



December 2012

Final Rev. 0

**Field Implementation Plan to
Plug and Abandon Boreholes
49-10046, 49-10047, 49-10048,
Coreholes CH-1, CH-3, CH-4,
Test Hole TH-4, TBM-1, TBM-2,
and Layne Western Well**

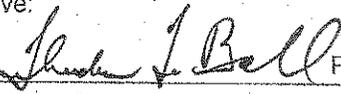
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Field Implementation Plan to Plug and Abandon Boreholes 49-10046, 49-10047, 49-10048, Coreholes CH-1, CH- 3, CH-4, Test Hole TH-4, TBM-1, TBM-2, and Layne Western Well

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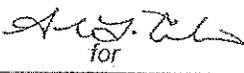
Responsible LANS representative:

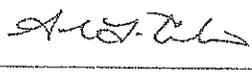
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1.0 INTRODUCTION

This field work plan provides technical guidance for field activities associated with the plugging and abandonment of Task Order 2 wells and boreholes located in Los Alamos, New Mexico as shown in Figure 1.0-1. The wells and boreholes associated with this task order are as follows: Boreholes 49-10046, 49-10047, 49-10048, Core Holes (CH) 1, CH-3, CH-4, Test Hole (TH) 4, TBM-1, TBM-2, and Layne Western Well. Some of the wells and boreholes are located within the Technical Area (TA) -49 Nuclear Environmental Site (NES) boundary. Wells and boreholes inside the NES are Boreholes 49-10046, 49-10047, 49-10048, Core Holes CH-1 and CH-4, and Test Hole TH-4. Abandonment of all wells and boreholes 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).

Specific details including pre-abandonment activities and well construction and abandonment details of the locations are presented below.

2.0 PRE-ABANDONMENT ACTIVITIES

The following activities will be conducted prior to subcontractor mobilizing well abandonment crews, material, and equipment onsite.

2.1 Removal of Appurtenances

All aboveground and belowground appurtenances will be removed, including pumps, transducers, data loggers, control panels, concrete surface pads, etc, with the exception of those discussed in the Abandonment sections below. Removal of appurtenances will be performed by LANL MSS prior to subcontractor's mobilization to the well or borehole with the exception of threaded riser pipes which will be removed by the well abandonment crew.

Casing stickups will be removed from all wells prior to commencing plugging and abandonment operations to prevent any delay in the grouting operations.

2.2 Downhole Video, Water-Level and Total-Depth Measurements

Water-level and total-depth measurements will be collected prior to plugging and abandonment of each borehole or well. If unexpected conditions are encountered, video logs may be run by LANL with the LANL geophysical logging trailer to assess the condition of the well or borehole. Anything placed in a well or borehole within the NES must be decontaminated with Fantastik™ cleaner and paper towels and screened for contamination prior to leaving the site, or as directed per the Radiological Worker Permit (RWP).

3.0 WELLS INSIDE THE TA-49 NES BOUNDARY

3.1 Well Construction, Current Conditions, and Abandonment

This section describes the location, construction, current disposition, and the methods that will be employed to plug and abandon each well/borehole. All vehicular travel within TA-49 will be in accordance with the site-specific Traffic Control Plan. Access routes to each location will be established in accordance with Document Safety Analysis (DSA) and Technical Safety Requirement (TSA) documents.

3.1.1 Well Construction and Current Conditions

3.1.1.1 Boreholes 49-10046, 49-10047, 49-10048

Boreholes 49-10046, 49-10047, and 49-10048 were installed in 2000 as shallow (15-ft deep) cased neutron logging holes for moisture monitoring at Area 2 shafts at TA-49 (LANL 2008, 102215). The boreholes are 2 inches in diameter with stainless-steel casing to 15 ft below ground surface (bgs). The casing has a stick-up of approximately 18 inches. The top of the borehole is completed with an 18-in x 18-in by 6-in thick concrete pad (approximate). The ground surface around the boreholes is covered with a steel mesh gopher barrier.

Boreholes 49-10046, 49-10047, and 49-10048 are located in TA-49 inside the NES boundary.

Current Conditions

No video log has been collected at boreholes 49-10046, 49-10047, or 49-10048. Conditions are expected to be as reported above.

Figure 3.1-1 is a well construction diagram that depicts the construction details and current conditions of boreholes 49-10046, 49-10047, and 49-10048, respectively.

3.1.1.2 Coreholes CH-1 and CH-4

CH-1 was cored in 1959 to 501 ft below ground surface (bgs). CH-4 was cored in 1960 to 303 ft bgs. The core holes are dry and are 4.5 inches in diameter (LANL 2008, 102215). They each contain 2-in. galvanized pipe to total depth (Purtymun 1995, 045344). The galvanized pipe is cemented in place. The surface completions at these holes are a 2 ft x 3 ft x 12-in thick concrete pad (approximate). A 6-ft high (approximate) galvanized riser is threaded into a coupler that is flush with the top of the concrete pad.

CH-1 and CH-4 are located at TA-49 inside the NES boundary.

Current Conditions

No video log has been collected at CH-1 or CH-4. Conditions are expected to be as reported above.

Figures 3.1-2 and 3.1-4 are well construction diagrams that depict the construction details and current conditions of CH-1 and CH-4, respectively.

3.1.1.3 Test Hole TH-4

TH-4 was installed in 1980 to 123 ft bgs for neutron moisture logging at Area 2 in TA-49. The dry borehole is 5 inches in diameter with a 4-in diameter surface casing that extends to approximately 2 to 3 ft bgs. The surface casing is not cemented in place. There is no concrete pad or other surface completion at the ground surface.

TH-4 is located at TA-49 inside the NES boundary.

Current Conditions

No video log has been collected at TH-4. Conditions are expected to be as reported above.

Figure 3.1-5 is a well construction diagram that depicts the construction details of TH-4.

3.1.2 Plugging and Abandonment Inside the NES

The locations will be plugged and abandoned per the direction of the New Mexico Environment Department (NMED) and TerranearPMC (TPMC) SOP 5034, Rev. 0, "Monitor Well and RFI Borehole Abandonment". The locations may be plugged and abandoned in any order, except those located within the NES boundary as outlined below.

Grouting of the wells will be performed using a trailer-mounted grout plant with a hydraulically powered spool of 1.25-inch diameter poly tubing. The grout trailer will remain outside the NES fence and the poly tube will be run through the fence and to the wellhead. The poly tube will be placed down the wells as a tremie pipe to pump cement from the bottom up to ensure holes are completely filled and do not bridge. Cement volumes will be calculated based on the piping/casing size and depth and compared to actual volumes pumped to determine if any bridging has occurred. Poly tubing placed into deeper wells may either be retracted as the borehole fills or cut off and grouted in place.

Any poly tubing that is retracted from a well/borehole inside the NES will have to be decontaminated with Fantastik™ and paper towels prior to leaving the site. Poly tube that comes in contact with the ground surface in an NES must be swiped for a radiological survey and if any contamination is detected it must be decontaminated with Fantastik™, or as directed by the radiological control technician (RCT), per the RWP. After the borehole is cemented, the poly tube will be flushed through with water to remove residual cement. Cement washout water will be discharged to the ground in a designated cement washout area outside the NES fence.

