Cementing Report

Well ID: Forge 58-32

Field: None

Geothermal Resource Group

Well Name: 58-32

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

Cement Job Information

Start Date/Time:	02-Aug-17 03:30	**Wellbore:**	Original Well Bore
Job Type:	PRIMARY	**String OD (ins):**	13.375
Well Section:	SURF	**String Type:**	FULL
Cementing Co:	Resource	**Cementing Engineer:**	Farzad Najafi

Primary Job Detail

	Volume (bbls)	Pump Time	Rate (bbls/min)	Pressure (psi)
Conditioning Data:		90	6.0	200
Cement Data:	126.0	90	5.0	200
Displacement Data:	0.0			
Calc. Displacement Vol:				

☐ **Reciprocate Pipe?** ☐ **Batch Mix?** ☐ **Bump Plug?** **Bump Pressure:**

Returns to Surface: FULL ☑ **Cement at Surface?** **Volume (bbls):**

Calc Top of Cement (ft): 0 **Excess (%):** **Avg. Hole Size (ins):**

Slurry Information

Type	Density	Yield	Sacks	Volume	Rate	Additives
FLUSH	8.40			20.0	5.0	Fresh Water ahead
SPACER	10.50			30.0	5.0	Sepiolite spacer
SPACER	8.40			5.0	5.0	Fresh water spacer
FLUSH	10.00			13.6	5.0	Sodium Silicate
SPACER	5.00			5.0	5.0	Fresh water spacer
LEAD	13.00	2.5	170	83.0	5.0	ThermaLite cement with 3% calcium chloride
TAIL	15.00	1.78	130	43.0	4.6	ThermaTail cement with 3% calcium chloride

Post Job Information

Liner Top Test (lbs/gal):		**Job Success?**	No
Actual Top of Cmt (ft):	4	**CBL Bond Quality:**	

Misc. Comments: Had full returns during job. Did not have good cement to surface after pumping available cement. Pumped top job cement. Unable to displace DP (3.2 bbls). Found wiper plug stuck in cement head. Found cement when drained stack.

Cementing Report

Well ID: Forge 58-32

Field: None

Geothermal Resource Group

Well Name: 58-32

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

Cement Job Information

Start Date/Time:	07-Aug-17 11:00	**Wellbore:**	Original Well Bore
Job Type:	PRIMARY	**String OD (ins):**	9.625
Well Section:	INT1	**String Type:**	FULL
Cementing Co:	Resource	**Cementing Engineer:**	Hamid

Primary Job Detail

	Volume (bbls)	Pump Time	Rate (bbls/min)	Pressure (psi)
Conditioning Data:		2	11.0	500
Cement Data:	252.0	34	11.0	700
Displacement Data:	139.0	71	8.0	1,100
Calc. Displacement Vol:	139.0			

☑ **Reciprocate Pipe?**	☐ **Batch Mix?**	☑ **Bump Plug?**		**Bump Pressure:**	1,700
Returns to Surface:	FULL	☑ **Cement at Surface?**		**Volume (bbls):**	1,100.0
Calc Top of Cement (ft):	0	**Excess (%):**	100.00%	**Avg. Hole Size (ins):**	18.000

Slurry Information

Type	Density	Yield	Sacks	Volume	Rate	Additives
SPACER	8.30	1	0	30.0	5.0	fresh water
SPACER		1	0	20.0	5.0	RC mud clean
PREFLSH	11.00	1	0	13.0	5.0	Sodium silicate
SPACER	8.30	1	0	5.0	5.0	Fresh water
SPACER	10.50	1	0	30.0	5.0	Sepiolite Spacer
LEAD	13.50	2.14	600	228.7	5.0	Class G cement with 30% silica flour, 10% Microlite, 0.5% CFL-115,
TAIL	15.00	1.75	75	23.4	5.0	Class G cement with 30% silica flour, 10% Microlite, 0.5% CFL-115
DISPLACE	8.30	1	0	20.0	5.0	Fresh water
DISPLACE	9.10		0	138.7	5.0	Mud

Post Job Information

Liner Top Test (lbs/gal):		**Job Success?**	Yes
Actual Top of Cmt (ft):	0	**CBL Bond Quality:**	

Misc. Comments:

