Preliminary Data Report for Stormwater Runoff Samples Collected in Guaje Canyon at State Road 502 on September 8, 2000

A precipitation event occurred over the Jemez Mountains and the Pajarito Plateau on the afternoon of September 08, 2000. The meteorological station on Pajarito Mountain recorded a total of 0.37 inches, the TA-6 station recorded 0.21 inches, and the North Community station in northern Los Alamos recorded 0.52 inches. Remote Automated Weather Stations (RAWS) located on US Forest Service land in the Jemez Mountains recorded 0.98 inches near Garcia Canyon, 0.56 inches in Pueblo Canyon, 0.89 inches near Los Alamos Canyon and 0.58 inches in Pajarito Canyon. Figure 1 shows the pattern of precipitation that was recorded in the Jemez Mountains and on the Pajarito Plateau on September 8.

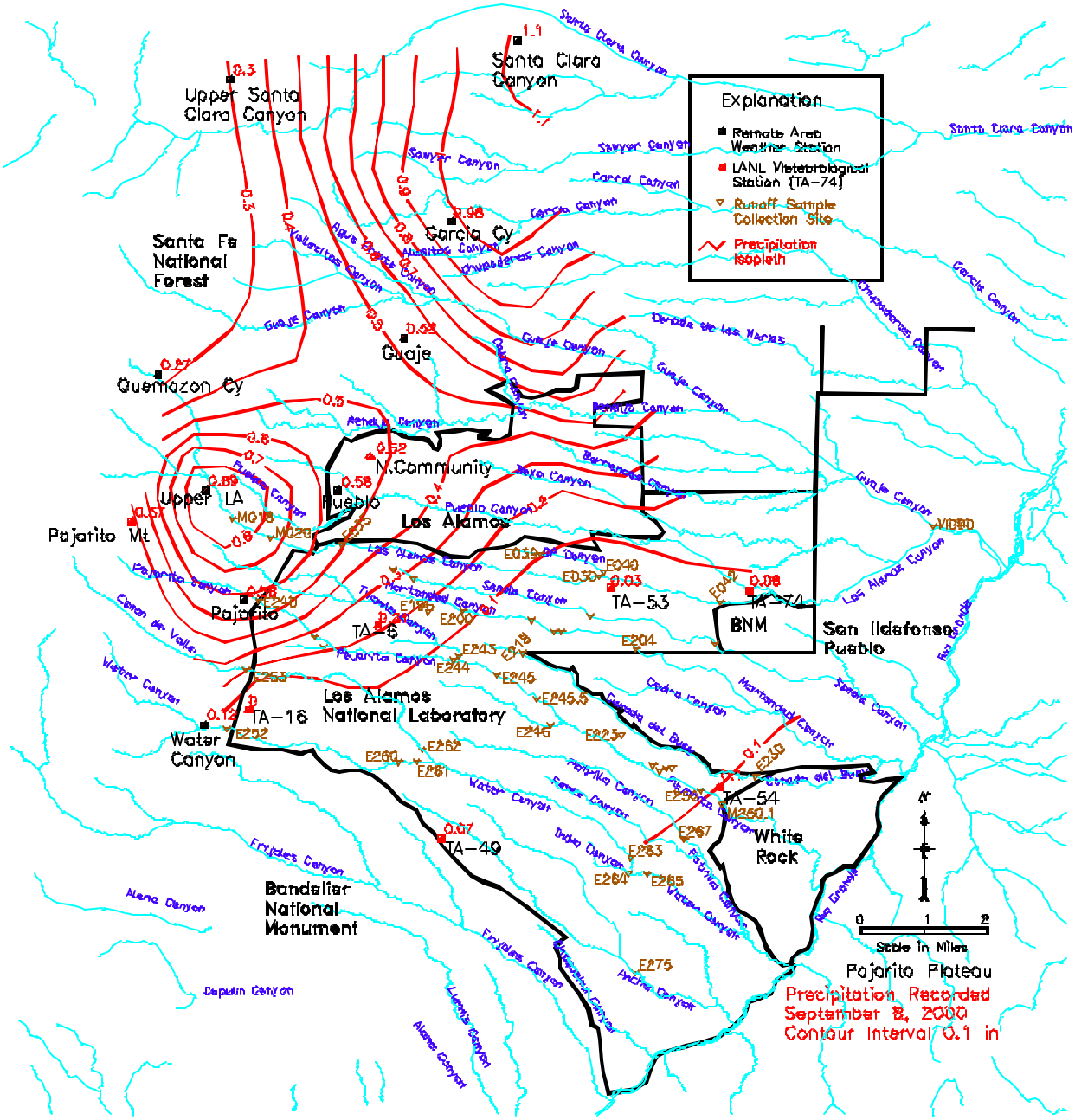

Figure 1. Precipitation recorded at meteorological station on the Pajarito Plateau on September 08, 2000

Manual (grab) stormwater runoff samples were collected in Guaje Canyon at State Route 502 near the confluence with Los Alamos Canyon during the runoff event. The samples were collected at 18:28 and 18:35 hours in the evening of September 8. Unfiltered and filtered samples were collected for analysis. The samples were sent to General Engineering Laboratories, Inc. in Charleston, South Carolina for analysis for radionuclides, metals, general inorganic constituents, VOCs, SVOCs, PCBs, HE, and Furans/Dioxins. Unfiltered samples were collected for analyses of radionuclides, metals, and general inorganic constituents.

