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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

July 19, 1996

ABB Combustion Engineering Nuclear Fuel  
Combustion Engineering, Inc.  
ATTN: Dr. B.J. Kaiser, Vice President  
Fuel Operations  
Hematite Nuclear Fuel Manufacturing  
P.O. Box 107  
3300 State Road P  
Hematite, MO 63047

SUBJECT: NOTICE OF VIOLATION (NRC INSPECTION REPORT NO. 70-36/96-202)

Dear Dr. Kaiser:

This refers to the inspection conducted by Messrs. J. Roth, G. A. Smith, and W. M. Troskoski of this office, J. Jacobson of the Region III office, and Dr. D. A. Outlaw and C. Robinson, U. S. Nuclear Regulatory Commission contractors, on May 20 through 24, 1996. The inspection included a review of activities for the Hematite facility. At the conclusion of the inspection, the findings were discussed with you and those members of your staff identified in the report.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures, representative records, interviews with personnel, and observations of activities in progress.

Based on the results of this inspection, three violations were identified by the NRC and are cited in the enclosed Notice of Violation (Notice). In addition, we reviewed a number of related issues that were identified by your staff as either part of the corrective actions for EA 96-002 or other internal audits and investigations. At the exit meeting (and subsequently documented in your letter of June 7, 1996), you indicated that, based on the results of the Annual Criticality Safety Audit, the investigation of a recent reportable event, and the preliminary NRC inspection findings, you recognized the need to enhance the administrative elements of the criticality safety program. You committed to develop a detailed action plan to improve the performance in this functional area. You will be contacted in the near future to schedule a management meeting to discuss those plans prior to submittal to the NRC.

You are required to respond to the enclosed Notice of Violation and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. After reviewing your response to this Notice, including your proposed corrective actions and the results of future inspections, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

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In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Sincerely,

**ORIGINAL SIGNED BY E. Q. TEN EYCK**

Elizabeth Q. Ten Eyck, Director  
 Division of Fuel Cycle  
 Safety and Safeguards, NMSS

Docket No. 70-36  
 License No. SNM-33

Enclosures: As stated

cc w/enclosures: R. W. Sharkey, Manager  
 Regulatory Compliance

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## NOTICE OF VIOLATION

ABB Combustion Engineering Nuclear Fuel  
Hematite, Missouri

Docket No. 70-36  
License No. SNM-33

During an NRC inspection conducted on May 20-24, 1996, violations of NRC requirements were identified. In accordance with the "General Statements of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

- I. Section 2.6 of the approved Application states, in part, that "Regulatory Compliance authorization must be obtained for every change involving nuclear safety or radiological safety. Regulatory Compliance reviews shall be documented except for minor changes within existing safety parameters. The Regulatory Compliance Manager shall grant approval only when: (a) A nuclear criticality safety evaluation has been performed based on the criteria and standards of the [license]... and be in sufficient detail to allow subsequent review; and (b) The criticality safety evaluation...includes verification of each of the following: 1) assumptions, 2) correct application of criteria of Chapter 4, 3) completeness and accuracy of the evaluation, and 4) compliance with the double contingency criteria."

Contrary to the above, as of May 24, 1996, no documented nuclear criticality safety evaluation was performed for the 1996 Oxide Conversion Process Modifications.

This is a Severity Level IV violation (Supplement VI).

- II. Section 2.6 of the approved Application states, in part, that "Prior to the start of a new activity affecting nuclear materials, approved procedures are available. A review procedure has been established for changes in processes, equipment and/or facilities prior to implementation."

Section 4.1.4 of the approved Application states, in part, that "All operations involving the handling and storage of SNM shall be performed according to written procedures... Procedures which include criticality safety controls specify the inspection requirements, calibration requirements, or other requirements appropriate for maintaining the criticality controls."

Contrary to the above, as of May 24, 1996, the licensee had not established a review procedure to assure that changes in processes, equipment, and/or facilities were reviewed to identify changes in procedures needed for criticality controls. Specifically, no change review procedure requirement had been established to develop or revise inspection requirements, calibration requirements, or other requirements appropriate for maintaining the criticality controls.

This is a Severity Level IV violation (Supplement VI).

Enclosure 1

- iii. Section 4.1.6, of the approved Application, states "Mass-limited containers employed in the handling or storage of SNM shall be labeled as to their contents. If SNM is in the container, the amount, enrichment and type shall be indicated; if empty, the container shall be so labeled or placed in a designated area for empty containers. Uncovered empty containers do not require an empty sign. Empty containers shall not be intermixed with loaded containers unless all containers are located within designated storage locations, rings, etc."

Contrary to the above, on May 20, 1996, the licensee failed to post mass-limited containers employed in the handling and storage of SNM, or ensure that each container of licensed material bared an appropriate label, as evidenced by:

- a. Ten of thirteen 2.5 Ton UF<sub>6</sub> Cylinders were not marked empty or stored in a posted area.
- b. Four 7A containers were not in a designated area or marked "empty."
- c. An unfavorable geometry portable HEPA filtration system located adjacent to the erbia pellet grinder was in use and not identified and labeled.
- d. Several B-25 boxes containing radioactive materials were not properly identified as containing radioactive material, nor were they labeled properly regarding content, enrichment and quantity.
- e. The inventory card on one B-25 container indicated the box exceeded posted array limits for individual boxes (700 grams). Further investigation indicated that the inventory values on the card were incorrect (625 grams) and that the actual inventory was even greater than 900 grams of U-235.

This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, ABB-Combustion Engineering, Inc., is hereby required to submit a written statement or explanation to the U. S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Director, Division of Fuel Cycle Safety and Safeguards and the Regional Administrator, Region III, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps which will be taken to avoid future violations; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an Order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked or why such other actions as may be proper should not be taken. Consideration may be given to extending the response time for good cause shown.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personnel privacy, proprietary, or Safeguards Information so that it can be placed in the PDR without redaction. However, if you find it necessary to include such information, you should clearly indicate the specific information that you desire not to be placed in the PDR, and provide the legal basis to support your request for withholding the information from the public.

Dated at Rockville, MD  
this 19day of July 1996

U. S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS

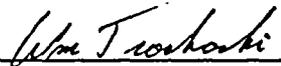
Report No.: 70-36/96-202  
License No.: SNM-33  
Safeguards Group: III  
Licensee: ABB Combustion Engineering Nuclear Fuel  
Combustion Engineering, Inc.  
Hematite, MO  
Inspection Conducted: May 20-24, 1996

  
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J. M. Jacobson, Project Inspector  
DRSS, Region III

7-19-96  
Date Signed

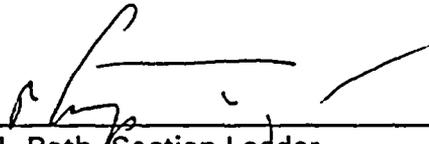
  
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G. A. Smith, Chemical Engineer  
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7-19-96  
Date Signed

  
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W. M. Troskoski, Senior Chemical Engineer  
Inspection Section  
Operations Branch

7-19-96  
Date Signed

Approved by:

  
\_\_\_\_\_  
J. Roth, Section Leader  
Inspection Section  
Operations Branch

7/19/96  
Date Signed

SUMMARY

Scope: An announced team inspection was conducted to (1) review the adequacy of the nuclear criticality safety program at the Combustion Engineering Hematite facility, and (2) perform a follow-up inspection to closeout items identified during the June 1995 chemical process safety inspection. A list of responses and commitments resulting from the June 1995 inspection was faxed to the licensee to facilitate the inspection (Enclosure 4).

