

Air-Monitoring Results for Technical Area 39 Ancho Canyon Fire LA-UR-08-04699

During the afternoon on Wednesday, June 11, 2008, a small fire occurred in vegetation in Ancho Canyon at Technical Area 39 (TA-39) of Los Alamos National Laboratory (LANL). The fire was brought under control within a few hours. Hotspots continued through the night. A back burn was conducted on Thursday afternoon, June 12, 2008, to reduce fuel loading in the area.

Part of LANL's response was to monitor the ambient air in the vicinity of the fire. Study of the soil contaminants suggested there would be no air emissions or air concentrations of concern for worker or public health, in areas where fire fighters were working and at public access locations; however air monitoring was implemented as a proactive measure. Air filters from air monitoring stations were analyzed for contaminants based on the review of soil-monitoring data for contaminants present above background levels in the areas adjacent to the fire. Air concentration results are compared to applicable worker or public standards.

I. Monitoring Plan

I. A. Locations

The filter from the AIRNET station at the corner of NM 4 and Monte Rey Drive South in Pajarito Acres was removed for earlier-than-scheduled analysis. This station was operating throughout the initial flare-up. It is situated downwind from the fire and is close to the residence nearest to TA-39. A replacement filter was inserted after the initial burn and before the back burn was conducted on the afternoon of Thursday, June 12, 2008. (This replacement filter will be removed at the usual AIRNET change out.) The AIRNET filter was analyzed for the routine set of radionuclides: americium, plutonium, and uranium.

In addition, two high-volume samplers were deployed. One was placed in Ancho Canyon at TA-39, approximately 75 meters from the burned and back burn areas. It was in position at approximately 12:30 PM on Thursday, June 12, 2008, prior to the back burn that began around 2:00 PM. The second high-volume sampler was placed on NM 4 on a ridge to the east of Ancho Canyon and downwind of the fire area. This sampler was operational at approximately 2:00 PM on Thursday June 12, 2008.

The filters on the high-volume samplers were changed out on the morning of Friday, June 13, 2008. The high volume sampler at TA-39 was switched off early on Thursday evening when the fire fighters completed their work and left the site. This sampler was restarted on Friday morning, following filter change out.

Both high-volume samplers operated continuously through the weekend, and the filters were removed for analysis on Monday, June 16, 2008.

I.B. Filter Analyses

The AIRNET filter was analyzed for the routine set of radionuclides: americium, plutonium, and uranium.

The high-volume sampler filters were analyzed for contaminants that have been measured above background in TA-39 soils: uranium and lead. The filters were also analyzed for other contaminants that have been associated with high explosives testing: beryllium, copper, lead, silver, zinc, and mercury. The high volume filters were analyzed for americium and plutonium, for consistency with the AIRNET filter analysis.

Based on the history of Laboratory operations in the vicinity of the fire, cesium (Cs) 137 and strontium (Sr) 90 are not expected to be significant soil contaminants. There are a few soil measurements in Ancho Canyon that were analyzed for Cs-137. The results were primarily at background levels. There are no soil samples analyzed for Sr-90. Therefore, air filters were not specifically analyzed for Cs-137 or Sr-90. However, the gamma counting of the four AIRNET filters in White Rock that operated throughout the fire will provide information on Cs-137 levels. In addition, the gross-beta counting of the four AIRNET filters in White Rock that operated throughout the fire will be reviewed to determine if elevated beta counts exist that should be analyzed specifically for Sr-90. The gamma counts and gross-beta counts will be available in mid-August 2008. Based on the current set of air concentration measurements (as follows), we anticipate both these measurements will be consistent with routine background measurements.

II. Results and Analysis

The air-monitoring results for radioactive constituents are presented in Attachment 1. The tables include the location, period of monitoring, analyte concentrations, analytical laboratory uncertainty, detection status of the analyte in the air sample, and applicable standards for comparison.

From the samplers in the two public locations, all radionuclide analyses except one were non-detections or below detection limits: U-234 was detected on NM 4, between Ancho and Water Canyons, from Friday, June 13 to Monday, June 16. This one detection is similar to other U-234 concentrations measured during windy conditions, when soils are re-suspended into the air (LANL 2004a). The concentration is more than 100 times less than applicable public exposure limits.

