Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

William J. Museler
Site Vice President, Watts Bar Nuclear Plant

OCT 20 1993

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

Gentlemen:

In the Matter of the Application of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

WATTS BAR NUCLEAR PLANT (WBN) - RESPONSE TO NRC REQUEST FOR TVA TO INSPECT THE REACTOR VESSEL HEAD PRESSURE HOUSING WELDS

The staff requested TVA perform liquid penetrant inspections on a sample of control rod drive mechanism (CRDM) pressure housing to reactor head welds on one of the WBN reactor heads. This testing is the result of cracking problems identified with the pressure housings (adaptor tube) to the reactor closure head at the French national utility Ringhals 2 plant. TVA selected eight CRDM housings on the WBN Unit 2 reactor head to inspect. The eight housings are identified on the attached sketch with an "H." Both reactor vessels at WBN are a Westinghouse design, similar to that of the French Ringhals 2 plant. The Unit 2 head was selected because of ease of entry and to prevent interference with Unit 1 activities.

The inspection method employed by TVA was a solvent removal penetrant performed in accordance with the examination procedure and acceptance requirements of American Society of Mechanical Engineers (ASME) Section III. Seven of the eight welds inspected were found to be acceptable. The rejected weld exhibited two linear indications, approximately 1/8 inch long and 5/64 inch long separated by about 5/8 inch. The indications were very faint and appeared to be the result of a lack of fusion between weld passes. There was also evidence of grinding at the location of the indications which gave the appearance that the vendor had previously identified the indications, but failed to completely remove them. These could have been the result of the vendor using a water washable penetrant that may not be as sensitive as solvent removal penetrant. There was no evidence of cracking in any of the samples selected.

290049

D030 1/1

OCT 20 1993

TVA removed the indications by grinding to a maximum of 1/16 inch and re-examining the area. All of the work was done to ASME Section III requirements, with Authorized Nuclear Inspector (ANI) involvement, and Westinghouse concurrence. A copy of the liquid penetrant examination and visual inspection records are attached.

Based on the results no further examinations of the CRDM pressure housing to reactor head welds are planned at WBN.

If you should have any questions, contact P. L. Pace at (615)-365-1824.

