Provisional Synopsis of Drilling Procedures
FORGE Deep Well 1
Well 16A(78)-32
Milford, Utah

June 29, 2020

Location Easting	334637.9 m	1097893 ft
Location Northing	4263458.9 m	13987726 ft
Location Elevation	5414.37 ft	
Latitude of Wellhead	38.50416	
Longitude of Wellhead	-112.89643	
Kick-off Depth	5938 ft	
Azimuth of Tangent	105°	
Build Rate	5°/100 ft	
TD Easting	335808.0 m	1101732 ft
TD Northing	4263145.4 m	13986698 ft
TD Latitude	38.50155	
TD Longitude	-112.882945	
Total Measured Depth	10938.3 ft	
True Vertical Depth at Toe	8540 ft	
Horizontal Offset	3974.2 ft	

This provisional program is intended as a guide, it may be modified to adjust to actual drilling conditions.

- Figure 1 shows the planned trajectory of the well.
- Figure 2 is another location view.
- Figure 3 is a wellbore schematic.
- Figure 4 is an elevation view of the well trajectory.
- Table 1 shows the casing program.

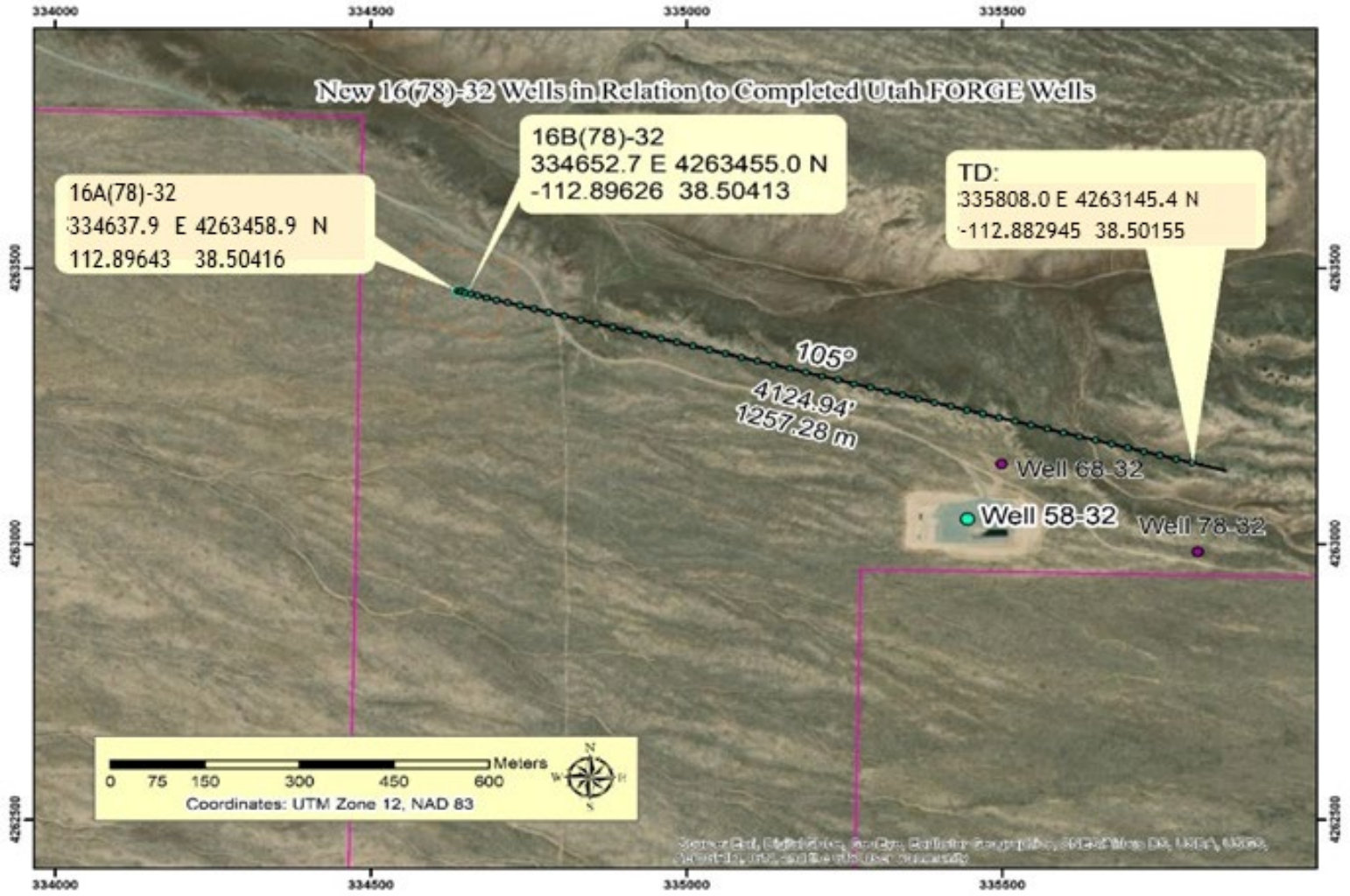

Figure 1. Plan view showing wellbore spud location for well 16A(78)-32 , and its azimuth, drilling from west to east. North is to the top of this image. The spud location is labeled as 16A(78)-32. On close examination, designations for existing wells 68-32 and 78-32 are visible. The pad for the existing well 58-32 is clearly visible. The planned spud location for well 16B(78)-32 – to be drilled at a later date - is also shown.