A total depth and depth to water measurement will initially be made and recorded at all locations. Measuring tapes placed in a well or borehole within the NES must be decontaminated with Fantastik™ cleaner and paper towels prior to leaving the site, or as directed by the radiological control technician (RCT), per the RWP.

All plugging and abandonment tasks will be completed in compliance with the Documented Safety Analysis (DSA), (LANL, 2010) and Technical Safety Review (TSR), (LANL, 2010) documents. Specifically, no vehicles or equipment will be driven across or be parked on the NES surface and foot traffic will stay on defined access routes and limited to required travel to and from, and between, the respective wells that need abandonment. Also, no materials will be staged within the NES boundary. In addition, only authorized personnel required for performing the job tasks will be allowed within the NES boundary. This will ensure that the integrity of the Inventory Isolation System (IIS) (essentially the soil overburden) is maintained and not adversely altered or modified.

Any washout water/cement slurry will be discharged to the ground or into a pit outside the NES boundary. If necessary, hoses that enter or cross the NES will be placed on bracing to minimize any impact to the IIS.

At site clean-up a walk down inspection of the IIS will be completed. If an accidental alteration occurred that may adversely impact or compromise the IIS, a proper notification will be made and repairs implemented according to established protocols.

3.2.1.1 Boreholes 49-10046, 49-10047, and 49-10048 Abandonment

Boreholes 49-10046, 49-10047, and 49-10048 will be abandoned by cutting the 2-inch stainless-steel casing as flush as practicable with the top of the concrete pad and filling the 2-in stainless-steel casing with neat cement from the bottom at 15 ft bgs to 2 ft bgs by means of 1.25-inch poly-tubing tremie pipe.

The poly tubing will be inserted into the casing to approximately 6 ft and retracted as the cement fills the casing. The remaining casing will be filled with concrete to the surface of the pad as part of the surface completion and a survey pin will be placed in the concrete.

Boreholes 49-10046, 49-10047, and 49-10048 and the top 10 ft of TH-4 will be grouted with a single mixed batch and with the same piece of poly tubing since they are in close proximity to each other. Boreholes 49-10046, 49-10047, and 49-10048 will be grouted first, then TH-4 will be grouted and the poly tube cut off at about 8 ft and grouted in place in TH-4.

3.2.1.2 CH-1 and CH-4 Abandonment

At CH-1 the 2-inch galvanized riser pipe will be unthreaded from the coupling at the top of the existing concrete surface completion pad. The concrete pad will not be removed. The hole will be abandoned by placing neat cement in the well from the bottom of the galvanized pipe at 501 ft bgs to 2 ft using poly tubing as a tremie pipe. The poly-tube tremie will be inserted to about 450 ft bgs (50 ft off bottom). The poly tubing will be cut off and abandoned in place or retracted and re-spoiled as the hole is filled. The remaining footage will be filled with concrete as part of the surface completion and a survey pin will be placed in the concrete.

At CH-4 the 2-in galvanized riser pipe will be unthreaded from the coupling at the top of the existing concrete surface completion pad. The concrete pad will not be removed. The hole will be abandoned by placing neat cement in the well from the bottom of the galvanized pipe at 303 ft bgs to 2 ft bgs using poly tubing as a tremie pipe. The poly-tube tremie will be inserted to about 250 ft bgs (50 ft off bottom). The poly tubing will be cut off and abandoned in place or retracted and re-spoiled as the hole is filled. The remaining footage will be filled with concrete to the top of the existing concrete surface completion and a survey pin will be placed in the concrete.

3.2.1.3 TH-4 Abandonment

TH-4 will be backfilled with 3/8-inch bentonite chips from the bottom, approximately 123 ft, to within 10 ft of ground surface. Chips will be hydrated at 20-ft intervals. Neat cement will then be placed in the borehole using poly tube as a tremie to 2 ft bgs. The 4-inch PVC surface casing will be extracted by hand. The remaining footage will be filled with concrete as part of the surface completion. As noted above, TH-4 grouting with Neat cement will be completed last in the abandonment sequence within the NES.

3.2.2 Surface Completions

The wells/boreholes will be grouted with neat cement to within 2.0 ft of ground surface. A simple concrete plug will be installed at ground surface with a brass or aluminum 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. Surveys will be performed by TPMC using LANL's survey instruments.

Boreholes 49-10046, 49-10047, and 49-10048 have existing concrete pad surface completions. The stainless-steel casing will be cut off as flush as practicable and concrete will be placed in the upper 2 ft to the top of the pad. A survey pin will be placed in the cement over the center of the casing.

CH-1 and CH-4 have existing concrete pad surface completions. The steel casing will be removed at the coupling that is flush with the top of the cement pad. The top 2 ft of the casing will be filled with concrete and a survey pin placed in the top center of the casing.

TH-4 will be completed with a simple concrete monument plug. The top 2 ft of the borehole will be filled with concrete that is mounded slightly above grade and slightly larger than the borehole diameter. A survey pin will be placed in the center of the concrete plug.

The surface completion tasks will be completed in compliance with the Documented Safety Analysis (DSA), (LANL, 2010) and Technical Safety Review (TSR), (LANL, 2010) documents. Specifically, for Boreholes 49-10046, 49-10047, 49-10048 and coreholes CH-1 and CH-4 that have existing surface completions, the only modification is removing above ground casing stick ups, and backfilling to the top of the already established surface completion. No adverse alteration to the established IIS is anticipated.

For testhole TH-4 a small circular and rounded surface concrete monument (~ 1 ft in diameter) will be emplaced at slightly above grade for placement of a permanent brass survey marker. No excavation and minimum soil disturbance is anticipated; as all work will be done by hand with minimum impact to the IIS. The concrete monument is basically a surface expression of the concrete plug emplaced as part of the abandonment process and thus adds to the integrity of the IIS, it will not detract from it.

All survey pins will be stamped with elevation and well or borehole number.

3.2.3 Waste Streams for Wells and Boreholes Inside the NES

At boreholes 49-10046, 49-10047, and 49-10048 waste streams will include contact waste (e.g. PPE, rags, poly sheeting), 2-in stainless-steel casing (one, 18-inch piece per well), and cement rinse-water.

At coreholes CH-1 and CH-4 waste streams will include contact waste (e.g. PPE, rags, poly sheeting), 2-in galvanized steel casing (one 5-ft piece per well) with a rotary vent on top, and cement rinse-water.

At TH-4 waste streams will include contact waste (e.g. PPE, rags, poly sheeting), 4-inch PVC casing (one 5-ft piece), and cement rinse-water.

4.0 WELLS OUTSIDE THE TA-49 NES BOUNDARY

4.1 Well Construction, Current Conditions, and Abandonment

This section describes the location, construction, current disposition, and the methods that will be employed to plug and abandon each well/borehole. All vehicular travel within TA-49 will be in accordance with the site-specific Traffic Control Plan.

