KERR-McGEE NUCLEAR CORPORATION
KERR-McGEE CENTER • OKLAHOMA CITY, OKLAHOMA 73125

October 16, 1974

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Mr. Donald F. Knuth, Director
Directorate of Regulatory Operations
United States Atomic Energy Commission
Washington, D.C. 20545

Re: License #SNM-1174, Docket #70-1193

Dear Mr. Knuth:

Kerr-McGee Nuclear Corporation hereby reports that two employees were potentially exposed to airborne concentrations of insoluble plutonium 239 in excess of the applicable limits.

The potential exposure data is as follows:

Employee	Exposure Period	Average 40 Hr. Concentration
A	July 28 - Aug. 3, 1974	3.71×10^{-10} uCi/ml
B	July 28 - Aug. 3, 1974	1.59×10^{-10} uCi/ml

This possible exposure to these employees occurred during the 4:00 p.m. - midnight work shift on July 31, 1974 in room #133 of the laboratory section in the plutonium plant. Employee A worked over-time until 4:00 a.m. the next morning. She spent approximately 7 hours in the room before midnight, and nearly 4 hours after midnight.

Employee B spent 3 hours in the room before midnight. Another person (employee C) spent 10 minutes in the room and his exposure was estimated to be 8.8 MPC hours.

Employee A was working in glovebox Z, preparing samples for emission spectrography. Not once did employee A, B or employee C notice anything which could have caused an airborne problem. Self monitoring with instruments showed no contamination.

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The two air samples in the room were changed by a health physics technician shortly before midnight. These samples were later found to have high counts. (The air samples for the previous work shift were normal and the next samples, from midnight to 8:00 a.m., were also normal).

After the high samples were discovered on the 8:00 a.m. - 4:00 p.m. shift of 8/1/74, room 133 was posted as a respirator use area, and a careful survey was made for contamination. No contamination was found on box Z, on floors, walls, room exhaust filters or other equipment. A small area on top of glovebox Y had some contamination as did a flange to the vacuum systems above box Y. Decontamination was done. This contamination was not considered to be a contributor to the high air-count samples.

Employees A, B and C were placed on a daily bioassay sampling program for the next 4 days. These samples were analyzed for Pu by a procedure having a lower sensitivity of 0.5 dpm/l (for urine) and 0.5 dpm/kg (for feces). These are rapid procedures. The sample analytical results did not indicate an uptake of Pu. In addition, employee A was in-vivo lung counted later in the day on 8/1/74. The lung count results were negative for both 239 Pu and 241 Am.

The high-count air sample papers were alpha autoradiographed and the resulting photograph showed a pattern not expected for a typical air sample. The high count papers were then subjected to a solubility test and the contaminate was found to be 3.4% soluble and 96.6% insoluble.

The lack of evidence confirming exposure prompted the collection of follow-up urine samples to be analyzed by a lengthy autoradiographic method giving a lower sensitivity of 0.1 dpm. Employee A submitted urine samples on 8/15/75 and 8/25/74. The results of these samples were received on 10/10/74. The results were 3.51 dpm/1100 ml. for the 8/15/74 sample and 4.98 dpm/700 ml. for the 8/25/74 sample.

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Employee A is now on a weekly bioassay sampling program which will be sustained until enough data has been accumulated to assign a burden value or until three consecutive samples have results less than 1.0 dpm.

An initial estimate of intake for employee A from the air sample data is 2.6 nanocuries during the seven hour period in room 133; as follows:

The air concentration averaged 19,479 dpm with a volume of 27,187 liters (960 ft^3) resulting in a concentration of 0.7165 dpm/liter. A woman's light activity breathing rate is 19 liters/minute. In seven hours, 7,980 liters of air containing 5,718 dpm could have been breathed. This is equivalent to 2.6 nanocuries.

Since lung retention of insoluble particulates (50-500 day 1/2 life) is 12½% of the intake, the ultimate lung burden could hardly be more than 0.31 nanocuries. 16.0 nanocuries is the maximum permitted lung burden.

Employees B and C will be bioassay sampled further to determine if any internal deposition of plutonium is present.

Employee A is no longer working with unencapsulated plutonium materials. She now works in an area of very low exposure potential. This work restriction will remain in effect until we are certain that it is no longer necessary.

A copy of this report will be supplied to employees A and B in accordance with Part 19 regulations. In accordance with Part 20.405, the employees' identification and exposure data are listed on the enclosed appendix.

Sincerely yours,

W. J. Shelley, Director
Regulation & Control
Kerr-McGee Nuclear Corporation

WJS:ml

cc: Mr. James Keppler
Mr. Dale McHard

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