Preliminary Data Report for Stormwater Runoff Samples Collected in Sandia Canyon at TA-3 Gage E122 on October 11, 2000

A precipitation event occurred over the Jemez Mountains and the Pajarito Plateau on the afternoon and evening of October 11, 2000. Meteorological stations across the plateau recorded a range of precipitation from 0.38 to 0.61 inches for the day. The station at TA-6 recorded a total of 0.46 inches and the station at TA-53 recorded a total of 0.38 inches. Remote Automated Weather Stations (RAWS) located on US Forest Service land in the Jemez Mountains recorded 0.43 inches in Pueblo Canyon, 0.51 inches in upper Los Alamos Canyon and 0.36 inches in Pajarito Canyon. Figure 1 shows the pattern of precipitation that was recorded in the Jemez Mountains and on the Pajarito Plateau on October 11.

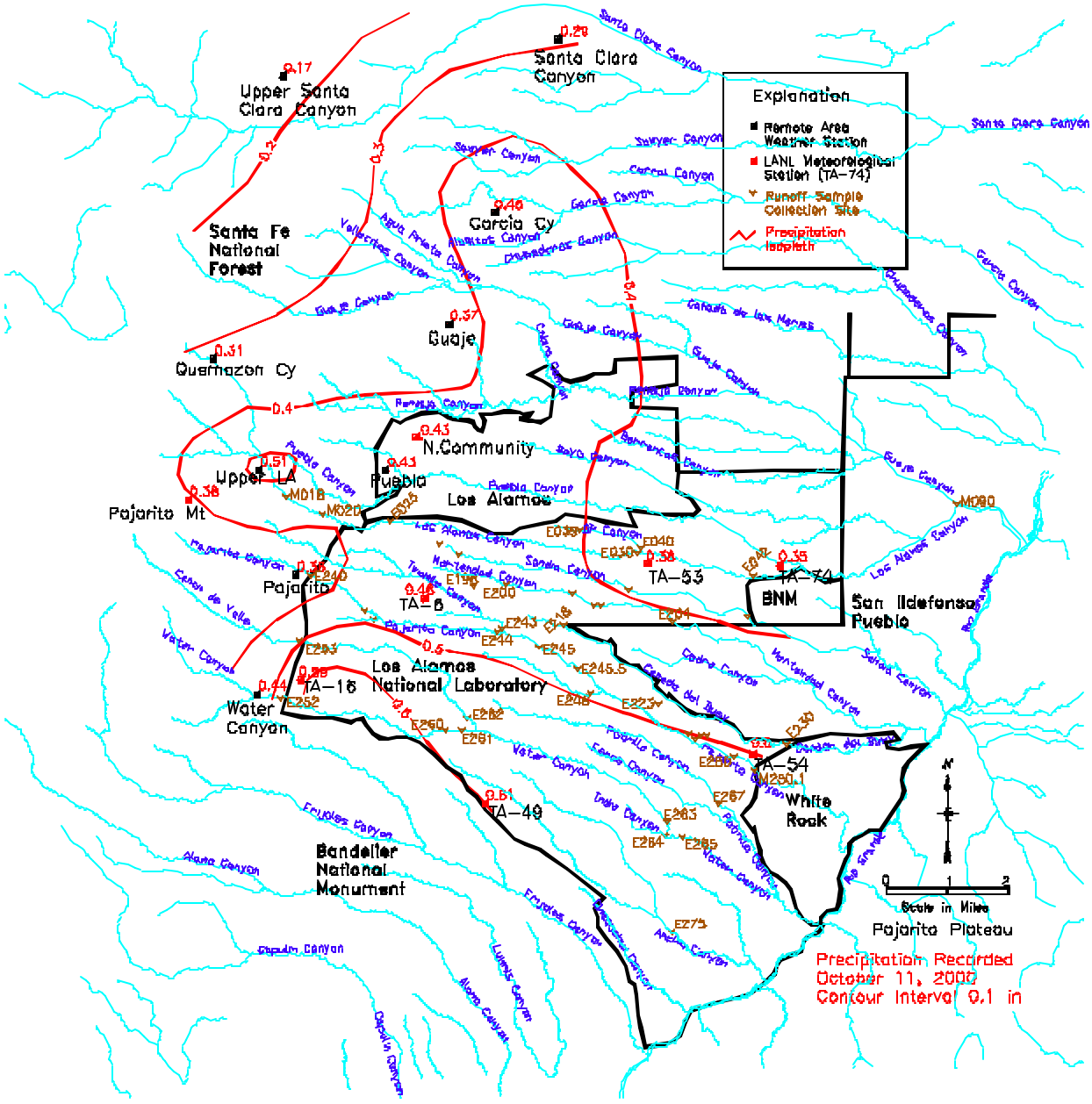

Figure 1. Precipitation recorded at meteorological stations on the Pajarito Plateau on October 11, 2000