4.1.1 Well Construction and Current Conditions

4.1.1.1 Corehole CH-3

Corehole CH-3 was cored in 1960 to 300 ft bgs. The corehole is dry and is 4.5 inches in diameter (LANL 2008, 102215). It contains 2-inch galvanized pipe to total depth (Purtymun 1995, 045344). The galvanized pipe is cemented in place.

Corehole 3 is located at TA-49 outside of the TA-49 NES boundary.

Current Conditions

No video log has been collected at CH-3. Conditions are expected to be as reported above.

Figure 3.1-3 is a well construction diagram that depicts the construction details and current conditions of CH-3.

4.1.1.2 TBM-1 and TBM-2

TBM-1 and TBM-2 are barometric measurement core holes that were drilled immediately adjacent to one another at TA-49 in 1993. TBM-1 was drilled to 139 ft bgs, and TBM-2 was drilled to 64 ft bgs (Purtymun 1995, 045344). Both core holes are 7.25 inches in diameter and dry.

TBM-1 contains three 0.5-inch-diameter polyvinyl chloride (PVC) casings with 1-ft screened intervals at 19 ft bgs, 79 ft bgs, and 124 ft bgs, respectively (each 0.5-inch casing has one screened interval). Sand was placed around each screened zone, with cement above and below; the intervals between the screens are filled with cuttings.

TBM-2 contains a single 4-in.-diameter PVC pipe set to 40 ft bgs with a biaxial tiltmeter at the bottom to measure tuff deformation. The annulus and open borehole beneath the pipe are filled with sand.

Test holes TBM-1 and TBM-2 are located at TA-49 outside the NES boundary.

Current Conditions

No video log has been collected at TBM-1 or TBM-2. Conditions are expected to be as reported above.

Figure 3.1-6 is a well construction diagram that depicts the construction details and current conditions of TBM-1 and TBM-2.

4.1.1.3 Layne Western Well

The Layne Western Well was installed in 1950 to 157 ft bgs (Purtymun 1995, 045344). The depth to water in 1960 was 105 ft bgs. The borehole is approximately 10 inches in diameter and the well is constructed as follows:

- 0- ~10-12 ft bgs-12-14-inch surface casing (Purtymun and Swanton 1998, 099096)
- 0-127 ft bgs-8-inch casing
- 127-147 ft bgs-8-inch screen
- 147-157 ft bgs-open

The Layne Western Well is located in Guaje Canyon a few miles north of the Laboratory boundary.

Current Conditions

A video log was run on February 28, 2012. The well was filled with sediment/fill to 107.5 ft bgs and no water was present. The outer casing is 10-inch OD with little to no annulus between it and the 8-inch ID casing.

Figure 3.1-7 is a well construction diagram that depicts the construction details and current conditions of the Layne Western Well.

4.1.2 Plugging and Abandonment

The locations will be plugged and abandoned per the direction of the NMED and TPMC SOP 5034, Rev. 0, "Monitor Well and RFI Borehole Abandonment". The locations may be plugged and abandoned in any order.

A Well Plugging Plan of Operations must be submitted and approved by the New Mexico Office of the State Engineer (NMOSE) for the Layne Western Well prior to plugging and abandonment. Following plugging and abandonment a Plugging Record must be submitted to the NMOSE.

A total depth and depth to water measurement will initially be made and recorded at all locations.

4.1.2.1 CH-3 Abandonment

At CH-3 the 2-inch galvanized riser pipe will be unthreaded from the coupling at the top of the existing concrete surface completion pad. The concrete pad will not be removed. The well will be abandoned by placing neat cement in the well from the bottom of the galvanized pipe at 300 ft bgs to 2 ft bgs by using poly tube as a tremie pipe. The poly tube tremie will be inserted to about 250 ft bgs (50 ft off bottom). The poly tube will be cut off and abandoned in place or retracted and re-spoiled as the well is filled. The remaining footage will be filled with concrete to the top of the existing surface completion and a brass survey pin will be placed in the concrete.

4.1.2.2 TBM-1 and TBM-2 Abandonment

TBM-1 will be abandoned by overdrilling the well to the bottom of the deepest of the ½-in PVC casings which terminates at 124 ft. A hollow-stem auger rig with 7 1/4-in OD augers will be used to drill out and remove the piping and annular materials from the surface to 124 ft bgs. The borehole will be backfilled with neat cement using a tremie pipe from 124 ft to within 2 ft of ground surface. The remaining footage will be filled with concrete as part of the surface completion.

TBM-2 will be abandoned by placing neat cement in the bottom of the 4-inch PVC casing at 40 ft bgs to approximately 20 ft bgs using poly tube as a tremie pipe. The poly tube will be inserted to about 30 ft (10 ft off bottom) and retracted as cement is emplaced. A hollow-stem auger rig with 7 1/4-inch OD augers will then be used to drill out the upper 20 ft of 4-inch PVC casing and sand backfill from the borehole. The top 20 ft of the casing may be filled with sand or cement to facilitate overdrilling. Neat cement will be placed in the borehole from 20 ft to within 2 ft of ground surface. The remaining hole will be filled with concrete as part of the surface completion.

4.1.2.3 The Layne Western Well Abandonment

The 10-inch and 8-inch well casings will be removed from the borehole using hydraulic casing jacks assisted by a workover rig (to power the jacks only). The workover rig will be placed a safe distance from the borehole due to overhead powerlines. A stickup will be welded onto the 10-inch casing and it will be jacked out of the hole and cut into 5-ft segments as it is retracted. This will allow managing the pieces without a hoist rig. A stickup will then be welded onto the 8-inch section and it will be jacked out of the hole and cut into 5 to 10-ft segments as it is retracted. The borehole will be backfilled with 3/8-in bentonite chips from the bottom to 10 ft bgs. Bentonite chips will be manually poured from the surface (free-fall) and hydrated at 20-ft intervals using a poly tube tremie pipe. Neat cement will then be placed in the borehole using a poly tube tremie from the top of the bentonite to 2 ft bgs. The remaining footage will be filled with concrete as part of the surface completion.

If the casings cannot be retracted or only portions come out due to separation downhole, the well will be filled from total depth to 2 ft bgs with neat cement. The remaining footage will be filled with concrete as part of the surface completion.

Note: overhead powerlines in close proximity to the Layne Western well prohibit the use of a rig with a raised derrick or boom.

4.1.3 Surface Completions

The wells/boreholes will be grouted with neat cement to within 2.0 ft of ground surface. A simple concrete plug will be installed at ground surface with a brass or aluminum 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. Surveys will be performed by TPMC using LANL's survey instruments.

The wells/boreholes that have existing concrete pad surface completions will be cement-grouted to within 2.0 ft of ground surface. Concrete will be placed in the top 2 ft of the casing with a brass survey pin placed in the cement over the center of the casing.

CH-3 has an existing concrete pad surface completion. The steel casing will be removed at the coupling that is flush with the top of the cement pad. The top 2 ft of the casing will be filled with concrete and a survey pin placed in the cement over the center of the casing.

Test holes TBM-1 and TBM-2 will be completed with a simple concrete plug. The top 2 ft of the borehole will be filled with concrete that is mounded slightly above grade and slightly larger than the borehole diameter. A survey pin will be placed in the center of the concrete plug.

