

Plan revision number: Revision 1
Plan revision date: December 2024

APPENDIX F

INJECTION WELL PLUGGING PLAN 40 CFR 146.92(B); 146.82(A)(16)

Jasper County Storage Facility

1 FACILITY INFORMATION

Facility Name: Jasper County Storage Facility

Facility Contact: Claimed as PBI
501 Westlake Park Blvd., Houston, Texas 77079
Claimed as PBI

Well Location: Jasper County, TX

Claimed as PBI

2 INTRODUCTION

On June 28, 2023, BP Carbon Solutions LLC (BP) submitted this section of the Class VI application for the Jasper County Storage Facility (Site), and the application was deemed administratively complete on November 22, 2023. In this Revision 1, the Injection Well Plugging Plan has been updated to reflect changes in **Appendix J** (Construction Details) that have resulted in a reduced number of injection wells, Claimed as PBI, and an accompanying reconfiguration of the well construction details. Additionally, the Area of Review (AoR) model has been updated to incorporate additional appraisal and offset well data, providing an enhanced understanding of the subsurface. These updates are expected to reduce project risk by moving away from known faults within the AoR, minimizing the AoR extent, optimizing injection well operations, and reducing interactions with legacy wells.

BP intends to sequester carbon dioxide (CO₂) Claimed as PBI

The calculations and supporting documentation for injection rates and volume are provided in **Appendix B** (Area of Review and Corrective Action Plan).

This Injection Well Plugging Plan describes the actions that BP will take in accordance with 40 CFR §146.92 to conduct injection well plugging and abandonment (P&A). The injection wells will be P&A at the end of life of the well or upon completion of the project. The plugging program and plug cement design are tailored to protect all underground sources of drinking water (USDW) zones while ensuring there is no movement of unwanted fluids, such as CO₂ and water mixtures, in the wellbore.

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The Site will **Claimed as PBI**

Claimed as PBI and infrastructure related to construction, operations, and post-injection site care and closure.

3 PLUGGING PROGRAM

This plugging program will be updated after wellbore construction if there is new data collected from the logging and testing program that indicates that there is a material change from the initial assumptions. After these updates, the final P&A program will be submitted to the Underground Injection Control (UIC) Program Director.

At the end of life of the well and prior to abandonment, the well will be displaced with kill fluid.

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Claimed as PBI The production casing will be logged and pressure-tested internally and externally to ensure adequate mechanical integrity prior to proceeding with the plugging procedure. The well will be remediated if any mechanical integrity issues are identified prior to plugging operations.

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4 PLANNED TESTS OR MEASURES TO DETERMINE BOTTOMHOLE RESERVOIR PRESSURE

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See

Appendix E (Testing and Monitoring Plan) for procedural details of **Claimed as PBI**

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5 PLANNED EXTERNAL MECHANICAL INTEGRITY TEST(S)

BP will conduct at least one of the tests listed in **Table 1** (Planned Mechanical Integrity Tests) to verify external mechanical integrity and ensure there is no leakage or upward migration due to channeling outside of the casing from the injection zone prior to plugging the injection well as required by 40 CFR 146.92(a).

Claimed as PBI Data from the logging will be used to evaluate for abnormalities in the temperature curve, which could be indicative of fluid migration along the wellbore. The temperature log data will be compared to pre-operational temperature log data from before injection of CO₂ into the well. Deviations between the temperature logs before and after CO₂ injection may indicate issues related to the integrity of the well casing or cement. **Claimed as PBI**

Claimed as PBI

6 INFORMATION ON PLUGS

BP will use the materials and methods noted in **Table 2** (Plugging Details) to plug each injection well. The volume and depth of the plugs will depend on the final geology and downhole conditions of each well as assessed during construction. The cement(s) formulated for plugging at the confining zone and below will be compatible with the CO₂ stream. The cement formulation and required certification documents will be submitted to the UIC Program Director with the well plugging plan. The owner or operator will report the wet density and will retain duplicate samples of the cement used for each plug.

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7 DESCRIPTION OF PLUGGING PROCEDURES

7.1 Notifications, Permits, and Inspections

In compliance with 40 CFR 146.92(c), BP will notify the UIC Program Director at least 60 days before plugging the well and provide an updated Injection Well Plugging Plan, if applicable. In addition, the following notifications, permits, and inspections will be performed or acquired as needed:

- In accordance with 16 Texas Administrative Code 5.203(k)(3)(B), notify Railroad Commission of Texas (RRC) five days prior to commencing operations. Ensure proper notifications have been given to all applicable regulatory agencies for rig movement.
- Ensure all permits have been duly executed by all applicable local, state, and federal agencies and have written permission to proceed with planned ultimate procedure.
- Ensure in advance that a pre-site inspection has been performed and that the rig company has visited the Site and is capable of transporting rigs, tanks, and ancillary equipment to perform operations.
- Notify all key stakeholders of expected work scope and ensure third-party contracts for work are in place prior to move-in.
- Hold copies of all required government permits prior to initiating operations and maintain copies at the Site at all times. Ensure that all conditions of approval have been met.
- Ensure relevant agency approvals have been obtained if applicable.
- Ensure that all necessary records are on the rig, including the National Pollutant Discharge Elimination System permit, safety meeting forms, trip sheets, etc.

