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May 12, 1978

Mr. Paul R. Nelson, Chief  
Fuel Facility and Materials  
Safety Branch  
Region I  
U. S. Nuclear Regulatory Commission  
631 Park Avenue  
King of Prussia, Pennsylvania 19406

Dear Mr. Nelson

This report is submitted to provide additional information concerning a discrepancy between the exposure recorded on an individual's film badge and that recorded as a result of self-reading pocket dosimeters. This matter was initially brought to the attention of the Commission on April 13, 1978, via telephone call to your Mr. L. Thonus.

For the period March 9 to 31, 1978, the subject film badge indicates a radiation exposure of 3110 mrem. Dosimeter readings during the same period indicated an exposure of 340 mrem. Readout of three (3) film badges previously issued the individual during the first quarter of 1978 corresponded satisfactorily with dosimeter readings; prior exposures recorded during 1978 are as indicated in the attached table.

Investigation showed that a 12-hour work shift on March 8, 1978, was the only time within the March 9 to 31 period that the subject worked in a radiation field greater than 20 mrem/hr. Detailed surveys performed prior to the start of and during this job showed levels of approximately 100-200 mrem/hr with "hot spots" of 1-3 R/hr. These "hot spots" were shielded but because of the nature of the work, removing reactor cavity floor plates, some of the shielding had to be rearranged to fully expose the retaining bolts before removal. Portions of the shielding were removed for brief time periods under Health Physics surveillance. However, such removal could not have contributed substantially to personnel exposure due to the physical position in which the worker had to be relative to the "hot spots".

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Our investigation also included a resurvey of the work area to examine the possibility of a previously unknown source of radiation. No evidence of such was found.

Continuous Health Physics coverage was provided on this job. This coverage included timing of work during the initial stages of the work followed by readout of workers' dosimeters by the Health Physics Technician. Changes that could potentially alter radiation fields, i.e., removing the lead shielding, were properly controlled and monitored. At least two (2) dosimeters and, for the majority of the time, three (3) dosimeters were worn by the workers.

The subject individual has stated that to the best of his knowledge, dosimeters for each job during the entire March 9 to 31, 1978 period, appeared to be functioning properly, were read and recorded accurately, and were worn in the immediate vicinity of the film badge/TLD holder. In addition, an evaluation of the time period shows that he may have actually been in the determined radiation fields associated with the above described job for a maximum of 4 hours. Seven (7) other persons were involved in that job, with a maximum dose recorded by dosimeter of 395 mrem.

Additional anomalies were noted during the course of the investigation and these involved two other workers on the job in question. Although their indicated quarterly exposure is not in excess of exposure limits as recorded by any dosimetry means, there is nonetheless a significant discrepancy (i.e., 1400 mrem) between their film badge/TLD indicated exposure and that indicated by self-reading pocket dosimeters (3 each). The two men were questioned, and like the subject individual, stated that their pocket dosimeters had been kept in close proximity to their film badge and TLD holder and further, that they were always read and recorded accurately.

Although we are unable to explain the total exposure of the film badges and TLD's issued to the subject three individuals, we are confident that said indices do not truly represent the whole-body exposure of the individuals. Since the nine dosimeters used by the men all yielded readings which were (1) consistent with one another, (2) consistent with the

measured radiation fields in the job area, we have determined that the whole-body exposure of the three subject individuals is more accurately reflected by the self-reading pocket dosimeters. Our film badge processor has been instructed to correct his records accordingly.

Very truly yours

*William J. Hill, Jr.*

SUBJECT'S EXPOSURE COMPILATION 1ST QTR. 1978 (IN MREM)

	<u>FILM</u>	<u>DOSIMETER</u>	<u>TLD</u>
<u>JAN</u>	30	55	20
<u>FEB</u>	150	120	120
<u>MAR</u> (1)	1190	950	1000
(2)	3110*	340	2750*

(1) March 1-8

(2) March 9-31

\*These readings considered non-representative of whole body exposures.