

Installation Procedure Title:

A25K-51512-IP7

ASSEMBLY OF STABILIZER JUMP PACKS

Page 1 of 12

LIST OF EFFECTIVE PAGES

PAGE	REV.	EFFECTIVE DATE	EXHIBIT	PAGE	REV.	EFFECTIVE DATE
1.0	0	03/12/83	7.1	1.0	0	03/12/83
2.0	0	03/12/83	7.2	1.0	0	03/12/83
3.0	0	03/12/83	7.3	1.0	0	03/12/83
4.0	0	03/12/83				
5.0	0	03/12/83				
6.0	0	03/12/83				
7.0	0	03/12/83				
8.0	0	03/12/83				
9.0	0	03/12/83				

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	SIGNATURE	TITLE/DIVISION/DEPARTMENT	DATE
Originator	<i>[Signature]</i>	Job Planner	3/14/83
Concurrence	<i>[Signature]</i>	Technical Support	3/14/83
Reviewed By	<i>[Signature]</i>	Responsible Technical Reviewer	3/14/83
	<i>[Signature]</i>	Plant Review Group	3/18/83
	<i>[Signature]</i>	Rad Con	3/17/83
	<i>[Signature]</i>	(ISR)	3/18/83
Approved By	<i>[Signature]</i>	P&S Manager	3-14-83
	<i>[Signature]</i>	O&M Director or N/A	3-18-83
	<i>[Signature]</i>	Mod/Ops QC Manager or N/A	3-15-83

1.0 INTRODUCTION AND SCOPE

1.1 THE PURPOSE OF THIS PROCEDURE IS TO ALLOW PRE-ASSEMBLY OF SELECTED STABILIZER SEGMENTS OUTSIDE THE OTSG UPPER HEADS. THIS WILL MINIMIZE THE TIME SPENT INSIDE THE OTSG HEAD AND REDUCE RADIATION EXPOSURE. IT ALSO ALLOWS CHANGES IN PRESENTLY ASSEMBLED JUMP TACKETS ASSEMBLED IN ACCORDANCE WITH GPUN SPEC. SP-1101-12-030, REV. 7 TO BE MODIFIED TO BE IN COMPLIANCE WITH LATER REVISIONS OF THAT SPECIFICATION.

2.0 REFERENCES

- 2.1 AP1020, CLEANLINESS REQUIREMENTS
- 2.2 GPUN SPEC. SP-1101-12-030, REV. ~~8~~ 9
- 2.3 GPUN SPEC. SP-1101-12-039, REV. 6
- 2.4 B&W OPERATING PROCEDURE 03-1024054-04
- 2.5 A25K-51512-IP6, REV. 0

DOB
3/18/83

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3.0 RESPONSIBILITIES

3.1 M&C DEPARTMENT IS RESPONSIBLE FOR ALL ASPECTS OF THIS WORK.

3.2 PLANT ENGINEERING WILL PROVIDE ASSISTANCE AS REQUIRED.

4.0 PREREQUISITES

4.1 A WORK AREA SHALL BE ESTABLISHED THAT WILL ENABLE WORKERS TO MAINTAIN THE REQUIRED CLASS B CLEANLINESS OF THE STABILIZER ASSEMBLY PACKETS.

5.0 SPECIAL/SAFETY PRECAUTIONS

5.1 STABILIZER SEGMENTS (AFTER PRE-ASSEMBLY) MUST NOT EXCEED THE MAXIMUM LENGTH SPECIFIED IN 6.1 TABLE #1. ~~REF 2.2.~~

5.2 STABILIZER ASSEMBLY TOOLING SHALL BE CALIBRATED IN ACCORDANCE WITH ATTACHMENT 7.3. CALIBRATIONS SHALL BE DOCUMENTED ON ASSEMBLY TOOL VERIFICATION DATA SHEET(S) FOUND IN JOB ORDER A25K-V1512. DATA SHEET SAMPLE IS ATTACHED; SEE ATTACHMENT 7.2.

