

070-00036



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137

April 15, 1983

*Release*

Docket No. 70-36

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

Gentlemen:

This refers to the routine safety inspection conducted by Messrs. C. C. Peck and A. G. Januska of this office on March 15-18 and 23-24, 1983, 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 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractors) believe to be exempt from disclosure under 10 CFR 9.5(a)(4), it is necessary that you (a) notify this office by telephone within ten (10) days from the date of this letter of your intention to file a request for withholding; and (b) submit within twenty-five (25) days from the date of this letter a written application to this office to withhold such information. If your receipt of this letter has been delayed such that less than seven (7) days are available for your review, please notify this office promptly so that a new due date may be established. Consistent with Section 2.790(b)(1), any such application must be accompanied by an affidavit executed by the owner of the information which identifies the document or part sought to be withheld, and which contains a full statement of the reasons which are the bases for the claim that the information should be withheld from public disclosure. This section further requires the statement to address with specificity the considerations listed in 10 CFR 2.790(b)(4). The information sought to be

*M-18*

Combustion Engineering, Inc.

2

April 15, 1983

withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified periods noted above, a copy of this letter and the enclosed inspection report will be placed in the Public Document Room.

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

Sincerely,

*M. Schumacher for*

C. J. Paperiello, Chief  
Emergency Preparedness and  
Radiological Safety Branch

Enclosure: Inspection Report  
No. 70-036/83-01(DRMS)

cc w/encl:  
J. A. Rode, Plant Manager  
DMB/Document Control Desk (RIDS)

RIII  
*Peck*  
Peck/jp  
4/13/82

RIII  
*(Januska)*  
Januska

RIII  
*(Gregor)*  
Gregor

RIII  
*(Schumacher)*  
Schumacher

RIII  
*(Ridgway)*  
Ridgway

RIII  
*(Paperiello)*  
Paperiello

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 70-036/83-01(DRMS)

Docket No. 70-036

License No. SNM-33

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

Facility Name: Hematite

Inspection At: Hematite, MO

Inspection Conducted: March 15-18 and 23-24, 1983

Inspectors: C. C. Peck *CC Peck*

*A. G. Januska*  
A. G. Januska

*L. R. Greger*

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

4/14/83

4/14/83

4/14/83

Inspection Summary:

Inspection on March 15-18 and 23-24, 1983 (Report No. 70-036/83-01(DRMS))

Areas Inspected: Routine, unannounced safety inspection, including: organization, facility changes, radiation protection, radioactive waste management, environmental monitoring, and confirmatory measurements. The inspection required 40 onsite hours by two NRC inspectors.

Results: No violations were identified.

- DETAILS

1. Persons Contacted

- (1)(2) L. F. Deul, Engineer
- (1)(2) H. E. Eskridge, Nuclear Licensing, Safety, and Accountability  
Supervisor
  - (1) R. W. Griscom, Engineering Supervisor
  - J. D. Harter, Material Control Foreman
  - (2) G. McKay, Safety Technician
  - (1) R. C. Miller, Production and Materials Control Supervisor
  - (1) A. J. Noack, Production Superintendent
  - (1) J. A. Rode, Plant Manager
- (1)(2) L. J. Swallow, Quality Assurance Manager
  - N. Wilpur, Safety Technician

- (1) Denotes those present at exit interview on March 18.
- (2) Denotes those present at exit interview on March 24.

2. General

The inspection began at 8:00 a.m. on March 15, 1983, and was concluded on March 24. Normal production of uranium oxide powder and pellets was observed during tours of the facility.

The licensee applied for renewal of License No. SNM-33 before expiration in March 1982 and is operating in timely renewal. The renewal process is in progress.

3. Organization

J. G. Abernathy, Radiation Specialist, terminated his employment with the licensee in early March. The licensee is seeking a replacement. Three safety technicians on rotating shifts have assumed some of the specialist's coordinating and record keeping functions until a replacement can be found.

4. Facility Modifications

The inspector examined documentation for all changes made since February 1982 (Report No. 70-036/82-01). Safety and criticality considerations were addressed in all cases. The changes included:

- a. Addition of an external cooling coil to the precipitator in the wet scrap recovery process. The coil will permit operation of the system in warm weather, previously impractical because of the decomposition of the hydrogen peroxide precipitant by heat.
- b. A revision to the vacuum system at the pellet presses. A separate system for each of the two presses was provided to improve air flow and reduce airborne radioactivity at the presses.