Enclosure 2

**Results:** Based on the results of this inspection, three violations, one unresolved item and five inspector followup items were identified. In addition, several issues related to the criticality safety program that were also identified by licensee audits, reviews and investigations, were reviewed, as summarized below.

**Violation 96-202-01:** Failure to document a criticality safety evaluation for the 1996 Oxide Conversion Facility modifications, as required by Section 2.6, Operating Procedures (Finding 13).

**Violation 96-202-02:** Failure of the change control process review procedure to include requirements for the establishment or updating of maintenance, surveillance and functional testing requirements for maintaining criticality controls, as required by Section 2.6, Operating Procedures (Finding 21).

**Violation 96-202-05:** Failure to properly post or label containers of radioactive material, as required by Section 4.1.6 (Finding 32).

**Unresolved Item 96-202-04:** Determine whether the training provided to production supervisors constitutes the formal training in criticality control specified in License Section 2.5, Training (Finding 30).

**Inspector Follow Item 96-202-03:** Review the UO<sub>2</sub> filtration operation and verify that double contingency has been established (Finding 28).

**Inspector Follow Item 96-202-06:** Review the management approved corrective actions for the Erbia Grinding Station Bulletin 91-01 investigation (Finding 33).

**Inspector Follow Item 96-202-07:** Review the Oxide Conversion Process ISA Supplement (Detail 14).

**Inspector Follow Item 96-202-08:** Review methodology for reporting test failures to management in a timely manner (Detail 15 a).

**Inspector Follow Item 96-202-09:** Review the licensee's actions to address the 1995 Annual Audit findings and recommendations (Detail 15 b).

In addition to the above, the following general issues were reviewed which are similar to issues and topics covered in several recent licensee audits, reviews and investigations. The referenced findings include both licensee identified violations, or areas requiring strengthening, as well as NRC observations which are not violations.

1. Nuclear Criticality Safety Program policies and implementing procedures not fully established or implemented (Findings 1-3, 5, 6, 8, 12, 13, 16, 17, 19, and 22).

2. Nuclear Criticality Safety Evaluation inadequacies (Findings 10, 11, 12, 13, 14, 15).
3. Documentation of compliance to license requirements (Findings 11, 15).
4. Procedure problems (Findings 24-28).
5. Tracking, prioritizing, scheduling, and closeout of audit and inspection findings, and ISA recommendations (Findings 7, 33-35).
6. Change control process (Findings 16-23).

REPORT DETAILS  
INSPECTION 70-36/96-202

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REPORT DETAILS  
INSPECTION 70-36/96-202

**1. Key Licensee Personnel Contacted**

- \*M. Eastburn, Nuclear Criticality Specialist
- \*H. Eskridge, Senior Consultant
- \*K. Hayes, Industrial Safety Engineer
- \*B. Kaiser, Vice President for Fuel Operations
- \*R. Land, Director of Infrastructure
- \*G. Page, Director of Ceramic Operations
- \*R. Sharkey, Director of Regulatory Affairs
- \*E. Saito, Health Physicist
- \*R. Tolan, Director of Assembly Operations

Other engineers, technicians, and operators were contacted during the course of the inspection, as appropriate.

- \*Attended exit meeting

**2. Introduction:**

a. Process Background

The current Special Nuclear Material License for the Combustion Engineering, Inc., facility at Hematite, Missouri, authorizes the licensee to, in part, conduct activities in accordance with the statements, representations, and conditions in Chapters 1 through 8 of the NRC-approved license application, as amended. The license was last renewed on July 27, 1994. Chapter 1.5, Authorized Activities, addresses the manufacturing of nuclear reactor fuel utilizing low-enriched uranium (up to 5.0 percent U-235). The process involves the receipt of enriched  $UF_6$  in 2.5 ton cylinders from the Department of Energy. The  $UF_6$  is vaporized and processed through a series of three fluidized bed reactors (located in the Oxide Building) where it is reacted with steam and hydrogen ( $H_2$ ), produced from dissociated ammonia ( $NH_3$ ), to chemically convert it to  $UO_2$ . The  $UO_2$  is then processed to form pellets which are loaded into rods and assembled for commercial power reactors. Uranium bearing scrap material is chemically recycled and recovered in the Recycle/Recovery Area.

b. Inspection Overview

The inspection was divided into two main areas: (1) a review of the nuclear criticality safety (NCS) program at C.E. Hematite, and (2) a follow-up inspection to the June 1995, chemical process safety inspection. Additionally, inspectors reviewed the oxide conversion facility Integrated Safety Assessment (ISA) and the follow-up from the May 8, 1996, Bulletin 91-01 Report.

### 3. Nuclear Criticality Safety (NCS) Program

#### Scope

Chapter 4 of the approved Renewal Application (License) identifies the general requirements for the nuclear criticality safety program, including the administrative conditions and technical criteria required to ensure an adequate level of safety. Chapter 2 identifies additional requirements in various functional areas that interact with the NCS program, including; training, operating procedures, plant modifications, audits and inspections, investigations, and reporting.

The inspectors reviewed the various implementing procedures to assure that an appropriate administrative and organizational framework had been established and documented to implement the programs, and that the programs were properly functioning.

#### Findings

1. The licensee has not established and communicated an NCS Policy for employees and plant organizations. ANS-8.19, Administrative Practices for Nuclear Criticality Safety, Section 4.2, recommends that "Management shall formulate nuclear criticality safety policy and make it known to all employees involved in operations with fissile material." Section 2.1 of the license states that, "The Vice President has delegated the safety and compliance responsibility for nuclear fuel manufacturing and support activities to the two Focused Factory Managers, and the Managers of Production Support and Supply Management, and Regulatory Compliance." Section 2.1.3 of the license specifies that the Manager, Regulatory Compliance, has the authority to halt any operation and approve restart, and Section 2.6 states, "Primary responsibility and authority to suspend unsafe operations is placed with line supervision." However, the licensee has not addressed the above license requirements in a policy that establishes the NCS responsibilities and authorities of the line organization, including the individual workers, to shutdown any operation thought to be unsafe. This is similar to several licensee observations in the last Annual Audit concerning the documentation of commitments and requirements in an auditable manner.
2. Written procedures have not been established to adequately define the interface between operations, nuclear criticality safety, and other operations support functions. Through discussions with the licensee's staff, the inspectors were informed that procedures have not been developed to define the NCS program, NCS staff roles and responsibilities, and the interface between the NCS staff, operations, and other support groups. Additionally, the interface between the Hematite and Windsor NCS staffs has not been formally established in procedures that would demonstrate how the various license requirements related to criticality safety were being implemented by the responsible plant groups. This is similar to several licensee observations in the last Annual Audit concerning the documentation of commitments and requirements in an auditable manner.

#### 4. Nuclear Criticality Safety Function (NCSF)

##### Scope

Section 2.1.4 of the license states, "The nuclear criticality specialist function [NCSF] reports to the Manager, Regulatory Compliance. The NCSF verifies that equipment, processes and procedures satisfy the nuclear criticality criteria in Chapter 4 by performing the review described in Section 2.6."

Section 2.6 of the license states, "Procedures concerning the handling, processing, storing and shipping of nuclear materials are given prior review and approval by the Manager, Regulatory Compliance. Suitable control measures are prescribed, and pertinent control procedures relative to nuclear criticality safety and radiological safety are followed... Prior to the start of a new activity affecting nuclear materials, approved procedures are available. A review procedure has been established for changes in processes, equipment and/or facilities prior to implementation."