The Layne Western Well will be completed with a simple concrete plug. The top 2 ft of the borehole will be filled with concrete that is mounded slightly above grade and slightly larger than the borehole diameter. A brass survey pin will be placed in the center of the plug.

The survey pins will be stamped with the elevation and well or borehole number.

4.1.4 Waste Streams for Wells and Boreholes Outside the NES

At CH-3 waste streams will include contact waste (e.g. PPE, rags, poly sheeting), 2-inch galvanized steel casing (one 5-ft piece) with a rotary vent on top, and cement rinse-water.

At test holes TBM-1 and TBM-2 waste streams will include contact waste (e.g. PPE, rags, poly sheeting), 4-in PVC casing (1 piece about 4 ft long), 1/2-inch PVC tubing (3 pieces about 18-inch long), drill cuttings containing sand, PVC and cement chips (about 40 cf), and cement rinse-water.

At the Layne Western Well waste streams will include contact waste (e.g. PPE, rags, poly sheeting), 147 ft of 8-inch diameter steel casing (cut into 5 to 10-ft pieces), 10 ft of 10-inch diameter steel casing (cut into 5-ft pieces), fill material/soil from inside well (from 107-147 ft, 14 cu. ft), and cement rinse-water.

5.0 WASTE MANAGEMENT

All waste generated during implementation of this field implementation plan will be managed in accordance with applicable Environmental Programs—Waste and Environmental Services (EP-WES) and Environmental Protection Water Quality and Resource Conservation Recovery Group (ENV-RCRA) SOPs. These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency (EPA) and NMED regulations, DOE orders, and Laboratory requirements. Documents applicable to the characterization and management of investigation derived waste (IDW) are the following:

- EP-DIR-SOP-10021, “Characterization and Management of Environmental Programs Waste” (http://int.lanl.gov/environment/all/docs/qa/ep_qa/EP-DIR-SOP-10021.pdf);

A Waste Characterization Strategy Form (WCSF) will be prepared by LANS in accordance with EP-DIR-SOP-10021, R0 and will provide more detailed information on waste descriptions, quantities, handling, and disposition. All wastes generated during this plug and abandonment project will be managed according to the approved WCSF.

6.0 REPORTING

A plugging and abandonment report will be prepared detailing the methods used, presenting the quantities of backfill 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.

7.0 REFERENCES

- LANL (Los Alamos National Laboratory), December, 2010. "Documented Safety Analysis for the Nuclear Environmental Sites at Los Alamos National Laboratory." Los Alamos National Laboratory document, NES-ABD-0101, R4.0, (LANL, 2010, 161774)
- LANL, December, 2010. "Technical Safety Requirements for the Nuclear Environmental Sites at Los Alamos National Laboratory, Revision 4." Los Alamos National Laboratory document, NES-ABD-0102, R4.0, (LANL, 2010, 161776)
- LANL, January 2008. "Investigation Work Plan for Sites at Technical Area 49 Outside the Nuclear Environmental Site Boundary, Revision 1," Los Alamos National Laboratory document LA-UR-08-0449, Los Alamos, New Mexico. (LANL, 2008, 102215).
- Purtymun, W.D., January 1995. "Geologic and Hydrologic Records of Observation Wells, Test Holes, Test Wells, Supply Wells, Springs, and Surface Water Stations in the Los Alamos Area," Los Alamos National Laboratory report LA-12883-MS, Los Alamos, New Mexico. (Purtymun 1995, 045344)
- 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)

