

WEP Closure Statement ----- Evaluation Report	<u>EMPLOYEE CONCERN GROUP CLOSURE</u> REACTOR CAVITY EMBEDDED BULKHEAD PLATES AND SUPERSTRUCTURE WELDS, WBNP-1	Page <u>1</u> of <u>8</u> Date <u>01/07/87</u> Revision <u>0</u> WEP Group No <u>11</u>
	WEP GROUP IDENTIFIER <u>EC-SP-11</u>	

Approved _____ Date _____

Reviewed A.E. Bradford 1/8/87 Prepared R.J. Roberts 1/7/87

Address the following items in the space remaining on this page and on additional pages as needed (see Standard Practice WEP 3.1.10 for specific instructions).

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1. Employee Concern(s)/Quality Indicator(s) (Reference 7.1)

Employee Concern IN-85-442-008.

2. Characterization of Issue

The problems identified by this concern pertain to the welds of embedded bulkhead plates in the reactor cavity superstructure, Reactor Building 1, Watts Bar Nuclear Plant, as follows: Engineering evaluations are by default, being utilized to disposition nonconformances relative to lack of installation documentation on welds; and acceptance of welds by engineering evaluation based on results of a previously conducted random sample weld verification program.

3. Summary

The concerned individual (CI) identified the embedded bulkhead plates of the reactor cavity superstructure, Reactor Building 1, Watts Bar Nuclear Plant, as not having documentation for welds performed by the Tennessee Valley Authority (TVA). The Department of Energy Weld Evaluation Project (DOE/WEP) reviewed various TVA welding documentation pertaining to the embedded structure and determined that acceptance of fit-up and welding was formally documented at the time of installation in compliance with TVA Quality Control Procedure WBNP-QCP-2.4 (Reference 7.2). Although a TVA engineering evaluation applies the results of the TVA Weld Random Sampling Program as a verification of weld quality in the reactor cavity embedded structure,

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it is considered by DOE/WEP to be unnecessary because of the already existing documentation. The DOE/WEP concludes that the CI was unaware of the documentation per WBNP-QCP-2.4.

4. Evaluation Methodology

The DOE/WEP Assessment Plan (Reference 7.3) required a 100% review of all available documents associated with the embedded bulkhead plate welds and the reactor cavity superstructure welds to evaluate the adequacy of documentation. If the review indicates that all fitup and welds were properly inspected and documented, the group can be closed.

An engineering review was made of all available welding documentation associated with the embedded bulkhead plate welds and reactor cavity superstructure welds. The reviewed documentation included a TVA Steel Inspection Report (Reference 7.4) for WBNP-1 that represents a summary verification of acceptance on welds in the reactor cavity embedded structure in accordance with WBNP-QCP-2.4; however, the report in some instances documents the welds by group classification rather than by individual weld. TVA was requested by DOE/WEP letter KGT-101-86 (Reference 7.5) to determine if weld inspection data existed for individual welds. TVA's reply to the DOE/WEP request for information was provided in TVA memorandum T25 860627 860 (Reference 7.6) which also addressed the TVA Random Sample Weld Verification Program of 1980-82 and the rationale used in applying the results of the program to verify quality of welds in the embedded structure, installed in 1978.

5. Findings

Various TVA documentation was reviewed in assessing the validity of the two items in the Employee Concern. Results of the DOE/WEP document review and evaluation of the two concern items is as follows:

a. Documentation During Reactor Building No. 1 Construction

The Employee Concern IN-85-442-008 (Reference 7.1) states that an Engineering Evaluation dated June 7, 1985 describes problems with the documentation pertaining to the Unit 1 reactor cavity embedded structure and adds that the plate installation was determined to be adequate based upon the completion and sign off of the concrete pour prerequisite requirements. The concrete pour records are shown on Reference 7.7 and 7.8. The various installations required to support the concrete pour were initialed by foremen and engineers to signify a completed status in preparation for pour; however, the concrete pour cards were

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not intended to be the documentation for structure welds, as implied by the Concerned Individual. Rather, weld inspection data are documented by other means as required by TVA Quality Control procedures.

