



## SITE CERTIFICATION SUMMARY

This Site Certification Summary provides information about the **Chupadera Mesa, New Mexico, Site**. The U.S. Department of Energy Office of Legacy Management is responsible for long-term stewardship of the site under the **Formerly Utilized Sites Remedial Action Program**.

### Site Description and History

The Chupadera Mesa, New Mexico, Site is located about 28 miles northeast of the Trinity atomic bomb test site at the White Sands Missile Range, New Mexico. The area consists of open range and is used primarily for cattle grazing. The Trinity test was the first detonation of a nuclear device, on July 16, 1945. The test resulted in deposition and dispersal of radioactive fallout over Chupadera Mesa to the northeast of the detonation site. Radiation measurements at ground zero and in the fallout zone began the same day as the test. Since then, surveys and studies have been performed in the area by the University of California in 1948, 1950, and 1951; the U.S. Environmental Protection Agency (EPA) in 1973 and 1974; and the Los Alamos National Laboratory (LANL) from 1972 to 1979.

Radioactive decay since the Trinity test has resulted in substantial reduction in levels of fallout-related radionuclides at the Chupadera Mesa Site. Only longer-lived radioactive materials (e.g., cesium-137, strontium-90, plutonium-239, europium-155) remain.

See the [Fact Sheet](#), the [Site Certification Data Summary Worksheet](#) on pages 3-4, and the [Site Overview Map](#) on page 5 for more details about the site.

### Site Remediation Timeline

**July 16, 1945** — The Trinity atomic bomb test took place at the White Sands Missile Range, New Mexico.

**1948, 1950, and 1951** — The University of California measured radiation at and around the test site.

**1973 and 1974** — EPA measured radiation at and around the test site.

**1972 through 1979** — LANL measured radiation at and around the test site, including in soil and vegetation samples.

**November 1985** — The Chupadera Mesa site was designated as eligible for the Formerly Utilized Sites Remedial Action Program (FUSRAP).

**April 22, 1986** — A notice of cleanup certification for the site was documented in a letter from the DOE Office of Nuclear Energy to the Environmental Safety and Health Division of the DOE Albuquerque operations office.

**1997** — A memorandum of understanding between DOE and the U.S. Army Corps of Engineers included Chupadera Mesa as a completed FUSRAP site.

### Current Site Conditions

Radiological survey data indicate that the radiological condition of the Chupadera Mesa Site is in compliance with applicable DOE standards and guidelines for cleanup of residual radioactive contamination. A release survey and evaluation, conducted by LANL, indicated that the incremental dose of 13 millirems per year (mrem/yr) for a hypothetical individual using the area as a residence is below the 25 mrem/yr criterion for unrestricted use and well below the 150 mrem/yr estimate for background in the area.

In 1985, DOE evaluated historical files and special studies for the Trinity Site under FUSRAP. The evaluation concluded that the Chupadera Mesa site satisfied the criteria for inclusion into FUSRAP, but no remedial action was required. Therefore, DOE released the site for unrestricted use.

DOE has been responsible for long-term stewardship of the Chupadera Mesa site since 1986. The stewardship requirements and protocols are captured in the Long-Term Stewardship Plan for Completed FUSRAP Sites, which is available on the DOE Office of Legacy Management website ([www.energy.gov/lm/chupadera-mesa-new-mexico-site](http://www.energy.gov/lm/chupadera-mesa-new-mexico-site)).



## ADDITIONAL INFORMATION

Documents related to FUSRAP activities at the Chupadera Mesa, New Mexico, Site are available on the LM website at [lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Chupadera](https://lmpublicsearch.lm.doe.gov/SitePages/default.aspx?sitename=Chupadera).

For other information on site history or current long-term stewardship activities, please contact us at:

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**Office of Legacy Management**  
**2597 Legacy Way**  
**Grand Junction, CO 81503**

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# Chupadera Mesa, New Mexico, Site Certification Data Summary Worksheet

Two tables (this worksheet) in the LANL report "Radiological Survey and Evaluation of the Fallout Area from the Trinity Test: Chupadera Mesa and White Sands Missile Range, New Mexico" (dated June 1985) provide evidence used to certify the site as clean.

