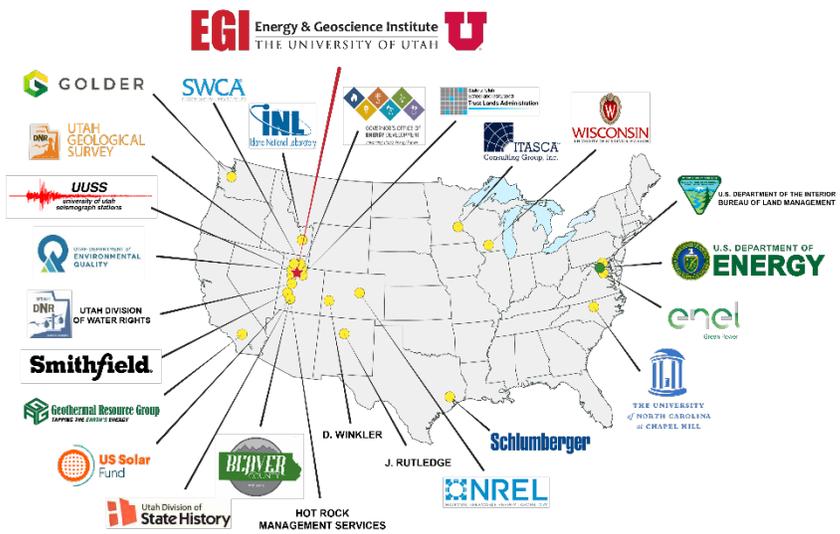


End of Well Report

Utah Forge Seismic Monitoring Well 78B-32 Milford, Utah



Prepared by:
Geothermal Resource Group, Inc.
for
University of Utah (UofU)



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1. SUMMARY

Department of Energy FORGE initiative Phase 3B Well 78B-32 was vertically drilled to a depth of 9,500 ft. to be used as a closed monitoring well. Well 78B-32 encountered the top of the granite at about 2,700 ft. Improved PDC technology and bit design, better understanding and use of MSE in real time and ongoing limiter redesign were the major factors in the tremendous increase in ROP. This well took less than 45% of the on-bottom drilling time, required in the previous two wells, to reach 9,000 ft. The ROP was effectively doubled when compared to the two previous wells.

The well was cased with 7 in. casing to a depth of 8,508 ft. and completed barefoot to 9,500 ft. A suite of geophysical logs, pressure and temperature surveys, and image logs were run to obtain data. 21.5 ft. of 8-3/4 in. core was cut between 6,700 and 6,740 ft. (two coring runs performed) and 32.4 ft. of 8-3/4 in. cored cut at 8,500 and 8,540 ft. (two coring runs performed), respectively. The drilling and testing of 78B-32 well were completed at planned depth.

2. ABBREVIATIONS AND ACRONYMS

The abbreviations and acronyms in Table 1 are used throughout the document, many of them are commonly used in the drilling industry and may appear without explanation in the text. The reader is urged to refer to this table to become familiar with the terms as they are employed within the report. Table 2 contains the units of measure that were used during drilling and the abbreviations or symbols may occur through this report.

Important Note: All depths in this program are measured depths from the rotary Kelly bushing (RKB) level of 30.40 ft. above ground level, unless stated otherwise

Table 1: Abbreviations and Acronyms

| Abbreviation or Acronyms | Description |
|--------------------------|-------------------------------|
| ACP | annulus casing packer |
| AD | Alternative (special) drift |
| AFE | authorization for expenditure |
| API | American Petroleum Institute |
| ASL | above sea level |
| BGL | below ground level |
| BHA | bottom-hole assembly |



| Abbreviation or Acronyms | Description |
|--------------------------|---------------------------------------------------|
| BHST | bottom hole static temperature |
| BOP | blowout preventer |
| BOPE | blowout prevention equipment |
| BTC | buttress threaded and coupled |
| CO ₂ | carbon dioxide |
| DC | drill collar |
| DP | drill pipe |
| DSV | drilling supervisor |
| EOWR | end-of-well report |
| EMW | equivalent mud weight |
| FC | float collar |
| FG | fracture gradient |
| FIT | formation integrity test |
| FOSV | full opening safety valve |
| FS | float shoe |
| GL | ground level |
| GRG | Geothermal Resource Group, Inc. |
| H ₂ S | Hydrogen sulfide |
| HSE | health, safety, and environmental |
| HWDP | heavy weight drill pipe |
| IADC | International Association of Drilling Contractors |
| ID | inner diameter |
| JSA | job safety analysis |
| jt | Joint (casing, drill pipe) |
| Ksi | Kilopounds per Square Inch |
| KPI | key performance indicators |
| LCM | lost circulation material |



| Abbreviation or Acronyms | Description |
|--------------------------|-----------------------------------------------------|
| LGS | low gravity solids |
| LOT | leak off test |
| LSR | Life-saving rules |
| LSND | low solids non-dispersed (drilling mud) |
| M/U | make up |
| MD | measured depth |
| MI/RU | move in and rig up |
| MSDS | material safety data sheet |
| MW | mud weight |
| N/U | nipple up |
| N/D | nipple down |
| NMDC | non-magnetic drill collar |
| NPT | national pipe thread |
| OD | outer diameter |
| P/U | pick up |
| PDC | polycrystalline diamond compact (bit) |
| PLC | partial loss of circulation |
| POH | pull out of hole |
| PoH | probability of hazard occurrence |
| PPB | pounds per barrel |
| PPF | pounds per foot |
| PPG | pounds per gallon |
| P/T or PT | pressure and temperature |
| PTS | pressure, temperature, and spinner logging / survey |
| PVT | pit volume totalizer |
| RD/MO | rig down and move off |
| ROP | Rate of Penetration |



| Abbreviation or Acronyms | Description |
|--------------------------|-----------------------------------------------------|
| RMG | rig manager |
| sFIT | step-rate formation integrity test |
| TD | Total Depth or Termination Depth of hole or section |
| UofU | University of Utah |
| xLOT | extended leak off test |

Table 2: Table of units and their symbols used during drilling of 78B-32.

| Unit Category | Description | Symbol |
|-----------------|----------------------------------------------|-----------|
| Cost | Currency – daily cost and AFE amounts | \$ |
| Size/Diameter-1 | Small diameter – bit nozzle diameter | 1/32 in |
| Size/Diameter-2 | Larger diameter – bit diameter, pipe OD | in or (") |
| Dog Leg | Dog leg severity (DLS) | °/100 |
| Drilling Rate | Rate of penetration -- feet per hour | fph |
| FlowRate-1 | Moderate flow rate – pump flow | gpm |
| FlowRate-2 | Large flow rates – gas flow rate | scfm |
| FlowRate-3 | Large flow rate - cement, mud/water loss | bpm |
| Fluid Density | Fluid density – mud weight/density | ppg |
| Gas | Gas concentrations – trip and connection gas | units |
| Length-1 | Moderate length – depth | ft or (') |
| Length-2 | Long lengths – visibility | mile |
| Pressure | Pressure – pump pressure | psi |
| Resistivity | Resistivity – geophysical survey | ohm.m |
| Temperature | Temperature – mud temperature | °F |
| Torque | Torque | ft-lb |
| Viscosity-1 | Viscosity – funnel viscosity | sec /qt |
| Viscosity-2 | Viscosity – plastic viscosity | cp |





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| Unit Category | Description | Symbol |
|-------------------|----------------------------------------|--------------|
| Volume-1 | Small to moderate volume | gal |
| Volume-2 | Large volume – mud/water/cement volume | bbl |
| Weight | Weight – WOB, hook load | lb |
| Weight per Length | Weight per unit of length - tubular | ppf |
| Yield Point | Yield point | lb /100 sqft |



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3. INTRODUCTION

Well 78B-32, drilled vertically and completed to a depth of 9,500 ft in a location that is advantageous for monitoring in relation to the final determined bottom hole location of the deep scientific well 16A-32, drilled in 2020. Well 78B-32 is the 6th well drilled in the Milford area Utah Frontier Observatory for Research in Geothermal Energy (FORGE) Enhanced Geothermal System (EGS) site (Utah FORGE). The project is administered by the U.S. Department of Energy and managed by the University of Utah (UofU).

Specific objectives of 78B-32 were to:

- Complete a closed monitoring well to 9,500 ft., with fiber optic seismic cable to 8,500 ft. cemented behind casing
- Use of Mechanical Specific Energy (MSE) calculation to evaluate PDC bits performance in hard rock

The first objective was partially achieved as the Silixa fiber optic seismic cable was run to 8,508 ft, but it is confirmed via continuity test that cable failed from 3,933 ft. to 8508 ft.

The second objective was successfully completed: better understanding and use of MSE in real time and ongoing limiter redesign workflow were the major factors in the tremendous increase in ROP. This well took less than 45% of the on-bottom drilling time, required in the previous two wells, to reach 9,000 ft.

The health and safety of all personal, and maintaining a clean, non-hazardous work environment (HSE), were the top priority during drilling and testing operations.

The safety and environmental standards of the U of U were implemented, achieving the following goals:

- No LTIs (lost time injuries or incidents)
- No environmental hazards and minimum environmental impact
- No major or catastrophic service quality incident

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

- The COVID-19 guidelines were implemented and followed. No cases were detected while drilling the well
- Daily safety meetings were held prior to each shift, addressing the importance of proper and safety conscious crew behavior
- Operation specific safety meetings with all personnel involved to identify safety risks and relevant precautions prior to specific tasks such as casing running, cementing, and logging
- Clear identification of muster areas at the location and clear lines communication for all personnel
- Safety drills were performed on a periodic basis



All detailed information including reports from service providers, daily drilling reports, BHAs, casing and cementing reports, mud log, geologic reports, drilling fluids reports, and other relevant documentation of operations are included as appendices in attached file.

4. WELL INFORMATION

4.1. Well Location

Well 78B-32 is located at the Utah Frontier Observatory for Research in Geothermal Energy (FORGE). The well site is just west of the Mineral Mountains and is 217 mi. (350 km.) south of Salt Lake City and 10 mi. (16 km) north-northeast of Milford (Figure 1). The Opal Mound Fault separates the convective thermal regime in Roosevelt Hot Springs geothermal system to the east from the conductive thermal regime surrounding Utah FORGE to the west. Figure 2 shows an aerial view of the surface locations for the Utah FORGE wells drilled and planned. Table 3 contains the basic planned well information for well 78B-32. All depth measurements in this report are referred to the rotary Kelly Bushing (RKB), unless otherwise noted.

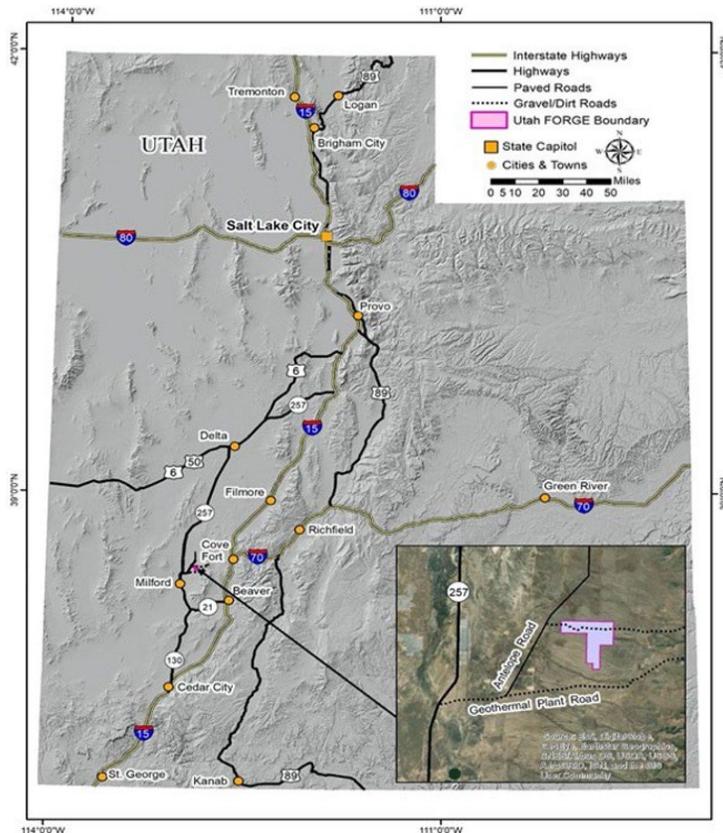


Figure 1: Utah FORGE project site location.



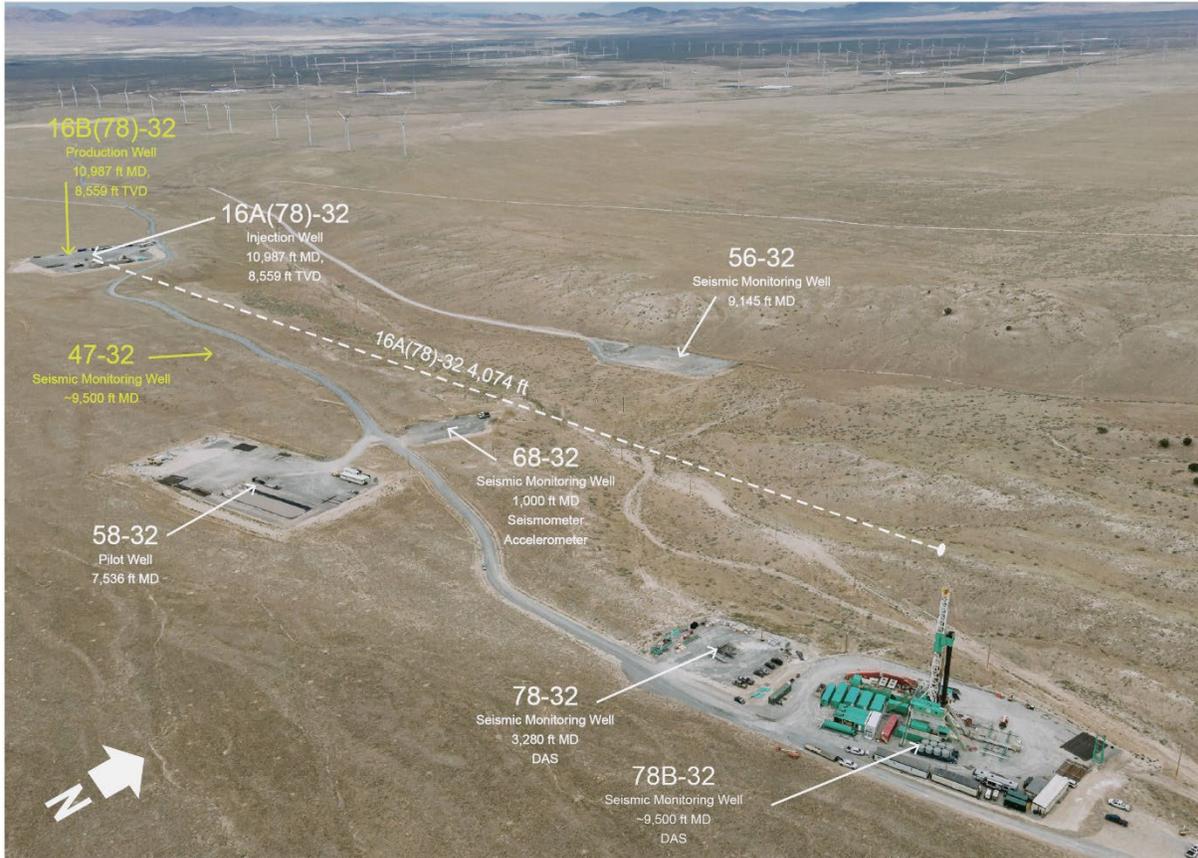


Figure 2: Aerial view of surface locations of Utah FORGE wells. The primary purpose of well 78B-32 is to provide a site where R&D tools and technologies for EGS development can be tested. At other times, the well will be used for seismic monitoring.

Table 3: 78-32 Well Information.

| | |
|---------------------------|---------------------------------|
| Country/Area: | USA / Milford, UT |
| Field: | FORGE UTAH |
| Operator: | University of Utah (UofU) |
| Drilling Project Manager | Geothermal Resource Group (GRG) |
| Drilling Contractor (PM): | Frontier |
| Drilling Rig: | Rig-16 |
| Well Name: | 78B-32 |





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| | |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Well Type: | Mid-size, vertical, deep monitoring and testing well, well of opportunity |
| Well Location: | Utah FORGE, 78-32 Pad Northing. : 4262991 Easting : 335868 Latitude : 38.50017088966857 Longitude : -112.8822210971944 |
| Coordinate Reference System: | NAD83, UTM Zone 12 |
| Rotary Table Height: | 30.40 ft. from ground level |
| Ground Level (GL): | 5,536 ft. ASL |
| Rotary Table Elevation | 5,566.4 ft. ASL |
| Planned Depth: | 9,500 ft. (within 4° inclination from vertical at TD) |
| Actual Depth: | 9,500 ft. (3.91° inclination at 9,500 ft) |

4.2. Planned Wellbore Construction and Well Plan

Well 78B-32 was planned as a mid-size, vertical, EGS monitoring and testing well to a total depth of 9,500 ft. (Figure 3). A 24 in. conductor casing was to be set at 100 ft., a 22 in. surface hole with cemented 16 in. casing was planned to 400 ft., the intermediate 14-3/4 in. hole with cemented 11-3/4 in. casing was planned to 3,300 ft., 10-5/8 in. hole to 8,500 ft. with cemented 7 in. casing then open hole completion to total depth.

Time to drill was estimated based on drilling performance of wells 16A-32 and 56-32. The days versus depth plots were calculated prior to drilling and is shown in Figure 5. The estimated time was 30 days for drilling and testing. Drilling was completed within 33 days to TD of 9,500 ft and rig was released in 35 days (this includes NPT time due to the Silixa cable failure and tools failure such as mud motors).



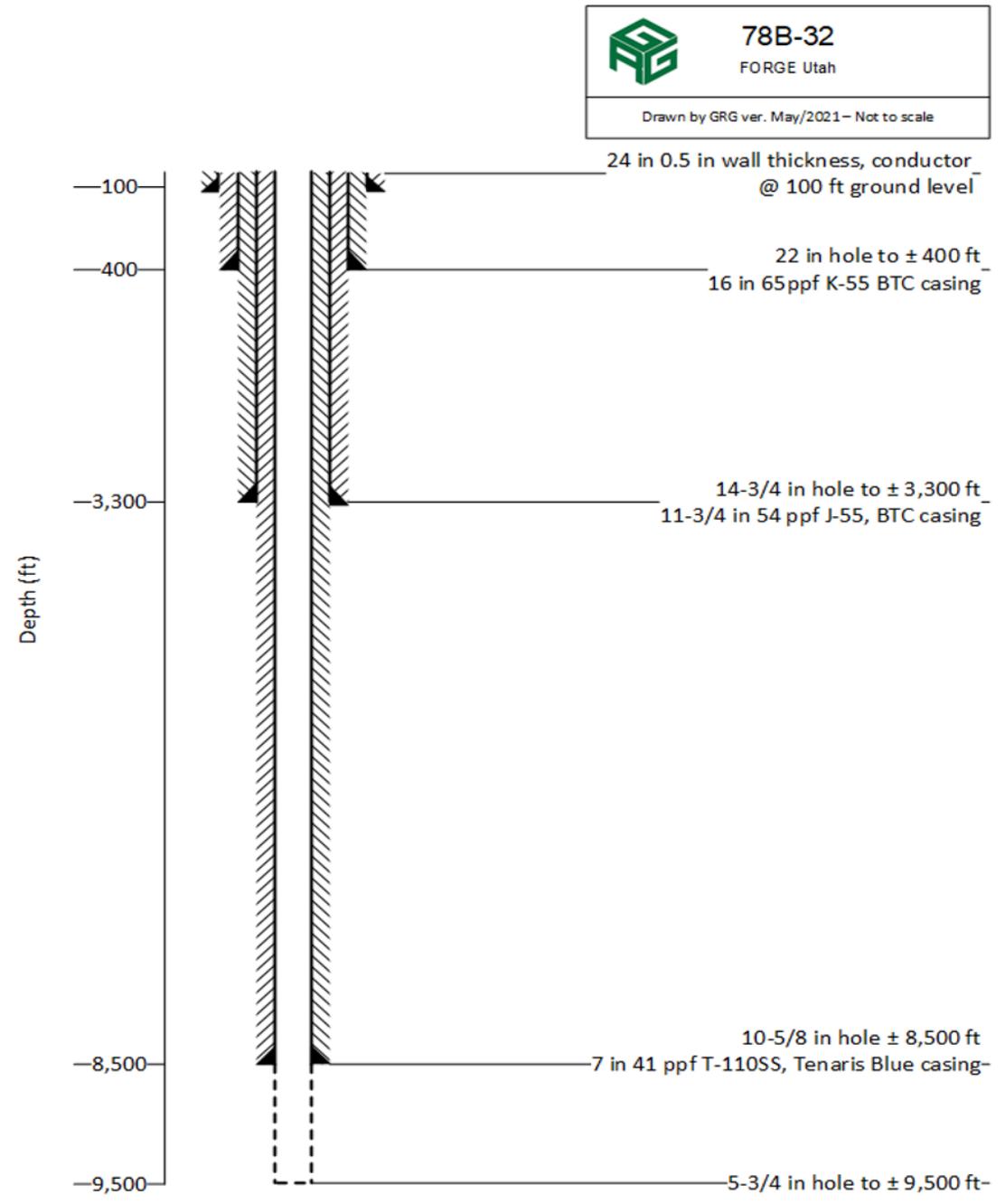


Figure 3: Planned well construction for 78B-32.