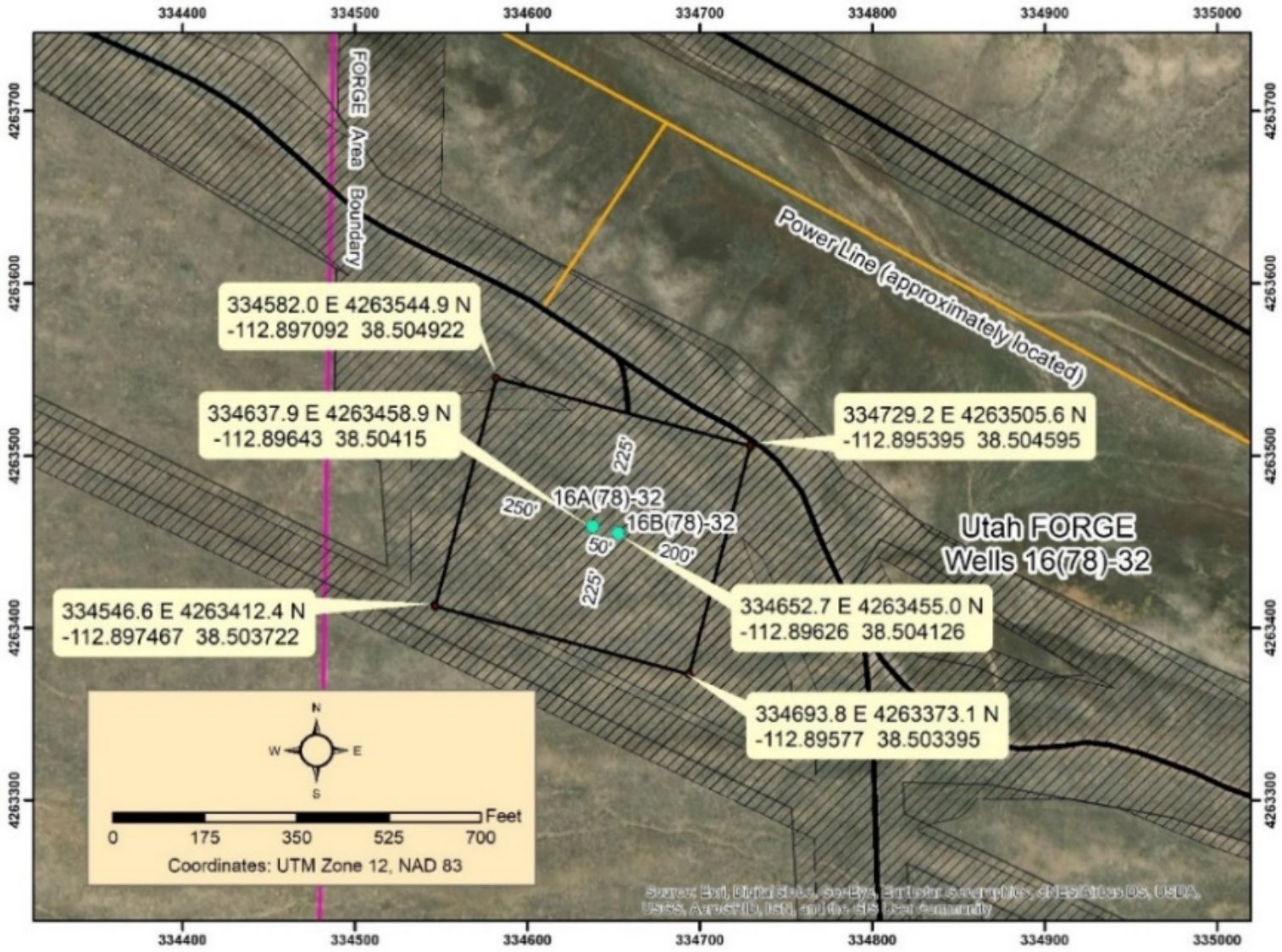

Figure 2. Lease close-up, showing topography and access. Hatching shows culturally cleared areas. Roads and power line are shown.

