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April 2010

**Field Work Plan to
Plug and Abandon Test Well
TW-4**

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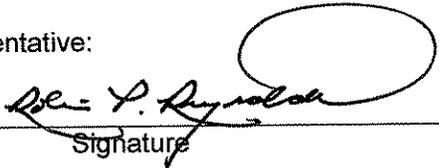
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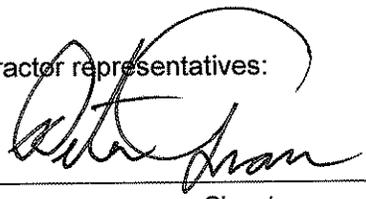
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1.0 INTRODUCTION

This field work plan provides technical guidance for field activities associated with the plugging and abandonment (P&A) of Test Well 4 (TW-4) located on Canyon Road in Los Alamos, New Mexico as shown in Figure 1.0-1. Well abandonment of this well 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, well construction and abandonment details of TW-4 are presented below.

2.0 PRE-ABANDONMENT ACTIVITIES

The following activities will be conducted prior to well abandonment activities.

2.1 Removal of Appurtenances

TW-4 is known to have a stuck submersible pump within the innermost 6-in. casing. An effort was made to remove the pump in 2006 when it became stuck after removing approximately 160-ft of 2-in. galvanized drop pipe. At least one 2-in. PVC transducer gauge tube is known to have separated from the pump's drop pipe and fallen down the 6-in. casing. Also, a portion of the pump's electrical cable is known to have separated and fallen down the 6-in. casing.

The initial phase of abandoning TW-4 will be a fishing effort to remove the submersible pump. First, an effort will be made to locate and raise the electrical cable. Then, an effort will be made to pull the pump with the existing 2-in. drop pipe, which is accessible and landed at the surface on the 6-in. well casing. A significantly larger and more powerful pump hoist will be used than the machine used in 2006.

If the fishing effort is unsuccessful and the pump remains stuck in the well, two options will be explored. First, an attempt will be made to extract the entire length of 6-in. casing using either appropriately sized casing jacks (with rings and slips) or by using a rotary drill rig. Completely removing the 6-in. casing is the more desirable option as it would have the benefit of removing the stuck pump and yield more than 600-ft of uncased borehole. If the 6-in. casing proves impossible to extract, the second option would be to investigate using an oilfield slickline or wireline subcontractor to enter the 2-in. pump column drop pipe and mechanically separate the pump from the pipe. This option would send the pump to the bottom of the well where it would be grouted in place.

2.2 Inspection and Geophysical Data Collection

If the fishing effort is successful and the pump is able to be removed, the well will be inspected with a downhole video camera and a natural gamma ray log collected to document the existing conditions. Final water-level measurements will also be collected.

3.0 WELL CONSTRUCTION AND ABANDONMENT

This section describes the construction of TW-4 and the methods that will be employed to plug and abandon the well.

3.1 Well Construction

Groundwater monitoring well TW-4 was installed in 1950 to monitor the water in the main aquifer in the vicinity of the former TA-45 Radioactive Waste Treatment Plant. The well is located on the south rim of Pueblo Canyon. Construction details are as follows:

- 0-109 ft: 16-in. inside diameter (I.D.) steel casing
- 0-288 ft: 12-in. I.D. steel casing
- 0-633 ft: 10-in. I.D. steel casing
- 0-1195 ft: 6-in. I.D. steel casing
- 1195-1205 ft: 6-in. diameter screen

3.2 Plugging and Abandonment

It is possible that TW-4 may be retained as a water level monitoring point. If that should be the case, the well will be outfitted with a dedicated water level transducer. If the well is retained, the surface completion will be remodeled so as not to be as obtrusive. The existing pump jack concrete surface pad will be removed, the casing strings will be trimmed to ground surface, the surface pad will be reconstructed as a flush-mount completion, and the chain link fence will be removed.

