and out side kill check valve to 300 psi. held for 5 mins. good test. All test charted out on Pason.	

Management Summary

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 30 **Report For 26-Jul-21**

Waited on cement.
Bled back 4 bbl's from casing to cement truck.
Slacked off casing and monitored for 5 mins.
Removed cement head and lines.
Cut Silixa fiber-optic cable 30' above rig floor.
Removed BOPE.
Rig up power tongs underneath substructure and back out landing joint.
Installed 7" 10k wellhead and torqued to 17,070 ft/lbs.
Set in and nippled up 7-1/16" 10K BOP's.
Tested casing to 300 psi low.

Comments

Cement at surface after 6 bbl top job.
Spacer spool on BOP had to be cut off due to being cemented up.
Unable to test BOP'S with cement pump truck due to pressure leaking at the truck and losing approximately 600 psi or 12% every 30 mins.
Tested BOP'S with rig pump. Removed Pason transducer from stand-pipe and installed on 2" 10K valve on well head to monitor casing pressure during BOP test. All test were charted out on the Pason and witnessed by GRG supervisor.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD		41	T-110S	

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
26-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	1	1	0	1	11	1	0	99	0.01	0	700	120		1	1	1	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
caustic Soda - 50#SK	2	---	Engineering - EACH	1	---
Other - EACH	1	---	perdiem - OTHER	1	---

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: None to report.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	120	120	120	120
Shaker No 2:	120	120	120	120
Shaker No 3:	120	120	120	120

Equipment Usage (Hrs): Desander: 0 Desilter: 0 Degasser: 0

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		10,187	382		9,805	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
3.5"	317	13.3	S-135	3.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews Nippling down BOP. forklift operations. Pressure testing.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	73 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	6 / SE	**Wind Gusts:**	3

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 31 **Report For 27-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8545	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8543	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	27-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 12.0	**Next BOP Test:**	28-Aug-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	0.0					**Well Cost ($):**			---
Drilling Days (act./plan):	31/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	31/30	**Days On Location:**			31
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	3 / 36	**Other:**	3 / 36	**Total:**	23 / 276

Safety Summary: No incidents or events reported. Conducted BOP Test, Crown Check, Safety Meeting.

Current Operations:
Circulated bottoms up Prior to testing casing.
Tested pipe rams along with annular 300 psi low to 5,200 psi high.
Drilled out cement and shoe track from 8,364" to 8,508'.
Drilled 5-3/4" hole from 8,545' to 8,555'.
Rigged up Resource cementing pump truck.
Troubleshoot pressure gage on truck.
Slipped and cut drilling line.

Planned Operations:
Perform xLOT.
Trip out of the hole from 8,482'.
Make up 5-3/4" directional assembly.
Trip in the hole to 8,555'.
Drill 5-3/4" hole section from 8,555'.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	3:00	3.00	8,545	3-15	Tested casing along with inside choke valve and out side kill check valve to 5,200 psi. held for 30 mins. good test. Tested outside valve on mud-cross along with inside kill valve to 300 psi low, 5200 high. Held low test for 5 mins held high test for 10 mins. Tested 3 outside valves on the choke to 300 psi low, 5200 high. Held low test for 5 mins held high test for 10 mins. Tested 3 middle valves on the choke to 300 psi low 5200 high. Held low test for 5 mins held high test for 10 mins. Tested 3 inside valves on choke to 300 psi low 5200 high. Held low test for 5 mins held high test for 10 mins. All test charted out on Pason.	
3:00	5:30	2.50	8,545	3-34-3	Picked up 4 3/4" drill collar. Make up 5-3/4" TCI bit. Picked up 29 joints of 4-3/4" drill collars. Tripped in the hole to 900'.	
5:30	7:15	1.75	8,545	3-34-1	Picked up 3.5" drill pipe from 900' to 2,003' @07:15 noticed a slip die missing from rented slips.	
7:15	9:00	1.75	8,545	3-97	Open doors on BOP and search for slip die	
9:00	12:00	3.00	8,545	3-6-4	Tripped out of the hole with drill pipe from 2,003' with BOP doors open looking for lost slip die.	
12:00	14:00	2.00	8,545	6-14	Once at top of drill collars close blind ram doors, Rigged up slings to lift BOP while pulling drill collars. Pick stack up 1 foot and chained off to sub substructure and block between wellhead and BOP Release pick up slings	
14:00	15:00	1.00	8,545	3-6-2	Pulled out of the hole with 10 stands of drill collars to bit looking for slip die.	
15:00	16:00	1.00	8,545	6-14	Remove BOP hanging system and Nipple BOP back up / Pull last stand of collars / no markings on bit to indicate slip die had passed / close blind rams and function pipe rams and Annular BOP / nothing fell on top of blind rams.	
16:00	16:30	0.50	8,545	3-6-1	RIH w/ bit and drill collars to 900'.	
16:30	0:00	7.50	8,545	3-6-3	Picked up 3.5" drill pipe and run in the hole to 8,400'.	

