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Date: DEC 15 2009
Refer To: EP2009-0670

James Bearzi, Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Subject: Submittal of the Work Plans for Plugging and Abandoning Wells TW-1 and TW-1A

Reference: Letter, Mr. Bearzi to Messrs. Gregory and McInroy, dated 11/12/09

Dear Mr. Bearzi:

Consistent with the work plan submittal date required in the above-referenced letter, enclosed please find two hard copies with electronic files of two separate work plans for plugging and abandonment of wells TW-1 and TW-1A. These work plans summarize the methods Los Alamos National Laboratory proposes to use in plugging and abandoning these groundwater monitoring wells. Well abandonment will be consistent with the requirements and guidelines of the "New Mexico Environment Department Monitoring Construction and Abandonment Guidelines" and the guidelines in Sections IV.B.1.b.v and X.D (Well Abandonment) of the Compliance Order on Consent. The schedule for completion of field work and reporting was approved in the above-referenced letter.

If you have any questions, please contact Mark Everett at (505) 667-5931 (meverett@lanl.gov) or Hai Shen at (505) 665-5042 (hshen@doeal.gov).

Sincerely,

B. C. Schappell for MJG
Michael J. Graham, Associate Director
Environmental Programs
Los Alamos National Laboratory

Sincerely,

David R. Gregory
David R. Gregory, Project Director
Environmental Operations
Los Alamos Site Office

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MG/DG/AB/TB/ME:sm

Enclosures: Two hard copies with electronic files –
(1) Work Plan to Plug and Abandon Well TW-1 (LA-UR-09-8074)
(2) Work Plan to Plug and Abandon Well TW-1A (LA-UR-09-8058)

Cy: (w/enc.)
Neil Weber, San Ildefonso Pueblo
Hai Shen, DOE-LASO, MS A316
Mark Everett, EP-LWSP, MS M992
RPF, MS M707 (with two CDs)
Public Reading Room, MS M992

Cy: (Letter and CD only)
Laurie King, EPA Region 6, Dallas, TX
Steve Yanicak, NMED-DOE-OB, MS M894
Kristine Smeltz, EP-WES, MS M992

Cy: (w/o enc.)
Tom Skibitski, NMED-OB, Santa Fe, NM
Annette Russell, DOE-LASO (date-stamped letter emailed)
Ted Ball, PMF-SEC, MS M992
Dave McInroy, EP-LWSP, MS M992
Michael J. Graham, ADEP, MS M991
IRM-RMMSO, MS A150 (date-stamped letter emailed)

Work Plan to Plug and Abandon Well TW-1

Primary Purpose	This work plan summarizes the methods Los Alamos National Laboratory (LANL) proposes to use to plug and abandon groundwater monitoring Test Well 1 (TW-1), located in Pueblo Canyon, Los Alamos, New Mexico. Well abandonment of TW-1 will be consistent with the requirements in the New Mexico Environment Department's (NMED's) letter of November 12, 2009 (NMED 2009, 107614) and the guidelines in Sections IV.B.1.b.v and X.D (Well Abandonment) of the Compliance Order on Consent (the Consent Order). The construction of TW-1 and the methods used to abandon the well are described below.
Conceptual Model of TW-1	Groundwater monitoring well TW-1 was installed in 1950 to monitor the water in the main aquifer in Pueblo Canyon downgradient of the waste treatment plant at Technical Area 45. Construction details are as follows and are presented in Figure 1: • 0–52 ft: 16-in.-inside diameter (I.D.) steel casing • 0–241 ft: 12-in.-I.D. steel casing • 0–627 ft: 8-in.-I.D. steel casing • 622–632 ft: 6-in.-I.D. steel casing swaged into bottom of 8-in. casing • 632–642 ft: 6-in.-diameter screen swaged into the bottom of the 6-in. casing
Abandonment Methods	All aboveground and belowground appurtenances, including pumps, transducers, data loggers, control panels, concrete pad, etc., will be removed. The well will be inspected with a downhole video camera and a natural gamma log collected to document the existing conditions. Based on the available well-completion notes (Purtymun and Swanton 1998, 099096), TW-1 does not have an annular seal or a filter pack around the screen. Unlike with other test wells, completion notes indicate TW-1 has an annular cement seal around the 12-in. casing from ground surface to 241 ft below ground surface (bgs). Plugging and abandonment at TW-1 will generally take the approach of removing as much or as many of the internal casing strings as possible to gain access to outer casing strings for the purpose of perforating and sealing via grouting. Work within the well will take place from inside to outside, working on the smallest diameter casing first. Grouting will take place in two stages to mitigate high hydrostatic pressures that will be present in this hole. 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. To plug and abandon TW-1, 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. If after reviewing the borehole video it appears removing the 20-ft section of 6-in. casing and screen has a low probability of success, the entire 20-ft section will be perforated, if necessary, and left in place. The 8-in. casing will be perforated from 500 to 580 ft bgs. The first grouting sequence will begin at this point. The 8-in. casing will be pressure-grouted with Portland Type I/II cement from the bottom to approximately 300 ft bgs using a tremie pipe. This 342-ft interval of grout will have substantially enough hydrostatic pressure to achieve the objective of sealing the well. The 8-in. casing will then be cut off at 245 ft bgs and removed from the hole. Since completion records indicate the 12-in. casing was cement grouted to 241 ft bgs, no attempt will be made either to perforate or to remove the 12-in. casing. The top of the 12-in. and 16-in. casings will be cut off approximately 2 ft bgs. The final grouting sequence will begin 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 2 ft bgs using a tremie pipe.

