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DATE 2/29/48

SUBJECT Rough Draft E.I. Department Report for Month of February 1948

TO File

FROM EM Parker

[redacted]

GG Lail
EM Parker

[redacted]

GG Lail 3-9-48
[illegible] 3-11-48
[illegible] 3-12-48

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HW 90854

February 29, 1948

c. 1 GG Lail - EK Parker

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By Authority of [illegible]
WA Snyder 4-4-91
[illegible] 6-6-91
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HEALTH INSTRUMENT DEPARTMENT

FEBRUARY 1948

Organization

The composition and distribution of the force as of 2/29/48 was as follows:

	100-B	100-D	100-F	200-W	200-E	300	700	P.G.	Total
Supervisors	0	1	3	7	4	13	5	0	33
Engineers	1	3	6	12	13	6	0	2	43
Others	0	13	18	47	23	47	7	15	170
Clerical	0	0	0	0	0	2	2	0	4
Total	1	17	27	66	40	68	14	17*	250

*Includes 12 in Training School.

Number of Employees on payroll:	February
Beginning of month	239
End of month	250
Net Increase	11

The total increase was derived by the addition of an Industrial Hygienist, four inspectors (for engineer training), four helpers for the critically short film badge program, and ten laborers for the badge and pencil routine. This was offset by five terminations and three long-term removals from the payroll.

C. M. Patterson and C. C. Gamertsfelder became Assistant Superintendents of the H. I. Operational Division, and Control and Development Division, respectively.

General

The course of lectures for the Institute of Radiobiology and Biophysics was completed on February 11.

The first section of the H. I. Lecture Series was also completed, and the trainees assigned to field work.

Due to film deterioration, portions of this document may be illegible. PNL-6-91 [redacted]

1008003

Health Instrument Department

A series of studies of H. I. procedures was initiated for the purposes of

1. Effecting economies where possible
2. Detecting omissions in the program that should be corrected.

Two such studies, one on routine film badges, and one on special film work were issued.

The active particle contamination in the Separations Plant Areas continued to command much attention. Since the replacement of one fan in each area, the rate of particle deposition has diminished by a factor less than two, whereas the average activity of each particle has diminished by a factor of 5. Recently used photographic methods of detection indicate about ten times as many particles as were found by meter surveys. Whether these weaker particles are capable of producing significant damage is not yet known. Biological monitoring to date has been inconclusive. Some active particles have been found on the filters worn by men in the area. Since new construction work cannot be envisaged with the requirement to wear masks, the feasibility of the present construction plans cannot be tested, until the second fan change has been made. This introduces critical timing into the program.

The plans for the study of the distribution of active material below a crib, by investigations from lateral pipes to a vertical shaft, received a set-back when the shaft flooded with the disposal water. The necessary information can still be obtained by a modified attack; the incident is a reminder, however, that local ground conditions are important in the disposal systems.

There was one instance of major hand contamination requiring a Class 2 investigation (#8 in the Series).

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OPERATIONAL DIVISION

100 Areas

Work Permit Summary

	January	February	1948 To Date
100-B	124	102	226
100-D	771	839	1610
100-F	857	987	1844
Total	1752	1928	3680

Retention Basin Effluent

The activity of the water leaving the Retention Basin was as follows:

	100-D	100-F
Power level	275	275
Average beta dosage-rate (mrep/hr)	0.6	0.7
Average gamma dosage-rate (mr/hr)	1.5	1.6
Average total dosage-rate (mrep/hr)	2.1	2.3
Average integrated dose in 24 hrs. (mrep)	50	55
Maximum integrated dose in 24 hrs. (mrep)	58	70
Maximum integrated dose in 24 hrs. (mrep) 1948	58	70

A total of four new leaks was discovered in the effluent water line between the 100-F Pile Building and the Retention Basin. In addition, a cave-in over the effluent line about 10 feet from the main entrance road into the area occurred. Survey readings were low but the areas have been made temporary Danger Zones.

The Power Department began a test in the F Area to determine the optimum number of filters for the process water system. The iron content of the water was only slightly increased and this was not detectable in routine beta checks on the effluent water.