Very truly yours,

W. J. Museler

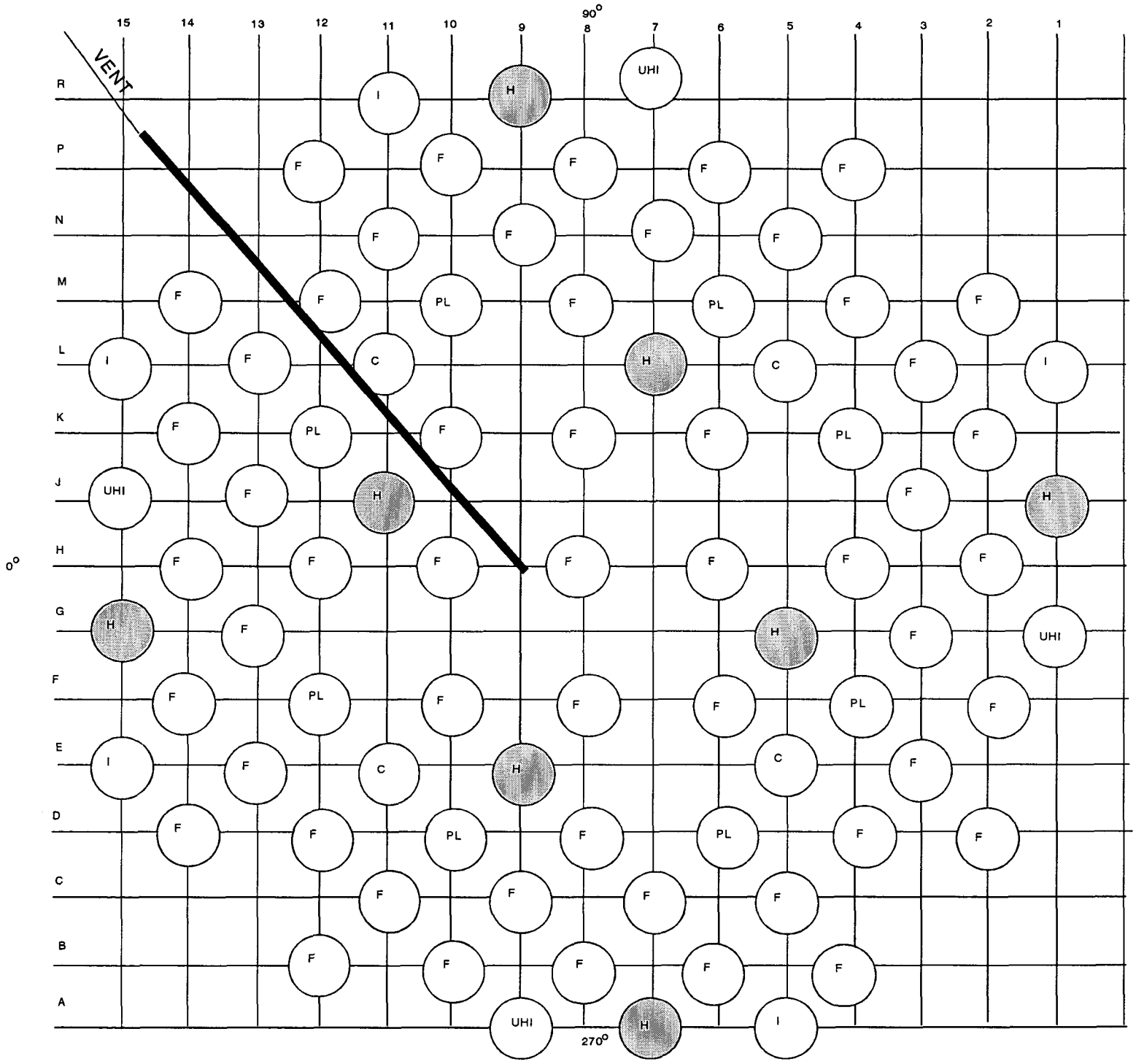
William J. Museler

cc (Enclosures):
NRC Resident Inspector
Watts Bar Nuclear Plant
Rt. 2, P.O. Box 700
Spring City, Tennessee 37381

Mr. P. S. Tam, Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852

U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

R.V. HEAD PENETRATIONS - WAT (UNIT 2)



F - FULL LENGTH CRDM
PL - PART LENGTH CRDM

I - INSTRUMENT PORT

H - HEAD ADAPTER PLUG

C - "CAPPED" CRDM HOUSING

UHI - UHI ADAPTER

TVA NUCLEAR POWER
RECORD OF LIQUID PENETRANT EXAMINATION

DATE OF EXAMINATION: 8-12-93 REPORT NO.: WBN-TVA-NDE-93-01101

PROCEDURE NO.: N-PT-9 REVISION NO.: L TC NO.: 93-16

ASME SECTION III: N/A SECTION VIII: X ANSI B31.1: N/A ACCEPTANCE CRITERIA

ASME SECTION III: N/A 8-12-93 SECTION XI: N/A 8-12-93 ANSI B31.7: N/A 8-12-93 APP.A: X APP.B: N/A 8-12-93

CODE CLASS/CATEGORY: A

ORIGINAL EXAMINATION: X RE-EXAMINATION: N/A 8-12-93

WELD JOINT NO.: 2-HEAD-068-0001- J1, R9, J11, G15, A7, G5, E9, & L7

ITEM OR SYSTEM DESCRIPTION: CRDM HOUSINGS to the CLOSURE HEAD

REFERENCE DRAWING NO.: DRAWING USED to Locate WELDS Attached to Work Instructions

PART TEMPERATURE: 94 °F SURFACE THERMOMETER NO.: E18805 DUE 12/23/93

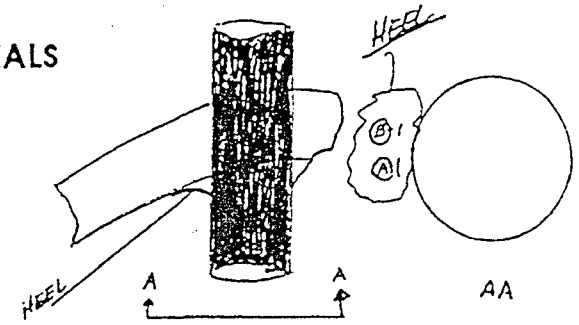
PENETRANT MATERIALS

BRAND NAME:

