NOTICE

**CERTAIN DATA
CONTAINED IN THIS
DOCUMENT MAY BE
DIFFICULT TO READ
IN MICROFICHE
PRODUCTS.**

DECLASSIFIED

HW--34810

DE93 001735

Classification Cancelled (Change to

DECLASSIFIED

By Authority of

DS Lewis 6/19/92
DJ Krueger 9-4-92
JE Savely 9-4-92

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

- Copy No. 1 - L. [REDACTED]
2 - L. R. [REDACTED]
D. E. Warner
3 - J. J. Cadwell
4 - V. R. Cooper - W. O. Switzer
5 - P. F. X. Dunigan
6 - D. P. Ebright
7 - E. P. Galbraith
8 - O. H. Greager
9 - D. S. Jackson
10 - H. A. Kornberg - F. P. Kungate
R. C. Thompson
11 - B. G. Lindberg
12 - W. L. Mickelson
13 - W. J. Ozeroff - H. A. Paulsen
14 - H. J. Pias
15 - D. W. Pearce
16 - W. H. Reas - L. C. Clossey
17 - M. F. Rice
18 - R. B. Richards
19 - G. M. Rolph
20 - L. C. Roos - R. T. Gardner
21 - J. M. Smith
22 - A. J. Stevens
23 - R. D. Tillson
24 - L. D. Turner
25 - H. H. Wilson
26 - F. W. Woodfield
27 - 300 File
28 - Yellow File

1-31-55

COPY 1 OF 1, SERIES MA

This document consists of
16 pages. No. [REDACTED]

MONTHLY REPORT - JANUARY 1955

RADIATION MONITORING UNIT

RADIOLOGICAL SCIENCES DEPARTMENT

OCT 13 1992

RECEIVED

JUL 10 1955

300 AREA
CLASS. FILES

MASTER

DECLASSIFIED

DISTRIBUTION RESTRICTED TO U.S. ONLY

Biology Facilities, 100-F Area

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	394	394
Routine and Special Surveys	147	147
Air Samples	7	7
Skin Contamination	0	0

Air Sample Results

<u>Location</u>	<u>No. Taken</u>	<u>Maximum Concentration</u>		
		<u>uc T/cc</u>	<u>uc Pu/cc</u>	<u>uc FP/cc</u>
108-F Stack	2	-	$< 1 \times 10^{-12}$	$< 1 \times 10^{-10}$
Room 403	2	-	$< 1 \times 10^{-12}$	-
Room 104	3	2.1×10^{-7}	-	-

A stock solution of P^{32} showing greater than 23 rad/hour at 1 inch was diluted at a hand dose rate of 3 rad/hour at 7 inches. Similarly, a Sr^{90} solution showing 17.5 rad/hour including 30 mr/hr over the container was diluted at a hand dose rate of 1.4 rad/hour at 1 foot and yielded a dilution giving 150 mrad/hour at 4 inches. The latter was added to a plant nutrient solution at a hand dose rate of 30 mrad/hour at 8 inches.

Each of 4 rats was injected with 20 μ c P^{32} , at a dose rate of 90 mrad/hour at surface of the syringe.

A rainbow trout weighing about 1 pound and about 12 inches long, which previously had been injected interperitoneally with 1 mc P^{32} , had a reading of 2.2 rad/hour at surface when sacrificed.

During a routine survey of the rat laboratory, room 403, an isolated floor spot of 132,000 d/m of Pu was found; air contamination was undetectable. Previous feedings of 0.4 mg quantities of Pu to each of several rats had been accomplished without difficulty and the fact verified by subsequent survey. No cause, therefore, could be assigned to the spread of contamination in the room; the event was reported as an Informal Radiation Incident.

A total of 100 mc T is being burned to oxide in a closed system within a hood, in 10 mc increments, and the resulting liquid is used in algae culture. Both urine and air samples are being analyzed to assure adequacy of control.

Six applications of ruthenium particles to pigs for study of skin effects were accomplished, with activities ranging from 170 mrad/hour to 21 rad/hour at surface, uncorrected for source size. Upon removal of the plaque carrying the particle, it was observed adhering to the lesion. To rapidly fix the particle before it fell off or broke up, the veterinarian placed a piece of masking tape over the particle and rubbed a finger tip of his right hand across the tape to make it adhere. He was quickly reminded of the tremendous dose rate being encountered and immediately withdrew. An estimated three seconds of exposure, however, resulted in a dose to the fingertip in the order of 50 rad as estimated at the time. The particle was retained for further study, the employee withheld from further radiation work, and the event reported as a Radiation Incident, Class II, No. 86.