Management Summary

Tested casing along with inside choke valve and out side kill check valve to 300 psi low and 5200 psi high.
Held low test for 5 mins - good test.
Held high test for 30 mins - good test.
Picked up 4 3/4" drill collars.
Made up 5-3/4" TCI bit.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 31 **Report For 27-Jul-21**

Picked up 29 joints of 4-3/4" drill collars.
Tripped in the hole to 900'.
Picked up 3 1/2" drill pipe from 900' to 2,003'. Found one 3 1/2" slip insert die missing.
Tripped out of the hole with drill pipe from 2,003' with BOP doors open looking for lost slip die.
Rigged up slings to lift BOP while pulling drill collars.
Picked up stack 1 foot and chained off to sub substructure.
Pulled out of the hole with 10 stands of drill collars to bit looking for slip die with no results.
Remove BOP hanging system and Nippled BOP back up.
Pulled last stand of collars / no markings on bit to indicate slip die had passed.
Closed blind rams and function pipe rams and Annular BOP / no indication of die on top of blind rams.
Ran in hole with bit and drill collars to 900'.
Picked up 3.5" drill pipe and ran in the hole to 8,400'.

Comments

At 07:15 noticed a slip die missing from rented slips. Unable to find it on floor or in cellar.
Pulled out of the hole looking for slip die.
No markings on bit to indicate slip die had dropped down the hole.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD		41	T-110S	

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	Solids %	Oil %	Water %	Sand %	LGS %	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
27-Jul-21 11:00 at Depth 8,540 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	11	1	0	99	0.01	0	700	120		1	1	1	98	105	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Engineering - EACH	1	---	Other - EACH	1	---
perdiem - OTHER	1	---			

Rig Information

Equipment Problems: Rental slips from Weatherford missing die segment.
Location Condition: Good.
Transport: Received 5-3/4" mill, junk basket,5-3/4" magnet.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom
Shaker No 1:	175	175	175	175
Shaker No 2:	175	175	175	175
Shaker No 3:	175	175	175	175

Equipment Usage (Hrs): Desander: 0 Desilter: 0 Degasser: 0

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		9,805			9,805	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
3.5"	317	13.3	S-135	3.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews Nippling down BOP. Picking up BHA. Picking up 3.5" drill pipe.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☑ **BOP Test** ☑ **Crownamatic Check**

	Daily Drilling Report	**Geothermal Resource Group, Inc.**
	Well ID: Forge 78B-32	**Well Name: 78B-32**
	Field: UTAHFORGE	Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 31 **Report For 27-Jul-21**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	75 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	6 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 32 **Report For 28-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	8950	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	8947	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	27-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	405 / 13.5	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	30.0			**LOT (lbs/gal):**	15.00	**Well Cost ($):**			---
Drilling Days (act./plan):	32/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	32/30	**Days On Location:**			32
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	3 / 36	**Other:**	3 / 36	**Total:**	23 / 276

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Drilled from 8,950 to 9,500' at report time.

