June 21, 1996

6-21-96

9 pgs

Mr. Robert W. Sharkey Manager
Regulatory Compliance
Hematite Nuclear Fuel Manufacturing
Combustion Engineering, Inc.
3300 State Road P
Hematite, MO 63047

SUBJECT: LICENSE AMENDMENT REQUEST FOR VALIDATION OF CRITICALITY CALCULATIONAL METHOD (TAC NO. L30849)

Dear Mr. Sharkey:

In accordance with your application dated January 26, 1996, and supplement dated May 29, 1996, and pursuant to Part 70 to Title 10 of the Code of Federal Regulations, Materials License SNM-33 is hereby amended to incorporate documentation of the validation of the current criticality calculational methodology used for analyzing complex systems and to incorporate the revised license pages 7-1 and 8-1 to correct the date of a referenced letter concerning the site decommissioning funding plan and the site emergency plan respectively. Accordingly, Safety Condition S-1 is revised to include the dates January 26, and May 29, 1996.

We have noted that Safety Condition No. S-5 has become obsolete since April 30, 1996. Therefore, Condition S-5 is hereby deleted from the license SNM-33.

All other conditions of the license shall remain the same.

Enclosed are copies of the revised Materials License SNM-33 and the Safety Evaluation Report, which includes the Categorical Exclusion determination.

Sincerely,
Original signed by:
Robert C. Pierson, Chief
Licensing Branch
Division of Fuel Cycle Safety
and Safeguards, NMSS

Docket 70-36
License SNM-33
Amendment 13

Enclosures:
1. Materials License SNM-33
2. Safety Evaluation Report

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

June 21, 1996

Mr. Robert W. Sharkey, Manager
Regulatory Compliance
Hematite Nuclear Fuel Manufacturing
Combustion Engineering, Inc.
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Hematite, MO 63047

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NRC FORM 374
(10-89)

U.S. NUCLEAR REGULATORY COMMISSION



# MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 39, 40 and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

| Licensee | | |
|---|---|---|
| 1. Combustion Engineering, Inc. | 3. License number | SNM-33<br>Amendment 13 |
| 2. 3300 State Road P<br>Hematite, Missouri 63047 | 4. Expiration date | July 31, 2004 |
| | 5. Docket or Reference No. | 70-36 |

| 6. Byproduct, source, and/or special nuclear material | 7. Chemical and/or physical form | 8. Maximum amount that licensee may possess at any one time under this license |
|---|---|---|
| A. Uranium enriched to maximum 5.0 weight percent in the U-235 isotope | A. Any (excluding metal powders) | A. 12,000 kilograms U-235 |
| B. Uranium, enriched to any enrichment in the U-235 isotope | B. Any (excluding metal powders) | B. 350 grams U-235 |
| C. Source material (uranium and thorium) | C. Any (excluding metal powders) | C. 50,000 kilograms |
| D. Cobalt-60 | D. Sealed sources | D. 40 millicuries, |
| E. Cesium-137 | E. Sealed sources | E. 500 millicuries |
| F. Mixed activation and fission product calibration sources including Am-241 | F. Solid sources | F. 200 microcuries |
| G. Californium-252 | G. Sealed sources | G. 4 milligrams |

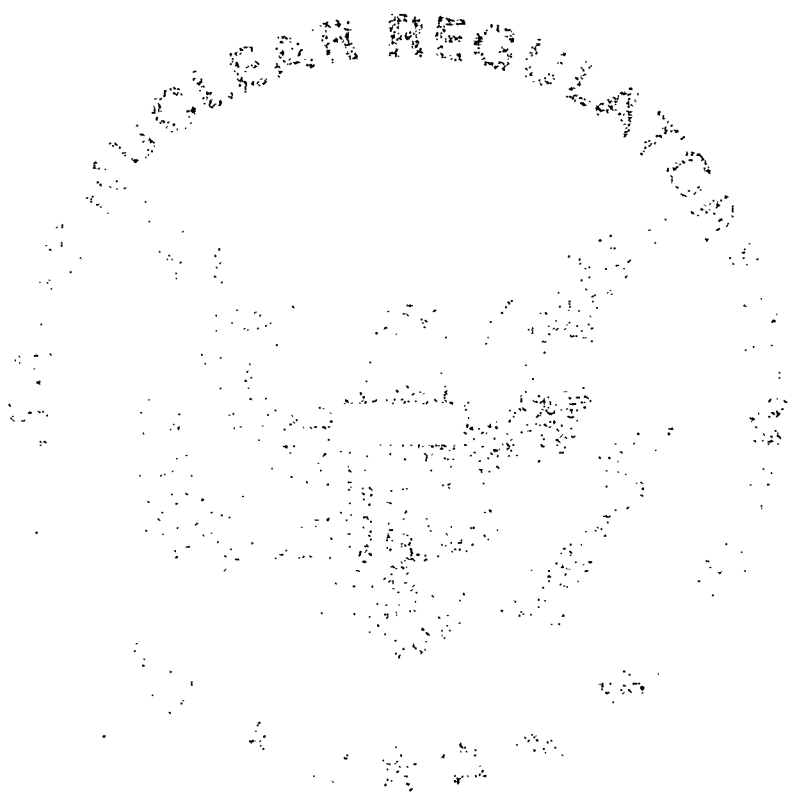
9. Authorized place of use: The licensee's existing facilities in Hematite, Missouri, as described in the license renewal application.

