



**ENTERGY**

Entergy Operations, Inc.  
P.O. Box B  
Kilona, LA 70066  
Tel 504 739 6774

**R. F. Burski**  
Director  
Nuclear Safety  
Waterford 3

**THE ATTACHED REPORT**  
**IS PROPRIETARY**

**W3F1-95-0152**  
**A4.05**  
**PR**

September 18, 1995

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Subject: Waterford 3 SES  
Docket No. 50-382  
License No. NPF-38  
Request for Additional Information Regarding NPF-38-146

Gentlemen:

By letter dated December 6, 1993, as supplemented by letter dated May 12, 1995, Entergy Operations, Inc. submitted the subject Technical Specification change request to allow the installation of tube sleeves as an alternative to plugging defective steam generator tubes at Waterford 3. The request proposed the use of Combustion Engineering Leak Tight Sleeving design at Waterford 3. In a letter dated July 11, 1995, the staff requested additional information concerning the use of the CE sleeves. Waterford 3 responded to the staff's questions per letter dated August 9, 1995. By letter dated September 1, 1995, the staff requested further information regarding the use of the CE sleeves. These latest requests and Waterford 3's responses are listed below. Details of the CE sleeving process and performance are included in the attached report, CEN-625-P, "Verification of the ABB CENO Steam Generator Tube Sleeve Installation Process and Operating Performance." This report contains information which is proprietary to the supplier, for which an affidavit is provided. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and specifically addresses the considerations listed in paragraph (b)(4) of Section 2.790 of Title 10 of the federal regulations. Accordingly, it is respectfully requested that

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Attachment 1 be withheld from public disclosure in accordance with that regulation.

1. Please provide details of the sleeve installation sequence with respect to whether or not the upper weld is completed and heat treated prior to the lower joint being welded or rolled. Also, if a sleeve has two welded joints, what is the timing and sequence between welding and PWHT of the two welds?

Waterford 3 Response: The following steps outline the installation sequence for a welded Tubesheet (TS) sleeve and a welded/rolled Expansion Transition Zone (ETZ) sleeve. All qualification samples (both mechanical and corrosion) were fabricated by following this sequence.

- A. Tube I.D. cleaning with an abrasive wire brush, followed by a lint free cotton swab.
- B. Sleeve installation to the proper tube elevation by using mechanical hardstops.
- C. Sleeve end expansion into contact with tube in preparation for welding.
- D. Structural weld near sleeve upper end using GTA process.
- E. Ultrasonic examination of sleeve upper weld.
- F. Visual examination of sleeve upper weld.
- G. Post weld heat treatment of sleeve upper weld.
- H. Torque roll of ETZ lower end or structural weld near sleeve lower end using GTA process for TS sleeve.
- I. Sleeve baseline examination with multifrequency ECT technique.

The following steps outline the installation sequence for a welded Eggcrate support (ECS) sleeve. All qualification samples (both mechanical and corrosion) were fabricated by following this sequence.

- A. Tube I.D. cleaning with an abrasive wire brush, followed by a lint free cotton swab.
- B. Sleeve installation to the proper tube elevation by using mechanical hardstops.

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- C. Sleeve end expansion into contact with tube in preparation for welding.
  - D. Structural weld near sleeve upper end using GTA process.
  - E. Structural weld near sleeve lower end using GTA process.
  - F. Ultrasonic examination of sleeve upper weld.
  - G. Ultrasonic examination of sleeve lower weld.
  - H. Visual examination of sleeve upper weld.
  - I. Visual examination of sleeve lower weld.
  - J. Post weld heat treatment of sleeve upper weld.
  - K. Post weld heat treatment of sleeve lower weld.
  - L. Sleeve baseline examination with multifrequency ECT technique.
2. What assurances exist that the tubes at Waterford are not locked in the ECS? Experience at other installations has demonstrated that TSP designs generally to be immune to creating a locked tube situation have proven otherwise. Describe tests to be performed or other measures to be taken to avoid possible detrimental effects of having locked tubes during PWHT.

Waterford 3 Response: It is ABB CENO's position that there is no assurance that the tubes at Waterford are not locked in the ECS. Therefore, ABB has taken a very conservative approach and has assumed that all tubes are locked in the ECS. A development program has been completed such that heater length, tube temperature and time at temperature have all been minimized to reduce the detrimental effects of having a locked tube condition, while still providing a quality PWHT process. The attached report (CEN-625-P) describes in detail the PWHT tests that have been completed with tubes locked at support plates.

3. Please provide additional discussion and details of far field residual stress measurements from welded sleeve mock-ups of tube bundles with locked supports. Provide information of the effect of multiple sleeves in a single locked tube with respect to residual far field stresses after PWHT.

Waterford 3 Response: ABB CENO has completed a number of tests on sleeve mock-ups of tube bundles with locked supports. These mock-ups

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included the installation and PWHT of up to three sleeves in a single locked tube. The attached report contains the results of the tests.

4. Discuss the temperature profile induced by the PWHT and what measures, if any, have been instituted to minimize its effect on a locked tube.

Waterford 3 Response: ABB CENO has completed a development program to optimize the variables which have the most detrimental effect on a locked tube. These variables include; heater length, tube temperature and time at temperature. All of these have been minimized to reduce detrimental effects while still providing a quality PWHT. The results of the program along with heater and temperature profiles are contained in the attached report.