Two tables (the second worksheet) in the EPA report "Levels and Distribution of Environmental Plutonium Around the Trinity Site" (dated October 1978) provide evidence used to certify the site as clean.

Results from the 1948, 1950, and 1951 University of California sampling events were not available.

Chupadera Mesa Surface Soil Measurements						
Table XVII in the LANL report						
Radionuclide	N	Depth (cm)	Mean ± S.E. <sup>a</sup>	Min	Max	
<sup>7</sup> Be	49	---	8.8 ± 11 nCi/m <sup>2</sup>	<MDA <sup>b</sup>	26	
<sup>60</sup> Co	49	---	0.58 ± 0.16 nCi/m <sup>2</sup>	<MDA	4.2	
<sup>137</sup> Cs	49	---	280 ± 30 nCi/m <sup>2</sup>	30	947	
<sup>152</sup> Eu <sub>c</sub>	49	---	0.48 ± 0.48 nCi/m <sup>2</sup>	<MDA	24	
<sup>159</sup> Eu	49	---	4.2 ± 2.4 nCi/m <sup>2</sup>	<MDA	86	
<sup>95</sup> Nb	49	---	4.65 ± 0.15 nCi/m <sup>2</sup>	<MDA	6.6	
<sup>95</sup> Zr	49	---	2.55 ± 0.15 nCi/m <sup>2</sup>	<MDA	4.2	
<sup>103</sup> Ru	49	---	0.28 ± 0.07 nCi/m <sup>2</sup>	<MDA	1.9	
Natural gamma	49	---	6.7 ± 0.24 µR/h	3.5	10	
Total gamma	49	---	8.2 ± 0.32 µR/h	4.1	13	
<sup>40</sup> K	49	---	16 ± 0.58 pCi/g	6.4	24	
<sup>232</sup> Th	49	---	0.85 ± 0.04 pCi/g	0.36	1.42	
<sup>238</sup> U	49	---	0.88 ± 0.04 pCi/g	0.34	1.81	
<sup>238</sup> Pu	19	0 - 5	0.083 ± 0.020 pCi/g	<MDA	0.32	
	15	5 - 10	0.023 ± 0.013 pCi/g	<MDA	0.19	
	15	10 - 15	0.006 ± 0.004 pCi/g	<MDA	0.06	
	3	15 - 20	0.003 ± 0.003 pCi/g	<MDA	0.01	
<sup>239,240</sup> Pu (1948)	10	0 - 2.5	3.1 ± 1.3 pCi/g	<MDA	10.8	
	(1950)	9	0 - 2.5	3.2 ± 1.2 pCi/g	0.2	11
	(1972)	3	0 - 2.5	0.80 ± 0.34 pCi/g	<MDA	1.4
	(1972)	3	2.5 - 10	0.15 ± 0.10 pCi/g	0.02	0.34
	(1972)	---	10 - 30	0.033 ± 0.015 pCi/g	0.01	0.06
	(1973)	---	0 - 5	20.6 ± 4.3 nCi/m <sup>2</sup> (0.29 pCi/g) <sup>d</sup>	0.4	86
	(1977)	19	0 - 5	1.7 ± 0.41 pCi/g	0.03	6.7
	(1977)	14	5 - 10	0.38 ± 0.27 pCi/g	<MDA	3.9
<sup>90</sup> Sr	7	0 - 5	2.3 ± 1.0 pCi/g	0.20	6.8	
	3	10 - 15	0.76 ± 0.47 pCi/g	0.22	1.7	
<sup>137</sup> Cs	27	0 - 5	2.81 ± 0.52 pCi/g	<MDA	10.4	
	4	5 - 10	0.16 ± 0.02 pCi/g	0.12	0.22	
	16	10 - 15	0.04 ± 0.02 pCi/g	<MDA	0.21	
	1	20 - 25	0.05	---	---	

<sup>a</sup>S.E. - Standard Error  
<sup>b</sup><MDA = less than minimum detectable activity  
<sup>c</sup>Forty-eight observations for <sup>152</sup>Eu were below MDA.  
<sup>d</sup>Calculation of the pCi/g based on 0.0143 (pCi/g)(nCi/m<sup>2</sup>).