The inspectors reviewed the NCSF program to ensure that appropriate administrative procedures had been developed and implemented for the routine NCSF activities described in Chapter 4 of the license, including qualification of the NCSF staff, qualification and validation of analytical methods, conduct of change reviews and nuclear criticality safety evaluations (NCSE).

##### Findings

3. Procedures and guidelines were not always established for routine NCSF activities, including: (1) the performance of inspections and audits; (2) the format and content of postings; (3) the conduct and documentation of onsite NCS evaluations, and development of NCS limits and controls; and (4) participation in NCS training. The current system appears to rely on the skills and initiative of the NCS staff and not the formality of an approved program. This is an NRC observation.
4. The organization and staffing of NCSF does not appear to be adequate to fully support all of the plant needs. The full-time NCS staff at the Hematite facility is limited to one NCS specialist with part-time assistance from a consultant (a retired employee). Both perform and review basic nuclear criticality safety evaluations (NCSE). However, the computer-based code calculations (i.e., KENO-type evaluations) were performed by the Windsor (Connecticut) office on an as-needed basis. As of this inspection, most of the NCSE calculation records and files were kept at the Windsor office. During the inspection, the licensee informed the inspectors that NCSEs, previously prepared for the oxide conversion reactors, were not available for review onsite during a hazards review (for the Integrated Safety Analysis) of this facility. Such an organizational structure does not appear appropriate to ensure that modifications were adequately reviewed. At the exit meeting, the Vice

President acknowledged the concern and indicated that he intended to centralize NCS records and personnel at the Hematite facility in order to strengthen program controls. This item is similar to a licensee identified recommendation in Section A.8 of the last Annual Audit Report.

## 5. NCS Inspections, Audits and Investigations

### Scope

Section 2.8 of the License specifies the requirements for the performance of daily safety checks, quarterly criticality inspections, and an annual audit to evaluate the effectiveness of the NCS program. Items identified during the quarterly criticality inspection that require corrective action are to be documented in a report distributed to the Focused Factory Managers and manager level staff, who are required to take and document followup action. Section 2.9 requires that events specified in applicable regulations or license conditions be investigated and reported to the NRC. Non-reportable occurrences are to be investigated and documented as appropriate.

The inspectors reviewed the program implementation procedures and completed licensee inspections, audits and investigations to verify that the license requirements were being effectively implemented.

### Findings

5. The licensee has not established a policy or an implementing procedure requirement to have every individual report all detected NCS violations. ANS-8.1, 4.1.5, Operations Control, recommends that, "Deviations from procedures and unforeseen alterations in process conditions that affect nuclear criticality safety shall be reported to management and shall be investigated promptly. Action shall be taken to prevent recurrence." Typical industry practice requires the immediate verbal notification of area supervision followed by written notification of NCSF so that the condition can be promptly evaluated and corrected. The inspectors could not determine whether all non-reportable occurrences were being appropriately investigated and documented. This item is similar to a licensee identified recommendation in Section A.6 of the last Annual Audit Report.
6. The licensee has not developed a formal policy to assure that area management representatives and NCS staff routinely inspect all areas of the plant to verify that operations are being carried out in a manner consistent with company policy and rules, approved operating procedures and license conditions. Although the licensee is conducting inspections and audits, the inspectors could not determine whether the licensee reviews all plant operations and areas at a management determined frequency. This is an NRC observation.
7. There does not appear to be an adequate system to prioritize, track, and closeout the quarterly inspection findings requiring corrective action. Discussions with the plant staff indicates that corrective actions are controlled by written instructions approved by NCSF, only if the criticality problem

approaches the Bulletin 91-01 reporting threshold. No records were found indicating that corrective actions for violations of written requirements were scheduled or assigned to individuals for action. Additionally, no records were found to indicate that plant management accepted or rejected each annual audit recommendation and the corrective actions were either completed or scheduled for completion. Discussions with the plant staff also indicated that the licensee did not have a program to confirm the adequacy of corrective actions, or to analyze and trend reportable events. This item is similar to a licensee identified recommendation in Section A.6 of the last Annual Audit Report.

8. The licensee has not developed an implementing document to provide guidance for the conduct of criticality safety audits and inspections. Such guidance typically covers: (1) responsibilities of staff positions and committees, (2) reporting levels, (3) the corrective action program, including responsibilities for designating actions, determining sufficiency of actions, tracking actions, and trending and preventing recurrence of criticality safety deficiencies, (4) methods established for observing operations to verify that conditions and assumptions used in the safety analyses are valid and are controlled by operating procedures and design documents, and (5) review of engineered controls by evaluation of programs established for maintenance, surveillance and functional testing. Currently, the licensee is in the process of developing a corrective action procedure with a checklist to address some of the above concerns. This is an NRC observation.

## 6. Safety Review Committee

### Scope

Section 2.3 of the License states, "The Hematite Plant Safety Committee meets at least once a calendar quarter to review plant operations, to compare them with selected safety requirements of Part I and the License Conditions and to consider other aspects of safety the Committee believes appropriate. The Plant Safety Committee (PSC) shall perform an annual review of... criticality safety practices; internal inspection and audit reports; abnormal occurrences and accidents including recommendations to prevent recurrence; and review of... significant changes to operations involving radiation and/or nuclear criticality safety. The review of findings and recommendations of corrective actions shall be reported to the appropriate Focused Factory Manager or Manager, Production Support and Supply Management, and to the Manager, Regulatory Compliance for action."

The inspectors reviewed PSC meeting minutes, recommendations and implementing procedures and conducted discussions with PSC members to confirm that the committee was effectively meeting the license requirements with regard to the above items.

## Findings

9. Discussions with the plant staff and review of meeting minutes indicated that the PSC is functioning to advise the Vice President on NCS issues. In the past, the licensee has tracked PSC recommendations and followup actions in the meeting minutes. It was difficult to follow management's acceptance or rejection of those recommendations, and the status of followup or corrective actions from those recommendations as the meeting minutes were often terse. The licensee is in the process of developing a new commitment tracking system in response to a previous enforcement action that is expected to address this issue.

## 7. Safety Analysis

### Scope

Section 2.6 of the approved Application states that "Prior to the start of a new activity affecting nuclear materials, approved procedures are available. A review procedure has been established for changes in processes, equipment and/or facilities prior to implementation. Regulatory Compliance Authorization must be obtained for every change involving nuclear safety or radiological safety. Regulatory Compliance reviews shall be documented except for minor changes within existing safety parameters. The Regulatory Compliance Manager shall grant approval only when: (a) A nuclear criticality safety evaluation has been performed based on the criteria and standards of the [license]... and be in sufficient detail to allow subsequent review; (b) The criticality safety evaluation...includes verification of each of the following: 1) assumptions, 2) correct application of criteria of Chapter 4, 3) completeness and accuracy of the evaluation, and 4) compliance with the double contingency criteria."

Section 4.1.1 of the license states, "The process design philosophy employed by Combustion Engineering, Inc. to assure nuclear criticality safety is based on the following key elements: (a) Process design with respect to handling and storage of SNM, shall incorporate sufficient factors of safety such that at least two unlikely, independent, and concurrent changes to plant conditions are required before a criticality accident can occur. Process design which does not meet this requirement shall be explicitly approved in Chapter 1, Section 1.6, of this application."

Section 4.1.3 of the license states, "The criticality evaluations shall consider potential scenarios which could lead to criticality and barriers erected against criticality in establishing applicable criticality limits and controls... Criticality evaluations shall include assumptions affecting criticality safety process limits and controls.