MAGNAFLUX SPOT CHECK: N/A 8-12-93

SHERWIN DUBL CHECK: X

OTHER: N/A 8-12-93



INSPECTION MATERIAL	TYPE	LOT OR BATCH NO.
PENETRANT	DP-40	21-F1
REMOVER	DR-60	224-F4
DEVELOPER	D-100	216-G6

RESULTS OF EXAMINATION: SATISFACTORY: 1 SAT UNSAT.: 1-UNSAT NOI NO.: N/A 8-12-93

EXPLANATION OF UNSATISFACTORY RESULTS: 2-HEAD-068-0001-J1 WAS Found to HAVE 2 LINEAR INDICATIONS (A) 1 @ 6 o'clock 1/8" IN LENGTH AND (B) 1 @ 5:30 WITH A LENGTH OF 5/16", THESE TWO INDICATIONS ARE APPROX 5/8" APART WELD WIDTH IS APPROXIMATELY 1½" WITH INDICATIONS CENTERED.

REMARKS: INDICATIONS EVALUATED PER P.S. 3.M.1.1 REV 5 AS REQUIRED BY WORK INSTRUCTIONS REFER TO E. LOOPE NE ON 8-12-93 TO EVALUATE INDICATIONS N/A 8-12-93

EXAMINED BY: Wayne A. Connell LEVEL: II

EVALUATED BY: Wayne A. Connell LEVEL: II

REVIEWED BY: John A. Mize III LEVEL: II DATE: 8-12-93

ANII REVIEW BY: NONE DATE: NONE

ATTACHMENT 1
Page 1 of 1

TVA NUCLEAR POWER
RECORD OF LIQUID PENETRANT EXAMINATION

DATE OF EXAMINATION: 9-16-93 REPORT NO.: WBNTVAW93-01273

PROCEDURE NO.: NPT-9 REVISION NO.: 6 TC NO.: 93-16

ASME SECTION I _____ SECTION VIII X (AM 9-16-93) ANSI B31.1 _____ ACCEPTANCE CRITERIA

ASME SECTION III ✓ SECTION XI _____ ANSI B31.7 _____ APP.A ✓ APP.B _____

CODE CLASS/CATEGORY 1

ORIGINAL EXAMINATION _____ RE-EXAMINATION ✓

WELD JOINT NO.: 2-HEAD-068-0001-J1

ITEM OR SYSTEM DESCRIPTION CRDM Housing to the Closure Head

REFERENCE DRAWING NO.: W 686J492 sht 3 of 7 Rev. 11

PART TEMPERATURE: 94 °F SURFACE THERMOMETER NO.: E18463 due 12-23-93

PENETRANT MATERIALS

BRAND NAME: MAGNAFLUX SPOT CHECK _____

SHERWIN DUBL CHECK ✓

OTHER _____

INSPECTION MATERIAL	TYPE	LOT OR BATCH NO.
PENETRANT	DP40	211F1
REMOVER	DR60	224F4
DEVELOPER	D-100	030-E6

RESULTS OF EXAMINATION: SATISFACTORY ✓ UNSAT. _____ NCI NO.: _____

EXPLANATION OF UNSATISFACTORY RESULTS: None

REMARKS: This inspection is a re-inspection of indications recorded on Inspection Report WBN-TVA-W93-01101. The indications were removed by disk sander. RE-EXAM was acceptable no indications present in area shown on original report which was the only area re-examined. QAM 9-16-93

EXAMINED BY: John Amizo LEVEL: II

EVALUATED BY: John Amizo LEVEL: III

REVIEWED BY: Will Ezell LEVEL: II PREVIOUS DATE: 9/16/93

ANII REVIEW BY: B. Esmyth DATE: 9/16/93

APPENDIX A

QUALITY CONTROL INSPECTION RECORD

QAI-10.01
Revision 5
Page 1 of 3

Inspection Record Number WBN-TVA-W93-01273
Work Document PR068HZ
System 068 Unit 2
Safety-Related Yes ☒ No ☐
Organization/Foreman MUDS / D. Mathis

Description PT & NVT on Reactor Head weld CRDM Housing to the closure head.
Procedure NPT-9 / NVT-3 Revision 6 7C93 16 / 6
Partial Inspection Yes ☐ N ☒ (See Remarks)

ITEM	MATERIAL/EQUIPMENT NUMBER	DRAWING REVISION	M&TE NUMBER	CALIBRATION DUE DATE	READING	S/U
1	2-HEAD-068-0001-J1	W686J490 sht 3 of 7 R11	E18463	12-23-93	94°F	S
2	2-HEAD-068-0004J-J1 bpms 9-16-93	W686J492 sht 3 of 7 R11				