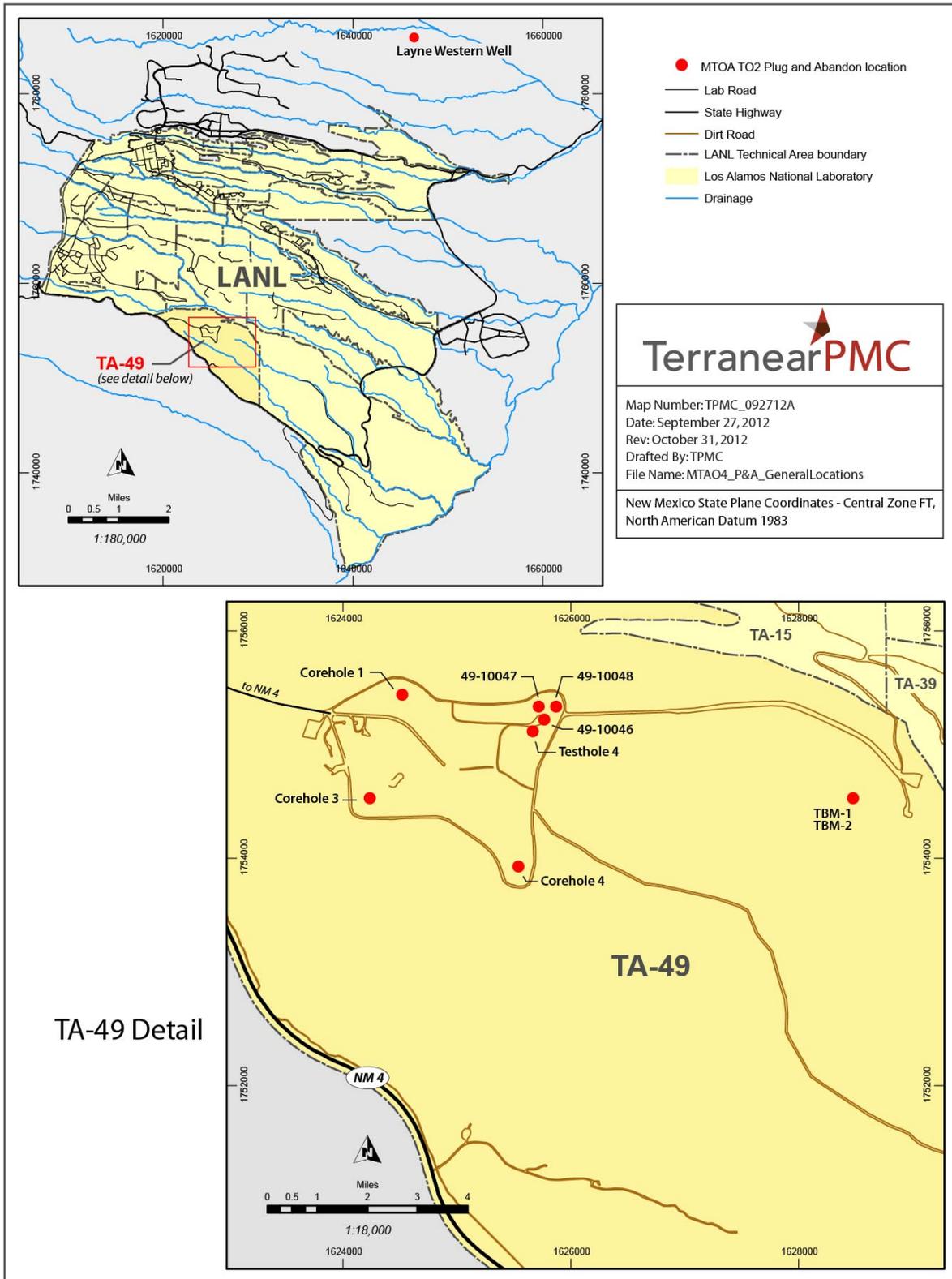


Figure 1.0-1 General location of P & A wells

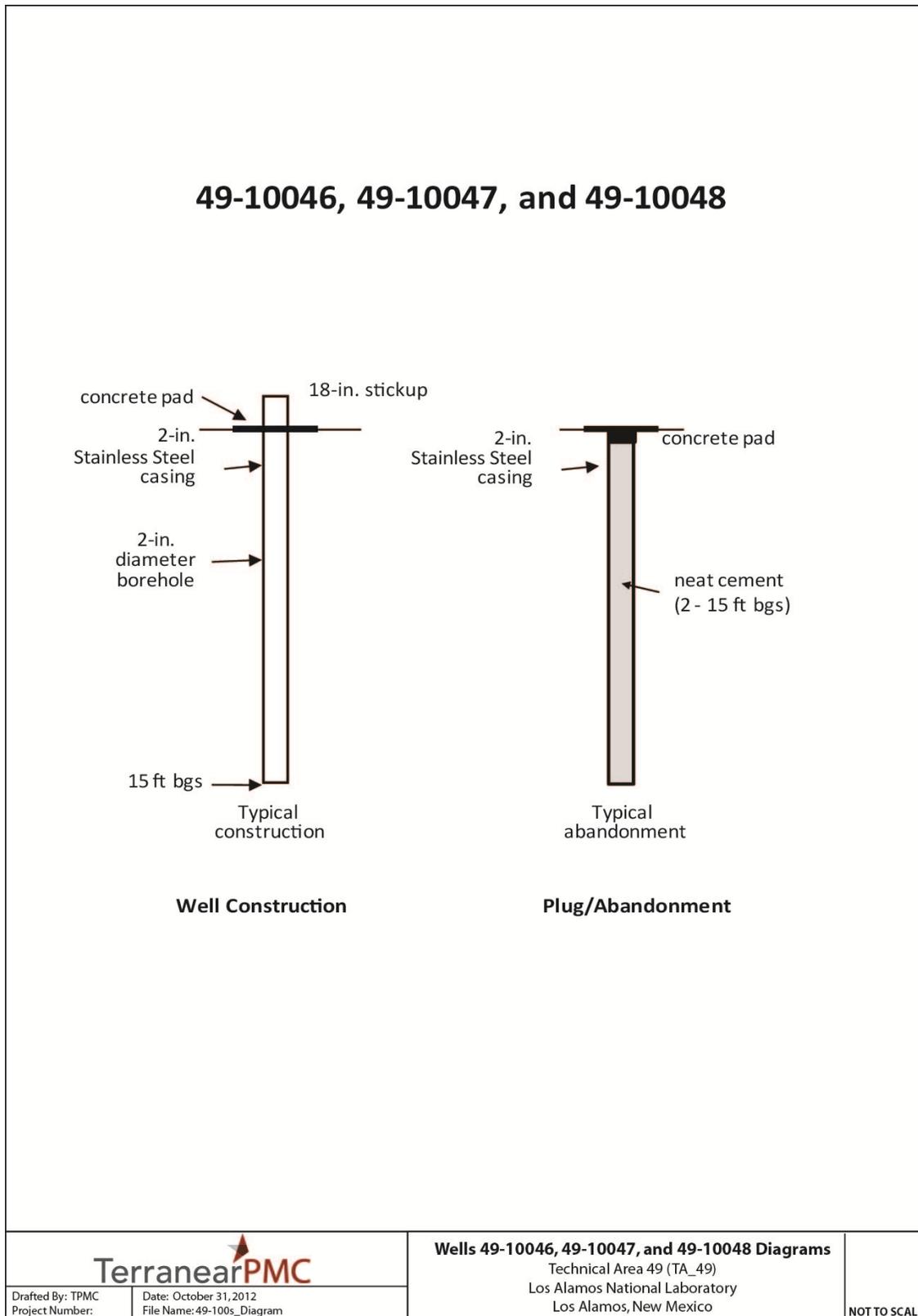


Figure 3.1-1 Boreholes 49-10046, 49-10047, and 49-10048 as-built and P&A diagram

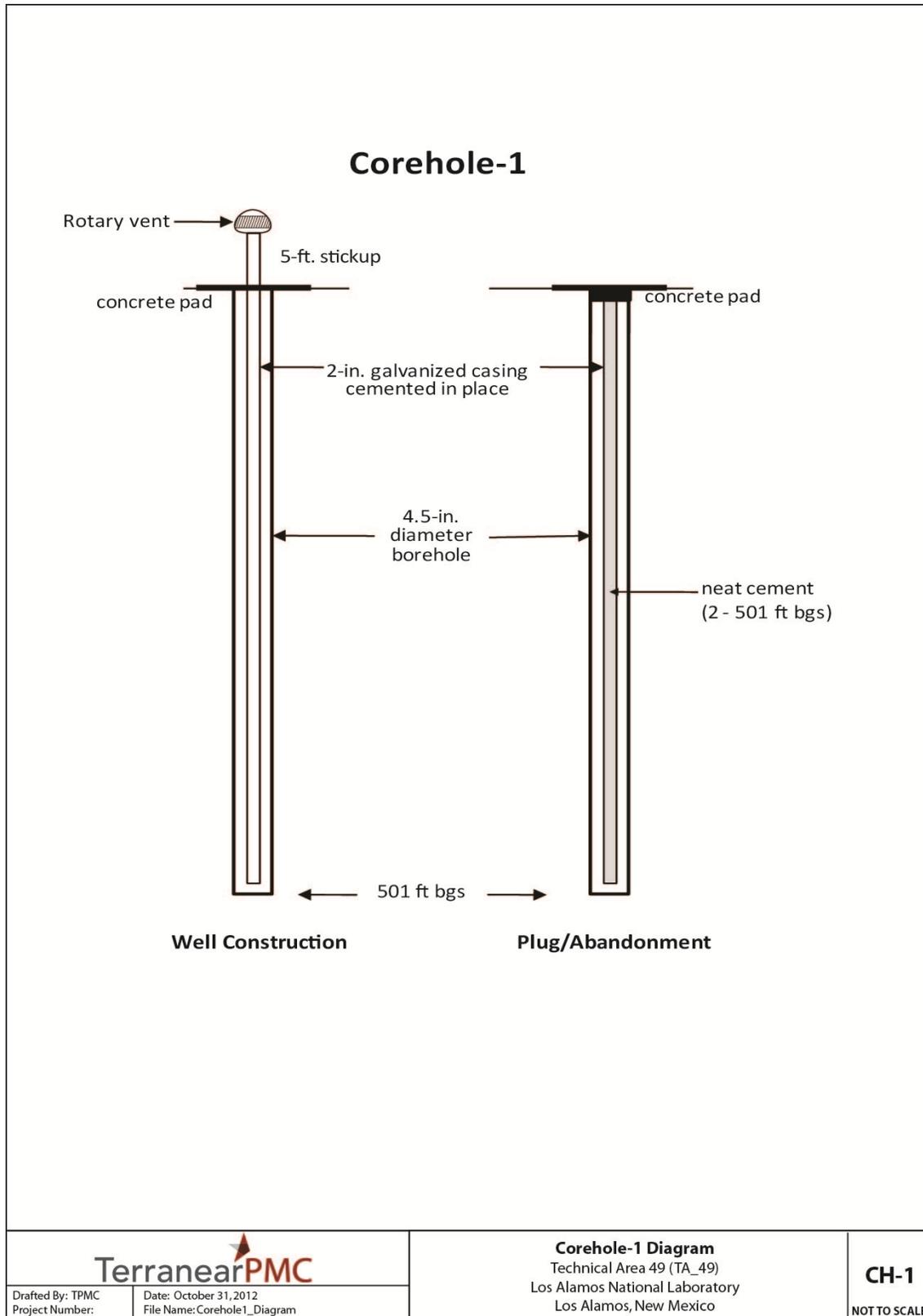


