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ATTACHMENT E: INJECTION WELL PLUGGING PLAN
40 CFR 146.92(b)

DONALDSONVILLE SITE

Facility Information

Facility name: Ciel
CIEL NO.1

Facility contact: Lauren Read –Vice President BKVerde, LLC
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Well location: Donaldsonville, Ascension, Louisiana
NAD 1927 (Louisiana South Zone) X: 2,114,245.33′; Y: 511,857.41′

Injection well plugging and abandonment will be conducted according to the procedures below.

Upon completion of the project, or at the end of the life of the Ciel No.1 injection well, the well will be plugged and abandoned to meet the requirements at 40 CFR 146.92. The plugging procedure and materials will be designed to prevent any unwanted fluid movement, to resist the corrosive aspects of CO_2 and/or water mixtures, and to protect any underground source of drinking water (USDW). Any necessary revisions to the well plugging plan to address new information collected during logging and testing of the well will be made after construction and logging and testing of the well have been completed. The final plugging plan will be submitted to the Underground Injection Control (UIC) Program Director.

After the injection is terminated permanently and the PISC period has ended, the well will be flushed with kill weight fluid. The tubing-casing annulus will be pressure tested. The packer will then be released, and a minimum of three tubing volumes will be circulated without exceeding fracture pressure. The packer and tubing will be removed from the well. Bottomhole pressure measurements will be conducted, and the well will be logged to ensure mechanical integrity inside and outside the casing prior to plugging. If a loss of mechanical integrity is discovered, the well will be repaired prior to proceeding with the plugging operations. A detailed plugging procedure is provided below. All casing in this well will be cemented to surface at the time of construction and will not be retrievable at abandonment. The balanced-plug placement method will be used to plug the well. If, after flushing, the tubing and packer cannot be released, an electric line with a tubing cutter will be used to cut off the tubing above the packer, the packer will be left in the well, and the cement retainer method will be used for plugging the injection formation below the abandoned packer. All the casing strings will be cut off at least 6 feet below the plow line. A blanking plate with the required permit information will be welded to the top of the cutoff casing.

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Planned Tests or Measures to Determine Bottomhole Injection Zone Pressure

BKVerde, LLC (BKVerde) will record bottomhole pressure from a downhole pressure gauge or use a fluid level and known fluid density to calculate kill fluid weight.

Planned External Mechanical Integrity Test(s)

BKVerde will conduct at least one of the following tests to verify external mechanical integrity (MIT) (**Table 1**) prior to plugging the injection well as required in 40 CFR 146.92(a).

Table 1. Planned MITs.

Test Description	Location
Pulsed Neutron Log (PNL)	Wireline well log
Temperature Log	Along wellbore using wireline well log
Noise Log	Wireline well log
Oxygen Activation Log	Wireline well log

Information on Plugs

BKVerde will use the materials and methods noted in **Table 2** to plug the injection well. The volume and depth of the plug or plugs will depend on the final geology and downhole conditions of the well as assessed during construction. The cement(s) formulated for plugging will be compatible with the CO_2 stream. The cement formulation and required certification documents will be submitted to the regulatory agency with the well plugging plan. The owner or operator will report the wet density and retain duplicate samples of the cement used for each plug.

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Table 2. Plug information.

Plug Information	Plug #1	Plug #2	Plug #3	Plug #4	Plug #5	Plug #6	Plug #7	Plug #8
Diameter of boring in which plug will be placed (inch)	8.535	8.535	8.535	8.535	8.535	8.535	8.535	8.535
Sacks of cement to be used	8	8	8	8	8	8	8	8
Slurry volume to be pumped (bbl)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Slurry weight (ppg)	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Top of plug (feet)	10,820	10,540	10,400	9,720	9,420	9,235	8,770	8,355
Bottom of plug (feet)	10,840	10,560	10,420	9,740	9,440	9,255	8.79	8,375
Type of cement or other material	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant
Method of emplacement (e.g., balance method, retainer method, or two-plug method)	Balance method	Balance method	Balance method	Balance method	Balance method	Balance method	Balance method	Balance method