4.3. Wellbore As-Constructed

Table 4 shows the casing specifications and depths for actual construction of the 78B-32 wellbore.

Table 4: 78B-32-hole sections, as constructed.

| Section | Hole Size (in.) | Casing Size (in.) | Specifications | Nominal ID / Drift ID/ Coupling OD (in.) | Actual Depth (ft.) | Remarks |
|---------------------|-----------------|-------------------|--------------------------------|------------------------------------------|--------------------|------------------------------------------------------|
| Conductor | n/a | 24 | 0.5 in. WT, Butt Welded | 23.000 n/a n/a | 128.5 | Preset |
| Surface | 22 | 16 | 65 ppf, K-55, BTC | 15.250 15.062 17.000 | 416 | Cemented well control string. Set in 100% alluvium |
| Intermediate | 14-3/4 | 11-3/4 | 54 ppf, K-55, BTC | 10.880 10.720 12.750 | 2,990 | Cemented intermediate string. Set in 100% granite |
| Production | 10-5/8 | 7 | 41 ppf, T-110 SS, Tenaris Blue | 5.820 5.695 7.656 | 8,509 | Cemented production string. Set in 100% granodiorite |



| | |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------|
|  | 78B-32 FORGE Utah AS BUILT |
| | <small>Drawn by GRG ver. August/2021 – Not to scale</small> |

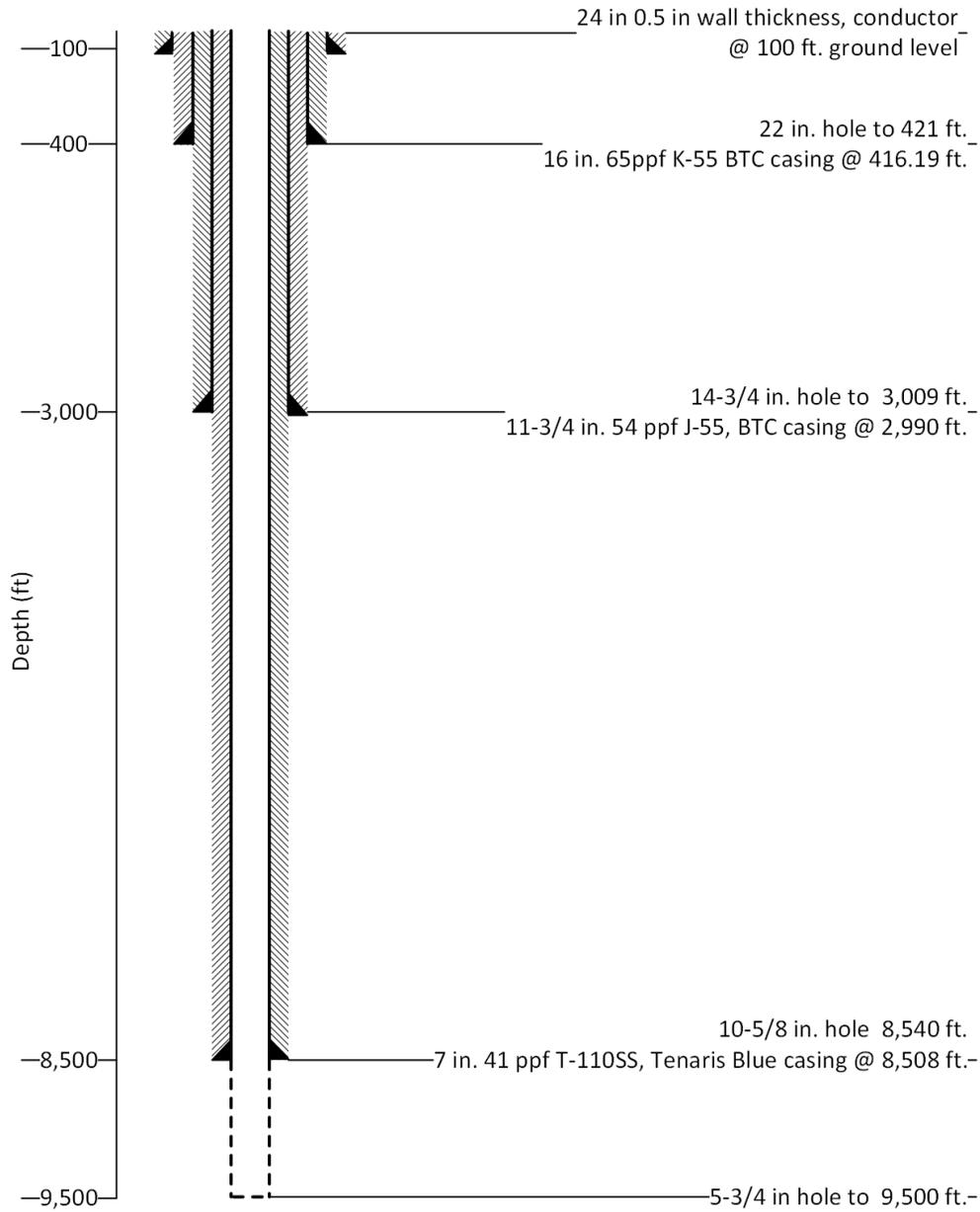


Figure 4: 78-B32 well schematic, as built.





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4.4. Drilling Summary

Prior to rig mobilization, the well pad was constructed including setting of the cellar and drilling of mouse and rat holes. Additionally, the 24 in. conductor pipe was cemented with the casing shoe at 100 ft. ground level on 8 June 2021. Drilling commenced on 28 June 2021. The 22 in. hole was drilled to 421 ft. and 16 in. casing was cemented to 416 ft., on the same day. Drilling of the 14-3/4 in. hole commenced on 30 June and continued to 1 July, when the casing point of 3,009 ft. was reached. The 11-3/4 in. casing was set and cemented at 2,990 ft. measured depth next day. Drilling of the 10-5/8 in. hole commenced on 4 July, and total depth of 8,500 ft. was reached on 16 July. Two 8-3/4 in. coring runs between 6,700 ft. and 6,740 ft. were performed and 21.5 feet of core was recovered, followed by additional two runs between 8,500 ft. and 8,540 ft with 32.4 feet recovered.

On 19 July, sonic scanner and formation borehole imager logs were conducted at 8,520 ft. Later, a Triple Combo was run to section TD on same day and maximum BHT was recorded as 354 F°. On 20 July, Schlumberger UBI log was conducted then the 10-5/8 in. hole section was deepened to 8,545 ft.

The 7 in. casing was to run to 6,753 ft when a loss of communication on the Silixa cable, run on the outside of the casing was observed, so it was decided to pull out the casing. While pulling the 7 in. casing, it was observed that the fiber optic cable has broken from 3,017 ft. to 1,212 ft. After finishing pulling it out, it was determined that there was still 3,686 ft. of usable cable. A decision was made to wait on delivery of additional 5,000 ft new fiber optic cable. While waiting on additional cable, tripped in hole 7 in. casing to 3,722 ft. installing available fiber optic cable and performed frequent continuity tests. Once received additional length on site, spliced on new fiber-optic cable at 3,722 ft. then continued to run in the 7 in. casing run to 8,508 ft., finished on 24 July and final continuity test on fiber-optic cables were conducted at TD. Test results indicated that fiber-optic cable failed from 3,933 ft. to 8,508 ft.

Cementing of the 7 in. casing was completed on 25 July 2021 and cement top fell to 95 ft. from the rig floor. Waited on cement and top fill with neat cement. Once waited on cement and worked on wellhead, a 5-3/4 in. TCI bit was run to 8,364 ft. then cement, floating equipment and 10 ft. of new formation were drilled to 8,555 ft. Performed xLOT on 28 July then pulled out of hole and picked up directional BHA. The 5-3/4 in. hole section was drilled to 9,500 ft. and drilling was completed on 29 July.

The rig was released on 31 July 2021 at 23:59 hours.

4.5. Days vs Depth

Well 78B-32 was drilled to a total depth of 9,500 ft. in less time than anticipated (Figure 5). The expected rate of penetration (ROP) was based on the PDC performance of the two previous wells. Improvements in the use of MSE allowed for this well to be drilled 60% faster than anticipated. Several types of PDC bits were tested within the granitic section, which led to improved performance.



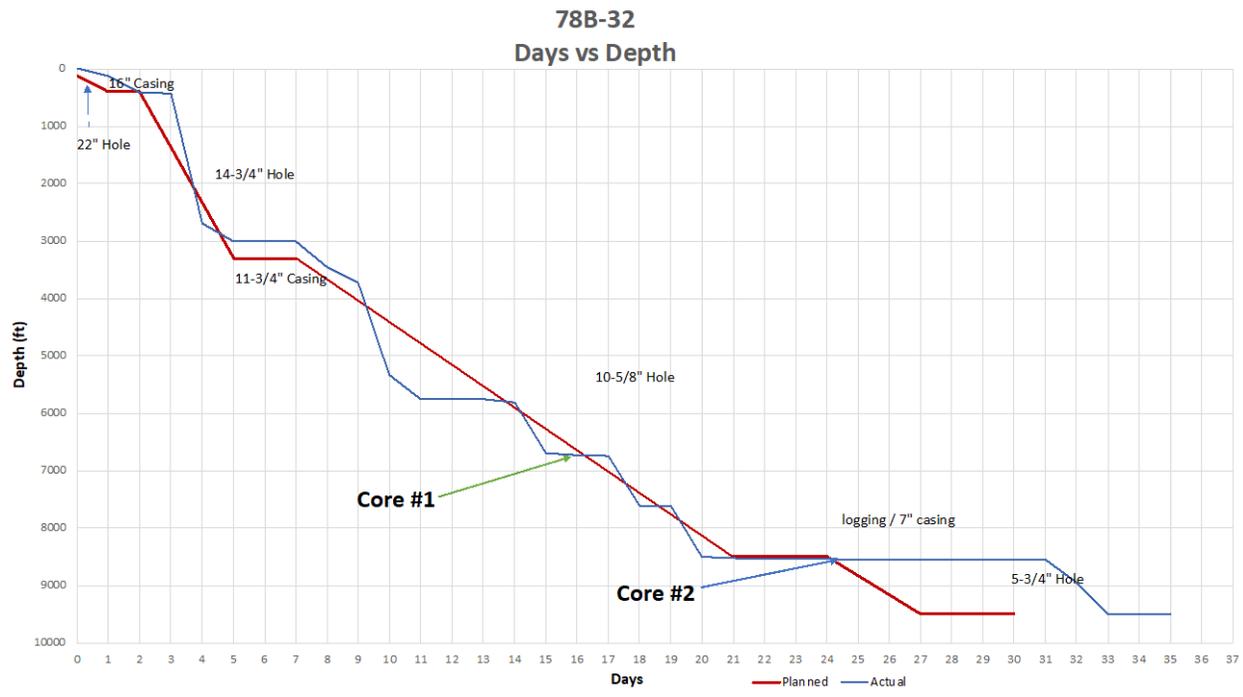


Figure 5: Planned vs actual drilling days plot for well 78B-32. Planned line is red and actual drilling days is blue.

5. DIRECTIONAL PROGRAM

Well 78B-32 was designed as a vertical well. Directional MWD surveys were taken frequently along the wellbore with correctional sliding drilling performed as needed to maintain verticality. Close monitoring was possible, as the well was completely drilled with mud motor and MWD. The survey results from surface to TD are shown in Table 5. The final Total Measured Depth is 9,500 ft. and True Vertical Depth is 9,497.3 ft., as calculated by the directional drilling services provider. The final plot is shown in Figure 6.

Table 5: Survey data for 78B-32.

| Survey Type | Measured Depth | Inc (deg) | Azimuth (deg) | TVD (ft) | Coordinates | | Closure (ft) | Vertical Section (ft) | Dogleg Severity |
|-------------|----------------|-----------|---------------|----------|-------------|----------|--------------|-----------------------|-----------------|
| | | | | | N-S (ft) | E-W (ft) | | | |
| **TieIn | 0,0 | 0,00 | 359.98 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,000 |
| MWD | 241,0 | 0,69 | 358.29 | 241,0 | 1,5 | -0,0 | 1,5 | 1,5 | 0,286 |
| MWD | 337,0 | 1,04 | 359.49 | 337,0 | 2,9 | -0,1 | 2,9 | 2,9 | 0,365 |





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|-----|---------|------|--------|---------|------|-------|------|------|-------|
| MWD | 545,0 | 0,17 | 93.92 | 545,0 | 4,8 | 0,2 | 4,8 | 4,8 | 0,513 |
| MWD | 731,0 | 0,07 | 271.76 | 731,0 | 4,8 | 0,4 | 4,8 | 4,8 | 0,129 |
| MWD | 822,0 | 0,12 | 37.38 | 822,0 | 4,8 | 0,4 | 4,8 | 4,8 | 0,187 |
| MWD | 914,0 | 0,15 | 342.6 | 914,0 | 5,0 | 0,4 | 5,0 | 5,0 | 0,138 |
| MWD | 1.005,0 | 0,47 | 187.27 | 1.005,0 | 4,8 | 0,3 | 4,8 | 4,8 | 0,670 |
| MWD | 1.101,0 | 0,19 | 350.91 | 1.101,0 | 4,5 | 0,3 | 4,5 | 4,5 | 0,682 |
| MWD | 1.195,0 | 0,07 | 294.81 | 1.195,0 | 4,7 | 0,2 | 4,7 | 4,7 | 0,172 |
| MWD | 1.291,0 | 0,19 | 82.64 | 1.291,0 | 4,8 | 0,3 | 4,8 | 4,8 | 0,263 |
| MWD | 1.386,0 | 0,12 | 297.71 | 1.386,0 | 4,8 | 0,3 | 4,8 | 4,8 | 0,312 |
| MWD | 1.480,0 | 0,24 | 141.52 | 1.480,0 | 4,7 | 0,4 | 4,7 | 4,7 | 0,376 |
| MWD | 1.576,0 | 0,17 | 48.65 | 1.576,0 | 4,6 | 0,6 | 4,7 | 4,6 | 0,314 |
| MWD | 1.670,0 | 0,10 | 216.87 | 1.670,0 | 4,7 | 0,7 | 4,7 | 4,7 | 0,286 |
| MWD | 1.765,0 | 0,14 | 231.05 | 1.765,0 | 4,5 | 0,5 | 4,6 | 4,5 | 0,052 |
| MWD | 1.861,0 | 0,18 | 123.07 | 1.861,0 | 4,4 | 0,6 | 4,4 | 4,4 | 0,271 |
| MWD | 1.955,0 | 0,10 | 292.13 | 1.955,0 | 4,3 | 0,6 | 4,4 | 4,3 | 0,297 |
| MWD | 2.050,0 | 0,26 | 216.12 | 2.050,0 | 4,2 | 0,4 | 4,2 | 4,2 | 0,268 |
| MWD | 2.145,0 | 0,15 | 323.76 | 2.145,0 | 4,1 | 0,2 | 4,1 | 4,1 | 0,355 |
| MWD | 2.240,0 | 0,12 | 115.81 | 2.240,0 | 4,2 | 0,2 | 4,2 | 4,2 | 0,276 |
| MWD | 2.335,0 | 0,18 | 98.85 | 2.335,0 | 4,1 | 0,5 | 4,1 | 4,1 | 0,078 |
| MWD | 2.431,0 | 0,11 | 21.4 | 2.431,0 | 4,2 | 0,6 | 4,2 | 4,2 | 0,197 |
| MWD | 2.526,0 | 0,08 | 179.69 | 2.526,0 | 4,2 | 0,7 | 4,2 | 4,2 | 0,197 |
| MWD | 2.620,0 | 0,10 | 52.94 | 2.620,0 | 4,2 | 0,7 | 4,2 | 4,2 | 0,171 |
| MWD | 2.715,0 | 0,12 | 192.1 | 2.715,0 | 4,1 | 0,8 | 4,2 | 4,1 | 0,217 |
| MWD | 2.810,0 | 0,13 | 85.79 | 2.810,0 | 4,0 | 0,9 | 4,1 | 4,0 | 0,211 |
| MWD | 2.905,0 | 0,14 | 127.62 | 2.905,0 | 4,0 | 1,1 | 4,1 | 4,0 | 0,102 |
| MWD | 2.981,0 | 0,09 | 327.33 | 2.981,0 | 4,0 | 1,1 | 4,1 | 4,0 | 0,298 |
| MWD | 3.101,0 | 0,15 | 39.36 | 3.101,0 | 4,2 | 1,2 | 4,3 | 4,2 | 0,124 |
| MWD | 3.196,0 | 0,18 | 42.83 | 3.196,0 | 4,4 | 1,3 | 4,6 | 4,4 | 0,033 |
| MWD | 3.289,0 | 0,08 | 311.16 | 3.289,0 | 4,5 | 1,4 | 4,7 | 4,5 | 0,214 |
| MWD | 3.384,0 | 0,76 | 228.36 | 3.384,0 | 4,1 | 0,9 | 4,2 | 4,1 | 0,794 |
| MWD | 3.480,0 | 2,55 | 231.96 | 3.479,9 | 2,4 | -1,3 | 2,7 | 2,4 | 1,867 |
| MWD | 3.575,0 | 3,93 | 223.19 | 3.574,8 | -1,3 | -5,2 | 5,3 | -1,3 | 1,539 |
| MWD | 3.642,0 | 3,93 | 218.32 | 3.641,6 | -4,7 | -8,2 | 9,4 | -4,7 | 0,498 |
| MWD | 3.737,0 | 1,10 | 218.9 | 3.736,5 | -8,0 | -10,8 | 13,4 | -8,0 | 2,979 |
| MWD | 3.832,0 | 1,11 | 93.69 | 3.831,5 | -8,8 | -10,4 | 13,6 | -8,8 | 2,065 |
| MWD | 3.927,0 | 1,83 | 89.39 | 3.926,5 | -8,8 | -8,0 | 11,9 | -8,8 | 0,766 |