Older well completions like TW-4 represent some challenges in determining a specific abandonment approach because of incomplete and sometimes discrepant completion records, multiple casing strings, and old casing. Plugging and abandonment at this well will generally take the approach of leaving the internal casing strings in place and backfilling the hole with sealing materials. It is possible that an attempt will be made to remove the innermost 6-in. casing string from the boreholes. This approach represents some risks of separating (parting) the casing string.

3.2.1 TW-4 Abandonment

Based on the available well-completion notes, TW-4 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 examinations at the start of field activities. Figure 3.1-1 details the construction specifics, casing schedule, and lithologic intervals at TW-4.

If TW-4 is not retained as a water level monitoring point, it will be plugged and abandoned. Since TW-4 is located on a mesa top, there is no alluvial water component. Also, no perched water was encountered during the drilling of the well and there is no modern evidence to the contrary. With this being the case, no 10-in., 12-in., or 16-in. casing string extractions or perforations are planned at TW-4. If the submersible pump is fished out, bentonite chips will be installed in the well from total depth (TD) to 50 ft below ground surface (bgs). If the pump does not come out and the 6-in. casing is extracted, bentonite chips will be installed in the hole from TD to 50-ft bgs. In either case, the top 50-ft will be filled with neat cement to 2-ft bgs. If the pump is separated from the drop pipe and sent to the bottom of the well, it will be grouted in place with a 50-ft neat cement plug from TD to 1155-ft bgs before removing the 2-in. drop pipe. Bentonite chips will then be installed to 50-ft bgs before filling the remainder of the well to 2-ft bgs with neat cement.

4.0 SURFACE COMPLETION

The hole will be cement-grouted to within 2.0 ft of ground surface. A 2-ft X 2-ft X 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.

5.0 WASTE

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 disposed of in accordance with the waste characterization strategy form that applies to this activity.

6.0 HEALTH AND SAFETY

Tailgate safety meetings will be conducted and daily site, drill rig, and heavy equipment inspection forms will be filled out prior to starting work. An IWD briefing will be conducted if the work scope changes or new hazards are introduced.

Copies of the emergency contact list and route to the hospital maps will be kept onsite.

7.0 REPORTING

A brief summary 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.

8.0 REFERENCES

Los Alamos Technical Associates, February 9, 1998. "Engineering, Geology, and Construction Data of Twenty-five Test Holes and Test Wells on and Adjacent to the Pajarito Plateau," report prepared for Los Alamos National Laboratory, (LA-UR-05-2230)