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 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 unfiltered runoff sample collected on Sept 8, 2000 at 18:28 hours contained 76,000 mg/L total suspended solids (TSS). Based on this sediment concentration and the activity of radionuclides measured of the unfiltered water and the filtered 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.

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, but the BVs, RSLs, and maximum values of ash and muck samples are provided here for reference and comparison.

The radionuclide results obtained to date for the samples collected from Guaje Canyon at SR-502 are below the historic pre-fire maximum values except for Cs-137, which was observed in a concentration of 212 pCi/L. The results are below DOE DCG and ESL values for each analyte result obtained to date except for Pb-210, which was observed in a concentration of 840 pCi/L.

The calculated radionuclide concentrations in the suspended sediment fraction of the samples are below BVs for each analyte available except for Cs-137, which has a calculated value of 2.773 pCi/g, about 3 times the BV of 0.9 pCi/g. The calculated concentration of Cs-137 is below the RSL of 5.1 pCi/g and the ash and muck maximum value of 5.16 pCi/g. The calculated concentration of Th-230 was 1.5 pCi/g, which is above the RSL and the ash and muck maximum observed value, but is below the BV of 2.29 pCi/g.

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)

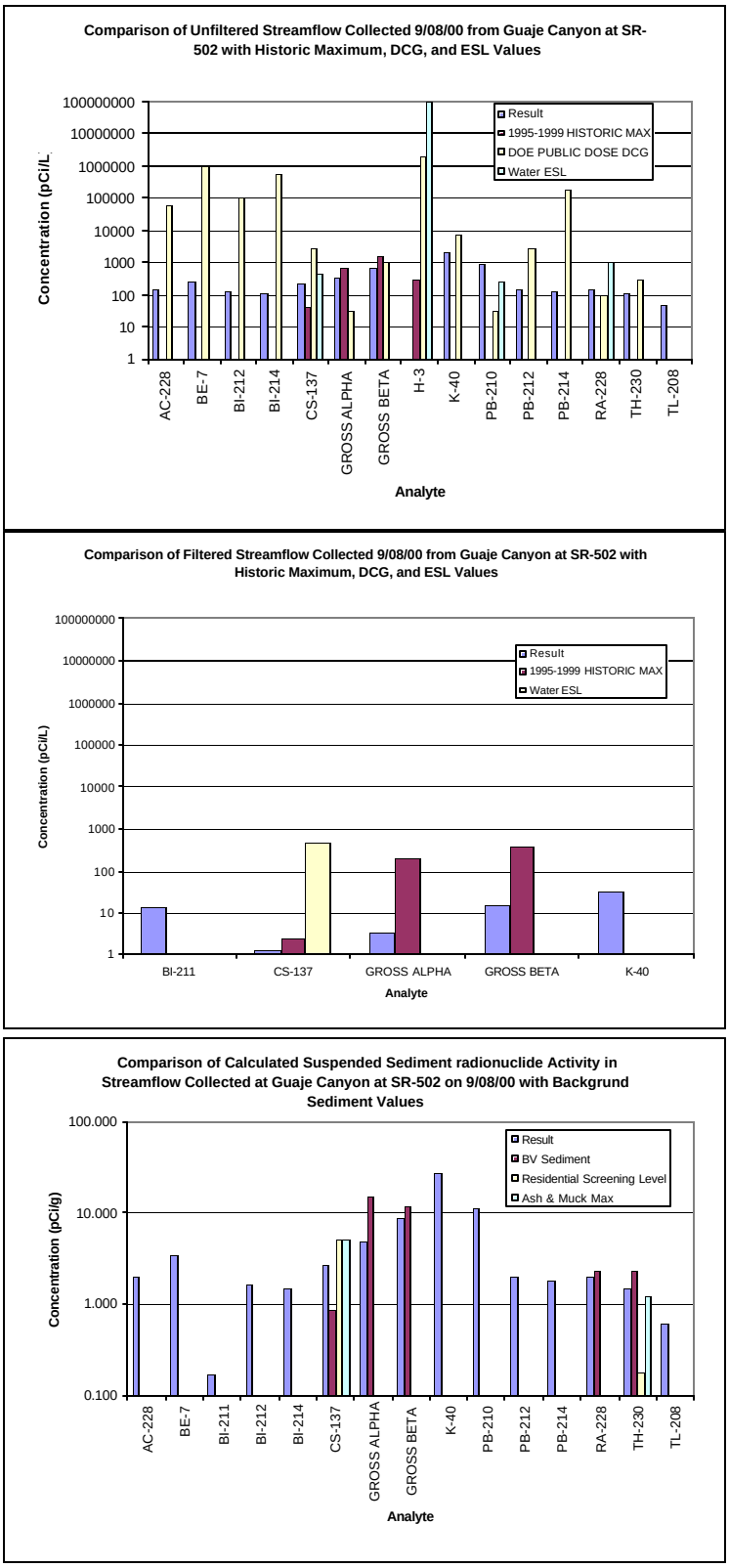

Figure 2. Comparison of runoff samples collected 9/08/00 in Guaje Canyon at SR-502 (M090) with Historic Maximum and DCG Values