DECLASSIFIED

HW-34810

Smears of Fe^{55} (6 kv gamma) from the incident previously reported were counted in the Control Laboratory, 329 building, to evaluate the comparative sensitivities of several means of detection in order to assure that field survey methods are adequate. In spite of a 3:1 sample size disadvantage of the Pete counter compared with a 2 pi P.C., Pete counts on a set of 23 one-inch square smears ranged from 14 to 27% of those on the P.C. The Pete was 5 times as sensitive as the next best instrument tested, a thin-window G.M. As a result of these comparisons, the same or similar isotopes may be detected in the field by use of the Pete, with a 50% confidence.

Monitoring was provided during calibration of approximately 250 particles, ranging from 110 mrad/hour to 3.75 rad/hour, uncorrected for source size, and required a maximum hand dosage rate of 225 mrad/hour at 6 inches.

Minor Construction, 100 Areas

General Statistics

	<u>Jan</u>	<u>1955 to Date</u>
Special Work Permits	96	96
Routine and Special Surveys	117	117
Air Samples	0	0
Skin Contamination	2	2

Work continued on utility poles and buried conduit in the vicinity of 190-B, in preparation for expansion of the facility. The only radiological hazard encountered has been ground particles, and a survey twice a day has been adequate control.

Work continues on the 105-B-to box 19 effluent line, which has progressed across the main 100-B Area road. Traffic is currently re-routed over a detour north of the road. Decontamination of the detour yielded 5 particles ranging from 30,000 c/m to 65 mrad/hour, in 27,000 square feet. The only radioactivity being encountered is ground surface particles and effluent vapors, and surveys have disclosed 2000 c/m on a glove and 8000 c/m on a hammer. Also involved in the excavation was the 106-B exclusion area burial ground where one full pit was capped with concrete and the lid welded on; the remaining useful pit was spotwelded shut. A maximum dose rate of 500 mr/hour was observed at the pits, but work was accomplished at 10 mr/hour or less. Spoil from the trench now temporarily covers the burial ground.

Further work on the 107-C branch of the effluent system is temporarily suspended. The 107-B outfall contractor has finished the pipeline and is now engaged in concrete work and joining his system to the Minor Construction portion at the area fence line.

The installation of expansion joints between pipe ends in the 100-D effluent expansion boxes was continued sporadically. The maximum radiation level observed was 2.1 rad/hour, including 1 r/hour on timbers from the boxes, and a maximum dose rate of 400 mr/hour at three feet was encountered during handling. Effluent vapors caused three cases of clothing contamination including two with skin contamination, the latter being 8000 and 15,000 c/m which by washing and decay were promptly reduced to negligible levels with insignificant doses accrued.

Approximately eight hours per day of monitoring service is currently being provided at White Bluffs. Twenty percent of the vehicles greased during the month were found contaminated between 400 and 30,000 c/m.

Miscellaneous Facilities, 100 Areas

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	39	39
Routine and Special Surveys	121	121
Air Samples	4	4
Skin Contamination	0	0

108-B Laboratory Analyses

Urine Samples, Tritium

<u>Activity Density, ($\mu\text{c/cc} \times 10^3$)</u>	<u>No. Analyses</u>	<u>No. Persons</u>
0 - 5	5	3*
5 - 10	5	2*
10 - 35	0	0
TOTAL	10	

*Five persons from 108-P were sampled.

Special Samples (not urine)

	<u>No. Analyses</u>
Spikes	6
Blanks	10
Recounts	4
TOTAL	20

Air Sample Results

<u>Location</u>	<u>No. Taken</u>	<u>$\mu\text{c Tritium oxide/cc of air (N} \times 10^{-7}$)</u>		
		<u>Maximum</u>	<u>Minimum</u>	<u>Average</u>
Operating Gallery, 108-B	4	0.5	0.2	0.3

The 108-B Separations Facility remains on stand-by status.

Work continued at the 108-B Metallurgical Facility. Transferring irradiated process tubing showing 2 r/hr at 4 inches was accomplished with a hand dose rate of 1 r/hour. Examining and photographing samples which gave 5 r/hour at 3 inches required hand dose rates of 1 r/hour at 5 inches and body rates of 300 mr/hour at 1 foot. The maximum hand dose rate during sectioning of tubing was 2 r/hour at 3 inches. Waste burial required one hand dose rate of 10 r/hour, and a body rate of 250 mr/hour.

DECLASSIFIED

HW-34810

A car-spotter installation is planned in each area, near the coal conveyor for the 164 building. At 100-B two particles showing 20,000 and over 80,000 c/m were removed from only 2000 square feet surveyed. Decontamination is planned. The other areas appear to have no more than 1 particle per 5000 square feet and will not be cleaned.