License Number
SNM-33 Amendment 13

Docket or Reference Number
70-36

**MATERIALS LICENSE**
**SUPPLEMENTARY SHEET**

10. The license shall be deemed to contain two sections: Safety Conditions and Safeguards Conditions. These sections are part of the license, and the licensee is subject to compliance with all listed conditions in each section.



FOR THE NUCLEAR REGULATORY COMMISSION

Date: 21 JUNE 1996

By: Robert C. Pierson
Division of Fuel Cycle Safety
and Safeguards, NMSS
Washington, DC 20555

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SNM-33 Amendment 13

Docket or Reference Number
70-36

SAFETY CONDITIONS

## SAFETY CONDITIONS

S-1. Authorized use: For use in accordance with the statements, representations, and conditions in Chapters 1 through 8 of the application dated October 29, 1993, and supplements dated November 24, 1993; January 14, January 28, March 21, April 20, June 14, October 24, and October 26, 1994; and January 28, February 27, March 10, April 24, July 27, October 31, and December 15, 1995, and January 26, and May 29, 1996.

S-2. The licensee shall conduct an evaluation to determine the source of the contamination to burial site well #4, as shown in Figure 13-2 of the application dated March 21, 1994, and shall identify the contaminants in the groundwater. The findings of the evaluation shall be submitted to the NRC within 180 days of the issuance of this renewed license.

S-3. Deleted - Hematite Evaporation Ponds Decommissioning Plan approved by Amendment 4 dated May 1995.

S-4. The licensee is hereby granted the special authorizations in Chapter 1, Section 1.6(a) through 1.6(g) of the renewal application.

S-5. Deleted - The 4-month delay in completion date of biennial emergency exercise was deleted by Amendment 13 dated June 1996.

## SAFEGUARDS CONDITIONS

Section 1.0 - Material Control & Accounting

SG-1.1 The licensee shall follow Sections 1.0 through 9.0 of its Fundamental Nuclear Material Control Plan dated April 28, 1995. Any revisions to this Plan shall be made only in accordance with the provisions of either 10 CFR 70.32(c) or 70.34.

SG-1.2 Notwithstanding the requirements of 10 CFR 74.31(c)(5) and section 5.3.1 of the Plan identified in Condition SG-1.1, the licensee may delay the start of its 1995 physical inventory beyond the currently scheduled deadline of August 15, 1995, so as to start on or before October 25, 1995. To compensate for this delay, the licensee's 1996 physical inventory shall be initiated no later than July 15, 1996.

SG-1.3 Notwithstanding the requirement of 10 CFR 74.31(c)(8) to independently assess the effectiveness of the material control and accounting system at least every 24 months, the latest due date for issuance of the assessment team report for the next required assessment may be delayed from May 21, 1995, to July 21, 1995.

SG-1.4 Notwithstanding the commitment in Section 4.3.1 of the Plan identified in Condition SG-1.1 regarding receipt measurements of $UF_6$, the licensee may, for the $UF_6$ shipment specifically identified in its August 14, 1995 letter (from R. W. Sharkey to R. C. Pierson), modify the methodology of determining receiver's values for uranium concentration and U-235 enrichment. In lieu of the measurements normally utilized for $UF_6$ shipper-receiver comparisons, the licensee may derive its U-235 enrichment measurement from two samples of the $UO_2F_2$ produced from each $UF_6$ cylinder in question, and may derive its percent uranium value by using a nominal (historical average) uranium element concentration for $UF_6$ receipts. The percent uranium and the U-235 isotopic weight fractions thus obtained will be applied to the license's cylinder weight measurements to obtain net weight of uranium element and U-235 isotope for each cylinder in the shipment. If no significant shipper-receiver difference (as defined in Section 7.2.5 of the licensee's FNMC Plan) exits, shipper's values may be booked by the licensee.

SG-1.5 Notwithstanding the requirements of Condition SG-1.1, and in accordance with their letter dated, March 18, 1996, the licensee is not required, per Section 4.3.1 of the Plan, to provide for "witnessed sampling" of the $UF_6$ cylinders received under work order GES 3048. As an alternate safeguards measure, the licensee will analyze two samples of $UO_2F_2$ produced from each cylinder during their conversion process to confirm the vendor's measurement of U-235.