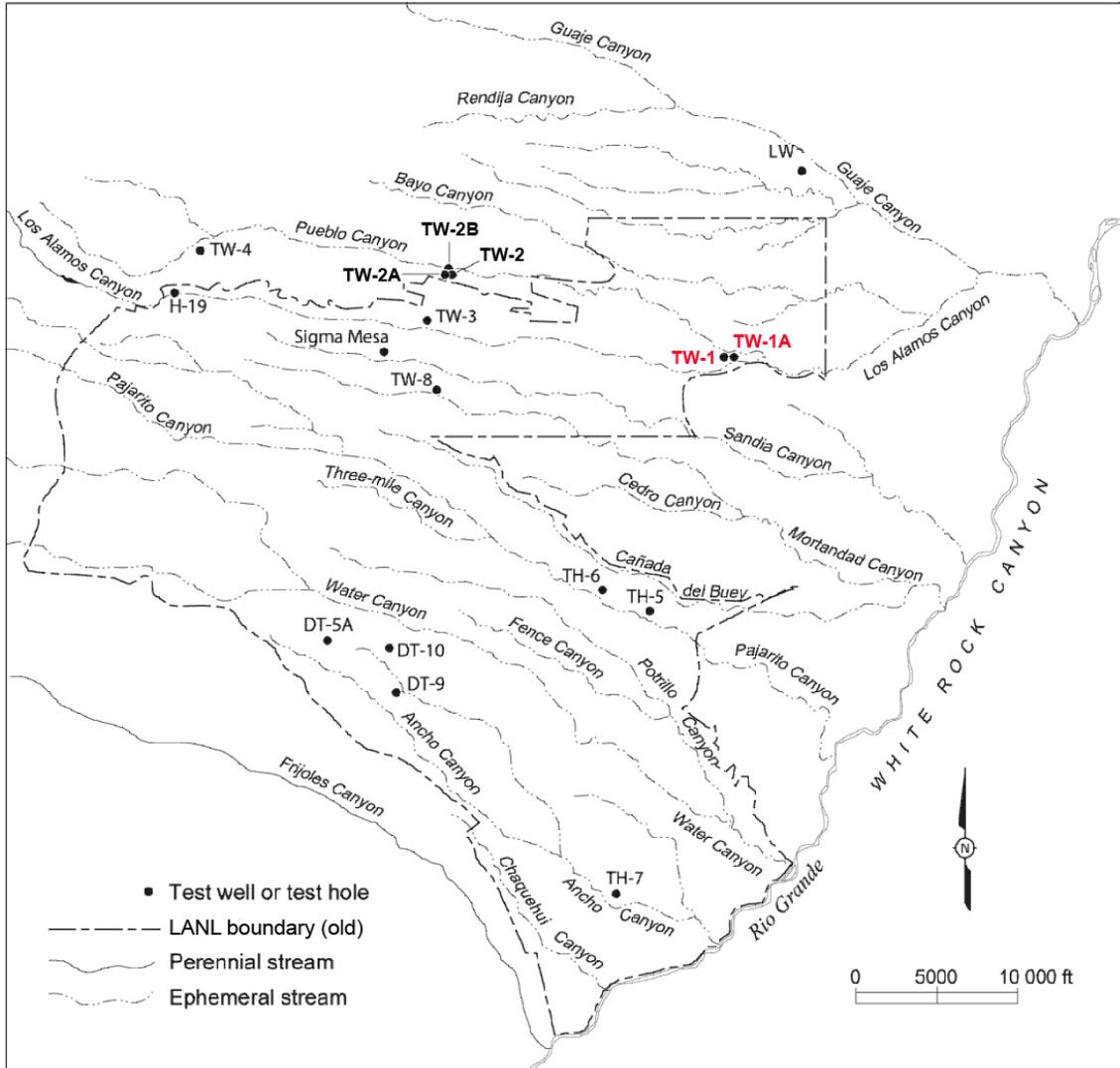


Figure 1.0-1 General location of well TW-4



Figure 1.0-2 Detailed location of well TW-4

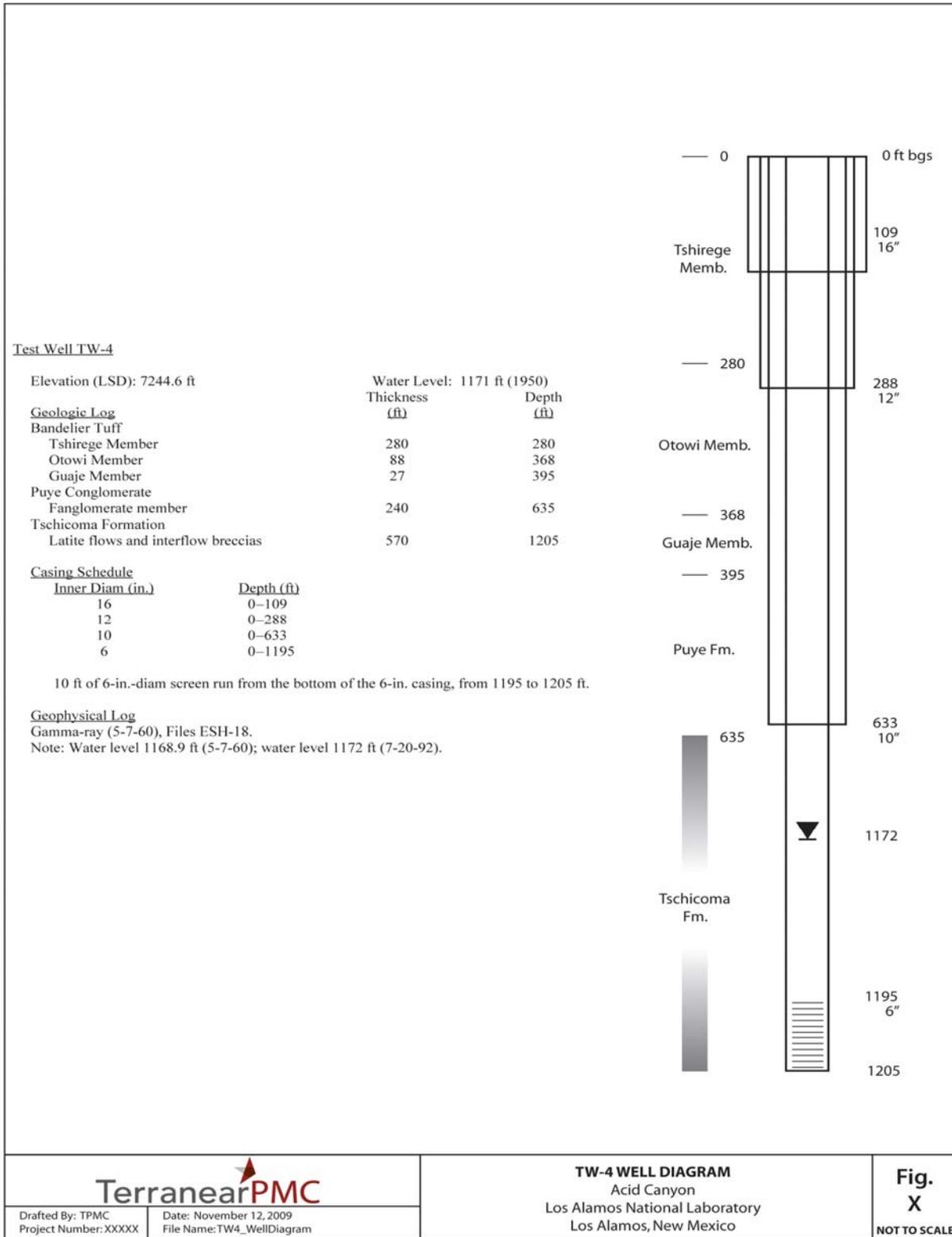


Figure 3.1-1 Monitoring well TW-4 as-built well construction diagram

UPPER FIGURES = WALL THICKNESS IN INCHES LOWER FIGURES = WEIGHT PER FOOT IN POUNDS

Pipe Size	O.D. in Inch	Dimensions and Weights of Seamless and Welded Pipe														DBLE. E.H.	
		5s	5	10s	10	20	30	40s & Std.	40	60	80s & E.H.	80	100	120	140		160
1/8	.405		.035 1383	.049 1863	.049 1863			.068 2447	.068 2447		.095 3145	.095 3145					
1/4	.540		.049 2570	.065 3297	.065 3297			.088 4248	.088 4248		.119 5351	.119 5351					
3/8	.675		.049 3276	.065 4235	.065 4235			.091 5676	.091 5676		.126 7338	.126 7338					
1/2	.840		.065 5383	.083 6710	.083 6710			.109 8510	.109 8510		.147 1088	.147 1088			.187 1304	.294 1714	
3/4	1.050		.065 6838	.065 6838	.083 8572	.083 8572		.113 1131	.113 1131		.154 1474	.154 1474			.218 1937	.308 2441	
1	1.315		.065 8678	.065 8678	.109 1404	.109 1404		.133 1679	.133 1679		.179 2172	.179 2172			.250 2844	.358 3659	
1 1/4	1.660		.065 1107	.065 1107	.109 1806	.109 1806		.140 2273	.140 2273		.191 2997	.191 2997			.250 3765	.382 5214	
1 1/2	1.900		.065 1274	.065 1274	.109 2085	.109 2085		.145 2718	.145 2718		.200 3631	.200 3631			.281 4859	.400 6408	
2	2.375		.065 1604	.065 1604	.109 2638	.109 2638		.154 3653	.154 3653		.218 5022	.218 5022			.343 7444	.436 9029	