Two particles showing a maximum of 74 mrad/hour were removed from 5000 square feet of the Hanford cinder pile, and the cinders released to the Army.

One retired building at White Bluffs was released for sale.

Work has begun at 189-D on experiments with unirradiated ruptured slugs. The maximum dose rate encountered thus far was 7 mr/hour while handling canned pieces with gloves.

A second survey of the gravel pit at the intersection of Rt. 1 and 4N disclosed no contamination in 2000 square feet, and the pit was decontrolled.

200-East Area

221-B Building

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	113	113
Routine and Special Surveys	191	191
Air Samples	63	63
Skin Contamination	0	0

Air Sample Results

<u>Location</u>	<u>No. of Samples</u>	<u>Number Above</u>		<u>Maximum Concentration</u>	
		<u>10^{-12} μc Pu/cc</u>	<u>10^{-10} μc FP/cc</u>	<u>μc Pu/cc</u>	<u>μc FP/cc</u>
221-B Canyon Section 11	22	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$
221-B Pipe Gallery Section 11	4	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$
291-B Stack Exhaust	4	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$
R-13 Change House	22	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$
221-B Canyon, Sec. 18	8	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$
221-B Canyon, Sec. 9	3	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$

The permanent fenced radiation zone extending from R-1 to R-7 was moved back from 221-B building approximately 12 feet to allow Minor Construction access to all canyon doors. The maximum dosage rate observed during the relocation of this fence was 10 mr/hour. After the completion of this job, all dosage rates outside of the new fenced area were less than 1 mr/hour.

A special survey was made in the railroad cut and railroad tunnel in preparation for work in this area. A maximum dosage rate in the tunnel gutters of 5 rad/hour at surface including 100 mr/hour at 2 inches was noted. The gutters were covered with 2 x 12 planks and the dosage rates were reduced to 30 mrad/hour including 10 mr/hour.

Three test holes were dug south of the 221-B building by Minor Construction to locate spare lines leaving the canyon. At R-11 a waste pipe stub was located at a depth of approximately 5 feet and a dosage rate of 250 mr/hour was obtained from this pipe.

The roped zone around the 151-BX diversion box located south of the canyon building at R-13 was left contaminated by Operations and cleaned by Minor Construction. The contaminated dirt was boxed and taken to the burial ground with a maximum dosage rate of 100 mrad/hour including 5 mr/hour at the surface of the container. Dirt was hauled to the site and the entire roped area was covered. The radiation zone is now confined to the concrete pad over the box.

Work has continued on the Carrier units and most of the units are now completed. Coils from these locations were contaminated up to 15,000 c/m. Boxes containing waste from these zones have given dosage rates up to 10 mrad/hour including 5 mr/hour at the surface of the container.

The gang valves have been removed from sections 13, 15, 19, and 20 in the operating gallery and taken to the hot shop for repairs. Contamination up to 1000 c/m was detected on opened lines and valves at section 13. All open lines were sealed off with plastic tape and no spread of contamination occurred. All other valves and lines were less than 100 c/m.

Jumper re-gasketing was completed at sections 18 and 19 in the canyon pipe gallery with a maximum dosage rate of 4 rad/hour at surface including 115 mr/hour at 2 inches on the A-30 jumper. Re-gasketing was accomplished with a body dose rate of 140 mrad/hour including 10 mr/hour at 6 inches. Canyon cells 19 and 20 were opened for re-gasketing and testing of jumpers and a maximum dosage rate of 2 rad/hour at the surface of a jumper and 45 mr/hour at 2 inches was obtained. All work was performed at a distance of 12 inches with a body dose rate of 30 mrad/hour including 6 mr/hour. Smears taken on jumpers from these cells showed alpha contamination up to 60,000 d/m. No spread of contamination to other sections was evident after completion of this work.

The 9-2 centrifuge was raised from cell 9-R to the canyon deck for observation and possible repair. The dosage rate observed during the removal of this equipment was 1.5 rad/hour including 500 mr/hour at 5 feet. An attempt was made to check the drive shaft with a dosage rate of 7.5 rad/hour including 2.5 r/hour at 12 inches being encountered. Dosage rates at the top of the centrifuge pot were greater than 5 r/hour. The centrifuge was returned to the cell for future disposition.

A total of 650 employees were surveyed in conjunction with the work performed during this report period.