At DOE/WEP request, TVA searched their records for an Engineering Evaluation dated June 7, 1985 referenced in Employee Concern IN-85-442-008, and could not locate any such document. The DOE/WEP approach was then to locate and assess all of the documentation available pertaining to welds in the reactor cavity embedded structure during the WBNP-1 construction phase to evaluate adequacy. The findings are presented herein.

Subassembly components of the reactor cavity embedded structure for both WBNP-1 and WBNP-2 were fabricated by an outside Supplier on TVA Contract No. 76K61-820198 (INRYCO P.O. No. 21C-5002). The bulkhead plate subassembly components were then fit up in place on the (reactor) building site by TVA and welded into a final assembly during the construction of the reactor building. The drawings used by INRYCO to fabricate the embedded parts subassemblies are INRYCO Erection Drawings of References 7.9 and 7.10. Documentation of weld inspection on the embedded parts subassemblies by INRYCO and NDE test laboratories subcontracted by INRYCO is provided in the inspection records of Reference 7.11.

The DOE/WEP was unable to locate a TVA inspection package which contains inspection data for every individual (TVA) weld on the embedded structure; however, the TVA Steel Inspection Report (Reference 7.4) for WBNP-1 was located in the TVA document control vault which represents a summary verification of overall weld inspection in accordance with WBNP-QCP-2.4 (Reference 7.2). The report verifies that an inspection of welds in the sixteen bays of WBNP-1 reactor cavity structure was performed, but the report does not document the inspection data by individual weld identification.

A DOE/WEP letter to TVA (Reference 7.5) requested that TVA determine if additional documentation is available to verify the individual weld inspection for all of the TVA field welds performed during the final installation of reactor cavity embedded plates and superstructure. A reply letter (Reference 7.6) was received from TVA in which it is stated that the installation, welding, and documentation of the reactor cavity embedded parts was performed in accordance with WBNP-QCP-2.4, Revision 1 and 2. It is further related that this procedure required that a feature to be installed and documented

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would be described and verified on Attachment A of the procedure, as specified by Section 6.3.3 of the WBNP-QCP-2.4. The Attachment A of WBNP-QCP-2.4 is the Steel Inspection Report, as shown by Reference 7.4, for the subject welds. TVA, by this process, verifies several welds (a group) within a feature as acceptable with one sign-off. It is stated in Reference 7.6 that this documentation concept is commonly practiced by TVA throughout the plant in such areas as hangers where all of the welds for a particular hanger are verified with one signature, or ductwork where all of the bolting on a particular duct section is verified with one signature.

A review of the Steel Inspection Report (Reference 7.4) for the embedded parts shows weld inspector buy-offs for inspection of TVA welds, which in total comprise all of the TVA welds performed in completing the Unit 1 reactor cavity embedded parts assembly. This, according to TVA, constitutes all of the available documentation to verify inspection and acceptance of the subject TVA welds prior to covering with concrete during the Unit 1 Reactor Building construction, and is all that TVA required to comply with Quality Control Procedure WBNP-QCP-2.4. The TVA concrete pour records show pour dates of May 30 and June 22 of 1978 for the time period when these welds were buried (Reference 7.7 and 7.8).

The above description of weld documentation shows that documentation of contractor and TVA welds was processed for the Unit 1 reactor cavity embedded welds in accordance with TVA procedures during construction of the reactor building. The CI may not have been aware of the documentation existing for the embedded structure at the time of construction.

b. ENDES Random Sample Weld Verification Program

The Employee Concern IN-85-442-008 (Reference 7.1) references a document accountability system Item 00948W9331011 in which reactor cavity superstructure welds were accepted by engineering evaluation based on the results of a previously conducted Random Sample Weld Verification Program at WBNP. The concern expressed by the CI was that welds of the reactor cavity embedded structure could not have been verified at all as they were embedded in concrete and TVA could have had no idea of the weld quality or even if the welds were there at all.

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The Employee Concern statement that TVA has no idea of weld quality in the reactor cavity embedded structure, or even if the welds exist at all, is refuted by the findings on weld documentation and verification presented above under "Documentation During RB No. 1 Construction." That is, the Steel Inspection Report (Reference 7.4) for the embedded parts shows weld inspector buy-offs for inspection of all the embedded welds. It is possible that the CI was not aware of the existing TVA documentation.