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|-----|---------|------|--------|---------|-------|-------|------|-------|-------|
| MWD | 4.022,0 | 3,01 | 85.27 | 4.021,4 | -8,6 | -4,0 | 9,5 | -8,6 | 1,255 |
| MWD | 4.117,0 | 1,92 | 159.41 | 4.116,3 | -9,9 | -0,9 | 9,9 | -9,9 | 3,259 |
| MWD | 4.181,0 | 1,19 | 199.7 | 4.180,3 | -11,5 | -0,8 | 11,5 | -11,5 | 1,987 |
| MWD | 4.213,0 | 0,99 | 220.09 | 4.212,3 | -12,0 | -1,1 | 12,1 | -12,0 | 1,354 |
| MWD | 4.308,0 | 0,86 | 209.26 | 4.307,3 | -13,3 | -1,9 | 13,4 | -13,3 | 0,229 |
| MWD | 4.403,0 | 0,40 | 258.72 | 4.402,3 | -14,0 | -2,6 | 14,2 | -14,0 | 0,708 |
| MWD | 4.498,0 | 0,66 | 264.54 | 4.497,3 | -14,1 | -3,5 | 14,5 | -14,1 | 0,279 |
| MWD | 4.593,0 | 1,33 | 319.25 | 4.592,2 | -13,3 | -4,8 | 14,1 | -13,3 | 1,148 |
| MWD | 4.688,0 | 1,75 | 318.56 | 4.687,2 | -11,4 | -6,4 | 13,1 | -11,4 | 0,443 |
| MWD | 4.783,0 | 1,48 | 0.52 | 4.782,2 | -9,1 | -7,4 | 11,7 | -9,1 | 1,246 |
| MWD | 4.879,0 | 1,68 | 339.26 | 4.878,1 | -6,5 | -7,9 | 10,2 | -6,5 | 0,641 |
| MWD | 4.974,0 | 1,65 | 322.94 | 4.973,1 | -4,1 | -9,2 | 10,1 | -4,1 | 0,498 |
| MWD | 5.069,0 | 0,45 | 52.1 | 5.068,1 | -2,8 | -9,7 | 10,1 | -2,8 | 1,794 |
| MWD | 5.164,0 | 0,21 | 25.93 | 5.163,1 | -2,4 | -9,3 | 9,7 | -2,4 | 0,292 |
| MWD | 5.259,0 | 0,57 | 255.65 | 5.258,1 | -2,4 | -9,7 | 10,0 | -2,4 | 0,762 |
| MWD | 5.354,0 | 1,12 | 247.76 | 5.353,1 | -2,8 | -11,0 | 11,4 | -2,8 | 0,590 |
| MWD | 5.499,0 | 1,46 | 260.8 | 5.498,0 | -3,7 | -14,2 | 14,7 | -3,7 | 0,308 |
| MWD | 5.545,0 | 2,01 | 268.39 | 5.544,0 | -3,8 | -15,6 | 16,0 | -3,8 | 1,293 |
| MWD | 5.640,0 | 1,97 | 247.92 | 5.639,0 | -4,5 | -18,7 | 19,3 | -4,5 | 0,745 |
| MWD | 5.736,0 | 1,56 | 198.04 | 5.734,9 | -6,3 | -20,7 | 21,6 | -6,3 | 1,598 |
| MWD | 5.832,0 | 1,57 | 189.05 | 5.830,9 | -8,9 | -21,3 | 23,1 | -8,9 | 0,256 |
| MWD | 5.927,0 | 1,77 | 197.93 | 5.925,8 | -11,5 | -21,9 | 24,8 | -11,5 | 0,344 |
| MWD | 6.022,0 | 1,47 | 189.12 | 6.020,8 | -14,1 | -22,6 | 26,7 | -14,1 | 0,410 |
| MWD | 6.117,0 | 1,10 | 155.48 | 6.115,8 | -16,2 | -22,4 | 27,6 | -16,2 | 0,867 |
| MWD | 6.307,0 | 1,06 | 132.51 | 6.305,7 | -19,0 | -20,4 | 27,9 | -19,0 | 0,227 |
| MWD | 6.402,0 | 1,07 | 123.66 | 6.400,7 | -20,1 | -19,0 | 27,6 | -20,1 | 0,173 |
| MWD | 6.497,0 | 0,71 | 100.21 | 6.495,7 | -20,7 | -17,6 | 27,2 | -20,7 | 0,532 |
| MWD | 6.592,0 | 0,88 | 33.24 | 6.590,7 | -20,2 | -16,7 | 26,2 | -20,2 | 0,935 |
| MWD | 6.635,0 | 0,77 | 56.73 | 6.633,7 | -19,8 | -16,2 | 25,6 | -19,8 | 0,820 |
| MWD | 6.675,0 | 1,18 | 44.22 | 6.673,7 | -19,3 | -15,7 | 24,9 | -19,3 | 1,149 |
| MWD | 6.770,0 | 1,25 | 25.97 | 6.768,7 | -17,7 | -14,6 | 22,9 | -17,7 | 0,412 |
| MWD | 6.865,0 | 1,46 | 26.18 | 6.863,7 | -15,7 | -13,6 | 20,8 | -15,7 | 0,221 |
| MWD | 6.960,0 | 1,09 | 38.77 | 6.958,6 | -13,9 | -12,5 | 18,7 | -13,9 | 0,486 |
| MWD | 7.056,0 | 1,57 | 205.96 | 7.054,6 | -14,3 | -12,5 | 19,0 | -14,3 | 2,754 |
| MWD | 7.151,0 | 1,92 | 193.85 | 7.149,6 | -17,1 | -13,5 | 21,7 | -17,1 | 0,533 |
| MWD | 7.246,0 | 1,38 | 197.6 | 7.244,5 | -19,7 | -14,2 | 24,3 | -19,7 | 0,579 |





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|-----|---------|------|--------|---------|-------|-------|------|-------|-------|
| MWD | 7.341,0 | 0,83 | 203.94 | 7.339,5 | -21,4 | -14,8 | 26,0 | -21,4 | 0,592 |
| MWD | 7.436,0 | 0,89 | 200.92 | 7.434,5 | -22,7 | -15,4 | 27,4 | -22,7 | 0,079 |
| MWD | 7.531,0 | 0,95 | 208.89 | 7.529,5 | -24,1 | -16,0 | 28,9 | -24,1 | 0,149 |
| MWD | 7.639,0 | 0,74 | 209.63 | 7.637,5 | -25,5 | -16,8 | 30,5 | -25,5 | 0,195 |
| MWD | 7.830,0 | 1,62 | 212.6 | 7.828,4 | -28,9 | -18,8 | 34,5 | -28,9 | 0,462 |
| MWD | 7.925,0 | 1,87 | 235.65 | 7.923,4 | -30,9 | -20,9 | 37,2 | -30,9 | 0,778 |
| MWD | 8.020,0 | 1,85 | 235.65 | 8.018,4 | -32,6 | -23,4 | 40,1 | -32,6 | 0,021 |
| MWD | 8.116,0 | 1,52 | 279.59 | 8.114,3 | -33,3 | -25,9 | 42,2 | -33,3 | 1,351 |
| MWD | 8.211,0 | 1,76 | 291.62 | 8.209,3 | -32,5 | -28,5 | 43,3 | -32,5 | 0,440 |
| MWD | 8.306,0 | 1,49 | 275.63 | 8.304,2 | -31,9 | -31,1 | 44,5 | -31,9 | 0,553 |
| MWD | 8.402,0 | 0,87 | 250.94 | 8.400,2 | -32,0 | -33,0 | 46,0 | -32,0 | 0,821 |
| MWD | 8.428,0 | 1,39 | 249.84 | 8.426,2 | -32,1 | -33,5 | 46,4 | -32,1 | 2,002 |
| MWD | 8.558,0 | 2,78 | 264.46 | 8.556,1 | -33,0 | -38,1 | 50,4 | -33,0 | 1,136 |
| MWD | 8.653,0 | 2,31 | 307.21 | 8.651,0 | -32,1 | -42,0 | 52,8 | -32,1 | 2,006 |
| MWD | 8.743,0 | 0,99 | 21.37 | 8.741,0 | -30,2 | -43,1 | 52,7 | -30,2 | 2,501 |
| MWD | 8.843,0 | 0,92 | 283.71 | 8.841,0 | -29,2 | -43,6 | 52,5 | -29,2 | 1,438 |
| MWD | 8.938,0 | 2,76 | 282.65 | 8.935,9 | -28,6 | -46,6 | 54,6 | -28,6 | 1,937 |
| MWD | 9.033,0 | 1,05 | 250.44 | 9.030,9 | -28,3 | -49,6 | 57,1 | -28,3 | 2,056 |
| MWD | 9.127,0 | 2,40 | 258.85 | 9.124,8 | -29,0 | -52,4 | 59,9 | -29,0 | 1,457 |
| MWD | 9.222,0 | 1,31 | 284.52 | 9.219,8 | -29,1 | -55,4 | 62,6 | -29,1 | 1,416 |
| MWD | 9.317,0 | 3,73 | 270.04 | 9.314,7 | -28,9 | -59,5 | 66,1 | -28,9 | 2,614 |
| MWD | 9.412,0 | 3,96 | 250.99 | 9.409,5 | -29,9 | -65,7 | 72,2 | -29,9 | 1,360 |
| MWD | 9.444,0 | 3,91 | 235.47 | 9.441,4 | -30,9 | -67,6 | 74,4 | -30,9 | 3,322 |
| MWD | 9.497,5 | 3,91 | 235.47 | 9.494,7 | -33,0 | -70,6 | 78,0 | -33,0 | 0,000 |
| MWD | 9.500,0 | 3,91 | 235.47 | 9.497,3 | -33,1 | -70,8 | 78,1 | -33,1 | 0,000 |



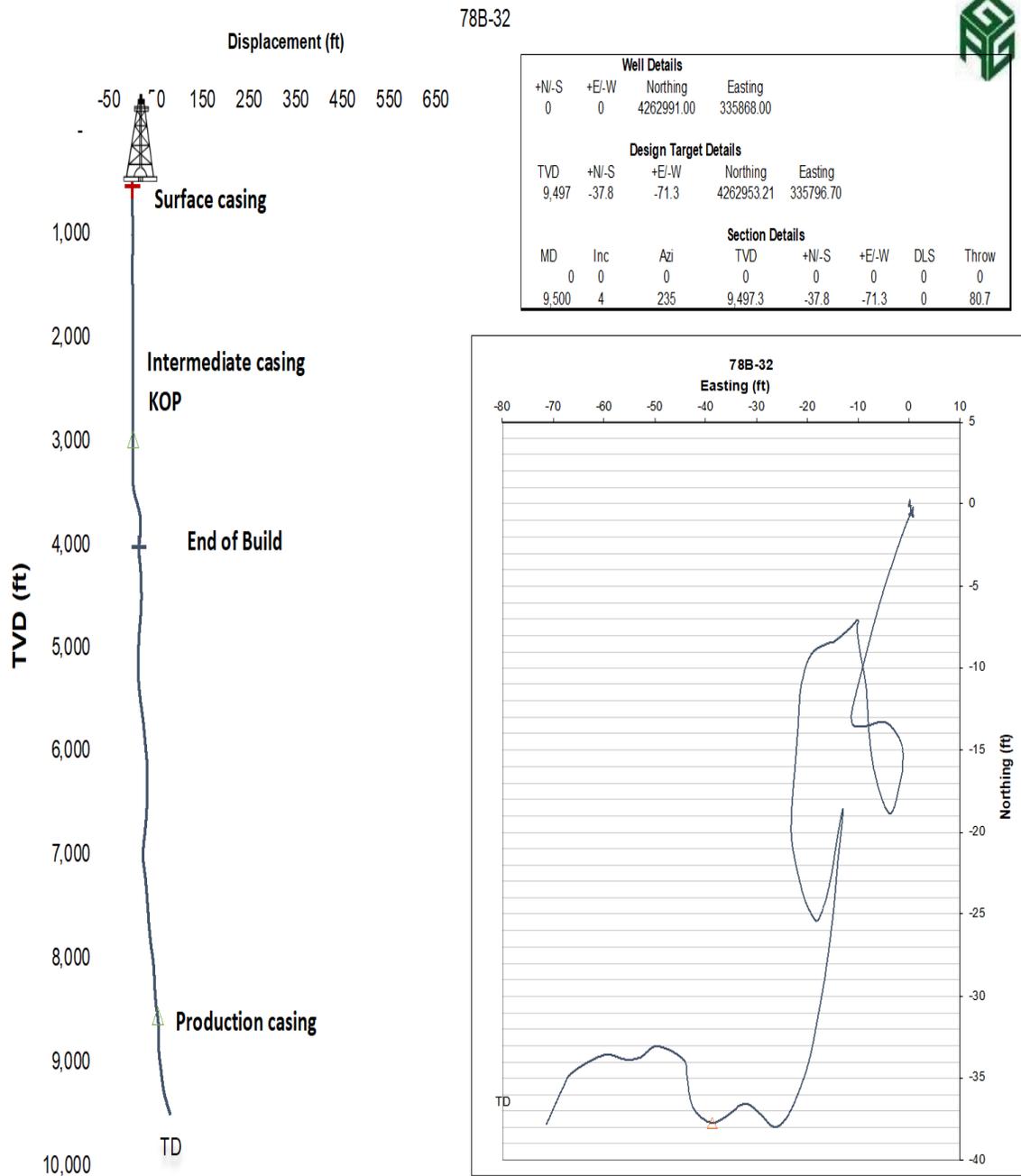


Figure 6: Final Directional survey plot.



6. DRILLING ACTIVITY BY WELL SECTION

6.1. Mob, Site Prep, Conductor

Following is the report including pictures: Move all equipment to the 78B-32 site on June 8, 2021. While trying to confirm delivery of 16 yards of ready mix. NOTE: The cement delivery was set up for 8 days now and while traveling down last night the local ready-mix company called Wyoming and cancelled all delivery schedules. Found a supplier in Delta and confirmed 2 deliveries. Drill 36 in. hole from surface to 100 ft. All material was alluvium (decomposed granite). Experienced no hole cave or sluff.



Figure 7: Drilling of conductor.



Figure 8: Conductor hole as drilled.

Check hole for fill / clean out to 100 ft. and welded 3 joints of 24 in. 1/2 in. wall thickness, 125.5 ppf conductor casing. Set on bottom, pulled rig forward and centered and leveled conductor (102 ft. total).



Figure 9: Conductor setting.



Figure 10: Conductor setting -cont.



Figure 11: Conductor and mouse - as constructed.



Figure 12: Lateral view, conductor and mouse hole.

6.2. 22 in. Hole to 416 ft. and 16 in. Casing

6.2.1. Drilling Objectives

Drilling objectives for the 22 in. hole section were:

- Drill 22 in. section from 24 in. conductor shoe at 128.5 ft. (ground level) to the 16 in. casing shoe depth at 416 ft. in a single bit run
- Case-off shallow unconsolidated formations, gas zones, and loss zones, if encountered
- Drill to sufficient casing depth to install the BOPE
- Maintain verticality and stabilize wellbore hazards

6.2.2. Summary

Drilling of the 22 in. hole began on 28 June from the bottom of the 24 in. conductor casing at 128.5 ft. Drilling to the casing point at 421 ft. was accomplished the same day without incident. The 16 in. 65 ppf, K-55, BTC casing was run to 416 ft. No circulation losses were found in this section and the wellbore inclination was approximately 1° at TD of section.

6.2.3. 22 in. Surface Equipment

The 22 in. section was drilled without a flowline welded to the conductor. Fluids returns were taken at the cellar and pumped back into the shakers.

6.2.4. 17-1/2 in. Bit, Hydraulics and BHA

A new 22 in. milled-tooth bit was used to drill the 22 in. section from 128.5 ft. to 421 ft. The bit parameters and basic drilling parameters shown in Table 6 were used. Bit selection was based on drilling performance of the previous wells (58-32, 16A-32 and 56-32). The bottom hole assembly consisted of the bit, bit sub, cross-over sub, MWD, cross-over sub, non-magnetic drill collar, float sub, cross-over sub and 8 joints heavy weight drill pipe for a total length of 314 ft.(Table 7).

Table 6: Basic drilling parameters for 22 in. section.

| Bit #/Run | Hole made (ft) | Bit Size (in.) | IADC Code | Ave. WOB (klbs) | Ave. RPM | Jet Size (32nd) | Ave. flow rate (gpm) | Ave. ROP (fph) |
|-----------|----------------|----------------|-----------|-----------------|----------|-----------------|----------------------|----------------|
| 1/1 | 292.5 | 22 | 117 | 15 | 90 | 28-28-28 | 800 | 83.7 |





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Table 7: BHA # 1 used with bit #1.

| BHA No: 1 | | Wellbore: Original Wellbore | | | | | | | | | | |
|------------------------------------------|-----------------------|------------------------------------|----------------------------------|-------|--------|-------|----------------|-----|----------------|-------|----------|-------------------------------------------|
| BHA Length (ft): | 314.30 | | | | | | | | | | | |
| | Weights in Air | Buoyed Weight | Mud Wt of (lbs/gal): 8.90 | | | | | | | | | |
| BHA Wt: | 21,473 | 18,552 | | | | | | | | | | |
| Drillstring Wt: | 21,473 | 18,552 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | In | Out | | | | | | | | | | |
| Depth (ft): | 128 | 421 | | | | | | | | | | |
| Date/Time: | 27-Jun-21 11:30 | 28-Jun-21 06:30 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 90 | Drilling Hrs.: | 3.5 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 3 | WOB - Max (lbs): | 30 | | | | | | | | | |
| Comments: 22" Surface section BHA | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 2.00 | 22.000 | | | | 7.625REG | Pin | | | | S/No: RH7510 |
| BS | 1 | 4.44 | 9.625 | 3.000 | 223.3 | S-135 | 6.625REG | Box | 2.28 | 8.000 | | S/No: DR42979 |
| XO | 1 | 2.24 | 8.125 | 3.125 | 150.2 | S-135 | 5.5IF | Box | | | | S/No: DR31132 |
| MWD | 1 | 30.11 | 8.125 | 4.250 | 128.0 | S-135 | 5.5IF | Box | | | | XBOLT MP MWD (D&I ONLY) S/No: D80H158D |
| XO | 1 | 2.72 | 8.063 | 3.500 | 140.8 | S-135 | 6.625REG | Box | | | | S/No: DR26834 |
| MONEL | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: DR34100 |
| FLOAT | 1 | 2.34 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: DR28684 |
| OTHER | 1 | 2.95 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | S/No: DR44846 |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 4.5IF | Box | 6.75 | 2.000 | | S/No: DR44284 |
| HWDP | 1 | 235.00 | 5.000 | 3.000 | 42.7 | S-135 | 4.5IF | Box | | | | S/No: RIGS |
| Total: | | 314.30 | | | | | | | | | | |

6.2.5. 22 in. Drilling Fluids

Planned basic drilling parameters and the design of the mud system for the 22 in. drilling sections are shown in Table 8 and the average parameters used are shown in Table 9. The spud mud was designed as a pre-hydrated gel mud blended with 3% (4 ppb) fine micronized cellulose. The accepted mud program included the maintenance of 3% micronized cellulose.

Table 8: Fluid Parameters Planned for 17-1/2 in. Section

| | |
|-------------------------|-----------------------|
| Hole Size | 22 in. |
| Casing Size | 16 in. |
| Mud Type | Lime/Gel/Water System |
| Mud Weight (ppg) | 8.6 – 9.2 |



| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Viscosity (sec) | 50-60+ |
| Filtrate (ML) | < 20 |
| Total Mud Volume | 400 bbls (300 bbls surface volume) |
| Directional Program | NA – Vertical Hole |
| Formations | Surface Alluvium |
| Interval BHT | < 100°F |
| <p>Planned section mud program: Drill the 22 in. hole with flocculated clay-based mud system; add Gel and Lime/Soda Ash/Caustic Soda as needed to maintain adequate viscosity for good hole cleaning (PV alap, YP 25+). Use Bentonite/Sawdust/Polyvis (PHPA) to sweep and stabilize the hole as needed; thin mud with Desco CF/water. If encountered, control lost circulation with conventional LCM pills. Run and cement 16” casing.</p> | |

Table 9: Average fluid properties for 22 in. section.

| Fluid Parameters (spud) | Unit | Min | Max | Ave |
|----------------------------------|-----------------------|------|------|------|
| Mud Weight | ppg | 8.9 | 8.9 | 8.9 |
| pH | | 9 | 9 | 9 |
| API Fluid Loss (Filtrate) | cc/30 sec. | 12.2 | 12.2 | 12.2 |
| Plastic Viscosity | cP | 19 | 19 | 19 |
| Yield Point | lb/100ft ² | 22 | 22 | 22 |

6.2.6. 16 in. Casing and Cementing

The 16 in. 65 ppg. K-55 casing was set at 416 ft., and cemented with centralizers at 337 ft., 253 ft., 169 ft., 85 ft., 40 ft., and 20 ft. The cement report is shown in (Table 10). Good cement returns held at surface and after 5.5 hours waiting on cement (WOC), the 13-5/8 in. 3,000 psi x 5,000 psi wellhead (w/ 2 ea. 2-1/16 in. x 5,000 psi side outlets) was installed and tested.