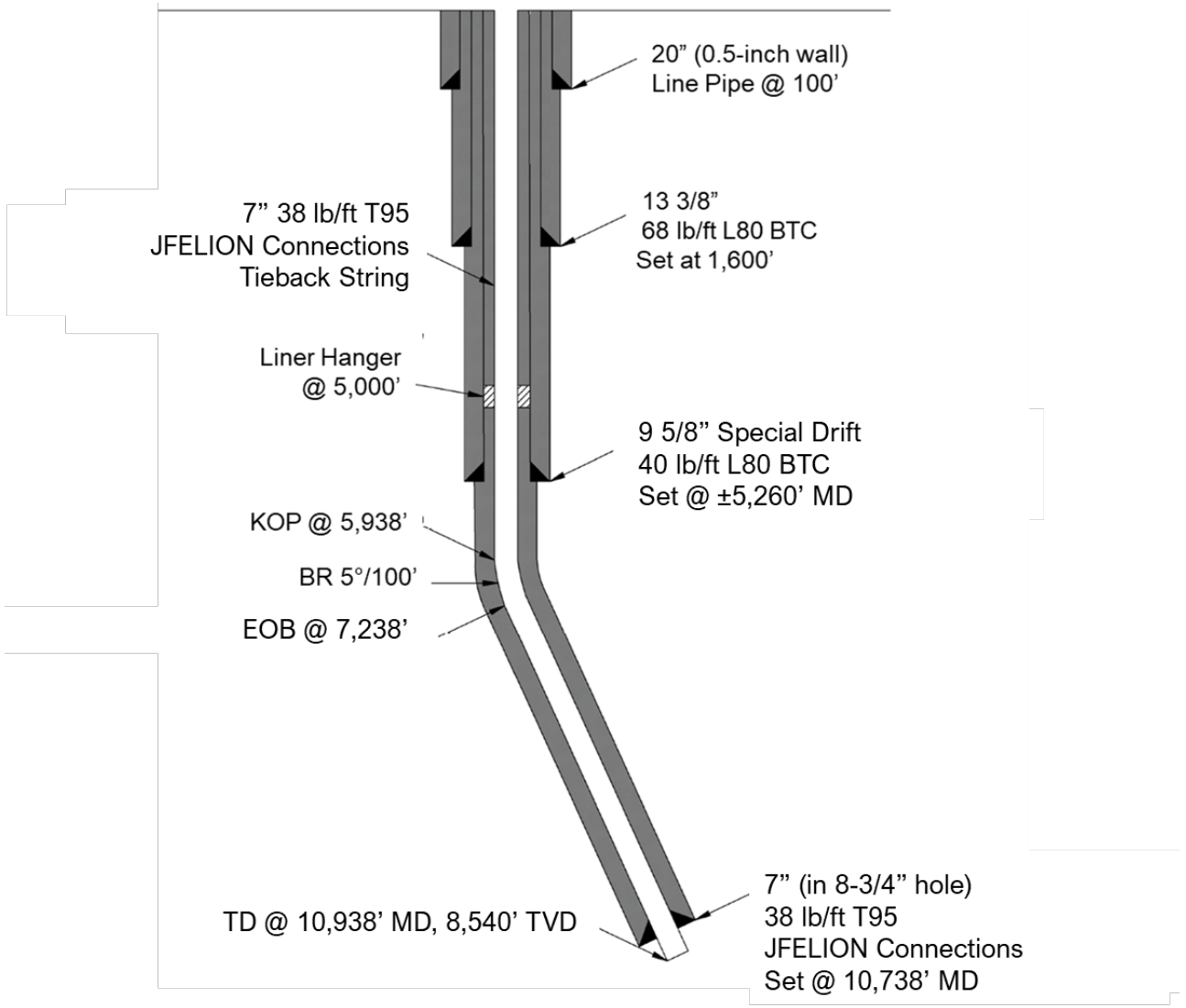

Figure 3. Wellbore schematic. True vertical depth at TD is 8540 ft TVD. Notice the liner hanger and the cemented tieback string.