On 1-18-55 at approximately 3:15 p.m., a Minor Construction employee entered the 221-B canyon building to observe re-gasketing procedure and after a period of 45 minutes realized that his assault mask was without a cannister. All surveys and air samples relating to this incident were negative and the details of the event were recorded as a Radiation Incident, Class I, No. 411.

Construction, 200 West Area

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	107	107
Routine and Special Surveys	129	129
Air Samples	66	66
Skin Contamination	0	0

DECLASSIFIED

DECLASSIFIED

Air Sample Results

<u>Location</u>	<u>No. Taken</u>	<u>Number Above</u>		<u>Maximum Concentration</u>	
		<u>10⁻¹² /uc Pu/cc</u>	<u>10⁻¹⁰ /uc FP/cc</u>	<u>/uc Pu/cc</u>	<u>/uc FP/cc</u>
233-S	30	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$
234-5	36	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$

Redox Expansion, 233-S Building

No unusual radiation conditions have been encountered in the 233-S building. Routine surveys have been made in the building and personnel surveys have detected no skin contamination.

291-S Area

A ditch was hand excavated from the exhaust jet building to the 291-S stack breach. By use of concrete block shielding, the body dose rates were reduced to 40 mr/hour. Assault masks were worn for all work in this vicinity and the work was accomplished without incident. Pipes will be laid and a tie-in to the stack breach completed at a later date. The maximum dosage rate obtained at the stack without benefit of shielding and near an open port was 1 rad/hour including 210 mr/hour at 2 inches.

Inspection and work were done in the exhaust jet building with a maximum body dosage rate of 200 mr/hour.

The chemical waste line southwest of the 202-S exclusion area was cleaned with all body dose rates being less than 6 mrad/hour. During the removal of contaminated dirt, portions of the ditch bank became contaminated to a maximum of 30 mrad/hour at surface including 5 mr/hour at 2 inches. Contaminated ground was bladed into the ditch and readings reduced to 2000 c/m. Minor Construction installed radiation zone signs at the lower end of the ditch at the request of RMU.

The 240-S-151 diversion box, which is located within the 233-S exclusion area, was opened by Separations Operations and a dosage rate of 15 mr/hour was obtained at a distance of 50 feet. Adjacent ground areas became contaminated from this source and vehicles with contamination up to 400 mrad/hour including 25 mr/hour were detected following this incident. All vehicles were cleaned to less than 1000 c/m.

Two cases of clothing contamination occurred in the 233-S area during the period and both were successfully cleaned.

Recuplex 234-5

Intermittent monitoring was required at Recuplex and no unusual conditions were noted in room 221. Corridor 224 became contaminated from an inadequately-sealed waste carton. Surveys were made on three Minor Construction employees who were observed using this corridor and negative results were obtained.

200-East Area

201-C Building, Hot Semi-Works

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	59	59
Routine and Special Surveys	269	269
Air Samples	203	203
Skin Contamination	1	1

Air Sample Results

<u>Location</u>	<u>No. Taken</u>	<u>Number Above</u>		<u>Maximum Concentration</u>	
		<u>10⁻¹² /uc Pu/cc</u>	<u>10⁻¹⁰ /uc FP/cc</u>	<u>/uc Pu/cc</u>	<u>/uc FP/cc</u>
"A" Sample Gal.	30	0	0	< 1.0 x 10 ⁻¹²	< 1.0 x 10 ⁻¹⁰
"B" Sample Gal.	28	2	0	3.5 x 10 ⁻¹²	< 1.0 x 10 ⁻¹⁰
"C" Sample Gal.	29	0	0	< 1.0 x 10 ⁻¹²	< 1.0 x 10 ⁻¹⁰
"A" Cell	28	0	1	< 1.0 x 10 ⁻¹²	1.9 x 10 ⁻¹⁰
"B" Cell	30	1	5	6.2 x 10 ⁻¹²	3.7 x 10 ⁻¹⁰
"C" Cell	30	0	0	< 1.0 x 10 ⁻¹²	< 1.0 x 10 ⁻¹⁰
Hot Shop	28	0	0	< 1.0 x 10 ⁻¹²	< 1.0 x 10 ⁻¹⁰
"A" Valve Room	29	0	0	< 1.0 x 10 ⁻¹²	< 1.0 x 10 ⁻¹⁰

Operating and maintenance forces performed work in each of the three cells. The agitator was removed from tank 7 in "A" cell. A maximum dosage rate of 4.5 rad/hour at the surface was encountered to the hands of maintenance forces while removing the agitator from the tank. Gloves worn were contaminated to 50 mrad/hour at the surface and were discarded.

The maximum normal dosage rate which personnel, working in "A" cell encountered was 200 mr/hour 10 inches from tank 6.