Incremental Doses													
Table XXVII in the LANL report													
Location	Mean External Whole Body Increment above Natural Background (mrem/yr)	mrem/yr (50-Year Committed Dose)											
		Inhalation Total from Resuspension <sup>a</sup>				Ingestion Total from Foods <sup>b</sup>				Inhalation of Dust by Home Gardener <sup>c</sup>			
		Whole Body	Bone	Lung	Liver	Whole Body	Bone	Liver	GI-LLI	Whole Body	Bone	Lung	Liver
Chupadera Mesa	13	0.088	0.91	0.95	0.45	1.9	37	8.1	1.5	0.083	0.86	0.87	0.42

<sup>a</sup>Major dose contributed by transuranics.  
<sup>b</sup>Major dose contributed by transuranics and <sup>90</sup>Sr.  
 NOTE: Table edited to only include data for Chupadera Mesa.

# Chupadera Mesa, New Mexico, Site Certification Data Summary Worksheet

Radionuclide Concentrations in Trinity Soil Samples Collected During November 1973					
Table A-3 in the EPA report					
Sample Number	Plutonium - 239, 240		Plutonium-238 Concentration (pCi/g)	Americium-241 Concentration (pCi/g)	Cesium-137 Concentration (pCi/g)
	Concentration (pCi/g)	Deposition (nCi/m <sup>2</sup> )			
Surface Samples					
0117	0.041 ± 0.022	2.9 ± 1.5	0.021 ± 0.017	<0.0052	0.38
0217	0.026 ± 0.019	1.8 ± 1.3	0.020 ± 0.017	<0.0041	0.47
0517	<0.015	<0.79	<0.015	NA	0.69
0617	<0.015	<0.84	0.019 ± 0.018	NA	0.24
0717	<0.014	<0.71	0.035 ± 0.021	NA	0.56
0817	0.054 ± 0.025	3.0 ± 1.4	<0.016	NA	0.21
0917	0.018 ± 0.016	1.0 ± 0.88	0.018 ± 0.016	<0.0050	0.71
1217	0.082 ± 0.031	4.9 ± 1.8	0.021 ± 0.018	NA	0.44
1317	0.033 ± 0.021	1.5 ± 0.99	0.021 ± 0.018	NA	0.94
1417	0.069 ± 0.036	4.1 ± 2.1	<0.021	NA	0.34
1517	0.024 ± 0.018	1.3 ± 0.97	<0.021	NA	0.39
1617	0.018 ± 0.017	1.1 ± 1.1	<0.017	NA	0.19
1717	0.017 ± 0.016	0.98 ± 0.93	<0.013	NA	0.76
1817	0.035 ± 0.021	1.8 ± 1.1	0.020 ± 0.017	NA	0.82
1917	0.071 ± 0.041	4.0 ± 2.3	<0.032	NA	0.47
2117	0.037 ± 0.018	2.5 ± 1.2	<0.018	NA	0.55
2217	0.086 ± 0.048	4.7 ± 2.7	<0.035	NA	0.45
2317	<0.015	<0.82	<0.026	NA	0.29
2417	0.045 ± 0.022	2.9 ± 1.5	<0.023	<0.0022	0.27
2517	0.016 ± 0.015	1.1 ± 0.97	<0.026	NA	0.12
2617	0.033 ± 0.020	2.0 ± 1.2	<0.022	NA	0.28
2817	0.031 ± 0.020	1.5 ± 0.96	0.017 ± 0.017	<0.0034	1.3
2917	<0.013	<0.63	<0.012	NA	0.77
3017	0.047 ± 0.022	2.6 ± 1.2	0.022 ± 0.016	NA	0.32
3117	0.91 ± 0.11	52 ± 6.4	0.076 ± 0.029	NA	1.4
