PRIVACY ACT MATERIAL REMOVED

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OAK RIDGE, TENN.

704963

November 23, 1951

DOE - FORRESTAL
MARKEY FILES
3 OF 6
MISC. "P-Z" 1953

Dr. George A. Hardie
Assistant to Chief
Medical Branch
Division of Biology and Medicine
United States Atomic Energy Commission
Washington 25, D. C.

Dear George:

Attached are two copies of additional report material in the case of _____ reported to you a few weeks ago.

Very cordially yours,

J. S. Felton, M. D.
Medical Director

JSF/as
Encl.

17437

1006648

OAK RIDGE NATIONAL LABORATORY
Health Physics Division

November 9, 1951

To: K. Z. Morgan

From: A. D. Warden

Subject: Exposure Incident Concerning

On October 8, 1951 at approximately 2:30 P.M., an equipment failure resulted in radioactive contamination to the above named employee and approximately 10 square feet of floor space in Bldg. 3030. The material involved was a mixture of rare earths. According to the best available estimate the solution contained the following:

1. Sr^{89} & ^{90}
2. Nd^{147}
3. Pr^{143}
4. Ce^{141} & 144
5. Y^{91}

Ce^{141} and Yttrium^{91} made up the bulk of the solution with the other tabulated isotopes present in much smaller quantity. It was estimated that approximately 8 curies of material were involved in the spill.

The solution sprayed on the employee's chest and neck when air pressure in a flask blew the material out of the solution inlet line. The employee left the building immediately, and walked to the change room in Bldg. 3037, a distance of approximately 60 yards. As the employee entered the shower a quick survey made with a Cutie Pie showed the following results: top of head reading 2 r/hr at 3", chest, neck, and feet read approximately 1 r/hr at 3".

A survey made after the shower and use of pax soap showed the highest body contamination to be 50 mr/hr on the body. A citric acid scrub followed by a versene scrub lowered this reading to 40 mr/hr. Further decontamination efforts were employed at Medical. It was impossible to remove all the outside body contamination. Consequently, the employee has reported to Medical frequently for appraisal of the outside contamination. Table 1, attached, is a record of outside body contamination presented in tabular form. Bar Graphs A and B, giving the same data, are also attached.

In figuring the amount of whole body irradiation absorbed by the employee the film meter results were analyzed. The GW of the sensitive film was blackened to the extent that it could not be read by the ordinary method. Using a specially prepared calibration curve, the amount of exposure on the GW sensitive film was estimated to be 16,000 mr/hr. It was estimated that the employee wore the grossly contaminated coveralls no longer than 10 minutes and possibly less. It was estimated that the film badge remained with the coveralls not less than 20 minutes before being removed for processing. This would seem to indicate that it was possible for the employee to have received as much as 5300 mr, or 1/3 of the 16,000 mr indicated on the film. The figure 5300 mr has been recorded in Personnel Monitoring Files as the probable maximum exposure, and the employee's supervisor is limiting his work with radioactive materials accordingly.

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It was realized immediately after the incident that analysis of the urine would be necessary in estimating possible internal exposure. A plan of collection and analyzing of the employee's urine was instituted immediately following the exposure. Table 2 shows an interesting record of urine specimens collected and analyzed during approximately one month. The specimens are still being collected and will continue to be collected until the results are negligible. Further decay and absorption studies are being made to determine the nature of the activity at the beginning of the excretion period and later.

Attached is a bar graph showing the elimination rate since the exposure on October 8, 1951. The width of the bars give the period covered by the sampling. The height gives the d/m corrected to a 24 hour sample.

Original Signed By

A. D. Warden

ADW:cs

cc: J. S. Felton
J. C. Hart
P. A. Brown
E. L. Sharp
Personnel Monitoring
-PM File

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Table 1

Record of Whole Body Contamination

Date	L.Resp.S.	U.Resp.S.	Abdomen	Thyroid	Kidneys	Ribs	Spine	Lungs	Shoulder Blade	Head
10-12	15187	24894	2487 c/m	L-822 R-249	R-69 L-138	R-1320 L-272	182	R-567 L-740	L-10691	7 mr/hr
10-15	1848	49	1796 c/m	L-431 R-246	R-0 L-62	--	31	--	4297	13212
10-16	2909	66	--	L-298 R-142	R-24 L-46	R-141 L-49	62	--	3835	20842
10-17	2895	162	--	R-38 L-118	R-0 L-8	R-40 L-13	14	R-48 L-40	2008	16791
10-18	1294	629	--	R-42 L-184	R-6 L-0	R-47 L-4	10	R-11 L-29	2283	10309
10-19	1289	73	--	R-45 L-69	R-0 L-8	R-0 L-3	0	R-10 L-69	2042	8618
10-22	731	55	79	R-52 L-183	R-0 L-11	R-27 L-0	0	R-48 L-15	1523	6727
10-23	612	25	140	R-0 L-0	R-0 L-0	R-32 L-11	0	R-25 L-33	982	9420
10-24	811	39	46	R-116 L-199	R-5 L-21	R-23 L-10	14	R-32 L-25	1480	8372
10-25	451	33	901	R-21 L-111	R-0 L-0	R-14 L-13	0	R-47 L-48	1452	7636
10-29	348	34	457	R-0 L-0	R-3 L-0	R-0 L-6	0	R-18 L-0	731	6801
11-8	396	26	62	--	--	--	--	--	116	2552

Readings were taken in Bldg. 2012. A Higginbotham Scaler, scale of 64, employing a thin end window tube, approximately 2 mg/cm^2, was used.

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Table 2

Urinalysis Results for Mixed Fission Products

Collection Period			Gross c/m	c/m Per 24 hours	c/m Per 24 Hour Specimen
Time and Date		Hours			
10:00 am 10-6-51	to 10:00 am 10-7-51	24	6.2	6.2	24.8*
3:00 pm 10-8-51	to 8:00 am 10-9-51	17	4636.0	6546.0	26184.0
1:00 pm 10-11-51	to 7:00 am 10-12-51	18	340.0	450.0	1801.0**
10-11-51	to 10-12-51	8	202.2	607.0	2446.0
4:00 pm 10-12-51	to 4:00 pm 10-13-51	24	457.0	457.0	1829.0
4:00 pm 10-13-51	to 10:00 pm 10-14-51	30	437.0	349.0	1397.0
9:00 am 10-17-51	to 3:30 pm 10-17-51	6.5	75.6	280.0	1120.0
4:00 pm 10-17-51	to 8:00 am 10-23-51	5.66 da	--	107.0	429.0***
8:00 am 10-23-51	to 8:00 am 10-28-51	5 da	--	59.2	237.0***

*This was before the accident.

**Correction was made for loss of part of sample. This correction was probably too low.

***This is a composit sample.