

OCCIDENTAL PETROLEUM CORPORATION

Please contact your area engineer with any questions concerning this procedure.

11/27/2023

PLUG and ABANDONMENT PROCEDURE

HARKIS 31-2

API: 05-123-22186

**Step Description**

1	Review Previous Open Wells Reports/Well History. If you have questions or concerns, contact Foreman/Engineer.
2	COA: Provide 48 hour notice to Colorado ECMC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.).
3	Notify Automation Removal Group at least 24 hours prior to rig move. Request they catch and remove plunger, isolate production equipment, and remove any automation prior to rig MIRU.
4	MIRU Slickline. Pull production equipment and tag bottom. Record tag depth, casing/tubing pressures and fluid level in Open Wells. Gyro was run on 09/20/11. RDMO Slickline.
5	Prepare location for base beam equipped rig. Install perimeter fence as needed.
6	COA: Verify Form 17 (State Bradenhead Test) has been run within 60 days of RU.
7	Refer to the Rockies Well Services Guidelines document whenever rigging up BOP and WL, or whenever tripping in or out of the well. Consult with Foreman/Engineer before deviating from these guidelines. All cement jobs (excluding injections squeezes) must be pumped at 4-6 BPM. All cement plugs pumped through tubing must use the Diverter tool. Final top-out can be pumped between 2-4 BPM.
8	Upon RU, check and record bradenhead pressure. If bradenhead valve is not accessible, re-plumb so that valve is above GL. Blow down bradenhead and leave open during working hours. Re-check pressure each day and input value in the "Casing press." box in Open Wells.
9	MIRU WO rig. Verify BOP and wellhead rating, inspect for appropriate API standards, pressure test BOP. Kill well as necessary using biocide treated fresh water. ND WH. NU BOP. Unland tbg. **Barrier Management** Fluid will be the only barrier while NU BOP. Stop and review JSA.
10	TOOH and SB 6842' of 2-3/8" tbg. LD remaining 2-3/8" tbg.
11	J-SAND CIBP
12	MIRU WL. PU and RIH with (4-1/2", 11.6#) gauge ring to 7530'. POOH.
13	PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 7520'. POOH. Slowly top fill well to clear out all gas. RIH and dump 2 sx cement on CIBP. POOH.
14	NIO INJECTION SQZ
15	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 6842'.
16	Establish an injection rate with treated water. Max injection pressure will be burst-limited at 6100 psi with water, 3500 psi with cement. If unable to establish injection, sting out, spot cement to EOT, then sting back in and attempt Nio injection squeeze in next steps. Record rate and pressure results and report them to the Foreman/Engineer. Plugging orders may change based on results. When 1 bpm is achieved, record pressure and successful test has been completed.
17	Note: Do not exceed 40 bbls of cement on injection squeezes.
18	MIRU cementers. Pump Niobrara Injection Squeeze: 100 sx (27.1 bbl or 152 cf) of the Niobrara Cement blend: Class G with 0.4% B547 Gas Block (Latex) and 0.4% D255 FLA (Fluid Loss) and 35% D066 Silica Flour and 0.2% D800 (Retardant) and 0.3% D065 (Dispersant). Underdisplace by 1 bbls. Volume is based on 30' in the casing below the CICR, cement squeezed into formation, and 62' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO cementers.
19	Pull out of cement. Stop and circulate clean above TOC. TOOH, SB 4255' of 2-3/8" tbg. LD remaining tbg.
20	SUSX INJECTION SQZ
21	PU and RIH with one 4', 3-1/8" deep penetrating perf gun with 4 spf. Shoot squeeze holes at 4285'. POOH. RDMO WL.
22	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 4255'.

