

## OCCIDENTAL PETROLEUM CORPORATION

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

11/29/2021

**PLUG and ABANDONMENT PROCEDURE**

GRAY 18-16

API: 05-123-26912

**Step Description**

<b>1</b>	Review Previous Open Wells Reports/Well History. If you have questions or concerns, contact Foreman/Engineer.
<b>2</b>	<b>COA: Provide 48 hour notice to COGCC prior to rig up per request on approved Form 6 (e.g. call field coordinator, submit Form 42, etc.).</b>
<b>3</b>	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.
<b>4</b>	MIRU Slickline and Core Tech. Pull production equipment and tag bottom. Record tag depth, casing/tubing pressures and fluid level in Open Wells. RUN GYRO to 7324', making stops every 100'. RDMO Slickline and Core Tech.
<b>5</b>	Prepare location for base beam equipped rig. Install perimeter fence as needed.
<b>6</b>	<b>COA: Verify Form 17 (State Bradenhead Test) has been run within 60 days of RU.</b>
<b>7</b>	<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. 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.</b>
<b>8</b>	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.
<b>9</b>	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.
<b>10</b>	TOOH and SB 4150' of 2-3/8" tbg. LD remaining 2-3/8" tbg.
<b>11</b>	MIRU WL. PU and RIH with (4-1/2", 11.6#) gauge ring to 7300'. POOH.
<b>12</b>	PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 7290' (collars at 7260' & 7304'). POOH. RIH and dump 2 sx cement on CIBP. POOH.
<b>13</b>	PU and RIH with (4-1/2", 11.6#) CIBP and set at +/- 6970' (collars at 6952' & 6995'). POOH. Slowly top fill well to clear out all gas. Pressure test CIBP to 1000 psi. RIH and dump 2 sx cement on CIBP. POOH.
<b>14</b>	Ensure hole has been circulated clean to remove gas interference. Run <b>CCL/GR/CBL/VDL log from +/- 5000' to surface</b> to confirm squeeze location. Run one pass with 1000 psi on casing. Future operations may change depending on CBL results.
<b>15</b>	Forward logs to engineering and in addition to the normal handling of logs/job summaries, email copies of all cement job logs/job summaries and invoices to DJVendors@anadarko.com within 24 hours of job completion. Note that squeeze hole locations and cement volumes may vary depending on CBL results.
<b>16</b>	PU and RIH with one 4', 3-1/8" deep penetrating perf gun wth 4 spf. Shoot squeeze holes at 4193'. POOH. RDMO WL.
<b>17</b>	PU and TIH with (4-1/2", 11.6#) packer on 2-3/8" tbg. Set packer at 4150'.
<b>18</b>	Establish an injection rate with treated water. 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.
<b>19</b>	Release packer. TOOH, SB 2-3/8" tbg. LD packer.
<b>20</b>	If gas is present, consider swabbing and venting before pumping injection squeeze.
<b>21</b>	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 4150'.
<b>22</b>	Note: Do not exceed 40 bbls of cement on injection squeezes.

23	MIRU cementers. Pump Sussex Squeeze: 100 sx (21.6 bbl) 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) and 0.3% D065 (Dispersant). Underdisplace by 3 bbls. Volume is based on 43' in the casing below the CICR, cement squeezed into formation, and 190' on top of the CICR. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
24	Pull Tbg to ~3,600' and Reverse Circulate Minimum 2x well capacity after cementing to ensure no cement is left in the Tbg or Annulus.
25	SB ~2800' of 2-3/8" Tbg. LD Stinger & remaining Tbg.
26	<b>COA: Confirm and document static conditions in the well before placing the next plug. If there is evidence of pressure or fluid migration at any time after placing the Sussex plug, contact Engineering.</b>
27	PU and RIH with one 4', 3-1/8" deep penetrating perf gun with 4 spf. Shoot squeeze holes at 2800'. POOH. RDMO WL.
28	PU and TIH with (4-1/2", 11.6#) packer on 2-3/8" tbg. Set packer at 2770'.
29	Establish an injection rate with treated water. 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.
30	Release packer. TOOH, SB 2-3/8" tbg. LD packer.
31	If gas is present, consider swabbing and venting before pumping injection squeeze.
32	PU and TIH with (4-1/2", 11.6#) CICR on 2-3/8" tbg. Set CICR at 2770'.
33	Note: Do not exceed 40 bbls of cement on injection squeezes.
34	MIRU cementers. Pump Squeeze: 100 sx (21.6 bbl or 121 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 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.
35	Pull Tbg to ~2610'. Reverse Circulate Minimum of 2x well capacity after cementing to ensure no cement is left in the tbg or annulus.
36	SB ~2100' of 2-3/8" tbg. LD Stinger & remaining Tbg.
37	PU and RIH with one 4', 3-1/8" deep penetrating perf gun with 4 spf. Shoot squeeze holes at 2470'. POOH. RDMO WL.
38	Pump down 4.5" Casing to establish an injection rate with treated water. 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. Record rate and pressure results and report them to the Foreman/Engineer.
39	Pump 40 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) into the Casing annulus and let soak for ~2 hours.
40	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.
41	If gas is present, consider swabbing and venting before pumping injection squeeze.
42	Note: Do not exceed 40 bbls of cement on injection squeezes.
43	MIRU cementers. Pump AGM Cmt down 4.5" Casing: 170 sx (36.6 bbls) 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 1 bbls. Volume is based on 570' casing capacity & 30% Excess OpenHole volume, and TOC 1900'. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
44	Displace AGM Cement with Treated Water to 1900'.
45	Leave valves open for 10 minutes to allow cement to balance between the production and surface casing. If 2 bbls or more of displacement fluid flows back through the production casing, shut in well to ensure TOC remains at a workable depth.
46	<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 proceeding to next cmt plug.</b>
47	RIH w/ ~1,900' of 2-3/8" Tbg to Tag TOC. Ensure TOC is deeper than 1,800'.
48	SB ~1000' of 2-3/8" Tbg. Lay down remaining Tbg.
49	MIRU WL. PU and RIH with one 4', 3-1/8" perf gun with 4 spf. Shoot 16 squeeze holes at 1700'. RDMO WL.

