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ASEA BROWN BOVERI

TELEFAX

R

Date: 13-April-93

Reference:

To: G. France

(708) 790-5665

Number of Pages To Follow: 10

From: J. A. Rode

Original will be hand delivered April 14, 1993.

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ABB Combustion Engineering Nuclear Fuel
Combustion Engineering, Inc.

3300 State Road P
P O Box 107
Hematite, MO 63047

Telephone:
(314) 937-4691
(314) 296-5640

Fax:
(314) 937-7955

N-83

April 13, 1993 M. A. Michelsen

Hematite Consolidation - Kardex Configuration Concern

A. E. Scherer	DD/A	VP., Reg. Affairs	5305-GC29
R. Siudek	(Letter Only)	Pres. Nuc. Fuel	5305-GC27
S. Junkrans		VP., Mfg. Ops.	5305-GC27
J. F. Conant	DD/A	Mgr. Nuc. Mat. Lic.	5329-GC29
J. A. Rode		Plt. Mgr.	HNFM
L. N. Grossman		Dir. Mfg. Tech.	HNFM
H. E. Eskridge		Mgr., Reg. Compl.	HNFM
M. Eastburn		Nuc. Crit. Spec.	HNFM
R. J. Klotz		Nuc. Crit. Spec.	5318-GC28
R. S. Harding		Nuc. Crit. Spec.	5318-GC28
R. S. Bell		VP, Gen. Council	9301-0426
C. B. Brinkman		Mgr., Wash. Off.	CEP-108
Docket File			
NML File		DD/A (original)	

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April 13, 1993

Ms. Elinor G. Adensam, Chief
Licensing Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Materials Safety and Safeguards
U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

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

Subject: Hematite Consolidation - Kardex Configuration Concern

Reference: Letter, E. G. Adensam (NRC) to J. A. Rode (C-E), dated April 7, 1993

Dear Ms. Adensam:

On March 30, 1993, we informed Dr. Sean Soong and Region III that, during one of our "preoperational inspections", Combustion Engineering had discovered a discrepancy in the Kardex fuel pellet storage device. The Kardex fuel pellet storage device is being installed as part of the Hematite Consolidation project. The discrepancy that we found involved the fact that more shelves were installed than originally envisioned in the design. The purpose of this letter is to provide the additional information concerning the situation, as requested in the Reference, and to describe the controls which we have in place with respect to assuring the systems, structures and components of the Consolidation project meet their safety functions.

During a subsequent telephone conversation with the NRC, it also became apparent that some confusion existed regarding the number of pans of UO_2 pellets which the Kardex was designed to store. In our Consolidation license amendment application of August 5, 1992, page II.8-11aa(38) (based on the original "as-designed" configuration) Part II Section 8.3.9.1.1, stated that the capacity of the Kardex was 330 storage locations. We attempted to explain in Part II Section 8.3.9.1.2, however, that for conservatism, the criticality analyses included 360 Kardex pans. [The Part I license condition (Section 4.2.3.t)) of 360 pans of UO_2 is

Combustion Engineering, Inc. Post Office Box 107 3300 State Road P Hematite, MO 63047 Telephone (314) 937-4691 (314) 296-5640 Fax (314) 937-7955

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appropriately based on the conservatively analyzed case.] On the other hand, the revision to the Fundamental Nuclear Material Control Plan forwarded in our letter of March 18, 1993, is based on the actual intended physical storage limit of 330 pans. We regret the confusion which our conservative analysis assumption may have introduced.

The Enclosure provides a description of the sequence of events leading up to our discovery of the additional Kardex shelves. This letter also describes our plans to resolve the situation.

Although preliminary analyses have shown that the Kardex is clearly acceptable as is, we intend (based on a completed feasibility assessment) to return the Kardex to its "as-designed" condition before any SNM is loaded. This is because we believe it is more important to comply with the original design (and licensing) bases than to introduce a change at this late date.

Based on the enclosed discussion, we believe that Combustion Engineering has taken the necessary steps to ensure that all of the safety bases of the license have been, and will continue to be, met. It is on this basis that we request that the NRC concur in our use of the Kardex as discussed in the Enclosure. We are looking forward to a more complete discussion and final resolution of these issues during our meeting on April 14, 1993.

If there are any questions or comments concerning this matter, please do not hesitate to call me or Mr. John F. Conant at (203) 285-5002.

Respectfully submitted,

J. A. Rode
Plant Manager

Enclosure: As Stated

cc: G. France (NRC - Region III)
S. Soong (NRC)

COMBUSTION ENGINEERING

HEMATITE NUCLEAR FUEL MANUFACTURING FACILITY

CONSOLIDATION PROJECT: KARDEX SHELVES

April 1993

COMBUSTION ENGINEERING
HEMATITE NUCLEAR FUEL MANUFACTURING FACILITY
CONSOLIDATION PROJECT: KARDEX SHELVES

1.0 INTRODUCTION AND SUMMARY

The process used on the Consolidation project to procure a system, structure or component that may affect nuclear safety is that of commercial procurement followed by a "preoperational inspection" to assure that the attributes important to safety are "as-designed" before its dedication to nuclear service. (This is obviously different than, and should not be compared to, the "typical" construction process for a nuclear power plant.) Unfortunately, occasionally during the dedication process the commercial item is found not to be acceptable for its intended use. As long as it is identified before its intended use, this may be a commercial, but not a safety, concern.