2 1/2	2.875		.083 2475	.083 2475	.120 3531	.120 3531		.203 5793	.203 5793		.276 7661	.276 7661			.375 1001	.552 1370	
3	3.500		.083 3029	.083 3029	.120 4332	.120 4332		.216 7576	.216 7576		.300 1025	.300 1025			.437 1432	.600 1858	
3 1/2	4.000		.083 3472	.083 3472	.120 4973	.120 4973		.226 9109	.226 9109		.318 1251	.318 1251			.437 1901	.636 2285	
4	4.500		.083 3915	.083 3915	.120 5613	.120 5613		.237 1079	.237 1079	.281 1266	.337 1498	.337 1498		.437 1901	.531 2251	.674 2754	
4 1/2	5.000							.247 1253			.355 1761					.710 3253	
5	5.563		.109 6349	.109 6349	.134 7770	.134 7770		.258 1462	.258 1462		.375 2078	.375 2078		.500 2704	.625 3296	.750 3855	
6	6.625		.109 7585	.109 7585	.134 9290	.134 9290		.280 1897	.280 1897		.432 2857	.432 2857		.562 3639	.718 4530	.864 5316	
7	7.625							.301 2357			.500 3805					.875 6308	
8	8.625		.109 9914	.109 9914	.148 1340	.148 1340	.250 2236	.277 2470	.322 2855	.406 3564	.500 4339	.500 4339	.593 5087	.718 6093	.812 6776	.906 7469	.885 7242
9	9.625							.342 3390			.500 4872						
10	10.750		.134 1519	.134 1519	.165 1865	.165 1870	.250 2804	.307 3424	.365 4048	.365 4048	.500 5474	.500 5474	.593 6433	.718 7693	.843 8920	1.000 1041	1.125 1157
11	11.750							.375 4555			.500 6007						
12	12.750		.156 2107	.165 2218	.180 2416	.180 2420	.250 3338	.330 4377	.375 4956	.406 5353	.562 7316	.500 6542	.687 8851	.843 1072	1.000 1255	1.125 1397	1.312 1603
