

INJECTION WELL PLUGGING PLAN
40 CFR 146.92(b)

Facility Information

Facility Name: Pelican Renewables, LLC
Well Names: Rindge Tract CCS Well #1
Rindge Tract CCS Well #2

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Well Locations: Rindge Tract Island, San Joaquin County, California
38.021507, -121.428926 (Well #1)
38.014567, -121.415405 (Well #2)

Pelican Renewables, LLC (Pelican) will conduct injection well plugging and abandonment in compliance with 40 CFR 146.92 and California Public Resources Code Section 3208.1. The wells will be plugged to protect all Underground Sources of Drinking Water (USDWs) and to prevent migration of injected carbon dioxide (CO₂) by using CO₂ resistant plugging materials. Following construction of the wells, necessary revisions to the plugging plan will be completed and submitted to the UIC Program Director.

After injection has ceased, bottom-hole pressure measurements will be recorded and mechanical integrity testing will be completed to confirm the integrity of the casing and seal in each well. The wells will be flushed and filled with brine solution to maintain pressure control of the wells. If a loss of mechanical integrity is discovered, the well will be repaired and retested prior to plugging operations.

Planned Tests or Measures to Determine Bottom-Hole Reservoir Pressure

Pressures will be continuously monitored during injection using the casing-conveyed external bottom-hole pressure gauges. Final pressures will be recorded prior to conducting external mechanical integrity tests. Bottom-hole pressure will be used to calculate the pressures required to plug each well, and the density of the brine to flush and fill each well.

Planned Mechanical Integrity Test(s) [MITs]

Pelican will demonstrate mechanical integrity in both injection and any monitoring wells that penetrate the confining zone or injection zone prior to operation, during operation, following corrective action, and before plugging and abandonment of the injection and monitoring wells in accordance with EPA 40 CFR 146.92 and California Public Resources Code Section 3208.1. The purpose of the MIT is as follows:

1. Confirm integrity of casing (i.e., internal MIT).
2. Confirm integrity of cement seal (i.e., external MIT).

Internal Mechanical Integrity

Internal mechanical integrity will be continuously monitored in each well. An APT (annular pressure test) will be performed on an annual basis, as well as following any corrective action, prior to final plugging activities, and at the request of the UIC Program Director. The APT confirms the well's ability to maintain pressure in the fluid-filled annular space between the tubing and casing. As described in EPA's guidance for standard annulus pressure tests, the annular space will be pressurized and pressure readings will be recorded for a minimum of one hour. Internal mechanical integrity will be confirmed if the pressure gain or loss does not exceed 3% of the initial test pressure.

External Mechanical Integrity

Pelican will conduct one of the tests listed in Table 1 to verify external mechanical integrity prior to plugging each injection well. Temperature logs can be used to identify fluid movement through the confining zone adjacent to the well borehole and can identify casing leaks. Noise logs or radioactive tracer surveys (RTSs) may be used if anomalies are identified in the temperature logs. Note that the distributed fiber optic sensing (DFOS) sensors deployed outside the long string casing of the injection well will also continuously monitor for temperature and noise anomalies via distributed temperature and distributed acoustic sensors. The MIT work will be performed by Pelican using experienced and licensed personnel, as applicable, with furnished equipment that is appropriate and adequate to complete all phases of the MIT testing.

Table 1. Planned External MITs.

Test Description	Location
Temperature Survey	Wireline Well Log
Noise Log	Wireline Well Log
Radioactive Tracer Survey (RTS)	Wireline Well Log

Equipment

Wellhead equipment will be furnished with stripper head (wireline pack-off) assemblies and used to conduct the geophysical log(s). The stripper head assembly will be securely attached to the wellhead to prevent flow from the well at the pressures observed. The stripper head assembly furnished and installed will be sized to accommodate the width and length of the longest geophysical tool or camera assembly used for conducting the tests and surveys. Each wellhead will be furnished with bleed and isolation valves so the stripper head assembly can be shut-in and isolated from the wellhead equipment. The assembly will include pressure gauges and appurtenances for monitoring pressure in the wells during the tests. Temperature surveys must be appropriately sensitive to temperature differentials to verify external mechanical integrity.

