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 SUBJ: Activities of the Environmental Branch
 FOLDER April 21 - May 20, 1970
 FILE: Environmental Science Branch
Monthly Reports for yrs. 1966-1970

June 3, 1970

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

Environmental MonitoringIndependent Measurements Program

Personnel participated in the Environmental Radioactivity course given for the Division of Compliance. Responsibilities were those of lecturer on sampling techniques, class observer and coordinator, and evaluator.

An accidental release of Hg-203 from the Mallinckrodt/Nuclear (M/N) facility near St. Louis was detected on the IMP air samplers. The charcoal filter on the roof-top sampler located on the building adjacent to M/N contained 0.27 uCi of Hg-203 at time of counting. Average collection efficiency of the charcoal filter for Hg vapor is 28%.

A process solution of thorium nitrate from Nuclear Fuel Services Fabrication Plant in Erwin, Tennessee was found to contain Sr-90 and further confirmed the suspicion that suppliers are sending contaminated solution to NFS.

All supplies necessary for the IMP at the Indian Point Reactor were shipped. A set of recommended sampling procedures was written.

NRTS

The NRTS Environmental Monitoring Report No. 25 (July-December and Annual Summary, 1969) was distributed.

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

	<u>Alpha</u>	<u>Beta</u>	<u>Iodine-131</u>
On-Site	0.0016 pCi/m ³	0.856 pCi/m ³	0.0037 pCi/m ³
Off-Site	0.0073 pCi/m ³	0.442 pCi/m ³	0.0035 pCi/m ³

All the above concentrations were less than 9% of the CG values for

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uncontrolled areas with the exception of the off-site alpha which is 37% of the CG values for unknown alpha emitters in uncontrolled areas.

The monthly average gross alpha concentrations for off-site locations are shown in pCi/m³ as follows:

IF Hqts	0.0036	Butte City	0.0022
IF Airport	0.0025	Pocatello Fire Station	0.0028
Blackfoot	0.0039	Pocatello Sewage Plant	0.0397
Arco	0.0019	American Falls	0.0019

The average concentrations of particulate material in on-site surface air for April was 23.3 ug/m³, compared to 101 ug/m³ for off-site locations.

The average on-site ground water concentrations for gross alpha, beta and tritium activity for April were less than 7% of their respective CG values for drinking water. The tritium and strontium-90 activity in CPP Well #2 continued to increase during April with a high concentration of 6.2 pCi/l of ⁹⁰Sr and 2.78 x 10⁵ pCi/l of tritium. Due to this increase weekly samples are being collected for analysis.

Eleven milk samples were collected and analyzed for iodine-131, cesium-137 and strontium-90 during April. All samples showed concentrations less than 20%, 0.3% and 2% of their respective CG values.

Other

Jack Selby and Ed Watson of BNW were escorted to various facilities for tours and discussions relative to the Instrumentation for Radiation Emergencies Questionnaire.

A course on operating the Mark IV File Management System given by Informatics, Inc. (the Mark IV manufacturer) was attended. This system will be used to store, update, and report environmental monitoring data from both the NRTS and IMP surveys.

A meeting with Steve Farkas and Bill Tupper was held in order for them to evaluate the Environmental Branch's emergency response capabilities and duties.

Dr. Spickard conducted a tour of the medical decontamination facilities and discussions concerning his emergency response functions were held. Basic radiation hazard signs were supplied to the Medical Branch.

Environmental Studies Section

Controlled Environmental Release Test (CERT) Program:

- (a) Mr. Ed McGrane began work on the Experimental Dairy Farm on 11 May. Routine pasture upkeep was performed and preparations for planting Sudangrass were made.
- (b) Installation of the equipment required for modification of the environmental chamber was begun. Bids were received on a carbon dioxide analyzer for the environmental chamber.

Experimental Cloud Exposure Study (EXCES)

- (a) A fifth field release test using a ^{24}Na aerosol was conducted at Test Grid 3 prior to shutdown of the MTR.
- (b) Data from the G-M counters for all five Na-24 tests were extracted from photographs and punched on cards. The computer program for reducing these data was debugged and half the data processing was completed.
- (c) Preparation of an area north of CF-690 for build-up factor experiments was begun. The area will be cleared and surveyed, auger anchors will be installed, and a power supply will be established.

Routine Activities

- (a) The regular weekly and monthly smear and radiation surveys of AEC facilities at the NRTS were completed.
- (b) Disposal of HSL radioactive waste and laundering of anti-contamination clothing were arranged as required.
- (c) A draft report on the results of tests of AC-1 filters for use in sampling Hg-203 in the air was prepared and is being reviewed.
- (d) Analysis of CDT-4 special sampler results was begun.
- (e) Calibration and checking of emergency kit equipment was performed. Thermoluminescent dosimeters in the kits were replaced and the exposed TLD's were processed. Readings as high as 75 mrad were observed; the test sources associated with kit instruments seem to be the most likely source of kit badge exposures.
- (f) A total of ten radioactive shipments to and from HSL or Test Grid 3 were surveyed and smeared by Section personnel.

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- (g) Paul Voilleque' attended a Civil Service Commission training course titled "Basic Management Techniques II", 18-22 May.

Waste Management

Research

In the tritium fractionation study aluminum hydroxide solutions were allowed to slowly evaporate in the hood in an attempt to slow down the rate of precipitation of aluminum hydroxide. However, the results indicate no difference in concentration between water bound by the precipitated minerals and that in free solution. X-ray analysis indicated that the precipitates are a combination of Bayerite and Nordstrandite (polymorphs of $Al(OH)_3$). These polymorphs were changed to aluminum oxides (Al_2O_3) on heating to 600 C (bound water driven off at this temperature) in the case of the non-tritiated precipitates. The phase change, hydroxides to oxides, is normal under these conditions. The tritiated precipitates changed from the hydroxides to amorphous or non-crystalline material on heating to 600 C. This particular phase change was not expected and the reason for the change is not known.

Documents Reviewed

SDD - 1.2.3. LOFT Integral Test System Preliminary System design and description for the test chamber and basement heating, ventilating, and halogen particulate removal system (HV System 9), March, 1970.

SDD - 1.3.14. LOFT Integral Test System Preliminary System design description for the heating, ventilating and air conditioning for continuous sampler monitor area and exhaust to stack system (HV System 8), March, 1970.

SDD - 1.2.8. LOFT Integral Test System Preliminary System design description for the containment isolation system, April, 1970.

General

A lecture was prepared and presented to the members of the AEC Regulatory Staff on Environmental Aspects of Radioactive Waste. The topic was "radionuclide Retention in Soil".

A trip was made to Rocky Flats and a tour made of Dow's waste processing operations. The experimental and theoretical studies on the solubility of plutonium waste were discussed with personnel in Dow's Chemical R&D Division. A more detailed account of the visit is given in the Trip Report.

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A report on "A Study of Possible Improvements in Liquid Waste Management at NRTS - TRA" was received on April 27 in consequence of No. 50-4005, July 30, 1969 by HSL.

A report on "Preparation and Properties of Barium Clinoptilolite" a MS Thesis - U of A Supported by equipment loan was received.

Final manuscripts were finished on subject reports (IDC-12072 - Radio-nuclide Distribution in the Regolith.....at NRTS) and two unnumbered reports.

U. S. Geological Survey

See attached report

ESSA-ARLFRO - Environmental Sciences Services Administration

See attached report

Charles A. Pelletier, Chief
Environmental Branch
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HSLE

Enclosures:

- 1. USGS Report
- 2. ESSA Report

cc: John R. Horan
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