High winds blew water and algae out of the South end of the 100-F Retention Basin. Dosage-rates as high as 50 mrep/hr were reported on the algae.

100-B Area

Nothing but incidental maintenance work occurred during the month.

[redacted]

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Health Instrument Department

100-D Area

Unusual difficulty was experienced during discharge of Tube 2464. After the front dummy train was replaced with aluminum slugs, the rear dummy charge and four metal slugs were then discharged, but two of the metal slugs remained on the tip off and prevented entry into the discharge area. Several more slugs were then floated out of the tube by increasing the inlet water pressure to 350 psi. This operation was continued until all slugs on the discharge side of the stuck slug were discharged at which time entrance into the discharge area was possible. The dosage-rate at the end of the tube with the stuck slug still in place was 5 roentgens per hour. The stuck slug was finally dislodged after maintenance cut out the ribs of the tube from the discharge end. Throughout the work total exposures were kept below 50 mrep. After discharging, the tube was borescoped and shielded on the front end. Neutron beams from the shielded end amounted to about 250 mrem per hour, and additional shielding was required.

On a subsequent shutdown, three other process tubes were very difficult to discharge, but were finally freed by the use of splines and the hydraulic charger. Exposure-rates were not excessive.

During the removal of the thimble from the "A" experimental hole and the borescoping of the hole by Technical Department personnel, exposure-rates to personnel were always less than 50 mr per hour. The thimble read 200 mr per hour at about 20 feet and the open hole into the pile, about 5 roentgens per hour.

The ionization chamber in the "D" experimental hole was replaced without incident. The chamber showed a dosage-rate of 12 roentgens per hour at 3 inches. A sample removed from the "B" experimental hole gave a dosage-rate estimated at 10 to 100 rep per hour. Personnel exposure, however, was not great.

During the discharge of poison columns a small piece of metal (3/4" x 1/4") reading about 1 rep per hour, was found in the trough in the discharge area. This was presumably a result of cutting Tube 2183 as it was removed. The piece was recovered and disposed of. During regular discharge operations the nozzle of Tube 4357 showed a reading of 250 mr/hr. This reading disappeared later indicating that some active material had been lodged momentarily in the nozzle.

Several process tubes were emptied, loaded with grooved steel pieces at each end and operated dry. After startup Tube 2186 showed unusually high activity on the front face. The following survey readings (uncorrected for beam size) were obtained:

Gamma	-	80 mr/hr
Slow neutrons	-	>50 mrem/hr (jammed BF_3)
Fast neutrons	-	38 mrem/hr

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The charge elevator was locked out until conditions were corrected by additional shields.

High airborne contamination was noted again this month in the storage and transfer areas. The condition was partially corrected by increased water flow through the basin.

100-F Area

High neutron fluxes on the experimental level, in the vicinity of the "D" hole, were a serious hazard throughout the month. With water flowing through the thimble, fast neutron readings as high as 39 mrem/hr were reported on the left side of the loading mechanism, but no attempt was made to approach closer and obtain maximum readings. A temporary paraffin shield was installed on 2/14/48 to allow special irradiations by the Technical Department in the "D" hole, but general access to the area was restricted. During the following shutdown a small paraffin and cadmium shielding collar was installed around the base of the loading mechanism and the water flow through the thimble discontinued. After startup slow neutrons in excess of 60 mrem/hr (normal BF_3) were obtained over a large area near the shielding collar. Fast neutron readings were as high as 225 mrem/hr at 6 inches from the pile face. After additional shielding was installed maximum slow and fast neutron fluxes were 56 and 40 mrem/hr respectively.

Technical Department men removed a sample of U^{238} from the "B" experimental hole and shipped it to the 200 Areas under control of Special Hazards Bulletin #5. Separation of the sample from the aluminum casing was difficult but exposures to personnel did not exceed 50 mr. Four special samples of organic tissue were also removed from the "D" experimental hole and were subsequently shipped off the plant. Exposure-rates were low both during the removal from the pile and during shipment. Special irradiations in the "E" experimental hole were likewise carried out under low exposure-rates.