The reference in the Employee Concern to acceptance of welds by engineering evaluation based on results of the WBNP Random Sample Weld Verification Program of 1980-82 is evidenced by the Engineering Evaluation QCI 1.08 (Reference 7.12), dated June 4, 1982, located in the TVA document Item 00948W9331011. The QCI 1.08 states that welds in the embedded structure of Drawing 48W933 which were determined to be structurally adequate but did not meet the geometric and cosmetic requirement of G29-C and QCP 4.3 would be dispositioned by NCR 2375 through the ENDES Weld Sampling Program to determine weld quality. At the time the QCI 1.08 was generated, June 4, 1982, the reactor cavity embedded structure had been buried under concrete for four years (since June 22, 1978). The DOE/WEP knows of no documentation relative to lack of geometric and cosmetic compliance in these welds determined prior to concrete pour; therefore, it can only be concluded that the results of the weld sampling program were automatically applied to the reactor cavity embedded structure by TVA because these are Category I structural welds made prior to February 6, 1981, which was the criterion for plant-wide Weld Sampling Program applicability.

A review of the Steel Inspection Report (Reference 7.4) for the embedded parts shows weld inspector buy-offs for all of the TVA welds performed in completing the structure. The inspections noted for each weld or group of welds in the Steel Inspection Report of Reference 7.4 are as follows: visual and MT; MT; and visual. Where only the "MT" method is noted, the MT inspection was preceded by a visual inspection even though the "visual" is not listed in the same block with the "MT" notation. It is standard TVA practice that inspection of all structural welds include VT examination even when a more rigorous inspection is specified by the applicable design drawing. Some inspectors elected to also note the "visual" along with the MT notation, while others did not. The drawings 48W930R9 Sheet 1, 48W931R10 Sheet 2, 48W932R15 Sheet 3 and 48W933R11 Sheet 4 are all applicable to the reactor cavity embedded parts (References 7.13 through 7.16). The Drawing 48W933R11 Sheet 4, Note 6

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(Reference 7.16) for the embedded welds invokes TVA Construction Specification N3G-881, (References 7.17 and 7.18) for the documentation and inspection of welds. The Paragraph 3.1.2.2 of N3G881 R0 and R1 (References 7.17 and 7.18) reads in part as follows: "All standard welds require visual examination at a minimum; but the drawing requirements impose a more detailed examination where applicable." It can therefore be concluded that all welds in the embedded structure were, at a minimum, visually inspected as part of the TVA examination prior to concrete pour, and most of these were additionally MT inspected to comply with the drawing requirements. In view of this, it is the opinion of DOE/WEP that it was not necessary to apply results of the TVA Weld Sampling Program to verify acceptance of the embedded welds to visual acceptance criteria as the inspection was adequately documented during installation.

6. Conclusions

It is the opinion of DOE/WEP that the Employee Concern IN-85-442-008 (EC-SP-11) can be closed based on the justification provided below. Closure recommendations relative to the two items of concern in IN-85-442-008 are as follows:

a. Documentation During Reactor Building No. 1 Construction

The Employee Concern item on documentation implies that the only documentation of TVA welds on installation of WBNP Reactor Building No. 1 embedded bulkhead plates prior to concrete pour was the sign-off of the concrete pour prerequisite requirements, which concerns items only relative to concrete. A search by DOE/WEP for weld inspection documentation located the TVA Steel Inspection Report (Reference 7.4) for the bulkhead assembly Drawing 48W933 of RB No. 1 which has inspector sign-offs for fit-up and inspection of completed TVA welds well in advance of the concrete pour date. Documentation of welds performed on subassemblies by INRYCO were also located (Reference 7.11). It can only be assumed that the concerned individual did not know of the existing installation/weld inspection documentation. It is the opinion of DOE/WEP that sufficient information and documentation is available to support closure of this item.

b. ENDES Random Sample Weld Verification Program

The Employee Concern item on the WBNP random sample weld verification program references a document accountability system Item 00948W9331011 which includes Engineering Evaluation QCI 1.08 (Reference 7.12) to verify acceptance quality of reactor cavity

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embedded bulkhead welds based on the TVA weld random sampling program of 1980-1982. The concern states that the welds could not be verified in this manner as they were embedded.

