727049

REPOSITORY INEL
COLLECTION RESL, File of Doug Carlson, Director
Box 6
BOX No. RESL C7A690 Rm 191
SUBJ: activities of the Environmental
FOLDER Branch March 21 - April 20, 1970
FILE: Environmental Science Branch
Monthly Reports for yrs. 1966-1970

June 1, 1970

BEST COPY AVAILABLE

George L. Voelz, M.D., Director
Health Services Laboratory

ACTIVITIES OF ENVIRONMENTAL BRANCH, MARCH 21 - APRIL 20, 1970

Environmental Monitoring

Independent Measurements Program

Report No. 7 for Nuclear Fuel Services - New York (July-September, 1969) was sent to CO:HQ.

Comments on Report No. 3 for Nuclear Fuel Services - Erwin, Tennessee (July-October, 1969) were incorporated and the finalized report sent to CO:HQ.

Report No. 2 for Humboldt Bay (August-November, 1969) and Report No. 8 for Nuclear Fuel Services - New York (October-December, 1969) are being written.

As a result of a meeting with the Dosimetry Branch and Dr. Voelz, the badge design for the TLD's used in the IMP will be changed so that both beta and gamma exposures can be determined.and differentiated.

NRTS

Comments on the NRTS Environmental Monitoring Report No. 25 (July-December and Annual Summary, 1969) were incorporated and the report is now ready for reproduction.

The average on- and off-site air concentrations of filterable gross alpha and beta radioactivity and iodine-131 for March were as follows:

	Alpha	Beta	Iodine-131
On-site	0.0015 pCi/m^3	1.064 pCi/m^3	0.0058 pCi/m^3
Off-site	0.0095 pCi/m^3	0.347 pCi/m^3	0.0043 pCi/m^3

All the above concentrations were less than 11% of the CG values for uncontrolled areas with the exception of the off-site alpha which is 47% of the CG values for uncontrolled areas. The higher off-site alpha

1187773

concentrations are due mainly to activity detected in the Pocatello area. The higher on-site beta concentrations are probably due to CPP dissolving processes.

The monthly average gross alpha concentrations for off-site locations are shown in pCi/m^3 as follows:

IF Hqts	0.0023	Butte City	0.0013
IF Airport	0.0019	Pocatello Fire Station	0.0036
Blackfoot	0.0023	Pocatello Sewage Plant	0.0389
Arco	0.0015	American Falls	0.0241

The average concentrations of particulate material in on-site surface air for March was 19.2 ug/m^3 compared to 76.4 ug/m^3 for off-site locations.

The average on-site ground water concentrations for gross alpha, beta and tritium activity for March were less than 6% of their respective CG values for drinking water. The beta and strontium-90 activity in CPP well No. 2 showed a small increase above the detection limit during March.

Fourteen milk samples were collected and analyzed for iodine-131 and cesium-137 during March. All samples showed concentrations less than 20% and 0.3% of their respective CG values.

The results of the in-plant air and ore samples collected from the FMC plant agreed with the Pocatello environmental air samples which indicate Po-210 is the major component of airborne alpha activity. The highest Po-210 air concentration, 2.9 x 10^{-12} uCi/cc, occurred in a sample collected from the area of FMC's #1 furnace during a "tapping" operation. A phosphate shale sample, which is the basic ore used in FMC's phosphorus production, had a Po-210 concentration of 1.2 x 10^{-5} uCi/g. The samples from the J. R. Simplot Company showed approximately the same concentrations of U-234, U-238, and Th-230 as those of Po-210.

Other

Sections of the Instrumentation for Radiation Emergencies Questionnaire pertinent to AEC responsibilities at the NRTS were completed. Other sections were distributed to INC and ANL personnel for completion. The questionnaire will aid BNW (at the request of DOS and DRL and with the interest and support of the ACRS and USPHS) to prepare practical criteria to define the types and performance characteristics of instrumentation which should be available to meet radiation emergencies at nuclear facilities.

Environmental monitoring personnel participated in the EXCES field experiments conducted during this reporting period.

1187774

Environmental Studies Section

Controlled Environmental Release Test (CERT) Program:

(a) Additional supports and access ports to facilitate hot-wire anemometer measurements in the environmental chamber were established and more date were obtained.

(b) A paper titled "An Environmental Chamber for Mass Transfer Studies" by C. A. Pelletier, P. G. Voilleque', and E. H. Markee, Jr. was presented by C. A. Pelletier at the Institute of Environmental Sciences 16th Annual Meeting.

(c) Mr. Ed McCrane was low bidder for the contract for operation of the Experimental Dairy Farm (EDF) for the period May—November, 1970.

(d) A meeting with Dr. B. R. Moss of Montana State University (MSU) was held to study and discuss the results of CERT-25 and CERT-26 and to formulate plans for metabolism studies at the EDF this summer.