Plug Information	Plug #9	Plug #10	Plug #11	Plug #12	Plug #13	Plug #14	Plug #15	Plug #16
Diameter of boring in which plug will be placed (inch)	8.535	8.535	8.535	8.535	8.535	8.535	8.535	8.535
Sacks of cement to be used	8	8	8	8	8	8	146	150
Slurry volume to be pumped (bbl)	1.4	1.4	1.4	1.4	1.4	1.4	14.1	23.5
Slurry weight (ppg)	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Top of plug (feet)	8,165	7,445	7,260	7,020	6,525	5,955	5,500	5,100
Bottom of plug (feet)	8,185	7,465	7,280	7,040	6,545	5,975	5,700	5,432
Type of cement or other material	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant
Method of emplacement (e.g., balance method, retainer method, or two-plug method)	Balance method	Balance method	Balance method	Balance method	Balance method	Balance method	Balance method	Balance method

Plug Information	Plug #17	Plug #18	Plug #19	Plug #20	Plug #21	Plug #22	Plug #23
Diameter of boring in which plug will be placed (inch)	8.535	8.535	8.535	8.535	8.535	8.535	8.535
Sacks of cement to be used	219	8	271	213	84	168	14
Slurry volume to be pumped (bbl)	28.7	1.4	35.7	42.5	17.7	35.5	2.8
Slurry weight (ppg)	14.8	14.8	14.8	14.8	15.6	15.6	15.6
Top of plug (feet)	4,695	4,675	4,100	3,500	1,800	600	10
Bottom of plug (feet)	5,100	4,695	4,651	4,100	2,050	1,100	50
Type of cement or other material	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	CO_2 Resistant	Class “A”	Class “A”	Class “A”
Method of emplacement (e.g., balance method, retainer method, or two-plug method)	Braiden Head Squeeze	Balance method	Braiden Head Squeeze	Balance method	Balance method	Balance method	Balance method

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Narrative Description of Plugging Procedures

Ciel No. 1 (Plug-Back procedures during injection operations)

Up hole recompletion methods during active injection shall be accomplished with several techniques. Each technique is designed to plug-off communication to the previous injection zone. Plugging methods that may be used include:

1. Workover Rig & Electric line operation (CIBP): corrosion resistant bridge plug (CIBP) with twenty feet of CO2 resistant cement placed on top,
2. Workover rig operation (cement retainer): a corrosion resistant cement retainer to squeeze existing perforations with CO2 resistant cement while placing twenty feet of CO2 resistant cement on top of the cement retainer,
3. Workover rig operation (balanced plug & bradenhead squeeze): a bradenhead squeeze to place a balanced CO2 corrosion resistant plug across the perforations prior to performing the bradenhead squeeze,
4. Coiled tubing operation (balanced plug): balanced CO2 resistant cement plug
5. Electric line operation (TTBP): a vented thru-tubing bridge plug (TTBP) with twenty feet of CO2 resistant cement placed on top,

All re-completion plug-back operations will require the following regulatory and safety meeting protocol:
NOTE: All plugging regulation as promulgated in 40 CFR: Part §146.92 will be followed. NOTE: Louisiana Administrative Code Title 43§XVII-137 (plugging and abandonment) & Louisiana Administrative Code Title 43§XVII-631 (specific to plugging and abandonment of Class VI wells) shall be followed. NOTIFY Regulatory Authority before commencing plug and abandonment operations. NOTE: all fluid volumes, sacks of cement, volume of cement slurry, and tag depths are subject to change based on actual conditions during operations.

Safety Meetings will be held each morning. Safety Meetings will be held at each significant change of operations regardless of the time of day.

The following are generic procedures for each of the above reference plugging methods during the injection phase of the Donaldsonville Site project: **In compliance with 40 CFR 146.92(c), BKVerde will notify the regulatory agency at least 60 days before plugging the well and provide an updated Injection Well Plugging Plan, if applicable.**

• Workover Rig & Electric line operation (CIBP) plug-back procedure:

1. MIRU (move-in-rig-up) Workover Rig and equipment.
2. Check tubing/annulus pressures. Pump kill weight fluid into formation. Pressure test tubing-casing annulus to 500 psig.

