Work Plan to Plug and Abandon Well TW-2A

Primary Purpose	This work plan summarizes the methods Los Alamos National Laboratory (the Laboratory) proposes to use to plug and abandon groundwater monitoring test well 2A (TW-2A), located in Pueblo Canyon, Los Alamos, New Mexico. Well abandonment of TW-2A 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-2A and the methods used to abandon the well are detailed below.
Conceptual Model of TW-2A	Groundwater monitoring well TW-2A was installed in 1949 to monitor intermediate perched groundwater in Pueblo Canyon downgradient of the waste treatment plant at Technical Area 45. Construction details are as follows: • 0–12 ft: 12-in.-inside diameter (I.D.) steel casing • 0–118 ft: 8-in.-I.D. steel casing • 0–128 ft: 6-in.-I.D. steel casing • 128–133 ft: 6-in. diameter screen
Abandonment Methods	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. Based on the available well-completion notes (Purtymun and Swanton 1998, 099096), TW-2A does not have an annular seal or a filter pack around the screen. The actual conditions at the well will be determined by the video camera survey and other methods at the start of field activities. Plugging and abandonment at TW-2A 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 one stage at TW-2A since it is not a particularly deep well, and the hydrostatic pressure associated with a single lift of grout will not be substantial enough to "blow out" the formations within the perforated intervals. 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. To plug and abandon TW-2A, the screened interval will be evaluated to determine the need for either ripping or perforating. An attempt will be made to remove the entire 20-ft section of 6-in. casing and screen at the bottom of the well. Based on the age of the well, it is difficult to predict the outcome of this approach. If the 20-ft section of 6-in. casing and screen breaks or cannot be removed, the entire 20-ft section will be perforated. The 8-in. casing will be perforated in two intervals: 10 to 30 ft below ground surface (bgs) and 95 to 115 ft bgs. An attempt will be made to remove the 12-ft piece of 12-in. casing at the surface. This activity may require minor excavation. Removal of the 12-in. surface casing is desirable in order to eliminate any potential conduit for alluvial water (alluvium logged to 11 ft bgs). The top of the 8-in. casing will be cut off approximately 2 ft bgs. The entire well will be pressure-grouted in one continuous lift with a mixture of Portland Type I/II cement and Baroid IDP-381 from the bottom to approximately 2 ft bgs using a tremie pipe to force cement through the well screen and perforated intervals and into the formation.

Surface Completion	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.	
Waste Disposal	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.	
Summary Report	A brief report will be prepared detailing the methods used, presenting borehole logs (video and natural gamma), 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. The proposed schedule for completion of well abandonment and reporting follows.	
Schedule	**Activity**	**Completion Date**
	Plug and abandon TW-2A	No later than January 31, 2010
	Submit report to the New Mexico Environment Department	No later than March 15, 2010

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)