3317	1.2 ± 0.15	68 ± 8.3	0.11 ± 0.041	NA	2.5
3417	0.065 ± 0.026	3.6 ± 1.4	<0.025	NA	0.57
3517	<0.032	<1.9	<0.035	NA	0.66
3617	0.040 ± 0.033	2.4 ± 1.9	<0.035	NA	0.59
3717	<0.034	<2.2	<0.034	NA	0.58
3817	0.073 ± 0.040	3.8 ± 2.1	<0.040	NA	0.73
3917	0.015 ± 0.013	0.80 ± 0.73	<0.021	<0.0022	0.35
4017	0.031 ± 0.019	1.8 ± 1.1	<0.021	<0.0037	0.31
4117	0.039 ± 0.020	1.8 ± 0.90	<0.020	<0.0024	1.1
4217	0.051 ± 0.022	2.9 ± 1.3	<0.023	0.0054 ± 0.0027	0.56
4317	0.049 ± 0.022	2.6 ± 1.2	<0.023	0.0055 ± 0.0033	0.91
4417	0.025 ± 0.018	1.3 ± 0.94	<0.020	<0.0038	1.2
Profile Samples					
032N	0.12 ± 0.051	8.5 ± 3.5	<0.026	NA	0.34
032O	<0.0094	<0.54	<0.024	NA	0.14
032P	0.12 ± 0.039	6.7 ± 2.1	0.025 ± 0.021	NA	ND
032Q	<0.034	<2.0	<0.050	NA	ND
032R	<0.021	<1.4	<0.019	NA	ND
042N	<0.011	<0.57	<0.024	NA	ND
042O	<0.014	<0.98	<0.025	NA	ND
042P	<0.008	<0.58	<0.027	NA	ND
042Q	<0.0074	<0.31	<0.023	NA	ND
102N	<0.0081	<0.40	<0.022	NA	0.25
102O	0.057 ± 0.036	2.8 ± 1.8	<0.031	NA	ND
102P	0.034 ± 0.033	1.7 ± 1.7	<0.036	NA	0.72
102Q	<0.012	<0.51	<0.028	NA	0.14
102R	<0.034	<1.7	<0.031	NA	ND
112N	<0.0086	<0.54	<0.025	NA	0.13
112O	<0.010	<0.66	<0.021	NA	ND
112P	<0.034	<2.1	<0.049	NA	ND
112Q	<0.013	<0.78	<0.021	NA	0.77
202N	0.30 ± 0.057	21 ± 4.0	0.033 ± 0.020	NA	0.73
202O	0.19 ± 0.044	13 ± 3.0	0.025 ± 0.018	NA	0.54
202P	0.079 ± 0.030	5.1 ± 1.9	0.027 ± 0.020	NA	0.08
202Q	0.029 ± 0.020	2.1 ± 1.4	0.020 ± 0.018	NA	0.065
202R	0.030 ± 0.020	2.0 ± 1.3	0.017 ± 0.016	<0.0041	0.064
202S	0.029 ± 0.020	2.2 ± 1.5	<0.016	NA	ND
272N	0.050 ± 0.029	2.8 ± 1.6	0.027 ± 0.023	NA	0.66
272O	0.018 ± 0.016	1.0 ± 0.88	0.016 ± 0.015	NA	ND
272P	0.027 ± 0.018	0.98 ± 0.67	0.020 ± 0.017	NA	0.08
272Q	0.051 ± 0.024	1.7 ± 0.79	0.029 ± 0.019	NA	ND
272R	0.054 ± 0.024	1.3 ± 0.57	0.032 ± 0.020	NA	ND
272S	0.024 ± 0.018	0.58 ± 0.44	0.044 ± 0.022	NA	0.095
272T	0.035 ± 0.021	2.0 ± 1.2	0.020 ± 0.017	NA	ND
322N	0.83 ± 0.11	47 ± 6.1	0.056 ± 0.026	NA	2.7
322O	0.11 ± 0.033	6.0 ± 1.8	0.017 ± 0.016	NA	0.30
322P	0.035 ± 0.020	2.1 ± 1.2	0.016 ± 0.015	<0.0029	ND
322Q	<0.014	<0.66	<0.014	NA	ND

Notes: 1. Error terms are two-sigma counting error.  
 2. "<" indicates concentration is less than the stated value.  
 3. NA indicates no analysis.  
 4. ND indicates activity was non-detectable.