5. Please provide additional information regarding the observed bowing that occurs in constrained tubes after sleeving. Has CE quantified the effect and analyzed the implications of bowing? Additionally, has bulging of a locked tube at the PWHT zone been observed, quantified and analyzed?

Waterford 3 Response: The attached report contains the results of the locked tube programs completed by ABB CENO. Included in the report is any observed bowing and/or bulging of the tube.

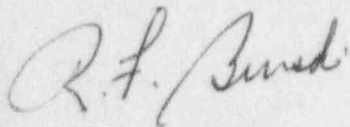
6. It is not clear from the submittal whether or not the licensee is committing to the latest ET probe technology, such as CECCO or Plus Point. Please clarify.

Waterford 3 will utilize an EPRI Appendix H qualified eddy current examination method for sleeve inspections. This includes the use of Plus Point or CECCO probes.

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Should you have any questions concerning the above, please contact Paul Caropino at (504) 739-6692.

Very truly yours,



R.F. Burski  
Director  
Nuclear Safety

RFB/DFL/tjs  
Attachment

cc: (w/Attachment)  
C.P. Patel, NRC-NRR

(w/o Attachment)  
L.J. Callan, NRC Region IV  
R.B. McGehee  
N.S. Reynolds  
NRC Resident Inspectors Office

ATTACHMENT 1

**AFFIDAVIT PURSUANT**

**TO 10 CFR 2.790**

I, I.C. Rickard depose and say that I am the Director, Operations Licensing of Combustion Engineering, Inc., duly authorized to make this affidavit, and have reviewed or caused to have reviewed the information which is identified as proprietary and referenced in the paragraph immediately below. I am submitting this affidavit in conformance with the provisions of 10 CFR 2.790 of the Commission's regulations and in conjunction with the application of ENTERGY Operations, Inc. for withholding this information.

The information for which proprietary treatment is sought is contained in the following document:

CEN-625-P, Rev. 00-P, "Verification of the ABB CENO Steam Generator Tube Sleeve Installation Process and Operating Performance", September 1995.

This document has been appropriately designated as proprietary.

I have personal knowledge of the criteria and procedures utilized by Combustion Engineering in designating information as a trade secret, privileged or as confidential commercial or financial information.

Pursuant to the provisions of paragraph (b) (4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure, included in the above referenced document, should be withheld.

1. The information sought to be withheld from public disclosure, is owned and has been held in confidence by Combustion Engineering. It consists of

design and development information regarding ABB CENO welded steam generator tube sleeves.

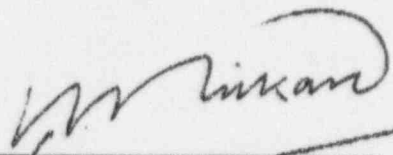
2. The information consists of test data or other similar data concerning a process, method or component, the application of which results in substantial competitive advantage to Combustion Engineering.
3. The information is of a type customarily held in confidence by Combustion Engineering and not customarily disclosed to the public. Combustion Engineering has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The details of the aforementioned system were provided to the Nuclear Regulatory Commission via letter DP-537 from F. M. Stern to Frank Schroeder dated December 2, 1974. This system was applied in determining that the subject document herein is proprietary.
4. The information is being transmitted to the Commission in confidence under the provisions of 10 CFR 2.790 with the understanding that it is to be received in confidence by the Commission.
5. The information, to the best of my knowledge and belief, is not available in public sources, and any disclosure to third parties has been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.
6. Public disclosure of the information is likely to cause substantial harm to the competitive position of Combustion Engineering because:
  - a. A similar product is manufactured and sold by major pressurized water reactor competitors of Combustion Engineering.
  - b. Development of this information by Combustion Engineering required millions of dollars and thousands of manhours of



effort. A competitor would have to undergo similar expense in generating equivalent information.

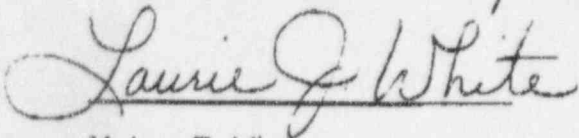
- c. In order to acquire such information, a competitor would also require considerable time and inconvenience to design and develop welded steam generator tube sleeves.
- d. The information consists of design and development information regarding ABB CENO welded steam generator tube sleeves the application of which provides a competitive economic advantage. The availability of such information to competitors would enable them to modify their product to better compete with Combustion Engineering, take marketing or other actions to improve their product's position or impair the position of Combustion Engineering's product, and avoid developing similar data and analyses in support of their processes, methods or apparatus.
- e. In pricing Combustion Engineering's products and services, significant research, development, engineering, analytical, manufacturing, licensing, quality assurance and other costs and expenses must be included. The ability of Combustion Engineering's competitors to utilize such information without similar expenditure of resources may enable them to sell at prices reflecting significantly lower costs.
- f. Use of the information by competitors in the international marketplace would increase their ability to market nuclear steam supply systems by reducing the costs associated with their technology development. In addition, disclosure would have an adverse economic impact on Combustion Engineering's potential for obtaining or maintaining foreign licensees.

Further the deponent sayeth not.

  
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I.C. Riskard, Director  
Operations Licensing

Sworn to before me

this 19<sup>th</sup> day of September, 1995

  
\_\_\_\_\_  
Laurie J. White

Notary Public

My commission expires: 8/31/99