Entergy Operations

Entergy Operations, Inc.
[illegible]

September 11, 1992

2CAN099206

U. S. Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, DC 20555

Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Information Concerning the Rolled
Transition Zone Steam Generator
Sleeve Rolled Joint
TAC No. M84099

Gentlemen:

In letter dated July 22, 1992 (2CAN079203), Entergy Operations submitted a Technical Specification Change Request revising the Surveillance Requirements for the Arkansas Nuclear One, Unit 2 (ANO-2) steam generator (SG) tubing. The request was to allow the use of Asea Brown Boveri-Combustion Engineering (ABB-CE) sleeves for tube repair of the ANO-2 SGs. As part of that submittal, ABB-CE Report CEN-601-P, Revision 01-P, "ANO-2 Steam Generator Tube Repair Using Leak Tight Sleeves", was provided.

During a September 8, 1992, telephone conference call with members of ANO, ABB-CE, and the NRC staff, the NRC requested a copy of the qualification report for the Rolled Transition Zone (RTZ) sleeve rolled joint. This report was referenced in CEN-601-P, Revision 01-P. This request was made because this is the first application of the RTZ sleeve in the United States.

Attachment 1 provides a copy of Procedure 00000-ESE-826, "Procedure for the Qualification of the Roll Transition Zone (RTZ) Sleeved Joint". As discussed in the September 8, 1992, conference call, a copy of the test report TR-ESE-887, "Test Report for the Qualification of the Roll Transition Zone Sleeve for Westinghouse 'D' Series Steam Generators", is provided in Attachment 2. Attachment 3 contains three ABB-CE Inter-Office Correspondence (ESE-92-159, CSE-92-261, and ESE-92-201) that documents that the test report, TR-ESE-887, bounds the application of the rolled joint for ANO-2.

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Attachments 1 and 2 contain information proprietary to ABB-CE, therefore an affidavit is being provided that sets forth the basis on which the information should be withheld from public disclosure by the Commission. Accordingly, it is respectfully requested that Attachments 1 and 2 be withheld from public disclosure in accordance with Title 10 of the Code of Federal Regulations, Section 2.790. Attachment 3 is non-proprietary.

If you have any questions concerning this submittal, please contact me.

Very truly yours,

James J. Fisicaro

James J. Fisicaro
Director, Licensing

JJF/RWC/sjf
Attachments

cc: Mr. James L. Milhoan
U. S. Nuclear Regulatory Commission
Region IV
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NRC Senior Resident Inspector
Arkansas Nuclear One - ANO-1 & 2
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AFFIDAVIT PURSUANT

TO 10 CFR 2.790

Combustion Engineering, Inc.)
State of Connecticut)
County of Hartford) SS.:

I, S. A. Toelle, depose and say that I am the Manager, Nuclear 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 in conjunction with Entergy Operations, Inc. for withholding this information.

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

1) 00000-ESE-826, " Procedure for the Qualification of the Roll Transition Zone (RTZ) Sleeve Rolled Joint," January 11, 1991.

2) TR-ESE-887, "Test Report for the Qualification of the Roll Transition Zone Sleeve Rolled Joint for Westinghouse "D" Series Steam Generators," April 1991.

These documents 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 of 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, which is owned and has been held in confidence by Combustion Engineering, is the characteristics of and procedures for a leak tight sleeve to repair Roll Transition Zone defects, including parameters and equipment utilized.

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 informatio 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 C-E required thousands of manhours and hundreds of thousands of dollars. To the best of my knowledge and belief, 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 develop the characteristics of and procedures for a leak tight sleeve to repair Roll Transition Zone defects, including parameters and equipment utilized.

d. The information required significant effort and expense to obtain the licensing approvals necessary for application of the information. Avoidance of this expense would decrease a competitor's cost in applying the information and marketing the product to which the information is applicable.

e. The information consists of the characteristics of and procedures for a leak tight sleeve to repair Roll Transition Zone defects, including parameters and equipment utilized steam generator sleeve, 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.

f. 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.

g. 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.

S. A. Toelle

S. A. Toelle
Manager
Nuclear Licensing

Sworn to before me
this 9th day of September, 1992

Laurie J. White

Notary Public

My commission expires: 3/31/94

ATTACHMENT 3

ABB
ASEA BROWN BOVERI

Inter-Office Correspondence

To: J. H. Sodergren

June 17, 1992

cc: J. A. Amburn
A. D. DePeau
W. R. Gahwiller
J. C. Matthews
D. G. Stepnick
G. H. Stevens

E. F. Lamoureux

ESE-92-159

SUBJECT: Analysis and Qualification of Roll Transition Zone Sleeve Rolled Joints in C-E Steam Generators

REFERENCE: (A) TR-ESE-887, "Test Report for the Qualification of the Roll Transition Zone Sleeve Rolled Joint for Westinghouse "D" Series Steam Generator".

(B) CEN-600-P, "Association Nuclear ASCO Units 1 and 2 Steam Generator Tube Repair Using Leak Tight Sleeves" (Licensing Report).