Some of the Purex test run equipment in "B" cell was converted for the removal of ruthenium from uranium solutions using an ozonated air sparge and a caustic scrub.

A maintenance man who entered "B" Sample Gallery to inspect sample ports, sustained clothing and skin contamination when he walked into a fine spray of plutonium contaminated water. A sample line which was undergoing hydrostatic testing at the time developed a small leak allowing an invisible spray to escape. The spray contaminated the man's eyebrows and forehead to 20,000 d/m, his glasses to 1,000 d/m, his coveralls in excess of 40,000 d/m and his personal undershirt to 1,000 d/m. All skin contamination was readily removed. The undershirt was discarded. The employee was wearing a half-mask. Bioassay samples were taken and revealed no plutonium intake resulted.

DECLASSIFIED

DECLASSIFIED

HW-34810

222-B Building, Fuel Technology

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	24	24
Routine and Special Surveys	1	1
Air Samples	0	0
Skin Contamination	0	0

All work performed at the 222-B building was of a routine nature. No special monitoring or surveying was required.

Construction, 200 East Area

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	46	46
Routine and Special Surveys	37	37
Air Samples	(See Hot Semi Works Statistics)	
Skin Contamination	0	0

Minor construction forces completed modifications in A cell. A maximum dosage rate of 8.5 rad/hour including 500 mr/hour was observed at the open end of a section of pipe being removed from the cell. A dosage rate of 85 mrad/hour including 15 mr/hour was encountered to the hands of a construction man while taping the ends of the pipe.

A dose rate of 380 mrad/hour including 30 mr/hour, both at 10 inches, was encountered to the hands of an employee changing a vacuum cleaner bag in A Sample Gallery.

200-West Area

Technical Laboratories

General Statistics

	<u>Jan.</u>	<u>1955 to Date</u>
Special Work Permits	125	125
Routine and Special Surveys	272	272
Air Samples	658	658
Skin Contamination	6	6

January Statistics

	<u>222-8</u>	<u>234-5</u>	<u>Misc.</u>	<u>Total</u>
Special Work Permits	53	52	20	125
Routine and Special Surveys	137	103	32	272
Air Samples	320	317	21	658
Skin Contamination	6	0	0	6
Non-Regulated Items	44	6	0	50
Contaminated Floor Spots	17	2	0	19

Air Sample Results

Location	No. Taken	Number Above		Maximum Concentration	
		10^{-12} μ c Pu/cc	10^{-10} μ c FP/cc	μ c Pu/cc	μ c FP/cc
222-S	320	1	21	3.4×10^{-12}	3.3×10^{-8}
234-5	317	1	0	6.5×10^{-12}	1.0×10^{-10}
Misc.	21	0	0	$< 1.0 \times 10^{-12}$	$< 1.0 \times 10^{-10}$

222-S Building

Decontamination of the 1-E cubicle was initiated and continued throughout the month. A maximum dosage rate of 500 rad/hour was observed 6 inches from a piece of plywood inside the cubicle. A momentary dosage rate of 50 rad/hour to the hands, was encountered by one employee, while placing a cover over the plywood prior to removing it from the cubicle.

Failure to comply with the recommendation that assault masks be worn in room 1-C when the large cubicle door was fully opened into room 1-C led to Radiation Incident Class I, No. 409. The airborne contamination level was found to have been 1.7×10^{-9} μ c of fission product per cc of air sampled 12 feet away from the cubicle. The maximum valid airborne contamination level observed in room 1-C during the cubicle decontamination was 3.3×10^{-8} μ c FP/cc. This resulted when a board used to cover the cubicle wall fell to the floor of the cubicle forcing air out into the room.

Skin contamination to the extent of 4000 c/m was sustained on the neck and chin of an employee decontaminating the 1-E cubicle. The contamination was the result of an improperly worn canvas hood. The contamination was readily removed.

Dismantling of the "Minilee", in room 1-J, continued throughout the month. The maximum dosage rate encountered during the operations was 12 rad/hour to the hands.

Four cases of skin contamination were reported for persons working in room 1-L. Three persons sustained hand contamination from a single box of contaminated protective clothing. Dry paper towel smears of the box revealed no smearable contamination on the box; however, following the skin contamination it was found that a wet cloth smear picked up 800 c/m from the box. The hands were readily decontaminated.

Contamination on the right ankle and left heel to the extent of 300 c/m and 3000 c/m respectively was found on one employee as he was being surveyed at the door of room 1-L prior to going to lunch. His personal socks were contaminated to the extent of 3,000 c/m and 7,000 c/m, and they were discarded. The inside heel of his left plant-issue shoe was contaminated to the extent of 1,000 c/m.

