



Department of Energy

Idaho Operations Office
785 DOE Place
Idaho Falls, Idaho 83402

March 6, 1986

CRMO

MAR 8 - '86

Mr. Robert E. Scott, Superintendent
Craters of the Moon National Monument
National Park Service
P.O. Box 29
Arco, Idaho 83213

✓	SUPERINTENDENT	
	ADMIN CLERK	
	PARK RANGER	
	PARK INTERPRETER	
	MAINTENANCE	
	FILES	

Dear Mr. Scott:

It was a pleasure to meet with you, Mr. King, and Ms. Laspna last week. We appreciate the update of current environmental monitoring and issues of concern at Craters of the Moon, as well as the opportunity to share some of our relevant studies and information with you. As I mentioned, Dr. Lorentz Pearson (of Ricks College) and I have been doing studies involving lichens of the INEL, which included species identification and distribution, trace element accumulation, and membrane leakage (a test for exposure to acidic gases). We collected one species, Lecanora melaphthalma, just outside of the Craters of the Moon for comparison with the INEL site. Some preliminary data and analysis are attached for your information.

Because F was one of the elements of potential concern at Craters, I am also enclosing some data on F in soil, sagebrush, and perennial grass at the INEL and two control locations in Idaho. Although the concentration in INEL soil is higher than the two control locations, the spatial distribution of the concentrations as well as the concentrations in the vegetation do not suggest that INEL operations have increased the environmental fluoride concentrations. In addition, the fluoride concentrations in vegetation are far below the Idaho Air Quality Standard for feed and forage (annual arithmetic mean: 40 ppm dry weight; bimonthly mean: 60 ppm; monthly mean: 80ppm).

In addition to exchanging data such as these, I would be happy to work jointly with you to compare the precipitation chemistry data (beginning with pH and conductivity) collected on the INEL with those from your identical NADP sampler.

↓ Haven't done theirs yet - samples still frozen from collection dates

Mr. Robert E. Scott, Superintendent -2-

Feel free to call me (526-1867) if you have any questions or would like to meet again.

Sincerely,

Susan K. Rope

Susan K. Rope, Radioecologist
Environmental Sciences Branch
Radiological and Environmental
Sciences Laboratory

Enclosure

cc: R. J. Beers, w/enc.
C. E. Clark, w/enc.
G. B. Wiersma, w/enc.

Table 1. Elemental content of the lichen Lecanora melanophthalma from the Idaho National Engineering Laboratory (INEL) and Craters of the Moon, Idaho

Geometric Mean (ppm dry weight) x/ 1 Geometric Deviation

<u>Element</u> [†]	<u>INEL</u> [‡]	<u>Craters of the Moon</u> [§]
Al	4372 x/ 1.36	2623 x/ 1.57
Ba	40.9 x/ 1.43	31.5 x/ 1.32
*B	1.86 x/ 1.05	<0.5 - 1.54(2) ¶
*Ca	29971 x/ 1.38	13200 x/ 1.36
Cr	17.3 x/ 1.72	12.1 x/ 2.22
Cu	8.10 x/ 1.27	8.93 x/ 1.23
F	71 x/ 1.63	43-75 (2) ¶
*Fe	4510 x/ 1.45	3078 x/ 1.58
K	2220 x/ 1.07	2062 x/ 1.12
*Mg	1443 x/ 1.46	803 x/ 1.24
Mn	76.5 x/ 1.47	57.0 x/ 1.34
Mo	2.0 x/ 1.50	<2.0 - 2.9(1) ¶
Na	103 x/ 1.49	89.6 x/ 1.43
Ni	23.5 x/ 1.78	16.4 x/ 1.96
P	897 x/ 1.09	939 x/ 1.17
Pb	13.5 x/ 1.30	30.9 x/ 1.80
*S	638 x/ 1.67	1410 x/ 1.33
Sr	36.3 x/ 1.36	28.2 x/ 1.10
Ti	299 x/ 1.39	264 x/ 1.54
V	12.0 x/ 1.41	7.85 x/ 1.53
Zn	41.2 x/ 1.13	41.6 x/ 1.10

*Significant difference between locations at the <0.05 probability level.

† Elements less than detectable: Hg, <0.04; Se, <0.5; Sb <8.0; As, <15.0; Be, <0.15; Bi, <25; Cd, <1.5; Co, <1.0; Ag, <1.5; Sn, <1.5. For lichens collected in 1985 from INEL Site 215° 5 km, more sensitive techniques were used for four elements. The geometric mean concentrations (ppm x/ GD) of six replicates were: As, 3.4 x/ 1.21; Cd, 1.0 x/ 1.17; Hg, 0.16 x/ 1.26; Se, 0.34 x/ 1.08.

‡ n = 35, except for S (n=33) and F(n=10).

§ n = 4, except for F (n=2).

¶ Range (number of samples above detection limit).

Table 2. Total F in Various Media at the INEL and Control Locations

<u>Media (Date)</u>	<u>Geometric Mean Concentration, ppm dry weight (number of samples)</u>		<u>Differences Among Locations</u>
	<u>INEL</u>	<u>Controls^a</u>	
Soil (1981) (nitric/perchloric acid extract)	1) 496(8) ^b	343(10)T	I > T > L
	2) 524(8)	195(10)L	
	3) 369(8)		
	4) 512(8)		
Saxicolous lichens (1984)	23-120(10) ^c	43-75(2) ^c COM	--
Sagebrush leaves (1981)	11.3(32)	20.0(10)T	T = I > L
		<1 (10)L	
Perennial grass (1981)	5.1(24)	12.0(10)T	T = I = L
		4.3(10)L	

^aT = Twin Falls County, L = Lemhi County, COM = Craters of the Moon.

^bGrouped by distance and direction from the Idaho Chemical Processing Plant: 1) Downwind-close 2) Upwind-close 3) Downwind-Far 4) Upwind-Far. The farthest sampling point was 10 km from the ICPP.

^cRange (number of samples).