1 Job Details & Summary

1.1 Geometry

Type	Function	OD (in)	ID (in)	Weight (lb/ft)	Thread	Top (ft)	Bottom (ft)	Excess (%)
Casing	Outer	9.625	8.921	36	n/a	0	1548	0
Open Hole	Outer	n/a	8.5	n/a	n/a	1548	6740	25
Casing	Inner	5.5	4.778	20	n/a	0	17547	0
Open Hole	Outer	n/a	8.5	n/a	n/a	6740	17690	15

1.2 Equipment / People

Unit Type	Unit	Power Unit	Employee #1	Employee #2	Mileage
Field Bin	602		Cook, John	Stille, Nick	120
Field Bin	604		Boyd, Brian		120
Bulk Trailer	502		Henderson, Ethan		120
Cement Pump	101	201	Casciato, Luke		120
Light Duty Pickups	5		Dent, Jerod		120
Plug Container	1312196				120
Swage	150529				120

1.3 Timing

Event	Date/Time
Call Out	1/14/2017 18:00
Depart Facility	1/14/2017 20:00
On Location	1/14/2017 21:00
Rig Up Iron	1/14/2017 21:30
Job Started	1/15/2017 00:16
Job Completed	1/15/2017 04:30
Rig Down Iron	1/15/2017 04:35
Depart Location	1/15/2017 07:30

1.5 General Job Information

Metrics	Value
Well Fluid Density	10.4 lb/gal
Well Fluid Type	WBM
Rig Circulation Vol	2,017 bbls
Rig Circulation Time	4 hours
Calculated Displacement	389 bbls
Actual Displacement	390 bbls
Total Spacer to Surface	100 bbls
Total CMT to Surface	100 bbls
Well Topped Out	No

1.6 Well Fluid Details

Metrics	Value
Plastic Viscosity	12
Yield Point	6
10 sec. SGS	4
10 min. SGS	13
30 min. SGS	19
Filtrate	6.5
Flow Line Temp.	75

1.7 Job Details

Metrics	Value
Flare Prior to Job	No
Flare During Job	No
Flare at End of Job	No
Well Full Prior to Job	Yes
Well Fluid Density Into Well	10.4 lb/gal
Well Fluid Density Out of Well	10.4 lb/gal

1.8 Job Details (cont.)

Metrics	Value
BHCT	220 °F
BHST	220 °F

1.9 Circulation

Lost Circulation Experienced
No

1.10 Job Execution Information

Job	Fluid	Product	Function	Density (lb/gal)	Yield (ft^3/sk)	Water Rq. (gal/sk)	Water Rq. (gal/bbl)	Volume (sks)	Volume (bbl)	Top (ft)
1	1	Water	Flush	8.33			42.00		60.00	0
1	2	CD Spacer	Spacer	11.00			33.77		40.00	0
1	3	ALTCem P100-X2	Lead	12.50	2.07	11.81		920.00	339.43	0
1	4	ALTCem P50-X1	Tail	13.50	1.48	7.41		1965.00	516.50	6740
1	5	MMCR Water	Displacement	8.33			41.90		5.00	17435
1	6	Water w/ Clay Protection and Biocide	DisplacementFinal	8.33			41.91		387.00	0

1.11 Job Fluid Details

Job	Fluid	Type	Fluid	Product	Function	Conc.	Uom
1	2	Spacer	CD Spacer	ASR-20	StrengthRetrogression	179.38	lb/bbl
1	2	Spacer	CD Spacer	AR-31	Retarder	0.51	lb/bbl
1	2	Spacer	CD Spacer	AVS-10	Viscosifier	0.80	lb/bbl
1	3	Lead	ALTCem P100-X2	AC3-10	Cement	100.00	%
1	3	Lead	ALTCem P100-X2	ABX-30	BondEnhancer	0.40	%BWOB
1	3	Lead	ALTCem P100-X2	ADF-11	Defoamer	0.30	%BWOB
1	3	Lead	ALTCem P100-X2	AFL-10	FluidLoss	0.30	%BWOB
1	3	Lead	ALTCem P100-X2	ALC-10	LostCirculation	0.13	lb/sk
1	3	Lead	ALTCem P100-X2	AR-31	Retarder	0.20	%BWOB
1	3	Lead	ALTCem P100-X2	AVS-20	Viscosifier	0.10	%BWOB
1	3	Lead	ALTCem P100-X2	ADF-20	Defoamer	0.00	
1	4	Tail	ALTCem P50-X1	ACG-10	Cement	50.00	%
1	4	Tail	ALTCem P50-X1	AFA-10	Extender	50.00	%
1	4	Tail	ALTCem P50-X1	ADF-11	Defoamer	0.30	%BWOB
1	4	Tail	ALTCem P50-X1	AFL-50	FluidLoss	0.20	%BWOB
1	4	Tail	ALTCem P50-X1	AR-10	Retarder	0.40	%BWOB
1	4	Tail	ALTCem P50-X1	AR-31	Retarder	0.05	%BWOB
1	4	Tail	ALTCem P50-X1	AVS-10	Viscosifier	0.10	%BWOB
1	4	Tail	ALTCem P50-X1	AVS-50	Viscosifier	2.00	%BWOB
1	4	Tail	ALTCem P50-X1	ADF-20	Defoamer	0.00	
1	5	Displacement	MMCR Water	AR-61	Retarder	0.10	gal/bbl
1	6	DisplacementFinal	Water w/ Clay Protection and Biocide	ASF-50	ClayProtection	0.08	gal/bbl
1	6	DisplacementFinal	Water w/ Clay Protection and Biocide	Biocide	Other	0.01	gal/bbl