Tube 01E2 was sex sicced and removed from the pile. The first cut included all of the grooved steel slugs in the discharge end of the tube and eliminated the contamination problem associated with the removal of these slugs by means of a push pole.

On three occasions it was necessary to remove dummy slugs from the discharge end of active process tubes, once to verify the status of the charge in the tube and twice to facilitate the discharge of stuck tubes. In all three cases this work was carried out with only slight exposure to personnel.

Active gas appeared on the zero level - near side and in the work area probably as a result of a ruptured bellows in tube [illegible]. This leak was repaired on the next shutdown by the installation of a [illegible] bent. Active gas to the extent of [illegible] mrem/hr was observed in the inner instrument room following [illegible] in the circulating system to the gas analysis cell. [redacted]

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200 Areas, T and B Plants

General Statistics

	January			February			1948
	T	B	Total	T	B	Total	To Date
Special Work Permits	372	389	761	290	307	597	1358
Routine & special surveys	325	353	678	288	284	572	1250
Air Monitoring Samples	355	496	851	340	523	863	1714
Thyroid checks	207	171	378	190	159	349	727

Canyon Buildings

The blocks were removed from Section 8 in the T Plant for replacement of a leaky connector. Air samples taken during this work showed two high results with maxima of 2.6×10^{-5} μc f.p./liter and 5.8×10^{-11} μg Pu/cc. In addition, the constant air monitor at Section 19 showed concentrations of 1.1×10^{-6} μc f.p./liter and 3.5×10^{-11} μg Pu/cc. No personnel were in the canyon during this time. A high air sample result was obtained at Section 7 when the blocks were removed from cell 6. The effect was apparently localized as no other air monitoring equipment in the Canyon showed evidence of airborne contamination during this period.

A high air sample result was obtained on a 24 hour sample taken at Section 13 in the T Plant Operating Gallery. No cause for such effect was found and further air samples did not substantiate the high result.

Sampler assemblies in the T Plant were raised and water flushed on four occasions. The work was well controlled and no contamination spread resulted. High exposure-rates were encountered for short periods and no overexposure resulted.

In the B Plant the routine check of tools and gloves, following work on the 6-14 weigh tank drain valve in the Operating Gallery disclosed the presence of f.p. contamination. Further surveys of the tank and line showed rather general low level contamination. The source of this contamination was not determined unless possible blow back from the operating tank.

High air sample results were obtained in the B Plant in connection with opened cells, and removal of the protective paper from the canyon deck.

Control Laboratory

A total of 347 non-regulated items was found contaminated on surveys by Technical and H. I. personnel; about 4 μg Pu were involved, and 40 floor spots. One floor spot occurred when a sample was spilled from its disc

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Health Instrument Department

as it was being carried through the corridor from the laboratory to the counting room. Assault masks were used during clean-up of the spill.

Work on Project AHL2 #44, conducted in the laboratory, was well conducted and exposures were normal. The maximum exposure-rate of 5 rep per hour was limited to a few seconds required to transfer the capsule from cask to dissolver.

Twenty-two cases of skin contamination were reported, all of which were reduced. Three instances of shoe contamination occurred and involved plant shoes only.

Concentration Buildings

Three instances of hand contamination occurred in the T Plant in connection with loading out PR cans. Hand decontamination was successful by the usual procedures. In the B Plant, hand contamination was discovered after unloading an RC can. Decontamination was immediately effective.

In the B Plant a slight puncture wound occurred during work in E cell and a rubber glove was punctured during work on the old E-2 centrifuge in the B cell balcony. No skin contamination was detected in either instance. Considerable product contamination was encountered during various jobs in E cell but work was well controlled and no contamination spread occurred.

Stack Areas

Daily checks at the inspection plate of the newly installed 50 fan in the T Plant showed a maximum of 1350 mr/hr during the month. A total of 3,864 Martindale pads was checked with instruments and no contamination found. Random checks of the pads by radioautograph did show indication of activity on 10 samples but there was some possibility of contaminated equipment or faulty film being involved. A rigorous radioautograph program has been instituted. No visual evidence of sparks was found on filters removed from the 50 foot stack sampling line.