It is also unavoidable that the dedication process, when using "preoperational inspection" as a method of acceptance, occurs late in the procurement process. Unfortunately, license approval also often comes late in the process of changing a facility, and sometimes these two steps have a tendency to overlap in time, as occurred here.

We have recently completed our investigation, including our determination of the root causes behind the discrepancy in the "as-built" condition of the Kardex fuel pellet storage device. The major factor found to be behind the discrepancy is inadequate communication between Combustion Engineering and the sub-contracted personnel responsible for installation. This was complicated by the fact that the Kardex device was originally purchased more than two years ago for use in the Windsor facility (it was never installed in Windsor but rather was placed in storage until it was shipped to Hematite in the latter half of 1992). Finally, this breakdown of communication was exacerbated by a design which allowed so much flexibility that the shelves could be installed at a wide variety of spacings.

2.0 BACKGROUND

Combustion Engineering's Hematite Consolidation Project was initiated during 1992 in order to transfer all remaining uranium manufacturing operations from the Windsor, Connecticut, facility to the Hematite, Missouri, facility. In addition to eliminating double licensing fees, one of the purposes of the project was to improve efficiencies through more automated manufacturing techniques than had been used in the past. As one of the automated features in the project, fuel pellet storage will be performed in a computer controlled commercial device manufactured by Kardex, an Industriever 8000 (the Kardex).

The Kardex storage device is comprised of six vertical storage modules which contain shelves, each designed to hold fuel pellets in trays within a "Kardex pan". The Kardex pan is used for both handling and storage purposes. Elevators with computer controlled indexing capability position the Kardex pans on the shelves. Each of the six modules contains an elevator, accessing two vertical towers of shelves.

The Kardex storage device was not purchased originally for the Hematite Consolidation Project, but rather was a commercial product purchased for use in the Windsor plant (via Purchase Order dated 1/23/90 to a local Windsor Kardex distributor). It was ordered but never assembled nor installed in Windsor. Rather, it was placed in storage. In the latter part of 1992, the unassembled Kardex was shipped to Hematite for installation.

3.0 INSTALLATION DETAILS

The Kardex storage device is a commercially available device sold in modular form with several different assembly configurations possible. The shelf spacing is not set at the factory, but rather is installed at the site. In this case, Combustion Engineering contracted with the St. Louis local Kardex distributor to provide the installation services (the original Combustion Engineering purchase order to the Windsor local Kardex distributor had specified a 6 9/16" shelf spacing).

The shelf spacing for the Kardex is determined both by the spacing of bolt holes in the vertical support posts and the spacing of holes in the shelf brackets. In order to achieve a 6 9/16" shelf spacing, the shelf bracket holes used to bolt the shelf must be alternated every other shelf. This is somewhat less obvious than using the same holes on each bracket and each post hole.

While the original Windsor purchase order to the local Kardex distributor for the Kardex hardware also included installation services, that installation was not performed because of the relocation of the Kardex from Windsor to Hematite. A separate purchase order, dated 9/2/92, was thus issued to the St. Louis local Kardex distributor to install the Kardex at Hematite. That purchase order did not provide specifications, but simply authorized them to provide "... 2. Initial installation of the 6 modules. ...".

4.0 PREPARATION OF THE CONSOLIDATION LICENSE AMENDMENT

The Consolidation License amendment of August 5, 1992, was prepared earlier in 1992 based upon the then current design information. The number of shelves was based upon the nominal shelf spacing of 6 9/16". This translates to up to 330 shelves. For conservatism, however, an additional 30 spaces were added to the criticality safety analyses. As a result, the license application specified a maximum number of 360 Kardex pans full of pellets (the up to 330 anticipated plus 30 for conservatism).

5.0 INSTALLATION PROCESS

As a result of a recent telephone discussion with the individual within the St. Louis local Kardex representative's office that actually installed the device, it was learned that the basis of the "as-built" shelf spacing was the number of parts supplied and the available room to install the parts. It thus appears that during the installation process of the Kardex storage device, the original Combustion Engineering specified shelf spacing was not effectively communicated to the representatives installing the device. The pertinent details as represented by the vendor concerning the installation efforts are summarized below:

1. Although the St. Louis local representative contacted the Windsor local representative for information, none was forthcoming. The original Windsor Kardex representative individual who was Combustion Engineering's liaison had since left the company, and the Windsor distributor apparently perceived their responsibility was complete.

2. Combustion Engineering had given the St. Louis local Kardex representative a copy of the original hardware/installation purchase order for information. Although that order specified a shelf spacing of 6 9/16", the St. Louis local Kardex representative did not base the "as-built" spacing on that original order, but rather the available parts supplied by Combustion Engineering.