(C) Sleeve Licensing Report for Arkansas Unit 2, D. Stepnick to J. Sodergren, Letter No. SG92143.DS dated June 6, 1992.

The planned sleeving effort at Arkansas requires an assessment of the Roll Transition Zone (RTZ) sleeve rolled joint qualification.

Reference (A) describes the qualification that was performed in support of RTZ sleeving at Ringhals and subsequently ASCO. The qualification bounded a range of minimum and maximum conditions in the 0.75 inch "D" series steam generator tube. Tube hole diameters of .752 inch to .774 inch were tested which bound the .758 inch C-E tube hole drilling. The difference in steam generator tube wall thickness between "D" series (.043/.044 inch) and C-E (.048 inch) is not significant and the identical RTZ sleeve design and installation criteria are planned for C-E plants.

The primary differences will be due to the tubesheet ligament pattern and plant specific loading conditions. It is in this area we request assistance in answering the following.

1. Will the qualification criteria in Section 3.0 of Reference (A) substantiate qualification of the RTZ rolled joint for ANO? Specifically, will the loading conditions in 3.3.1 together with analytical results be sufficient or will more mechanical testing be required?

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2. For the sleeve lengths and joint locations described in Reference (C), will the axial loads, the tubesheet stresses at the rolled joint and the number of cycles be within the bounds of those tested for Ringhals? If necessary, the rolled joint could be shifted towards the neutral axis of the tubesheet, although this is not desirable.

3. Can criteria be established such that all C-E plants (or a majority thereof) can be qualified at this time?

Your response is requested by July 2, 1992.

E. F. Lamoureux

EFL

ABB
ASEA BROWN BOVERI

Inter-Office Correspondence

To: E. F. Lamoureux

July 01, 1992
Southeast Nuclear Service Center
CSE-92-261

cc: J. A. Amburn
A. D. DePeau
H. H. Harris
J. E. Roberts
J. H. Sodergren
D. G. Stepnick

SUBJECT: **COMPARISON OF ANALYSIS AND TESTING OF RTZ SLEEVE ROLLED JOINTS IN CE STEAM GENERATORS**

Reference: (A) Analysis and Qualification of RTZ Sleeve Rolled Joints in CE Steam Generators, E. F. Lamoureux to J. H. Sodergren, letter no. ESE-92-159, dated June 17, 1992

In response to the questions in Reference (A) Southeast Nuclear Service Center Engineering can offer the following.

(1) The qualification criteria in Section 3.0 of TR-ESE-887 will substantiate the qualification of the RTZ rolled joint for ANO. The enclosed Table 1 shows comparisons between the test report analysis results and those analysis results for the ANO Unit 2 steam generator.

(2) The axial loads, tubesheet ligament stresses at the rolled joint, and the number of cycles for the ANO Unit 2 steam generator are within the bounds of those tested for Ringhals in TR-ESE 887. Table 2 shows the comparisons between the two plants.

(3) Criteria can be established for all the C.E. plants, but this will require a review of all the appropriate stress reports to list the individual primary and secondary temperatures at 100% power along with a standard sleeve length for use in computing the respective axial loads at each C.E. plant. Also the tubesheet ligament stresses and transient conditions from each of these stress reports must be compared against those tested for Ringhals to assure that the test results in

TR-ESE-887 envelope all of the C.E. plants. This information can be provided at a later date after receiving directions from you on a standard sleeve length to use in the analysis of the respective sleeve loads. I will be on vacation from July 2 through July 12, 1992.

If there are any questions on this information, please call Jan Sodergren at 615-752-2833 or me at 615-752-2392.

Sincerely,

B. A. Bell

BAB:bab

TABLE 1

RTZ SLEEVE ROLLED JOINT CYCLIC LOAD ANALYSIS RESULTS IN TR-ESE-887 vs. ANALYSIS RESULTS FOR ANO-2 STEAM GENERATOR

CONDITION	TRANS.	N. PLANT	CYCLES	AXIAL LOAD(lb.)	ΔP(REF.)	TUBESHEET STRESS
1. Heatup & Loading	Ambient 100%SS	TR-ESE-887 ANO-2	500 500	0 TO -804 0 TO -794	1373 1350	22.4 11.6
2. Loading/ Unloading	0%SS 100%SS	TR-ESE-887 ANO-2	20500 17000	-265 TO -804 -360 TO -794	1373 1350	22.4 13.0
3. Reactor Trip	100%SS 0%SS	TR-ESE-887 ANO-2	800 480	-804 TO -182 -794 TO -262	1373 1350	22.4 13.4
4. Primary Leak Test Heatup	Ambient 0%SS	TR-ESE-887 ANO-2	200 200	0 TO -182 0 TO -262	1600 2250	26.1 19.9
5. Second. Leak Test	Ambient	TR-ESE-887 ANO-2	200 200	0 0	-670 -820	-10.8 -7.2

NOTES:

