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SUBJ: Environmental Branch Activities October 27, 1970
FOLDER 21 Sept - 20 Oct 1970

FILE: Environmental Sciences Branch
Monthly Reports for the years 1966-1970
Donald I. Walker, Director
Health Services Laboratory

ENVIRONMENTAL BRANCH ACTIVITIES, 21 SEPTEMBER--20 OCTOBER 1970

Independent Measurements Program

The Humboldt Bay Report for August-December 1969 was written and sent to CO:HQ.

The Nuclear Fuel Services (NY) report for October-December 1969 is being prepared in draft form.

Richard Bangart has been on temporary duty at CO:HQ in an effort to establish better communications between HSL and CO:HQ and to better understand the objectives which CO:HQ has for the Independent Measurements Program. From CO:HQ, Bangart has travelled to the PHS Radiological Engineering Laboratory in Cincinnati which analyzes duplicates of some of the in-plant samples collected by CO and sent to the HSL. He has also travelled to the Nuclear Materials and Equipment Corporation (NUMEC) plutonium fuel fabrication plant around which soil samples were previously collected and sent to the HSL for Pu analysis.

All the M/N IMP data available to date has been tabulated and sent to CO:III for their use in a scheduled inspection of the M/N facility.

The computer program for the IMP Data Storage and Retrieval System is still in the debugging stage and not yet operational on a routine basis. Kae Sidle has been hired on a temporary appointment to help debug this program and perform other systems type jobs for the Branch.

NRTS Environmental Monitoring Program

A draft of NRTS Environmental Monitoring Report No. 26, January-June 1970 has been written and submitted for initial comments.

NRTS Environmental Monitoring

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

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	<u>Alpha</u>	<u>Beta</u>	<u>Iodine-131</u>
On-Site	0.0019 pCi/m ³	0.296 pCi/m ³	<0.05 pCi/m ³
Off-Site	0.0059 pCi/m ³	0.276 pCi/m ³	<0.05 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 30% 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	0.0028	Butte City	0.0019
IF Airport	0.0031	Pocatello Fire Station	0.0073
Blackfoot	0.0023	Pocatello Sewage Plant	0.0221
Arco	0.0021		

The average concentration of particulate material in on-site surface air for September was 28.4 ug/m³ compared to 83.8 ug/m³ for off-site locations.

The average on-site ground water concentration for gross alpha, beta, and tritium activity for September were less than 6% of their respective CG values for drinking water. The tritium activity in ICPP well #2 continued to decrease during September but the strontium-90 activity is remaining relatively constant.

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

Controlled Environmental Release Test (CERT) Program:

- (a) The cows used for the CERT-28 and -29 metabolism experiments were returned to Montana State University on 29 September. The thyroid counting results for the two experiments have been received from the Analytical Chemistry Branch.
- (b) The Experimental Dairy Farm pastures were fertilized. The special small alfalfa plot is being fenced.
- (c) One field release of ⁴²K aerosol was made; another was planned but not executed because of unfavorable meteorological conditions. Changes in the particle size sampling procedures have been made and additional tests are planned for the next reporting period.
- (d) The paper "Some Processes Affecting the Deposition of Radioiodine Gas on Grass" by Earl Markee (formerly ESSA) and Don Adams is being revised based on comments by the reviewers for Atmospheric Environ-

ment.

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Experimental Cloud Exposure Study (EXCES)

- (a) Two experiments to measure the build-up factor for Tm-170 photons in air were completed. Data from the first test were found to be of questionable value; the dosimeters from the second have not yet been evaluated.
- (b) The 28 remote gamma ray exposure chambers and readout units were received from EG&G. Evaluations by the Instrumentation Branch indicate that they still do not meet the stability criterion and further modification of the units will be required.
- (c) The data from the Na-24 release tests are being evaluated to determine the magnitude of the problem of deposition on the G-M tubes and on the ground surface. Laboratory tests to determine the effectiveness of an air curtain for the G-M tubes indicate that the technique is promising.