During the precipitation event, stormwater runoff samples were collected in Sandia Canyon at the TA-3 gaging station E122 near the Roads and Grounds yard. Automated samples were collected at 17:21 and 17:33 hours during the afternoon of October 11. Unfiltered samples were collected for analysis. The first samples collected were sent to General Engineering Laboratories, Inc. in Charleston, South Carolina for analysis for radionuclides, metals, and general inorganic constituents. The second sample collected at 17:33 remained unfiltered for the analysis of total suspended sediment (TSS). Filtered samples were collected for metals analysis.

Preliminary results of the available analyses for radionuclides are shown in Table 1. Also shown on Table 1 are the maximum values of constituents that have been recorded previous to the Cerro Grande Fire in unfiltered stormwater runoff at LANL (1995 through 1999), the DOE Public Dose Derived Concentration Guides (DCGs), and the available Environmental Restoration Project's Ecological Screening Level (ESL) for water, for comparison purposes. Results of gamma spectroscopy are reported only for Am-241, Cs-137, and other radionuclides that were detected in concentrations above the laboratory method detection limit. A summary of the preliminary results of the analyses is shown in Figure 2. The results are compared with the historic maximum values obtained for unfiltered runoff and the DOE DCGs and the ESLs.

The radionuclide results obtained to date for the unfiltered samples collected from Sandia Canyon at E122 on October 11 are below the historic pre-fire maximum values and the DOE DCG and ESL values for each analyte result obtained to date.

The unfiltered runoff sample collected at E122 on October 11, 2000 at 17:21 contained 95 mg/L total suspended solids (TSS). Based on this sediment concentration and the activity of radionuclides measured of the unfiltered water samples, the concentrations of the radionuclides in the suspended sediment fraction of the runoff samples were calculated. These calculated values are also shown on Table 1 and the data are summarized in the Figure 3. Values for radionuclides that were reported below the method detection limits are not shown on Figure 3.

The background values (BVs) that have been determined for stream sediments at Los Alamos National Laboratory (Ryti et al. 1998) and the calculated residential screening level (RSL) or soil for each radionuclide are also shown on Table 1. The RSL values were derived using DOE's RESRAD code and are based on a dose limit of 10 mrem/yr, which is less than the DOE free-release dose limit of 15 mrem/yr (LANL 2000). The maximum value of radionuclide concentrations observed in ash and muck sediment samples collected in June after precipitation events by the LANL ER Project are also shown on Table 1 (LANL 2000). The BVs for stream sediments, the RSLs, and the maximum ash and muck values are provided as a comparison for the results of the calculated activities of radionuclides in the suspended sediment fraction of the runoff samples. Suspended sediments in runoff samples are typically finer-grained than stream sediment samples; some radionuclides have been found to be preferentially located in finer grained sediments so direct comparison of the suspended sediment fraction of runoff samples with stream sediment BVs may not be appropriate, however the BVs, RSLs, and maximum values of ash and muck samples are provided here for reference and comparison.

The calculated radionuclide concentrations in the suspended sediment fraction of the samples are above the stream sediment BVs for Cs-137, Gross Beta, Ra-226, and Sr-90. The calculated concentrations of Cs-137 and Sr-90 are above their respective RSLs. The calculated concentrations of Cs-137 and Sr-90 are above the ER ash and muck maximum values.

References

Los Alamos National Laboratory (LANL), 2000, "Post-Cerro Grande Fire Environmental Sampling Data: Baseline Ash and Muck Samples," Environmental Restoration (ER) Project report LA-UR 00-4362, September 2000, ER2000-0485. Preliminary data also presented on LANL ER Web site located at http://erproject.lanl.gov/Fire/Data/datahome.html

Ryti, R. T., P. A. Longmire, D. E. Broxton, S. L. Reneau, and E. V. McDonald, September 1998, "Inorganic and Radionuclide Background Data for Soils, Sediments and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory Report LA-UR-98-4847. (Ryti et al. 1998, 59730)