One other case of skin contamination resulted when an employee handled uranium solutions in room 4-M without the benefit of gloves. The contamination to the extent of 2,000 c/m was successfully removed, and the use of gloves was emphatically recommended.

234-5 Building

The faces of hoods 3, 5, and 6 in room 179 were changed. The only contamination observed, other than on the hood components themselves, was 40,000 d/m on the end of a screwdriver used to loosen the hood faces and two floor spots containing a maximum of 2000 d/m. The work was well planned and excellent contamination control was practiced during the entire removal of the grossly contaminated face plates.

DECLASSIFIED

DECLASSIFIED

HW-34810

Around the clock monitoring coverage was provided during a week of operations in room 186. Several batches of plutonium solution were concentrated from 10 grams per liter to 100 grams per liter during the week. A surgeons glove, worn by one employee became contaminated with approximately 0.01 grams of plutonium when a couple of drops of solution escaped the end of a hose prior to transferring a batch of concentrate from the hood. The glove was immediately removed. No skin contamination resulted.

A time study of operations performed in room 172 was initiated to obtain more information on hand doses acquired there.

200-West Area, General

The Soil Sciences Unit at the 222-U building performed some studies on effluent water from a reactor tube which had contained a ruptured slug. The maximum dose rate observed was 14.5 rad/hour at the surface including 50 mr/hour at 2 inches. The maximum dosage rate encountered by laboratory personnel was 3 mr/hour.

A survey of the 200-West Area firehouse annex revealed 6 particles on the roof ranging from 800 c/m to 20,000 c/m and 5 particles on the floor inside the building ranging from 800 c/m to 10,000 c/m. A particle deposition of one particle in 12 square feet was observed around the building. These particles ranged from 6,000 c/m to greater than 80,000 c/m.

200 Areas, General

A tank trailer containing about 2,000 gallons of UNH solution was being towed from U Facility to the 321 building in the 300 Area when the trailer jackknifed on the hill at mile 6 on route 4 south and rolled over on its side. A valve on the tank broke, and approximately 1500 gallons of the UNH solution ran across the highway and down the shoulder at the south side of the road to form a pool in a hollow at the foot of the hill. Two days after the solution had settled into the ground, about 130 yards of soil were removed and placed in a hurriedly-built sluice box at the 241-BX tank farm for recovery of the uranium.

The road was decontaminated and the road shoulder sealed. Complete decontamination of the area was planned. The incident was formally investigated (Class I, No. 406).

Thirty-five soldiers stationed at PSN-40 and PSN-50 were surveyed and found to be free of detectable contamination. A bulldozer which had been used around PSN-50 was surveyed and found free of contamination.

300 Area

Technical Laboratories

General Statistics

	Jan.	1955 to Date
Special Work Permits	293	293
Routine and Special Surveys	793	793
Air Samples	1075	1075
Skin Contamination	7	7

January Statistics

	SWP's	Surveys	Air Samples
304, 314, 3730, 3732 Bldgs., Fuel Tech.	2	10	5
321 Bldg., Cold Semi-Works	14	26	72
325 Bldg., Radiochemistry	26	125	460
326 and 3741 Bldgs., Pile Tech.	45	112	28
327 Bldg., Radiometallurgy	95	265	407
329 Bldg., Biophysics	7	28	103
3745, 3745-A, 3745-B Bldgs., Calib.	3	9	0
Miscellaneous Bldgs., 300 Area	19	70	0
Construction	52	108	0
Richland and Vicinity	30	66	0

Air Sample Results

Location	Number Above		Maximum Concentration		Remarks
	10^{-12} μ c Pu/cc	10^{-10} μ c FP/cc	μ c Pu/cc	μ c FP/cc	
325	0	5	$< 1 \times 10^{-12}$	3.0×10^{-9}	5-4C Filter Box after fire
326	0	1	$< 1 \times 10^{-12}$	7.6×10^{-10}	
327	0	318	$< 1 \times 10^{-12}$	1.0×10^{-8}	Exhaust sample
329	0	0	$< 1 \times 10^{-12}$	$< 1 \times 10^{-10}$	

	Number Above		Maximum Concentration		Remarks
	10^{-11} μ c U/cc	μ c U/cc	μ c U/cc	μ c U/cc	
321	17		$> 40,000$ d/m		Respiratory Protection Worn
314	3		3.5×10^{-11}		Respiratory Protection Worn
326	0		$< 1 \times 10^{-11}$		

	Number Above		Maximum Concentration	
	10^{-12} μ c Th/cc	μ c Th/cc	μ c Th/cc	μ c Th/cc
326	0		1×10^{-12}	

304, 314, 3730, and 3732 Buildings, Fuel Technology

Contamination resulting from the uranium fire and explosion in the 314 building mentioned in last month's report was successfully reduced to 400 c/m smearable on the floor area and 4000 c/m in a small area around the lathes. The floor was painted to fix all remaining contamination.