Waste Disposal Area

A 25 gallon sample of supernate from the 103-T tank was pumped into a specially designed cask mounted in a truck. A maximum surface dosage rate of 2.0 rep per hour was reported on the rubber tubing during transfer. A maximum reading of 50 mr/hr was reported on the loaded truck and all readings in the drivers seat were below 1 mr/hr.

Contamination was found on the dirt in the bottom of the 105-DR diversion box just south of the canyon at Section 11; presumably due to radioactive "sparks" which have settled into it.

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Health Instrument Department

Letting of the 2nd cycle waste from the 112-B tank to the new crib was started on 2/24/48; but was stopped on 2/26/48 when it was discovered that liquid from the crib was running into the nearby sampling shaft.

The Isolation Building

Air Monitoring

There were 187 spot air samples taken, of which 181 were below 10^{-11} µg Pu/cc. The high result of 5.5×10^{-11} µg Pu/cc was obtained during S.W.P. work in Cell 4. Masks were worn. Forty-eight Little Sucker samples run continuously by shifts had as the high result, 1.4×10^{-11} µg Pu/cc associated with the Cell work mentioned above. Ten Big Sucker samples of the 903 exhaust system had as the high result 3.4×10^{-11} µg Pu/cc, obtained during filter change on Cells 6-A and 6-B. In addition 116 special air samples were taken in connection with filter media tests and canister tests.

Surface Contamination

A total of 240 non-regulated items was found contaminated on surveys by Technical, "S", and H. I. Department personnel. Thirteen items above 20,000 d/m and one above 80,000 d/m were reported. There were 21 instances of floor contamination reported, and 6 cases of skin contamination.

Gamma Radiation

P R. Container	9.5 mr/hr (maximum)
Process Hood	2.5 mr/hr (maximum)
S.C.	5 mr/hr (maximum)

The 300 Area

General Statistics

	January	February	1948 To Date
Special Work Permits	155	281	436
Routine and Special Surveys	185	162	347
Air Monitoring Samples	136	112	248

Metal Fabrication Plant

Thirty of 39 air samples taken were above tolerance, summary was as follows:

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Location	No. Taken	No. Above 1.5×10^{-4} µg U/cc	Maximum Concentration µg U/cc
Extruder Building	15	11	8×10^{-4} - Near Automatic operators position
Chip Recovery	9	6	8.3×10^{-4} - 1st Sorting Table
Oxide Burner	7	5	8.5×10^{-4} - Operator's position
Melt Plant	8	8	1.1×10^{-3} - Near Furnace

Work on machine inspection and canned metal inspection are now rotated in order to reduce hand exposures. Data indicated that a full days work on machine inspection resulted in a few overexposures.

There were no high hand scores recorded. Two high shoe scores were recorded on personnel who work full time in the Extruder Building.

Technical Building

All air sample results were below 2×10^{-11} µg Pu/cc. There were 22 instances of high hand scores, 2 of which were attributed to Plutonium. All were reduced except for 2 cases where no attempt at reduction was made. Three cases of shoe contamination occurred and were cleaned.

Danger Zones were established for certain cribs in the 3722-A Warehouse after 5 stainless steel trays stored there were found contaminated.

Redox Semi-Works Building

Since some plutonium work had been done in this building in the past, analyses were made for this element in process solution. It was felt that perhaps some plutonium had remained in the equipment and was picked up in the Redox process. No evidence of plutonium was found.

Laundry Decontamination and Hand Counting

A total of 108,777 items was monitored in the Plant Laundry, including 42, 192 alpha checks. Also included were [illegible],247 coveralls, 37,456 gloves, 23,118 overshoes, and 3,622 slacks and jackets.

Fifty-six spot air samples and 35 Big Sucker air samples were taken. The high result was obtained while washing 300 lots operations clothes and was most likely due to uranium. Calculated as U it amount [illegible] $\times 10^{-7}$ µg U/cc.

There were 25,478 alpha hand checks, and [illegible],000 beta hand checks returned. About 0.[illegible]% of the alpha, and about 0.[illegible]% of the beta counts were above the warning levels. No attempt at decontamination was involved in 6 cases of alpha contamination and 7 cases of beta contamination. Where decontamination was attempted, it was successful in all cases.