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Table 10: Cement report for 16 in. casing.

| Cement Job Information | | | | | | |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|---------------------|-----------------------|------|---------------------------|
| Start Date/Time: | 28-Jun-21 13:00 | | Wellbore: | Original Wellbore | | |
| Job Type: | PRIMARY | | String OD (ins): | 16.000 | | |
| Well Section: | SURF | | String Type: | FULL | | |
| Cementing Co: | Resource | | Cementing Engineer: | | | |
| Primary Job Detail | | | | | | |
| | Volume (bbls) | Pump Time | Rate (bbls/min) | Pressure (psi) | | |
| Conditioning Data: | | | | | | |
| Cement Data: | 146.0 | 30 | 5.0 | 260 | | |
| Displacement Data: | 6.0 | 3 | 3.0 | 120 | | |
| Calc. Displacement Vol: | 6.0 | | | | | |
| <input type="checkbox"/> Reciprocate Pipe? | <input checked="" type="checkbox"/> Batch Mix? | <input type="checkbox"/> Bump Plug? | Bump Pressure: | | | |
| Returns to Surface: | FULL | <input checked="" type="checkbox"/> Cement at Surface? | Volume (bbls): | | 10.0 | |
| Calc Top of Cement (ft): | 0 | Excess (%): | 50.00% | Avg. Hole Size (ins): | | 22.000 |
| Slurry Information | | | | | | |
| Type | Density | Yield | Sacks | Volume | Rate | Additives |
| LEAD | 13.88 | | | 146.0 | 5.0 | Thermalite-A with 2% cacl |
| Post Job Information | | | | | | |
| Liner Top Test (lbs/gal): | | | | Job Success? | No | |
| Actual Top of Cmt (ft): | 0 | | | CBL Bond Quality: | | |
| Misc. Comments: | 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 silicate, 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 | | | | | |



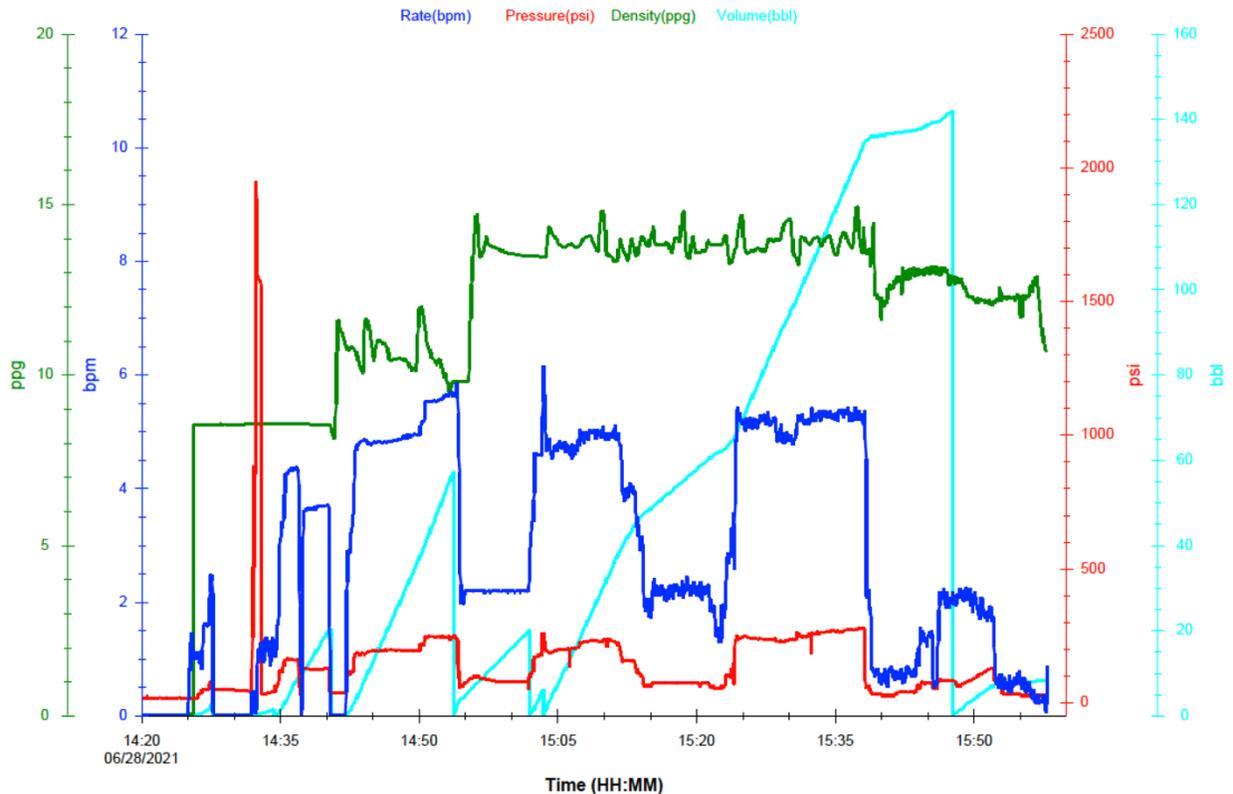


Figure 13: 16 in. surface casing cement pressure chart.

6.3. 14-3/4 in. Hole to 3,009 ft. and 11-3/4 in. Casing

6.3.1. 14-3/4 in. Hole Objectives

The drilling objectives for the 14-3/4 in. section were:

- Drill the cement inside the 16 in. shoe track (± 40 ft.) and new 14-3/4 in. hole from the 16 in. casing shoe depth to 3,300 ft. (11-3/4 in. casing shoe depth) in two bit runs.
- Maintain verticality within 3° and stabilize wellbore hazards. The departure from vertical not to exceed a radius of 250 ft. north, east, and west and no more than 150 ft. south in any portion of the well.
- Drill fast to reduce the wellbore exposure to the drilling fluid.

All above objectives were achieved to TD this hole section at 3,009 ft.

6.3.2. 14-3/4 in. Summary

After the 21-1/4 in. 2,000 psi BOPE was installed and tested, cement, float shoe and rat hole were drilled to 421 ft. and new hole was drilled to 433 ft. A Formation Integrity Test (FIT) gave



a maximum allowable mud weight of 19.2 ppg (tested to 1 psi/ft. gradient) for the next drilling section. The 14-3/4 in. vertical hole was drilled to 3,009 ft. between 29 June and 1 July. The 11-3/4 in. casing was set at 2,990 ft. and cemented. No circulation losses, reactive clays or kicks were found in this section. The wellbore deviation was approximately 0.15° at section TD.

6.3.3. 14-3/4 in. Surface Equipment

The BOPE used for the 14-3/4 in. drilling section is shown in (Figure 14), consisting of a 21-1/4 in. 2,000 psi double gate preventer and a 21-1/4 in. 2,000 psi annular preventer as the main elements. The equipment was function tested and pressure charts were sent to a Utah Department of Natural Resources representative on 29 June.

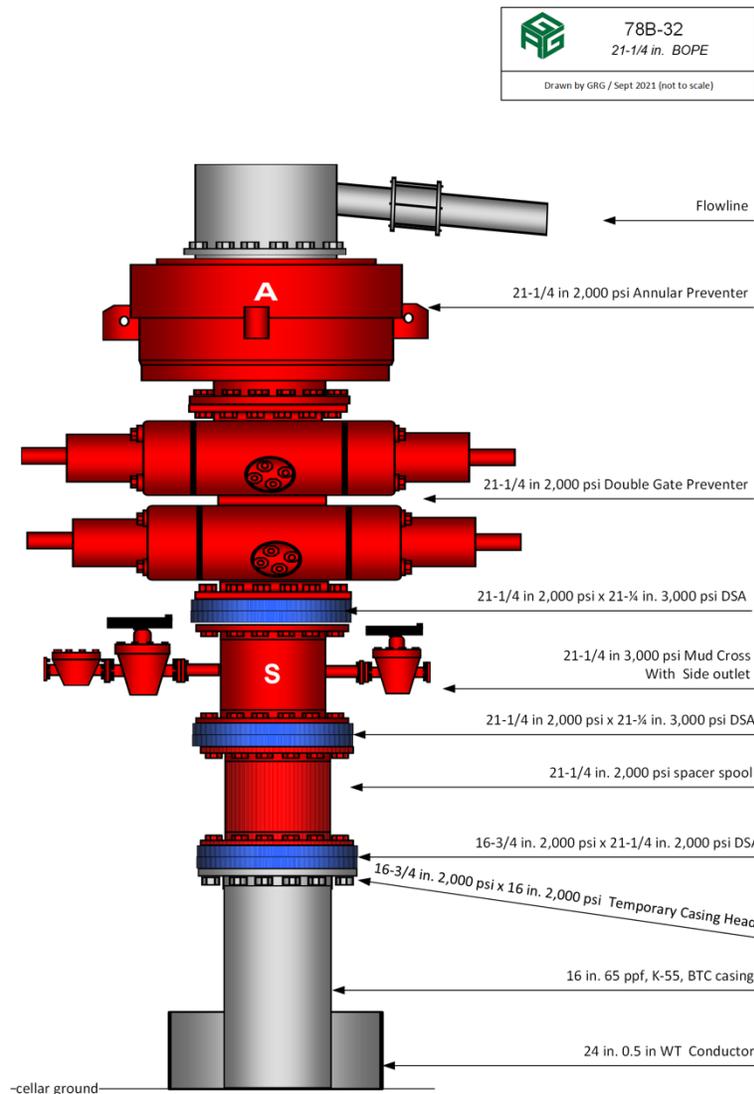


Figure 14 : BOPE 21-1/4" for drilling 14-3/4" hole.





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6.3.4. 14-3/4 in. Bit, Hydraulics Program and BHA

Three bits were used to drill 14-3/4 in. hole section and Table 11 indicates some of the bit parameters.

Table 11: 14-3/4 in. Bit parameters.

| Bit #/Run | Hole made (ft.) | Bit Size (in.) | IADC Code | Ave. WOB (Klb.) | Av. RPM | Jet Size (32nd) | Ave. flow rate (gpm) | Ave. ROP (fph) |
|-----------|-----------------|----------------|-----------|-----------------|---------|----------------------|----------------------|----------------|
| 2/1 | 12 | 14-3/4 | GT-C1 | 10 | 50 | 18 18 18 | 450 | 62 |
| 3/1 | 2,266 | 14-3/4 | M423 | 65 | 120 | 15 15 15 15 16 16 | 900 | 238.6 |
| 4/1 | 310 | 14-3/4 | S333 | 40 | 188 | 15 15 15 15 16 16 | 900 | 36.4 |

BHAs used in 14-3/4 in. hole section is listed below (Table 12).

Table 12: BHAs used to drill 14-3/4 in. hole section.

| BHA # | Depth In (ft.) | Depth Out (ft.) | Drilled Distance (ft.) | BHA Length (ft) | Remarks |
|-------|----------------|-----------------|------------------------|-----------------|--------------------------------------------------------|
| 2 | 421 | 433 | 12 | 434 | Drilled out cement, float shoe and 12 ft. of new hole. |
| 3 | 433 | 2,699 | 2,266 | 957 | RSS BHA with matrix body PDC bit. |
| 4 | 2,699 | 3,009 | 310 | 957 | RSS BHA with steel body PDC bit. |





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Table 13: BHA #2 used with bit #2.

| BHA No: 2 | | Wellbore: Original Wellbore | | | | | | | | | | |
|-------------------------------------------------------|----------|------------------------------------|-------|----------------------------|--------|-------|----------------|-----|----------------|-------|----------|---------------|
| BHA Length (ft): | | 433.74 | | | | | | | | | | |
| | | Weights in Air | | Buoyed Weight | | | | | | | | |
| BHA Wt: | | 48,914 | | | | | | | | | | |
| Drillstring Wt: | | 48,914 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | | In | | Out | | | | | | | | |
| Depth (ft): | | 370 | | 433 | | | | | | | | |
| Date/Time: | | 29-Jun-21 17:00 | | 29-Jun-21 23:45 | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | | 0 | | 0 | | | | | | | | |
| Average RPM: | | 50 | | Drilling Hrs.: 0 | | | | | | | | |
| Build Rate: | | | | Walk Rate: | | | | | | | | |
| WOB - Avg (lbs): | | 10 | | WOB - Max (lbs): 20 | | | | | | | | |
| Comments: BHA for drilling out the shoe track. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 1.25 | | | | | 7.625REG | Pin | | | | S/No: FO1JY |
| BS | 1 | 4.44 | 9.625 | 3.000 | 223.3 | S-135 | 7.625REG | Box | 8.00 | 2.280 | | S/No: DR42979 |
| DC | 9 | 270.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 4.5IF | Box | 6.75 | 1.950 | | S/No: DR44284 |
| HWDP | 5 | 154.00 | 5.000 | 3.000 | 42.7 | S-135 | 4.5IF | Box | | | | S/No: RIGS |
| Total: | | 433.74 | | | | | | | | | | |





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Table 14: BHA # 3 used with bit # 3.

| BHA No: 3 | | Wellbore: Original Wellbore | | | | | | | | | | | | | | | |
|---------------------------------------|----------|------------------------------------|--------|----------------------------------------|--------|--------------------------|----------------|----------------------------------|----------------|------------------------------|----------|----------------------------------------|--|--|--|--|--|
| BHA Length (ft): | | 956.61 | | | | | | | | | | | | | | | |
| Weights in Air | | | | Buoyed Weight | | | | Mud Wt of (lbs/gal): 9.10 | | | | | | | | | |
| BHA Wt: | | 100,526 | | | | 86,544 | | | | | | | | | | | |
| Drillstring Wt: | | 100,526 | | | | 86,544 | | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | | | | | |
| In | | | | | | Out | | | | | | | | | | | |
| Depth (ft): | | 433 | | | | 2,699 | | | | | | | | | | | |
| Date/Time: | | 30-Jun-21 00:00 | | | | 01-Jul-21 02:00 | | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | | | | | | |
| Azimuth: | | 0 | | | | 0 | | | | | | | | | | | |
| Average RPM: | | 80 | | | | Drilling Hrs.: | | | | 9 | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | | | | | | |
| WOB - Avg (lbs): | | 40 | | | | WOB - Max (lbs): | | | | 65 | | | | | | | |
| Comments: 14 3/4" RSS Assembly | | | | | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | | | | | |
| BIT | 1 | 1.50 | 14.750 | | | | 7.625REG | Pin | | | | S/No: A279635 | | | | | |
| OTHER | 1 | 13.65 | 9.000 | 5.125 | 146.1 | S-135 | 6.625REG | Box | | | | RSS PD 900 POWER V S/No: 68994 | | | | | |
| STAB | 1 | 6.67 | 8.000 | 3.000 | 146.8 | S-135 | 6.625REG | Box | 8.00 | 2.530 | 14.500 | NON MAG STAB S/No: DR11424 | | | | | |
| MWD | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: DR34100 | | | | | |
| OTHER | 1 | 3.66 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | GAP SUB S/No: GSDRSN20 | | | | | |
| OTHER | 1 | 5.76 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 80001-3 | | | | | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB S/No: DR44846 | | | | | |
| OTHER | 1 | 2.18 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | CUBIC SENSOR S/No: 800CSS008 | | | | | |
| MMTR | 1 | 33.81 | 9.625 | 7.852 | 82.7 | S-135 | 6.625REG | Box | 9.63 | 3.710 | | S/No: RVDF96005 | | | | | |
| Mud Motor: Type: PDM | | Manufacturer: | | | | Model: | | | | | | | | | | | |
| Lobe Configuration: 5/6 | | Speed: 0.12 | | | | Stages: 4 | | | | Torque: 19,240 ft/lbs | | | | | | | |
| Dir. Company: SLB | | Bend Setting: 0 | | | | Distance: 0.00 ft | | | | | | | | | | | |
| Bearing Stab. OD: 11.500 ins | | <input type="checkbox"/> Motor Pad | | <input type="checkbox"/> Motor Failure | | Failure Time: | | | | | | | | | | | |
| RR | 1 | 8.06 | 8.125 | 3.000 | 152.2 | S-135 | 6.625REG | Box | 8.13 | 2.260 | | RED BACK ROLLER REAMER S/No: GU4505 | | | | | |
| FLOAT | 1 | 8.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: DR28684 | | | | | |
| OTHER | 1 | 5.02 | 8.250 | 3.250 | 153.5 | S-135 | 6.625REG | Box | | | | DIFFUSER SUB S/No: DHRTDS399 | | | | | |
| OTHER | 1 | 2.08 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | CUBIC SENSOR S/No: 800CSS007 | | | | | |
| DC | 1 | 450.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIG | | | | | |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 4.5IF | Box | | | | S/No: DR44284 | | | | | |
| HWDP | 1 | 380.76 | 5.000 | 3.000 | 42.7 | S-135 | 4.5IF | Box | | | | S/No: RIGS | | | | | |
| Total: | | 956.61 | | | | | | | | | | | | | | | |





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Table 15: BHA # 4 used with bit # 4.

| BHA No: 4 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|-------------------------------------|----------|------------------------------------|--------|------------------------------------|-------------------------|----------------------------------------|----------------|----------------------------------|----------------|------------------------------|----------|----------------------------------------|--|
| BHA Length (ft): | | 956.61 | | | | | | | | | | | |
| | | Weights in Air | | | Buoyed Weight | | | Mud Wt of (lbs/gal): 9.10 | | | | | |
| BHA Wt: | | 100,526 | | | 86,544 | | | | | | | | |
| Drillstring Wt: | | 100,526 | | | 86,544 | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| | | In | | | Out | | | | | | | | |
| Depth (ft): | | 2,699 | | | 3,009 | | | | | | | | |
| Date/Time: | | 01-Jul-21 02:00 | | | 01-Jul-21 23:45 | | | | | | | | |
| Inclination: | | 0.02 | | | | | | | | | | | |
| Azimuth: | | 0 | | | 0 | | | | | | | | |
| Average RPM: | | 188 | | | Drilling Hrs.: | | | 10.25 | | | | | |
| Build Rate: | | | | | Walk Rate: | | | | | | | | |
| WOB - Avg (lbs): | | 40 | | | WOB - Max (lbs): | | | 70 | | | | | |
| Comments: 14 3/4" RSS run #2 | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | |
| BIT | 1 | 1.50 | 14.750 | | | | 7.625REG | Pin | | | | S/No: A279636 | |
| OTHER | 1 | 13.65 | 9.000 | 5.125 | 146.1 | S-135 | 6.625REG | Box | | | | RSS PD 900 POWER V S/No: 68994 | |
| STAB | 1 | 6.67 | 8.000 | 3.000 | 146.8 | S-135 | 6.625REG | Box | 8.00 | 2.530 | 14.500 | NON MAG STAB S/No: DR11424 | |
| MWD | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: DR34100 | |
| OTHER | 1 | 3.66 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | GAP SUB S/No: GSDRSN20 | |
| OTHER | 1 | 5.76 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 80001-3 | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB S/No: DR44846 | |
| OTHER | 1 | 2.18 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | CUBIC SENSOR S/No: 800CSS008 | |
| MMTR | 1 | 33.81 | 9.625 | 7.852 | 82.7 | S-135 | 6.625REG | Box | 9.63 | 3.710 | | S/No: RVDF96005 | |
| Mud Motor: | | Type: PDM | | Manufacturer: | | | | Model: | | | | | |
| Lobe Configuration: | | 5/6 | | Speed: 0.12 | | | | Stages: 4 | | Torque: 19,240 ft lbs | | | |
| Dir. Company: | | SLB | | Bend Setting: 0 | | | | | | Distance: 0.00 ft | | | |
| Bearing Stab. OD: | | 11.500 ins | | <input type="checkbox"/> Motor Pad | | <input type="checkbox"/> Motor Failure | | Failure Time: | | | | | |
| RR | 1 | 8.06 | 8.125 | 3.000 | 152.2 | S-135 | 6.625REG | Box | 8.13 | 2.260 | | RED BACK ROLLER REAMER S/No: GU4505 | |
| FLOAT | 1 | 8.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: DR28684 | |
| OTHER | 1 | 5.02 | 8.250 | 3.250 | 153.5 | S-135 | 6.625REG | Box | | | | DIFFUSER SUB S/No: DHRTDS399 | |
| OTHER | 1 | 2.08 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | CUBIC SENSOR S/No: 800CSS007 | |
| DC | 1 | 450.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIG | |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 4.5IF | Box | | | | S/No: DR44284 | |
| HWDP | 1 | 380.76 | 5.000 | 3.000 | 42.7 | S-135 | 4.5IF | Box | | | | S/No: RIGS | |
| Total: | | 956.61 | | | | | | | | | | | |



6.3.5. 14-3/4 in. Drilling Fluids

Planned basic drilling parameters and the design of the mud system for the 14-3/4 in. drilling section are shown in Table 16 and the average parameters used are shown in Table 17. The mud system was designed as a lightly dispersed clay-based mud system with a weight between 8.6 and 9.5 ppg, adding gel as needed to maintain adequate viscosity for good hole cleaning.