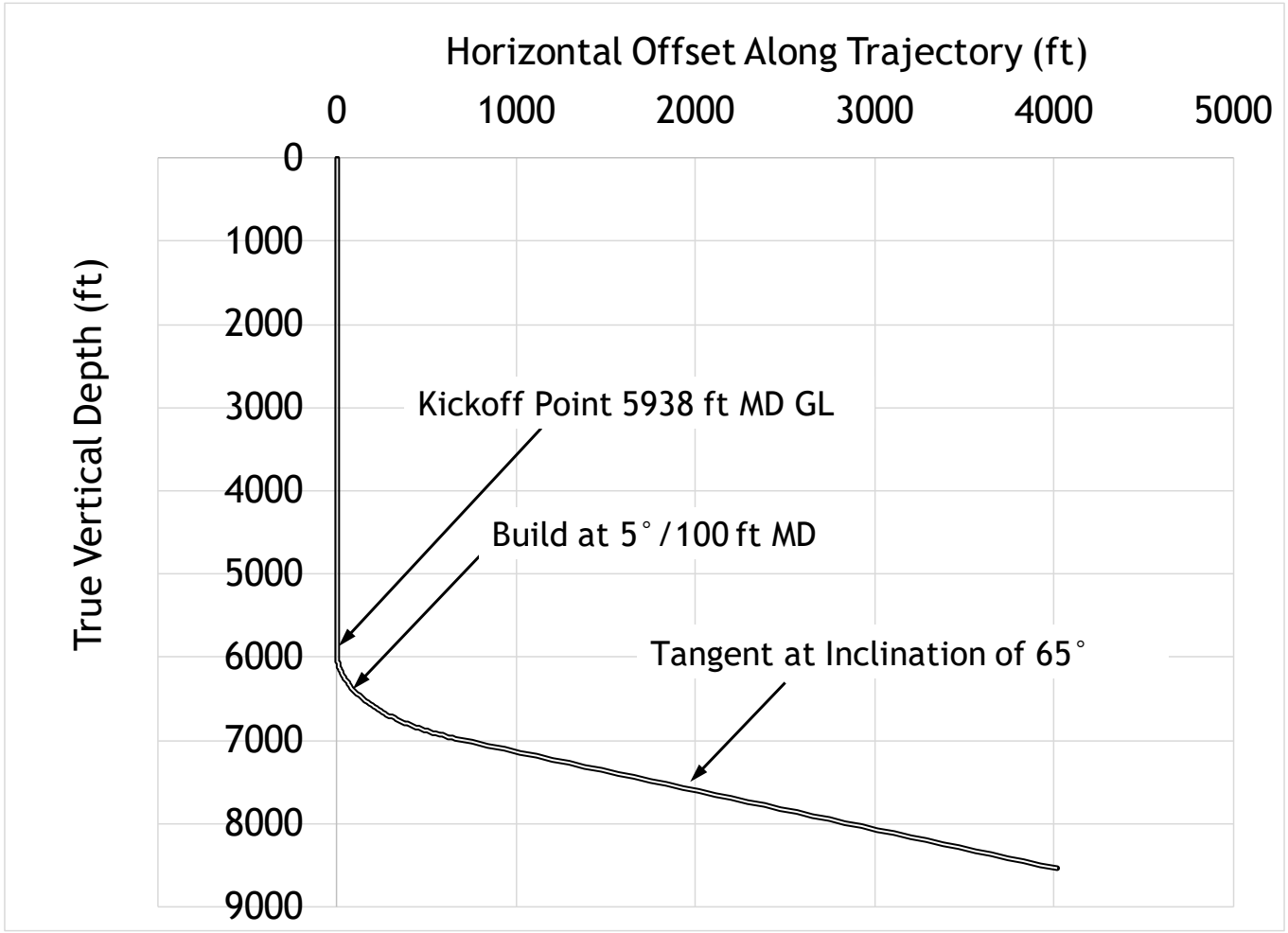

Figure 4. Elevation view of well. KOP is at 5,938 ft and the toe is at 10,738 ft MD. The MD at the toe is 10,938 ft and the TVD at the toe is 8,540 ft TVD.

Table 1. Casing Program

Casing	Nominal Hole Size (inches)	Casing Size (inches)	Specifications	Nominal ID (inches)	Drift ID (inches)	Coupling OD (inches)	Planned Depth (ft MD)	Comments
Conductor	30	20	A53B. 0.5" WT, Welded	19	19	N/A	100	Preset. Beveled ends or Sch 40
Surface	17-1/2	13-3/8	68 ppf, L-80, BTC	12.415	12.259	14.375	1,600	Cemented well control string. Set in competent, stable zone. Aquifer covered.
Intermediate	12-1/4	9-5/8	40 ppf, L-80, BTC Special drift	8.835	8.750 (API Special Drift)	10.625	5,260	Cemented intermediate string set 600 ft below alluvium-granite contact
Production Tieback	8-3/4	7	38 ppf, T-95, JFELION Connections	5.920	5.795	7.944	5,000	Cemented to surface
Liner Hanger	TBD						5000 to 5100	
Production	8-3/4	7	38 ppf, T-95, JFELION Connections	5.920	5.795	7.944	~5100 to 10,738	Rotating bearing in hanger for cementing
Open hole	8-3/4	Open hole	Open hole				10,738 to 10,938	Plug back with sand

This synopsis does not cover HSE issues – they are covered in the detailed prognosis. All HSE and spill procedures will be consistent with DOE approved HSE procedures and requirements.

High level procedures and steps have been extracted from the detailed prognosis and are given below.

17-1/2” Surface Hole Section to 1,600 ft MD

Drill the 17-1/2” hole to 1,600 feet and set the 13-3/8”, 68 ppf casing. Drilling will continue until stable and competent formation is encountered and the potable water aquifer is passed. The biggest consideration is maintaining verticality even for the surface hole (not to exceed 2°/100 ft).

