

## OCCIDENTAL PETROLEUM CORPORATION

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

3/29/2024

**PLUG and ABANDONMENT PROCEDURE**

BERNHARD 4-23A

API: 05-123-21036

**Step Description**

1	Review Previous Open Wells Reports/Well History. If you have questions or concerns, contact Foreman/Engineer.
2	<b>COA: Provide 48 hour notice to Colorado EMMC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.).</b>
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 04/10/14. RDMO Slickline.
5	Prepare location for base beam equipped rig. Install perimeter fence as needed.
6	<b>COA: Verify Form 17 (State Bradenhead Test) has been run within 60 days of RU.</b>
7	<b>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.</b>
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	<b>MIRU</b>
10	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. <b>**Barrier Management**</b> Fluid will be the only barrier while NU BOP. Stop and review JSA.
11	TOOH and SB 7270' of 2-3/8" tbg. LD remaining 2-3/8" tbg.
12	MIRU WL. PU and RIH with (4-1/2", 11.6#) gauge ring to 7960'. POOH.
13	PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 7950'. POOH. RIH and dump 2 sx cement on CIBP. POOH.
14	<b>NIO INJECTION SQUEEZE</b>
15	PU and RIH with one 4', 3-1/8" deep penetrating perf gun with 4 spf. Shoot squeeze holes at 7300'. POOH. RDMO WL.
16	<b>Note : You can shoot the Sussex and 2400' perfs at this time also.</b>
17	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 7270'.
18	MIRU cementers. Make sure the tubing annulus is loaded with water then attempt to establish injection max pressure <b>6160 psi</b> with water. If it won't inject then sting out, load tubing with cement a bbl short of EOT then sting back in, in the next step. Max pressure is <b>3500 psi</b> with tubing full of cement unless pressure is applied to annulus.
19	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 60' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO cementers.
20	Pull out of cement and reverse clean with 2x bottoms up. TOOH, SB 4450' of 2-3/8" tbg. LD remaining tbg.
21	<b>SUSSEX INJECTION SQUEEZE</b>
22	PU and RIH with one 4', 3-1/8" deep penetrating perf gun with 4 spf. Shoot squeeze holes at 4480'. POOH. RDMO WL.
23	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 4450'.
24	MIRU cementers. Make sure annulus is full of water then attempt to establish injection with water, max pressure is <b>4100 psi</b> , pipe is light at max. If it won't inject then sting out and load tubing with cement a bbl short of EOT then sting back in, in the next step. Max pressure is <b>3600 psi</b> , with tubing full of cement, pipe is light at max.

25	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.
26	Move up above cement top and reverse circulate 2X Bottoms up. TOO H and SB ' of 2-3/8" tbg. LD stinger, and remaining tbg.
27	<b>UPPER PIERRE BALANCED CIRCULATION PLUG</b>
28	MIRU WL. PU and RIH with one 4', 3-1/8" perf gun with 4 spf. Shoot 16 squeeze holes at 2400'. RDMO WL.
29	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.
30	Pump 95 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) displace to the perfs and let soak for ~1 hour . This takes care of HSF requirements for the rest of the job.
31	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.
32	MIRU cementers. Pump Squeeze: 160 sx (34.5 bbl or 194 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) down the casing. Volume is based on 500' in the casing-hole annulus with 25% excess, and 500' in the casing. Displace cement with Water to 1900'. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
33	Leave valves open to allow cement to balance between the production and surface casing. If it gets shut in for too long while cement is getting rigged down there's a chance that the plug doesn't balance, so do what you can to make any shut in period brief.
34	<b>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.</b>
35	TIH with 2-3/8" tubing and tag cement top to verify TOC inside production casing. TOO H and SB 1600' of tubing.
36	<b>CUT AND PULL CASING</b>
37	MIRU WL. RIH and jet cut 4-1/2", 11.6# casing at 1550'. RDMO WL.
38	Attempt to establish circulation with biocide treated fresh water.
39	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. <b>**Barrier Management**</b> Fluid will be the only barrier while unlanding casing. Stop and review JSA.
40	Install BOP on casing head with 4-1/2", 11.6# pipe rams. <b>**Barrier Management**</b> Fluid will be the only barrier while NU BOP. Stop and review JSA.
41	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.
42	<b>SHOE PLUG</b>
43	TIH with 2-3/8" tubing to 1600'. Establish circulation to surface with biocide treated fresh water.
44	<b>NOTE: Don't spend more than an hour trying to get into casing, if you can't get back in pump at the cut, the state prefers that it gets pumped from 50' in so just do what you can.</b>
45	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.
46	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.
47	<b>COA: Verify and document that all pressure and fluid migration has been eliminated prior to placing the SC shoe plug at 1600'. If there is evidence of pressure or fluid migration, contact Engineering.</b>
48	MIRU cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Surface Casing Shoe Plug: Pump 385 sx (83 bbl or 466 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). Volume is based on 50' in 4-1/2", 11.6# production casing with no excess. 884' in 7.875" bit size open hole with 30% excess factor. 201' in the 8-5/8", 24# surface casing with no excess. The plug is designed to cover 1600'-465'. Plug length exceeds 500'. Consult with Foreman or Engineer on splitting up the plug. Collect wet and dry samples of cement to be left on rig. RDMO Cementers. Notify engineering if circulation is ever lost during job.

49	<b>COA: If cement was not circulated to surface, then WOC 4 hours. Tag TOC. TOC must be 616' or shallower. If tag is too deep or there is evidence of pressure or fluid migration, contact Engineering.</b>
50	Pull out of cement. TOO H to 300'. Circulate tbg clean with fresh water. TOO H & SB 300' of tubing. WOC 4 hours.
51	Note: Plug can be tagged after a 4 hour WOC, but must have a 6 hour WOC prior to pressure testing.
52	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.
53	<b>SURFACE PLUG</b>
54	PU and RIH with (8-5/8", 24#) CIBP and set at 300'. POOH.
55	TIH with 2-3/8" tubing to 300'.
56	MIRU Cementers. Pump Surface Plug: Pump 90 sx (19.4 bbl or 109 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 300' inside 8-5/8", 24# surface casing with no excess. Cement will be from 300' to surface. Verify and document cement to surface. Collect wet and dry samples of cement to be left on rig.
57	TOOH and 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.
58	Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to DJVendors@oxy.com within 24 hours of completion of the job.
59	Supervisor submit paper copies of all invoices, logs, and reports to Well Services Engineering Specialist.
60	Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
61	Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
62	Welder cut casing minimum 5' below ground level.
63	Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
64	Obtain marker plate GPS location data and provide to GPS Teams page and Oxy GIS database.
65	If applicable, abandon flow lines per Rule 1105. File electronic Form 42 and/or Form 44 once abandonment is complete.
66	Back fill hole with fill. Clean location, and level.
67	Submit Form 6 Subsequent Report to CECMC ensuring to provide 'As performed' WBD identifying operations completed.