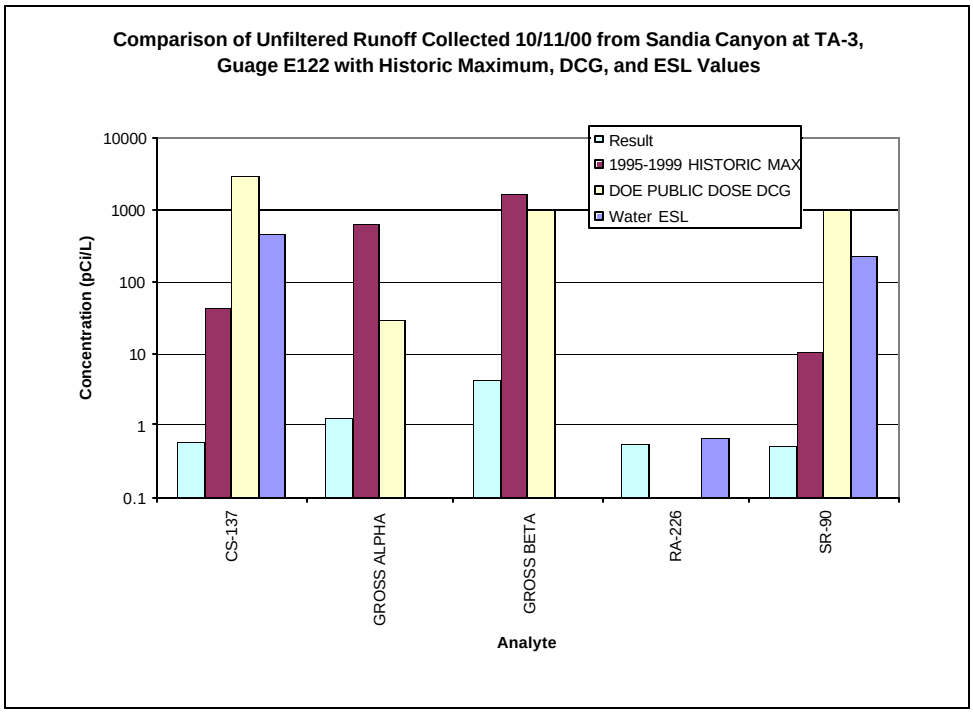

Figure 2. Comparison of runoff samples collected 10/11/00 in Sandia Canyon at TA-3 (E122) with Historic Maximum, DCG Values, and Ecological Screening Levels

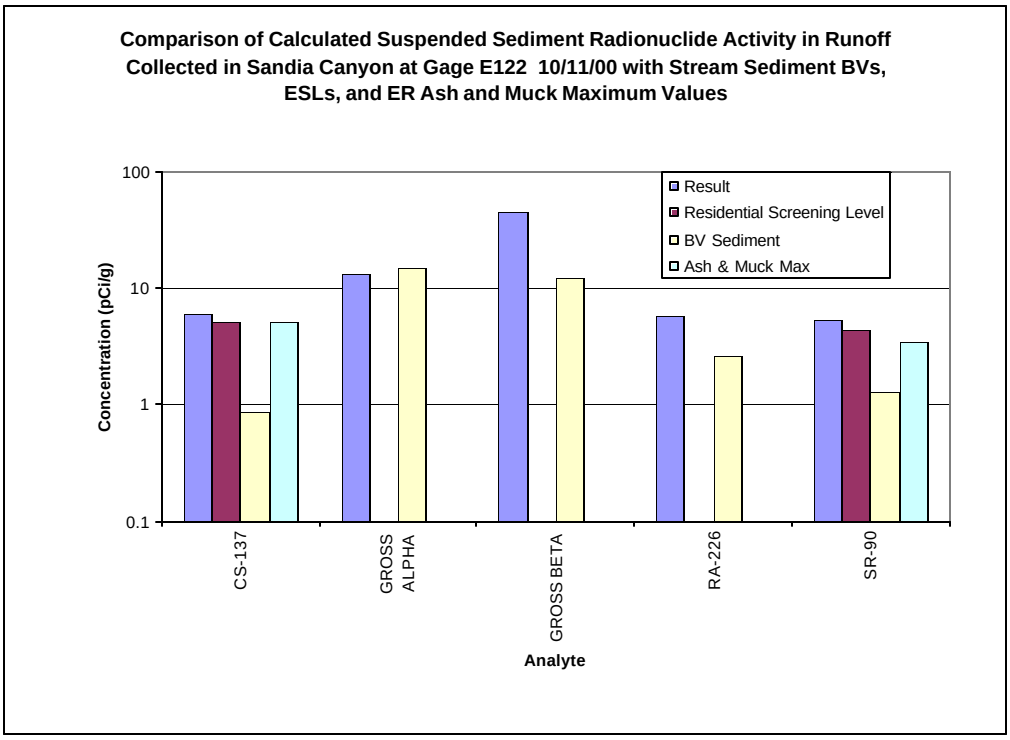

Figure 3. Comparison of calculated radionuclide activity in suspended sediment fraction of runoff samples collected 10/11/00 in Sandia Canyon at TA-3 (E122) with residential screening levels, stream sediment BVs, and ER ash and muck maximum values obtained after the Cerro Grande Fire.