1. The axial load range is from Table 3.3.1 for TR-ESE-887 and Tables 8-6, 8-7, and 8.8 in CR-9417-CSE92-1107 for ANO-2.

2. SS = Steady State.

3. The tubesheet ligament stress is from Table 3.3.1 for TR-ESE-887 and Table 8-7 in CR-9417-CSE92-1107 for ANO-2 at 0% thru 100% SS. The tubesheet ligament stress for ANO-2 at primary and secondary leak tests is derived from CENC-1223 using the following expression:

   Primary Stress = [(10.75"-4.25")/10.75"] [32.905(from CENC-1223)] = 19.9 ksi

   Secondary Stress = [(10.75"-4.25")/10.75"] [-11.933(from CENC-1223)] = -7.2 ksi

TABLE 2

CYCLIC LOAD TEST PARAMETERS

LOAD CASE	N. PLANT	AXIAL CYCLES	AXIAL LOAD(lb.)	TUBESHEET ΔP(REF.)	TUBESHEET STRESS
1. Tubesheet Cycles	TR-ESE-887	700	0 to -1000	1600	26.1
	ANO-2	700	0 to -794	2250	19.9
2. Axial Cycles at Constant Tubesheet Load	TR-ESE-887	23300	0 to -1000	1600	26.1
	ANO-2	17480	-262 to -794	1350	13.4

NOTES:

1. Tubesheet cycles were conducted in parallel with axial cycles in TR-ESE-887. This included Conditions 1 and 4 in Table 1. The axial load range is from Table 3.3.2 for TR-ESE-887 and Tables 8-7 and 8-8 in CR-9417-CSE92-1107 for ANO-2. The tubesheet ligament stress is from Table 3.3.2 for TR-ESE-887 and Table 1 for ANO-2 at Primary Leak Test.

2. Axial cycles represent Conditions 2 and 3 in Table 1 plus 2000 more cycles for Feedwater Cycling in Table 3.3.1 for TR-ESE-887. The axial cycles for ANO-2 are only from Conditions 2 and 3 in Table 1 since no feedwater cycling is used in this steam generator. The axial load range is from Table 3.3.2 for TR-ESE-887 and Table 8-7 in CR-9417-CSE92-1107 for ANO-2. The tubesheet ligament stress is from Table 3.3.2 for TR-ESE-887 and Table 8-7 in CR-9417-CSE92-1107 for ANO-2.

ABB
ASEA BROWN BOVERI

Inter-Office Correspondence

To: D. G. Stepnick

July 30, 1992

cc: J. M. Amburn
A. D. DePeau
W. R. Gahwiller
E. F. Lamoureux
F. C. Myers
G. H. Stevens

M. J. Malatesta

ESE-92-201

SUBJECT: Analysis and Qualification of Explansion Transition Zone Sleeve Rolled Joints in C-E Steam Generators

REFERENCE: (A) "Comparison of Analysis and Testing of RTZ Sleeve Rolled Joints in C-E Steam Generators", B. Bell to E. Lamoureux, Letter No. CSE-92-261 dated July 1, 1992.

(B) "Analysis and Qualification of Roll Transition Zone Sleeve Rolled Joints in C-E Steam Generators", E. F. Lamoureux to J. Sodergren, Letter No. ESE-92-159, dated June 17, 1992.

(C) TR-ESE-887, "Test Report for the Qualification of the Roll Transition Zone Sleeve Rolled Joint for Westinghouse "D" Series Steam Generator".

(D) STD-500-016, "Technical Operating Procedure for the Transition Zone Sleeve Rolling Tool and Controls for Steam Generators with 3/4" O.D. and .043" or .048" Wall Thickness."

Current mechanical testing results will be considered sufficient for the assessment of the Explansion Transition Zone (ETZ) sleeve rolled joint qualification for the planned sleeving effort at Arkansas.

Via Reference (A), Southeast Nuclear Service Center Engineers confirm that the qualification that was performed in support of RTZ sleeving at Ringhals, and subsequently ASCO, is sufficient to substantiate the qualification of the ETZ rolled joint for ANO. The axial loads, tubesheet ligament stresses at the rolled joint, and the number of cycles for the ANO Unit 2 steam generator are within the bounds of those tested for Ringhals in Reference (C).

ETZ sleeving may be simplified by the lack of the need for a confirmatory roll, as detailed in Reference (D). Previous work in Westinghouse steam generators involved manufacturing techniques which called for mechanical rolling of the tubes into the tubesheet.

The confirmation roll was conducted in order to assure that the generator tube met original manufacturing specifications and that the tube region in question was not skipped during the original rolling process. For C-E generators manufacturing techniques call for the explansion of generator tubes into the tubesheet. This process results in lower probability of surface irregularities being present and therefore the Technical Operating Procedure, Reference (D), as been revised to make the confirmation roll optional for C-E generators.

Review of field eddy current data for in tubesheet tube diameter can be made to verify the absence of unexpanded tube. The confirmation roll would not be required when no unexplanded tube was found in the area of ETZ sleeve installation.

Mark J. Malatesta

M. J. Malatesta

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ATTACHMENT 1