9-5/8” Intermediate to 5,260 ft MD

The depth (5,260 ft) is approximately 600 ft below the current best estimate of the top of the granite (4,660 ft TVD). Drill 12-1/4” vertical hole to 5,260 ft. and set the 9-5/8” 40 ppf casing (API Special Drift). Confirm the TD for this section and stop drilling early or extend TD, according to the competency of the formation.

8-3/4” Production Hole from 5,260 ft to 5500 ft MD

After the 9-5/8” casing is cemented, a cement evaluation log will be run with a base line mechanical caliper. The mechanical caliper log is projected to also be run at the end of the build, halfway through the tangent and during production logging.

Cut a 60’ core from 5,500 ft to 5,560 ft MD

Cut 60 ft of core.

8-3/4" Production Hole Section 5,560 ft to 5,938 ft MD

This is vertical hole, in advance of the KOP. The first 60 ft will include reaming out the cored hole. This is an important drilling section for getting a feel for performance of all drilling equipment before the build section and for tuning Mechanical Specific Energy (MSE).

8-3/4” Curve from 5,938 ft to Landing at 7,238 ft MD

This is the build section. Drill the curve at 5°/100 ft with the KOP at 5,938 ft MD/TVD and the projected EOB is 65° at 7,238 ft MD, TVD 6,976 ft. Hold azimuth at 105°.

Drill 8-3/4" 65° Tangent Hole from 7,238 ft to 7,484 ft MD

This is the start of the tangent hole. Drill ahead a short distance on the tangent and in advance of an open hole to perform Extended Leak Off Test (XLOT). Before the XLOT, run a caliper to assess wear in the 9-5/8” casing.

Extended Leak Off Test (XLOT) Covering 7,384 ft to 7,484 ft MD

This test will require setting an inflatable packer some distance below the end of the build (EOB). Ideally a baseline and a post-injection image log would be run (the former if there was any indication of losses or intersecting a natural fracture). Rig pumps could be used for the injection (low rate) as in standard XLOT procedures or third-party pumping equipment would be brought in.

Drill 8-3/4” 65°Tangent Hole from 7,484 ft MD to 8,484 ft MD

Drill this section and then run another mechanical caliper log to look for wear in the 9-5/8” casing. Cleanout cycle (dye caliper, high vis pill, circulate bottoms up) will be done at prescribed intervals to prevent drag from cuttings buildup.

Drill 8-3/4" 65° Tangent Hole from 8,484 feet MD to 10,878 feet MD

This is for drilling to near TD, pending a subsequent stage for coring.

Core from 10,878 to 10,938 ft MD

Cut 60 ft of core.

Logging the Production Hole

Rig up and log the production hole section. This may consist of multiple logging runs for both lithologic logs and temperature logs.

Gauge Assembly Run from 5260 ft to 10,938 ft MD

After logging, a gauge run will be carried out. The maximum rate will be 300 feet per hour.

Run 7” Liner, Liner Hanger and Cement, Run 7” Tieback and Cement

Run and cement 7-inch liner below a liner hanger. Squeeze, as necessary. Run and cement a 7-inch tieback string. Run a cement evaluation log, with pressure on the casing while logging.

Cleanout and Prepare for Diagnostic Fracture Injection Test (DFIT)

Drill out landing collar, float collar and one joint of shoe track. Circulate the hole to clean fluids. Pressure test the float equipment to 5000 psi. Drill out the rest of the shoe track and float shoe. Circulate out the sand.

Diagnostic Fracture Injection Test (DFIT)

Carry out a Diagnostic Fracture Injection Test (DFIT) to determine closure pressure in the barefoot section of the well. Run a third-party compression. A third-party pumping service will be contracted for pressurizing below the packer. The DFIT procedures will be provided with the final drilling plan.

Secure Well

Lay down drill pipe and BHA. Secure the Well. The rig is released.