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JUL 15 1981

DOCKET NO: 70-1100

APPLICANT: Combustion Engineering, Inc.

FACILITY: Windsor, Connecticut

SUBJECT: REVIEW OF AMENDMENT APPLICATION DATED MARCH 18, 1981 AND ITS SUPPLEMENT DATED JUNE 1, 1981

I. Background

Combustion Engineering (CE), by application dated March 18, 1981, and its supplement dated June 1, 1981, requested authorization to increase the thickness and width of stacked trays of UO_2 pellets on each shelf of the storage array to 4.0 inches and 30.0 inches, respectively. The current slab thickness and width of stacked trays on each storage shelf are 3.7 inches and 18.0 inches, respectively.

II. Discussion

A. Nuclear Criticality Safety

The storage array for pellets is three shelves high with 17 7/8 inches spacing between adjacent shelves. No other fuel storage or work station is positioned closer than 60 inches from the storage array.

CE evaluated the nuclear criticality safety of the array using the KENO-IV Code with the 16 group Hansen-Roach cross section library and assumed the following:

1. Each shelf holds a 4.0-inch thickness of UO_2 pellets at optimum moderation and maximum enrichment (4.1 wt% ^{235}U).

2. The water density between shelves and surrounding the array is optimum for maximum k_{eff}.

The maximum k_{eff} under the above conditions was calculated to be 0.9313 .0044.

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The staff made independent calculations to confirm the nuclear criticality safety of the storage array. The KENO-IV Code with the 27 group cross section library was used in the calculations. The staff confirmed the CE calculations were made at optimum water moderation between pellets on each shelf. The maximum k_{eff} was calculated to be 0.9489 .0047 at optimum interspersed water moderation between shelves but with full density water in front and back of the array. With optimum interspersed water density in front and in back of the array as well as between shelves, the calculated maximum k_{eff} was found to be approximately 0.5% greater.

The model used by the staff for the evaluation of the nuclear criticality safety of the array is conservative for the following reasons:

1. Optimum moderation between pellets on a shelf occurs at approximately one-half the normal packing density of pellets in a tray.

2. Optimum water mist density of (~0.05 g H_2O/cm^3) can not be attained from sprinklers.

3. Water from sprinklers cannot introduce significant moderation between shelves of pellets since the entire array is covered by a metal top.

Therefore, the array can not be made critical under all credible accident conditions.

B. Radiation Safety

Since the licensee does not propose any change in process operations, no significant effect in radiological safety should result.

C. Environmental Effects

Since the licensee does not propose any change in process operations, no significant change in environmental effect should result.

D. General

The amendment application was discussed with Mr. Jerome Roth, Region I, (IE), Inspector of the CE facility, on July 6, 1981. He foresaw no safety or environmental related problems with authorization to increase the size of the storage array of pellets.

JUL 15 1981

III. Conclusion

The presently authorized nuclear criticality safety controls associated with the increased size of the pellet storage array are adequate for the protection of the health and safety of the operating personnel, the public and the environment.

Issuance of the license amendment is recommended.

Original Signed by
N. Ketzlach
Norman Ketzlach
Uranium Process Licensing Section
Uranium Fuel Licensing Branch
Division of Fuel Cycle and
Material Safety

Approved by: Original signed by:
W. T. Crow
W. T. Crow, Section Leader

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