Table 16: Planned fluids parameters for 14-3/4 in. hole section.

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|
| Hole Size | 14-3/4 in. |
| Casing Size | 11-3/4 in. |
| Mud Type | HT treated Gel/Water/Polymer System |
| Mud Weight (ppg) | 8.6 – 9.5 |
| Viscosity (sec) | 45-55 |
| Filtrate (ML) | < 12 |
| Total Mud Volume | 1,000 bbls (500 bbls surface volume) |
| Directional Program | NA – Vertical Hole |
| Formations | Surface Alluvium, Tuff, Top of Granite |
| Interval BHT | < 200°F |
| <p>Lightly dispersed clay-based mud HT system, adding Gel as needed to maintain adequate viscosity for good hole cleaning (YP 15-25). Use Bentonite/LCM pills and Polyvis (PHPA) to sweep hole; thin mud with Desco CF/HT Thin as needed. Maintain mud weight to control any artesian influx, if encountered, and add 2 – 4 ppb Micro C for wellbore strengthening. Use DMA/PAC Polymer for desired fluid loss control, and TORKease/Walnut to reduce torque and drag; maintain pH of 9.5-10.5 with caustic soda/lime. Soybean vegetable oil will be utilized if torque and drag becomes a problem. The oil used while drilling 16A(78)-32 reduced torque by two thirds. If encountered, control lost circulation with conventional LCM pills and drill cuttings. Run and cement 9 5/8” casing.</p> | |

Table 17: Average fluid properties for 14-3/4 in. section.

| Fluid Parameters (spud) | Unit | Min | Max | Ave |
|-------------------------|------|-----|------|------|
| Mud Weight | ppg | 8.6 | 9.1 | 8.9 |
| pH | | 10 | 11.5 | 10.8 |





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|----------------------------------|-----------------------|-----|------|------|
| API Fluid Loss (Filtrate) | cc/30 sec. | 7.8 | 18.8 | 13.3 |
| Plastic Viscosity | cP | 8 | 14 | 11 |
| Yield Point | lb/100ft ² | 7 | 15 | 11 |

6.3.6. 11-3/4 in. Casing and Cementing

The 11-3/4 in. 54 ppf. K-55 casing was run on 2 July, with the shoe set at 2,990 ft. and cemented. The cement report is shown in Table 18 and pump schedule in Figure 15. No top jobs were needed.

Table 18: Cement job report for 11-3/4 in. casing.

| Cement Job Information | | | | | | |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------|------------------------------|-------------|-----------------------|
| Start Date/Time: | 02-Jul-21 12:00 | | Wellbore: | Original Wellbore | | |
| Job Type: | PRIMARY | | String OD (ins): | 11.750 | | |
| Well Section: | INT1 | | String Type: | FULL | | |
| Cementing Co: | Resource | | Cementing Engineer: | | | |
| Primary Job Detail | | | | | | |
| | Volume (bbbls) | Pump Time | Rate (bbbls/min) | Pressure (psi) | | |
| Conditioning Data: | | 20 | 5.0 | 500 | | |
| Cement Data: | 315.0 | 63 | 5.0 | 320 | | |
| Displacement Data: | 50.0 | 10 | 5.0 | 480 | | |
| Calc. Displacement Vol: | 50.0 | | | | | |
| <input type="checkbox"/> Reciprocate Pipe? | <input checked="" type="checkbox"/> Batch Mix? | <input type="checkbox"/> Bump Plug? | Bump Pressure: | | | |
| Returns to Surface: | FULL | <input checked="" type="checkbox"/> Cement at Surface? | Volume (bbbls): | 30.0 | | |
| Calc Top of Cement (ft): | 0 | Excess (%): | 40.00% | Avg. Hole Size (ins): | 14.750 | |
| Slurry Information | | | | | | |
| Type | Density | Yield | Sacks | Volume | Rate | Additives |
| LEAD | 13.00 | 2.23 | | | 5.5 | RC Thermalite-HT-HSLD |
| Post Job Information | | | | | | |
| Liner Top Test (lbs/gal): | | | | Job Success? | No | |
| Actual Top of Cmt (ft): | | | | CBL Bond Quality: | | |
| Misc. Comments: | Pump 2 bbl water, pressure test lines to 3000 psi, pump 52 bbbls 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 | | | | | |



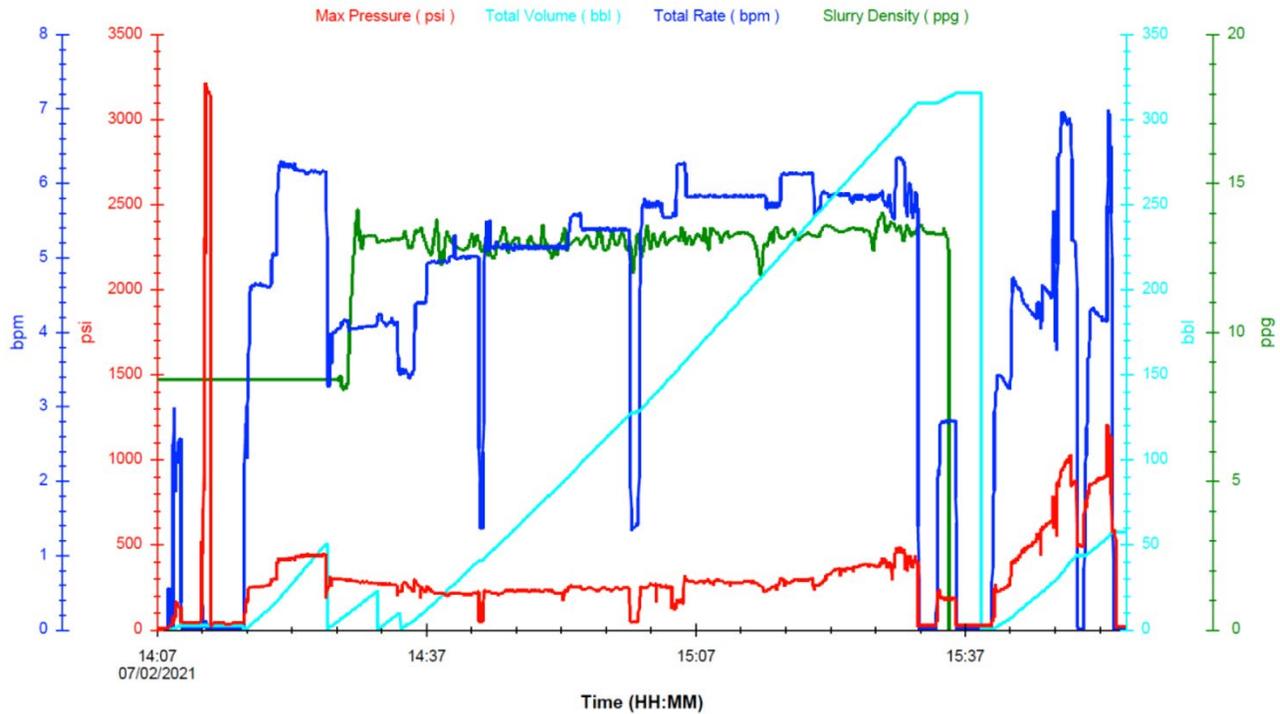


Figure 15 : 11-3/4" Intermediate casing cement pressure chart.

6.4. 10-5/8 in. Hole to 8,500 ft. and 7 in. Casing

6.4.1. 10-5/8 in. Hole Objectives

The drilling objectives for the 10-5/8 in. section were:

- Drill the cement inside the 11-3/4 in. shoe track (± 80 ft.) and 5,200 ft. of new hole from the 11-3/4 in. casing shoe to 8,500 ft. using PDC bits
- Maintain verticality within 2° and stabilize wellbore hazards
- Penetrate the reservoir test section
- Drill fast to reduce wellbore exposure to the drilling fluid
- Collect 2x 30 ft. core sections; one from approximately 6700 ft., the second from approximately 8,500 ft.
- Run suit of logs as planned.
- Install fiber optic cable on the OD of the casing from 8,500 ft. back to surface

These objectives were achieved with some deficiency: missing coring footage at 6,700 ft (21.5 ft recovered instead of planned 30 ft) and fiber-optic cable functioning failed between 3,933 and 8,508 ft.



6.4.2. 10-5/8 in. Summary

The drilling of the 10-5/8 in. hole commenced on 4 July, and total depth of 8,500 ft. was reached on 16 July. Seven 10-5/8 in. bits were required to drill this section. Maximum inclination was measured as 3.9° at 3,642 ft. Geophysical open hole logs were run in this hole section along with total four coring runs at 6,700 ft. and 8,500 ft. Initial 10-5/8" section TD was first deepened to 8,540 ft after 8-3/4 in. coring runs were performed. Section TD was extended to 8,545 ft. for rat hole purposes prior to running the 7in. casing string to 8,508 ft. and cemented in place.

6.4.3. 10-5/8 in. Surface Equipment

The 11-3/4 in. casing was cut off and the 13-5/8 in. surface BOPE equipment was used for the 10-5/8 in. section. The annular preventer and pipe rams were tested prior to running in the hole. A sFIT was performed after drilling out shoe track and rat hole to 3,009 ft., giving equivalent mud weight of 11.7 ppg.

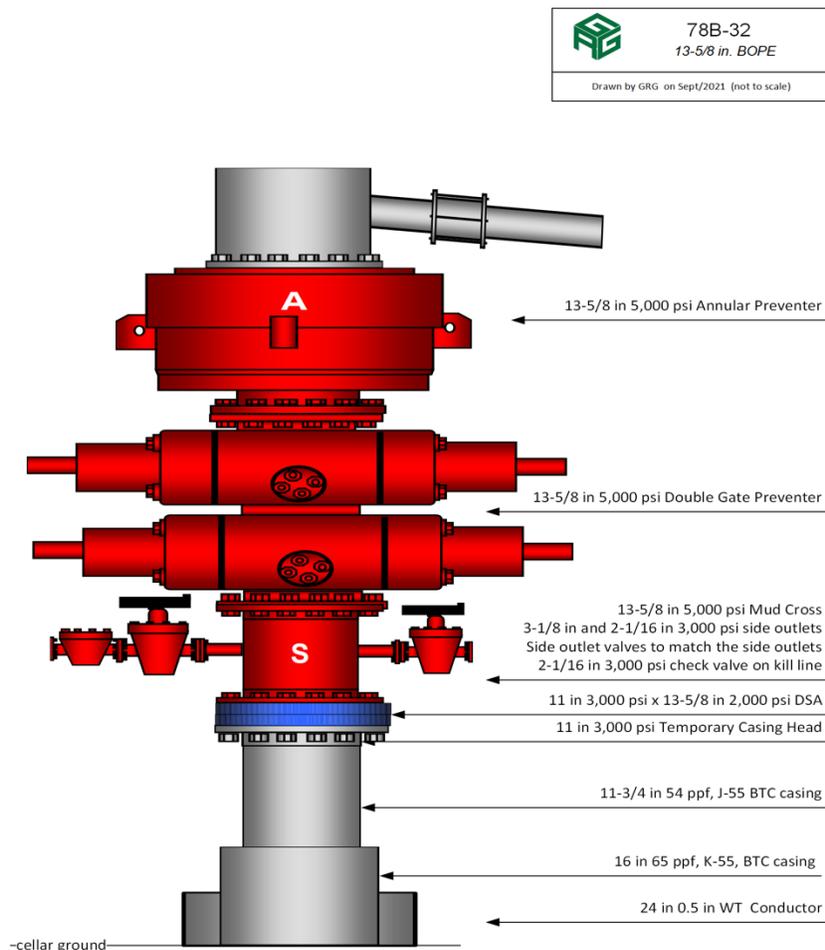


Figure 16: 13-5/8" BOPE Stack for drilling 10-5/8" hole.



6.4.4. 10-5/8 in. Bits, Hydraulics Program and BHA

In the 10-5/8 in. section, the primary formation was granodiorite, and a selection of bits were used through the section to test their performance. After the 7 in. casing was run, a 5-3/4 in. bit was run to clean out the cement inside casing. The bits used in this section is captured in Table 19 including two coring bits.

Table 19: Bits used in drilling 10-5/8" hole section.

| Bit #/Run | Hole made (ft) | Bit Size (in.) | IADC Code | Ave. WOB (Klb) | Ave. RPM | Jet Size (32nd) | Ave. flow rate (gpm) | Ave. ROP (fph) |
|-----------|----------------|------------------------|-----------|----------------|----------|----------------------------|----------------------|----------------|
| 5/1 | - | 10.625 | 117 | 10 | 60 | 28 28 28 | 800 | DOC |
| 6/1 | 642 | 10.625 | M433 | 66 | 170 | 12 12 12 12 12 12 13 13 | 820 | 49.8 |
| 7/1 | 2,110 | 10.625 | M433 | 62 | 168 | 12 12 12 12 12 12 13 13 | 802 | 75.6 |
| 8/1 | - | 10.625 | M433 | - | - | 12 12 12 12 12 12 13 13 | - | - |
| 8/2 | 60 | 10.625 | M433 | 66 | 140 | 12 12 12 12 12 12 13 13 | 815 | 100 |
| 9/1 | 879 | 10.625 | M433 | 66 | 184 | 12 12 12 12 12 12 13 13 | 844 | 80.6 |
| 10/1 | 28 | 8.75 x 4 Coring Bit | N/A | 22 | 50 | 17 17 17 17 17 17 17 17 | 300 | 18.7 |
| 11/1 | 12 | 8.75 x 4 Coring Bit | N/A | 14 | 55 | 17 17 17 17 17 17 17 17 | 320 | 44.4 |
| 12/1 | 2 | 10.625 | 433 | 21 | 61 | 20 20 20 | 800 | 3.3 |
| 12/2 | 26 | 10.625 | 433 | 23 | 45 | 20 20 20 | 800 | 26 |
| 12/3 | 5 | 10.625 | 433 | 25 | 45 | 20 20 20 | 820 | 10 |
| 13/1 | 871 | 10.625 | M433 | 67 | 186 | 12 12 12 12 12 12 13 13 | 845 | 88.9 |





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| Bit #/Run | Hole made (ft) | Bit Size (in.) | IADC Code | Ave. WOB (Klb) | Ave. RPM | Jet Size (32nd) | Ave. flow rate (gpm) | Ave. ROP (fph) |
|-----------|----------------|------------------------|-----------|----------------|----------|----------------------------|----------------------|----------------|
| 14/1 | 887 | 10.625 | M433 | 65 | 50 | 12 12 12 12 12 12 13 13 | 800 | 88.7 |
| 14/2 | 14 | 10.625 | M433 | 25 | 55 | 12 12 12 12 12 12 13 13 | 820 | 14 |
| 15/1 | 30 | 8.75 x 4 Coring Bit | N/A | 8 | 65 | 17 17 17 17 17 17 17 17 | 290 | 7.5 |
| 15/2 | 10 | 8.75 x 4 Coring Bit | N/A | 16 | 40 | 17 17 17 17 17 17 17 17 | 300 | 3.3 |

BHAs used in 10-5/8 in. hole section can be seen in Table 20 to Table 35.

Table 20: 10-5/8 in. BHA used with bit # 5.





| | | | |
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| BHA No: 5 | | Wellbore: Original Wellbore | | | | | | | | | | |
|---------------------------------------------|-----------------|------------------------------------|----------------------------------|-------|--------|-------|----------------|-----|----------------|----|----------|---------------|
| BHA Length (ft): | 739.12 | | | | | | | | | | | |
| Weights in Air | | Buoyed Weight | Mud Wt of (lbs/gal): 9.10 | | | | | | | | | |
| BHA Wt: | 61,996 | 53,373 | | | | | | | | | | |
| Drillstring Wt: | 61,996 | 53,373 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| In | | Out | | | | | | | | | | |
| Depth (ft): | 3,009 | 3,009 | | | | | | | | | | |
| Date/Time: | 03-Jul-21 23:00 | 04-Jul-21 09:30 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 50 | Drilling Hrs.: | 1.5 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 10 | WOB - Max (lbs): | 18 | | | | | | | | | |
| Comments: 10 5/8" Clean out assembly | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 1.25 | 10.625 | | | | 6.625REG | Pin | | | | S/No: A279636 |
| JUNK | 1 | 2.93 | 8.375 | 3.000 | 163.2 | S-135 | 6.625REG | Box | | | | S/No: 3595 |
| DC | 9 | 274.52 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIG |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 5.5IF | Box | | | | S/No: DR44284 |
| HWDP | 15 | 456.37 | 5.000 | 3.000 | 42.7 | S-135 | 5.5IF | Box | | | | S/No: RIGS |
| Total: | | 739.12 | | | | | | | | | | |

Table 21: 10-5/8 in. BHA # 6 used with bit # 6





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Table 22: 10-5/8 in. BHA #7 used with bit # 7.

| BHA No: 7 | | Wellbore: Original Wellbore | | | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------|-----|------------------------------------|--------|-----------------------------------------------|-------|----------------------------------------|-------|----------------------|------------|----------------|-------|----------------------------------|----------------------------------|--|--|
| BHA Length (ft): | | 960.36 | | | | | | | | | | | | | |
| | | | | Weights in Air | | | | Buoyed Weight | | | | Mud Wt of (lbs/gal): 9.10 | | | |
| BHA Wt: | | 92,360 | | | | 79,513 | | | | | | | | | |
| Drillstring Wt: | | 92,360 | | | | 79,513 | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | | | |
| | | | | | | In | | | Out | | | | | | |
| Depth (ft): | | 3,651 | | | | 5,761 | | | | | | | | | |
| Date/Time: | | 05-Jul-21 21:00 | | | | 07-Jul-21 17:00 | | | | | | | | | |
| Inclination: | | 3.93 | | | | | | | | | | | | | |
| Azimuth: | | 223.19 | | | | 0 | | | | | | | | | |
| Average RPM: | | | | | | | | | | | | Drilling Hrs.: | | | |
| Build Rate: | | | | | | | | | | | | Walk Rate: | | | |
| WOB - Avg (lbs): | | | | | | | | | | | | WOB - Max (lbs): | | | |
| Comments: 8" 1.5 DEG Motor. Pulled due to low ROP. Found 2 jets plugged with rubber the stator section of the motor and bit DBR'd. | | | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | | | |
| Item | No. | Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | | |
| BIT | 1 | 1.50 | 10.625 | | | | | 7.625REG | Pin | | | | S/No: A279639 | | |
| MMTR | 1 | 30.87 | 8.250 | 6.250 | 77.4 | S-135 | | 6.625REG | Box | | | | S/No: RVENN86052 | | |
| Mud Motor: Type: OTHER | | Manufacturer: | | Model: RVEN | | | | | | | | | | | |
| Lobe Configuration: 7/8 | | Speed: 0.166 | | Stages: 4 | | Torque: 14,930 ft lbs | | | | | | | | | |
| Dir. Company: SLB | | Bend Setting: 1.5 | | Distance: 11.51 ft | | | | | | | | | | | |
| Bearing Stab. OD: | | ins | | <input checked="" type="checkbox"/> Motor Pad | | <input type="checkbox"/> Motor Failure | | Failure Time: | | | | | | | |
| STAB | 1 | 7.35 | 8.313 | 2.750 | 164.3 | S-135 | | 6.625REG | Box | 8.00 | 3.550 | 10.375 | NON MAG STAB S/No: SD604680 | | |
| MWD | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | | 6.625REG | Box | | | | S/No: DR34100 | | |
| OTHER | 1 | 3.66 | 8.000 | 3.430 | 139.4 | S-135 | | 6.625REG | Box | | | | GAP SUB S/No: GSDRSN20 | | |
| OTHER | 1 | 5.76 | 8.125 | 3.500 | 143.5 | S-135 | | 6.625REG | Box | | | | PULSER SUB S/No: 80001-3 | | |
| STAB | 1 | 8.77 | 8.250 | 2.750 | 161.5 | S-135 | | 6.625REG | Box | 8.25 | 4.090 | | 10 3/8" NM STAB S/No: DR43576 | | |
| MONEL | 1 | 28.87 | 8.000 | 3.430 | 139.4 | S-135 | | 6.625REG | Box | | | | S/No: DR24762 | | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | | 6.625REG | Box | | | | FILTER SUB S/No: DR28684 | | |
| OTHER | 1 | 2.34 | 8.000 | 2.750 | 150.7 | S-135 | | 6.625REG | Box | | | | FLOAT SUB S/No: DR28684 | | |
| OTHER | 1 | 5.02 | 8.250 | 3.250 | 150.7 | S-135 | | 6.625REG | Box | | | | DIFFUSER SUB S/No: DHRTDS399 | | |
| DC | 1 | 450.00 | 8.000 | 2.750 | 150.7 | S-135 | | 6.625REG | Box | | | | S/No: RIGS | | |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | | 5.0XH | Box | | | | S/No: DR44284 | | |
| HWDP | 1 | 380.76 | 5.500 | 4.776 | 19.9 | S-135 | | 5.0XH | Box | | | | S/No: RIGS | | |
| Total: | | 960.36 | | | | | | | | | | | | | |