3. ND (Nipple Down) Tree. NU (Nipple Up) BOP's (Blow Out Preventers). Test same high/low (3,000/250 psig). Test backside to 1,000 psig. RU tubing encapsulated cable (TEC) spool. MIRU chrome tubing tools and equipment.
4. Release Packer. Circulate clean with kill weight fluid.
5. POOH (pull out of hole). Spool up TEC. LD (lay-down) packer. Stand or LD (lay-down) tubing.
6. MIRU (move-in-rig-up) Electric Line Unit (EL). NU (nipple-up) lubricator and blow-out preventors (BOP). Test BOP high/low (3,000/250 psig). Record tubing and casing pressures.
7. Make gauge ring trip to PBTD (plug-back total depth).
8. MU (make-up) corrosion resistant CIBP. RIH w/CIBP. Set above perforations per design. POOH. Pressure test CIBP and casing to 500 psig.
9. MU cement bailer. RIH w/cement bailer and dump bail 20 feet of CO2 resistant cement on top of CIBP. POOH. Pressure test CIBP and casing to 500 psig.
10. In accordance with any Testing and Monitoring requirements (Attachment D), perform any required electric logging analysis.
11. RDMO (rig-down-move-out) EL.
12. MU BHA (mulsehoe, redressed or new packer, nipples, bottom-hole pressure/temperature gauges, and TEC per design). RIH w/BHA and tubing to packer setting depth. ND BOP's. NU Tree. Space out. Circulate inhibited packer fluid. Set packer. Land tubing. Test tubing-casing annulus.
13. MIRU EL. NU lubricator and BOP's. Test BOP's high/low (3,000/250 psig). Record tubing and casing pressures.
14. Make gauge ring trip to PBTD (plug-back total depth). POOH.
15. Make up perforating guns per design. RIH to depth per design. Perforate. POOH. LD spent guns. Note: several trips may be required to complete the perforating phase.
16. RDMO EL. RDMO Workover rig.
17. Submit re-completion and plug-back reports to regulatory authorities for approval to begin CO2 injection into the new injection zone.

• Workover rig operation (cement retainer):

1. MIRU (move-in-rig-up) Workover Rig and equipment.
2. Check tubing/annulus pressures. Pump kill weight fluid into formation. Pressure test tubing-casing annulus to 500 psig.
3. ND (Nipple Down) Tree. NU (Nipple Up) BOP's (Blow Out Preventers). Test same high/low (3,000/250 psig). Test backside to 1,000 psig. RU tubing encapsulated cable (TEC) spool. MIRU chrome tubing tools and equipment.
4. Release Packer. Circulate clean with kill weight fluid.
5. POOH (pull out of hole). Spool up TEC. LD (lay-down) packer. Stand or LD (lay-down) tubing.
6. Offload WS (work-string) onto pipe rack.

7. MU BHA (corrosion resistant cement retainer). PU BHA & WS. RIH to depth above perforations per design and set cement retainer. PU out of cement retainer. Circulate clean. Sting into cement retainer. Test backside to 500 psig. Establish pump-in rate. Determine number of sacks of cement needed for cement squeeze. Mix and pump CO2 resistant cement. Squeeze perforations. PU WS out of cement retainer. Circulate clean leaving at least 20 feet of cement on top of retainer.
8. POOH. LD WS.
9. MU BHA (mulsehoe, redressed or new packer, nipples, bottom-hole pressure/temperature gauges, and TEC per design). RIH w/BHA and tubing to packer setting depth. ND BOP's. NU Tree. Space out. Circulate inhibited packer fluid. Set packer. Land tubing. Test tubing-casing annulus.
10. MIRU EL. NU lubricator and BOP's. Test BOP's high/low (3,000/250 psig). Record tubing and casing pressures.
11. Make gauge ring trip to PBTD (plug-back total depth). POOH.
12. Make up perforating guns per design. RIH to depth per design. Perforate. POOH. LD spent guns. Note: several trips may be required to complete the perforating phase.
13. RDMO EL. RDMO Workover Rig.
14. Submit re-completion and plug-back reports to regulatory authorities for approval to begin CO2 injection into the new injection zone.

• Workover rig operation (balanced plug & bradenhead squeeze):

1. MIRU Workover Rig and equipment.
2. Check tubing/annulus pressures. Pump kill weight fluid into formation. Pressure test tubing-casing annulus to 500 psig.
3. ND Tree. NU BOP's. Test same high/low (3,000/250 psig). Test backside to 1,000 psig. RU tubing encapsulated cable (TEC) spool. MIRU chrome tubing tools and equipment.
4. Release packer. Circulate clean with kill weight fluid.
5. POOH. Spool up TEC. LD packer. Stand or LD tubing.
6. Offload WS onto pipe rack.
7. PU WS. RIH w/WS to bottom perforation depth per design. Mix and pump CO2 resistant cement per design as a balanced plug. PU WS out of cement plug above top of cement. Circulate clean. Perform bradenhead squeeze. Hold squeeze pressure and wait on cement to harden, +/- 8 hours minimum.
8. Trip in hole with tubing. Tag top of cement. Circulate clean. Test casing to 500 psig. POOH. LD WS.
9. MU BHA (mulsehoe, redressed or new packer, nipples, bottom-hole pressure/temperature gauges, and TEC per design). RIH w/BHA and tubing to packer setting depth. ND BOP's. NU Tree. Space out. Circulate inhibited packer fluid. Set packer. Land tubing. Test tubing-casing annulus.
10. MIRU EL. NU lubricator and BOP's. Test BOP's high/low (3,000/250 psig). Record tubing and casing pressures.
11. Make gauge ring trip to PBTD. POOH.