23	Establish an injection rate with treated water. Tubing will be neutral at 3950 psi with water, 3400 psi with cement. If unable to establish injection, sting out, spot cement to EOT, then sting back in and attempt Sussex injection squeeze in next steps. Record rate and pressure results and report them to the Foreman/Engineer. Plugging orders may change based on results. When 1 bpm is achieved, record pressure and successful test has been completed.
24	If gas is present, consider swabbing and venting before pumping injection squeeze.
25	Note: Do not exceed 40 bbls of cement on injection squeezes.
26	MIRU cementers. Pump Sussex Squeeze: 100 sx (21.2 bbl or 119 cf) of the Sussex AGM: Class G with 0.4% B547 Gas Block (Latex) and 2% D053 Expansion (Gyp) and 0.25% D255 FLA (Fluid Loss) 0.3% D065 (Dispersant). Underdisplace by 1 bbls. Volume is based on 30' in the casing below the CICR, cement squeezed into formation, and 60' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
27	TOOH, stopping to circulate clean above TOC, and SB 2160' of 2-3/8" tbg. LD stinger, and remaining tbg.
28	2800' CIRC SQZ
29	MIRU WL. PU and RIH with two 4', 3-1/8" perf guns with 4 spf. Shoot 16 squeeze holes at 2800' and 16 squeeze holes at 2100'. RDMO WL.
30	PU and TIH with (4-1/2", 11.6#) packer on 2-3/8" tbg. Set packer at 2160'.
31	Initiate circulation at low rate monitoring returns for fluid. Add mud thinner to hydrate/clean mud. Slowly increase circulation rate to 4-6 BPM using mud thinner and gel polymer sweeps as needed.
32	Pump 49 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) and let soak for ~2 hours.
33	Continue circulating at 4-6 BPM if possible. If returns show hydrocarbons or a 1 hr build-up shows pressure, swab and vent well and clean open tank. Circulate clean fluid before pumping cement.
34	Release packer. TOOH, SB 2-3/8" tbg. LD packer.
35	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 2160'.
36	MIRU cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Squeeze: 225 sx (48.5 bbl or 273 cf) of the Lower AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 1% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp). Underdisplace by 2.5 bbls. Volume is based on 640' in the casing below the CICR, 700' in the casing-hole annulus with 25% excess, and 160' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
37	Pull out of cement. TOOH to 1900'. Reverse circulate a minimum of 2 hole volume after cementing to ensure no cement is left in the tbg or annulus.
38	TOOH and SB 990' of 2-3/8" tbg. LD stinger, and remaining tbg.
39	1800' CIRC SQZ
40	MIRU WL. PU and RIH with two 4', 3-1/8" perf guns with 4 spf. Shoot 16 squeeze holes at 1800' and 16 squeeze holes at 1200'. RDMO WL.
41	PU and TIH with (4-1/2", 11.6#) packer on 2-3/8" tbg. Set packer at 1260'.
42	Initiate circulation at low rate monitoring returns for fluid. Add mud thinner to hydrate/clean mud. Slowly increase circulation rate to 4-6 BPM using mud thinner and gel polymer sweeps as needed.
43	Pump 43 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) and let soak for ~2 hours.
44	Continue circulating at 4-6 BPM if possible. If returns show hydrocarbons or a 1 hr build-up shows pressure, swab and vent well and clean open tank. Circulate clean fluid before pumping cement.
45	Release packer. TOOH, SB 2-3/8" tbg. LD packer.
46	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 1260'.
47	MIRU cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Squeeze: 195 sx (42.1 bbl or 236 cf) of the Upper AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 1.5% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp). Underdisplace by 2.5 bbls. Volume is based on 540' in the casing below the CICR, 600' in the casing-hole annulus with 25% excess, and 160' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
48	Pull out of cement. TOOH to 1000'. Reverse circulate a minimum of 2 hole volume after cementing to ensure no cement is left in the tbg or annulus.
49	TOOH and SB 1050' of 2-3/8" tbg. LD stinger, and remaining tbg.
50	COA: WOC 8 hours. If there is evidence of pressure or fluid migration, contact Engineering as there will need to be additional remediation attempts before the SC shoe plug.

