

Mallinckrodt

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NUCLEAR

RADIOPHARMACEUTICALS

December 18, 1967

Director, Division of Compliance
U. S. Atomic Energy Commission
1717 "H" Street
Washington, D.C. 20545

Dear Sir:

Two incidents occurred during May, June, and July, 1967 involving the same individual, which are being reported as requested.

First Incident

An incident occurred on May 5, 1967 involving the diagnostic capsule production machine which resulted in gross contamination of the operator's hair. A high vacuum pump and a large vacuum flask containing water had routinely been used to "vacuum up" the small amount of granular sodium phosphate which is spilled inside the hood during the filling operation. The vacuum tube became plugged with sodium phosphate. While attempting to unplug the tubing, the vacuum flask was jarred and imploded. The water containing the dissolved sodium phosphate was splashed about the room and onto the back of the operator's head and the back of the protective clothing being worn. The operator immediately vacated the room, removed the contaminated clothing, and contacted the Health Physics Department. An estimated 20 to 50 microcuries of ^{131}I was in the hair on the back of the individual's head. Decontamination resulted in a residual activity of approximately 1 microcurie fixed in the hair. Decontamination of the room was later effected by Health Physics Department personnel.

A thyroid burden measurement was performed which indicated the presence of 6 times the permissible quantity of ^{131}I , or about 0.84 microcurie. It was not possible to measure the actual thyroid burden without also measuring the hair contamination. The total measured value was recorded as a "thyroid burden" for the purpose of following the decay of the activity and its removal from the hair. The average of this value and others recorded during the week resulted in a value of 3.60 times permissible, or 0.50 microcurie. We did not consider this incident to be one which resulted in an exposure to the thyroid gland of the individual. However, the individual was restricted from work with ^{131}I to assure that an actual increase in her thyroid burden would not be masked by the activity fixed in her hair. She was permitted to resume work with ^{131}I after the activity had decayed to less than 0.07 microcurie.

Information in this record was deleted
in accordance with the Freedom of Information

Act, exemptions

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The high vacuum pump and vacuum flask were replaced by a commercial vacuum cleaner to prevent a recurrence.

Last Incident

A spill occurred on July 17, 1967 in the oleic acid capsule production glovebox which resulted in gross contamination of the operator's hands. The operator wore standard 10 inch gloves which were inserted through the glovebox sleeves but were not attached to the sleeves by means of the plastic adapter rings. This was an accepted procedure at that time for the routine production of oleic acid capsules. However, a non-routine operation was performed in the same manner which resulted in the hand contamination.

A small amount of solid sodium sulfate used as a drying agent was found in the oleic acid stock solution. This was being removed by hand pressure filtration when the filter head separated from the syringe barrel, causing the oleic acid to be splashed on the interior walls of the glovebox and on the exposed wrist areas of the operator's arms. Some of the oleic acid ran down inside the gloves, causing further contamination. She contacted the Health Physics Department and proceeded to decontaminate her hands.

After secondary decontamination of her hands, a thyroid burden measurement was performed. A value of 3.36 times permissible, or 0.47 microcurie, was recorded.

This individual stated that she had the personal habit of rubbing the back of her neck with her hand when in a state of concern and that she had probably done so between the initial and secondary decontamination of her hands. She did not want to be restricted again from her normal duties and as proof that the measured activity was not in her thyroid gland, she voluntarily cut a lock of her hair. The equivalent "thyroid burden" of the lock of hair was 1.20 times permissible, or 0.17 microcurie. It then was estimated from the external contamination measurements that about 75% of the activity was in her hair rather than in the thyroid gland. This estimate implied a value of 0.85 times permissible in the thyroid gland. Nonetheless, she was again restricted from work with ^{131}I products. The total measured values were recorded as a "thyroid burden" for the same reasons outlined in the first incident.

Several corrective measures were put into effect as a result of this incident.

1. The gloves were attached to the oleic acid glovebox sleeves as a routine procedure.
2. The use of disposable filter heads which do not have Luer-Lock fittings was discontinued.

3. Disposable gloves were required to be worn for general laboratory use. This virtually eliminated the personal habit of this individual with regard to rubbing the back of her neck under situations which could conceivably result in the transfer of activity.

The measured thyroid values of this individual have shown much improvement since this last incident as indicated on the enclosed Fractional Permissible Iodine-131 Thyroid Burden records.

Sincerely yours,

MALLINCKRODT/NUCLEAR

Donald W. Soldan

Donald W. Soldan, Manager
Health Physics Department

DWS:cd

encl.

cc: Manager, Region III
Division of Compliance
U. S. Atomic Energy Commission
Suite 410 Oakbrook Professional Bldg.
Oak Brook, Illinois 60523

December 18, 1967

The individual referred to in this report is [REDACTED]

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1967 FRACTIONAL PERMISSIBLE IODINE-131 THYROID BURDEN
(1 FPTB = 0.14 Microcuries of Iodine-131)

DATE	10-2	10-9	10-16	10-23	10-30	11-6	11-13	11-20	11-27	12-4	12-11		
WEEK	1	2	3	4	5	6	7	8	9	10	11	12	13
MON	.38	.96	.47	.28	.29	.14	.07	.06	0	0	.21		
TUES		.84	.68	.63	.24	.15	.06	0	0	.17	.11		
WEDS	.31	.87	.48	.46	.48	.19	.12	.04	.05	.21	.16		
THURS		.75	.39	.73	.31	.13	.05	Holiday	.07	.04	.08		
FRI	1.58	.38	.40	.38	.31	.25	.06	Holiday	.05	.13	-		
SAT		.76											
AVERAGE	.75	.83	.46	.49	.32	.17	.05	.03	.04	.11	.14		

4th QUARTERLY AVERAGE _____ COMMENTS _____

NAME - Omitted

SOC. SEC. NO Omitted

MALLINCKRODT/NUCLEAR

1967 FRACTIONAL PERMISSIBLE IODINE-131 THYROID BURDEN*

<u>NAME</u>	<u>SOCIAL SECURITY NUMBER</u>		<u>IDENTIFICATION NUMBER</u>	
Omitted	Omitted			
<u>Period of Exposure</u>	<u>1/2/67-4/3/67</u>	<u>4/3/67-7/3/67</u>	<u>7/3/67-10/2/67</u>	<u>10/2/67-1/1/68</u>
<u>Week Starting</u>	<u>1 st. quarter</u>	<u>W. S. 2nd quarter</u>	<u>W. S. 3rd quarter</u>	<u>W. S. 4th quarter</u>
1/2	.78	4/3 .41	7/3 0.86	10/2 .75
1/9	.81	4/10 .69	7/10 -	10/9 .83
1/16	.75	4/17 -- (Vac)	7/17 3.36*	10/16 .48
1/23	.74	4/24 -- (Vac)	7/24 1.75 *	10/23 .49
1/30	.89	5/1 3.60	7/31 1.03*	10/30 .32
2/6	.75	5/8 3.87	8/7 0.36	11/6 .17
2/13	.98	5/15 2.19	8/14 0.64	11/13 .05
2/20	.88	5/22 1.17	8/21 0.55	11/20 .03
2/27	.99	5/29 .79	8/28 0.23	11/27 .04
3/6	.70	6/5 .55	9/4 0.17	12/4 .11
3/13	.43	6/12 .32	9/11 0.20	12/11 .14
3/20	.26	6/19 .27	9/18 0.65	12/18
3/27	.38	6/26 .40	9/25 0.36	12/25
Quarterly Average	.71	1.29	0.84	

* Fractional Permissible Throid Burden based on a permissible quarterly average thyroid burden of 0.14 microcuries of Iodine-131.