7.2 Plugging Design

The abandoned wellbore volume will be calculated for the specific environment based on desired plug diameter and length requirements. The volume calculation is the same for plugging and abandonment as during construction and post-injection.

1. Choose the following:
 - a. Desired cement plug length.
 - b. Desired setting depth of plug.
 - c. Amount of spacer to be pumped ahead of cement slurry.
2. Determine the following:
 - a. Number of sacks of cement required.
 - b. Volume of spacer to be pumped behind the cement slurry to balance the plug.

- c. Plug length before the pipe is withdrawn.
 - d. Displacement volume required to spot the plug.
3. Field cementing and wellsite supervisor will both review calculations prior to any plugging.

7.3 Plugging Procedures

1. Conduct wellsite verification and hazard identification on the injection well site.
2. Move in and rig up a drilling rig on the injection well site and conduct inspections.
3. Move in and rig up reels for behind tubing gauges and fiber (if applicable).
4. Monitor surface pressures on tubing, tubing annulus, and all casing annulus on the wellhead and tree pressure gauges.
5. Monitor and record bottomhole pressure from downhole gauge.
6. Derive kill fluid density based on bottomhole pressure.
7. Test surface pumps.
8. Test casing annulus.
9. Establish injection into well with kill fluid (or determined by bottomhole pressure measurement) and inject two times the tubing capacity volume with kill fluid. It is recommended to bleed off tubing intermittently to remove air from the string and surface line.
10. Monitor both the tubing and tubing annulus pressure for two hours to confirm the well is static and there is no fluid movement and no pressure in the tubing and tubing annulus.
11. Rig up wireline and lubricator, run in hole and remove injection valve from tubing (if in place). Pull out of hole with injection valve assembly.
12. Run in hole and set an isolation plug in the lower profile nipple below the gravel pack packer.
13. Monitor both the tubing and tubing annulus pressure for a minimum of 30 minutes to confirm the well is static and there is no fluid movement and no pressure in the tubing and tubing annulus.
14. Nipple down wellhead tree and nipple up a blowout preventer (BOP).
15. Pressure test the pipe rams, blind rams, and the annular preventer on the BOP. Function test BOP.

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16. Pressure test all BOP equipment, kill lines, choke, choke manifold.
17. Pick up tubing and release upper completion (production) packer. Allow adequate time for packer elements to relax.
18. Circulate tubing and tubing annulus with kill fluid until the well is static.
19. Monitor the well for a minimum of 30 minutes to confirm the well is static.
20. Pull tubing and upper completion packer out of the hole and lay down tubing.
 - a. Retrieve behind tubing pressure gauge assembly and fiber optic assembly (if equipped) onto reels for disposal.
21. Pick up workstring and overshot bottomhole assembly. Trip in hole to gravel pack packer tubing entry guide. Latch onto tubing stem.
22. Rig up wireline and lubricator. Run in hole to jet cut tubing stem just above the gravel pack packer depth.
23. Pull out of hole and rig down wireline and lubricator.
24. Trip out of hole with workstring, overshot, and fish assembly.
25. Rig up wireline and lubricator. Confirm mechanical integrity of the production casing based on any of the three options listed in **Table 1** (Planned Mechanical Integrity Tests) above.
26. Pull out of hole and rig down wireline and lubricator. Prepare to spot injection zone isolation plug.
27. Trip in hole with workstring to gravel pack packer depth.

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29. Wait on cement. Trip in hole to tag plug. Trip out of hole with workstring.

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31. Trip in hole with workstring to CIBP depth. Prepare to spot confining zone isolation plug.

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33. Wait on cement. Trip in hole to tag plug. Trip out of hole with workstring.

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35. Trip in hole with workstring to CIBP depth. Prepare to spot surface shoe isolation plug.

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37. Wait on cement. Trip in hole to tag plug. Trip out of hole with workstring.

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39. Pull out of hole and rig down wireline and lubricator. Prepare to spot USDW and base of useable quality water (BUQW) isolation plug to surface.

40. Trip in hole with workstring to CIBP depth.

41. Mix and spot balanced neat cement plug from the CIBP to surface. Ensure coverage across USDW and BUQW to surface. Circulate workstring clean and stand back.

42. Wait on cement. Tag plug.

43. Lay down the work string.

44. Flow check and nipple down BOP.

45. Cut all casing strings (surface and production) approximately two to three feet below surface or as required by any regulatory guidelines or requirements issued by the RRC, if applicable.

46. Install and weld a blanking plate to the top cutoff of the casing with a well name sign.

8 PLUGGING REPORT

In accordance with 40 CFR 146.92(d), BP will develop and submit a Plugging Report, including associated mechanical integrity test data, cement pump charts, cementing labs results, and post-job reports, to the UIC Program Director within 60 days after plugging an injection well. The report will be retained for 10 years following Site closure.