Figure 3.1-2 Well CH-1 as-built construction and P&A diagram

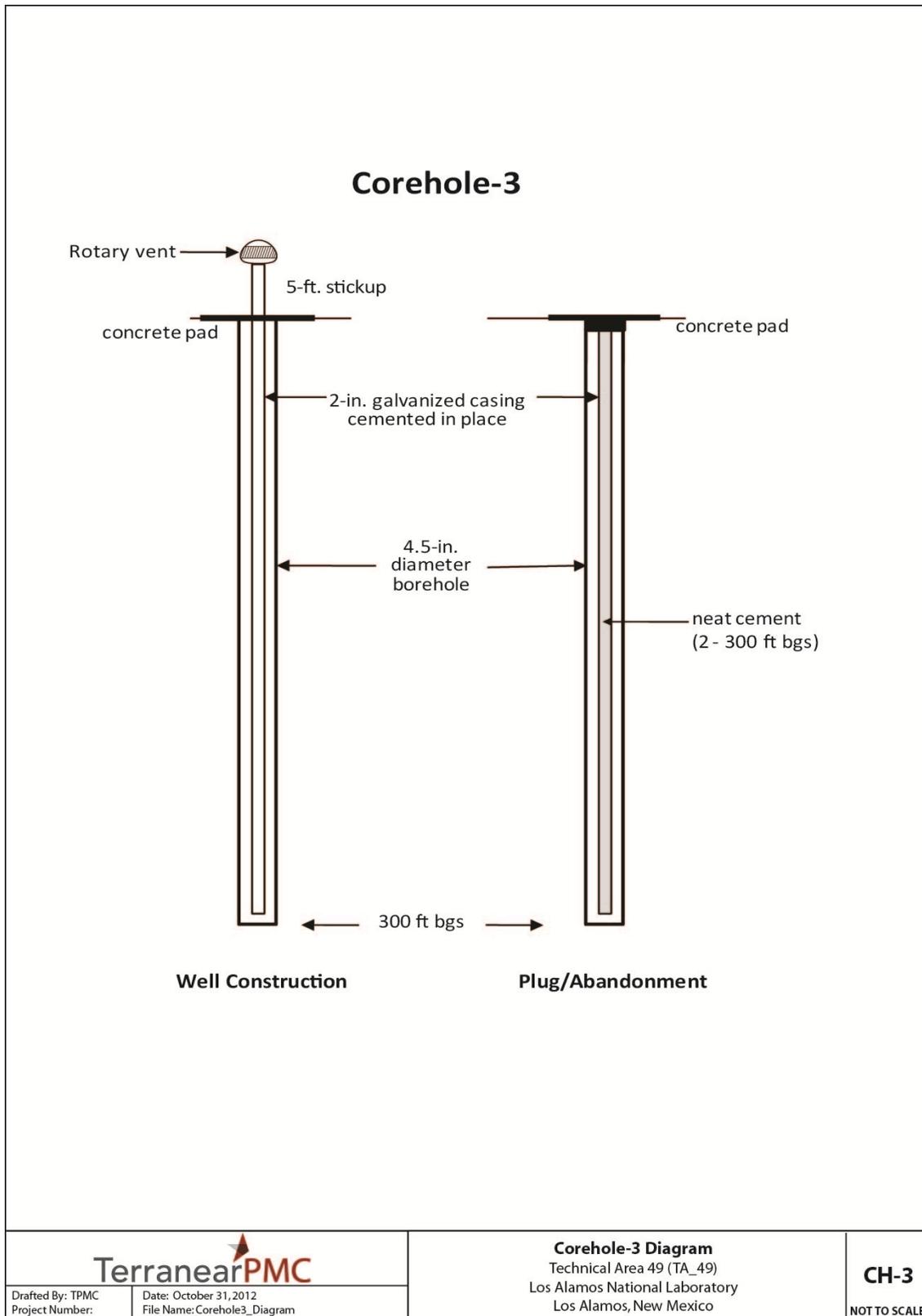


Figure 3.1-3 Well CH-3 as-built construction and P&A diagram

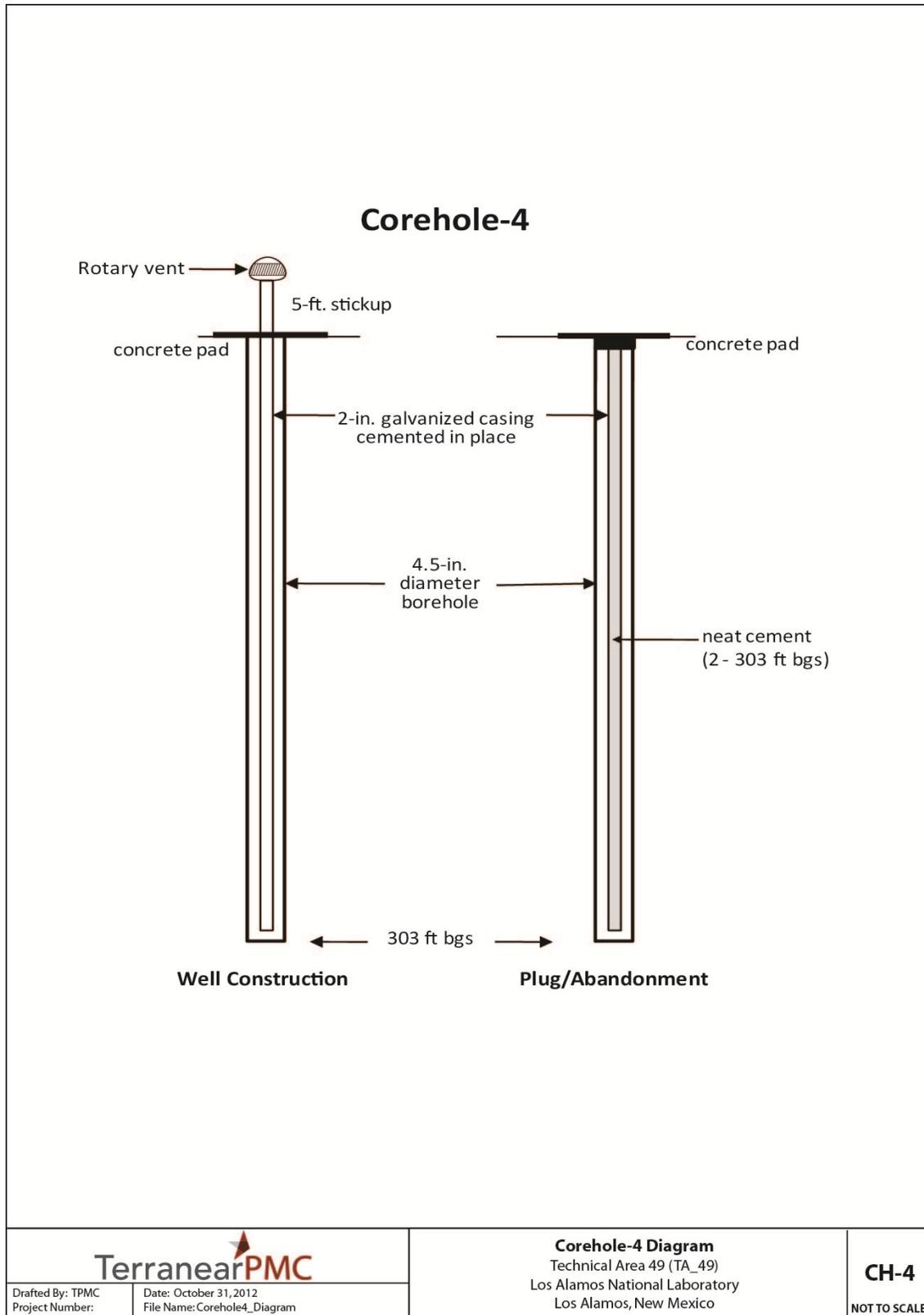
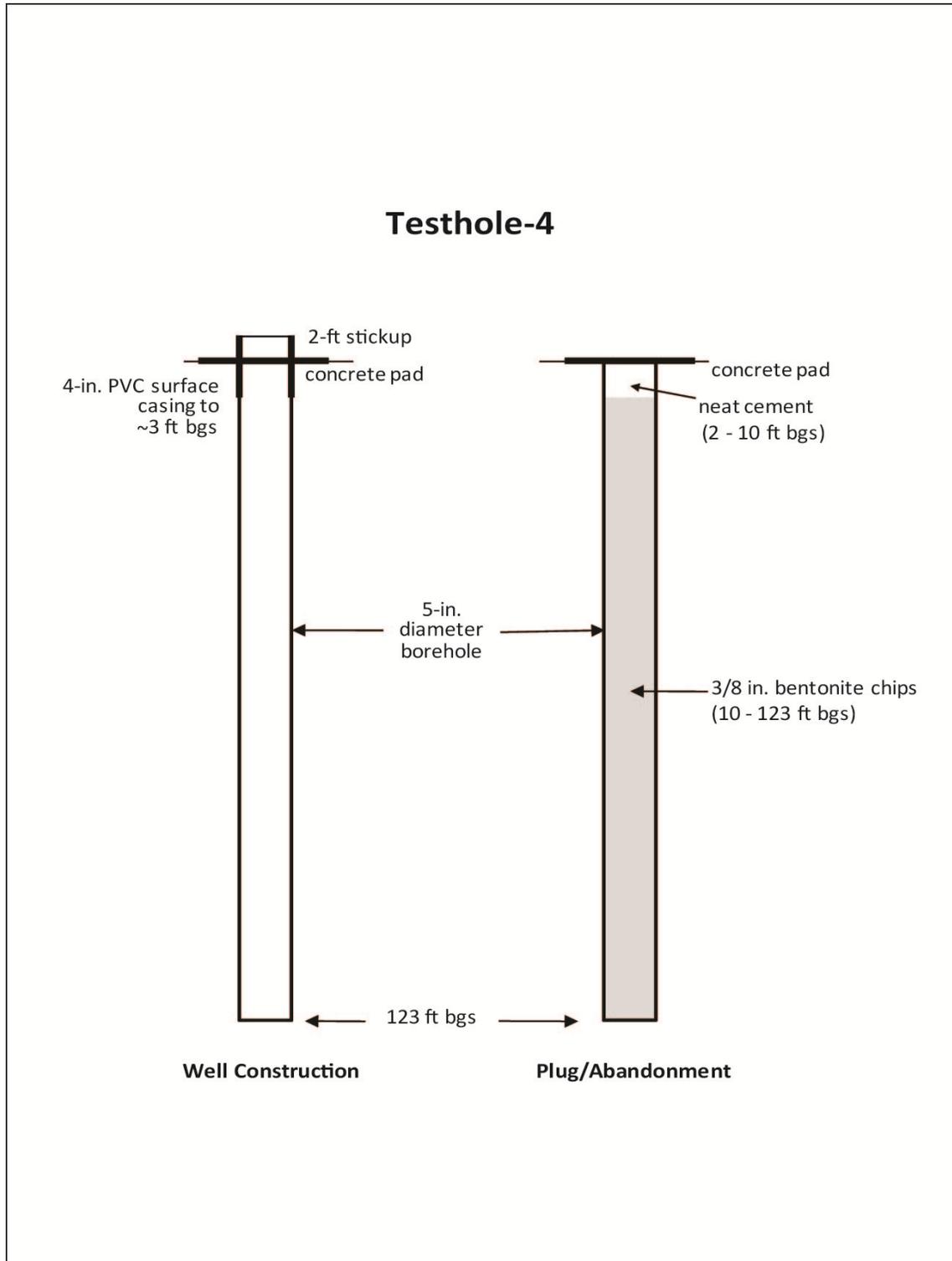


Figure 3.1-4 Well CH-4 as-built construction and P&A diagram



		Testhole-4 Diagram Technical Area 49 (TA_49) Los Alamos National Laboratory Los Alamos, New Mexico	TH-4 NOT TO SCALE
Drafted By: TPMC Project Number:	Date: October 31, 2012 File Name: Testhole4_Diagram		