Held JSA, Pressure test lines to 1500 psi, pump 30 bbls of fresh water @ 5 BPM, pump 20 bbl of RC MUD Clean @ 5 BPM, pump 13 bbls of Sodium Slicate spacer @ 3 BPM, pump 5 bbls of fresh water @ 5 BPM, pump 30 bbls of 10.5ppg Sepiolite spacer @ 5 BPM, mix and pump 228.7 bbls (1284 cu ft) of 13.5 ppg RC Thermalite HT lead cement w 30% silica flour, 10% micro slica, 0.5% CFL-115, followed by 23.4 bbls (131 cu ft) of 15.0 RC Thermalite HT tail cement w/30% silica flour, 10% micro Lite, 0.5% CPL-15 @ 5 BPM, shut down and dropped plug Our displacement was 158. bbls. 138 bbl mud and 20 bbl water We displaced 100 bbls @ 8 BPM and slowed displacement to 1 BPM for the next 18 min until 118 bbl was displaced, while pumping 1 BPM returns came and went. We then shut down for 20 minuets (to allow for gelling) and checked fluid level in the wellbore until it stopped dropping. Then displaced the last 20 bbls at 2 BPM with 100% returns and bumped the plug with 750 psi over the 1100 psi pump pressure. Bled back the pressure and confirmed the floats were holding. CIP was 12:45 . The BOP stack was drained @ 1500 hours and there is solid cement to the wellhead

Cementing Report

Well ID: Forge 58-32

Field: None

Geothermal Resource Group

Well Name: 58-32

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

Cement Job Information

Start Date/Time:	15-Sep-17 19:30	**Wellbore:**	Original Well Bore
Job Type:	PLUG	**Cementing Engineer:**	Farzad Najafi
Cementing Co:	Resource		

Plug Job Detail

Plug Type:	Bottom hole plug.				
Plug: Top (ft):	7,526	**Bottom (ft):**	7,536	**Length (ft):**	10
Calc. Displacement Vol (bbls):	79.500	**Hole Size at Plug (ins):**	8.750		

	Volume (bbls)	Pump Time	Rate (bbls/min)	Volume (psi)
Conditioning Data:		2	10.0	850
Cement Data:	5.0	21	5.1	250
Displacement Data:	79.0	15	6.3	369

Slurry Information

Type	Density	Yield	Sacks	Volume	Rate	Additives
PREFLSH	8.33			60.0	5.1	Water ahead.
LEAD	14.50		16	5.0	5.1	Mix and pump cement.
POSTFLSH	8.33			8.0	4.2	Water behind
DISPLACE	8.60			71.0	6.3	Displace with mud.

Post Job Information

Actual Top of Cmt (ft):		**Job Success?**	Yes
Misc. Comments:	Reversed out approx 3 bbls of cement.		

Cementing Report

Well ID: Forge 58-32

Field: None

Geothermal Resource Group

Well Name: 58-32

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

Cement Job Information

Start Date/Time:	17-Sep-17 04:00	**Wellbore:**	Original Well Bore
Job Type:	PRIMARY	**String OD (ins):**	7.000
Well Section:	PROD	**String Type:**	FULL
Cementing Co:	Resource	**Cementing Engineer:**	Farzad Najafi

Primary Job Detail

	Volume (bbls)	Pump Time	Rate (bbls/min)	Pressure (psi)
Conditioning Data:		120	6.0	233
Cement Data:	317.0	63	5.0	
Displacement Data:	271.0	55	5.0	2,200
Calc. Displacement Vol:	271.0			

☐ **Reciprocate Pipe?** ☐ **Batch Mix?** ☑ **Bump Plug?** **Bump Pressure:** 5,000

Returns to Surface: FULL ☑ **Cement at Surface?** **Volume (bbls):** 60.0

Calc Top of Cement (ft): 0 **Excess (%):** 100.00% **Avg. Hole Size (ins):** 8.750

Slurry Information

Type	Density	Yield	Sacks	Volume	Rate	Additives
PREFLSH	8.33			50.0	5.0	Water ahead
PREFLSH	8.33			30.0	5.0	Foamed water
FLUSH	11.00			13.0	3.0	FoamedvSodium silicate
SPACER	8.33			5.0	5.0	Foamed water.
LEAD	13.50	2.14	750	284.0	5.5	Foamed Lead Cement 11 ppg foamed
TAIL	15.00	1.75	90	28.0	4.0	Cement, Not foamed.
TAIL	15.00	1.75	25	5.0	2.0	ECP cement behind plug.
POSTFLSH	8.33			271.0	6.0	Water behind.

Post Job Information

Liner Top Test (lbs/gal):		**Job Success?**	Yes
Actual Top of Cmt (ft):	0	**CBL Bond Quality:**	

Misc. Comments: