

Drillers Notes
(6/12/2019 to 10/24/2019)

Well Name
USGS 148/148A

Rig
CS 1500

Special Equipment
Mud pumps, grouting pump

Drilling System

Diameter	Bit Type	Method	Rig	Depth
6-inch	Tricone	Air rotary, water	CS 1500	0-5 feet
4.8-inch	PCD/PQ3 core	Water/mud	CS 1500	3.6-759.2 feet

Borehole Diameters

Diameter	Top Depth	Bottom Depth
6-inch	0 feet	5 feet
4.8-inch	5 feet	759.2 feet

Casing

Diameter	Top Depth	Bottom Depth	Slotted	Thickness
5-inch	+1 feet	5 feet	No	.288-inch

Grout Seal

Material	Top Depth	Bottom Depth	Amount	Placement Method
Neat cement with 2.5% bentonite	0 feet	314 feet	68 cubic yards	Tremie

Date **Depth** **Driller Notes**
(mm/dd/yyyy) (feet) (Note of daily activity)

6/12/2019	24	Setup and drill 6-inch to 5 feet. Set 5-inch casing to 5 feet start coring 4.9-inch PQ core hole using mud. Pre-job briefing held in morning.
6/13/2019	84	Coring okay, sediment at 49 to 54 feet.
6/17/2019	154	Coring okay.
6/18/2019	214	Cored lots of rubble zones but not caving.
6/19/2019	254	Coring okay, some caving zones, decide to grout hole.
6/20/2019	254	Pumped 8 yards of grout into hole.
6/21/2019	21	Pumped 16 yards of grout into hole still not full.
6/26/2019	188	Pumped 16 yards of grout.
6/27/2019	0	Pumped 3.5 yards of grout into hole before it filled, lost tremie pipe in grout.
6/28/2019	57	Trying to drill grout and PVC tremie, not going well.
7/1/2019	110	Drilling grout, switched to HQ rods trying to clean hole more efficiently, drilling very slow, used 27,00 gallons of water.
7/2/2019	154	Stopped drilling at 130 feet due to returns showing basalt instead of grout; switched back to coring and called new hole/core USGS 148A.

Date (mm/dd/yyyy)	Depth (feet)	Driller Notes (Note of daily activity)
7/3/2019	224	Coring okay, very little grout recovered in fractures.
7/8/2019	264	Coring okay; stopped and ran a gyro. Log hole has deviated 6.8 inches to the NE.
7/9/2019	314	Repair water swivel and replaced seals in triplex pump, coring okay. After discussion about need to move hole, decision was to continue as is.
7/10/2019	314	Grout 15.5 yards, small IR compressor blew engine.
7/11/201	314	Grout 9 yards to fill hole.
7/12/2019	177	Drill out grout with 4.75-inch tricone, touched the PVC at 54 feet but the bit followed USGS 148A core hole.
7/15/2019	314	Drill out grout, lost returns at 273 feet.
7/16/2019	364	Set back up for coring, cored to 364 feet no issues.
7/17/2019	444	Coring fine, sediment at 406 to 410 feet
7/18/2019	474	Cored fine, shut down rig to help get a Frac tank through security for ATR drilling (USGS 150).
7/19/2019	544	Coring fine.
7/22/219	599	Coring okay, sediment at 595 to 602 feet. Core boxing process by Wood is slowing down production.
7/23/2019		Wildfire closure.
7/25/2019	654	Fire out, back at it. Coring fine, switched from drilling mud to using straight water. Wood still slowing us down.
7/26/2019	709	Coring fine.
7/29/2019	754	Coring fine, hole seems clean.
7/30/2019	759	TD hole at 759 feet. Ran geophysical logs; 9095 gyroscope, 9057 electric tool and 0024 gamma tool.
7/31/2019	759	Tripped out coring tools and ran a video; hole in stable condition.
7/31/2019 8/9/2019	759	Geo Vision logged well.
8/14/2019 8/16/2019	759	FLUTe and Geo Vision well logging.
8/19/2019		Moved off of well site.
10/21/2019	759	Setup CS 1500 on hole and set CPWL rod/casing to 654 feet.
10/22/2019	759	Set 16S50-38 Grundfos pump and 5 HP motor into well to 720 feet.
10/24/2019		Finished well head and well box install. Poured a concrete pad with brass cap and reference point. Moved equipment off well site.