Experimental Cloud Exposure Study (EXCES):

(a) Four field experiments involving releases of ^{24}Na at Test Grid 3 were conducted during the reporting period. Particle size was measured using Anderson samplers on six arcs. Ion chamber and G-M tube data were obtained for all tests. High-volume air samples were taken across the 400-m arc and on the towers located at the 400-m arc. Analysis of data from the first test indicates that the aerosol generated had an activity median aerodynamic diameter of about 3 microns (this is larger than originally anticipated but consistent with the required increase in the mass of sodium carbonate irradiated to produce the source). The high-volume samplers were calibrated and analysis of those data has begun. A computer program to treat the data from the 50 G-M tubes is being developed.

Routine Activities

(a) The regular weekly and monthly smear and radiation surveys of AEC facilities at the NRTS were completed. CF-638, now occupied by the Dosimetry Branch, will be smeared on a monthly basis.

(b) Disposal of HSL radioactive waste and laundering of anti-contamination clothing were arranged as required. An unusual amount of work of this type resulted from the EXCES test series.

Non-Routine Activities

(a) A plexiglass chamber to contain the pots for growing plants in soil contaminated with plutonium was completed.

OFFICE ▶

(b) Special smear surveys of surplus equipment and of CF-634 (vacated by the Dosimetry Branch) were completed.

(c) Eleven radioactive shipments received by and seven shipments from HSL were surveyed and smeared. Fourteen of these resulted from the EXCES tests.

(d) Special monitoring of Analytical Chemistry personnel and equipment in Room 121 was performed as required by their analysis of an Am-241 source and contaminated articles.

(e) The use of Trailer City during the EXCES test series has proved to be very beneficial--both from an operational point of view and for acquainting Branch personnel with its capabilities.

(f) Spot checks of the emergency kits showed the instruments to be in satisfactory operating condition. Two kits used in a RAT response were checked in.

Waste Management

The data indicated no significant difference between the tritium concentration of the structual H_2O and that of the solution in which the precipitation occurred.

More solutions of V-B and V-C are being aged before further analyses will be made.

Solutions have been prepared and are being allowed to evaporate slowly in order to cause a slower rate of precipitation of the aluminum hydroxide. The resulting precipitates and filtrates will be analyzed for possible tritium fractionation. The effect of alumino-silicate solutions on tritium fractionation will also be studied.

Considerable time has been spent writing a report on the effect of solubility on the concentration of aqueous plutonium in a soil environment. It is hoped that this theoretical study can be related to the experimental study being conducted by the Rocky Flats Division of Dow for the Environmental Branch of HSL.

A preliminary report on the geo-chemical research is being conducted at the University of Alaska under the terms of Contract AT(10-1)1286 was received on April 10. The work has been conducted as a graduate thesis project under the direction of Dr. D. B. Hawkins. It involves the modification of the zeolite mineral "Clinoptilolite" to enhance the sorptive characteristics of strontium. The unmodified or naturally occurring form, used at the NRTS in liquid waste treatment is more selective, or has a much greater capacity for

OFFICE ▶

1187776

cesium. It must be discarded however, as soon as the small strontium capacity has been reached. According to the preliminary report, such capacity as exists may be due to a limonite impurity. The modification involves the inclusion of barium in the crystal structure at a temperature of 85°C under one atmosphere pressure. This form remains stable to a temperature of about 400°C. After recharging with acid and sodium solutions the capacity for strontium is greater than the original mineral. The complete report is to be published in the American Mineralogist. Copies of the complete unpublished report will be in our hands by the 25th of May for review.

Reports Reviewed

1. "Radiological Effects at the LOFT Tests", JHMc-3-70. Feb. 20, 1970.

2. SDD 1.5.3 - "LOFT Integral Test System Preliminary System Design Description for the Wall Plateout Panel Sampler System (with and without coupons".)

3. "Safety Review Report for the In-Bed Combustion System for the Waste Calcining Facility" CI-1175, March, 1970.

4. FDD 1.2 - "LOFT Integral Test System Preliminary Facility Design Description for the Containment Facility", March, 1970.

5. FDD 1.3 - "LOFT Integral Test System Preliminary Facility Design Description for the Support Facilities", March, 1970.

General

Radioactive liquid and airborne waste data were sent to AEC Headquarters as requested. Meetings were held with INC people to discuss final development of the burial ground and improve the operating procedures for the burial ground. As a result of discussions, INC is to rewrite their latest Standard Practice Manual on the burial ground.

The waste Disposal Data report is being circulated for review in preparation for final printing. The new criteria for radioactive airborne releases are being prepared for review and final inclusion in the revision of IDM Chapter 0510.

The disposal of liquid waste at the NRTS was discussed with a Japanese visitor (Kazukuni Shimoura) from the Kyoto University.

U. S. Geological Survey

See attached report.

ESSA-ARLFRO - Environmental Sciences Services Administration

See attached report.

Charles A. Pelletier, Chief
Environmental Branch
Health Services Laboratory

HSLE

Enclosures:
1. USGS Report
2. ESSA Report

cc: John R. Horan
George L. Voelz, M.D.

OFFICE ▶	HSLE					
SURNAME ▶	CAPelletier:dc					
DATE ▶	6/1/70					