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Table 23: 10-5/8 in. BHA # 8 used with bit # 8.

| BHA No: 8 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------|--------|-----------------------------------------------|----------------------|----------------------------------------|-------------------------|----------------------------------|----------------|---------|----------|----------------------------------|---------------|
| BHA Length (ft): | | 962.49 | | | | | | | | | | | |
| | | Weights in Air | | | Buoyed Weight | | | Mud Wt of (lbs/gal): 9.10 | | | | | |
| BHA Wt: | | 92,524 | | | 79,655 | | | | | | | | |
| Drillstring Wt: | | 92,524 | | | 79,655 | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| | | In | | | | | Out | | | | | | |
| Depth (ft): | | 5,761 | | | | | 5,761 | | | | | | |
| Date/Time: | | 07-Jul-21 21:00 | | | | | 08-Jul-21 00:00 | | | | | | |
| Inclination: | | | | | | | | | | | | | |
| Azimuth: | | 0 | | | | | 0 | | | | | | |
| Average RPM: | | 0 | | | | | Drilling Hrs.: | | | | | | |
| Build Rate: | | | | | | | Walk Rate: | | | | | | |
| WOB - Avg (lbs): | | 0 | | | | | WOB - Max (lbs): | | | | | | |
| | | | | | | | 0 | | | | | | |
| Comments: 8" 1.50 DEG Assembly. Motor was not the Wright speed. BHA was pulled out of the hole and motor was swapped. | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | |
| BIT | 1 | 1.50 | 10.625 | | | | 7.625REG | Pin | | | | S/No: A279690 | |
| MMTR | 1 | 33.00 | 8.250 | 6.250 | 77.4 | S-135 | 6.625REG | Box | 8.00 | 1.420 | | S/No: 800-36-7618 | |
| Mud Motor: | | Type: OTHER | | Manufacturer: | | | | Model: NOV | | | | | |
| Lobe Configuration: | | 9/10 | | Speed: | | 0.111 | | Stages: | | 3.9 | | Torque: | 14,930 ft lbs |
| Dir. Company: | | SLB | | Bend Setting: | | 1.5 | | Distance: | | 6.93 ft | | | |
| Bearing Stab. OD: | | ins | | <input checked="" type="checkbox"/> Motor Pad | | <input type="checkbox"/> Motor Failure | | Failure Time: | | | | | |
| STAB | 1 | 7.35 | 8.313 | 2.750 | 164.3 | S-135 | 6.625REG | Box | 8.00 | 3.550 | 10.375 | NON MAG STAB S/No: SD604680 | |
| MWD | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: DR34100 | |
| OTHER | 1 | 3.66 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | GAP SUB S/No: GSDRSN20 | |
| OTHER | 1 | 5.76 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 80001-3 | |
| STAB | 1 | 8.77 | 8.250 | 2.750 | 161.5 | S-135 | 6.625REG | Box | 8.25 | 4.090 | | 10 3/8" NM STAB S/No: DR43576 | |
| MONEL | 1 | 28.87 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | S/No: DR24762 | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB S/No: DR28684 | |
| OTHER | 1 | 2.34 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | FLOAT SUB S/No: DR28684 | |
| OTHER | 1 | 5.02 | 8.250 | 3.250 | 150.7 | S-135 | 6.625REG | Box | | | | DIFFUSER SUB S/No: DHRTDS399 | |
| DC | 1 | 450.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS | |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 5.0XH | Box | | | | S/No: DR44284 | |
| HWDP | 1 | 380.76 | 5.500 | 4.776 | 19.9 | S-135 | 5.0XH | Box | | | | S/No: RIGS | |
| Total: | | 962.49 | | | | | | | | | | | |





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Table 24: 10-5/8 in. BHA # 9 used with bit #9.

| BHA No: 9 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------|--------|-------------------------|--------|------------|----------------|----------------------------------|----------------|----------|----------|----------------------------------|--|
| BHA Length (ft): | | 962.49 | | | | | | | | | | | |
| Weights in Air | | | | Buoyed Weight | | | | Mud Wt of (lbs/gal): 9.10 | | | | | |
| BHA Wt: | | 92,524 | | 79,655 | | | | | | | | | |
| Drillstring Wt: | | 92,524 | | 79,655 | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| In | | | | | | Out | | | | | | | |
| Depth (ft): | | 5,761 | | 5,821 | | | | | | | | | |
| Date/Time: | | 08-Jul-21 06:00 | | 10-Jul-21 23:00 | | | | | | | | | |
| Inclination: | | | | | | | | | | | | | |
| Azimuth: | | 0 | | 0 | | | | | | | | | |
| Average RPM: | | 40 | | Drilling Hrs.: | | | | 1 | | | | | |
| Build Rate: | | | | Walk Rate: | | | | | | | | | |
| WOB - Avg (lbs): | | 65 | | WOB - Max (lbs): | | | | 65 | | | | | |
| Comments: 1.25 DEG .166 rev. Pulled due to motor failure. Stator rubber at shakers along with high pressure. | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| No. Item | Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | Blade OD | Blade OD | Comment | |
| BIT | 1 | 1.50 | 10.625 | | | | 7.625REG | Pin | | | | S/No: A279690 | |
| MMTR | 1 | 33.00 | 8.250 | 6.250 | 77.4 | S-135 | 6.625REG | Box | 8.00 | 1.420 | | S/No: 800-36-7618 | |
| Mud Motor: Type: OTHER Manufacturer: Rival Model: NOV | | | | | | | | | | | | | |
| Lobe Configuration: 9/10 Speed: 0.166 Stages: 3.9 Torque: 14,930 ft lbs | | | | | | | | | | | | | |
| Dir. Company: SLB Bend Setting: 1.25 Distance: 6.93 ft | | | | | | | | | | | | | |
| Bearing Stab. OD: ins <input checked="" type="checkbox"/> Motor Pad <input checked="" type="checkbox"/> Motor Failure Failure Time: 10-Jul-21 16:00 | | | | | | | | | | | | | |
| Comments: Motor failed after 1 hour stator rubber at shakers along with 2 plugged jets | | | | | | | | | | | | | |
| STAB | 1 | 7.35 | 8.313 | 2.750 | 164.3 | S-135 | 6.625REG | Box | 8.00 | 3.550 | 10.375 | NON MAG STAB S/No: SD604680 | |
| MWD | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: DR34100 | |
| OTHER | 1 | 3.66 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | GAP SUB S/No: GSDRSN20 | |
| OTHER | 1 | 5.76 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 80001-3 | |
| STAB | 1 | 8.77 | 8.250 | 2.750 | 161.5 | S-135 | 6.625REG | Box | 8.25 | 4.090 | | 10 3/8" NM STAB S/No: DR43576 | |
| MONEL | 1 | 28.87 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | S/No: DR24762 | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB S/No: DR28684 | |
| OTHER | 1 | 2.34 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | FLOAT SUB S/No: DR28684 | |
| OTHER | 1 | 5.02 | 8.250 | 3.250 | 150.7 | S-135 | 6.625REG | Box | | | | DIFFUSER SUB S/No: DHRTDS399 | |
| DC | 1 | 450.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS | |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 5.0XH | Box | | | | S/No: DR44284 | |
| HWDP | 1 | 380.76 | 5.500 | 4.776 | 19.9 | S-135 | 5.0XH | Box | | | | S/No: RIGS | |
| Total: | | 962.49 | | | | | | | | | | | |





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Table 25: 10-5/8 in. BHA # 10 used with bit #9.

| BHA No: 10 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|------------------------------|----------|-----------------------------------------------|--------|----------------------------------------|--------|-----------------------|----------------|----------------------------------|----------------|-------|----------|----------------------------------|--|
| BHA Length (ft): | | 963.16 | | | | | | | | | | | |
| Weights in Air | | | | Buoyed Weight | | | | Mud Wt of (lbs/gal): 9.10 | | | | | |
| BHA Wt: | | 92,634 | | | | 79,750 | | | | | | | |
| Drillstring Wt: | | 92,634 | | | | 79,750 | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| In | | | | | | Out | | | | | | | |
| Depth (ft): | | 5,821 | | | | 6,700 | | | | | | | |
| Date/Time: | | 11-Jul-21 01:00 | | | | 11-Jul-21 11:30 | | | | | | | |
| Inclination: | | | | | | | | | | | | | |
| Azimuth: | | 0 | | | | 0 | | | | | | | |
| Average RPM: | | 50 | | | | Drilling Hrs.: | | 12 | | | | | |
| Build Rate: | | | | | | Walk Rate: | | | | | | | |
| WOB - Avg (lbs): | | 65 | | | | WOB - Max (lbs): | | 75 | | | | | |
| Comments: 1.5 deg .111 rev | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | |
| BIT | 1 | 1.50 | 10.625 | | | | 7.625REG | Pin | | | | S/No: A279692 | |
| MMTR | 1 | 33.00 | 8.250 | 6.250 | 77.4 | S-135 | 6.625REG | Box | 8.00 | 1.420 | | S/No: 800-36-7618 | |
| Mud Motor: Type: OTHER | | Manufacturer: NOV | | Model: NOV | | | | | | | | | |
| Lobe Configuration: 9/10 | | Speed: 0.111 | | Stages: 3.9 | | Torque: 26,270 ft lbs | | | | | | | |
| Dir. Company: SLB | | Bend Setting: 1.5 | | Distance: 6.93 ft | | | | | | | | | |
| Bearing Stab. OD: ins | | <input checked="" type="checkbox"/> Motor Pad | | <input type="checkbox"/> Motor Failure | | Failure Time: | | | | | | | |
| STAB | 1 | 8.02 | 8.313 | 2.750 | 164.3 | S-135 | 6.625REG | Box | 8.00 | 3.550 | 10.375 | NON MAG STAB S/No: DR43516 | |
| MWD | 1 | 28.45 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: DR34100 | |
| OTHER | 1 | 3.66 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | GAP SUB S/No: GSDRSN20 | |
| OTHER | 1 | 5.76 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 80001-3 | |
| STAB | 1 | 8.77 | 8.250 | 2.750 | 161.5 | S-135 | 6.625REG | Box | 8.25 | 4.090 | | 10 3/8" NM STAB S/No: DR43576 | |
| MONEL | 1 | 28.87 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | S/No: DR24762 | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB S/No: DR28684 | |
| OTHER | 1 | 2.34 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | FLOAT SUB S/No: DR28684 | |
| OTHER | 1 | 5.02 | 8.250 | 3.250 | 150.7 | S-135 | 6.625REG | Box | | | | DIFFUSER SUB S/No: DHRDTS399 | |
| DC | 1 | 450.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS | |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 5.0XH | Box | | | | S/No: DR44284 | |
| HWDP | 1 | 380.76 | 5.500 | 4.776 | 19.9 | S-135 | 5.0XH | Box | | | | S/No: RIGS | |
| Total: | | 963.16 | | | | | | | | | | | |





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Table 26: 10-5/8 in. BHA # 11 used with bit # 10.

| BHA No: 11 | | Wellbore: Original Wellbore | | | | | | | | | | |
|-----------------------------------------------------------------------------|-----------------|------------------------------------|-----------------------------------|-------|--------|-------|----------------|-----|----------------|-------|----------|-----------------------|
| BHA Length (ft): | 612.69 | | | | | | | | | | | |
| Weights in Air | | Buoyed Weight | Mud Wt of (lbs/gal): 83.00 | | | | | | | | | |
| BHA Wt: | 47,376 | -12,728 | | | | | | | | | | |
| Drillstring Wt: | 47,376 | -12,728 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| In | | Out | | | | | | | | | | |
| Depth (ft): | 6,700 | 6,728 | | | | | | | | | | |
| Date/Time: | 12-Jul-21 00:30 | 12-Jul-21 20:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: 50 Drilling Hrs.: 1.5 | | | | | | | | | | | | |
| Build Rate: Walk Rate: | | | | | | | | | | | | |
| WOB - Avg (lbs): 22 | | WOB - Max (lbs): 30 | | | | | | | | | | |
| Comments: 8-3/4" Coring assembly. Recovered approximately 12' of good core. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| CORBIT | 1 | 1.22 | 8.750 | | | | OTHER | Pin | | | | 8-3/4"X4" |
| STAB | 1 | 4.00 | 8.468 | 4.000 | 148.7 | | OTHER | Box | 1.94 | 7.250 | 8.468 | |
| CORE | 1 | 26.00 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | |
| STAB | 1 | 4.00 | 8.468 | 5.875 | 99.3 | | OTHER | Box | 7.25 | | 1.940 | |
| OTHER | 1 | 1.50 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | Lower sub |
| OTHER | 1 | 1.75 | 6.750 | 5.375 | 44.5 | | OTHER | Box | | | | Upper sub |
| FLOAT | 1 | 3.12 | 6.750 | 3.000 | 97.6 | | OTHER | Box | | | | |
| XO | 1 | 3.20 | 6.750 | 3.000 | 97.6 | | OTHER | Box | | | | |
| RR | 1 | 6.50 | 10.625 | 3.000 | 277.3 | | 6.625REG | Box | | | | 10-5/8" Roller Reamer |
| DC | 3 | 93.20 | 8.000 | 3.000 | 146.8 | | 6.625REG | Box | | | | |
| XO | 1 | 3.20 | 8.000 | 3.000 | 146.8 | | 5.5IF | Box | | | | |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | |
| Total: | | 612.69 | | | | | | | | | | |





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Table 27: 10-5/8 in. BHA # 12 used with bit # 11.

| BHA No: 12 | | Wellbore: Original Wellbore | | | | | | | | | | |
|---------------------------------------------------------------------------|-----------------------|------------------------------------|-----------------------------------|-------|--------|-------|----------------|-----|----------------|-------|----------|-----------------------------|
| BHA Length (ft): | 509.79 | | | | | | | | | | | |
| | Weights in Air | Buoyed Weight | Mud Wt of (lbs/gal): 83.00 | | | | | | | | | |
| BHA Wt: | 31,578 | -8,484 | | | | | | | | | | |
| Drillstring Wt: | 31,578 | -8,484 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | In | Out | | | | | | | | | | |
| Depth (ft): | 6,723 | 6,740 | | | | | | | | | | |
| Date/Time: | 12-Jul-21 23:00 | 13-Jul-21 08:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 55 | Drilling Hrs.: | 1 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 14 | WOB - Max (lbs): | 16 | | | | | | | | | |
| Comments: 8 3/4" core assembly. Core run #2 Recovered 9.5 of core. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| CORBIT | 1 | 1.22 | 8.750 | | | | OTHER | Pin | | | | 8-3/4"X4" S/No: 12958459 |
| STAB | 1 | 4.00 | 8.468 | 4.000 | 148.7 | | OTHER | Box | 1.94 | 7.250 | 8.468 | |
| CORE | 1 | 26.00 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | |
| STAB | 1 | 4.00 | 8.468 | 5.875 | 99.3 | | OTHER | Box | 7.25 | | 1.940 | |
| OTHER | 1 | 1.50 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | Lower sub |
| OTHER | 1 | 1.75 | 6.750 | 5.375 | 44.5 | | OTHER | Box | | | | Upper sub |
| FLOAT | 1 | 3.12 | 6.750 | 3.000 | 97.6 | | OTHER | Box | | | | |
| XO | 1 | 3.20 | 8.000 | 3.000 | 146.8 | | 5.5IF | Box | | | | |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | |
| Total: | | 509.79 | | | | | | | | | | |





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Table 28: 10-5/8 in. BHA # 13 used with bit # 12.

| BHA No: 13 | | Wellbore: Original Wellbore | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------|-----------------|------------------------------------|----------------------------------|-------|--------|-------|----------------|-----|----------------|----|----------|---------------|
| BHA Length (ft): | 845.73 | | | | | | | | | | | |
| Weights in Air | | Buoyed Weight | Mud Wt of (lbs/gal): 9.10 | | | | | | | | | |
| BHA Wt: | 78,354 | 67,455 | | | | | | | | | | |
| Drillstring Wt: | 78,354 | 67,455 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| In | | Out | | | | | | | | | | |
| Depth (ft): | 6,740 | 6,742 | | | | | | | | | | |
| Date/Time: | 13-Jul-21 09:00 | 13-Jul-21 21:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 60 | Drilling Hrs.: | 1 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 21 | WOB - Max (lbs): | 25 | | | | | | | | | |
| Comments: BHA was used to open hole up from 8.75' to 10-5/8" drilled 2' of new formation | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 1.50 | 10.625 | | | | 7.625REG | Pin | | | | S/No: 1116990 |
| DC | 1 | 31.00 | 8.250 | 3.250 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS |
| RR | 1 | 7.42 | 10.625 | 3.250 | 273.1 | S-135 | 6.625REG | Box | | | | |
| DC | 1 | 421.00 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS |
| XO | 1 | 4.05 | 8.000 | 2.750 | 150.7 | S-135 | 5.0XH | Box | | | | S/No: DR44284 |
| HWDP | 1 | 380.76 | 5.500 | 4.776 | 19.9 | S-135 | 5.0XH | Box | | | | S/No: RIGS |
| Total: | | 845.73 | | | | | | | | | | |





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Table 29: 10-5/8 in. BHA # 14 used with bit # 13.

| BHA No: 14 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------------------------------|----------------------------|-------|--------|-------|----------------|-----|----------------|-------|----------|-------------------------------------|--|
| BHA Length (ft): | | 1,035.59 | | | | | | | | | | | |
| | | Weights in Air | Buoyed Weight | | | | | | | | | | |
| BHA Wt: | | 93,580 | 80,564 | | | | | | | | | | |
| Drillstring Wt: | | 93,580 | 80,564 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| | | In | Out | | | | | | | | | | |
| Depth (ft): | | 6,742 | 7,613 | | | | | | | | | | |
| Date/Time: | | 14-Jul-21 01:00 | 15-Jul-21 17:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | | |
| Azimuth: | | 0 | 0 | | | | | | | | | | |
| Average RPM: | | 45 | Drilling Hrs.: 12.5 | | | | | | | | | | |
| Build Rate: | | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | | 65 | WOB - Max (lbs): 70 | | | | | | | | | | |
| Comments: 10-5/8" dir assembly w/1.15 deg motor .166 rev/gal. Motor took a high amount of torque to drain 45 kft/lbs. Bit had 3-plugged jets with pieces of rubber from the stator | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | |
| BIT | 1 | 0.92 | 10.625 | | | | 7.625REG | Pin | | | | S/No: A279638 | |
| MMTR | 1 | 33.29 | 8.250 | 6.250 | 77.4 | S-135 | 6.625REG | Box | 8.00 | 1.420 | | S/No: BPG2800-047 | |
| Mud Motor: Type: OTHER Manufacturer: BICO Model: Bico Lobe Configuration: 7/8 Speed: 0.166 Stages: 4 Torque: ft lbs Dir. Company: SDI Bend Setting: 1.15 Distance: 11.00 ft Bearing Stab. OD: 10.625 ins <input checked="" type="checkbox"/> Motor Pad <input type="checkbox"/> Motor Failure Failure Time: Comments: Motor took a high amount of torque to drain 45 kft/lbs. Bit had 3-plugged jets with pieces of rubber from the | | | | | | | | | | | | | |
| STAB | 1 | 5.14 | 8.313 | 2.750 | 164.3 | S-135 | 6.625REG | Box | 8.00 | 3.550 | 10.250 | 10-1/4"NON MAG STAB S/No: 770162 | |
| MONEL | 1 | 29.79 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: 84-121 | |
| OTHER | 1 | 9.28 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | PONY COLLAR S/No: 126-120 | |
| OTHER | 1 | 5.82 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 74-124 | |
| STAB | 1 | 4.30 | 8.250 | 2.750 | 161.5 | S-135 | 6.625REG | Box | 8.25 | 4.090 | | 10 1/2" NM STAB S/No: 770132 | |
| MONEL | 1 | 29.28 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | S/No: 84-350 | |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB | |
| DC | 1 | 455.86 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS | |
| XO | 1 | 2.64 | 8.000 | 2.750 | 150.7 | S-135 | 5.0XH | Box | | | | S/No: DR44284 | |
| HWDP | 1 | 456.31 | 5.500 | 4.776 | 19.9 | S-135 | 5.0XH | Box | | | | S/No: RIGS | |
| Total: | | 1,035.59 | | | | | | | | | | | |