Radionuclide Concentrations in Trinity Soil Samples Collected During December 1974						
Table A-4 in the EPA report						
Sample Number	Plutonium - 239, 240		Atom Ratio Pu-240/Pu-239	Plutonium-238 Concentration (pCi/g)		
	Concentration (pCi/g)					Deposition (nCi/m <sup>2</sup> )
	Alpha Spectroscopy	Mass Spectroscopy				
Surface Samples						
10017	<0.023	0.007 ± 0.0013	0.56 ± 0.10	Limit	Limit	
10117	0.011 ± 0.0077	Limit	0.93 ± 0.65	Limit	Limit	
10217	<0.034	0.008 ± 0.003	0.61 ± 0.23	0.175 ± 0.12	Limit	
10317	<0.021	0.008 ± 0.00082	0.42 ± 0.043	0.177 ± 0.039	Limit	
10417	<0.056	0.009 ± 0.002	0.56 ± 0.12	Limit	Limit	
10517	<0.021	0.025 ± 0.013	1.9 ± 0.93	Limit	Limit	
10617	0.015 ± 0.0060	0.011 ± 0.00055	1.1 ± 0.44	0.135 ± 0.015	Limit	
10717	0.077 ± 0.0099	0.084 ± 0.0024	4.6 ± 0.59	0.053 ± 0.0046	Limit	
10817	<0.012	Limit	<0.76		Limit	
11117	0.096 ± 0.050	0.095 ± 0.0072	6.1 ± 3.2	0.076 ± 0.018	Limit	
11217	0.013 ± 0.0073	0.019 ± 0.014	0.91 ± 0.51	Limit	Limit	
11317	0.015 ± 0.016	0.15 ± 0.0034	9.1 ± 0.93	0.043 ± 0.0032	Limit	
11417	0.53 ± 0.038	0.53 ± 0.013	28 ± 2.0	0.028 ± 0.0024	0.028 ± 0.0032	
11617	0.38 ± 0.047	0.44 ± 0.016	29 ± 3.5	0.036 ± 0.0086	0.049 ± 0.015	
11717	0.068 ± 0.0082	0.074 ± 0.0066	4.5 ± 0.27	0.047 ± 0.021	Limit	
11917	14 ± 1.8	15 ± 0.22	1100 ± 130	0.025 ± 0.00030	0.80 ± 0.11	
12017	0.004 ± 0.0026	0.0060 ± 0.00067	0.31 ± 0.20	0.165 ± 0.043	Limit	
12117	1.3 ± 0.21	1.4 ± 0.019	110 ± 17	0.023 ± 0.0012	0.079 ± 0.019	
12217	0.022 ± 0.011	Limit	1.8 ± 0.87	Limit		
12317	0.015 ± 0.0030	0.017 ± 0.0095	1.2 ± 0.24	0.153 ± 0.077	0.0095 ± 0.0027	
12417	0.013 ± 0.0057	0.014 ± 0.00070	1.1 ± 0.48	0.133 ± 0.015	Limit	
15017	0.52 ± 0.071	0.47 ± 0.013	32 ± 4.3	0.026 ± 0.0028	0.027 ± 0.0070	
15117	0.24 ± 0.023	0.23 ± 0.0046	17 ± 1.6	0.032 ± 0.0021	0.025 ± 0.0055	
15317	0.017 ± 0.0095	0.021 ± 0.0011	1.1 ± 0.62	0.127 ± 0.018	Limit	
15417	0.38 ± 0.092	0.34 ± 0.020	27 ± 6.5	0.042 ± 0.0081	Limit	
15517	0.022 ± 0.0048	0.029 ± 0.0015	1.7 ± 0.38	0.114 ± 0.015	Limit	
15617	0.29 ± 0.071	0.29 ± 0.0047	25 ± 5.9	0.038 ± 0.0024	Limit	
15717	0.17 ± 0.030	0.18 ± 0.014	12 ± 2.1	0.049 ± 0.0094	Limit	
15817	0.14 ± 0.020	0.19 ± 0.015	10 ± 1.4	0.075 ± 0.024	Limit	
15917	0.18 ± 0.035	0.16 ± 0.0065	12 ± 2.4	0.031 ± 0.0062	Limit	
16017	0.60 ± 0.16	0.52 ± 0.010	48 ± 12	0.028 ± 0.0015	0.034 ± 0.016	
16117	0.10 ± 0.022	0.12 ± 0.0097	6.1 ± 1.3	0.027 ± 0.014	Limit	