2 Job Logs

Line	#	Event	Date (MM/DD/YY)	Time (HH:MM)	Density (lb/gal)	Pump Rate (bpm)	Pump Volume (bbls)	Pipe Pressure (psi)	Comment
1		Call out	1/14/2017	18:00					Crew was called to Bayswater Thornton K-29-30HC production casing cement job.
2		Pre convoy meeting	1/14/2017	19:45					Crew discuss routes and hazards associated with driving to location.
3		Depart facility	1/14/2017	20:00					Crew depart facility for location.
4		Arrive at location	1/14/2017	21:00					Crew arrive at Bayswater production cement job.
5		Assess location	1/14/2017	21:10					Crew assess location to identify hazards.
6		Spot equipment	1/14/2017	21:15					Crew spot in all equipment
7		Safety meeting	1/14/2017	21:25					Crew discuss hazards of rig up on location.
8		Rig up	1/14/2017	21:30					Crew rig up all ground fittings.
9		Safety meeting	1/14/2017	23:45					Crew, customer rep and rig personnel discuss job procedure and hazards associated with job such as muster area, pinch points, slips/falls, trapped pressure, weather conditions, etc;. 17,547' of 5.5", 20 lb, P-110 casing was landed at 19:00, circulating at 8.4 bbl/min with 1,273 psi with no gas units for 4 hours.
10		Start job	1/15/2017	00:16					Start production cement job.
11		Fill lines	1/15/2017	00:17	8.33	2	2	50	Fill lines with 2 bbls fresh water
12		Shutdown	1/15/2017	00:18					Shutdown to pressure test
13		Pressure test	1/15/2017	00:19					Pressure test lines to 6,500 psi
14		Pump spacer	1/15/2017	00:24	8.33	42	6	1200	Pump 40 bbls fresh water spacer ahead.
15		Slow rate	1/15/2017	00:31	8.33	62	2	900	Slow rate to 2 bbls/min for remaining 20 bbls of fresh water spacer to bring CD spacer to desired density.
16		Pump spacer	1/15/2017	00:36	11	102	6	1215	Pump 40 bbls CD spacer at 11 ppg behind fresh water spacer.
17		Pump Lead Cement	1/15/2017	00:42	12.5	441	6	1186	Mix and pump 920 sks of ALTcemP100-X2 lead cement at 12.5 ppg, 2.07 yld, 11.81 gal/sk (Total of 339 bbls/cmt)

18		Pump Tail Cement	1/15/2017	01:42	13.5	959	6	434	Mix and pump 1965 sks of ALTCem P50-X1 tail cement at 13.5 ppg, 1.48 yld, 7.41 gal/sk (Total of 518 bbls/cmt)
19		Shutdown	1/15/2017	03:08					Shutdown to wash pumps and lines
20		Wash pumps and lines	1/15/2017	03:10					Wash pumps and lines with 20 bbls fresh water.
21		Drop bottom plug	1/15/2017	03:12					Break top cap of cement head off to load bottom plug.
22		Pump displacement	1/15/2017	03:16	8.33	5	2	900	Pump 5 bbls of water displacement with 1 gal of AR-61 cement retarder.
23		Shutdown	1/15/2017	03:19					Shutdown to load top plug.
24		Drop top plug	1/15/2017	03:20					Break top cap of cement head off to load top plug.
25		Pump displacement	1/15/2017	03:21	8.33	15	8	850	Pump 10 bbls fresh water displacement with Biocide (1 gal/100bbl)and ASF-50 clay stabilizer (.08 gal/bbl.)
26		Shutdown	1/15/2017	03:22					Shutdown to break top cap off of cement head to verify top plug leaving plug container.
27		Pump displacement	1/15/2017	03:24	8.33	365	8	1100	Pump 355 bbls fresh water displacement with Biocide (1 gal/100bbl)and ASF-50 clay stabilizer (.08 gal/bbl.) at 8 bbls/min
28		Slow rate	1/15/2017	04:15	8.33	380	5	3094	Slow rate to 5 bbls/min with 380 total bbls displacement away per customer request.
29		Slow rate	1/15/2017	04:18	8.33	390	2	2200	Slow rate to 2 bbls/min for last 10 bbls displacement.
30		Land plug	1/15/2017	04:23					Land plug with 390 total bbls displacement away. Final circulating pressure was 2,341 psi. Brought pressure to 3,024 psi.
31		Check floats	1/15/2017	04:27					Floats held with 3.5 bbls back to truck.
32		End job	1/15/2017	04:28					Crew end cement job
33		Rig down	1/15/2017	04:30					Crew rig down all fittings and equipment
34		Pre convoy meeting	1/15/2017	07:20					Crew discuss routes and hazards associated with driving to facility.
35		Depart location	1/15/2017	07:30					Crew departs for facility.

3 Water Analysis

Metrics	Value	Recommended
Water Source	None	
Temperature	52 °F	50-80 °F
pH Level	6	5.5-8.5
Chlorides	0 mg/L	0-3000 mg/L
Total Alkalinity	40	0-1000
Total Hardness	<55 mg/L	0-500 mg/L
Carbonates	0 mg/L	0-100 mg/L
Sulfates	<200 mg/L	0-1500 mg/L
Potassium	1500 mg/L	0-3000 mg/L
Iron	0 mg/L	0-300 mg/L

4 Pump Diagrams