

General



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Date: **AUG 19 2011**  
Refer To: EP2011-0276

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

**Subject: Additional Modifications to Work Plans to Plug and Abandon Wells and Boreholes at Los Alamos National Laboratory**

Dear Mr. Kieling:

The purpose of this letter is to formally transmit for your review, some additional modifications to the Work Plans to Plug and Abandon Wells and Boreholes at Los Alamos National Laboratory (EPA ID NM0890010515) and the associated Notice of Approval with Modifications.

Many of the wells and boreholes described in the work plan have now been visited in the field and several have had downhole videos completed on them. These visits and videos have in some cases changed our planned approach to the plugging and abandonment. Therefore, on Wednesday, July 27, 2011, Laboratory personnel met with Michael Dale of your staff to review the proposed changes.

For wells and boreholes with new proposed changes, Table 1 presents the original plugging and abandonment scope from the work plan (Column 1), any modifications to the work plan from the Notice of Approval with Modifications (Column 2), and the revised scope discussed with Michael Dale (Column 3).

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If you have any questions, please contact Craig Douglass at (505) 665-2469 (craigd@lanl.gov) or Woody Woodworth at (505) 665-5820 (lance.woodworth@nnsa.doe.gov).

Sincerely,



Michael J. Graham, Associate Director  
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Sincerely,



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Table 1

Well	Original Scope	Approval with Modifications	Final Proposed Scope
H-19	<p>Drill borehole out to approximately 525 ft below ground surface (bgs) to seal off a perched-intermediate zone encountered at the base of the Bandelier Tuff from 450–472 ft bgs during initial well drilling. Backfill with 3/8-in. bentonite chips to within 10 ft of the ground surface.</p>	<p>Conduct video logging of well H-19 to identify the obstruction referenced in the work plan and attempt to remove the obstruction. If the obstruction can be removed, video log the open hole to total depth. Assuming the borehole is open to a depth greater than approximately 525 ft bgs, backfill the open hole as described in the work plan. If the open hole is less than 525 ft deep after the obstruction has been cleared, overdrill the well to the total depth of the well boring and backfill as proposed in the work plan. If the obstruction cannot be removed, attempt to remove the surface casing in a manner that does not compromise the open hole, assuming open-hole conditions exist. If the borehole is open after the surface casing is removed, video log the borehole to total depth and record the depth to water and any other pertinent observations. After the borehole is video logged, the borehole will be backfilled as described in the work plan.</p>	<p>Drill no deeper than the proposed 525 ft bgs in any case and backfill as described in the work plan. Video indicates casing to 60 ft bgs with branch obstructing borehole at this point. An additional attempt will be made to remove obstruction and complete video.</p>
Layne Western Well	<p>An attempt will be made to remove the 8-in. casing using a pull-back pressure of approximately 125% of the calculated casing weight. If the casing can be removed, the borehole will be filled with 3/8-in. bentonite chips to within 10 ft of ground surface and with neat cement above the bentonite to approximately 2 ft bgs.</p> <p>If the 8-in casing cannot be removed, it will be perforated from approximately 125 to 90 ft bgs, and then the well screen and casing will be pressure-grouted to within 2 ft of ground surface. The annular space around the 8-in. casing will be filled with neat cement from a minimum of 20 ft bgs to 2 ft bgs; the casing will be cut off approximately 2 ft bgs.</p>	<p>Install a temporary pump in the Layne Western Well, purge at least 3 well casing volumes of groundwater and collect groundwater samples for laboratory analysis for major anions, low-level perchlorate, dissolved and total nonfiltered target analyte list (TAL) metals, dissolved (filtered) lithium, silicon, strontium and uranium, total nonfiltered americium-241, plutonium-239/240, strontium-90, gamma emitters (e.g., cesium-137) and uranium, low-level tritium, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and stable isotopes of oxygen and hydrogen in water and nitrogen and oxygen in nitrate. After sampling, the well will be plugged and abandoned as specified in the work plan.</p>	<p>This well is located on U.S. Forest Service property that is going to be transferred to San Ildefonso Pueblo and then to Los Alamos County. Given the land transfer situation, access has been denied until the transfer is complete, sometime next year. At that time, the sampling and plugging and abandonment will be conducted, if possible. This well is now located beneath high-voltage power lines, which will make use of a drill rig impossible.</p>