Planned Operations:
Circulate hole clean.
Trip out of the hole.
Lay out drill collars.
Trip in the hole with 3.5" drill pipe.
Rig up logger and log.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:30	0.50	8,545	03-051	Circulated bottoms up Prior to testing.	
0:30	1:45	1.25	8,545	3-15	Tested pipe rams to 300 psi low, 5200 high. Held low test for 5 mins held high test for 10 mins. Good test. Tested annular to 300 psi low, 5200 high. Held low test for 5 mins held high test for 10 mins. Good test.	
1:45	2:30	0.75	8,545	3-28	Drilled out cement and shoe track from 8,364" to 8,508'. Good cement in shoe. Observed 1' of good cement outside of the shoe. Cleaned out rat hole from 8,508' to 8,545'. Note: Float collar did not take any weight while drilling out. Note: Pumped 2-5 gallon buckets of Poly Vis along with 25 pounds of torkease mixed in 40 bbl's of water.	
2:30	3:30	1.00	8,555	3-99	Drilled 5-3/4" hole from 8,545' to 8,555'.	
3:30	4:00	0.50	8,555	3-5-1	Circulated bottoms up prior to performing XLOT.	
4:00	5:00	1.00	8,555	OTHER	Rigged up Resource cementing pump truck. Troubleshoot pressure gage on truck.	
5:00	6:00	1.00	8,555	CUTDL	Slipped and cut drilling line.	
6:00	8:00	2.00	8,555	3-46	Conducted xLOT with Resource bleed back was 2.5 bbl with both low and high rates	
8:00	11:30	3.50	8,555	3-6-4	Pulled out of the hole and lay down bit.	
11:30	12:00	0.50	8,555	SERV	Serviced Rig.	
12:00	14:00	2.00	8,555	3-34-3	Picked up 5-3/4" directional drilling assembly. NOTE: hole took 25 bbls of fluid to fill while picking up tools avg loss is 12.5 bbl/hour	X
14:00	20:00	6.00	8,555	3-6-3	Tripped in the hole with drill pipe filling pipe at 4,000' 6,000'. Staged in the hole every 50' from 7,000' to 8,150'. Washed down from 8,150' to 8,555' to keep tools under 345 degrees. Max temperature observed was 345 degrees at MWD. Note: Lost connection with MWD once on bottom. Recycled pump 3 times and was able to regained communication with MWD.	
20:00	20:30	0.50	8,615	3-2-3	Drilled 5-3/4" hole from 8,555' to 8,615'.	
20:30	21:30	1.00	8,654	3-2-3	Slide Drilled 5-3/4" from 8,615' to 8,654'.	
21:30	22:00	0.50	8,709	3-2-3	Drilled 5-3/4" hole from 8,654' to 8,709'.	
22:00	22:30	0.50	8,742	3-2-3	Slide Drilled 5-3/4" from 8,709' to 8,742'.	
22:30	0:00	1.50	8,950	3-2-3	Drilled 5-3/4" hole from 8,742' to 8,950'.	

Management Summary

Circulated bottoms up prior to testing.
Tested pipe rams to 300 psi low, 5200 high. Held low test for 5 mins held high test for 10 mins. Both test good.
Tested annular to 300 psi low, 5200 high. Held low test for 5 mins held high test for 10 mins. Both test good.
Drilled out cement and shoe track from 8,364" to 8,508'.
Drilled 5-3/4" hole from 8,545' to 8,555'.
Circulated bottoms up prior to performing xLOT.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 32 **Report For 28-Jul-21**

Rigged up Resource cementing pump truck.
Troubleshoot pressure gage on truck.
Slipped and cut drilling line.
Conducted xLOT with Resource cementing pump truck.
Pulled out of the hole and lay down bit.
Serviced Rig.
Picked up 5-3/4" directional drilling assembly.
Tripped in the hole with drill pipe filling pipe at 4,000' 6,000'.
Staged in the hole every 500' from 7,000' to 8,150'.
Washed down from 8,150' to 8,555' to keep tools under 345 degrees.
Drilled 5-3/4" hole from 8,555' to 8,950'.

Comments

Float collar did not take any weight while drilling out.
Pumped 2-5 gallon buckets of Poly Vis along with 25 pounds of Torkease mixed in 40 bbl's of water while drilling 10' rat hole.
Lost connection with MWD once on bottom. Recycled pump 3 times and was able to regained communication with MWD.
Performed WOB step test at 8,555'
Slide drilled 5-3/4" from 8,615' to 8,654'.
Slide drilled 5-3/4" from 8,709' to 8,742'.
Performed RPM step test at 8,835'.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD	10.625	41	T-110S	15.00

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
28-Jul-21 21:00 at Depth 8,626 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	11	1	0	99	0.01	0	700	120		1	1	1	82	100	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
AlUMINUM sTEARATE - 50#SK	2	---	caustic Soda - 50#SK	1	---
Engineering - EACH	1	---	MicA - 50#SK	5	---
Other - EACH	1	---	perdiem - OTHER	1	---
polyvis - 5GAL	2	---	TORKease concentrate - 5GAL	1	---
Trucking - EACH	1	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
16	1	BAKER	STX	5.750	8545	10	1	10.0	18.0	16	45	4	8	300	1360	129	124	22	166
Jets: 18 18 18					**Out:** 8555		**Grade:**	**Cutter:**	1 / 1	**Dull:**	WT / NO	**Wear:** S	**Brgs:** 0	**Gge:** 0		**Pull:** BHA			
17	1	REED	TKC63	5.750	8555	395	3.5	112.9	278.0	30	30	5	8	300	2760				
Jets:					**Out:**		**Grade:**	**Cutter:**	/	**Dull:**	/	**Wear:**	**Brgs:**	**Gge:**		**Pull:**			