51	CUT & PULL PRODUCTION CASING, PUMP SHOE PLUG
52	TIH with 2-3/8" tubing and tag cement top to verify TOC inside production casing. TOOH and SB 1050' of tubing.
53	PU and TIH with mechanical cutter on 2-3/8" tbg. Cut 4-1/2", 11.6# casing at 1050'. TOOH and LD cutter.
54	Attempt to establish circulation with biocide treated fresh water.
55	ND BOP. ND TH. Un-land casing. Rig max pull shall be 100,000#. Max pull over string weight shall be 50,000#. If unable to unland, contact Foreman/Engineer. **Barrier Management** Fluid will be the only barrier while unlanding casing. Stop and review JSA.
56	Install BOP on casing head with 4-1/2", 11.6# pipe rams. **Barrier Management** Fluid will be the only barrier while NU BOP. Stop and review JSA.
57	TOOH and LD all 4-1/2", 11.6# casing. Remove 4-1/2", 11.6# pipe rams and install 2-3/8" pipe rams.
58	TIH with diverter tool on 2-3/8" tubing to 1050'. Establish circulation to surface with biocide treated fresh water.
59	Initiate circulation at low rate monitoring returns for fluid. Add mud thinner to hydrate/clean mud. Slowly increase circulation rate to 4-6 BPM using mud thinner and gel polymer sweeps as needed.
60	Pump 33 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) and let soak for ~2 hours.
61	Continue circulating at 4-6 BPM if possible. If returns show hydrocarbons or a 1 hr build-up shows pressure, swab and vent well and clean open tank. Circulate clean fluid before pumping cement.
62	COA: Verify and document that all pressure and fluid migration has been eliminated prior to placing the SC shoe plug at 1050'. If there is evidence of pressure or fluid migration, contact Engineering.
63	MIRU cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Surface Casing Shoe Plug: Pump 155 sx (33.5 bbl or 188 cf) of the Surface AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 2% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp). Volume is based on 162' in 7.875" bit size open hole with 100% excess factor. 203' in the 8-5/8", 24# surface casing with no excess. The plug is designed to cover 1050'-685'. Collect wet and dry samples of cement to be left on rig. RDMO Cementers. Notify engineering if circulation is ever lost during job.
64	COA: If cement was not circulated to surface, then WOC 4 hours. Tag TOC. TOC must be 838' or shallower. If tag is too deep or there is evidence of pressure or fluid migration, contact Engineering.
65	Pull out of cement. TOOH to 280'. Forward circulate tbg clean with fresh water. TOOH & SB 260' of tubing. WOC 4 hours.
66	Note: Plug can be tagged after a 4 hour WOC, but must have a 6 hour WOC prior to pressure testing.
67	ND 7-1/16" BOP. NU 9" or 11" BOP. RIH with bit and scraper. Clean csg and tag TOC. Circulate Clean. POOH. PT casing to 500 psi. Contact engineering if test fails.
68	SURFACE PLUG
69	MIRU WL. PU and RIH with (8-5/8", 24#) CIBP and set at 260'. POOH. RDMO WL.
70	TIH with diverter tool on 2-3/8" tubing to 260'. Either swab well down or use rig air to remove water from well. (Note: Do not exceed 175 psi if using rig air). If either methods cannot be performed, contact engineering to discuss excess cement volume for top out plug.
71	DO NOT PUMP WATER AHEAD OF CEMENT. MIRU Cementers. Pump Surface Plug: Pump 80 sx (17.3 bbl or 97 cf) of the Surface AGM blend: Class G with 0.4% B547 Gas Block (Latex) and 2% S001 CC (Calcium Chloride) and 4% D053 Expansion (Gyp). Volume based on 260' inside 8-5/8", 24# surface casing with no excess. Cement will be from 260' to surface. Verify and document cement to surface. Collect wet and dry samples of cement to be left on rig.
72	TOOH and remove diverter tool. Insert ~5' of 2-3/8" Tbg. Circulate FW to clean Csg & Csg Valves. LD final joint of 2-3/8" Tbg. RDMO cementers. ND BOP. Install night cap. RDMO WO rig.
73	Instruct cementing, tools and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@oxy.com within 24 hours of completion of the job.
74	Supervisor submit paper copies of all invoices, logs, and reports to Well Services Engineering Specialist.
75	Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
76	Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
77	Welder cut casing minimum 5' below ground level.
78	Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
79	Obtain GPS location data as per Colorado ECOM Rule 215 and provide to GPS Teams page and Oxy GIS database.

80	Properly abandon flow lines per Rule 1105. File electronic Form 42 and/or Form 44 once abandonment is complete.
81	Back fill hole with fill. Clean location, and level.
82	Submit Form 6 Subsequent Report to Colorado ECMC ensuring to provide 'As performed' WBD identifying operations completed.