An attempt was made to simulate conditions for boring graphite and uranium in a reactor in the burnout room of the 314 building. The work was accomplished with a maximum dosage rate of 280 mrad/hour including 7 mr/hour while handling uranium.

DECLASSIFIED

HW-3b810

325 Building, Radiochemistry

A fire and explosion occurred in the exhaust duct located in the basement of the 325 building which serves a hood in room 5-4C. Small holes were drilled in the stainless steel duct above the filter and it is assumed a hot chip dropped on the paper filter. A red glow was noticed through the holes just drilled while working on the adjacent duct; an explosion followed with enough force to bulge out the duct and knock off the door at the filter. It is also possible the filter was rendered highly flammable with perchloric acid fumes previously used in the hood for dissolution of samples. Surveys and air samples indicated no spread of contamination. The incident was formally investigated. (Class I, No. 401).

Another 20 grams of irradiated thorium was introduced to the cave in room 7-6 F bringing the total to 30 grams. The dosage rate to the body for work at the front of the cave is 35 mrad/hour including 6 mr/hour. A maximum dosage rate of 5 rad/hour including 1 r/hour to the hands was encountered while removing the dissolve pot from the cave and placing it in a cask.

Attempts were made to recover Pu^{239} from two specially irradiated UO_3 samples contained in Mg capsules. During the work a maximum dosage rate of 3 rad/hour including 40 mr/hour at five inches was reported while decontaminating the cave. A dose rate of 112.5 rad/hour at two inches was observed on a sample during the separation attempt.

Dosage rates as high as 14 rad/hour at two inches were observed on thorium and uranium samples manipulated in the analytical laboratories. Dosage rates of 2.8 rad/hour including 550 mr/hour at two inches were encountered while working with the samples. Kleenex wipes were discovered lying at the front of one of the hoods reading 1.5 rad/hour at two inches. They were disposed of immediately.

Routine surveys of laboratory hoods revealed dosage rates to 250 mrad/hour including 20 mr/hour in the working area at hood #1 in room 4-7A-2. A dose rate of 11 rad/hour at two inches was observed in the sink of hood #1 in room 4-7-B.

Approximately one million gallons of waste solution entered the 300 Area retention system during the month. Sixty-five thousand gallons were transported to 200-West for cribbing, the average analysis for the waste was 8.0×10^{-5} μC Pu/ml and 4.0×10^{-2} μC total beta/ml.

326 and 3741 Buildings, Pile Technology

Irradiated foil samples were prepared in room 4-A for counting with a maximum dosage rate of 5 rad/hour including 100 mr/hour at 20 inches. A dose rate of 35 rad/hour including 500 mr/hour was observed at 13 inches from the sources. Sources containing milligram amounts of plutonium were manipulated without incident.

A 50 kvp X-ray machine was installed in room 16-A. A dosage rate of 500 mr/hour was observed at the operating panel without shielding around the tube. With lead shielding installed the dosage rate was reduced to 35 mr/hour.

A pool of water was discovered under an exhaust hopper servicing room 48c. Survey results indicated an area of 10 square feet contaminated from 600 to 8000 c/m. The area was decontaminated to less than detectable limits. Source of water and contamination was not determined.

Five cases of skin contamination were reported for personnel in the Metallography laboratories. All contamination was confined to the hands with a maximum of 2000 c/m being detected, decontamination was successful in every case. Handling of uranium with bare hands is a routine procedure in these laboratories although the wearing of gloves has been repeatedly recommended by Radiological Sciences.

Work with irradiated graphite samples was accomplished in the 3741 building with a maximum dosage rate of 22.2 rad/hour including 200 mr/hour at four inches from an aluminum papoose. Dose rates of 10 mr/hour were observed on two occasions at the fence around the building from waste cartons stored in the building. Removal of the cartons to the burial ground reduced the level to less than 1 mrad/hour.

327 Building, Radiometallurgy

Work in the 327 building was primarily with irradiated material which was accomplished with a maximum dosage rate of 7 rad/hour including 1 r/hour at one foot while examining a sample at B-cell.

Routine surveys revealed clean SWP clothing delivered from the plant laundry contaminated generally from 200 c/m to 3000 c/m. The clothing was returned for re-washing.