Execution of Test Logs

Pelican will conduct one of the tests listed below to verify external mechanical integrity prior to plugging the injection well.

External MIT – Temperature Survey

The wellbore will be cleared of any material that would be corrosive to the logging tools or present obstructions that would prevent passage of the tools. The temperature log will be conducted through the injection tubing from the surface to total depth of the well. Fluid will be injected into the well and will have a temperature differential of no less than 10° F than the wellbore temperature. The minimum volume of fluid to be injected will be based on three well volumes. Pelican will calculate the fluid volume based on the final well design, including the total depth, the diameter of the long-string casing, and the diameter of the slotted liner and under-reamed gravel pack annulus. The approximate volumes are calculated below.

Table 2. Well Design Information

Rindge Tract CCS Well #1	Depths (ft. bgs)	Linear ft
Total Depth of Well	6946	6946
Packer Depth	5396	N/A
8.875" Long-string Casing	0-5494	5494
12" Under-reamed boring	5494-6946	1452
Rindge Tract CCS Well #2		
Total Depth of Well	6880	6880
Packer Depth	5330	N/A
8.875" Long-string Casing	0-5428	5428
12" Under-reamed boring	5428-6880	1452

Note:

ft. bgs: feet below ground surface

Rindge Tract CCS Well #1

Long-string casing volume

5494 linear ft * 0.0595 bbl./linear ft. = 327 bbl. (13725 gallons)

Under-reamed gravel pack volume

1452 linear feet x 0.1394 bbl/linear ft. = 202 bbl (8502 gallons)

Total Casing Volume

327 bbl + 202 bbl = 529 bbl

Three Casing Volumes

Plan revision number: V3.0
Plan revision date: 02/10/2023

3 x (529 bbl.) = 1588 bbl. (66832 gallons)

Rindge Tract CCS Well #2

Long-string casing volume
5428 linear ft * 0.0595 bbl./linear ft. = 323 bbl. (13560 gallons)

Under-reamed gravel pack volume
1452 linear feet x 0.1394 bbl/linear ft. = 202 bbl (8502 gallons)

Total Casing Volume
323 bbl + 202 bbl =525 bbl

Three Casing Volumes
3 x (525 bbl.) = 1576 bbl. (66186 gallons)

Notes:

*Volume calculations completed using Halliburton's eRedBook® Mobile application
bbl:barrels*

Following fluid injection, intermediate temperature surveys will be conducted from the base of the confining unit to total depth. Running the temperature log through this interval will identify temperature anomalies due to leakage behind the casing.

External MIT-RTS

Prior to proceeding with the RTS, the wells will be flushed with fresh water. The RTS will be conducted with medicinal grade Iodine-131 or equivalent and dynamic surveys will provide data for evaluation of external mechanical integrity.

External MIT- Noise Log

A noise log will be conducted under static conditions. The tool will record the amplitude of the reflected acoustic signal as photographic-like images, and the transit-time data will be used to generate high-resolution caliper logs within the tubing.

Should a well fail any portion of the MIT, it will be subject to immediate repair. A workover procedure utilizing best industry practices at the time will be developed and submitted to the UIC Program Director for review and approval based on the anticipated technical issue to be resolved.

Information on Plugs

Following a determination of mechanical integrity, the injection tubing and packer will be removed. Each well will be permanently plugged using the balanced-plug placement method described herein and the casing string will be cut off approximately three feet below ground surface (below plow depth). A metal cap inscribed with the UIC permit number will be welded atop the casing.

Pelican will use the materials and methods noted below to plug each 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 carbon dioxide stream. The cement formulation and required certification documents will be submitted to the UIC Program Director with the well plugging plan. Pelican will report the wet density and will retain duplicate samples of the cement used for each plug.

Narrative Description of Plugging Procedures

Notifications, Permits, and Inspections

In compliance with 40 CFR 146.92(c), Pelican will notify the UIC Program Director at least 60 days before plugging each well and provide updated Injection Well Plugging Plan, if applicable.

