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Los Alamos Air Monitoring Data Related to the Fukushima Daiichi Reactor

Introduction

In response to the disasters in Japan on March 11, 2011, Los Alamos National Laboratory (LANL) is collecting air data and analyzing the data for fission products. At present, we report preliminary data from three high-volume air samplers and one stack sampler.

Iodine-131 (I-131) is not optimally measured by our standard polypropylene filters. In addition to the filter data, we have one measurement obtained from a charcoal cartridge. These data, together with measurements of other radionuclides are adequate for a preliminary assessment and assure us that radionuclides from Fukushima Daiichi do not present a threat to human health at or near Los Alamos.

High Volume Samplers

The locations of the three high-volume air samplers are listed below.

Station #	Location
#167	White Rock Old Fire Station, Los Alamos County, NM 87544
#173	LANL Technical Area 49 Gate, NM 87545
#211	Los Alamos Medical Center, NM 87544

These high-volume air samplers were operated according to standard procedures by the LANL Environmental Data Analysis group, WES-EDA. The samplers use standard polypropylene filters with a nominal flow rate of 40 cubic feet per minute (1.1 m³/minute). The actual flow rates and times were measured: each run was typically 3 to 4 days and the volume for each run was approximately 5000 to 6000 m³.

Filters were counted and analyzed according to standard procedures by the Health Physics Analysis Laboratory of LANL group RP-2. The following table follows the format of the EPA RadNet data listed at the following URL:

<http://www.epa.gov/japan2011/docs/rert/radnet-filter-data-public-release-3-28-11.pdf>

Station #	Date Collected	Radionuclide (pCi/m ³)					
		Cs-134	Cs-136	Cs-137	I-131	I-132	Te-132
#167	3/17/2011	ND	ND	ND	ND	ND	ND
#173	3/17/2011	ND	ND	ND	ND	ND	ND
#211	3/17/2011	ND	ND	ND	ND	ND	ND
#167	3/21/2011	0.002	ND	0.003	0.10	0.003	0.003
#173	3/21/2011	0.002	0.0004	0.003	0.07	0.003	0.002
#211	3/21/2011	0.002	ND	0.003	0.08	0.002	0.002
#167	3/24/2011	ND	ND	ND	0.01	ND	ND
#173	3/24/2011	ND	ND	ND	0.05	ND	ND
#211	3/24/2011	ND	ND	ND	0.05	ND	ND
#167	3/28/2011	0.08	0.010	0.09	0.27	0.024	0.023
#173	3/28/2011	0.07	0.010	0.08	0.21	0.021	0.019
#211	3/28/2011	0.07	0.008	0.08	0.22	0.021	0.021

Data Quality

The data are internally consistent. For most radionuclides, several gamma-ray peaks were observed and their relative areas were consistent with the emission probabilities. Also, the relative concentrations of the radionuclides and elements are consistent with expectations. For example, I-132 is in secular equilibrium with Te-132 as expected.

The data are also consistent with other measurements, such as those of the EPA RadNet system.

The data from the three stations are consistent, indicating a uniform concentration in Los Alamos county, as expected.

Charcoal Cartridge

We also have preliminary data from two charcoal cartridges deployed according to standard procedures by the Rad-NESHAP team (ENV-ES) at the Los Alamos Neutron Science Center, LANSCE, Technical Area 53. The charcoal cartridges are preceded by HEPA filters and glass-fiber particulate filters so they measure only radio-iodine in the vapor phase. These samples ran from March 15 through March 22 at 2 cubic feet per minute so the volumes were 571 m³. It is likely that the radioactive material from Fukushima Daiichi did not arrive until near the end of the sampling period so the average concentration reported here is likely less than will be measured for the week of March 22 through March 29.

Station #	Date Collected	Radionuclide (pCi/m ³)					
		Cs-134	Cs-136	Cs-137	I-131	I-132	Te-132
LANSCE stack	3/22/2011				0.13		

Human Health

For a preliminary estimate we use the EPA standards listed in Appendix E Table 2 of 40 CFR 61. For simplicity, we assume the maximum concentrations persist 0.04 years (2 weeks). For I-131, we use the sum of the filter data and the cartridge data.

Radionuclide	Measurement (pCi/m3)	EPA Standard (pCi/m3)	Dose (mrem)
Cs-134	0.08	0.027	1.2
Cs-136	0.01	0.53	0.01
Cs-137	0.09	0.019	1.9
I-131	0.4	0.21	0.8
Te-132	0.02	0.71	0.01

These doses are much smaller than the annual doses received from natural background radiation and are not expected to result in measurable health effects.