Experimental work with ultrasonics for decontamination purposes is being conducted in the basement of the building. Contaminated aluminum dummies are being used for these experiments, the maximum dosage rate encountered was 600 mrad/hour including 100 mr/hour at two inches.

329 Building, Biophysics

A Ru¹⁰³ source, shipped from Oak Ridge after irradiation in a reactor, was manipulated with a maximum dosage rate of 500 mr/hour at six inches from the hands, the maximum dose rate observed on the sample was 15 rad/hour at two inches.

321 Building, Cold Semi-Works

Survey of the tank trailer, involved in an accident on the 200 East Area hill while hauling UNH solution, revealed contamination levels to 10 mrad/hour including 5 mr/hour at two inches. Decontamination efforts reduced the levels to a non-smearable condition and with minor repairs the tank was put back in service on another trailer. The new trailer used to transport the tank to the 300 Area was contaminated to 2000 c/m.

Radiation levels at the calciner in C-cell enclosure #2 increased when UNH solution from Redox was introduced into the building. Dosage rates have increased from 75 mrad/hour including 5 mr/hour to 150 mrad/hour including 20 mr/hour for work at the calciner. Air sample results continue to verify the necessity of wearing respiratory protection within the enclosure at all times.

DECLASSIFIED

HW-3-51

A training program, in the use of portable detection instruments for making personal surveys, was conducted during the month for all personnel assigned to the 321 bldg.

3745 and 3745-A Buildings, Calibrations

- A dosage rate of 1.8 r/hour at two inches was encountered while loading a source holder with two Pa D, E, F sources. Two one-half gram Ra-Be sources were transferred for use in the 3745-A building with a maximum dosage rate of 1 r/hour to the body.

Miscellaneous Buildings, 300 Area

A routine survey in the First Aid building revealed a spot of contamination of 200 c/m on a chair. It was immediately reduced to less than detectable limits.

While processing non-routine film in the 3705 Exposure Records Building, glass wool was discovered floating in the film-processing solutions. Inspection of the 14" x 7" X-ray film being processed, revealed glass wool adhering to the film surface. The film was used for radioautographing glass wool filters exposed in 200-West Area to determine particle deposition. A personal survey of the dark room technician revealed 20,000 c/m on his shirt and 30,000 c/m on his pants, no skin contamination was detected. Contamination to 600 c/m on a faucet handle and 1500 c/m on a 15-gallon developing tank was detected, no other contamination was detected in the building. The incident was formally investigated. (Class I, No. 410).

Construction, 300 Area

Radiation monitoring in the 303 Area for Minor Construction consisted primarily of surveying equipment, vehicles, and personnel for release from radiation zones. A total of 155 vehicles were surveyed and three were found contaminated to a maximum of 40,000 d/m after transporting old laboratory equipment to the burial ground. A particle showing a maximum of 30,000 c/m was detected on the gas truck. All contamination was reduced to less than detectable limits.

The cap and can line was moved and installed in the old chip recovery room of the 313 building. General contamination of 4000 c/m on a majority of the surfaces was encountered. All work was accomplished without contamination spread.

Renovation of the 3706 building is in progress with a majority of the decontamination work being completed. A few areas contaminated to 2000 c/m and 5000 d/m remain in rooms 17, 19, and 21.

Duct work was installed in room 42-B of the 326 building. The maximum contamination level detected was 2000 c/m.

Richland and Vicinity

Monitoring was provided on nine occasions for decontamination and maintenance work on RAPO locomotives at the 1171 roundhouse. Maximum contamination found was greater than 80,000 c/m on the front and rear frame of locomotive HO-39-3731.

Eighteen shipments of radioactive material from off-plant were surveyed at Central Stores. A maximum dose rate of 105 mrad/hour including 5 mr/hour at two inches was observed on a shipment from the National Lead Company.

Over 1200 miscellaneous items and 19 vehicles were surveyed for release to excess during the month. One vehicle was found contaminated to 50,000 c/m and two gas cylinders to 350 c/m. The cylinders were decontaminated to less than detectable limits.

HAFO Vehicles

A total of 502 vehicles were surveyed for contamination at the 1171 garage and 110 vehicles were surveyed at the 300 Area Survey Station during the month. Twenty-five were found contaminated, the maximum being greater than 80,000 c/m. Those not readily decontaminated were sent to 200 West Area for steam cleaning.

A. J. Stevens

RADIATION MONITORING UNIT

AJ Stevens:DSJ:GME:REW:BGL:eb

DECLASSIFIED

END

**DATE
FILMED**

2 1261 93