Table 1
RADIOACTIVE SCREENING MEASUREMENTS IN SANDIA CANYON AT TA-3, GAGE E122 ON OCTOBER 11, 2000
DRAFT: DATA ARE PRELIMINARY

Canyon	Gage	Location	Sample ID	Lab Sample ID	Collection Date	F/UF	Collection Method	Sample Type	Analyte	Result	Units	TPU	DL	METHOD	QUALIFIER	COMMENT	1995-1999 HISTORIC MAX	DOE PUBLIC DOSE DCG	Water ESL
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	SAMPLE	AM-241	-23.2	pCi/L	6.63	20.5	GAMMA SPEC	U		10.288	30	5.8
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	SAMPLE	CS-137	0.581	pCi/L	1.62	5.01	GAMMA SPEC	U		42.28	3000	470
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32880007	10/11/00	UF	A	SAMPLE	GROSS ALPHA	1.23	pCi/L	0.51	1.43	GFPC			640.8	30	
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32880007	10/11/00	UF	A	SAMPLE	GROSS BETA	4.21	pCi/L	0.98	2.93	GFPC			1637	1000	
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	SAMPLE	RA-226	0.54	pCi/L	0.67	0.862	LUCAS CELL					0.68
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	SAMPLE	SR-90	0.513	pCi/L	0.18	0.575	GFPC			10.312	1000	230
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32885007	10/11/00	UF	A	SAMPLE	CN AMEN	0	mg/L		0.0028	EPA 335.1	U	REPORTED ND			
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32885007	10/11/00	UF	A	SAMPLE	CN TOT	0	mg/L		0.0028	EPA 335.3	U	REPORTED ND			
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00102E122	32880002	10/11/00	UF	A	SAMPLE	TSS	105	mg/L		6.99	EPA 160.2		AVERAGE OF 2			
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32880001	10/11/00	UF	A	SAMPLE	TSS	95	mg/L		6.99	EPA 160.2		AVERAGE OF 2			

Calculated Suspended Sediment Concentrations of Radionuclides

Canyon	Gage	Location	Sample ID	Lab Sample ID	Collection Date	F/UF	Collection Method	Sample Type	Analyte	Result	Units	TPU		METHOD	QUALIFIER	COMMENT	Residential Screening Level	BV Sediment	Ash & Muck Max
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	Calculatec	AM-241	-244.2	pCi/g	69.8		GAMMA SPEC	U		22	0.04	0.203
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	Calculatec	CS-137	6.1158	pCi/g	17.1		GAMMA SPEC	U		5.1	0.9	5.16
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32880007	10/11/00	UF	A	Calculatec	GROSS ALPHA	12.947	pCi/g	5.37		GFPC				14.8	
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32880007	10/11/00	UF	A	Calculatec	GROSS BETA	44.316	pCi/g	10.3		GFPC				12	
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	Calculatec	RA-226	5.6842	pCi/g	7.01		LUCAS CELL				2.59	
Sandia	E122	Sandia Canyon at TA-3 R&G	GS00101E122	32882001	10/11/00	UF	A	Calculatec	SR-90	5.4	pCi/g	1.87		GFPC			4.4	1.3	3.48

A or M: Automated or Manual (Grab) Sample
F/UF: filtered/unfiltered
Uncert.: 1 Stand. Dev.uncertainty in result
MDA or MDC: analytical method detection limit
TPU: Total Propogated Uncertainty
DUP: Laboratory Duplicate
DL = Detection Limit
RL = Reporting Limit
DCG = Derived Concentration Guide
ESL = Ecological Screening Level
RSL = Residential Screening Level. for soil based on RESRAD code using 10 mrem/yr
BV = Background Value (95/95 UTL)

Comparison of Calculated Suspended Sediment Radionuclide Activity in Runoff Collected in Sandia Canyon at Gage E122 10/11/00 with Stream Sediment BVs, ESLs, and ER Ash and Muck Maximum Values