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Table 30: 10-5/8 in. BHA # 15 used with bit # 14.

| BHA No: 15 | | Wellbore: Original Wellbore | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------|--------|-------|------------------|-------|-----------------|---------------------------|----------------|-------|----------|---------------------------------|
| BHA Length (ft): | | 1,049.30 | | | | | | | | | | |
| | | Weights in Air | | | Buoyed Weight | | | Mud Wt of (lbs/gal): 9.10 | | | | |
| BHA Wt: | | 95,535 | | | 82,247 | | | | | | | |
| Drillstring Wt: | | 95,535 | | | 82,247 | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | | In | | | | | Out | | | | | |
| Depth (ft): | | 7,613 | | | | | 8,500 | | | | | |
| Date/Time: | | 15-Jul-21 23:00 | | | | | 16-Jul-21 23:00 | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | | 0 | | | | | 0 | | | | | |
| Average RPM: | | 50 | | | Drilling Hrs.: | | | 12 | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | | 65 | | | WOB - Max (lbs): | | | 70 | | | | |
| Comments: 1.5 deg. 160 rev/gal. 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. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 0.92 | 10.625 | | | | 7.625REG | Pin | | | | S/No: A279691 |
| MMTR | 1 | 33.29 | 8.250 | 6.250 | 77.4 | S-135 | 6.625REG | Box | 8.00 | 1.420 | | S/No: BPG2800-0035 |
| Mud Motor: Type: OTHER Manufacturer: BICO Model: Bico Lobe Configuration: 7/8 Speed: 0.16 Stages: 4 Torque: ft lbs Dir. Company: SDI Bend Setting: 1.50 Distance: 11.00 ft Bearing Stab. OD: ins <input checked="" type="checkbox"/> Motor Pad <input type="checkbox"/> Motor Failure Failure Time: Comments: Slick | | | | | | | | | | | | |
| STAB | 1 | 5.14 | 8.313 | 2.750 | 164.3 | S-135 | 6.625REG | Box | 8.00 | 3.550 | 10.250 | 10-5/8" roller reamer |
| OTHER | 1 | 9.00 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | Pony Collar S/No: 126-120 |
| OTHER | 1 | 2.15 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | Cubic sensor S/No: CSS-006 |
| MONEL | 1 | 29.79 | 8.375 | 3.500 | 154.5 | S-135 | 6.625REG | Box | | | | S/No: 84-121 |
| OTHER | 1 | 5.82 | 8.125 | 3.500 | 143.5 | S-135 | 6.625REG | Box | | | | PULSER SUB S/No: 74-124 |
| OTHER | 1 | 9.08 | 8.000 | 3.500 | 138.1 | S-135 | 6.625REG | Box | | | | Pony Collar S/No: 126-058 |
| STAB | 1 | 4.30 | 8.250 | 2.750 | 161.5 | S-135 | 6.625REG | Box | 8.25 | 4.090 | | 10 1/2" NM STAB S/No: 770127 |
| MONEL | 1 | 29.28 | 8.000 | 3.430 | 139.4 | S-135 | 6.625REG | Box | | | | S/No: 84-350 |
| OTHER | 1 | 2.76 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | Cubic sensor S/No: CS-04 |
| OTHER | 1 | 2.96 | 8.063 | 2.750 | 153.4 | S-135 | 6.625REG | Box | | | | FILTER SUB |
| DC | 1 | 455.86 | 8.000 | 2.750 | 150.7 | S-135 | 6.625REG | Box | | | | S/No: RIGS |
| XO | 1 | 2.64 | 8.000 | 2.750 | 150.7 | S-135 | 5.0XH | Box | | | | S/No: DR44284 |
| HWDP | 1 | 456.31 | 5.500 | 4.776 | 19.9 | S-135 | 5.0XH | Box | | | | S/No: RIGS |
| Total: | | 1,049.30 | | | | | | | | | | |





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Table 31: 8-3/4 in. Coring BHA #16 used with bit #15.

| BHA No: 16 | | Wellbore: Original Wellbore | | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------------------------------------|-----------------------------------|-------|--------|-------|----------------|-----|----------------|-------|----------|-----------------------------|
| BHA Length (ft): | 509.79 | | | | | | | | | | | |
| | Weights in Air | Buoyed Weight | Mud Wt of (lbs/gal): 83.00 | | | | | | | | | |
| BHA Wt: | 31,578 | -8,484 | | | | | | | | | | |
| Drillstring Wt: | 31,578 | -8,484 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | In | Out | | | | | | | | | | |
| Depth (ft): | 8,500 | 8,530 | | | | | | | | | | |
| Date/Time: | 17-Jul-21 08:00 | 18-Jul-21 01:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 65 | Drilling Hrs.: | 4 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 8 | WOB - Max (lbs): | 10 | | | | | | | | | |
| Comments: Core run #3. Recovered 23.7' of core. 50% 2-3" in size with the other 50% 9-12" in size. Note: Inner barrel assembly was pushed up inside of core barrel approximately 3'. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| CORBIT | 1 | 1.22 | 8.750 | | | | OTHER | Pin | | | | 8-3/4"X4" S/No: 13206404 |
| STAB | 1 | 4.00 | 8.468 | 4.000 | 148.7 | | OTHER | Box | 1.94 | 7.250 | 8.468 | |
| CORE | 1 | 26.00 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | |
| STAB | 1 | 4.00 | 8.468 | 5.875 | 99.3 | | OTHER | Box | 7.25 | | 1.940 | |
| OTHER | 1 | 1.50 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | Lower sub |
| OTHER | 1 | 1.75 | 6.750 | 5.375 | 44.5 | | OTHER | Box | | | | Upper sub |
| FLOAT | 1 | 3.12 | 6.750 | 3.000 | 97.6 | | OTHER | Box | | | | |
| XO | 1 | 3.20 | 8.000 | 3.000 | 146.8 | | 5.5IF | Box | | | | |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | |
| Total: | | 509.79 | | | | | | | | | | |





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Table 32: 8-3/4 in. Coring BHA # 17 used with bit # 15.

| BHA No: 17 | | Wellbore: Original Wellbore | | | | | | | | | | |
|---------------------------------------|-----------------|------------------------------------|-------------------------|-------|--------|-------|----------------|-----|----------------|-------|----------|--------------------------|
| BHA Length (ft): | 509.79 | | | | | | | | | | | |
| | | Weights in Air | Buoyed Weight | | | | | | | | | |
| Mud Wt of (lbs/gal): 83.00 | | | | | | | | | | | | |
| BHA Wt: | 31,578 | -8,484 | | | | | | | | | | |
| Drillstring Wt: | 31,578 | -8,484 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | | In | Out | | | | | | | | | |
| Depth (ft): | 8,530 | 8,540 | | | | | | | | | | |
| Date/Time: | 18-Jul-21 02:00 | 18-Jul-21 18:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| | | Average RPM: | Drilling Hrs.: | | | | | | | | | |
| | | 65 | 3 | | | | | | | | | |
| | | Build Rate: | Walk Rate: | | | | | | | | | |
| | | | | | | | | | | | | |
| | | WOB - Avg (lbs): | WOB - Max (lbs): | | | | | | | | | |
| | | 10 | 16 | | | | | | | | | |
| Comments: 8-3/4" Core assembly run #4 | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| CORBIT | 1 | 1.22 | 8.750 | | | | OTHER | Pin | | | | 8-3/4"X4" S/No: 13206404 |
| STAB | 1 | 4.00 | 8.468 | 4.000 | 148.7 | | OTHER | Box | 1.94 | 7.250 | 8.468 | |
| CORE | 1 | 26.00 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | |
| STAB | 1 | 4.00 | 8.468 | 5.875 | 99.3 | | OTHER | Box | 7.25 | | 1.940 | |
| OTHER | 1 | 1.50 | 7.250 | 5.875 | 48.2 | | OTHER | Box | | | | Lower sub |
| OTHER | 1 | 1.75 | 6.750 | 5.375 | 44.5 | | OTHER | Box | | | | Upper sub |
| FLOAT | 1 | 3.12 | 6.750 | 3.000 | 97.6 | | OTHER | Box | | | | |
| XO | 1 | 3.20 | 8.000 | 3.000 | 146.8 | | 5.5IF | Box | | | | |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | |
| Total: | | 509.79 | | | | | | | | | | |

Table 33: 10-5/8 in. BHA # 18 used with bit # 14.

| BHA No: 18 | | Wellbore: Original Wellbore | | | | | | | | | | |
|--------------------------------------|-----------------|------------------------------------|-------------------------|-------|--------|-------|----------------|-----|----------------|----|----------|--------------------|
| BHA Length (ft): | 469.42 | | | | | | | | | | | |
| | | Weights in Air | Buoyed Weight | | | | | | | | | |
| Mud Wt of (lbs/gal): 83.00 | | | | | | | | | | | | |
| BHA Wt: | 28,767 | -7,729 | | | | | | | | | | |
| Drillstring Wt: | 28,767 | -7,729 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| | | In | Out | | | | | | | | | |
| Depth (ft): | 8,500 | 8,514 | | | | | | | | | | |
| Date/Time: | 18-Jul-21 19:00 | 19-Jul-21 08:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| | | Average RPM: | Drilling Hrs.: | | | | | | | | | |
| | | 55 | 1 | | | | | | | | | |
| | | Build Rate: | Walk Rate: | | | | | | | | | |
| | | | | | | | | | | | | |
| | | WOB - Avg (lbs): | WOB - Max (lbs): | | | | | | | | | |
| | | 25 | 30 | | | | | | | | | |
| Comments: 10-5/8" Ream out assembly. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 1.22 | 10.625 | | | | OTHER | Pin | | | | |
| BS | 1 | 3.20 | 8.000 | | | | 5.5IF | Box | | | | S/No: A279691 |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | Dressed with float |
| Total: | | 469.42 | | | | | | | | | | |





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Table 34: 10-5/8 in. BHA # 19 used with bit # 12.

| BHA No: 19 | | Wellbore: Original Wellbore | | | | | | | | | | |
|------------------------------------------------------------|-----------------|------------------------------------|-----------------------------------|-------|--------|-------|----------------|-----|----------------|----|----------|---------------------------------|
| BHA Length (ft): | 469.42 | | | | | | | | | | | |
| Weights in Air | | Buoyed Weight | Mud Wt of (lbs/gal): 83.00 | | | | | | | | | |
| BHA Wt: | 28,767 | -7,729 | | | | | | | | | | |
| Drillstring Wt: | 28,767 | -7,729 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| In | | Out | | | | | | | | | | |
| Depth (ft): | 8,514 | 8,540 | | | | | | | | | | |
| Date/Time: | 19-Jul-21 21:00 | 20-Jul-21 10:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 50 | Drilling Hrs.: | 1 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 23 | WOB - Max (lbs): | 28 | | | | | | | | | |
| Comments: BHA was used to open hole from 8-3/4" to 10-5/8" | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 1.22 | 10.625 | | | | OTHER | Pin | | | | TCI BIT RE-RUN S/No: 1116990 |
| BS | 1 | 3.20 | 8.000 | | | | 5.5IF | Box | | | | Dressed with float |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | |
| Total: | | 469.42 | | | | | | | | | | |

Table 35: 10-5/8 in. BHA # 20 used with bit # 12.

| BHA No: 20 | | Wellbore: Original Wellbore | | | | | | | | | | |
|---------------------------------------|-----------------|------------------------------------|-----------------------------------|-------|--------|-------|----------------|-----|----------------|----|----------|---------------------------------|
| BHA Length (ft): | 469.42 | | | | | | | | | | | |
| Weights in Air | | Buoyed Weight | Mud Wt of (lbs/gal): 83.00 | | | | | | | | | |
| BHA Wt: | 28,767 | -7,729 | | | | | | | | | | |
| Drillstring Wt: | 28,767 | -7,729 | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | |
| In | | Out | | | | | | | | | | |
| Depth (ft): | 8,540 | 8,545 | | | | | | | | | | |
| Date/Time: | 20-Jul-21 21:30 | 21-Jul-21 11:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | |
| Azimuth: | 0 | 0 | | | | | | | | | | |
| Average RPM: | 45 | Drilling Hrs.: | 0.5 | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | |
| WOB - Avg (lbs): | 25 | WOB - Max (lbs): | 28 | | | | | | | | | |
| Comments: 10-5/8" clean out assembly. | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment |
| BIT | 1 | 1.22 | 10.625 | | | | OTHER | Pin | | | | TCI BIT RE-RUN S/No: 1116990 |
| BS | 1 | 3.20 | 8.000 | | | | 5.5IF | Box | | | | Dressed with float |
| HWDP | 15 | 465.00 | 5.500 | 2.750 | 60.6 | | 5.5IF | Box | | | | |
| Total: | | 469.42 | | | | | | | | | | |





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6.4.5. 10-5/8 in. Drilling Fluids

Planned basic drilling parameters and the design of the mud system for the 10-5/8 in. drilling sections are shown in Table 36 and the average parameters used are shown in Table 37. The mud system was designed as a lightly dispersed clay-based mud system with a weight between 8.6 and 9.5 ppg. adding gel as needed to maintain adequate viscosity for good hole cleaning.

Table 36: Fluid parameters planned for 10-5/8 in.

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| Hole Size | 10-5/8 in. |
| Casing Size | 7 in. |
| Mud Type | Lime/Gel/Water System |
| Mud Weight (ppg) | 8.6 – 9.5 |
| Viscosity (sec) | 50-60+ |
| Filtrate (ML) | < 12 |
| Total Mud Volume | 1,200 bbls (500 bbls surface volume) |
| Directional Program | NA – Vertical Hole |
| Formations | Granite-Gneiss |
| Interval BHT | ~ 365°F |
| <p>Continue drilling 10-5/8 in. hole. The current mud system will be treated as required for a sumplless system. The drilling fluid properties for the 10-5/8 in. section shown here may be modified per the accepted detailed drilling fluids program. Lightly dispersed clay-based mud HT system, adding gel as needed to maintain adequate viscosity for good hole cleaning (YP 15-25). Use Bentonite/LCM pills and Polyvis (PHPA) to sweep hole; thin mud with Desco CF/HT Thin as needed. Maintain mud weight to control any artesian influx, if encountered, and add 2 – 4 ppb Micro C for Wellbore Strengthening. Use DMA/PAC Polymer for desired fluid loss control, and TORKease/Walnut to reduce torque and drag; maintain pH of 10 -11 with caustic soda/lime. If encountered, control lost circulation with conventional LCM pills and drill cuttings. Run and cement 7” casing to 8,500 ft.</p> | |



Table 37: Average fluid properties for 10-5/8 in. section.

| Fluid Parameters (spud) | Unit | Min | Max | Ave |
|---------------------------|-----------------------|------|------|------|
| Mud Weight | ppg | 8.6 | 9.5 | 9 |
| pH | | 10 | 11 | 10.5 |
| API Fluid Loss (Filtrate) | cc/30 sec. | 12 | 12 | 12 |
| Plastic Viscosity | cP | alap | alap | alap |
| Yield Point | lb/100ft ² | 8 | 12 | 16 |

6.4.6. 7 in. Casing and Cementing

Upon reaching section TD and finished coring operations (from 8,500 to 8,540 ft.), 8-3/4 in. cored hole was opened to 10-5/8 in. from 8,500 to 8,514 ft. A suite of geophysical logs was run including sonic scanner, borehole formation imager and triple combo. Maximum BHT was recorded as 354 F° during logging operations. 8-3/4 in. cored hole was opened from 8,514 to 8,540 ft. using a 10-5/8 in. TCI bit. BHA was pulled up to surface then Schlumberger ran in hole and performed UBI log. Section TD was deepened to 8,545 ft. to provide enough rat hole prior to run 7 in. casing.

The wellhead was prepped and the 7 in. 41 ppf T-110SS Tenaris casing was run to 6,753 ft. with the Silixa fiber optic cable strapped to outside on 22 July. A continuity test of the fiber was run every 15 joints to ensure functioning and catch any damage early. While running in, at 3,722 ft. a splice was made to new spool of cable. Static temperature was 208 °F at 3,933 ft. The continuity test at 7,070 ft. indicated that the cable failed at 4,000 ft. from the surface. Circulated bottoms up at 7,106 ft. with max surface flow temperature of 99° F. Static temperature reading at 6,966 ft. with fiber-optic cable was 359° F. Continuity test once casing reached 7,812 ft. indicated fiber-optic cable lost conductivity from 4,500 ft. to 7,812 ft. Static temperature was 240° F at 4,500 ft. Continuity test from the casing setting depth of 8,508 ft. indicated fiber-optic cable failed from 3,933 ft. to 8508 ft. Static temperature was 208° F at 3,933 ft.

Cementing of 7 in. commenced on 25 July at 02:30 hours. 809 bbls of 12.7 ppg RC ThermaLite-HT cement slurry was pumped and displaced with 273 bbls of fresh water. Waited on cement while holding 2,800-3,000 psi pressure inside casing. 7-1/16 in. 10,000 psi BOPE, installed and tested on 26-27 July.

Primary cementing report and pumping schedule are provided in Table 38 and Figure 17, respectively.