If explicit analyses using validated methodologies are employed, the margin to criticality and a clear definition of off-normal conditions shall be employed."

Section 4.2.1.3(g) of the license states "The highest effective multiplication factor derived from the validated analytical methods for credible operating conditions shall

be less than or equal to 0.95 including applicable biases and calculational uncertainties [ $K_{eff} < 0.95$ ]."

The licensee uses both hazard evaluations (for implementing the Integrated Safety Analysis (ISA) commitment under Section 1.6(e) of the license) and nuclear criticality safety evaluations (NCSEs) to document safety analysis. The inspectors reviewed the implementing procedures and criticality safety evaluations for both new and existing systems to verify that the licensee was effectively implementing the license requirements in this functional area.

Analysis of recent changes reviewed by the inspectors included:

- A-HFF-FE-0021, "Nuclear Criticality Safety Analysis of Proposed Mop Water Processing System," Revision 00.
- A-HFF-FE-0023, "Nuclear Criticality Safety Analysis of Tennant Model 5700 XP Floor Scrubber," Revision 00.
- A-HFF-FE-0010, "Nuclear Criticality Safety Analysis of Oxide Conversion Process at the Hematite Fuel Facility," dated August 1993.
- ISA Hazards Evaluation of the Oxide Conversion Facility, dated March 1996.
- An undated, unsigned, KENO Analysis of the 254 Building Bulk Storage Hoppers and Blenders.

#### Findings

10. The interface between the hazards analysis performed for the ISA and NCSEs is unclear. The inspectors reviewed the hazard analysis (HA) for the Oxide Building modifications that were completed in March 1996, and noted that the HA was not sufficiently detailed such that an independent reviewer could reconstruct the analysis and the bases for the conditions presented, as required by Section 4.1.3 of the license. To meet the license requirement, a separate NCSE was performed to assure double contingency protection. Procedure NIS-216, "Hazard Evaluation," Revision 1, provides guidance for developing criticality accident scenarios, establishing the bounding assumptions and NCS limits and controls, and for performing contingency analysis. However, the use of this guidance in conjunction with separate NCSEs is unclear. At the time of the inspection, the licensee had not established a formal policy or procedure specifying the relationship of the ISA hazard analysis to the license required NCSEs. This item is similar to a licensee identified recommendation in Section D of the last Annual Audit.
11. NCSE documentation did not always demonstrate that the evaluation was performed to the criteria and standards of the license (as required by Section 2.6). The NCSEs reviewed did not always: (1) consider potential scenarios that

could lead to a criticality; (2) provide a summary of the NCS limits and controls; and (3) demonstrate that  $K_{eff} < 0.95$  for all abnormal credible operating conditions.

This issue is similar to the licensee identified recommendation in Section A.8 of the last Annual Audit. The audit specifically noted that "... there was a common weakness displayed relating to record keeping of auditable requirements under SNM-33 Renewal... The renewal license has imposed added requirements on, for example, documented safety analysis; these include formal configuration control procedures for computer codes employed in the safety analyses (Section 4.2.3.2) and more rigorous validation of calculational uncertainties for analytical models (Section 4.2.3.2)."

12. No NCSE guidance has been developed to determine what accident conditions are considered "credible" or "incredible." The 1993 Nuclear Criticality Safety Analysis of the Oxide Conversion Process identified accident scenarios that exceeded the license condition for  $K_{eff}$ . However, the licensee did not provide any analysis or discussion in the NCSE to support which accidents the licensee considered to be "incredible." This has a similar root cause as Finding 11, above.
13. The supporting NCSE for the 1996 redesign and replacement of the oxide conversion process reactors was not available during the inspection and apparently does not exist. The modification likely increased the value of  $K_{eff}$  under both normal and accident conditions since the diameter of one of the reactors was increased. Further, major components within the process area were repositioned without the performance of an interaction analysis. The only specific analysis for the modification was apparently verbal (i.e., since the principal control for both the new and old systems was moderation control and  $K_{eff}$  for the old system under normal conditions was low, no additional analysis was needed). The failure to document the NCSE for the 1996 Oxide Conversion Process is a Violation (96-202-01) of License Section 4.1.3, Documenting Criticality Evaluations and Reviews.

Although the licensee conducted an ISA hazard analysis for the oxide conversion process in March 1996, that hazard analysis was not adequate to meet the intent or requirements of License Section 4.1.3 in that the analysis was not performed on the "as-built" system (see Detail 14 of this report for further discussion of the ISA). The inspectors were informed by the licensee that the ISA was performed on a "moving target" in that the oxide conversion equipment was being modified during the conduct of the ISA. Also, the analysis identified additional accident scenarios requiring KENO runs which had not yet been performed as of the date of this inspection (see Detail 14).

14. Development of criticality controls based on contingencies and the translation of those controls into operational documents is not formal and comprehensive. Process Equipment/Facility Change Proposal Review Sheet (PEFCRS) forms are developed by the onsite NCS staff through review of the NCSEs performed offsite. How the limits and controls specified in the PEFCRS are translated into

procedures and postings is not specified in a procedure. The involvement of the operations group in approving the limits and controls for established operations is not documented. The licensee apparently relies on the judgement of the onsite staff to advise supervision and elaborate on the safety practices associated with the scope of the operations. This item is similar to licensee identified recommendations in Section A.5

15. Criticality safety evaluations and files were available for only a few of the plant processes. Documentation of the criticality safety of many of the plant systems was limited to the Safety Demonstration portion of the license. Consequently, it was not evident that all facility process designs either met double contingency or were explicitly approved by Section 1.6. This item is similar to licensee identified recommendations in Section A.8.

## **8. NCS Change Control**

### Requirements

Section 2.6 of the license states "Prior to the start of a new activity affecting nuclear materials, approved procedures are available... The Regulatory Manager shall grant approval only when:... correct application of criteria of Chapter 4 [has been verified]."

Section 2.7 of license states "The Manager, Regulatory Compliance is responsible for determining the necessary safety reviews (e.g., for criticality and/or radiological safety) for proposed changes or modifications to equipment for SNM processing, handling, or storage, or related operations. The necessary management and safety reviews shall be performed prior to implementation of the change. Significant changes, as determined by the Manager, Regulatory Compliance, to operations affecting radiological and/or criticality safety are also reviewed by the Hematite Plant Safety Committee. Facility change requests requiring a criticality safety review shall be evaluated by a Nuclear Criticality Specialists. If it is deemed necessary, by any reviewer, that an inspection of equipment, procedures, and postings to assure completeness prior to startup of a new or modified process, the requirement for such an inspection will be so designated in the Change Request... A modified process is defined as one involving a change in equipment design, SNM amount and/or configuration, or process controls when that change invalidates any aspect of the previous safety analysis."

Section 4.1.7 of the license states, "Preoperational testing and inspection is performed as described in Chapter 2, Section 2.7."

Section 4.1.8 states that, "Internal procedures require that all facility changes affecting the handling and storage of SNM receive appropriate safety reviews and evaluations."

Section 4.1.4 of the license states, "Procedures will include criticality safety controls specify the inspection requirements, calibration requirements, or other requirements appropriate for maintaining the criticality controls."

### Inspection Scope

The inspectors reviewed the licensee's implementing procedures and reviewed facility changes and modifications to determine whether the licensee was effectively implementing the license conditions.