SG-1.6 The licensee shall follow all sub-codes within Codes 1 through 8 of the 19-page Transitional Facility Attachment No. 14A, dated December 4, 1995, to the US/IAEA Safeguards Agreement.

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
SNM-33 Amendment 13

Docket or Reference Number
70-36

SAFEGUARDS CONDITIONS

Section 2.0 - Physical Protection for SNM of Low Strategic Significance

SG-2.1 The licensee shall follow the security plan entitled "Physical Security Plan for Protection of Nuclear Material of Low Strategic Significance" dated May 1980, as revised by Revision 3 dated November 1992 (letter dated November 12, 1992), and as revised in accordance with the provisions of 10 CFR 70.32(e).

SG-2.2 The licensee shall ensure that the surveillance tour, conducted by the guards or authorized person in accordance with Section 3.1.1, includes surveillance over the $UF_6$ outdoor storage area.

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

June 21, 1996

DOCKET: 70-36

LICENSEE: Combustion Engineering, Inc. (CE)
Hematite, Missouri

SUBJECT: SAFETY EVALUATION REPORT: APPLICATION DATED JANUARY 26, 1996, REQUEST FOR APPROVAL OF VALIDATION OF CRITICALITY CALCULATIONAL METHOD

BACKGROUND

By application dated January 26, 1996, CE requested a license amendment to incorporate documentation of the validation of the current criticality calculational methodology used for analyzing complex systems. In response to the staff's letter dated April 22, 1996, CE provided supplemental information dated May 29, 1996.

DISCUSSION

The validation was performed in accordance with Section 4.2.3.2 of the renewal application, consistent with ANSI/ANS-8.1 and Regulatory Guide (RG) 3.4, "Nuclear Criticality Safety in Operations with Fissionable Materials at Fuels and Materials Facilities," Revision 2, dated March 1986. The validation studies performed have been documented and will remain on file at the site while the results of the model are being utilized.

CE utilizes industry standard methodology; viz., a sixteen broad neutron group homogeneous model with the Hansen-Roach sixteen group library and the SCALE 4 calculational methodology, for criticality calculations. The sixteen broad neutron group homogeneous model and the Hansen-Roach library were validated by calculating forty experiments for homogeneous SNM/moderator systems. The SCALE 4 methodology is used for both homogeneous and heterogeneous systems consisting of SNM, moderator, and structural materials. The version of the SCALE code currently verified and in use is 4.1/0. The CSAS modules are used to process problem-dependent cross sections as part of the SCALE modular code system.

CE has committed that the highest effective multiplication for normal or abnormal credible operating conditions shall be less than or equal to 0.95 including applicable biases and calculational uncertainties for validated computer analysis methods.

The staff considers the manner in which CE validates their criticality calculational methods to be acceptable because (1) a database of analyzed critical experiments that are pertinent to the various systems and operations at the fuel facility was established, (2) CE's staff has adequate training and experience to determine which critical experiments are applicable to the systems of interest, and (3) validation was performed in accordance with ANSI/ANS-8.1 and RG 3.4, Revision 2, dated March 1986, which is considered acceptable industry practice.

In CE's May 29, 1996, letter, CE submitted a revised license page 7-1 to correct the date of a reference letter concerning the site decommissioning funding plan from June 19, 1990, to July 19, 1990, and a revised license page 8-1 to correct the date of the letter of submission of the site emergency plan from August 23, 1993 to October 28, 1993. The staff has reviewed the changes and determined that the changes are acceptable.

Safety License Condition S-5 granted a 4-month delay in completion date of biennial emergency exercise from December 31, 1995, to before April 30, 1996. The condition has become obsolete and should be deleted.

ENVIRONMENTAL REVIEW

The staff has determined that the validation of CE's criticality safety methodology will result in the following conditions having been met:

1. There is no significant change in the types or significant increase in the amounts of any effluents that may be released offsite,

2. There is no significant increase in individual or cumulative occupational radiation exposure,

3. There is no significant construction impact, and

4. There is no significant increase in the potential for or consequences from radiological accidents.

Accordingly, pursuant to 10 CFR 51.22(c)(11), neither an environmental assessment nor an environmental impact statement is warranted for this action.

CONCLUSION

Based on the above discussion, the staff concludes that the proposed amendment can be issued to include documentation of CE's current criticality calculational methodology for complex systems without undue risk to the workers, public, and the environment. Therefore, the staff recommends that the amendment be approved.

The Region III staff has no objection to this proposed action.

Principal Contributors
Kim Hardin
Sean Soong
Mary Adams