Well	Original Scope	Approval with Modifications	Final Proposed Scope
Sigma Mesa Well	<p>The 20-in. well casing will be perforated between ~1425 and 1250 ft bgs and pressure-grouted from 1425 ft bgs to within 2 ft of ground surface. The 30-in. surface casing will be cut approximately 20 ft bgs and removed; the 20-in well casing will be cut off approximately 2 ft bgs. The annulus between the well casing and the borehole wall will be cemented from 2 ft to 20 ft bgs.</p>	<p>The field personnel will attempt to seal the annular space from total depth to within 10 ft of the ground surface with bentonite slurry using a tremie pipe inserted between the 20-in. casing and the borehole wall. Neat cement must be placed above the bentonite seal to the surface. If this approach is unsuccessful, four sections of the 20-in casing will be perforated at depth intervals of approximately 1250 to 1425 ft, 875 to 1050 ft, 500 to 675 ft, and 125 to 300 ft bgs and lifts of neat cement will be placed at the four perforation locations and along the annular space.</p>	<p>The 20-in. casing will be cut at 25 ft bgs and removed, and the 30-in casing will be cut at 20 ft bgs and removed. Intervals in the 20-in. casing will be perforated as noted in the modification and pressure grouted to 2 ft bgs. To avoid getting tremie pipe stuck between casing and borehole wall, field personnel will not attempt to place grout between the 20-in. casing and borehole wall except through perforations.</p>
Test Holes 5 and 6, Pajarito Canyon	<p>TH-5: The 24-in surface casing will be removed and the open borehole will be filled with 3/8-in bentonite chips to within 10 ft bgs. Neat cement will be placed above the bentonite to approximately 2 ft bgs.</p> <p>TH-6: An attempt will be made to remove the 120-ft long casing in TH-6 using a pull back pressure equal to 125% of the calculated casing weight. If the casing can be removed, bentonite chips will be placed in the borehole from total depth to approximately 10 ft bgs. The remainder of the borehole will be cemented to within 2 ft bgs.</p>	No modifications	<p>TH-5 is located under high voltage power lines. Video shows that the well is bridged or backfilled up to 33 ft bgs. Can't set up rig under power lines to drill or pull casing. Propose backfilling borehole to 2 ft bgs, cutting casing 2 ft bgs and removing, then filling remaining borehole with neat cement.</p> <p>TH-6 no proposed changes.</p>

Well	Original Scope	Approval with Modifications	Final Proposed Scope
Seismic Hazards Borehole (SHB) 3	The 2.8-in. polyvinyl chloride (PVC) casing will be filled with neat cement to within 2 ft of ground surface; the casings will be cut off at approximately 2 ft bgs.	<p>Before initiating abandonment activities at boring SHB-3, a temporary pump will be installed in the well, at least three casing volumes of groundwater will be removed, and groundwater samples will be collected for laboratory analysis for major anions, low-level perchlorate, dissolved and total nonfiltered TAL metals, dissolved (filtered) lithium, total silicon, strontium and uranium, low-level tritium, explosive compounds, VOCs, SVOCs, and stable isotopes of oxygen and hydrogen in water and nitrogen and oxygen in nitrate.</p> <p>Before backfilling the well casings with neat cement, a cement-bond log will be conducted in borings SHB-3 and SHB-4 wells. If the bond logs indicate the integrity of cement in the annular space will not adequately prevent infiltration of liquids, then the field personnel either will overdrill the well(s) to total depth and backfill to near surface with high-solids hydrated bentonite or perforate and inject sealant in the area(s) where the integrity of original cement is compromised.</p>	<p>SHB-3 will be sampled as requested.</p> <p>For SHB-3 and SHB-4, definitive results from cement bond logs are unlikely in PVC wells according to several geophysical subcontractors contacted. Therefore, the wells and annular cement will be drilled out, then backfilled with bentonite chips to 10 ft bgs and neat cement to surface.</p>
Technical Area 46 Distillation Hole	An attempt will be made to remove as much of the distillation instrumentation as possible from the six holes. The cased holes will then be filled with neat cement to within 2 ft of the ground surface.	A cement bond log will be conducted in each of the six distillation wells. If the bond logs indicate the annular space between the casing and the formation in any boring does not adequately prevent infiltration of liquids, then field personnel will either overdrill the wells before backfilling to near surface with high-solids hydrated bentonite or perforate and inject sealant in the area(s) where the integrity of original cement is compromised.	These distillation holes are being used at this time for isotope production and so will not be abandoned.

Well	Original Scope	Approval with Modifications	Final Proposed Scope
USGS Test Hole East of Material Disposal Area C	The existing exterior appurtenances will be removed from the borehole before abandonment begins. Any interior equipment or instrumentation remaining in the borehole will be removed and the 2-in. PVC casing will be filled with neat cement to approximately 10 ft bgs. Neat cement will then be placed in the casing to within 2 ft bgs. The casing will be cut off approximately 2 ft bgs.	No modifications	This well has already been filled with neat cement with some instrumentation still in the well. The Laboratory proposes to cap the well with neat cement through the final 2 ft to the base course surface because this well is below the edge of the R-60 well pad.