6.0 DISCOVERY OF THE "AS-BUILT" NUMBER OF SHELVES

On the Consolidation project, before any commercially procured item is dedicated to its nuclear application, a process is instituted to check the "as-built" against design and license requirements. This is performed during the final equipment checkouts and preoperational testing and before any SNM is introduced.

It was during this checkout process that the as-built spacing discrepancy with respect to the license application was discovered. As a result, Combustion Engineering placed an internal "hold" on the introduction of SNM into the Kardex.

The basic facts behind the "as-built" versus "as-designed" discrepancy were discovered on Saturday March 27, 1993. This information was evaluated and its importance determined on Monday March 29, 1993. Combustion Engineering management was informed on Monday March 29, 1993, and the NRC was informed the next day.

7.0 CORRECTIVE ACTIONS

The following provides the evaluation of corrective actions resulting for the Kardex shelves condition.

a. What was the cause of the deficiency?

Based upon an April 6, 1993, telephone conversation with the local St. Louis representative and installer of the Kardex, the installer had a copy of the original hardware purchase order which specified a 6 9/16" spacing. However, Combustion Engineering did not specifically refer to this in the order which authorized the installation. The installer thus did what they believed they were told to do, i.e., to provide "... Initial installation of the 6 modules. ..." with the parts provided. As a result, the basis of the "as-built" shelf spacing appears to be the quantity of parts provided and the available room to install the parts. Parts sufficient for somewhat more than 414 shelves were provided and there was sufficient room to install 414 shelves at 5 5/8" spacing. The ease or difficulty of achieving the originally desired 6 9/16" spacing apparently did not have a significant impact on the installer's ultimate decision to use the 5 5/8" spacing.

In light of the above, the three factors contributing to the root cause have been determined to be:

1. Inadequate communication between Combustion Engineering and the installer.

2. Inadequate compensation for the extensive time span between original procurement of the hardware and its ultimate installation. This includes the impact of the change in the installation vendor.

3. Inadequate compensation for the flexibility in the hardware design that allowed for a wide variety of shelf spacings.

b. What action has been taken to resolve the deficiency?

Upon identification, the action that has been taken by Combustion Engineering was to place a "hold" on the introduction of Special Nuclear

Material into the Kardex storage device. (This hold will remain in effect until the NRC has lifted the restriction of NRC letter dated April 7, 1993.)

Although preliminary analyses have shown that the Kardex is clearly acceptable as is, we intend to return the Kardex to its "as-designed" condition before any SNM is loaded, i.e., up to 330 shelves at .6 9/16" shelf spacing. This is because we believe it is more important to comply with the original design (and licensing) bases than to introduce a change at this late date.

c. What action has been taken to prevent recurrence?

While there has been no degradation in safety, Combustion Engineering has had to accept a negative commercial impact due to the late discovery of this discrepancy. As a result, we intend to reevaluate the commercial implications of the procurement process's ability to more effectively communicate with our suppliers. In addition, we intend to reevaluate the commercial implications of using earlier methods of acceptance rather than relying solely on inspections at the end of the procurement process. While procurement of Consolidation equipment is essentially complete, Combustion Engineering will include these "lessons learned" in future projects.

d. When will the above actions be completed?

Combustion Engineering intends to complete the modifications to the Kardex by April 23, 1993.

e. What action was taken to evaluate the effect on other goods/services?

Final equipment checkouts and preoperational acceptance testing for Consolidation is in progress and will be completed prior to the dedication or use of any system, structure or component to its nuclear service.

8.0 NUCLEAR SAFETY CONSIDERATIONS

The process used on the Consolidation project to procure a system, structure or component that may affect nuclear safety is that of commercial procurement followed by a "preoperational inspection" to assure that the attributes important to safety are "as-designed" before its dedication to nuclear service. Unfortunately, occasionally during the dedication process the commercial item is found not to be acceptable for its intended use. As long as it is identified before its intended use, this may be a commercial, but not a safety, concern.

It is also unavoidable that the dedication process, when using "preoperational inspection" as a method of acceptance, occurs late in the procurement process. Unfortunately, license approval also comes late in the process of constructing a new facility, and sometimes these two steps have a tendency to overlap in time, as occurred here.

While there was an obvious weakness of the Combustion Engineering/vendor communication in the procurement controls of the Kardex installation, the result has been a commercial - - and not a safety - - impact. In fact, we believe that this experience has demonstrated that Combustion Engineering has instituted appropriate controls in its Consolidation project. In this case, Combustion Engineering correctly administered the dedication process of the Kardex and determined that the "as-built" item was not "as-designed". The "as-built" configuration was properly evaluated and an internal "hold" placed on the use of the Kardex. This process was completed and the determination made prior to use of the Kardex for SNM storage.

Rectification of the Kardex to the "as-designed" condition is currently underway and will be completed before SNM is introduced.