QCP-502.4, "Change Control Management," Revision 01, describes the administrative practices for assuring plant management approval of modifications. NIS-216, Hazard Evaluation, Revision 1, specifies the requirements for design basis documentation updates, revisions of operating procedures, and operations personnel retraining for modifications.

### Findings

16. The functional relationship between QCP-502.4 and NIS-216 has not been clearly established as to which procedural requirements take precedence over the other and under what circumstances that occurs. Although both of the procedures appear to cover many of the same requirements, it is not evident how their interaction assures that the applicable license requirements for plant changes and safety evaluations are met. This is similar to a licensee identified recommendation in Section D of the Annual Audit.
17. Although both QCP-502.4 and NIS-216 establish preoperational inspection and pre-startup inspection requirements, no guidance for conducting those inspections has been established. Additionally, pre-operational inspections by NCSF are not required. The inspectors were unable to determine whether plant modifications and changes that could impact criticality controls receive an appropriate pre-operational or startup review by NCSF. This is similar to licensee identified issues in Section D of the last Annual Audit.
18. There did not appear to be a formal document control system for updating safety-related documents. Although QCP-502.4 contains guidance that covers procedures and drawings, it is unclear how the NCSEs are updated. There also did not appear to be any guidance for incorporating ISA hazards analysis recommendations and findings into prior existing NCSEs. The interface among participating organizations for the revision, review, approval and distribution of safety-related documents did not appear to be well established. Consequently, it was unclear how the licensee maintained existing NCSEs and other safety-related documents current. This is similar to licensee identified recommendations in Sections A.4 and 5 of the Annual Audit.
19. The licensee has not established criteria or guidance in their administrative control procedures for identifying changes that require a license amendment. Although QCP-502.4 allows the "cognizant" engineer to determine whether a proposed change requires a criticality safety review, there is no requirement to have the NCSF review all of the proposed changes. Further, the inspectors were informed that the "cognizant" engineer was not required to have any specialized NCS training beyond the general employee training. Therefore, the inspectors could not determine whether a licensee individual with adequate

NCS knowledge had reviewed all proposed changes to identify those that could impact safety and/or license requirements. At the exit meeting, licensee management stated that future change requests would be reviewed by a criticality safety specialist to assure proper determinations of safety review requirements by personnel trained in that area.

20. Section 2.7 of the license requires that the Plant Safety Committee (PSC) review significant changes to operations affecting criticality safety prior to operations. There did not appear to be any guidance as to how this requirement was formally implemented. The inspectors noted that the PSC reviewed the hazard evaluations, but their involvement with the overall change control process was not evident. This is similar to a licensee identified recommendation in Section A.5 of the last Annual Audit.
21. Neither QCP-502.4 or NIS-216 require the establishment of maintenance or surveillance criteria for engineered controls. Although NIS-216 requires the hazard evaluation teams to verify that adequate maintenance procedures are in place, specific criteria has not been established. Additionally, no criteria has been established for functional testing. The licensee did not appear to have a method for assuring that procedures containing engineered controls related to criticality safety were revised to reflect plant modifications. The failure of the change control process review procedure to include requirements for the establishment or updating of maintenance, surveillance, and functional testing requirements for maintaining criticality controls is a Violation (96-202-02) of License Section 2.6, Operating Procedures.
22. The licensee has not established a management control system to ensure that all engineered safety equipment is identified and listed in a controlled document (i.e., siphon breaks for backflow prevention in the recovery area) and that the list is maintained up-to-date as the plant is modified. Although OS 4101 lists the equipment and instrumentation identified in the license for criticality safety, it does not include all engineered safety equipment used for criticality control. The lack of this information appears to hamper the ability of NCSF to fully evaluate criticality safety, conduct an independent review and assessment of surveillance requirements, or audit engineered control features for maintenance and surveillance activities. For example, no monitoring requirements have been established for the roof drain, a passive engineered control used to ensure the structural integrity of the moderation control barrier for the Kardex unit. This is similar to issues identified by the licensee in Sections A.5 and D of the last Annual Audit and the licensee root cause analysis discussed in Detail 13.
23. The plant does not have an adequate NCS configuration control program to maintain the design bases documentation up-to-date. Attempts to obtain files containing program documents supporting the criticality safety of selected systems were largely unsuccessful. Unified records on a system-by-system basis for each of the systems of criticality importance did not exist. Documents that would define a configuration control system which, in general, were not available included: (1) site design bases; (2) facility design bases; (3) unit process descriptions, including P&IDs and process material flows;

(4) controls for movement of SNM; (5) postulated pathways to criticality accidents and related safety analysis; (6) training, maintenance, calibration and surveillance for safety control systems; and (7) inspection and audit requirements. Without such a system, the inspectors were unable to determine whether the licensee reviewed all proposed new changes against up-to-date design bases documents. At the exit meeting, licensee management stated that they had already recognized the need to develop a centralized document control center at the Hematite facility that would address the substance of this concern. This is similar to a licensee identified recommendation in Section A.8 of the last Annual Audit (see Finding 4).

## 9. Procedures

### Scope

Section 2.6 of the license states "Operations which affect licensed material shall be conducted in accordance with approved written procedures... These procedures provide the detailed instructions for equipment operation and material handling and the limits and controls required by the License... Suitable control measures are prescribed, and pertinent control procedures relative to nuclear criticality safety and radiological safety are followed... Prior to the start of a new activity affecting nuclear materials, approved procedures are available... The minimum frequency for review... shall be every two years."

Section 4.1.4 of the license states "Procedures which include criticality safety controls specify the inspection requirements, calibration requirements, or other requirements appropriate for maintaining the criticality controls."

The inspectors reviewed the licensee's controls for the development, review and approval of operating procedures used to implement the above requirements.

### Findings

24. The license has not established administrative procedures specifying procedure development and format requirements for plant procedures. The inspectors found that the operating procedures do not always specify: (1) the sequence of steps to be taken under upset conditions; (2) instructions and criteria for shutdown; (3) actions to be taken during abnormal operations, and (4) the limits selected for a commitment to action. This is similar to a licensee identified recommendation in Section E of the last Annual Audit.
25. The license requires that operating procedures be updated at least every two years. The last annual audit performed in March 1996 identified a continuing problem (from the 1995 annual audit) in this area which the licensee is tracking as an open item. The previous audit noted that: OS-204, UF<sub>6</sub> Release, had not been reviewed since 1974, and OS-201, Review of Process Equipment/Facility Changes, had not been reviewed since 1987. A total of 18 out of 48 Recycle/Recovery OSs and 19 Oxide Plant OSs had not been reviewed in the last two

years. The latest annual audit noted in Section A.4 that not as many OSs were reviewed, but that at least 13 still did not meet the two-year review requirement.

26. The licensee has no formal requirement to have NCSF review new or revised procedures, although they appear to in practice. This is similar to a licensee identified issue in Section A.5 of the last Annual Audit.
27. NCS controls are not always integrated into operating procedures. For example, OS 801.18 governs the transfer of solutions from favorable to unfavorable geometry vessels, but does not specify requirements for:  
(1) determining and logging concentration and volume values used to calculate mass limits, (2) employment of a portable sandpiper pump used for solution transfer, (3) flushing of lines, (4) identifying "liquids that will crystallize," and (5) identifying the routing of solutions for pump cleaning. However, discussions with operations personnel indicates that they appeared to have an adequate level of knowledge of the NCS controls for the operation in question.