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PERSONNEL RECORDS

Pencils	100-B 100-D	100-F	WSP 200	200-W	300	Total	1948 To Date
Total pencils read:	9,767	12,784	27,338	33,819	29,958	113,666	237,[illegible]
No. of single readings: (100 to 280 mr)	46	77	111	70	120	424	823
No. of paired readings: (100 to 280 mr)	1	1	0	0	1	3	5
No. of single readings: (Over 280 mr)	96	105	201	53	150	605	1,[illegible]
No. of paired readings: (Over 280 mr)	0	1	2	2	3	8	20
Paired readings lost:	3	3	0	2	0	8	13

No significant pencil result was confirmed by the badge result. Investigation of lost readings disclosed no possibility of an overexposure.

Badge Records, Construction Areas

	105-DR	241-AX	284	Total	1948 To Date
Badges Processed:	9,068	2,873	185	12,126	18,683
No. of readings: (100 to 500 mrep)	1	2	0	3	3
No. of readings: (Over 500 mrep)	0	0	0	0	0
Lost Readings:	4	0	0	4	23

Two lost readings were attributed to lost in processing, one to a light leak, and one to a damaged packet. One of the readings of from 100 to 500 mrep was traced to use of an x-ray machine in the field.

Badges	100-B	100-D	100-F	200-E	R.H.E. 200-H	200-W	300	Total
Badges Processed:	2,243	3,792	4,010	4,323	705	5,126	6,190	26,410
No. of readings: (100-500 mrep)	0	1	1	2	2	0	100	106
No. of readings: (Over 500 mrep)	0	0	0	0	0	0	0	0
Lost readings:	0	2	2	2	0	0	1	7

Lost readings were accounted for as follows:

Badge lost in area - [illegible]
Other [illegible] - [illegible]
Badge dropped in [illegible] - 1

In addition 1,500 [illegible] and processed [illegible] for a 1948 to-date total of [illegible].

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Health Instrument Department

CONTROL AND DEVELOPMENT DIVISION

Water Monitoring

Three hundred and sixty-nine samples of drinking water were taken during the month. The maximum alpha contamination of six dis/min/liter was found in Riverland and the Lower Knob well. One sample of sanitary water from 200 West gave a value of beta activity of 5×10^{-5} µc/liter. This was not confirmed by a resample. There were no other samples that gave beta activity as high as 5×10^{-5} µc/liter.

Eleven test well samples were taken with no detectable alpha or beta contamination.

Sixty-nine samples of Columbia River water were taken with no alpha result as great as 2 dis/min/liter. The maximum beta reading was 1.3×10^{-3} µc/liter from a Hanford sample. Thirteen samples were taken from the Yakima River with no positive result for either alpha or beta activity.

Atmospheric Monitoring

The integrons and "C" Chambers indicated average dosage-rates as follows:

Location	Integrons (mrep/24 hours) January	Integrons (mrep/24 hours) February	C Chambers (mrep/24 hours) January	C Chambers (mrep/24 hours) February
100-B	0.6	0.3	0.4	0.3
100-D	1.0	0.3	0.4	0.4
100-F	0.9	0.9	0.4	0.4
200-W	0.3	0.3	0.4	0.3
200-E	0.8	1.0	0.6	0.4
Riverland	0.7	1.2	---	---
Hanford	0.6	1.0	---	---
300 Area	< 0.1	1.3	0.4	0.3
700 Area	< 0.1	0.8	---	---
Kennewick	0.1	< 0.1	---	---
Pasco	< 0.1	0.1	---	---
Benton City	< 0.1	0.1	---	---

The increase in dosage-rates to the south of the 200 Area is [illegible] detectable chambers and air filter readings. The average readings in the [illegible] Area, 105 [illegible], White Bluffs, and Hanford with detectable chambers were 0.55, 0.62, 0.53, and 0.67 mrep/24 hours respectively. The [illegible] hour reading on a C[illegible] unit was [illegible] The highest average concentration for the month [illegible] in the 200 East Area. Forty-five air samples [illegible] were collected. The [illegible] West Area. The [illegible] Riverland.