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 to 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), detailing 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. The proposed schedule for completion of well abandonment and reporting follows.
Schedule	• Plug and abandon TW-1, March 31, 2010 • Submit report to NMED, April 28, 2010

REFERENCES

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.

NMED (New Mexico Environment Department), November 12, 2009. "Extension Request App[r]oval to Complete Plugging and Abandonment of Test Wells TW-1 and TW-1A," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 107614)

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)

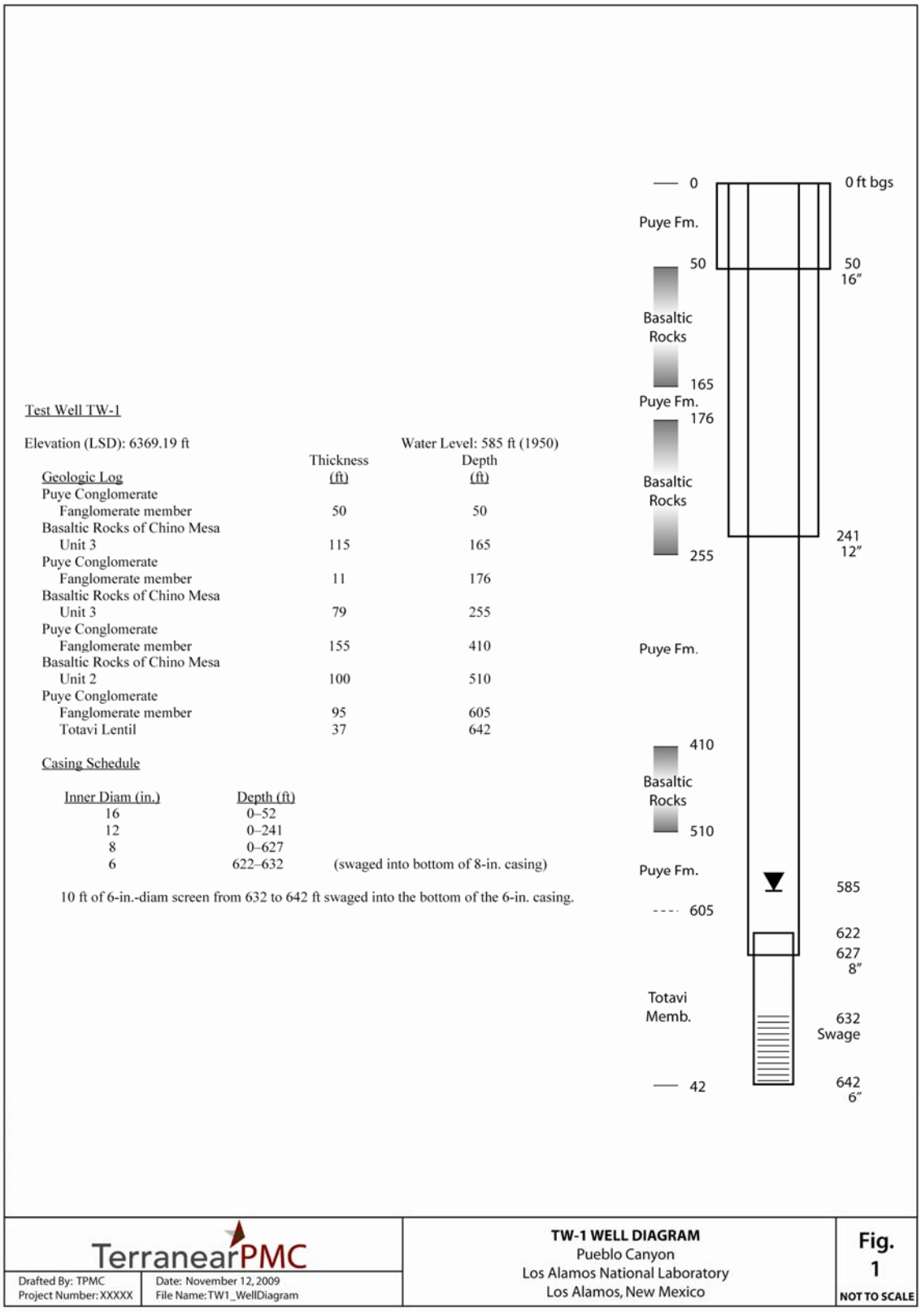

Figure 1 Well construction diagram for TW-1

Work Plan to Plug and Abandon Well TW-1A

Primary Purpose	This work plan summarizes the methods Los Alamos National Laboratory (LANL) proposes to use to plug and abandon groundwater monitoring Test Well 1A (TW-1A), located in Pueblo Canyon, Los Alamos, New Mexico. Well abandonment of TW-1A will be consistent with the requirements in the New Mexico Environment Department's (NMED's) letter of November 12, 2009 (NMED 2009, 107614) and the guidelines in Sections IV.B.1.b.v and X.D (Well Abandonment) of the Compliance Order on Consent (the Consent Order). The construction of TW-1A and the methods used to abandon the well are described below.
Conceptual Model of TW-1A	Groundwater monitoring well TW-1A was installed in 1950 to monitor the perched water in the main aquifer in Pueblo Canyon downgradient of the waste treatment plant at Technical Area 45. Construction details are as follows and are presented in Figure 1: • 0–39 ft: 16-in.-inside diameter (I.D.) steel casing • 0–100 ft: 12-in.-I.D. steel casing • 0–215 ft: 6-in.-I.D. steel casing • 215–225 ft: 6-in.-diameter screen swaged into the bottom of the 6-in. casing
