

GENERAL PLUGGING AND ABANDONMENT PROCEDURE

Prior to the plugging and abandonment of the injection wells the applicant will submit a revised plugging and abandonment plan to the director of the California Underground Injection Control (UIC) for review and approval.

Procedure

1. Conduct a pressure mechanical integrity test on the well. The pressure test will be witnessed by the UIC and the test procedure will follow UIC Program procedures for pressure testing a Class I disposal well. If leakage is indicated by the test, the location of the leakage will be identified, the impact to the environment evaluated, and this information submitted to UIC. An environmental remediation plan and implementation schedule and/or a repair plan will be submitted to the UIC for review and approval. No work will commence until the plan has been approved by the UIC.
2. The tubing and packers will be removed from the well.
3. A cement bond log and a gamma ray-neutron log will be run on the well and any other tests or logs determined necessary by UIC. The logs and test results will be submitted to UIC for review and approval. The logs and test results will include an interpretation of the log and tests by a person with the technical expertise to evaluate the data.
4. Based on the evaluation of the logs and tests conducted on the well, a plan for remedial work must be submitted to UIC for review and approval. The remedial work, determined necessary by UIC, will be performed. Remedial work will not commence until the plan has been approved by the UIC.
5. A cement retainer will be set at the base of the long string casing just above the injection interval.
6. Cement will be displaced through the retainer, squeezing the injection interval with cement.
7. After cementing the injection interval, the bottom of the retainer will be closed and the cementing pipe disconnected from the top of the retainer.
8. The casing will be filled with cement and abandonment mud as proposed in Figure Q1.
9. The cementing tubing will be removed from the well. The casing will be filled with cement back to surface.
10. The cement level will be observed in the casing after cement has set for 24 hours. If cement has fallen back, the casing will be filled with cement back to surface.
11. The wellhead equipment will be removed.
12. A metal cap will be welded to the casing inscribed with the UIC permit number and the date the well plugging was completed.
13. A map showing the tri-coordinate location (includes elevation) of the remaining wellhead prepared by a licensed professional land surveyor or professional engineer licensed to practice will be submitted to the UIC.

14. A plugging report with related details will be submitted to the UIC within 30 days of completing the plugging operation on a form provided by UIC. The work done with appropriate service company cementing reports and "day" reports will be submitted to the UIC.

PROPOSED PLUGGING AND ABANDONMENT ACTIVITIES

An example of a proposed plan, approval, and reporting for the injection well is shown in Figure Q1, General Abandonment Plan for All Wells.

The Proposed Plugging and Abandonment Activities

1. Install blowout prevention equipment.
2. Rig up working platform and crane equipment.
3. Pick up 1-1/4-inch Hydril tubing.
4. Go into hole to total depth.
5. Set >400-foot cement plug from total depth to 2,200 feet.
6. Displace drilling mud into wellbore.
7. Locate and identify top of cement plug. UIC to witness.
8. Set 200-foot base of fresh water cement plug at 400 to 600 feet.
9. Displace drilling mud into wellbore.
10. Set 100-foot cement plug at surface.
11. Rig down equipment.
12. Remove wellhead. Weld steel plate onto 9-5/8-inch casing.
13. Remove cellar and restore location. Notify UIC.

Agency Approval of Plan

Before proceeding with the abandonment program, the applicant will have received U.S. Environmental Protection Agency (USEPA) approval of the final abandonment procedure. The USEPA will be notified at least 30 days prior to the scheduled abandonment:

- To witness the location and hardness of the cement plug at 2,200 feet.
- Upon restoration of the location to near original conditions so that a final environmental inspection can be made.

Schedule for Agency Approval and Reporting of Well Plugging Operations

1. Plugged with cement from 2,740 to 2,200 feet.
2. Plugged with cement from 400 to 600 feet.
3. Plugged with cement 100 feet to surface.

ABANDONMENT COST ESTIMATE PER INJECTION WELL

<u>INTANGIBLES:</u>	COST
Rig time: Coil tubing unit including mod/demob per day	\$ 37,500
Transportation	\$ 2,000
Tank rental	\$ 750
Cement services	\$ 31,075
Casing cutter	\$ 1,500
Surface labor	\$ 5,000
Total intangibles	<u>\$ 77,825</u>
<u>TANGIBLES:</u>	COST
Abandonment mud	\$ 3,500
Total workover costs	\$ 81,325
Contingency @ 15%	\$ 12,199
Total Authorization for Expenditure Amount (Per Well)	<u>\$ 93,524</u>