ATTRIBUTE CODE	ATTRIBUTE NOMENCLATURE	INITIAL INSPECTION SAT ITEM	INITIAL INSPECTION UNSAT ITEM	INSPECTOR'S INIT/LEVEL/DATE	C/A TAKEN	C/A TAKEN BY SIGNATURE/DATE	CORRECTIVE ACTION VERIFICATION SAT ITEM	CORRECTIVE ACTION VERIFICATION UNSAT ITEM	INSPECTOR'S INIT/LEVEL/DATE

C/A Taken: W-Rework; P-Replace; T-Return; Delete; D-Documentation; Delete; N-Instruction Change; F-Design Change; X-SCAR/PER

	A	Current Craft Workmanship	Probable Cause:
	B	Existing (Old) Workmanship	
	C	Design Engineering Output Error (DCNs)	
	D	Workplan or Maintenance Request Error	
	E	Material Defects	Acknowledged By: Foreman Rejected IR Rec'd By:

REMARKS: This inspection is a re-exam of weld 2-HEAD-068-0001-J1. The original exam recorded on QC inspection report WBN-TVA-W930110I was unsatisfactory due to 2 linear indications see original report for locations. Craft removed the indications by Grinding. Visual exam & P.T. exam was acceptable. Craft removed .116" maximum weld metal in area of indication. Engineering to determine maximum Partial Inspection Point of ~~Departure~~ weld metal removal. JAMES 9-16-93
Item 1 above is NPT-9 inspection & Item 2 is NVT-3 inspection see attached page 2 & 3 for attributes inspected. JAMES 9-16-93 JAMES 9-16-93

NOTE: NA'd blanks on this inspection record have been evaluated by the inspector and have been determined not applicable to this inspection.

QC Inspector/Date [signature] / 9-16-93 Level II Duration Time 4.0 Trainee None

Reviewed By/Date _____ / _____ Level _____

APPENDIX U
Page 1 of 1

SURFACE EVALUATION SHEET

Weld Removal [ ]
ARC Strike Removal [ ]
Base Metal Indication Removal [✓]

I.D. # 1568
Weld # Removed NONE
Weld Map VENDOR - NONE
WMCR(s) N/A

Component 2-HEAD-068-0001 ①
Diam N/A Thick N/A
Manufacturer's Min. Wall N/A ②
Design Min. Wall _____ per _____
CAQR#/Memo#/NE Engr. & Contact Date

Material Spec & Grade

Final Size (L/W/D)
TVA Class A ASME Class 1
WID PRO68HZ
① CRDM HOUSINGS TO CLOSURE HEAD PER C181079

Location
SEE PT REPORT NUMBER WBN-TVA-W93-01101 IN PACKAGE.

ED WOPE	NE	8/31/93
RE NAME	REU	DATE

Inspection Hold Points		Procedure Reference	Hold Points Required WE	Required ANI	Released WI	Released ANI
Preliminary Thickness Check		NONE				
EVALUATION	VT	N-VT-3	X		③ 9-16-93	
	PT/MT	N-PT-9	X	ANI ③	③ 9-16-93	NONE 9/16/93
	ACID ETCH	NONE				
	Thickness Check	N-VT-3 ②	X		③ 9-16-93	

Comments/Instructions
② TRE DEPTH REMOVAL MUST BE DOCUMENTED FOR NE EVALUATION WHEN MEASURABLE. 9-16-93
NOTE: ~~FOR WAIVE GRINDER~~ = TVA QC SHALL PERFORM INSPECTIONS. CRAFT SHALL REMOVE THE LEAST AMOUNT OF MAT'L POSSIBLE.
NOTE: PERSONNEL REQUIRED TO WITNESS THIS WORK - FOLLOW NE's INSTRUCTIONS
PRELIMINARY PT IS FOR INFO ONLY.
ANI
Ⓐ ANI WIT. PNT ONLY ON CRDM ≠ J-1.
Depth of Removal was 1/16" maximum.
(X) Report No WBNTVAW93 01273 ANI 9-16-93
Ref. Documents for Defect Correction
CAQR #
WELD #

WE Preparation _____ Date 8/31/93
WE Review _____ Date 8/31/93

ANI Review _____ Date 9/14/93

FINAL ACCEPTANCE REVIEW

WE _____ Date 9/20/93
REASON:

ANI _____ Date 9/22/93

DCRM TO FILE WITH WID _____
Retention: Lifetime
Form SSP-7.50-13, Rev. 2

Responsibility: DCRM