BHA - No. 22 - BIT, MMTR, 2 MONEL, OTHER, MONEL, 30 DC = 1020.17

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
8,555	8,950	200.0	268.0	30	30	30	50	5	6	280	300	2,760

Annular Velocity: **Drill Collars:** 681.0 **Drill Pipe:** 321.0

Comments: Slide Drilled 5-3/4" from 8,615' to 8,654'.
Slide Drilled 5-3/4" from 8,709' to 8,742'.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 32 **Report For 28-Jul-21**

Miscellaneous Drilling Parameters

Hook Loads (lbs):	**Off Bottom Rotate:**	178	**Pick Up:**	185	**Slack Off:**	170	**Drag Avg/Max:**	3 / 8			
Slow Circulation Data:											
Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi					
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi					
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi					
Hours on BHA:	**Since Inspection:**	4.5	**Total:**	4.5	**Jars:**	0					
Hours on Casing/Liner:	**Rotating:**	4.5 / 0	**Tripping:**	12 /	☐ **Wear Bushing Installed**						

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	8,558.0	2.78	264.5	8,556.1	50.4	-33.0	S 33.0	W 38.1	1.136
MWD	8,653.0	2.31	307.2	8,651.0	52.8	-32.1	S 32.1	W 42.0	2.006
MWD	8,743.0	0.99	21.4	8,741.0	52.7	-30.2	S 30.2	W 43.1	2.501
MWD	8,843.0	0.92	283.7	8,841.0	52.5	-29.2	S 29.2	W 43.6	1.438

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
8,555	8,950	8,552	8,947											

Formation Name:
Lithology: 100% Granodiorite

Rig Information

Equipment Problems: None to report
Location Condition: Good.
Transport: Received new 3.5" slips from Weatherford.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	**Equipment Usage (Hrs):**		
Shaker No 1:	175	175	175	175	**Desander:** 0	**Desilter:** 0	**Degasser:** 0
Shaker No 2:	175	175	175	175	**Centrifuge 1:** 12 (Solids Removal)		**Centrifuge 2:** 12 (Solids Removal)
Shaker No 3:	175	175	175	175			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		9,123			9,123	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
3.5"	317	13.3	S-135	3.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Making up BHA. Tripping in the hole.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**
Accident Description: None to report.
☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	71 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	12 / SE	**Wind Gusts:**	4

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 33 **Report For 29-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	9500	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	9497	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	27-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	550 / 19.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):	28.95			**LOT (lbs/gal):**	15.00	**Well Cost ($):**			---
Drilling Days (act./plan):	33/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	33/30	**Days On Location:**			33
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	3 / 36	**Other:**	3 / 36	**Total:**	23 / 276

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Rigged up and ran Triple-Combo. Logged up from 9532' to 8530' wire line depth. Max BHT was 416 F. POH with logging tools and rigged down logging equipment.
Tripped in the hole with 5-3/4" slick assembly to 5,000' at report time.

Planned Operations: Trip in the hole to 6,000'.
Lay out 3.5" drill pipe to BHA.
Trip in the hole with remaining drill pipe and lay out same.
Lay out BHA.
Nipple down 7-1/16" 10K BOP's.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	0:30	0.50	8,995	3-2-3	Drilled 5-3/4" hole from 8,950' to 8,995'.	
0:30	1:00	0.50	9,031	3-2-3	Slide Drilled 5-3/4" from 8,995' to 9,031'.	
1:00	2:00	1.00	9,184	3-2-3	Drilled 5-3/4" hole from 9,031' to 9,184'.	
2:00	3:00	1.00	9,225	3-2-3	Slide Drilled 5-3/4" from 9,184' to 9,225'.	
3:00	4:00	1.00	9,225	3-2-3	Drilled 5-3/4" hole from 9,225' to 9,373'.	
4:00	5:00	1.00	9,225	3-2-3	Slide Drilled 5-3/4" from 9,373' to 9,406'.	
5:00	6:00	1.00	9,225	3-2-3	Drilled 5-3/4" hole from 9,406' to 9,500'.	
6:00	7:00	1.00	9,225	3-5-1	Circulated hole clean at TD.	
7:00	12:00	5.00	9,225	3-6-4	Tripped out of the hole from 9,500' to BHA. Laid down directional tools.	
12:00	13:00	1.00	9,225	3-34-4	Lay down all directional tools	
13:00	13:30	0.50	9,225	SERV	Serviced Rig.	
13:30	14:00	0.50	9,225	3-6-1	Tripped in the hole w/ same bit, BS w/ a float and all DCS	
14:00	17:30	3.50	9,225	3-6-3	RIH filling pipe @ 4,000' 8,000' and bottom	
17:30	20:00	2.50	9,225	3-5-1	Circulated to cool well bore while waiting on loggers.	
20:00	0:00	4.00	9,225	3-6-4	Tripped out of the hole from 9,500' to surface with no issues.	

