

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 70-36/82-04(DETP)

Docket No. 70-36

License No. SNM-33

Licensee: Combustion Engineering, Inc.
Nuclear Power Systems
Windsor, CT 06905

Facility Name: Hematite facility

Inspection At: Hematite, MO

Inspection Conducted: August 17-20, 1982

Inspector: C. C. Peck

MC Greger for

9/8/82

Approved By: L. R. Greger, Chief
Facilities Radiation
Protection Section

MC Greger

9/8/82

Inspection Summary

Inspection on August 17-20, 1982 (Report No. 70-36/82-04(DETP))

Areas Inspected: Routine, unannounced inspection of radiation protection, radioactive waste management, criticality safety, and audits. The inspection required 29 inspector-hours onsite by one NRC inspector.

Results: No violations were identified.

DETAILS

1. Persons Contacted

*J. A. Rode, Plant Manager
*H. E. Eskridge, Nuclear Licensing, Safety, and Accountability Supervisor
*L. J. Swallow, Quality Assurance Manager
*A. J. Noack, Production Superintendent
R. C. Miller, Production and Materials Control Supervisor
*J. G. Abernathy, Radiation Specialist
*L. F. Deul, Engineer
*R. W. Griscom, Engineering Supervisor
J. D. Harter, Material Control Foreman

*Denotes those present at exit meeting.

2. General

The inspection began at 8:00 a.m. on August 17, 1982, and was concluded on August 20, 1982. Normal production of uranium oxide powder and pellets was in progress.

3. License Status

The licensee submitted an application for renewal of License No. SNM-33 before its expiration date on March 31, 1982. The license is in timely renewal.

Amendment No. 8 to SNM-33, incorporating the facility Radiological Contingency Plan into the license, was issued on June 9, 1982. A 90-day period for implementing the plan was in effect during the inspection.

4. Criticality Safety

The annual calibration of criticality monitoring instruments was conducted in July 1982. Vacuum tubes were replaced, sensitivity adjustments made, and each instrument calibrated with a cobalt-60 source. The instruments were set to alarm at 10 mR/hr. All appeared operable during the inspection. The licensee reported that a false nuclear alarm occurred on March 7, 1982. Evacuation was accomplished without incident. Re-entry disclosed no reason for the response of the instrument that caused activation of the alarm. The instrument has functioned normally since resetting.

The incinerator authorized by Amendment No. 4 to SNM-33 in 1979 continues to be used extensively for volume reduction of combustible waste and recovery of uranium. Licensee data indicate a volume reduction of 99.7 percent. Scrubber solutions in the primary venturi and secondary packed tower scrubbers are sampled weekly and analyzed for uranium concentration as required. Concentrations have been

less than 0.1 g/l of uranium. Semiannual visual inspections of Raschig rings in the secondary scrubber have disclosed no abnormalities. Recently, the interior of the scrubber was rebuilt. The licensee attributes an accumulation of about 15 kgs of material containing 0.5 kgs of uranium that were found in the system heat exchanger to a failure of the original incinerator interior causing an incorrect air flow to the exchanger. The material was removed.

The annual inspection of boron Raschig rings in the two filtrate hold tanks and the blend tank in the recycle-recovery area was performed. The rings were clean and no chipped, cracked, or broken rings were found. A sample of rings was sent to an outside laboratory for boron analysis. The licensee said results will be available before startup of the wet recovery system.

5. Radiation Protection

a. Urinalyses

Monthly samples for urinalysis by a contractor laboratory are submitted by all operators. Volumes of about 250 ml are collected at home on weekends and submitted before return to work. Samples are analyzed by a fluorometric method having a detection limit of 5 $\mu\text{g/l}$. Early in 1982, the licensee reduced the action point from 50 $\mu\text{g/l}$ to 25 $\mu\text{g/l}$.

Results of all urinalyses in the first half of 1982 averaged about 6 $\mu\text{g/l}$, assuming that samples reported to contain less than 5 $\mu\text{g/l}$ had a concentration of 5 $\mu\text{g/l}$. The concentration of one sample was 50 $\mu\text{g/l}$. Investigation disclosed no apparent cause for the elevated concentration. This plus a concentration of 5 $\mu\text{g/l}$ for a sample taken seven days later lead to the conclusion that the high concentration was caused by a contaminated sample or represented a minor exposure of less than 40 MPC-hours to soluble uranium.

