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SEP 4 1980

Docket No. 70-36 80-04

Combustion Engineering, Inc.
ATTN: Mr. H. V. Lichtenberger
Vice President
Manufacturing
Nuclear Power Systems
Windsor, CT 06095

Gentlemen:

This refers to the routine inspection conducted by Mr. C. C. Peck of this office on August 12-15, 1980, of activities at your Hematite facility authorized by NRC Special Nuclear Material License No. SNM-33 and to the discussion of our findings with Mr. J. A. Rode and members of his staff at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

No items of noncompliance with NRC requirements were identified during the course of this inspection.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

MI-4

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

A. B. Davis, Chief
Fuel Facility and
Materials Safety Branch

Enclosure: IE Inspection
Report No. 70-036/80-04

cc w/encl:
Mr. J. A. Rode, Plant
Manager
Central Files
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U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 70-036/80-04

Docket No. 70-036 License No. SNM-33

Licensee: Combustion Engineering, Inc.
Nuclear Power Systems
Windsor, CT 06095

Facility Name: Hematite

Inspection At: Hematite, MO

Inspection Conducted: August 12-15, 1980

Inspector: for W. L. Fisher C. C. Peck 9/2/80

Approved By: W. L. Fisher, Chief 9/2/80
Fuel Facility Projects and
Radiation Support Section

Inspection Summary

Inspection on August 12-15, 1980 (Report No. 70-036/80-04)
Areas Inspected: Routine, unannounced health and safety inspection, including: organization, facility changes, internal audits, external exposure control, internal exposure control, liquid effluents, gaseous effluents, and training. The inspection involved 27 inspector-hours onsite by one NRC inspector.
Results: No items of noncompliance or deviations 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
*R. C. Miller, Production and Materials Control Supervisor
*G. Abernathy, Health and Safety Technician
*A. G. Swaringin, Production Superintendent
C. C. Hirscher, Engineer

In addition to the inspector, R. L. Stevenson of NMSS represented NRC throughout the inspection.

*Denotes those present at the exit interview.

### 2. General

The inspection began at 8:15 a.m. on August 12, 1980. The NRC representatives toured plant operating areas during the first day of the inspection and revisited areas of interest during subsequent progress. No unsafe conditions or practices were observed.

### 3. Organization

There have been no changes in plant management, supervision, or the health and safety organization since the last health and safety inspection on February 26-28, 1980 (Report 70-036/80-01).

### 4. Facility Changes

There have been no recent developments in long range plans to construct additional production facilities.

The licensee documents modifications to equipment and systems. The review and approval of the Nuclear Licensing, Safety and Accountability Supervisor and the Quality Assurance Manager, who reports to the corporate QA Manager, are required. The industrial, radiation and criticality safety significance of each change are considered in these reviews. Changes approved in 1980 were examined (numbers 051 through 058). The safety implications of each were documented. None of the changes appeared to have any potential for reducing plant safety.

The inspector observed that new instruments for detecting uranium hexafluoride leaks were being installed on the steam chambers where $UF_6$ is vaporized in the first step of the process. The new instruments, like the old, are activated by electrical conductivity.

Increased reliability and sensitivity are expected from the new instruments.

No items of noncompliance were identified.

5. Radiation Protection

a. External Exposure Control

Film badges are changed quarterly. Records of exposures from July 1979 through June 1980 disclosed that no individual exposures approached 1.25 rems in any quarter.

b. Internal Exposure Control

Continuous air samplers are positioned at about 30 locations in operating areas. Samples are counted daily. One continuous sampler located on the highest level of the oxide building has an alarm function and detects high air activity. Sample results were examined for the period since the inspection in February 1980. No concentrations exceeding the MPC of 1E-10 uCi/ml for periods exceeding one day were found.

Lapel samplers are the principal means of determining the exposure of individuals to airborne activity. Fixed air sample results are used as leak monitors and to determine exposure when lapel sample information is not available. Each production worker is required to wear a lapel sampler at least two shifts a week. Maintenance people are assigned samplers once a week. In assigning the samplers, preference is given to work in areas where air activity is most likely to be high. Lapel sample data for the first half of 1980 were inspected. There were no instances of exposures exceeding 40 MPC-hours in any week. The highest individual exposure for any week was 28 MPC-hours. For all employees, the average weekly exposure appeared to be about 9 MPC-hours.

Urinalyses are required monthly for all production and maintenance employees. Other employees submit semiannual samples. Samples are analyzed for uranium by an outside laboratory using the fluorometric method with a detection limit of 5 micrograms/liter. Confirmed concentrations greater than 50 micrograms per liter are investigated and workers whose samples exceed 100 micrograms per liter are subject to work restrictions. Results of samples submitted in the first half of 1980 exceeded 50 micrograms/liter in one instance. The resample was about 12 micrograms/liter.