Management Summary

Drilled 5-3/4" hole from 8,950' to 9,500'.
Circulated hole clean at TD.
Tripped out of the hole from 9,500' to BHA.
Laid down directional tools.
Serviced Rig.
Tripped in the hole with 5-3/4" PDC bit to 9,500'.
Circulated to cool well bore while waiting on loggers.
Tripped out of the hole from 9,500' to surface.

Comments

Slide Drilled 5-3/4" from 8,995' to 9,031'.
Slide Drilled 5-3/4" from 9,184' to 9,225'.
Slide Drilled 5-3/4" from 9,373' to 9,406'.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 33 **Report For 29-Jul-21**

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD	10.625	41	T-110S	15.00

Mud Information

Dens.	Vis	PV	YP	Filt.	Cake	pH/ES	% Solids	% Oil	% Water	% Sand	% LGS	Cl	Ca	CaCl	Gels 10s	Gels 10m	Gels 30m	Temp In	Temp Out	Mud Loss
29-Jul-21 06:15 at Depth 9,500 ft Mud Pits, Type: Low Solids Non-Dispersed																				
8.30	26	0	1	0	1	10	2	0	98	0.01	0	700	120		1	1	1	84	97	

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	80	---	Bicarb - 50#SK	9	---
caustic Soda - 50#SK	2	---	Engineering - EACH	1	---
Other - EACH	1	---	pallets - OTHER	2	---
perdiem - OTHER	1	---	polyvis - 5GAL	3	---
TORKease concentrate - 5GAL	2	---			

Bit/BHA/Workstring Information

No	Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Pump Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
17	1	REED	TKC63	5.750	8555	945	9.5	99.5	230.0	30	30	5	8	300	2760				

Jets: **Out:** **Grade:** **Cutter:** / **Dull:** / **Wear:** **Brgs:** **Gge:** **Pull:**

BHA - No. 22 - BIT, MMTR, 2 MONEL, OTHER, MONEL, 30 DC = 1020.17

Drilling Parameters

Depth (ft) From	Depth (ft) To	ROP (ft/hr) Avg	ROP (ft/hr) Max	WOB (lbs) Avg	WOB (lbs) Max	RPM Avg	RPM Max	Torque (ft lbs) Avg	Torque (ft lbs) Max	Flow (gals/min) Avg	Flow (gals/min) Max	Pressure (psi)
8,950	9,500	120.0	230.0	30	32	30	50	5	6	290	300	2,760

Annular Velocity: **Drill Collars:** 612.0 **Drill Pipe:** 327.0

Comments: Slide Drilled 5-3/4" from 8,995' to 9,031'.
Slide Drilled 5-3/4" from 9,184' to 9,225'.
Slide Drilled 5-3/4" from 9,373' to 9,406'.

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** 186 **Pick Up:** 222 **Slack Off:** 175 **Drag Avg/Max:** 5 / 10

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 10.5 **Total:** 10.5 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 10.5 / 6 **Tripping:** 24 / ☐ **Wear Bushing Installed**

Mud Log Information

Depth (ft) From	Depth (ft) To	TVD (ft) From	TVD (ft) To	Gas (Units) Avg	Gas (Units) Max	Gas at Depth	Gas Connect.	Gas Trip	Drilling Exp.	Pore Press	Mud Dens.	Shale Dens.	ROP Shale	ROP Sand
8,950	9,500	8,947	9,497											

Formation Name:

Lithology: 100% Granodiorite

Rig Information

Equipment Problems: None to report.

Location Condition: Good.

Transport: None to report.