Routine Activities:

- (a) The regular weekly smear and radiation surveys of AEC facilities at the NRTS were completed. Contaminated instruments were smeared and the results were reported to the appropriate contractor health physics offices. Three shipments of radioisotopes to the Laboratory were smeared and surveyed.
- (b) The disposal of radioactive laboratory waste and the laundering of anti-contamination clothing were arranged as required.
- (c) The special monitoring grid around the TRA pond was discontinued after the 1964 pond again began to receive radioactive liquid waste. No significant resuspension of radioactivity was observed during the time when the pond bottom was exposed to winds and air turbulence.
- (d) John Echo has continued to work with Will Polzer on the simulation of pond bottom behavior using soil columns. A summary of the results of our TRA pond bottom sampling was prepared. A report on the implications of radioactivity observed in TRA pond waterfowl is being prepared.
- (e) Four test runs of the $^{14}\text{CO}_2$ sampler indicated that 5 grams of dry (but not anhydrous) crystals of barium hydroxide will collect in excess of 98% of the $^{14}\text{CO}_2$ which passes through the sampling tube.
- (f) The yearly samples of wheat from farms around the NRTS were gamma counted by Analytical Chemistry (no activity found) and are being prepared for ^{90}Sr analysis by Don Adams.

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- (g) Two sections of the LOFT Preliminary Safety Analysis Report were reviewed and comments were prepared.
- (h) Paul Voilleque's paper "AERIN, A code for Acute Aerosol Inhalation Exposure Calculations" was published in the September issue of Health Physics.

TRA Pond

The liquid waste discharged to the old ponds is now allowed to flow into the 1964 pond which had previously been dried in order to increase its permeability. After several weeks of discharge the bottom of the 1964 pond is only 25 to 50% covered indicating good infiltration of waste solution.

The Laboratory study on the affect of algae and calcium carbonate precipitate on infiltration of pond water is continuing. The infiltration through the reference soil column using distilled carbonate precipitate using pond water and approximately seven times that through a soil containing a surface layer of algae using pond water. After approximately 100 hours the rates of infiltration in all three columns appear to decrease at a constant rate even though the amplitude is different. New soil columns will be prepared for experimental runs to evaluate the decrease in infiltration at a constant rate and to evaluate the minimum amount of algae and carbonate required to significantly affect the infiltration rate.

Burial Ground

Four background samples of soil for monitoring purposes have been given to Analytical Chemistry Branch for Sr-90 and various alpha and gamma nuclide determinations. Other soil samples from near Pit No. 1 and Trench No. 1 will be analyzed for appropriate nuclides after the background samples have been evaluated as to the sensitivity of the various analyses.

Dr. Friend J. Miner of the Dow Chemical Company at Rocky Flats Colorado spent October 14 and 15 at the NRTS. A proposed study on plutonium in soil with particular emphasis on its movement through soil environment such as those found at the burial ground of the NRTS and at Rocky Flats was discussed. As a result of the discussion a project proposal will be written and approval sought so that the proposed study can be implemented.

A staff report which shows the effect of radioactive decay on the quantity of radioactive materials in the burial ground has been prepared. Using reasonable assumptions the report shows the radioactivity, with and without decay corrections, in the burial ground for each year of its existance.

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Sufficient information is provided so that updating can easily be done as desired. This report was prepared primarily to put into a convenient available form the information that resulted from work that was necessary in responding to the recent request of Governor Samuelson.

Documents Reviewed

1. Draft of Section 14, LOFT PSAR
2. Revised Plan - LOFT PSAR
3. Section 3, LOFT PSAR ("Site and Environment")
4. Draft of Section 7.0 LOFT PSAR ("Engineered Safety Features")
5. Appraisal of NRTS Solid Radioactive Waste Disposal

U. S. Geological Survey

See attached report

NOAA - ARLFRO, Environmental Sciences Services Administration

See attached report

Charles A. Pelletier, Chief
Environmental Branch
Health Services Laboratory

Enclosures:

1. USGS Report
2. NOAA Report

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