16217	0.25 ± 0.081	0.24 ± 0.019	20 ± 6.3	0.048 ± 0.014	0.072 ± 0.035	
16317	0.11 ± 0.012	0.12 ± 0.0030	8.6 ± 0.96	0.031 ± 0.0045	0.0070 ± 0.0025	
16416	0.63 ± 0.33	1.0 ± 0.10	28 ± 1.5	0.027 ± 0.00043	Limit	
16516	1.2 ± 0.42	1.3 ± 0.038	45 ± 15	0.037 ± 0.0033	Limit	
16616	0.30 ± 0.065	0.29 ± 0.0059	8.0 ± 1.8	0.027 ± 0.0015	Limit	
16716	2.8 ± 0.73	3.2 ± 0.038	86 ± 22	0.025 ± 0.0011	0.16 ± 0.062	
16916	1.5 ± 0.26	1.6 ± 0.054	42 ± 7.2	0.032 ± 0.0062	0.098 ± 0.033	
Profile Samples						
1092A	0.036 ± 0.0036	0.034 ± 0.0044	1.5 ± 0.15	0.070 ± 0.039	Limit	
1092B	0.014 ± 0.0016	0.015 ± 0.0014	0.53 ± 0.060	0.104 ± 0.021	0.002 ± 0.0009	
1092C	<0.039	<0.001			Limit	
1092D	<0.025	<0.0008			Limit	
1092E	<0.038				Limit	
1092F	<0.015	<0.023			Limit	
1092G	<0.003	Limit			Limit	
1092H	<0.009	<0.0003			Limit	
1092I	<0.030	<0.002			Limit	
1092J	<0.021	<0.002			Limit	
1102A	0.010 ± 0.0062	0.0090 ± 0.00005	0.27 ± 0.17	0.084 ± 0.024	Limit	
1102B	<0.0090	0.0020 ± 0.00015	0.053 ± 0.0039		Limit	
1152A	1.3 ± 0.11	1.4 ± 0.014	36 ± 3.0	0.025 ± 0.00060	0.072 ± 0.0060	
1152B	<0.0050	0.0050 ± 0.00094	0.17 ± 0.031		Limit	
1152C	0.255 ± 0.0714	0.268 ± 0.0038		0.026 ± 0.0011	Limit	
1152D	0.120 ± 0.0432	0.141 ± 0.0107		0.029 ± 0.0052	Limit	
1152E	0.064 ± 0.0218	0.060 ± 0.0008		0.029 ± 0.0017	Limit	
1152F	<0.042	<0.018			Limit	
1152G	0.013 ± 0.0055	<0.016			Limit	
1152H	<0.006	<0.003			Limit	
1152I	<0.014	<0.001			Limit	
1152J	<0.012	<0.007			Limit	
1182A	0.088 ± 0.015	0.093 ± 0.0032	2.1 ± 0.36	0.035 ± 0.0070	Limit	
1182B	0.075 ± 0.0065	0.080 ± 0.0034	2.0 ± 0.17	0.039 ± 0.0086	0.0050 ± 0.0017	
1182C	0.086 ± 0.0138	<0.100			Limit	
1182D	0.066 ± 0.0172	<0.081			Limit	
1182E	<0.010	<0.002			Limit	
1182F	<0.010	Limit			Limit	
1182G	<0.017	Limit			Limit	
1182H	<0.013	Limit			Limit	
1182I	<0.027	Limit			Limit	
1182J	<0.008	Limit			Limit	
1522A	0.0070 ± 0.0031	0.0090 ± 0.00067	0.19 ± 0.083	0.119 ± 0.021	Limit	
1522B	1.2 ± 0.11	1.3 ± 0.015	39 ± 3.6	0.025 ± 0.00065	0.073 ± 0.0085	
1522C	<0.019	Limit			Limit	
1522D	<0.012	Limit			Limit	
1522E	<0.024	Limit			Limit	
1522F	<0.015	Limit			Limit	
1522G	<0.007	Limit			Limit	
1522H	<0.005	Limit			Limit	
1522I	<0.006	Limit			Limit	

Analysis Codes: 1. Error terms are two-sigma counting error.  
 2. "Limit" indicates activity was below limit of detection.  
 3. "<" indicates concentration is less than the stated value.