- c. Installation of a new hood and pneumatic transfer system to eliminate manual transfer of uranium dioxide powder to the agglomeration stations. This change is also intended to reduce airborne activity in the pellet plant.
- d. Installation of a new incinerator. The unit is near the incinerator installed and approved in 1979 by Amendment 4 to SNM-33. The additional incinerator will exhaust through the same heat exchanger scrubber system and continuously sampled stack as the existing incinerator. The two incinerators are not to be operated simultaneously. Only some trial runs with nonradioactive combustibles have been made in the new unit thus far. The inspector concluded that a license amendment would not be necessary, but that the license should be revised as appropriate after all engineering changes have been made and routine operating procedures have been developed.
- e. Installation in March of a constant alpha air monitor above the pellet presses to detect high airborne radioactivity concentrations.

## 5. Radiation Protection

### a. Air Sampling

Exposures to individuals continue to be based on airborne concentrations determined by lapel samplers. Exposures in the pellet plant tend to be higher than elsewhere. This tendency continued during recent months despite the engineering changes described in Section 4. Weekly exposures for all workers in the plant averaged about 10 MPC-hours during the fourth quarter of 1982, about the same as in preceding quarters. No exposures exceeded 40 MPC-hours in one week, the control level for the insoluble uranium oxide in the pellet plant.

A limited amount of 1982 data, comparing airborne concentrations measured at the pellet presses by fixed air samplers with those measured by lapel samplers worn by individuals working at the presses, disclosed the lapel sample concentrations to be higher by factors up to five. These data are questionable because the fixed sampler measures the airborne activity at the press for an entire shift while the lapel sampler is normally in the press area less than half the shift and is normally in atmospheres with lower or negligible concentrations the remainder of the time.

The licensee collected additional data in February 1983. In addition to the fixed sampler and the lapel sampler worn by the worker at the press, a second lapel sampler was mounted close to the fixed sampler. Concentrations measured by the three sampling methods were obtained for eleven shifts. Average concentrations for the three methods were:

Fixed Sampler	0.36 E-10 uCi/ml
Lapel Sampler Adjacent to Fixed Sampler	0.43 E-10 uCi/ml
Lapel Sampler worn by worker	0.62 E-10 uCi/ml

Thus the data show reasonably good agreement between the fixed sampler and the lapel sampler mounted close to it; the lapel sample results averaged 19 percent higher. Concentrations measured by the lapel samplers worn by the workers, however, average 72 percent higher than the fixed sampler and 44 percent higher than the mounted lapel sampler. The distance between samplers was not more than about one foot when the operator was at the press. The licensee believes that lapel samplers worn by workers become contaminated in some unknown way, perhaps associated with handling. Further data will be collected by the licensee in an attempt to resolve this matter. Until the matter is resolved, the licensee will continue to calculate workers' airborne exposures based on their lapel sampler data. This matter will be reviewed further during a future inspection.

b. Urinalysis

Monthly analyses since the inspection in August 1982 disclosed no concentrations above the action point of 25 ug/l. Most concentrations were less than the detection limit of 5 ug/l.

Beginning in January 1982, analyses have been done by the Corporation's laboratory at Windsor rather than an outside contractor laboratory. The change was made to reduce the time required to obtain results, a subject discussed during the previous inspection. An elevated concentration reported more than a month after sampling would offer little opportunity to determine the cause, magnitude, or validity of an exposure to soluble uranium. The Windsor laboratory agreed to report results within a week of sample receipt. The fluorometric technique is used. Several aliquots are spiked with different amounts of uranium, permitting extrapolation of a curve down to a detection limit of 1 ug/l. Most reported results have been less than 1 ug/l. The highest concentration reported was 7 ug/l.

c. In Vivo Counting

The second 1982 series of counts, conducted in November, included those not counted in June and those whose counts were previously relatively high. No counts exceeded 100 ug of uranium-235 except for one individual who has been restricted from work with uranium for many years. The licensee's action level is 130 ug.

d. Surveys

Routine smear survey data for personnel areas were examined. The lunch and break rooms are surveyed and cleaned daily.

While no significant contamination levels were identified it was noted that counts above background were frequently detected on a small table in the break room, an area within the pellet plant. The cause was not obvious since clothing, monitoring, and hygiene controls seem adequate. In discussions with the licensee, it was agreed that food and beverages should not be permitted in the break room because access is through operating areas.

## 6. Radioactive Waste Management -

### a. Solid Wastes

Records of recent shipments of low specific activity waste to the burial site at Barnwell, SC were inspected. Shipping papers, survey records, and certifications indicated there were no problems.