Abandonment Methods	All aboveground and belowground appurtenances, including pumps, transducers, data loggers, control panels, concrete pad, etc., will be removed. The well will be inspected with a downhole video camera and a natural gamma log collected to document the existing conditions. Based on the available well-completion notes (Purtymun and Swanton 1998, 099096), TW-1A does not have an annular seal or a filter pack around the screen. Plugging and abandonment at TW-1A will generally take the approach of removing as much or as many of the internal casing strings as possible to gain access to outer casing strings for the purpose of perforating and sealing via grouting. Work within the well will take place from inside to outside, working on the smallest diameter casing first. Grouting will take place in one stage at TW-1A since it is not a particularly deep well. 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-1A, the screened interval will be evaluated to determine the need for either ripping or perforating. An attempt will be made to remove the entire 225-ft section of 6-in. casing and screen. If after reviewing the borehole video it appears removing the 6-in. casing and screen has a low probability of success, the entire 10-ft screen section will be perforated, if necessary, as well as a 40-ft interval between 180 and 220 ft bgs. The 6-in. casing will then be cut off at 105 ft bgs and removed from the hole. The 12-in. casing will be perforated from 40 to 60 ft bgs. The top of the 12-in. casing will be cut off approximately 2 ft bgs. The entire well will be pressure-grouted in one continuous lift with Portland Type I/II cement 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 to 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), detailing 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. The proposed schedule for completion of well abandonment and reporting follows.
Schedule	• Plug and abandon TW-1A, March 31, 2010 • Submit report to NMED, May 25, 2010

REFERENCES

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.