Table 38: Primary cement job report for 7" casing.

| Cement Job Information | | | | | | |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------------------|------------------------------------------------|------|---------------|
| Start Date/Time: | 25-Jul-21 03:00 | Wellbore: | Original Wellbore | | | |
| Job Type: | PRIMARY | String OD (ins): | 7.000 | | | |
| Well Section: | PROD | String Type: | FULL | | | |
| Cementing Co: | Resource | Cementing Engineer: | | | | |
| Primary Job Detail | | | | | | |
| | Volume (bbls) | Pump Time | Rate (bbls/min) | Pressure (psi) | | |
| Conditioning Data: | | 20 | 5.0 | 315 | | |
| Cement Data: | 809.0 | 134 | 6.0 | 1,114 | | |
| Displacement Data: | 276.0 | 27 | 12.0 | 3,685 | | |
| Calc. Displacement Vol: | 276.0 | | | | | |
| <input type="checkbox"/> Reciprocate Pipe? | | <input type="checkbox"/> Batch Mix? | | <input checked="" type="checkbox"/> Bump Plug? | | |
| Returns to Surface: | FULL | <input checked="" type="checkbox"/> Cement at Surface? | | Bump Pressure: | | |
| Calc Top of Cement (ft): | 0 | Excess (%): | 50.00% | Volume (bbls): 126.0 | | |
| | | Avg. Hole Size (ins): | 10.625 | | | |
| Slurry Information | | | | | | |
| Type | Density | Yield | Sacks | Volume | Rate | Additives |
| LEAD | 12.97 | 2.27 | 2000 | 809.0 | 6.0 | Thermalite-HT |
| Post Job Information | | | | | | |
| Liner Top Test (lbs/gal): | | | | Job Success? | Yes | |
| Actual Top of Cmt (ft): | 0 | | | CBL Bond Quality: | | |
| Misc. Comments: | <p>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 ThermoLite-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.</p> | | | | | |

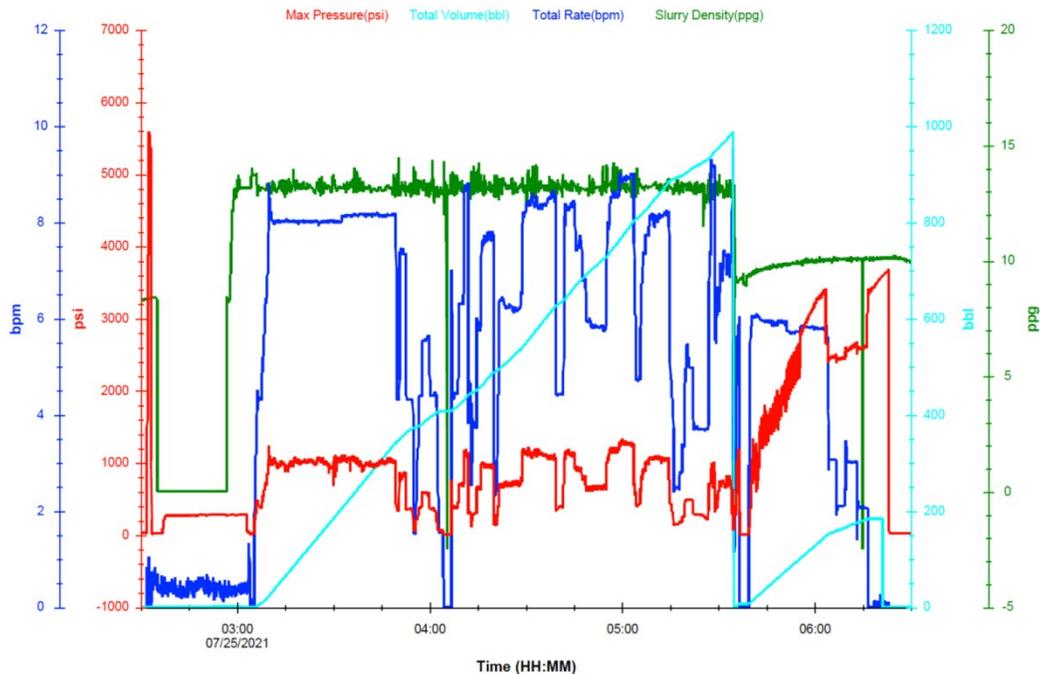


Figure 17: 7 in. Production casing cement pressure chart (primary job)





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6.5. 5-3/4 in. Hole to 9,500 ft.

6.5.1. 5-3/4 in. Hole Objectives

The drilling objectives for the 5-3/4 in. section was:

- Drill the cement inside the 7 in. shoe track and new 5-3/4 in. hole from the 7 in. casing shoe depth to 9,500 ft.
- Wellbore deviation from vertical shall be surveyed at least every 200 ft. and at bottom of section, not to exceed 3° in total.
 - Departure should not exceed a radius of 250 ft. north, east, and west and no more than 150 ft. south in any portion of the well.
- Drill fast to reduce the wellbore exposure to the drilling fluid.

All these objectives were achieved.

6.5.2. 5-3/4 in. Section Summary

The drilling of the 5-3/4 in. hole commenced on 28 July, and total depth of 9,500 ft. was reached on 29 July. A TCI bit was used to drill out shoe track and 10 ft. of new formation. Remaining hole section was drilled with a PDC bit from 8,555 to 9,500 ft. in one run. Maximum inclination was measured as 3.96° at 9,412 ft. Open hole logging was performed at this hole section including the Schlumberger induction tools, sonic, compensated neutron, telemetry and gamma ray tools ('Triple Combo'). Maximum BHT was recorded as 416 F°. This hole section was completed open hole and rig was released as of 31 July 2021 23:59.

6.5.3. 5-3/4 in. Surface Equipment

Threaded type 7 in. wellhead was rigged up and torqued up on casing string, then the 7-1/16 in. 10,000 psi BOPE was installed. Following pressure tests on wellhead and BOPE, a 5-3/4 in. TCI bit was run, and shoe track and 10 ft. of new hole was drilled down to 8,555 ft. An xLOT was performed then drilling of this hole section was finished in one run using a PDC bit. The results of the xLOT was 0.78 psi/ft., which is similar to the results obtained from DFIT in well 16A-32.



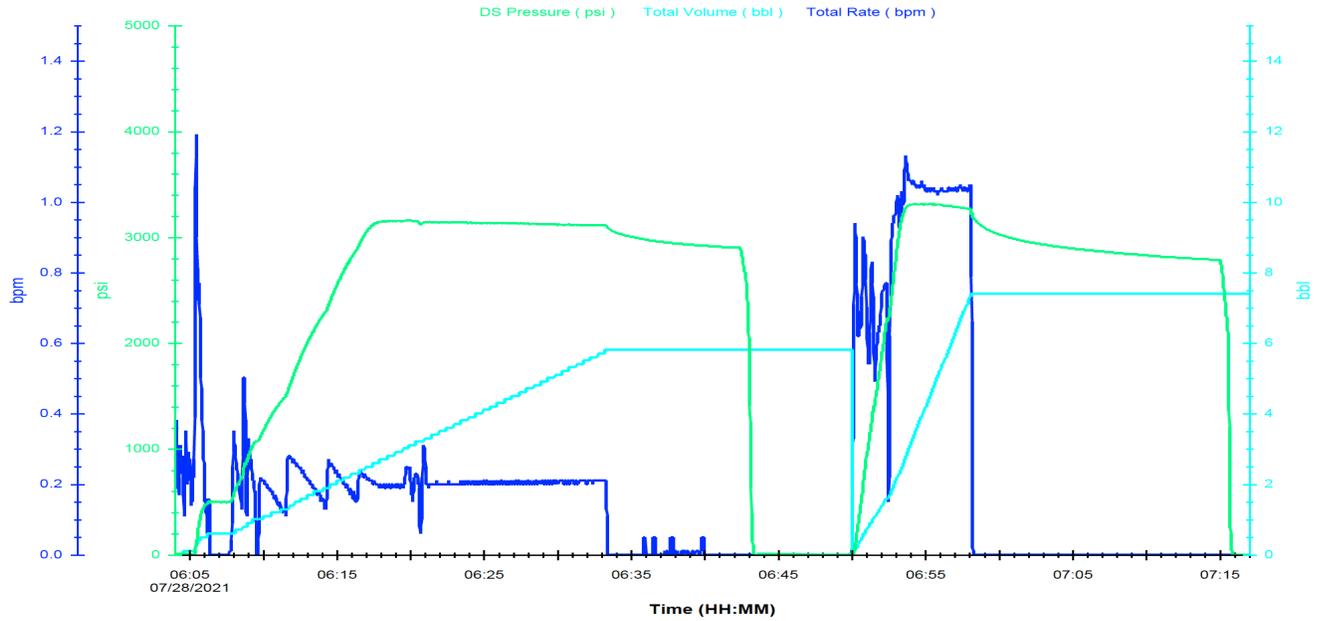


Figure 18: xLOT pump chart at 8,555 ft.



| | |
|------------------------------------------------------------------------------------|------------------------------------------|
|  | 78B-32 7 in, BOPE |
| | Drawn by GRG on Sept/2021 (not to scale) |

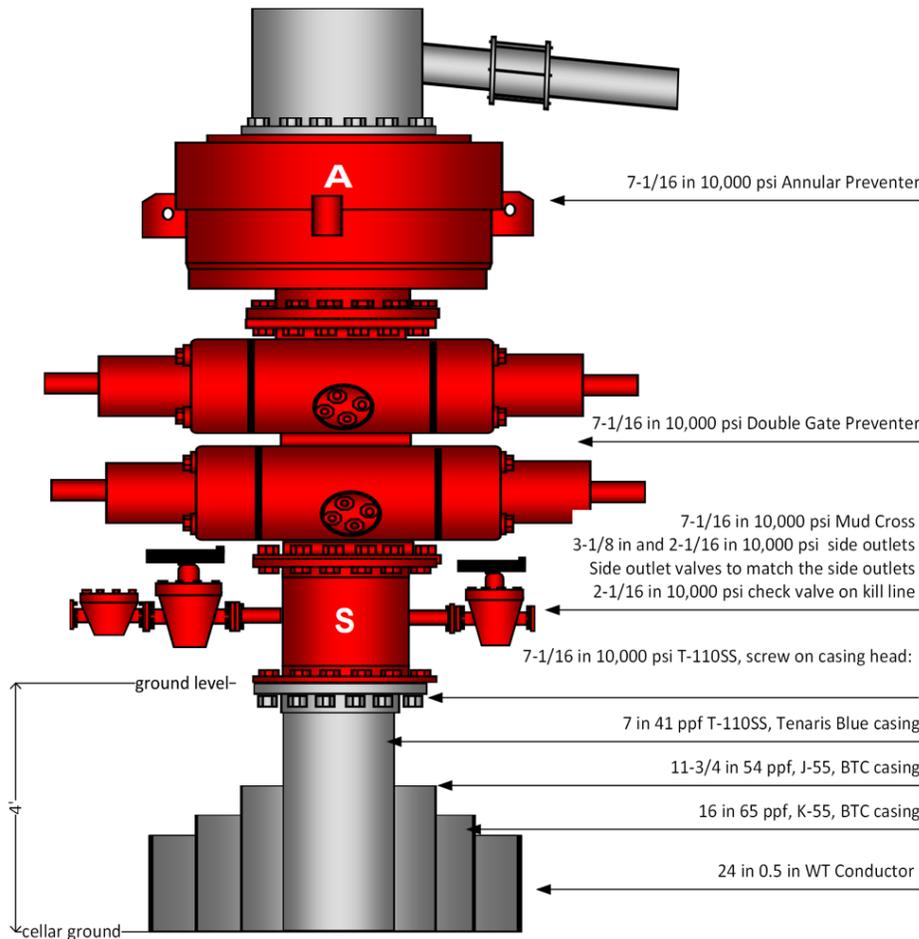


Figure 19: 7-1/16" BOPE stack for drilling 5-3/4" hole.

6.5.4. 5-3/4 in. Bits, Hydraulics Program and BHA

In the 5-3/4 in. section, formation was 100% granodiorite, and two bits were used through the section to reach to 9,500 ft. TD: one TCI bit to drill out cement and float equipment and one PDC bit to get to TD. The bits used in this section are captured in Table 39. Table 40 and Table 41 refer to BHAs used to drill the 5-3/4 in. hole section to well TD.





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Table 39: Bits used to drill the 5-3/4 in. hole section.

| Bit #/Run | Hole made (ft) | Bit Size (in.) | IADC Code | Ave. WOB (Klb) | Ave. RPM | Jet Size (32nd) | Ave. flow rate (gpm) | Ave. ROP (fph) |
|-----------|----------------|----------------|-----------|----------------|----------|-----------------|----------------------|----------------|
| 16/1 | 10 | 5.75 | 511 | 16 | 208 | 18 18 18 | 300 | 10 |
| 17/1 | 945 | 5.75 | M233 | 30 | 198 | 12 12 12 | 300 | 99.5 |

Table 40: 5-3/4 in. BHA #21 to clean-out cement inside the 7 in. casing.

| BHA No: 21 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|-------------------------------------------------|----------|------------------------------------|----------------------------|-------|--------|-------|----------------|-----|----------------|------------|----------|---------------|--|
| BHA Length (ft): | | 921.57 | | | | | | | | | | | |
| | | Weights in Air | Buoyed Weight | | | | | | | | | | |
| BHA Wt: | | 45,656 | | | | | | | | | | | |
| Drillstring Wt: | | 45,656 | | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| | | In | Out | | | | | | | | | | |
| Depth (ft): | | 8,545 | 8,555 | | | | | | | | | | |
| Date/Time: | | 28-Jul-21 01:00 | 28-Jul-21 09:00 | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | | |
| Azimuth: | | 0 | 0 | | | | | | | | | | |
| Average RPM: | | 40 | Drilling Hrs.: 1 | | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | | |
| WOB - Avg (lbs): | | 16 | WOB - Max (lbs): 18 | | | | | | | | | | |
| Comments: 5-3/4" TCI clean out assembly. | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | Fishing OD | Blade OD | Comment | |
| BIT | 1 | 0.75 | 5.750 | | | | 3.5REG | Pin | | | | S/No: 5002331 | |
| BS | 1 | 2.82 | 4.620 | 2.620 | 38.7 | S-135 | 3.5IF | Box | | | | | |
| DC | 30 | 918.00 | 4.750 | 2.000 | 49.6 | S-135 | 3.5IF | Box | | | | | |
| Total: | | 921.57 | | | | | | | | | | | |





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Table 41: 5-3/4 in. BHA # 21 used with bit # 17.

| BHA No: 22 | | Wellbore: Original Wellbore | | | | | | | | | | | |
|--------------------------------------|-----------------|------------------------------------|----------------------------|------------------------------------|--------|----------------------------------------|----------------|-------------------|----------------------|----|----------|-----------------------------|--|
| BHA Length (ft): | | 1,020.17 | | | | | | | | | | | |
| | | Weights in Air | Buoyed Weight | | | | | | | | | | |
| BHA Wt: | | 47,123 | | | | | | | | | | | |
| Drillstring Wt: | | 47,123 | | | | | | | | | | | |
| Wt Above Jars: | | | | | | | | | | | | | |
| Wt Below Jars: | | | | | | | | | | | | | |
| | | In | Out | | | | | | | | | | |
| Depth (ft): | | 8,555 | 10 | | | | | | | | | | |
| Date/Time: | 28-Jul-21 18:00 | 29-Jul-21 07:00 | | | | | | | | | | | |
| Inclination: | | | | | | | | | | | | | |
| Azimuth: | | 0 | 0 | | | | | | | | | | |
| Average RPM: | | 50 | Drilling Hrs.: 9.5 | | | | | | | | | | |
| Build Rate: | | Walk Rate: | | | | | | | | | | | |
| WOB - Avg (lbs): | | 30 | WOB - Max (lbs): 32 | | | | | | | | | | |
| Comments: 5-3/4" Dir Assembly | | | | | | | | | | | | | |
| BHA Component Details | | | | | | | | | | | | | |
| Item | No. Jnts | Length | OD | ID | Weight | Grade | Top Connection | P/B | Fishing Length | OD | Blade OD | Comment | |
| BIT | 1 | 0.75 | 5.750 | | | | 3.5REG | Pin | | | | S/No: A279641 | |
| MMTR | 1 | 23.90 | 5.000 | 2.620 | 48.4 | S-135 | 3.5IF | Box | | | | S/No: BPG2475-0192 | |
| Mud Motor: Type: TURB | | | | Manufacturer: BICO | | | | Model: | | | | | |
| Lobe Configuration: 7/8 | | | | Speed: 0.56 | | | | Stages: 3 | Torque: 5,175 ft lbs | | | | |
| Dir. Company: SDI | | | | Bend Setting: 1.25 | | | | Distance: 2.95 ft | | | | | |
| Bearing Stab. OD: 0.000 ins | | | | <input type="checkbox"/> Motor Pad | | <input type="checkbox"/> Motor Failure | | Failure Time: | | | | | |
| MONEL | 1 | 9.99 | 4.750 | 2.360 | 45.4 | S-135 | 3.5IF | Box | | | | PONY COLLAR S/No: 17-261 | |
| MONEL | 1 | 30.59 | 4.750 | 2.650 | 41.5 | S-135 | 3.5IF | Box | | | | S/No: 121-151 | |
| OTHER | 1 | 5.58 | 4.750 | 2.650 | 41.5 | S-135 | 3.5IF | Box | | | | PULSER SUB S/No: 65-258 | |
| MONEL | 1 | 31.10 | 4.750 | 2.650 | 41.5 | S-135 | 3.5IF | Box | | | | S/No: 121-698 | |
| DC | 30 | 918.26 | 4.740 | 2.250 | 46.5 | S-135 | 3.5IF | Box | | | | | |
| Total: | | 1,020.17 | | | | | | | | | | | |

7. CORING

Two coring runs were performed at 6,700 ft. over July 12-13. A total recovery from the two runs was 21.5 ft. The core barrel size is 7-1/4 in. with 4 in. inner barrel. 30 ft. in length. The core head diameter was 8-3/4". The first run from 6,700 to 6,728 ft. cut 28 ft., recovering 12 ft. (43 % recovery). In the second run, cored from 6728 to 6740 ft., cut 12 ft., recovering 9.4 ft (78 % recovery).

Once reached to 10-5/8 in. section TD at 8,500 ft., two more runs were performed over July 17-18, recovering an additional 32.4 ft. in total. Core barrel and head had the same specifications for the previous runs. In core run #3 8,500 ft. to 8530 ft, 30 ft. were cut with a recovery of 29.4 ft. (83% recovery), and on core run #4 from 8,530 ft. to 8,540 ft. 10 ft. were cut and 8.5 ft. recovered (85 % recovery). Contractor's report provided in Appendix 9.10.



8. DATA COLLECTION

During drilling operations, cutting samples were retrieved, washed, and described onsite, packaged and labeled for further analyses by the mud logging company on-site. A daily mud log and geology report was provided as well. In addition to lithology and alteration, the mud logging unit also captured additional parameters such like ROP, WOB, mud temperature in and out, CO₂ gas shows, and other well and drilling information. MSE was calculated within the drilling data systems and available in real time from data system. Final Mud Log and Daily Reports are provided in Appendices 9.9 and 9.1 respectively.

8.1. Geophysical Logging

A set of open hole geophysical logs were conducted at the TD of the 14-3/4 in., 10-5/8 in., and 5-3/4 in. hole as shown in Table 42. A Formation Microimager (FMI) and an Ultrasonic Borehole Imager (UBI) were run in the 14-3/4” hole. The UBI was also run in the 10-5/8 in. section. The basic geophysical logs for density, porosity, resistivity, gamma ray (Triple-Combo) were run at all three logging intervals.

Table 42: Open hole geophysical logs for 78B-32.

| Service Provider | Log Name | Tool Name | Date | Start Depth (ft) | Stop Depth (ft.) |
|------------------|----------|------------------------------------|-----------|------------------|------------------|
| 14-3/4 in. Hole | | | | | |
| Schlumberger | QAIT | Hostile Slim Array Induction Tools | 7/19/2021 | 2970.5 | 8563.5 |
| Schlumberger | QSLT | Slim Xtreme Sonic Logging Tool | 7/19/2021 | 2970.0 | 8529.5 |
| Schlumberger | QCNT | Slim Hot Compensated Neutron Tool | 7/19/2021 | 2970.5 | 8563.5 |
| Schlumberger | HLDS | Hostile Litho-Density Sonde Tool | 7/19/2021 | 2970.5 | 8563.5 |
| Schlumberger | QCNT | Slim Hot Compensated Neutron Tool | 7/19/2021 | 2970.5 | 8563.5 |
| Schlumberger | FMI | Fullbore Formation Microimager | 7/19/2021 | 2970.5 | 8529.5 |
| Schlumberger | UBI | Ultrasonic Borehole Imager | 7/19/2021 | 2970.5 | 8529.5 |
| 10-5/8 in. Hole | | | | | |
| Schlumberger | USIT | Ultrasonic Imager Tool | 7/20/2021 | 2970.5 | 8518.5 |





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| Service Provider | Log Name | Tool Name | Date | Start Depth (ft) | Stop Depth (ft.) |
|------------------|----------|------------------------------------|-----------|------------------|------------------|
| Schlumberger | PPC | Powered Positioning Caliper Tool | 7/20/2021 | 2970.5 | 8518.5 |
| Schlumberger | GPIT | General Purpose Inclinometry Tool | 7/20/2021 | 2970.5 | 8518.5 |
| 5-3/4 in. Hole | | | | | |
| Schlumberger | QAIT | Hostile Slim Array Induction Tools | 7/30/2021 | 7447.0 | 9553.0 |
| Schlumberger | QSLT | Slim Xtreme Sonic Logging Tool | 7/30/2021 | 7447.0 | 9553.0 |
| Schlumberger | QCNT | Slim Hot Compensated Neutron Tool | 7/30/2021 | 7447.0 | 9553.0 |
| Schlumberger | QTGC | SlimXtreme Telemetry and Gamma Ray | 7/30/2021 | 7447.0 | 9553.0 |
| Schlumberger | QAIT | Slim Hostile Array Induction Tool | 7/30/2021 | 7447.0 | 9553.0 |





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9. APPENDICES see attached file that accompanies this report