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 33 **Report For 29-Jul-21**

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	175	175	175	175	Desander: 0	Desilter: 0	Degasser: 0
Shaker No 2:	175	175	175	175	Centrifuge 1: 12 (Solids Removal)		Centrifuge 2: 12 (Solids Removal)
Shaker No 3:	175	175	175	175			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		8,323			8,323	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
3.5"	317	13.3	S-135	3.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Making up BHA. Tripping in the hole.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	70 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	5 / SE	**Wind Gusts:**	2

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.

Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 34 **Report For 30-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**		---
Measured Depth (ft):	9500	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**	**Actual ($)**
Vertical Depth (ft):	9497	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---	---
Proposed TD (ft):	9500	**Last BOP Test:**	27-Jul-21	**Job Reference RKB (ft):**		---	---	---
Hole Made (ft) / Hrs:	0 / 3.75	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---	---
Average ROP (ft/hr):	0.0			**LOT (lbs/gal):**	15.00	**Well Cost ($):**		---
Drilling Days (act./plan):	34/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	34/30	**Days On Location:**		34
Pers/Hrs: **Operator:**	3 / 36	**Contractor:**	14 / 168	**Service:**	3 / 36	**Other:**	2 / 24	**Total:** 22 / 264

Safety Summary: No incidents or events reported. Conducted Crown Check, Safety Meeting.

Current Operations: Nipple down 7-1/16" 10K BOP's. Install master valve with 3" 10k spool on top.

Planned Operations: Clean pits and release rig.

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	4:00	4.00	9,225	LOG	Rigged up and run Triple-Combo / Max BHT was 416 F / Logging upwards Note: worked past ledge at 8,555'.	
4:00	6:00	2.00	9,225	3-6-3	Tripped in the hole with 5-3/4" slick assembly to 5,000'.	
6:00	10:30	4.50	9,225	3-34-2	Laid down 3.5" drill pipe to top of drill collars.	
10:30	12:15	1.75	9,225	3-6-3	Tripped in the hole with 3-1/2" drill pipe and slick assembly to 5,500'.	
12:15	15:30	3.25	9,225	3-34-2	Laid down 3-1/2" drill pipe to the top of the drill collars.	
15:30	18:00	2.50	9,225	3-34-4	Laid down 4-3/4" drill collars.	
18:00	19:00	1.00	9,225	SAFE	Shut down and test night tour for Covid-19 due to 3 guys on daylights testing positive. Night driller tested positive for Covid-19. Resume operations.	
19:00	0:00	5.00	9,225	6-99	Nippled down 7-1/16" 10K BOP's.	

Management Summary

Rigged up and run Triple-Combo / Max BHT was 416 F.
Tripped in the hole with 5-3/4" slick assembly to 5,000'.
Laid down 3.5" drill pipe to top of drill collars.
Tripped in the hole with 3-1/2" drill pipe and slick assembly to 5,500'.
Laid down 3-1/2" drill pipe to the top of the drill collars.
Laid down 4-3/4" drill collars.
Shut down and tested night tour for Covid-19 due to 3 guys on daylights testing positive. Night driller tested positive for Covid-19. Resume operations shorthanded.
Nipple down 7-1/16" 10K BOP's.

Comments

Shorthanded due to 4 of Frontier's employees testing positive for Covid-19: 3 on daylights and one on nights along with mud engineer for a total of 5 people.
GRG site supervisor notified service contractors that had been on location over the past week of the Covid-19 positive test on the rig site.
Weatherized top section of casing by poring 8 gals of vegetable oil down 7" casing.
7" well head was noticed to be down 8" and setting on top of the 11.75" well head.

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD	10.625	41	T-110S	15.00

Mud Consumables

Item Description	Qty.	Cost	Item Description	Qty.	Cost
Barite - 100#SK	50	---	Engineering - EACH	1	---
Other - EACH	1	---	pallets - OTHER	2	---
perdiem - OTHER	1	---	Trucking - EACH	1	---

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 34 **Report For 30-Jul-21**

Bit/BHA/Workstring Information

No Run	Make	Model	Diam	Depth In	This Run Dist	This Run Hrs	R.O.P. Avg	R.O.P. Max	WOB	RPM	Torque	Mud Wt	Mud Flow	Pump Press	J. Vel	P. Drp	HHP	JIF
17 1	REED	TKC63	5.750	8555	945	9.5	130.0		30	30		8	300		291	627	110	374

Jets: 12 12 12 **Out:** 9500 **Grade:** **Cutter:** 3 / 3 **Dull:** WT / CT **Wear:** S **Brgs:** X **Gge:** 0 **Pull:** TD