Table 1
RADIOACTIVE SCREENING MEASUREMENTS IN RUNOFF COLLECTED IN GUAJE CANYON AT SR-502 ON SEPTEMBER 8, 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
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	AC-228	151	pCi/L	15.6	13.7	GAMMA SPEC				60000	
Guaje	M090	Guaje Canyon at SR-502	GS00091EGS4	3118100	8-Sep-00	UF	M	SAMPLE	AM-241	8.51	pCi/L	7.49	22.5	GAMMA SPEC	U		10.288	30	5.8
Guaje	M090	Guaje Canyon at SR-502	GF00091EGS4	3118101	8-Sep-00	F	M	SAMPLE	AM-241	-5.14	pCi/L	4.75	11.7	GAMMA SPEC	U		3.509	30	5.8
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	BE-7	255	pCi/L	25.9	34.9	GAMMA SPEC				1000000	
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	3118101	9/8/00	F	M	SAMPLE	BI-211	13	pCi/L	8.79	12.4	GAMMA SPEC		F ONLY			
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	BI-212	123	pCi/L	18.2	30.2	GAMMA SPEC				100000	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	BI-214	114	pCi/L	8.67	7.72	GAMMA SPEC				600000	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	CS-137	212	pCi/L	12	4.14	GAMMA SPEC			42.28	3000	470
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	3118101	9/8/00	F	M	SAMPLE	CS-137	1.23	pCi/L	0.7	2.6	GAMMA SPEC	U		2.45	3000	470
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	GROSS ALPHA	367	pCi/L	2230	81.2	GFPC		HI TPU	640.8	30	
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	3118101	9/8/00	F	M	SAMPLE	GROSS ALPHA	3.32	pCi/L	0.6	0.588	GFPC			200	30	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	GROSS BETA	685	pCi/L	4160	153	GFPC		HI TPU	1637	1000	
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	3118101	9/8/00	F	M	SAMPLE	GROSS BETA	14.9	pCi/L	1.18	1.54	GFPC			354.3	1000	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	H-3	-120	pCi/L	55.6	198	LS			281	2000000	1E+08
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	K-40	2080	pCi/L	122	40.9	GAMMA SPEC				7000	
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	3118101	9/8/00	F	M	SAMPLE	K-40	30.3	pCi/L	14.9	23.5	GAMMA SPEC				7000	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	PB-210	840	pCi/L	332	636	GAMMA SPEC				30	250
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	PB-212	155	pCi/L	9.07	6.67	GAMMA SPEC				3000	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	PB-214	140	pCi/L	10.2	8.38	GAMMA SPEC				200000	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	RA-228	151	pCi/L	15.6	13.7	GAMMA SPEC				100	1100
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	TH-230	114	pCi/L	8.67	7.72	GAMMA SPEC				300	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	3118100	9/8/00	UF	M	SAMPLE	TL-208	46.6	pCi/L	3.96	3.98	GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00092EGS4	3118100	9/8/00	UF	M	SAMPLE	TSS	76000	mg/L		69.9	EPA 160.2					

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	Residential Screening Level	BV Sediment	Ratio Result to BV	Ash & Muck Max
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	AC-228	1.987	pCi/g	0.205		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	BE-7	3.355	pCi/g	0.341		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	BI-212	1.618	pCi/g	0.239		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	BI-214	1.500	pCi/g	0.114		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	CS-137	2.773	pCi/g	0.17		GAMMA SPEC		5.100	0.9	3.081	5.16
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	31181011	9/8/00	UF	M	Calculated	GROSS ALPHA	4.785	pCi/g	29.3		GFPC			14.8	0.323	
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	GROSS BETA	8.817	pCi/g	54.8		GFPC			12	0.735	
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	31181011	9/8/00	UF	M	Calculated	K-40	26.970	pCi/g	1.8		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	PB-210	11.053	pCi/g	4.368		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	31181011	9/8/00	UF	M	Calculated	PB-212	2.039	pCi/g	0.119		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181008	9/8/00	UF	M	Calculated	PB-214	1.842	pCi/g	0.134		GAMMA SPEC					
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	RA-228	1.987	pCi/g	0.205		GAMMA SPEC			2.33	0.853	
Guaje	M090	Guaje Canyon at SR 502	GF00091EGS4	31181011	9/8/00	UF	M	Calculated	TH-230	1.500	pCi/g	0.114		GAMMA SPEC		0.18	2.29	0.655	1.19
Guaje	M090	Guaje Canyon at SR 502	GS00091EGS4	31181002	9/8/00	UF	M	Calculated	TL-208	0.613	pCi/g	0.052		GAMMA SPEC					

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 Streamflow Collected at Guaje Canyon at SR-502 on 9/08/00 with Backgrund Sediment Values