In vivo counting for uranium-235 is conducted twice a year by an outside company. Workers whose counts exceed 130 micrograms, approximately half the maximum permissible body burden, are restricted. A series of counts in April 1980 showed one individual with a count of 137 micrograms. A recount the following day was 68 micrograms. One individual who had been in a restricted work status as a result of a September 1979 count of 139, counted 63 in April. The average for all individuals counted was about 50 micrograms. The 2-sigma uncertainty of the measurements is about 45 micrograms.

No items of noncompliance were identified.

6. Radioactive Waste Management

a. Liquid Effluents

The licensee releases small quantities of radioactivity to a pond outside the fenced area. Flow from the pond is continuously sampled at a dam which flows to an onsite creek. Samples are analyzed monthly by an outside laboratory for gross alpha and gross beta activity. The principal source of the activity released to the pond is plant laundry solution containing traces of uranium. The average amount of uranium released in 1979 was about 25 grams per month; the average in 1980 has been lower, because of the installation of a filter press in the pipeline from the laundry. Results in picocuries per liter for monthly samples taken at the dam are summarized below:

| | Alpha | Alpha MPC | Beta | Beta MPC |
|---|---|---|---|---|
| Average 1979 | 53 | 30,000 | 49 | 20,000 |
| Average 1980 (6 mos.) | 27 | 30,000 | 28 | 20,000 |

The status of the two small lagoons or evaporation ponds located within the plant perimeter fence was reviewed. One of these lagoons has an area of about 900 $ft^2$. The other is an overflow of waste solutions containing low concentrations of uranium, some highly enriched. From 1976 to 1978 potassium hydroxide scrubber solution containing low enriched uranium was the principal material transferred to the lagoons. The lagoons are not lined. Quantities of lime discarded over the years perhaps serve to impede the migration of radionuclides. In late 1978, discharge of liquids to the lagoons was discontinued.

There are three monitoring wells to detect the migration of radioactivity. The Missouri Department of Natural Resources was consulted concerning location and design of the wells. One well is located about 25 feet south of the lagoons in the direction of Joachim Creek, the assumed direction of water flow.

The other two wells are about 100 feet southeast and southwest of the first well. The three wells form an equilateral triangle. Depth of all wells is about twenty feet. When the southwest well was found to be dry, an adjacent well about forty feet deep was dug.

The wells are sampled monthly; analyses for gross alpha and gross beta activity are performed by an outside laboratory. Gross alpha results for samples taken from the well nearest the lagoons averaged 25 picocuries per liter in 1979. Gross beta, representing primarily technicium-99, averaged 440 picocuries per liter in the same period. The gross beta measurements have decreased significantly from a peak of 4800 picocuries perliter in August 1978. Samples from the other two monitoring wells have shown no positive evidence of radionuclides from the lagoons.

b. Gaseous Effluents

Stack effluents are continuously sampled and the samples are counted weekly. Licensee measurement data show that concentrations have been well below the MPC of 1E-10 μCi/ml for uranium-234 for each of the stacks. The licensee's calculation of concentrations at the site boundary indicate an average concentration in 1980 of 0.002 percent MPC.

Early operations of the waste incinerator caused relatively high effluent concentrations at one stack (S230). The condition was corrected by an adjustment in the air flow to the incinerator.

No items of noncompliance were identified.

7. Training

Employees are retrained at monthly safety meetings, which include industrial and radiological safety subjects. Three meetings a year are devoted to training in emergency procedures, radiation safety, and criticality safety. The licensee has recently strengthened the program by using written quizzes.

No items of noncompliance were identified.

8. Internal Audits

The most recent semiannual audit conducted by auditors from Windsor was examined. Among other findings, the auditors observed that some uranium oxide shipping containers (CE-250-2) were without studs or had stripped studs. Inspection procedures were changed to correct the situation.

The weekly safety inspections by the Nuclear Licensing, Safety, and Accountability Supervisor continue, as does a monthly criticality audit by the Quality Assurance Manager.

No items of noncompliance were identified.

9. Compliance with Environmental Protection Agency Effluent Requirements

EPA regulations require that planned effluent releases from fuel cycle plants be limited so that no member of the public will receive an annual dose equivalent of more than 25 millirems to the whole body. NRC license No. SNM-33 was therefore amended to require the licensee to report gaseous effluents exceeding 150 microcuries per quarter. Samples taken at the north air monitoring station indicate that effluents have been a small fraction of that quantity.

No items of noncompliance were identified.

10. Exit Interview

The NRC representatives met with licensee representatives identified in Paragraph 1 at the close of the inspection. The inspector described the scope of the inspection and stated that no items of noncompliance had been found.

The retraining program and possible ways to improve the system of identifying empty containers were discussed.