12. Make up perforating guns per design. RIH to depth per design. Perforate. POOH. LD spent guns. Note: several trips may be required to complete the perforating phase.
13. RDMO EL. RDMO Workover Rig.
14. Submit re-completion and plug-back reports to regulatory authorities for approval to begin CO2 injection into the new injection zone.

• Coiled tubing operation (balanced plug): balanced CO2 resistant cement plug

1. MIRU Coiled Tubing Unit (CTU). NU lubricator and BOP's. Test BOP's high/low (3,000/250 psig). Record tubing and casing pressures.
2. Check tubing/annulus pressures. Pressure test tubing-casing annulus to 500 psig.
3. RIH w/coiled tubing pumping kill weight fluid at low rate until reaching the bottom of the perforated zone. Circulate kill weight fluid.
4. Mix and pump CO2 resistant cement per design as a balanced plug. PU coiled tubing out of cement plug above top of cement. Circulate clean.
5. POOH slowly maintaining balanced pressure on top of cement plug.
6. RDMO CTU.
7. MIRU EL. NU lubricator and BOP's. Test BOP's high/low (3,000/250 psig). Record tubing and casing pressures.
8. Make gauge ring trip to PBTD (plug-back total depth). POOH.
9. Make up perforating guns per design. RIH to depth per design. Perforate. POOH. LD spent guns. Note: several trips may be required to complete the perforating phase.
10. RDMO EL.
11. Submit re-completion and plug-back reports to regulatory authorities for approval to begin CO2 injection into the new injection zone.

• Electric Line operation TTBP (thru-tubing vented bridge plug):

1. RU pump and tank. Pump kill weight fluid to kill well. Keep hole full of kill weight fluid
2. MIRU EL. NU lubricator and BOP's. Test BOP's high/low (3,000/250 psig). Record tubing and casing pressures.
3. Make gauge ring trip to PBTD (plug-back total depth). POOH.
4. Make up TTBP. RIH w/TTBP. Set above perforations per design. POOH.
5. Make up bailer. Fill bailer with gravel. RIH w/bailer to TTBP. Dump gravel on TTBP. POOH.
6. Fill bailer with sand. RIH w/bailer to TTBP. Dump sand on TTBP. POOH.
7. RIH w/bar to top of TTBP. Tap and close vent on TTBP. POOH.
8. Make up cement bailer. Fill with CO2 resistant cement. RIH w/cement bailer. Tag TTBP. Dump bail twenty feet of corrosion resistant cement on TTBP. Note: this may take several trips. POOH. Let cement harden.
9. Pressure test cement plug to 500 psig.
10. Make up perforating guns per design. RIH to depth per design. Perforate. POOH. LD spent guns. Note: several trips may be required to complete the perforating phase.

11. RDMO EL.
12. Submit re-completion and plug-back reports to regulatory authorities for approval to begin CO2 injection into the new injection zone.

Post-PISC Plug and Abandonment Procedure (Ciel No. 1)

Notifications, Permits, and Inspections: In compliance with 40 CFR 146.92(c), BKVerde will notify the regulatory agency at least 60 days before plugging the well and provide an updated Injection Well Plugging Plan, if applicable.