Plugging Procedures

Each injection well shall be plugged and abandoned as outlined in the following steps:

1. Mark and note all CO₂ pipelines with rig supervisor prior to MIT.
2. Conduct internal MIT.
3. Test, measure, and determine bottom-hole reservoir pressure. Calculate a kill fluid density.
4. Flush injection well with a kill weight fluid. Circulate tubing and annulus with kill weight fluid pressure is controlled.
5. Install blowout preventers (BOP) and perform a function test of the preventers.
6. Remove disposal tubing and packer.
7. Conduct an external MIT on the well as specified in 40 CFR 146.89 and described above.
8. Conduct cement bond log (CBL). Should an evaluation of the CBL indicate that remedial cementing is necessary, a plan and schedule will be submitted for review and approval. The CBL shall have the cement bond rating clearly marked on the log. Information shall

be included on the log stating the criteria for various bond ratings appropriate for the casing size. In the event that remedial cementing is necessary, additional well inspections such as a caliper log may be completed to evaluate potential additional remedial procedures.

9. Deploy the first cement plug through a work-string. This procedure will be done by slowly withdrawing the work-string in stages (maximum of 500 ft). The actual volume will be based on length of the plug to be emplaced. Calculations are as follows:

The number of sacks of CO₂ resistant cement, with a yield of 1.12 ft³/sack, will be calculated for each 8.75-inch diameter casing as follows:

Rindge Tract CCS Well # 1

Long-string casing
5494 ft. – 3400 ft. = 2094 ft.

Volume in ft.³
2094 linear feet of casing x 0.3340 ft.³/ft. = 699 ft.³

Under-reamed gravel pack
6946 ft. – 5494 ft. = 1452 feet
Volume in ft.³
1452 linear ft. of casing x 0.771 ft.³/ft. = 485 ft.³
Total Volume in ft.³
699 ft.³ + 495 ft.³ = 1184 ft.³

Cement in sacks
1 cubic foot = 1.12 sacks of cement
Total Cement in Sacks
1,184 ft³ of cement ÷ 1.12 ft³/sack = 1057 sacks

Rindge Tract CCS Well # 2

Long-string casing
5428 ft. – 3400 ft. = 2028 ft.
Volume in ft.³
2028 linear feet of casing x 0.3340 ft.³/ft. = 677 ft.³

Under-reamed gravel pack
6880 ft. – 5428 ft. = 1452 ft.
Volume in ft.³
1452 linear ft. of casing x 0.7718 ft.³/ft. = 485 ft.³

Total Volume in ft.³
677 ft.³ + 495 ft.³ = 1162 ft.³

Cement in sacks
1 cubic foot = 1.12 sacks of cement
Total Cement in Sacks
1,162 ft³ of cement ÷ 1.12 ft³/sack = 1038 sacks

10. Deploy the second cement plug through a work-string. This procedure will be done by slowly withdrawing the work-string in stages (maximum of 500 ft). The actual volume will be based on length of the plug to be emplaced. The actual volume will be based on 133% of the calculated volume. Calculations are as follows:

The number of sacks of class A/H cement, with a yield of 1.18 ft³/sack, will be calculated for each 8.875-inch diameter casing as follows:

Pelican CCS Well No. 1
3,400 feet of casing * 0.3340 ft³/ft of casing = 1136 ft³
1136 ft³ of cement ÷ 1.18 ft³/sack = 962 sacks
962 sacks * 1.33 = 1,575 sacks

Pelican CCS Well No. 2
3,400 feet of casing * 0.3340 ft³/ft of casing = 1136 ft³
1136 ft³ of cement ÷ 1.18 ft³/sack = 962 sacks
962 sacks * 1.33 = 1,575 sacks

11. Once all cementing operations are complete, the wellheads will be removed and casing will be cut off at least three feet below ground level (below plow depth).
12. A metal cap will be welded onto the long string casing inscribed with the referenced UIC permit number and the plugging date.
13. A tri-coordinate location map (including the elevation of the casing cap) will be submitted to the UIC Program Director. The map will be prepared by either a licensed professional land surveyor or California-licensed professional engineer.
14. A plugging report will be submitted to the UIC Program Director within 60 days of the plugging activities.

Construction diagrams for Rindge Tract CCS Wells #1 and #2 are provided in **Figures 1 and 2**.



