

Work Plan to Plug and Abandon Well TW-2

<p>Primary Purpose</p>	<p>This work plan summarizes the methods Los Alamos National Laboratory (the Laboratory) proposes to use to plug and abandon groundwater monitoring test well 2 (TW-2), located in Pueblo Canyon, Los Alamos, New Mexico. Well abandonment of TW-2 will be consistent with the requirements and guidelines of Sections IV.B.1.b.v and X.D (Well Abandonment) of the Compliance Order on Consent (the Consent Order). The construction of TW-2 and the methods used to abandon the well are detailed below.</p>
<p>Conceptual Model of TW-2</p>	<p>TW-2 was installed in 1949 to monitor the water in the regional aquifer in Pueblo Canyon downgradient of the waste treatment plant at Technical Area 45. TW-2 was completed to 789 ft, with a slotted screen section from 779 to 789 ft. In 1990, 15 ft of the 6-in. casing and screen was removed, and a 6-in.-inside diameter (I.D.) casing was hung in the well from 0 to 834 ft, with the lower section slotted from 774 to 824 ft. Construction details are as follows:</p> <ul style="list-style-type: none"> • 0–57 ft: 16-in.-I.D. steel casing • 0–197 ft: 12-in.-I.D. steel casing • 0–519 ft: 10-in.-I.D. steel casing • 0–779 ft: 8-in.-I.D. steel casing • 0–834 ft: 6-in.-I.D. steel casing, with slotted screen section from 774 to 824 ft
<p>Abandonment Methods</p>	<p>All aboveground and belowground appurtenances will be removed, including pumps, transducers, data loggers, control panels, concrete pad, etc. The well will be inspected with a downhole video camera, and a natural gamma log will be collected to document the existing conditions.</p> <p>Based on the available well-completion notes (Purtymun and Swanton 1998, 099096), TW-2 does not have an annular seal or a filter pack around the screen. Completion notes disagree on the exact screen interval; one source places the top of the screen at 774 ft below ground surface (bgs). Completion notes are also unclear about the status of annular seals between strings of casing. Most likely, given TW-2 was installed with a cable-tool rig, there are no seals (e.g., cement) between casing strings. The actual conditions at the well will be determined by the video camera survey and other methods at the start of field activities.</p> <p>Plugging and abandonment at TW-2 will generally take the approach of removing as many of the internal casing strings as possible in order to gain access to outer casing strings for the purpose of perforating and sealing via grouting. Work will take place within the well from inside to outside, working on the smallest diameter casing first. Grouting will take place in stages to mitigate very high hydrostatic pressures that will be present in this telescopic hole, which will be capable of “blowing out” formations. Grouting in stages will also allow time for the grout to set while other work with larger casing strings is performed simultaneously. Casing cutters and perforators will be pneumatic tools run in the hole on drill rods. This approach will require the use of a rotary drilling rig.</p>

<p>Abandonment Methods (continued)</p>	<p>To plug and abandon TW-2, an effort will be made to remove the entire section of 6-in. casing and screen. Because the 6-in. casing was fished out of the hole in 1990 to deepen the hole (and very likely the hole was deepened with 8-in. tooling), it is probable that the entire section of 6-in. casing can be pulled out. If the 6-in. casing string cannot be removed, the screen section will be evaluated via video logging to determine the need for perforating. After screen evaluations are made, the 6-in. casing will be cut off at the bottom of the 8-in. casing at 780 ft bgs and removed from the hole. After the 6-in. casing has been removed, the 8-in. casing will be perforated from 725 to 775 ft bgs. The first grouting sequence will be initiated at this point. The 8-in. casing will be pressure-grouted with a mixture of Portland Type I/II cement and Baroid IDP-381 additive from the bottom to approximately 540 ft bgs using a tremie pipe. This 294-ft interval of grout will have substantial enough hydrostatic pressure to achieve the sealing objective without having too much pressure to potentially blow out the loose Totavi Lentil formation logged at the bottom of the hole. The 8-in. casing will then be cut off at 520 ft bgs and removed from the hole. The 10-in. casing will be perforated from 380 to 420 ft bgs before being cut off at 200 ft bgs and then removed from the hole. The second grouting sequence will be initiated at this point. The previously installed grout will be physically measured with a tag line, and the second lift of grout will be installed from the top of the first lift to approximately 100 ft bgs. No interval of perforation is planned for the 12-in. casing because no lithologic targets in the section are interpreted to pose potential leaking contributions. The 12-in. casing will be cut off at 60 ft bgs and removed from the hole. The 16-in. casing will be perforated from 10 to 30 ft bgs and left in place. The third grouting sequence will be initiated at this point. The previously installed grout will be physically measured with a tag line, and the third lift of grout will be installed from the top of the second lift to approximately 2 ft bgs. Perforating the 16-in. casing will ensure that any alluvial water will be sealed off from the well casing.</p>						
<p>Surface Completion</p>	<p>The hole will be cement-grouted to within 2.0 ft of ground surface. A 2-ft × 2-ft concrete surface pad will be installed at ground surface with a brass survey marker and will be surveyed in accordance with the Section IX.B.2.f of the Consent Order, which states that pertinent structures may be horizontally located with a global positioning system within 0.5 ft.</p>						
<p>Waste Disposal</p>	<p>No sampling will take place during plugging and abandonment of this well. The intent is to reuse and recycle all materials. If some materials cannot be recycled, they will be sampled, characterized, and disposed of in accordance with the waste characterization strategy form that applies to this activity.</p>						
<p>Summary Report</p>	<p>A brief report will be prepared detailing the methods used, presenting borehole logs (video and natural gamma), describing the quantities of materials used, and providing the final abandonment details. Figures depicting the location of the abandoned well and backfill completion will also be included in the report.</p>						
<p>Schedule</p>	<table border="1"> <thead> <tr> <th>Activity</th> <th>Completion Date</th> </tr> </thead> <tbody> <tr> <td>Plug and abandon TW-2</td> <td>No later than January 31, 2010</td> </tr> <tr> <td>Submit report to the New Mexico Environment Department</td> <td>No later than March 15, 2010</td> </tr> </tbody> </table>	Activity	Completion Date	Plug and abandon TW-2	No later than January 31, 2010	Submit report to the New Mexico Environment Department	No later than March 15, 2010
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REFERENCE

The following list includes all documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

Purtymun, W.D., and A.S. Swanton, February 5, 1998. "Engineering, Geology, and Construction Data of Twenty-Five Test Holes and Test Wells on and Adjacent to the Pajarito Plateau," draft, Los Alamos National Laboratory, Los Alamos, New Mexico. (Purtymun and Swanton 1998, 099096)