This issue is similar to a licensee identified recommendation in Section B.(j) of the last Annual Audit. Specifically, the audit reviewed OS 801.18 and other procedures related the transfer of fissile aqueous solutions from "safe" to "unsafe" geometry vessels, and stated that "The above OSs do not appear to contain instructions consistent with the license commitment... no OS appears to contain the necessary words to implement this license commitment... It would appear that a number of OSs need to be upgraded when the barriers are defined."

28. Criteria for sampling and measurement have not been fully established. As an example, OS-850, "UO<sub>4</sub> Filtration," requires 2 hour mixing, flushing of the sample tap, and recording of the volume for the filtrate tank; however, multiple sampling and measurement is not required and therefore, is subject to common-mode failure. The review of the UO<sub>4</sub> filtration operation to verify that the double contingency criteria is met is an Inspector Follow Item (96-202-03).

## 10. Training

### Scope

Section 2.5 of the license states "Hematite staff conduct or supervise the indoctrination of new employees in the safety aspects of the facility. The indoctrination topics shall include nuclear criticality safety... After test results demonstrate that a new employee has sufficient knowledge [they] begin on-the-job training... The training and personnel training program continues with on-the-job training supplemented by training in specialized topics such as personnel protective equipment, accident prevention, and other safety topics. Production supervisors receive formal training in radiation and criticality control. Testing determines when they have sufficient knowledge to enable them to carry out their training functions.

Operating personnel receive a re-training course on a biennial basis. The effectiveness of retraining is determined by testing. Formal training shall be documented."

### Findings

29. Although various methods of training exist, there does not appear to be a formal program for training. Documented requirements have not been established for: (1) defining the responsibilities for development, implementation and coordination of NCS training; (2) NCS staff participation in development and implementation of the training program; (3) system for maintaining training records; (4) training for supervisors, maintenance personnel, engineers, NCS staff, management, and the Safety Review Committee; (5) assessing training effectiveness, (6) auditing training programs at least annually; (7) updating training courses to reflect plant modifications and changes to procedures; and (8) troubleshooting activities for process abnormalities in operations training.

Although NIS-216, "Hazard Evaluation," requires the hazard evaluation teams to verify that employees have been trained to operate the process, no formal requirements have been established for conducting training prior to the operation of installed equipment or use of revised procedures.

The program does not identify training that extends to maintenance, engineering, management and supervisory personnel. The program does not address the additional training required for supervisors to conduct on-the-job training, for engineers to perform design and process modifications, and for NCSF staff to qualify as evaluators and reviewers. This is an NRC observation.

30. Discussions with the NCSF indicated that the production supervisors only received limited criticality control training as part of the general employee training program and no additional (formal) criticality safety training was provided. No retraining was specified. Additional information is required to determine whether the training provided to production supervisors constitutes the formal training in criticality control specified in License Section 2.5, Training. This is an Unresolved Item (96-202-04).

## **11. Maintenance for NCS**

### Scope

The facility management control systems were reviewed to verify that the licensee has established appropriate methods to ensure that nuclear criticality safety controls were maintained in an operational state and would be available and reliable if called upon to function.

## Findings

31. A mechanism is not in place to ensure that maintenance schedules are established and adhered to and are adequate for active NCS controls; that calibration schedules are established for all NCS control systems; and, that the schedules are consistent with license commitments. (See Finding 22 regarding a current list of engineered controls.) This is similar to a licensee identified issue for the Bulletin 91-01 root cause analysis discussed in Detail 13.

## 12. Plant Tour

### Scope

During the course of the inspection, several plant tours were conducted to review plant conditions, to familiarize the inspectors with the ongoing operations at the facility, and to review specific critically control areas and topics.

### Inspection Findings

32. During the plant tours, apparent violations were observed concerning the failure to properly label, mark, and post containers of radioactive material in accordance with Section 4.1.6 of the license, as described below.

Section 4.1.6, Labeling of Special Nuclear Material [SNM], requires that mass-limited containers employed in the handling or storage of SNM to be labeled as to their contents. If SNM is in the container, the amount, enrichment and type shall be indicated; if empty, the container shall be so labeled or placed in a designated area for empty containers. Uncovered empty containers do not require an empty sign. Empty containers shall not be intermixed with loaded containers unless all containers are located within designated storage locations, rings, etc.

- a. Ten of thirteen 2.5 Ton UF<sub>6</sub> Cylinders were not marked empty or stored in a posted area. Each was promptly labeled as "empty."
- b. Four 7A containers were not in a designated area or marked "empty." One container was opened and verified to be empty.
- c. An unfavorable geometry portable HEPA filtration system located adjacent to the erbia pellet grinder was in use and not identified and labeled.
- d. Several B-25 boxes containing radioactive materials were not properly identified as containing radioactive material, nor were they labeled properly regarding content, enrichment, and quantity.
- e. The inventory card on one B-25 container indicated the box exceeded posted array limits for individual boxes (700 grams). Further investigation indicated that the inventory values on the card were incorrect (625 grams) and that the actual inventory was even greater than 900 grams of U-235.

The failure to properly post or label containers of radioactive material is a Violation (96-202-05) of License Section 4.1.6.

**13. Bulletin 91-01 Report - Erbia Grinding Station**

Summary

On May 8, 1996, the licensee reported that one of two criticality safety controls was lost at the erbia pellet grinder station due to inadequate maintenance. A gap was left in the vibratory feeder working surface through which about 145 kgs of fuel pellets accumulated. The loss of geometry control was discovered by operations personnel investigating the resultant failure of the feeder. Moderator control remained in effect throughout the event.

Licensee Root Cause Analysis

The inspectors reviewed the licensee's Erbia Grinding Station Root Cause Analysis Report, dated May 16, 1996. The report documented an in-depth team review of the event that appeared to be detailed and well thought out. Among the problems identified by the licensee in the report were:

- Instructions were often given in verbal format rather than written.
- The system was not analyzed for material accumulation.
- There was a lack of commitment to follow procedures.
- The change control and management system was not fully understood due to inadequate training and implementation.
- There was no preventive maintenance program developed for the grinders.
- After corrective maintenance had been performed, the grinder had to be reassembled from memory as since no drawings were available.
- The old feeder hopper was to be installed, but the Line 2 UO<sub>2</sub> plant feeder hopper was installed instead.
- The system was not verified for operability or checked for industrial/criticality safety before being put into use.

The inspectors toured the erbia pellet grinding area and observed the bracket that had been installed to eliminate the gaps in the feeder working surface and the plexiglass inspection ports to allow detection of pellet accumulation in the feeder. No concerns were identified with the immediate corrective actions.

### Inspector Findings

33. The Root Cause Analysis Report demonstrated the licensee's ability to self-identify performance problems at the facility. However, at the time of this inspection, the licensee's management had not yet had sufficient time to conduct a comprehensive review of the report's findings in order to identify and schedule the appropriate long-term corrective actions to address the above issues. Review of the management approved corrective actions will be tracked as Inspector Followup Item 96-202-06.

## 14. Integrated Safety Assessment

### Scope

Section 1.6(e) of the license states "Combustion Engineering shall perform Integrated Safety Assessments (ISAs; also termed hazard analysis) for plant processes. A schedule for such has been submitted to and approved by the NRC. New or significantly modified plant processes (as determined by the Manager, Regulatory Compliance) shall include such hazard analyses."

By letter of January 26, 1995, the licensee committed to conduct the first ISA for the Oxide Conversion Facility by March 31, 1996.

