

Further Study

Three portable HPICs will be used during the next LAMPF operating cycle. The instruments will be placed in the directional sectors of north, north-northwest, and northeast from the LAMPF stack toward East Gate. A TLD will also be placed by each HPIC. It is hoped that the dimensions of the plume can be better defined over short time periods. Also, the short-term model's accuracy and precision can be tested further. Finally, comparisons of HPIC data with TLD data of model predictions will be made.

DELTA COUNT-RATE MONITORING SYSTEM

Authors: D. Van Etten and W. A. Olsen

Group: Environmental Surveillance, HSE-8

Funding Organization: Los Alamos National Laboratory

Detection of radioactive contaminants in the environment often requires surveying large areas. A need for a more effective way to rapidly search for gamma-ray contamination over large areas led to the design and construction of a very sensitive gamma detection system. This system alerts the user to small changes in the count rate, or delta, which can locate areas of potential radioactive contamination.

Environmental surveys are frequently done in areas with rugged off-road conditions in adverse weather. For this reason, the delta count-rate monitoring system was installed in a four-wheel-drive van instrumented for environmental surveillance and accident response.

The system consists of four main sections: (1) two scintillation detectors, (2) high-voltage power supply amplifier and single-channel analyzer, (3) delta count-rate monitor, and (4) count-rate meter and recorder. The van's 6.5-kW generator powers the standard nuclear instrument modular design system. The two detectors are mounted in the rear corners of the van and can be run singly or jointly. A solid-state bar-graph count-rate meter mounted on the dashboard can be read easily by both the driver and passenger. Mounted just to the right of the driver is a solid-state strip chart recorder, which shows trends and provides a permanent record of the data. An audible alarm is sounded at the delta monitor and at the dashboard count-rate meter if a detected radiation level exceeds the set background level by a predetermined amount.

Reference

1. D. Van Etten and W. Olsen, "Delta-Count Rate-Monitoring System," Los Alamos National Laboratory report LA-9855-M (September 1983).
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SAMPLING AND INSTRUMENTATION REQUIREMENTS FOR LONG-RANGE D&D ACTIVITIES AT INEL

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Group: Environmental Surveillance, HSE-8

Funding Organization: EG&G

Assistance was requested to help determine sampling and instrumentation requirements for the long-range decontamination and decommissioning activities at the Idaho National Engineering Laboratory. Through a combination of literature review, visits to other DOE contractors, and a

determination of the needs for the INEL program, a draft report has been prepared that is now under review. The final report should be completed in FY 84.

PLUTONIUM CONCENTRATIONS REFLECTING WORLDWIDE FALLOUT

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Group: Environmental Surveillance, HSE-8
Funding Organization: Los Alamos National Laboratory

Special analyses for plutonium were performed on 1-kg soil samples from six regional stations (Fig. 24). This is 100 times the usual mass used for analyses. These larger samples increase the sensitivity of the plutonium analyses, which is necessary to evaluate background plutonium concentrations in fallout from atmospheric nuclear weapons tests. The samples at each station were collected by taking 5 plugs, 75-mm diam and 50 mm deep, at the center and corners of a square area 10 m on a side. The five plugs were combined into one sample for radiochemical analyses. (One set of samples from Santa Cruz Lake consisted of 1-kg plugs at the four corners and center and were taken to determine variability in radionuclide concentrations within a sampling

TABLE XXV. Radiochemical Analyses of Special Regional Soils

Analysis	Units	No. of Samples	1981 ($\bar{x} \pm 2s$)	1983 ($\bar{x} \pm 2s$)
^{137}Cs	(pCi/g)	6	0.68 ± 0.80	0.55 ± 0.68
^{238}Pu	(pCi/g)	6	0.00040 ± 0.00049	0.00054 ± 0.00090
$^{239,240}\text{Pu}$	(pCi/g)	6	0.0091 ± 0.0098	0.00819 ± 0.01105
^{90}Sr	(pCi/g)	6	0.49 ± 0.50	0.32 ± 0.22
Total uranium	($\mu\text{g/g}$)	6	—	2.4 ± 1.2
Gross gamma	(counts/min/g)	6	—	3.0 ± 2.8
$^{239,240}\text{Pu}/^{238}\text{Pu}$	—	6	23	15

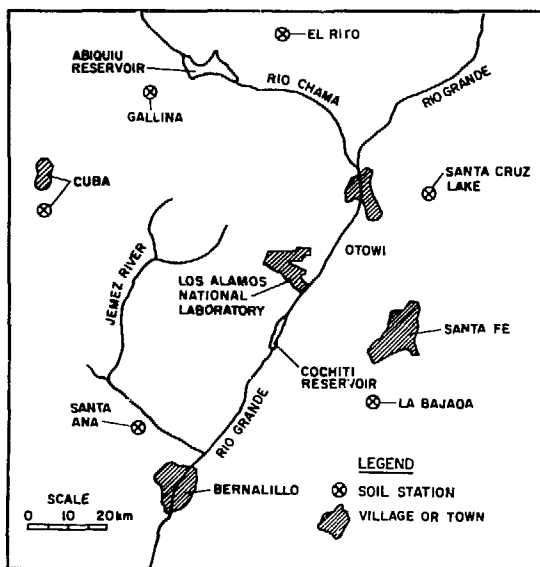


FIGURE 24. Special regional soil sampling locations.