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NMED (New Mexico Environment Department), November 12, 2009. "Extension Request App[r]oval to Complete Plugging and Abandonment of Test Wells TW-1 and TW-1A," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 107614)

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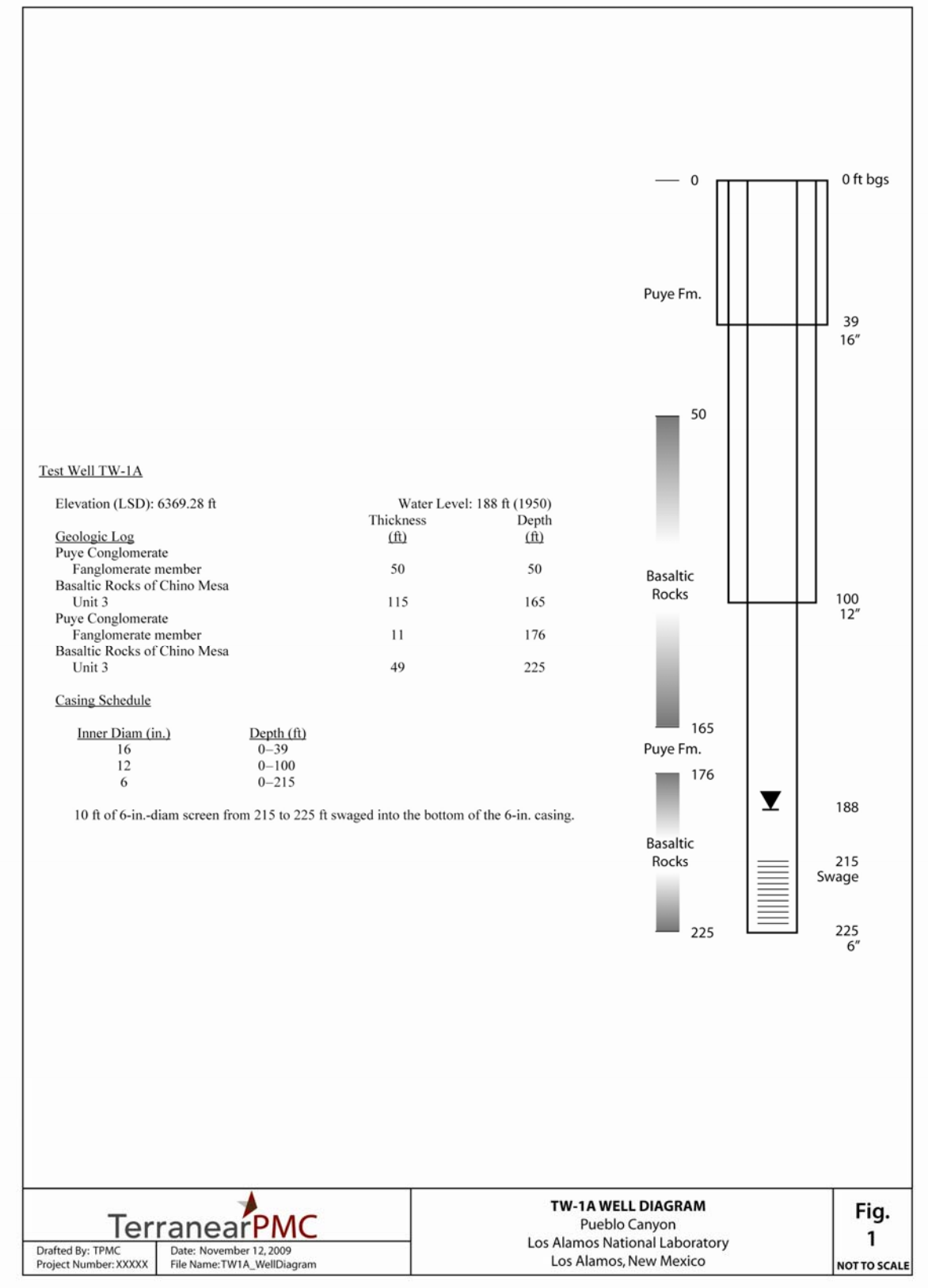

Figure 1 Well construction diagram for TW-1A