### Conduct of the ISA

The inspectors reviewed the ISA, dated March 27, 1996, and the supporting documentation. Although the ISA appeared to be detailed and well thought out, several problems were noted. The introduction stated that "...the team performed this HA using the best information available at the time. However, accurate, up-to-date drawings of the piping and instrumentation of the oxide conversion facility (termed "flow diagrams" in the report) did not exist, and the ability to generate these was partially hampered by the fact that major modification were being made to the facility during much of the HA." It further noted that "The team... cannot state that all analyses were based on actual, final configuration of the facility... Therefore, this report is being issued with the condition that final flow diagrams be issued and the hazard evaluations already performed be compared with those diagrams for accuracy, and revised as necessary. The results of that review are to be issued as a supplement to this report, not later than May 31, 1996." Review of the ISA supplement will be tracked as an Inspector Followup Item (96-202-07).

### Finding

34. The NRC's Fuel Cycle Licensing Branch was not informed of the ISA delay. Based on the above, the inspectors concluded that the licensee failed to fully meet the March 31, 1996, commitment date and complete an ISA for the oxide conversion facility. This issue has been forwarded to the Fuel Cycle Licensing Branch for resolution.

### ISA Recommendations

The inspectors were informed that the modifications to the Oxide Conversion Facility were a major undertaking involving the installation of new chemical reactors and associated process equipment and instrumentation. The interim ISA concluded that there was sufficient protection in the areas of nuclear criticality, radiological and fire safety, as well as protection against exposures to hazardous chemicals. However, the ISA found problems with inadequate protection of employees from day-to-day industrial injuries and minor exposures to hazardous chemicals, and the management controls on configuration. The ISA team recommended that the licensee's management review the report and develop an action plan to evaluate and act on the recommendations, develop a schedule for implementing approved recommendations, and periodically monitor the progress of those recommendations.

### Finding

35. NIS-216, Hazard Evaluations, Revision 1, Step 9.8, requires that the evaluation team and cognizant management review the analysis document, reach concurrence regarding any recommendation, and establish a documented timetable for implementation. As of May 21, 1996, the licensee's management had not acted on the ISA team's interim recommendations until the issue was identified by the NRC. Once notified, the licensee formed a management team to review and address the ISA recommendations.

### **15. June 1995 Chemical Safety Inspection Follow-Up**

Prior to this inspection, a summary of June 1995 chemical process safety inspection issues that would be reviewed by the NRC for closeout (Enclosure 4) was provided to the Manager of Regulatory Compliance to facilitate the inspection effort. The licensee provided several documents and verbal status reports discussing all of the listed actions. The majority of those actions were completed satisfactorily except where noted below.

a. Oxide Inspection and Alarm Calibration/Testing, O.S. 4101.

### Scope

Violation 95-201-04 stated that, "no procedure was developed to specify inspection requirements, calibration requirements, and other [functionally test] requirements for the vaporizer chest criticality safety control associated with the steam flow shut-off from the conductivity probe or level monitor."

### Inspector Findings

The inspectors reviewed the revision to O.S. 4101 and determined that acceptable inspection and calibration requirements were specified (closing Violation 95-201-04). However, during review of the test data for an instrument completed during the first quarter of 1996, the inspectors noted that the steam to the vaporizers did not shut off as required. Although this apparent test failure was

noted in the data sheets, neither the process engineer or the focused factory manager was notified of the as required by the procedure.

An interview with the process engineer indicated that the test failure was subsequently identified and the test was repeated one month later. The licensee determined that the problem was due to the failure to perform the test under the correct set of conditions. An interlock is provided to override the steam isolation function during the first hour that it is turned on in order to allow heatup. The procedure had been revised by adding an appropriate note to this effect. The licensee's representative indicated that they would review the methodology for reporting test failures. This issue will be tracked as Inspector Follow-up Item (96-202-08).

b. Licensee Review of License Condition 4.2.4

Summary

License Condition 4.2.4, Special Controls [Nuclear Criticality], (a) through (w), identifies the technical criteria that shall be applied to plant operations. The licensee's March 25, 1996, Reply to a Notice of Violation and Payment of \$12,500 Civil Penalty (EA 96-002), stated "The Hematite Plant Safety Committee has reviewed all of the criticality safety controls listed in section 4.2.4 of the license application to assure that appropriate procedures are in place for such controls. During the annual criticality safety audit scheduled for the week of March 25, 1996, each condition of Section 4.2.4 will be reviewed."

Inspector Findings

The inspectors reviewed the 1995 Annual Nuclear Criticality and Radiological Safety Audit, dated April 1, 1996. The audit was conducted on March 25-29, 1996, and covered follow-up items from the previous audit, all of the Section 4.2.4 items, reporting, hazards evaluations, and procedures. The audit comments and findings appeared substantive and insightful. A sampling of the audit findings include the following:

- A number of the Operation Sheets still do not meet the two-year license review requirement (item remains open from the previous annual audit).
- The 1994 review of plant modifications (Section 2.7 of the license) identified a number of observations that the 1995 follow-up could not close. It specifically noted that the Facility Change Request criticality safety reviews need to be implemented in a more rigorous manner. Several evaluations contained no evidence that the independent review required by Section 4.1.3 and the calculational bias assessment required by Section 4.2.1.3 were performed. There was no description of the calculational model provided to demonstrate that the analysis was done using a validated model as described by Section 4.2.3.2.

- The 1995 audit recommended that a discrepancy between surface density modeling practices and those in the License Chapters 4 and 14 should be updated during the next license update to provide the technical support and justification of current practices. The issue was not viewed as a safety problem by the licensee's auditor.
- The audit of the Section 4.2.4 found items such as no drawings for the wet recovery area in drawing control, a lack of procedures for packaging of scrap, no regular inspection of the physical barriers against water ingress into the Kardex pans, temporary barriers used around the [chemical] reactors did not provide the one foot spacing, and concerns with the training program for 91-01 reporting.
- For the hazards evaluations, the auditor noted that there did not appear to be any "What-If" evaluation relating to the absence of software configuration control for the reactor control system. The inspectors noted that this concern had been previously identified to the licensee in Inspection Report 95-201, dated July 12, 1995. In the September 9, 1995, reply, the licensee stated that "The adequacy of change control for Oxide will be reviewed during the Hazard Analysis." The ISA noted that while there is a computer software change control system at the facility, the oxide control system had been specifically exempted from having to follow it. The ISA team recommended that the oxide control system be incorporated into a formal program.
- Posting of firefighting restrictions in moderator controlled areas was limited.
- Techniques used for investigation of SNM accumulations and for safe removal of accumulated material are not fully described in surveillance procedures. Procedures do not include the components to be inspected, specific action levels, inspection frequencies, and response actions.

The licensee's audit appeared to be thorough and reasonably comprehensive, demonstrating the ability to self-identify problems and weaknesses. However, at the time of the inspection, the licensee had not conducted a comprehensive management overview to identify potential programmatic issues. Review of the licensee's actions to address the 1995 Criticality Audit will be tracked as Inspector Followup Item 96-202-09.

A task force has documented the status of the licensee's compliance with Part I license commitments in "License Commitments," dated February 29, 1996. Corrective actions have been completed for most of the identified deficiencies. However, no schedule for completion or followup action had been established for the remainder. The inspectors were informed by the licensee that a commitment tracking system is currently under development as part of their corrective action for a previous enforcement action (EA 96-002).

**16. Closeout of IFI**

During this inspection, certain of the items opened during the June 1995 inspection were closed. The close-out of violation 95-201-04 is discussed in Section 7 above. An additional closed item is:

- a. (CLOSED) Inspector Follow-up Item No. 95-201-01.