50	Pump down 4.5" Casing to establish an injection rate with treated water. 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. Record rate and pressure results and report them to the Foreman/Engineer.
51	Pump 40 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) into the Casing annulus and let soak for ~2 hours.
52	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.
53	MIRU cementers. Pump AGM Cmt down 4.5" Casing: 185 sx 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 700' in the casing with no excess and 700' in Casing annulus with no excess. Displace cement with Water to 1000'. Collect wet and dry samples of cement to be left on rig. RDMO Cementers.
54	Displace AGM Cement with Treated Water to 1000'.
55	Leave valves open for 10 minutes to allow cement to balance between the production and surface casing. If 2 bbls or more of displacement fluid flows back through the production casing, shut in well to ensure TOC remains at a workable depth.
56	<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 proceeding plug.</b>
57	RIH w/ ~1,000' of 2-3/8" Tbg to Tag TOC. Ensure TOC is deeper than 850'.
58	SB ~825' of 2-3/8" Tbg. Lay down remaining Tbg.
59	PU and TIH with mechanical cutter on 2-3/8" tbg. Cut 4-1/2", 11.6# casing at 825'. TOO H and LD cutter.
60	Attempt to establish circulation with biocide treated fresh water.
61	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.
62	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.
63	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.
64	TIH with diverter tool on 2-3/8" tubing to 825'. Establish circulation to surface with biocide treated fresh water.
65	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.
66	Pump 25 bbls of 160F HSF (0.5 gals/bbl or 1.5 lbs/bbl) and let soak for ~2 hours.
67	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.
68	<b>COA: Verify and document that all pressure and fluid migration has been eliminated prior to placing the SC shoe plug at 825'. If there is evidence of pressure or fluid migration, contact Engineering.</b>
69	MIRU cementers. Pump 10 bbls (min) of pre-flush, followed by 5 bbls fresh water spacer. Pump Surface Casing Shoe Plug: Pump 120 sx (25.9 bbl or 146 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 100' in 7.875" bit size open hole with 100% excess factor. 200' in the 8-5/8", 24# surface casing with no excess. The plug is designed to cover 825'-525'. Collect wet and dry samples of cement to be left on rig. RDMO Cementers. Notify engineering if circulation is ever lost during job.
70	<b>COA: If cement was not circulated to surface, then WOC 4 hours. Tag TOC. TOC must be 675' or shallower. If tag is too deep or there is evidence of pressure or fluid migration, contact Engineering.</b>
71	Pull Tbg to ~600' and Forward Circulate Minimum 2x well capacity. TOO H w/ Tbg.
72	Note: Plug can be tagged after a 4 hour WOC, but must have a 6 hour WOC prior to pressure testing.
73	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.
74	MIRU WL. PU and RIH with (8-5/8", 24#) CIBP and set at 260'. POOH. RDMO WL.

75	TIH with diverter tool on 2-3/8" tubing to 260' and pump 18 bbls of 160F HSF (0.125 gals/bbl or 0.5 lbs/bbl) to fill Csg & Flush Csg Valves. Let soak for 1 hour. 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.
76	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.
77	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.
78	Instruct cementing and wireline contractors to e-mail copies of all job logs/job summaries to rscDJVendors@anadarko.com within 24 hours of completion of the job.
79	Supervisor submit paper copies of all invoices, logs, and reports to VWP Engineering Specialist.
80	Excavation crew to notify One Call to clear excavation area around wellhead and for flow lines.
81	Excavate hole around surface casing enough to allow welder to cut casing a minimum 5' below ground level.
82	Welder cut casing minimum 5' below ground level.
83	Spot weld on steel marker plate. Marker should contain Well name, Well number, legal location (1/4 1/4 descriptor) and API number.
84	Obtain GPS location data as per COGCC Rule 215 and send to rscDJVendors@anadarko.com.
85	Properly abandon flow lines per Rule 1103. File electronic Form 42 once abandonment is complete.
86	Back fill hole with fill. Clean location, and level.
87	Submit Form 6 to COGCC ensuring to provide 'As performed' WBD identifying operations completed.

Deepest WW 1 mile: 200'; FHM: 734'; Sussex Top: 4173'; Sussex Base: 4378'; Shannon Base: 4797'; Niobrara Top: 7037'

GYRO IS NEEDED

No known casing integrity issues.

SHANNON PRODUCTIVE WITHIN 1 MILE

Well was drilled by Kerr McGee.

Directional Well.