[redacted]

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Health Instrument Department

Land and Vegetation Contamination

The vegetation contamination shows a slight increase on the reservation.

Location	Average for January	pc I^{131} per kg. February	
		Maximum	Average
North of 200 Areas	0.05	0.24	0.07
Near the 200 Areas	0.18	3.18	0.2[illegible]
South of 200 Areas	0.06	0.19	0.0[illegible]
Richland	< 0.04	0.13	0.0[illegible]
Pasco	0.04	0.08	< 0.04
Kennewick	0.04	0.11	0.04
Benton City	0.04	0.12	0.07
Richland "Y"	0.04	0.06	0.04
Hanford	0.04	0.10	0.05

Twenty-nine samples were collected from X.P. Posts on Rattlesnake Mountain. The average of all samples was 0.07 pc/kg. Twelve samples were collected south of the 200 East Area. The average result was 0.30 pc/kg.

Well Drilling

No significant contamination was detected by field checks from the final well #241 B-12 drilled near the second cycle crib.

The drilling on the last two wells scheduled for the 241-BX Area was completed and the perforations should be completed in about two weeks.

Water samples taken from the three water table wells located at distances of about 500 feet from the 361 B dry well all give positive indications of both alpha and beta activity. The maximum results, found in the 361-B-1 well located to the east of the dry well, were 7.2 x 10-8 pc/liter for beta and 105 dis/min/liter for alpha. Two other wells are being drilled at distances of 1000 feet but these are not yet completed. In one of these new wells the casing cemented at a well about 70 feet from the bottom. The remainder of the well will be put down using smaller casing.

No significant contamination was found in a water sample from well #[illegible]-B-4 or in soil samples taken 20 feet beneath the 241-T crib.

Bioassay

Four hundred and sixty-six samples were [illegible] resulted the necessary data which [illegible] resamples were necessary because of a [illegible] the unit. The two resamples not [illegible]

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processed and gave less than 0.6 d/m. The one resample from last month has been processed and gave a result of ..62 d/m which is comparable to the original value. It is believed [illegible] this result is due to contamination in the process and a third sample will be obtained. A spiked sample was sent through the process unknown to the workers and gave a result within the statistical limits of the process.

Forty-four urine samples, forty-nine water samples, and ninety-two Hanford samples were analyzed on the fluorophotometer. Three urine samples gave greater than 10 µg/liter. These men are being resampled. A series of analyses was made on urine spiked to 11 µg/liter. The fifteen results had a standard deviation of 7% while the standard error from the true value was 13%. This indicates that the instrument is capable of detecting at least 10 µg/liter in urine.

Biological Monitoring

Some of the tissues have been examined from the first testicular implant which was obtained after 37 days exposure. The testicle tissue within 1 mm. of the speck is definitely void of sperm with some evidence of tissue damage. The region to 5 mm. shows definite damage in quantity and quality of sperm. The control testis was normal. A second rabbit with a testicular implant of an active speck was sacrificed after a period of 65 days. No gross changes were observed and the tissues are not yet prepared for study.

A female Pekin duck was sacrificed and all tissues except thyroid and lung were higher than have been obtained previously. Significant values were; thyroid 0.6 pc/kg, bone 0.12 pc/kg, pancreas 0.06 pc/kg, liver 0.046 pc/kg, kidney 0.036, spleen 0.035 pc/kg, muscle 0.02 pc/kg, blood 0.013 pc/kg and lung 0.002 pc/kg. Egg yolk from this duck had 0.065 pc/kg while other egg yolks checked had about 0.05 pc/kg. No activity has been found in egg albumen.

then

Data on decay of activity of an alpha sample has been obtained for a period of 410 days. Analysis of the data shows that 50% of the original activity was due to 14.8 hr. Ra^{224}, 35% has a half life of about 15 days, 15% has a half life of about 100 days and 4% has a very long half life.