This IFI was opened to track the removal of combustible material around the Anhydrous ammonia tank. The area around the ammonia tanks has been cleared, and a fence has been erected to segregate this area. This item is closed.

**17. Exit Meeting**

The inspection scope and findings were summarized during an exit meeting on May 24, 1996. As a result of this inspection several violations and observations were discussed. As a result of this inspection the licensee committed to a program improvement plan to document the enhancements that will be completed in the criticality safety area. The licensee did not identify any of the specific material discussed as proprietary.

FAXED SUMMARY  
INSPECTION NO. 70-36/96-202

Bill,

I have attached excerpts from several letters written by CE to the NRC. These letters contained responses and commitments for various issues. Please have ready for our on-site review the following requested information.

We would prefer copies of procedures and/or documents if available. If documentation is not available, then discussions with cognizant plant personnel will need to be set up. Thanks

Garrett Smith

1. R. W. Sharkey to P. Ting, *Reply to a Notice of Violation (NRC Inspection Report 70-36/95-201)*, August 10, 1995

- a. **Response to violation 95-201-03**

"Responsibility for performing the operability and calibration checks for the oxide conversation equipment has been reassigned to the process engineer for this area. A preventive maintenance checklist and schedule has been prepared which includes the checks in question."

*Please provide: This preventive maintenance checklist and schedule.*

2. S. B. Junkrans to J. Lieberman, *Response to Demand for Information EA-95-194*), November 18, 1995

- a. **Response to violation 95-201-04, enclosure 1, page 3**

"The vaporizer drain's conductivity cells were tested on November 5, 1995, and the functioning of the alarms and interlocks was verified. Appropriate requirements have been proceduralized and added to OS 4101 "Oxide Alarm Calibration." The vaporizer drain's level monitor (thermocouple) were tested on November 13 and 14, 1995, and the functioning of the interlock was verified. Appropriate requirements have been proceduralized and added to OS 4101. The requirements in the procedures described above will be reevaluated during the pending Hazard Analysis for the Conversion Facility scheduled to be completed by March 31, 1996."

Enclosure 4

*Please provide: The November 5, 13, and 14 test plan and test results; a copy of OS 4101; and the documentation of the reevaluation conducted as part of the HA work.*

**b. Response to violation 95-201-04, enclosure 1, page 4**

"Combustion Engineering has adopted a formalized process for responding to notices of violations that assures that line management approves every response, and that support personnel participate appropriately."

*Please provide: The documentation that discusses the formalized process for responding to notices of violations to assure that line management approves every response, and that support personnel participate appropriately.*

**c. Response to violation 95-201-04, enclosure 1, page 4**

"The Hematite Plant Safety Committee has undertaken a review of all of the criticality safety controls listed in section 4.2.4 of the license application to assure that appropriate procedures are in place for such controls. This will be completed by November 30, 1995."

*Please provide: This review of all of the criticality safety controls listed in section 4.2.4 of the license application.*

**d. Response to violation 95-201-04, enclosure 1, page 4**

"A task force is being set up to review Part 1 of License No. SNM-33 to systematically document all commitments in Part 1 of the license and the status of Combustion Engineering's compliance with those commitments. This effort will be completed by February 29, 1996."

*Please provide: The task force's results from this systematic documentation of all of the licensee commitments and the status of compliance.*

**e. Response to violation 95-201-04, enclosure 1, page 4**

"Combustion Engineering's licensing amendment process will be revised to assure that appropriate responsibility is assigned for each new commitment. This will also be completed by February 29, 1996."

*Please provide: The revised licensee amendment process.*

f. **Response to violation 95-201-04, enclosure 1, page 4**

"In order to provide additional assurance that all license commitments are complied with, CE will establish a license commitment tracking system for license No. SNM-33. This will be completed by June 30, 1996."

*Please provide: The status of the development of this process.*

g. **Response to violation 95-201-04, enclosure 2, page 3**

This page discusses the report, *Using temperature measurement in the steam chest to detect condensate build-up*, dated December 8, 1992. This was used as the technical justification for using temperature as a level monitor.

*Please provide: A copy of the above mentioned report.*

h. **Response to violation 95-201-04, enclosure 2, page 4**

This section describes the testing criteria that was added to OS 4101.

*Please provide: A copy of this procedure, as stated in 2.a (above).*

3. **B. J. Kaiser to J. Lieberman, Reply to a Notice of Violation and Payment of \$12,500 Civil Penalty (EA-96-002), March 25, 1996**

a. **Cover letter**

Restatement of 2.c. above.

b. **Cover letter**

Restatement of 2.e. above.

c. **Cover letter**

"An audit of each license condition of Section 4.2.4 will be conducted during the annual criticality safety audit this month [March 1996] and repeated annually thereafter."

*Please provide: The report from the March 1996 criticality safety audit.*

d. **Cover letter**

"A detailed review of the facility's compliance with the OSHA PSM rule (29 CFR 1910.119) has been completed."

*Please provide: This documented review.*

e. **Cover letter**

"Our July 27, 1995, submittal regarding our evaluation of our safety program against the NRC's Branch Technical Position for Chemical Safety will be revised by May 31, 1996."

*Please provide: The status of this revised submittal.*

f. **Reply to notice of violation (NRC letter EA 96-002), enclosure 1, page 4**

"By March 31, 1996 we will have completed the outstanding actions remaining from the PHA with the exception of replacing a roof and painting the ammonia tank which are scheduled to be completed by July 31, 1996."

*Please provide: The status and documentation showing the completion of each of these items.*

g. **Reply to notice of violation (NRC letter EA 96-002), enclosure 1, page 4**

"Combustion engineering is developing a regulatory compliance commitment tracking system ..... by June 30, 1996."

*Please provide: The status of the development of this process.*

4. R. W. Sharkey to P. Ting, *Review of Nuclear Criticality Safety Controls*, January 24, 1996

a. **Cover Letter**

"... it was concluded that some of the Section 4.2.4. requirements should be more specifically stated in a procedure. The plant wide criticality safety procedure, O.S. 201, *Nuclear Safety Parameters*, has been revised to include the complete wording of all Section 4.2.4. license conditions and establish the requirement for auditing or inspecting these controls at least annually."

*Please provide: The updated copy of OS 201.*

5. R. W. Sharkey to P. Ting, *NRC Recommendations concerning Chemical Safety*, September 9, 1995

a. **Cover Letter**

"The existing PHA [ammonia] will be revisited for potential changes as part of bringing the second tank on-line."

*Please provide: The updated PHA and/or the documented review of the PHA as a result of bringing the second tank on-line.*

**b. Response to NRC's Recommendations concerning Chemical Safety, Enclosure 1**

"Heightened management awareness of the need to maintain access to the ammonia system emergency shutoff valve ... will ensure the valve remains unobstructed."

*Please provide: A discussion of this heightened management awareness.  
What exactly was done to complete this action.*

**c. Response to NRC's Recommendations concerning Chemical Safety, Enclosure 1**

Several responses (5, 6, 7, 8, and 13) state that these issues will be addressed during the performance of the process hazard analysis.

*Please provide: The documentation that these issues were addressed during the performance of the PHA.*

**d. Response to NRC's Recommendations concerning Chemical Safety, Enclosure 1**

"Alarm response procedures are under development."

*Please provide: The status of these procedures.*

**e. Response to NRC's Recommendations concerning Chemical Safety, Enclosure 1**

"The management of controls over programming changes are documented in internal procedures."