The two samples were taken only seven days apart because the individual involved submitted monthly samples late in one month and early in the following month. If the time span had been the usual month or longer, a conclusion that 50 $\mu\text{g/l}$ represented no significant exposure would not be justified. In discussions of the problem during the inspection and at the exit meeting, the licensee agreed either to adopt a biweekly urinalysis schedule for oxide plant operators or to get a firm commitment from a laboratory to report sample and resample results promptly. This matter was discussed at the exit meeting and will be reviewed further during a future inspection.

b. In-vivo Counting

The services of a mobile counting unit are engaged twice a year. Two sessions are scheduled in order that each shift operator may be counted once annually. About 40 percent of the operators were

counted in June 1982. No counts exceeded 130 μg of uranium-235, the point at which work restrictions are imposed. Another series of counts is planned later in 1982.

The possibility of reducing the counting sessions to once per year in future years was discussed. The inspector said such a plan would be acceptable provided all potentially exposed employees are counted annually as at present.

c. Air Sampling

Air is sampled continuously at about 30 fixed operating locations. Samples are counted daily. Examination of data disclosed only a few sample results that approached or exceeded the MPC for insoluble uranium ($1\text{E}-10 \mu\text{Ci/ml}$).

Lapel samplers are the basis for calculating worker exposures. Daily, weekly, and quarterly MPC-hour totals are calculated for each operator. Pellet plant operators assigned to the operation of the pellet presses and the agglomerator station, where press feed is prepared, generally receive more exposure than other operators. In the third quarter of 1981, when the pellet plant was not operated, weekly exposures for all operators averaged about 7 MPC-hours. Since the startup of the presses in the fourth quarter of 1981, weekly exposures have averaged about 11 MPC-hours. The increase is attributed primarily to pellet plant operations. However, there have been no weekly exposures exceeding 40 MPC-hours, the control point for exposures to insoluble uranium dioxide. The licensee has established an action point of 32 MPC-hours, at which point work restrictions may be imposed.

The licensee has made some changes and plans additional efforts to improve exposures in the pellet plant. Ventilation at the presses has been modified by the installation of individual exhaust and filter systems for each press. The size of press feed batches is to be doubled, which will reduce the time required in handling the feed hoppers. Contamination problems at the agglomerator station were discussed, including the merits of a cleanup at the end of each shift. The licensee also stated that engineering design changes in this area were planned. These matters were discussed during the exit meeting and will be reviewed further during a future inspection.

d. Surveys

Records of smear surveys of materials and equipment released from the plant, of respiratory equipment, and of operating areas were examined. No problems with the survey system or results were evident.

Elevated contamination levels in the vicinity of the agglomerator station exist frequently. High survey results are reported to the responsible production foreman. After cleanup, the area is resurveyed. Judging from the survey data, cleanup is sometimes ineffective. The problem was discussed at the exit meeting and will be reviewed further during a future inspection.

6. Radioactive Waste Management

A shipment of solid waste to a licensed burial site was made in May 1982, the first shipment in a year. The shipment consisted of 55-gallon drums containing either low specific activity or limited quantities of low enriched uranium. Examination of shipping papers disclosed that packaging, marking, and paperwork were as required by regulations.

Drums containing sludge that was excavated from two abandoned onsite lagoons are being heated to dry the material in preparation for disposal at a waste burial site. Disposition of the waste may be a problem because the one burial site licensed to receive special nuclear material is limited to 350 grams of SNM above ground. Analyses disclose that the sludge will contain much more than 350 grams, meaning that multiple shipments would be required if the condition in the burial site license is intended to limit the contents of a shipment to 350 grams of SNM.

Liquid and airborne releases were not inspected in detail. The licensee's semiannual effluent monitoring report for January - June 1982 indicated that quantities of radioactivity released from the plant were small and of the same order of magnitude as in previous periods. Liquid concentrations averaged $2.1 \text{ E-9 } \mu\text{Ci/ml}$ (about 0.007% of MPC). Airborne concentrations averaged $3.7 \text{ E-13 } \mu\text{Ci/ml}$ when released from the stacks. This is about 9 percent of the MPC for release to an unrestricted area without application of dilution factors.

7. Audits

The Nuclear Licensing, Safety and Accountability Supervisor continues to perform and document weekly safety inspections. Monthly criticality inspections are made by the Quality Assurance Manager. These inspections are required by the current license. In their application for license renewal, the licensee proposes to reduce the frequency of these inspections to monthly and quarterly. At the present frequency, the NLS and A Supervisor and the QA Manager often have nothing of substance to document, so a reduced audit frequency appears acceptable. This will reduce paperwork but should cause no loss in the effectiveness of the audit program because both the NLS and A Supervisor and QA Manager tour the plant almost daily.

8. Exit Meeting

The inspector met with licensee representatives identified in Section 1 at the conclusion of the inspection. Matters discussed included the following:

- a. Airborne radioactivity in the pellet plant. (Section 5.c)
- b. Surface contamination at the agglomeration station.
(Sections 5.c and 5.d)
- c. More frequent urinalyses for oxide plant employees. (Section 5.a)