In samples collected on-site, U-234 and U-238 measurements were typical of other uranium measurements made during windy conditions, when soils are re-suspended into the air (LANL 2004a). These measurements indicate naturally occurring uranium, based on an evaluation of the isotopic uranium concentrations and their concentration uncertainties. The uranium values are less than 0.002% of worker exposure limits. Americium and plutonium measurements were less than detection limits or not detected in the samples collected on-site.

The air-monitoring results for nonradioactive constituents are presented in Attachment 2. The tables include the location, period of monitoring, analyte concentrations, detection status of the analyte in the air sample, and applicable standards for comparison. For metals, the analytical laboratory does not report analytical uncertainty values, only whether or not the analyte was detected.

Beryllium, silver, and mercury were not detected in any samples collected on-site or off-site. Measurements of lead were well below all applicable worker and public health standards. Measurements of zinc and copper were well below applicable worker standards. No public standards exist for zinc or copper. Measurements of lead, zinc, and copper are consistent with previous air measurements taken at Los Alamos (LANL 2004b).

III. Conclusions

No adverse health effects to workers or members of the public have been identified from Laboratory contaminants potentially re-suspended from the fire at TA-39 Ancho Canyon on June 11 and 12, 2008.

References:

LANL 2004a: "Environmental Surveillance at Los Alamos during 2003," LA-14162-ENV, September 2004.

LANL 2004b: "Nonradioactive Ambient Air Monitoring at Los Alamos National Laboratory, 2001–2002," LA-14169, September 2004.

Attachment 1: Air Monitoring Results for Radionuclide Contaminants

Sample 1 AIRNET station 63 time =52 hours air volume=177 m³

Corner of S.R. 4 and Monte Rey South

During initial burn: Monday June 9 – Thursday June 12

Analyte	Concentration	Concentration Uncertainty (2 sigma analytical laboratory)	Concentration Units	Detect Status	Concentration = 10 mrem (public exposure limit)
U-234	94.5	73.6	aCi/m ³	Less than detection limits	7700
U-235	11.1	56.6	aCi/m ³	Non-detect	7100
U-238	8.6	48.1	aCi/m ³	Non-detect	8300
Am-241	49.4	62.3	aCi/m ³	Non-detect	1900
Pu-238	0.4	55.5	aCi/m ³	Non-detect	2100
Pu-239	22.6	55.5	aCi/m ³	Non-detect	2000

Sample 2 High volume at TA-39 time=6 hours air volume=223 m³

TA-39 Ancho Canyon

During back burn noon Thursday June 12 – early evening Thursday June 12

Analyte	Concentration	Concentration Uncertainty (2 sigma analytical laboratory)	Concentration Units	Detect Status	Concentration = DAC (worker exposure limit)
U-234	215.8	115.8	aCi/m ³	Detected	20,000,000
U-235	9.4	66.7	aCi/m ³	Non-detect	20,000,000
U-238	339.1	132.6	aCi/m ³	Detected	20,000,000
Am-241	27.4	63.4	aCi/m ³	Non-detect	2,000,000
Pu-238	45.8	61.6	aCi/m ³	Less than detection limits	3,000,000
Pu-239	36.8	75.6	aCi/m ³	Non-detect	2,000,000

Sample 3 High volume at TA-39 time=73 hours air volume=2375 m³
 TA-39 Ancho Canyon
 After back burn Friday June 13 – Monday June 16

Analyte	Concentration	Concentration Uncertainty (2 sigma analytical laboratory)	Concentration Units	Detect Status	Concentration = DAC (worker exposure limit)
U-234	27.8	13.7	aCi/m ³	Detected	20,000,000
U-235	3.3	9.0	aCi/m ³	Non-detect	20,000,000
U-238	20.5	11.3	aCi/m ³	Detected	20,000,000
Am-241	5.1	6.6	aCi/m ³	Non-detect	2,000,000
Pu-238	2.5	5.7	aCi/m ³	Non-detect	3,000,000
Pu-239	4.2	5.8	aCi/m ³	Less than detection limits	2,000,000

Sample 4 High volume on S.R. 4 time=22 hours air volume= 716 m³
 S.R. 4 between Water and Ancho Canyon
 During back burn Thursday June 12 – Friday June 13