1. **NOTE: Louisiana Administrative Code Title 43§XVII-137 (plugging and abandonment) & Louisiana Administrative Code Title 43§XVII-631 (specific to plugging and abandonment of Class VI wells) shall be followed. NOTIFY Regulatory Authority before commencing plug and abandonment operations. NOTE: all fluid volumes, sacks of cement, volume of cement slurry, tag depths are subject to change based on actual conditions during operations.**
2. MIRU (Move-in-rig-up) Rig and plug and abandon equipment.
3. Check pressures. Bleed Off & Monitor. Pump kill weight brine fluid to control well.
4. ND (nipple-down) Tree. NU (nipple-up) BOP's (blowout preventors). Test BOPs to 250 psi/4,000 psi on chart and record.
5. Test tubing/casing annulus to 1,000 psi for 30 minutes on chart and record. RU TEC Spool. RU Chrome handling tools and equipment.
6. PU (pick-up) on tubing and release retrievable packer. Circulate clean.
7. POOH (pull-out-of-hole). Spool up TEC. LD (lay-down) packer, gauges and 5-1/2" tubing.
8. Offload 2-7/8" 6.5 lb/ft work string (WS) onto pipe rack.
9. MU bit and scraper (BHA). RIH (run-in-hole) w/BHA and WS to 4,330'. Circulate clean. POOH. LD BHA. Stand WS.
10. MIRU EL. Test lubricator 250 psi/2,500 psi. Make gauge ring trip to 4,050'. POOH.
11. PU External Mechanical Integrity Test (MIT) Tool. RIH to 4,675'. Log from 4,050' to 1,800'. POOH. LD MIT tool.
12. PU Pulsed Neutron Log (PNL) tool. RIH to 4,400'. Log from 4,675' to surface. LD PNL tool assembly.
13. PU segmented cement bond log tool. RIH to 4,400'. Log from 4,675' to surface. LD tool assembly.
14. RDMO EL.
15. RIH w/WS to 4,675'. Circulate clean.
16. Mix and pump 226 sx (253 cubic feet 14.8 ppg) CO2 resistant balanced cement plug per design (4,015-4,651'). POOH. Stand 750' of WS. Reverse circulate clean. Secure well and hold 250 psi on plug a minimum of 8 hours.
17. Pressure test casing to 1,000 psi for 30 minutes on chart and record. RIH with WS. Tag top of cement plug at 4,015'. Circulate clean.

18. POOH. Stand WS.
19. MU corrosion resistant CIBP. RIH w/CIBP and WS to 4,015'. Set CIBP at 4,015'. Circulate clean,
20. With end of WS at 4,015'. Mix and pump 173 sx (205 cubic feet of 15.6 ppg CL "A") balanced cement plug per design (3,500-4,015'). POOH. Stand 600' of tubing. Reverse circulate clean. Secure well and hold 500 psi on plug a minimum of 8 hours.
21. Pressure test casing to 1,000 psi for 30 minutes on chart and record. RIH with WS. Tag top of cement plug at 3,500'. Circulate clean.
22. POOH. LD WS until the end of WS is at 2,050'. Circulate clean.
23. Mix and pump 84 sx (99 cubic feet of 15.6 ppg CL "A") balanced cement plug per design (1,800-2,050'). POOH. Stand 250' of WS. Reverse circulate clean. Secure well and hold 500 psi on plug a minimum of 8 hours.
24. Pressure test casing to 1,000 psi for 30 minutes on chart and record. RIH with WS. Tag top of cement plug at 1,800'. Circulate clean.
25. POOH. LD WS until the end of WS is at 600'. Circulate clean.
26. Mix and pump 168 sx (199 cubic feet of 15.6 ppg CL "A") balanced cement plug per design (600-1,100'). POOH. Stand 600' of WS. Reverse circulate clean. Secure well and hold 500 psi on plug a minimum of 8 hours.
27. Pressure test casing to 1,000 psi for 30 minutes on chart and record. RIH with WS. Tag top of cement plug at 600'. Circulate clean.
28. POOH. LD WS until the end of WS is at 50'. Circulate clean.
29. Mix and pump 14 sx (16 cubic feet of 15.6 ppg CL "A") balanced cement plug per design (10-50'). POOH. LD WS.
30. Clean cement equipment. Nipple Down BOP's.
31. Dig cellar 6' below ground level. Cut and remove wellhead and all strings of casing.
32. Weld ½" plate with serial number and date to seal wellbore.
33. RDMO Rig. Complete plugging forms and send in with charts and all laboratory information to regulatory agency. Plugging report shall be certified as accurate by BKVerde and shall be submitted within 60 days after plugging is completed.
34. The procedures described above are subject to modification during execution as necessary to ensure a plugging operation that protects worker safety and is effective to protect USDWs, and any significant modifications due to unforeseen circumstances will be described in the plugging report. Complete plugging forms and send in charts and all laboratory information to the regulatory agency as required by permit. Plugging report shall be certified as accurate by BKVerde and plugging contractor and shall be submitted within 60 days after plugging is completed.