14	14.000		.156 2307		.188 2773	.250 3671	.312 4568	.375 5457	.375 5457	.437 6337	.593 8491	.500 7209	.750 1061	.937 1307	1.093 1507	1.250 1702	1.406 1891
16	16.000		.165 2790		.188 3175	.250 4205	.312 5236	.375 6258	.375 6258	.500 8277	.656 1075	.500 8277	.843 1365	1.031 1648	1.218 1923	1.437 2235	1.593 2451
18	18.000		.165 3143		.188 3576	.250 4739	.312 5903	.375 8206	.375 8206	.562 7059	.750 1048	.500 9345	.937 1708	1.156 2080	1.375 2441	1.562 2742	1.781 3085
20	20.000		.188 3978		.218 4605	.250 5273	.375 7860	.500 1041	.375 7860	.593 1229	.812 1664	.500 1041	1.031 2089	1.280 2561	1.500 2964	1.750 3411	1.968 3790
22	22.000		.188 438		.218 5071	.250 5807	.375 8661	.500 11481	.375 8661		.875 19741	.500 11481	1.125 25081	1.375 30288	1.625 35361	1.875 4030	2.125 45106
24	24.000		.218 5537		.250 6341	.250 6341	.375 9462	.562 1408	.375 9462	.687 1712	.968 2381	.500 1255	1.218 2964	1.531 3674	1.812 4294	2.062 4831	2.344 54213
26	26.000					.312 8560	.500 13617		.375 10263			.500 13617					
28	28.000					.312 9226	.500 14685	.625 18273	.375 11064								
30	30.000		.250 7943		.312 9893	.500 15753	.625 19608	.375 11865				.500 15753					
32	32.000					.312 10559	.500 16821	.625 20943	.375 12666	.688 23008		.500 16821					
34	34.000					.312 11225	.500 17889	.625 22278	.375 13467	.688 24477							
36	36.000					.312 11892	.500 23613	.625 23613	.375 28235	.750 28235		.500 18957					

Attachment A Pipe Dimensions and Weights