The inspector read the draft report of a survey of the former waste burial site on the licensee's property, conducted by an NRC contractor. Materials and equipment contaminated with uranium were buried as permitted by 10 CFR Part 20 until about 1970. Many shafts for core sampling and several monitoring wells were sunk. The report concluded that relatively small quantities were buried and the buried material is essentially stable. The highest sample concentration found was 38 picocuries of uranium-238 per gram of soil. Most concentrations were significantly less.

### b. Liquid Wastes

Waste water from the laundry remains the only radioactive liquid released from the facility. Measured volumes are sampled and discharged through the storm sewer to the site pond which flows to Joachim Creek. Quantities released have been less than 25 grams of uranium per month, and concentrations are well within the MPC for release to an unrestricted area.

### c. Airborne Releases

Ten stacks are continuously sampled when the associated equipment is in operation. The filters are changed and analyzed weekly. Records disclosed that stack velocities were measured at least annually in 1982 and that concentrations at the stacks were generally less than the MPC for release to an unrestricted area. The average concentration of all effluent released during 1982 was 4.05 E-13 microcuries/ml. This is about 10 percent of the permissible concentration for insoluble uranium-234, the most restrictive isotope.

## 7. Audits

The semiannual nuclear safety audit of the Hematite criticality specialist was reviewed. The audit pointed out several problems concerning difficulties in placing and wording criticality signs. The auditor questioned need for some of the signs. A response to the audit is being prepared by licensee management.

The annual audit of the Nuclear Safety Program by Windsor representatives, required by License SNM-33, was conducted in December 1982.

The inspector reviewed weekly inspections by the Nuclear Licensing, Safety, and Accountability Supervisor.

No significant problems were noted concerning the audits and inspections.

## 8. Environmental Monitoring Program

The Nuclear Licensing, Safety and Accountability Supervisor manages the Radiological Environmental Monitoring Program (REMP). Samples are collected by the licensee and analyzed by either the licensee or by an Environmental Contractor as appropriate. In January 1983, the licensee contracted with Teledyne Isotopes to provide analyses of certain environmental samples and with Controls for Environmental Pollution (CEP) for analyses of others.

The licensee's REMP was examined and found to be as described in the Environmental Impact Appraisal and the facility license. The inspector examined CEP data, the licensee's Environmental Log, and a running Summary of soil, vegetation, offsite liquid effluent, and environmental liquid samples for 1980 through 1982. The program results were found to be complete with no anomalous results. In addition to sample results, the Environmental Log contained notations on problems encountered at certain sampling stations. Samples missed due to climatic conditions were properly noted.

The inspector visited several offsite sampling locations during the Confirmatory Measurements sample split. Required air sampling systems were found to be operable.

Although the licensee has a monitoring program for fluoride release, the details and implementation were not examined during this inspection.

No items of noncompliance were identified.

## 9. Quality Control of Laboratory Analyses

The licensee's program for assuring quality in analyses of effluent and environmental samples was examined. The licensee has procedures for environmental samples which include frequency, location, analyses, preparation and shipping of samples, and for calibration of counting equipment used for samples counted by the licensee. The licensee performs and records background counts once per operating shift and weekly efficiency checks.

Although a review of the efficiency data revealed no anomalies, the inspector discussed the age of the standard being used and the need for a recertification of its activity.

The licensee plans to perform a Quality Assurance Audit of Teledyne Isotopes early this year as an addition to an annual product audit.

No items of noncompliance were identified.

## 10. Confirmatory Measurements

During the inspection, a laundry waste tank effluent sample and an air particulate effluent sample were collected in addition to environmental



samples from Joachim Creek, the north monitoring well, and soil and vegetation from Station 13. The samples will be analyzed by the NRC Reference Laboratory and the licensee. The licensee agreed to send his results to Region III. These results will be compared to those of the NRC and sent to the licensee as an addendum to this report.

11. Exit Interview

The inspectors met with licensee representatives denoted in Section 1 on March 18 and 24, 1983. The inspectors summarized the scope of the inspection. The following matters were discussed:

- a. The comparison between fixed location samplers and lapel samplers as a means of determining employee exposure. (Section 5.a)
- b. Contamination controls in personnel areas. (Section 5.d)
- c. Possible changes and simplification to the criticality sign system as suggested in the semiannual audit. (Section 7)
- d. Recertification of the activity of the standard used for weekly efficiency checks. (Section 9)
- e. Environmental samples that were split with NRC. The licensee agreed to send Region III the results of their analyses. (Section 10).