Figure 3.1-5 Well TH-4 as-built construction and P&A diagram

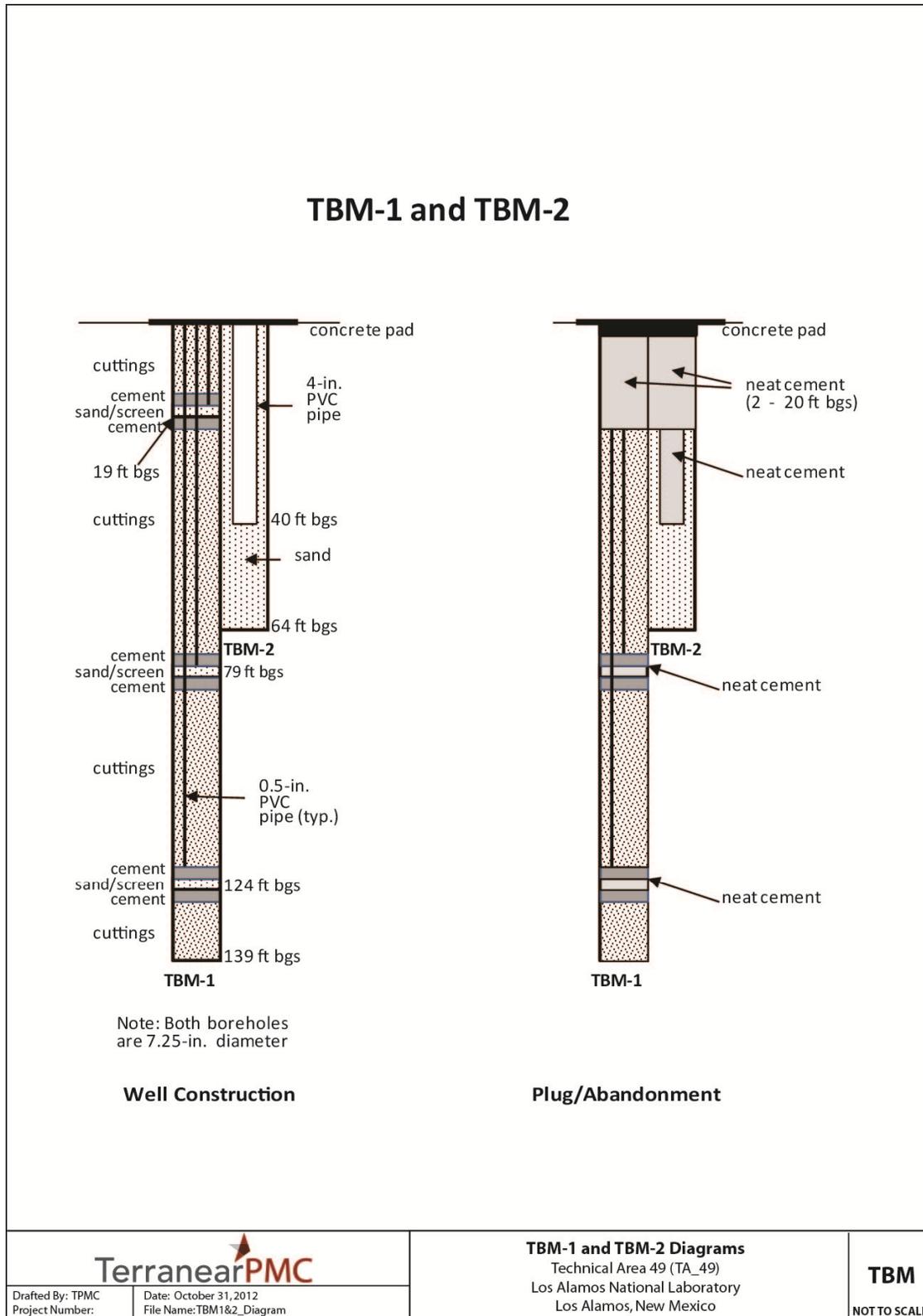


Figure 3.1-6 Wells TBM-1 and TBM-2 as-built construction and P&A diagram

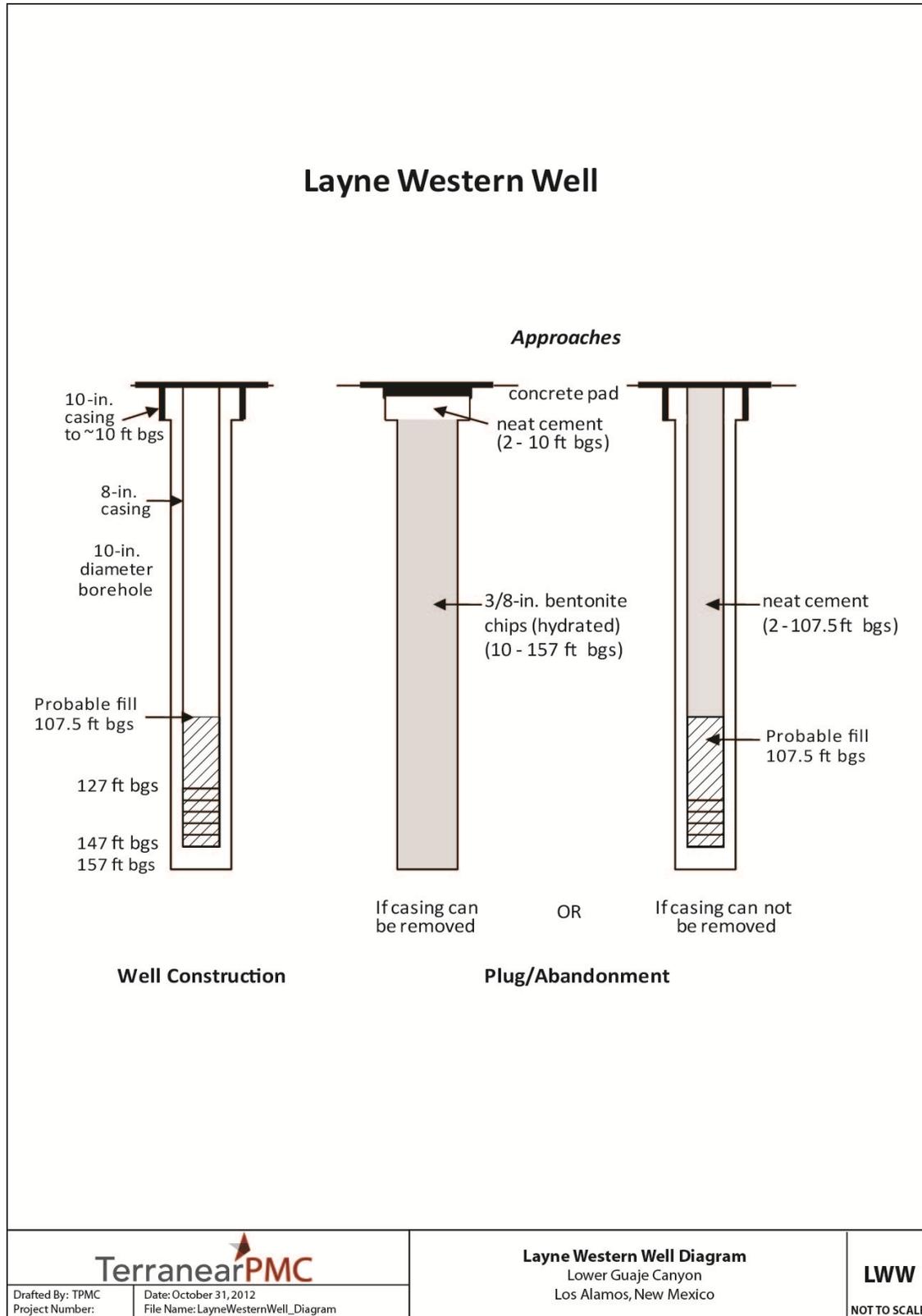


Figure 3.1-7 Layne Western Well as-built construction and P&A diagram