BHA - No. 22 - BIT, MMTR, 2 MONEL, OTHER, MONEL, 30 DC = 1020.17

Miscellaneous Drilling Parameters

Hook Loads (lbs): **Off Bottom Rotate:** **Pick Up:** **Slack Off:** **Drag Avg/Max:** /

Slow Circulation Data:

Pump 1:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 2:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi
Pump 3:	30 spm	110 psi	40 spm	215 psi	50 spm	311 psi

Hours on BHA: **Since Inspection:** 10.5 **Total:** 10.5 **Jars:** 0

Hours on Casing/Liner: **Rotating:** 10.5 / 6 **Tripping:** 40 / ☐ Wear Bushing Installed

Survey Information

Survey Type	Meas. Depth	Inc.	Azimuth	TVD	Closure	Vertical Section	Coordinates N-S	Coordinates E-W	D.L.S.
MWD	8,938.0	2.76	282.7	8,935.9	54.6	-28.6	S 28.6	W 46.6	1.937
MWD	9,033.0	1.05	250.4	9,030.9	57.1	-28.3	S 28.3	W 49.6	2.056
MWD	9,127.0	2.40	258.9	9,124.8	59.9	-29.0	S 29.0	W 52.4	1.457
MWD	9,222.0	1.31	284.5	9,219.8	62.6	-29.1	S 29.1	W 55.4	1.416
MWD	9,317.0	3.73	270.0	9,314.7	66.1	-28.9	S 28.9	W 59.5	2.614
MWD	9,412.0	3.96	251.0	9,409.5	72.2	-29.9	S 29.9	W 65.7	1.360
MWD	9,444.0	3.91	235.5	9,441.4	74.4	-30.9	S 30.9	W 67.6	3.322
MWD	9,500.0	3.91	235.5	9,497.3	78.1	-33.1	S 33.1	W 70.8	0.000

Rig Information

Equipment Problems: None to report.
Location Condition: Good.
Transport: None to report.

Solids Control Information

Screen Sizes:	Top	Middle 1	Middle 2	Bottom	Equipment Usage (Hrs):		
Shaker No 1:	175	175	175	175	**Desander:** 0	**Desilter:** 0	**Degasser:** 0
Shaker No 2:	175	175	175	175			
Shaker No 3:	175	175	175	175			

Bulk Inventory

Item Type	Units	Beginning	Used	Received	On Hand	Net
Rig Fuel		7,532	1,200		6,332	

Drill Pipe Inventory

DP Size	Joints	Weight	Grade	Thread	DP Size	Joints	Weight	Grade	Thread
3.5"	317	13.3	S-135	3.5IF					

Safety Information

Meetings/Drills	Time	Description
Safety	60	Two 30 min Pre tour safety meetings with both crews. Laying out drill pipe along with drill collars. Nippling down BOP's.

First Aid Treatments: 0 **Medical Treatments:** 0 **Lost Time Incidents:** 0 **Days Since LTI:**

Accident Description: None to report.

☐ **BOP Test** ☑ **Crownamatic Check**

Weather Information

Sky Condition:	Partly Cloudy	**Visibility:**	10
Air Temperature:	76 degF	**Bar. Pressure:**	29.89
Wind Speed/Dir:	5 / SE	**Wind Gusts:**	1

Daily Drilling Report

Well ID: Forge 78B-32
Field: UTAHFORGE

Geothermal Resource Group, Inc.
Well Name: 78B-32
Sect: 32 Town: 26 Rng: 9W County: Beaver State: UT

Report No: 35 **Report For 31-Jul-21**

Operator:	University of Utah	**Rig:**	Frontier Rig 16	**Spud Date:**	28-Jun-21	**Daily Cost / Mud ($):**			---
Measured Depth (ft):	9500	**Last Casing:**	7.000 at 8,509	**Wellbore:**	Original Wellbore	**AFE No.**	**AFE ($)**		**Actual ($)**
Vertical Depth (ft):	9497	**Next Casing:**		**RKB Elevation (ft):**	30.40	---	---		---
Proposed TD (ft):	9500	**Last BOP Test:**	27-Jul-21	**Job Reference RKB (ft):**		---	---		---
Hole Made (ft) / Hrs:	0 / 0.0	**Next BOP Test:**	24-Jul-21	**Working Interest:**		**Totals:**	---		---
Average ROP (ft/hr):				**LOT (lbs/gal):**	15.00	**Well Cost ($):**			---
Drilling Days (act./plan):	35/21	**Flat Days (act./plan):**	0/9	**Total Days (act./plan):**	35/30	**Days On Location:**			35
Pers/Hrs: **Operator:**	0 / 0	**Contractor:**	0 / 0	**Service:**	0 / 0	**Other:**	0 / 0	**Total:**	0 / 0

Safety Summary: No incidents or events reported.