It is not considered to be within the work scope of DOE/WEP to assess the validity of the TVA Random Sample Weld Verification Program in verifying acceptability of the subject embedded welds; therefore, no judgement will be made as to whether or not this program provided adequate basis for weld verification and an "after concrete pour" acceptance (to visual criteria) of the embedded reactor cavity structure welds of Unit 1. The DOE/WEP investigation of the concern identified existing documentation (Reference 7.4) which verified that all of the reactor cavity structural welds were inspected by "visual" at a minimum, and the record shows that most of these welds were additionally inspected by magnetic particle testing as required by design drawing. It appears to have been unnecessary for TVA to apply the results of their Weld Sampling Program to the embedded structure to verify acceptable weld quality as the inspection during structure installation was sufficiently documented; therefore, this concern item should be closed.

7. References

- 7.1 Original Employee Concern as listed in Section 1.
- 7.2 TVA Quality Control Procedure WBNP-QCP 2.4 R2, dated June 17, 1977.
- 7.3 DOE/WEP Assessment Plan 011, Revision 0, June 20, 1986.
- 7.4 TVA Steel Inspection Report WBNP-QCP 2.4, Attachment A, for Drawing 48N933.
- 7.5 WEP letter, K. G. Therp to L. E. Martin, Subject: Reactor Cavity Embedded Bulkhead Plates and Superstructure Welds, Watts Bar Nuclear Plant, Unit 1 (WBNP-1), KGT-101-86, May 13, 1986, without Attachments.
- 7.6 TVA Memorandum, L. E. Martin to K. G. Therp, Subject: Watts Bar Nuclear Plant, Welding Task Group (ECTG), WBN Reactor Cavity Embedded Plates, No. T25 860627 860, June 27, 1986.
- 7.7 TVA Concrete Pour Card dated May 30, 1978, Attachment 0 of WBNP QCP 2.2 R2, Concrete Placement and Documentation.

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<p>7.8 TVA Concrete Pour Card dated June 22, 1978, Attachment O of WBNP QCP 2.2 R2, Concrete Placement and Documentation.</p> <p>7.9 INRYCO Drawing E-1, Miscellaneous Steel, Reactor Cavity Embedded Parts, Units 1 and 2, Watts Bar Nuclear Plant, dated December 1, 1975.</p> <p>7.10 INRYCO Drawing E-2, Miscellaneous Steel, Reactor Cavity Embedded Parts, Units 1 and 2, Watts Bar Nuclear Plant, dated October 24, 1975.</p> <p>7.11 INRYCO Inspection Records, for PO 21C-5002, various dates, 1976 and 1977.</p> <p>7.12 TVA Engineering Evaluation QCI 1.08, Identification 48W933 1011, dated June 4, 1982.</p> <p>7.13 TVA Drawing 48W930 R9, Miscellaneous Steel, Reactor Cavity Embedded Parts, dated September 16, 1975.</p> <p>7.14 TVA Drawing 48W931 R10, Miscellaneous Steel, Reactor Cavity Embedded Parts, dated May 30, 1975.</p> <p>7.15 TVA Drawing 48W932 R15, Miscellaneous Steel, Reactor Cavity Embedded Parts, dated May 30, 1975.</p> <p>7.16 TVA Drawing 48W931 R11, Miscellaneous Steel, Reactor Cavity Embedded Parts, dated May 30, 1975.</p> <p>7.17 TVA Construction Specification N3G-881 R0, Identification of Structures, Systems, and Components Covered by the Watts Bar Nuclear Plant Quality Assurance Program, dated August 12, 1977.</p> <p>7.18 TVA Construction Specification N3G-881 R1, Identification of Structures, Systems, and Components Covered by the Watts Bar Nuclear Plant Quality Assurance Program, dated March 16, 1978.</p>		
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