Fish Laboratory

Studies on the effect of exposing chinook salmon to concentrations of area effluent water ranging from one part effluent to five parts river water to one part effluent to two-hundred fifty parts river water have been continued. Fish subjected to 1:5 or 1:10 concentrations of the area effluent water have shown an increased mortality and retarded growth rate. Dilutions of the strength present in the process water (12.0 p.p.m.) arrests development of the young fish before they are ready to start feeding and causes a high rate of death. The chinook

[redacted]

of fish have been started in refrigerated retention basin water and in pre-pile process water where the original stocks had succumbed.

About fifteen percent of the adult rainbow trout being subjected to the half strength 107 basin water have now spawned and their eggs are developing slowly in the laboratory. Warmer weather will hasten the spawning of the other fish.

Since copper sulfating of the 107 Basin has been considered some tests are being run on the tolerance of young salmon to this chemical. Strengths of 2.0 p.p.m. ($CuSO_4 \cdot 5H_2O$) and 1.0 p.p.m. are soon lethal and mortalities have started after exposures of four or five days at the 0.5 p.p.m. level. A strength of 0.2 p.p.m. is not quickly lethal but appears to inhibit growth of the fish.

The sampling of algae, higher aquatic plants and invertebrate animals living on the bottom of the Columbia River in this vicinity has been continued and accentuated since the river is now at the lowest point of the season. Collections of representative specimens have been transplanted to the laboratory where studies can be continued. Routine sampling of Columbia River fish for activity also continues, being facilitated by better conditions.

Methods Development

The measurement on the $C^{14}O_2$ content of the 100-D pile gas is somewhat ambiguous because of the interference from the S^{35} present in the gas stream. Average values of approximately 10^{-2} μc/liter of soft beta emitters are found in the gas from 100-D. One sample from 100-F gave 4×10^{-3} μc/liter. This difference is not believed to be significant. Attempts are now being made to separate the C^{14} from the S^{35} by chemical means. Several 10 ml. samples of Hexone spiked with plutonium and fission products were burned to determine the hazard of disposing of waste solvent by this means. Less than 0.5% of the fission product activity was found in the gas, condensate, or soot. Results on the plutonium carryover are not yet available. Consistent yields of 70 -75% are being obtained in the development of a procedure for routine other extractions of water samples. Work has been started to evaluate the fission product extraction. Some time has been spent with the Physics group in evaluating the geometry of Bar and Ether GM counters and in assisting in the neutron experiment at 100-D. Preliminary designs for a device for checking mica window GM tubes before use and for a sample changer for the bar counters have been made.

Instrument Development

A successful light weight portable power has been built using a charged condenser as the high voltage source. The unit weighs 24 pounds without a probe and has counted a 2000 c/m source continuously for 4 hours without recharging. Five more units are being constructed so that a thorough

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field check can be given.

The water curtain beta monitor for the 107 Basin effluents has been given some additional shielding and now has a background of about 250 c/m which does not build up with continued operation. The active water gives an additional 450 c/m which is quite usable.

The "Rem" survey meter for fast neutrons proved to be unsatisfactory for use in the field because of the long waiting period necessary when ranges were switched on the instrument. Recent changes in the method of switching have been made which permit readings to be taken more rapidly.

Physics

The entire time of this group was spent in planning and carrying out an experiment in the neutron beam from the "F" hole in the 100-F pile. The experiment was done on February 27 with the aid of additional personnel from the Methods group, the Survey branch and the Technical Department. The data has not yet been analyzed.

Calibrations

One new 500 mg radium source was received. This will facilitate high level calibrations with gamma radiation uncomplicated by the presence of neutrons which are obtained with our present large sized radium beryllium sources.

H M Parker

[redacted]

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Health Instrument Department

The routine calibrations were:

	Number of Calibrations	
RADIOX CALIBRATIONS	**[illegible]**	**[illegible]**
Fixed Instruments:		
Gamma	513	528
Portable Instruments:		
Alpha	50	55
Beta	51	87
Gamma	382	340
X-ray	1	3
Neutron	28	4
Total	522	489
Personnel Meters:		
Beta	1,120	1,262
Gamma	8,541	8,659
X-ray	8,442	2,774
Neutron	4	18
Total	18,107	12,613
GRAND TOTAL	19,148	13,630

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