Current Operations: Rigging down. FINAL REPORT.

Planned Operations: Move rig to yard

Toolpusher: Steve Caldwell , Justin Bristol

Wellsite Supervisors: Virgil Welch , Brian Gresham **Tel No.:** 7132807438

Operations Summary

From	To	Elapsed	End MD(ft	Code	Operations Description	Non-Prod
0:00	6:00	6.00	9,225	6-99	Continued nippling down 7-1/16" 10K BOP's. Installed master valve with 3" 10k spool on top. Note: Weatherized top section of casing by poring 8 gals of vegetable oil down 7" casing.	
6:00	0:00	18.00	9,225	OTHER	Load out 6 loads of rental equipment 3.5" pipe, loaded out 2 loads of cooling towers to drill cool, loaded out mud logging shack, loaded out centrifuge tank, clean cellar and pits with price pumping, Rig released from Day rate @ midnight on 7/31/2012	

Management Summary

Rig released on 7/31/2021 at midnight

Comments

In the last 2 days we have had 6 negative COVID test. Early afternoon on 8/1/2021 Frontier decided to stop the rig move and send everyone home for 2 weeks and quarantine

Casing/Tubular Information

Type	Size (ins)	Top MD (ft)	Top TVD (ft)	Bottom MD (ft)	Bottom TVD (ft)	Hole Section	OH Diam. (ins)	Nom. Wgt. (lbs)	Nominal Grade	LOT (lbs/gal)
FULL	16.000	0		416		SURF	22.000	65	K-55	0.61
FULL	11.750	0		2,990		INT1	14.750	54	J-55	11.70
FULL	7.000	0	0	8,509	8,507	PROD	10.625	41	T-110S	15.00

Bit/BHA/Workstring Information

BHA - No. 22 - BIT, MMTR, 2 MONEL, OTHER, MONEL, 30 DC = 1020.17

Rig Information

Equipment Problems:

Location Condition:

Transport:

Safety Information

First Aid Treatments:	Medical Treatments:	Lost Time Incidents:	Days Since LTI:

☐ **BOP Test** ☐ **Crownamatic Check**

This page left blank

DISTRIBUTION

Email—Internal

Name	Org.	Sandia Email Address
Erik K. Webb	08910	ekwebb@sandia.gov
Doug A. Blankenship	08930	dablank@sandia.gov
Giorgia Bettin	08916	gbettin@sandia.gov
David W. Raymond	08916	dwraymo@sandia.gov
Jiann Su	08916	jsu@sandia.gov
Melanie Brianna Schneider	08916	mbschne@sandia.gov
Steve Buerger	06530	sbuerge@sandia.gov
Technical Library	01977	sanddocs@sandia.gov

Email—External [redacted]

Name	Company Email Address	Company Name
Cullen Henderson	Cullen.Henderson@ee.doe.gov	DOE/EERE/GTO
Lauren W. Boyd	Lauren.Boyd@ee.doe.gov	DOE/EERE/GTO
Alexis McKittrick	Alexis.McKittrick@ee.doe.gov	DOE/EERE/GTO
Angel Nieto	angel.nieto@ee.doe.gov	DOE/EERE/GTO
Kevin Jones	kevin.jones1@ee.doe.gov	DOE/EERE/GTO
Joseph Moore	jmoore@egi.utah.edu	Energy & Geoscience Institute
John McLennan	jmclennan@egi.utah.edu	EGI/University of Utah
Fred Dupriest	fred.dupriest@tamu.edu	Texas A&M University
Samuel F. Noynaert	noynaert@tamu.edu	Texas A&M University
Tom Roberts	Tom.Roberts@nov.com	NOV
Aaron Schen	Aaron.Schen@nov.com	NOV
Matt Stevenson	Matt.Stevenson@nov.com	NOV
Derek Nelson	DNelson4@slb.com	Smith International
Jordan Self	jself@ulterra.com	Ulterra
Geir Hareland	geir.hareland@okstate.edu	OSU
Mohammed Al Dushaishi	m.aldushaishi@okstate.edu	OSU
Andrew Pauli	Andrew.Pauli@bakerhughes.com	Baker Hughes

Hardcopy—Internal

Number of Copies	Name	Org.	Mailstop
2	David W. Raymond	08916	1033

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.