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January 28, 1994

LICENSE NO. SNM-33
DOCKET NO. 70-36

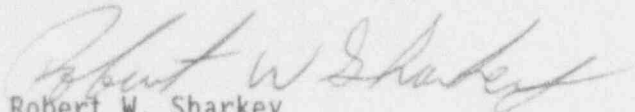
Robert M. Bernero, Director
Office of Material Safety and Safeguards
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: REPORT ON RADIOACTIVITY IN GASEOUS EFFLUENTS EXCEEDING QUARTERLY ALARA LIMIT.

Dear Mr. Bernero:

The subject report is submitted in accordance with Condition S-8.a. of License SNM-33, which requires reporting when radioactivity exceeds 150 microcuries per calendar quarter. The report identifies the cause for exceeding the limit and the corrective actions to be taken to reduce the release rates. Please contact me if there are any questions, or if further information is required.

Cordially yours,


Robert W. Sharkey
Manager, Regulatory Compliance

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cc: John B. Martin, Regional Administrator
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LICENSEE: Combustion Engineering
Hematite, Missouri

January 28, 1994

LICENSE NO.: SNM-33

REPORT ON RADIOACTIVITY IN GASEOUS EFFLUENTS EXCEEDING QUARTERLY LIMIT OF 150 MICROCURIES FOR THE FOURTH QUARTER OF 1993

Summary of Events

Stack releases of radioactivity totaled 433 microcuries for the October-December quarter of 1993. Of this total, 339 microcuries were released from the oxide conversion stack during the month of December, primarily during the plant shutdown period between Christmas and New Year's Day. No processing of UF_6 was conducted during this period, but maintenance activities on the HEPA filter banks were performed.

Maintenance activities consisted of relocating the smoke detectors from the intake side of the three filter housings to a position between the filterbanks. It was necessary to move the detectors, which are also sensitive to dust, to avoid false alarms. The first bank of HEPA filters in each housing was removed for this reason and reinstalled. The sampling period was extended for this stack due to the plant shutdown condition and data analysis was delayed due to the holidays, however, the high samples were reported to Chemical Operations personnel when they returned to the plant at 11:00 p.m. on January 2, 1994. Chemical Operations personnel performed an inspection of the filter banks and noticed that the top section of both front and back banks on the second floor was brittle by HF corrosion. There was also some powder reported between the banks. All filters in this bank were replaced and the filterbanks were DOP tested by Health Physics. The third and fourth floor filterbanks were inspected and found to be in good shape.

Elevated samples continued during the following two weeks, although at a decreasing release rate. During this period additional investigations were conducted to attempt to locate the source of the contamination, as no conditions existed in the conversion process to cause the high samples. Each filter bank was DOP tested and sampling was conducted after each filterbank prior to entrance into the main stack. There was no indication of any leakage. It was suspected that the problem was contamination inside the ventilation ducts after the filterbanks.

Oxide conversion was shut down early in the morning on January 16 and the ventilation systems opened for inspection. The second and third floor housings had a brown dust coating inside the metal ductwork on the exit side after the HEPA filters. The coating extended into the main duct going to the main exhaust blower.

Root Cause

Although several activities contributed to the problem, including cleaning conversion off gas lines and relocation of the smoke detectors, the root cause for the contamination of the ventilation ducts and high stack emissions is the HF coming from the UF_6 to UO_2 conversion process which causes degradation of the HEPA filters.

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Radiological Considerations

Analysis of air samples from the three remote sampling stations surrounding the plant showed normal values for the period of elevated stack releases. Weekly samples collected on December 31 and January 7 had a maximum concentration of 2×10^{-15} microcuries per milliliter.

Although there was degradation of the HEPA filter integrity, no filter media was lost to the stack exhaust. Therefore, no contamination of the roof or immediate environs of the stack would be expected.

Corrective Actions

A full week was spent on cleaning the filterbank housings and the ventilation ducts and the main exhaust fan. It was cleaned with a high pressure water spray washer, which was very effective in removing all visible traces of foreign material.

Corrosion of the ventilation ducts after the second floor filterbank was caused by HF entering this duct just after the filterbank. These emissions will be much lower when the Conversion starts up again since the dry scrubber system will be replaced this winter. The new design has a secondary scrubber to lower the HF content in the off-gas leaving the primary scrubbers. The off-gas piping will be cleaned or replaced before conversion is restarted. Another contributor to the HF problem is the R3 Cyclone, which will be eliminated before the process is restarted.

The UF_6 scrubber will be modified to get a longer residence time and a better gas-liquid contact. This will provide a more complete conversion of UF_6 to UO_2F_2 and a better separation of uranium compounds from the air coming from the vaporizers. The ventilation ducts between this scrubber and the second floor filterbank will also be cleaned. An actuated valve will be installed and interlocked to open only when the scrubber is in operation.