Analyte	Concentration	Concentration Uncertainty (2 sigma analytical laboratory)	Concentration Units	Detect Status	Concentration = 10 mrem (public exposure limit)
U-234	30.9	30.9	aCi/m ³	Less than detection limit	7700
U-235	-5.9	21.8	aCi/m ³	Non-detect	7100
U-238	33.0	28.4	aCi/m ³	Less than detection limit	8300
Am-241	32.1	26.4	aCi/m ³	Less than detection limit	1900
Pu-238	2.7	19.1	aCi/m ³	Non-detect	2100
Pu-239	2.8	19.2	aCi/m ³	Non-detect	2000

Sample 5 High volume on S.R. 4 time=71 hours air volume=2279 m³
 S.R. 4 between Water and Ancho Canyon
 After burn Friday June 13 – Monday June 16

Analyte	Concentration	Concentration Uncertainty (2 sigma analytical laboratory)	Concentration Units	Detect Status	Concentration = 10 mrem (public exposure limit)
U-234	23.7	13.4	aCi/m ³	Detect	7700
U-235	4.7	7.2	aCi/m ³	Non-detect	7100
U-238	12.5	9.3	aCi/m ³	Less than detection limits	8300
Am-241	2.9	6.5	aCi/m ³	Non-detect	1900
Pu-238	0.0	6.0	aCi/m ³	Non-detect	2100
Pu-239	-0.9	6.0	aCi/m ³	Non-detect	2000

Attachment 2: Air Monitoring Results for Non-Radioactive Constituents

Sample 2 High volume at TA-39 time=6 hours air volume=223 m³

TA-39 Ancho Canyon

During back burn noon Thursday June 12 – early evening Thursday June 12

Analyte	Concentration	Concentration Units	Detect Status	Worker exposure limit (ng/m ³)*	Averaging Time
Beryllium	0.1	ng/m ³	Non-detect	2,000	8 hr
Copper	44.9	ng/m ³	Detect	100,000	8 hr
Lead	19.7	ng/m ³	Detect	50,000	8 hr
Silver	4.5	ng/m ³	Non-detect	10,000	8 hr
Zinc	183.9	ng/m ³	Detect	2,000,000	8 hr
Mercury	0.1	ng/m ³	Non-detect	25,000	8 hr

*Assumes inorganic form and fume or fine particles. More conservative value used; OSHA or ACGIH.

Sample 3 High volume at TA-39 time=73 hours air volume=2375 m³

TA-39 Ancho Canyon

After back burn Friday June 13 – Monday June 16

Analyte	Concentration	Concentration Units	Detect Status	Worker exposure limit (ng/m ³)*	Averaging Time
Beryllium	0.0	ng/m ³	Non-detect	2,000	8 hr
Copper	4.6	ng/m ³	Detect	100,000	8 hr
Lead	1.7	ng/m ³	Detect	50,000	8 hr
Silver	0.4	ng/m ³	Non-detect	10,000	8 hr
Zinc	13.5	ng/m ³	Detect	2,000,000	8 hr
Mercury	0.0	ng/m ³	Non-detect	25,000	8 hr

*Assumes inorganic form and fume or fine particles. More conservative value used; OSHA or ACGIH

Sample 4 High volume on S.R. 4 time=22 hours air volume= 716 m³
 State Rte 4 between Water and Ancho Canyon
 During back burn Thursday June 12 – Friday June 13

Analyte	Concentration	Concentration Units	Detect Status	Public Exposure Limit (ng/m ³)	Averaging Time
Beryllium	0.03	ng/m ³	Non-detect	10	24 hours
Copper	13.3	ng/m ³	Detect	NA	
Lead	3.8	ng/m ³	Detect	1500	Calendar Quarter
Silver	1.4	ng/m ³	Non-detect	NA	
Zinc	33.5	ng/m ³	Non-detect	NA	
Mercury	0.0	ng/m ³	Non-detect	NA	

NA = no applicable standard

Sample 5 High volume on S.R. 4 time=71 hours air volume=2279 m³
 State Rte 4 between Water and Ancho Canyon
 After burn Friday June 13 – Monday June 16

Analyte	Concentration	Concentration Units	Detect Status	Public Exposure Limit (ng/m ³)	Averaging Time
Beryllium	0.01	ng/m ³	Non-detect	10	24 hours
Copper	3.1	ng/m ³	Detect	NA	
Lead	1.2	ng/m ³	Detect	1500	Calendar Quarter
Silver	0.4	ng/m ³	Non-detect	NA	
Zinc	8.3	ng/m ³	Detect	NA	
Mercury	0.0	ng/m ³	Non-detect	NA	

NA = no applicable standard