1. Table 1The procedures described above are subject to modification during execution as necessary to ensure a plugging operation that protects worker safety and is effective to protect USDWs, and any significant modifications due to unforeseen circumstances will be described in the plugging report. Complete plugging forms and send in charts and all laboratory information to the regulatory agency as required by permit. Plugging report

shall be certified as accurate by BKVerde and plugging contractor and shall be submitted within 60 days after plugging is completed.

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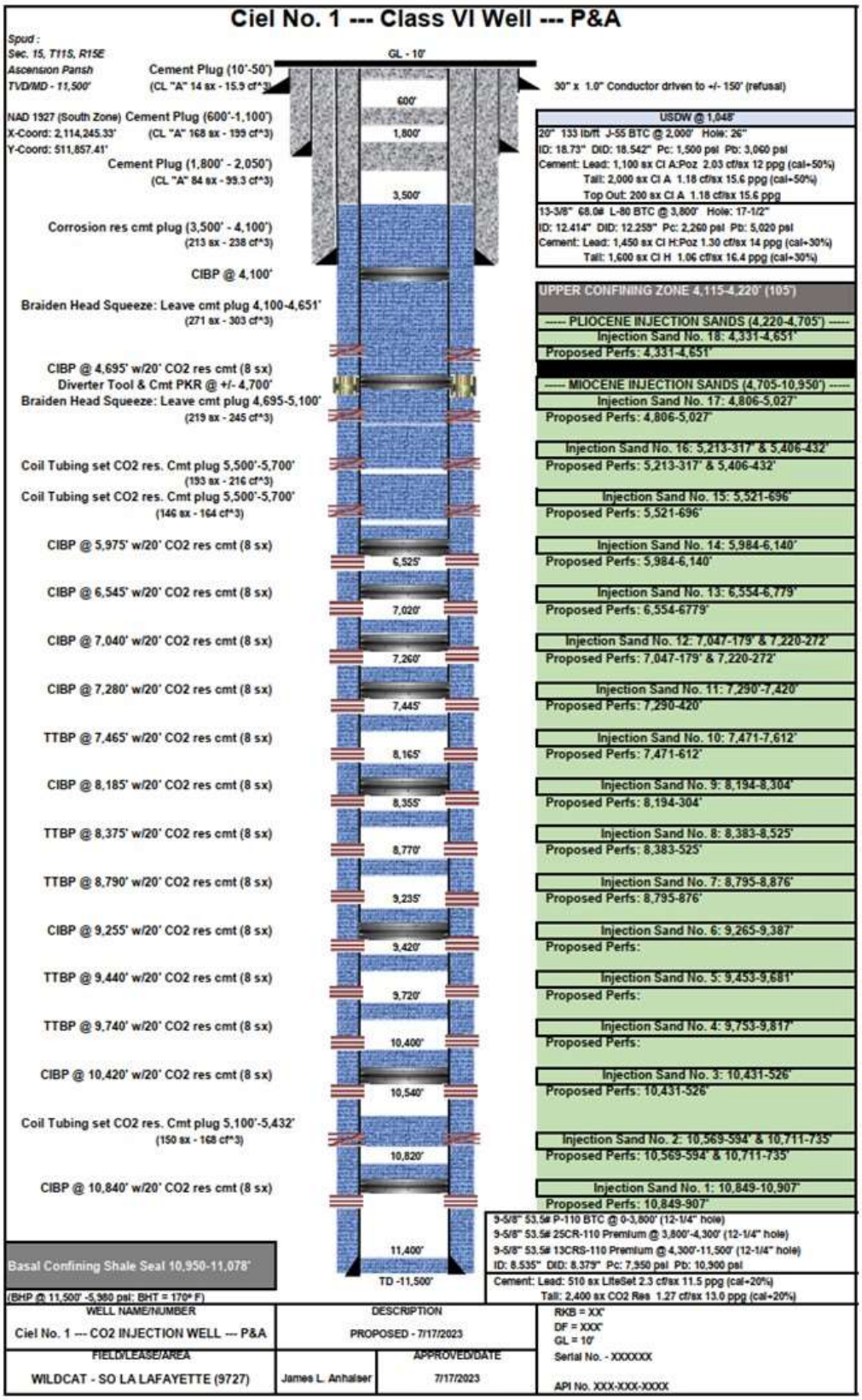

Figure 1. Ciel No.1 injection well plugging schematic.