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3/18/83

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6.0 INSTALLATION REQUIREMENTS

- 6.1 Pre-assembly jump packs are of 11 different styles based on the length of the segments used. The length of the segments, and thus the style of the jump pack is determined utilizing a computer calculated dome height which takes into account installation clearance needed for TMI-1 OTSGs.

The styles and their makeup are as follows:

Table 1

Style	Make up	Design installed length (109" $\pm 1/2$ ")
A	12 ea. 9-3/4" segments 1 ea. end rod 1 ea. cap P/N 660	109"
B	8 ea. 14-1/16" segments 1 ea. end rod 1 ea. cap P/N 660	111-1/2"
C	6 ea. 18-7/16" segments 1 ea. end rod 1 cap P/N 660	112"
D	4 ea. 28-1/4" segments 1 ea. end rod 1 ea. cap P/N 660	118"
E	3 ea. 9-3/4" segments 3 ea. 28-7/16" segments 1 ea. end rod 1 ea. cap P/N 660	115-5/8"
F	12 ea. 9-3/4 segments 1 ea. end rod 1 ea. cap P/N 660	109"
G	12 ea. 9-3/4" segments 1 ea. end rod 1 ea. cap P/N 1104483-003 (FCA 3921 only)	109
H	35 ea. 9-3/4" segments 1 ea. end rod 1 ea. cap P/N 660	295 7/8
J	35 ea. 9-3/4" segments 1 ea. end rod 1 ea. cap P/N 660	295-7/8"
K	As A except cap (P/N 660) is replaced by cap (P/N 1104483-003)	
L	As A except cap (P/N 660) is replaced by cap (P/N 1104483-005)	

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DELETED DOB 3/18/83

DELETED DOB 3/18/83

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Style

Make up

DESIGN INSTALLED
LENGTH

M

1 ea. end rod
1 ea. cap PIN 660
(NOTE 1)

$182" \pm 6"$
 $-1"$

N

1 ea. end rod
1 ea. cap PIN 660
(NOTE 1)

$256" \pm 5"$
 $-1"$

P

1 ea. end rod
1 ea. cap PIN 660
(NOTE 1)

$335" \pm 4"$
 $-1"$

NOTE 1: STABILIZER JUMP PACKS TO BE ASSEMBLED USING AVAILABLE STABILIZER LENGTHS AS RESTRICTED BY DOME CLEARANCE.

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- 6.2 Pre-crimping shall be accomplished only on jump-pack styles E, F, G, and J as follows: *

Style	Pre-crimped segments	Total
E	1 - nose + 28-7/16"	4 pre-crimps/pack
	2 - 9-3/4" + 28-7/16"	
	1 - 9-3/4" + cap	
F	1 - nose + 9-3/4"	7 pre-crimps/pack
	5 - 9-3/4" + 9-3/4"	
	1 - 9-3/4" + cap	
G	1 - nose + 9-3/4"	6 pre-crimps/pack (Do <u>NOT</u> crimp cap)
	5 - 9-3/4" + 9-3/4"	
	1 cap + 9-3/4"	
J	1 - nose	18 pre-crimps/pack
	17 - 9-3/4" + 9-3/4"	
	1 - 9-3/4" + cap	

NOTE: All assembly/crimping tools shall be qualified in accordance with *ATTACHMENT 7.2*.

- 6.3 Additionally, each cap will have screwed into the "head" end, a tube "flag marker" provided by GPUN. This flag marker will serve as a final row-tube verification marker, as well as serving as a readily visible marker for subsequent welding of the cap to the tubesheet. This will support ALARA concepts.

- 6.4 "Jump pack" containers, sized and compartmented to accommodate each style, based on selected segment lengths, *ARE REQUIRED*.

- 6.5 Each flag marker shall be *MARKED* on one side with the following information:

1. OTSG, either A or B
2. Row (e.g., R 32)
3. Tube (e.g., T56)

Example: (AR32-T56)

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HAVE BEEN

- 6.6 All stabilizer parts (including weld cap), shall ~~be~~ inspected prior to use in accordance with *REF. 2.3 & 2.4*.

* 6.2 NOTE. Pre-crimping may also be accomplished on jump-pack styles M, N, P provided individual tube dome clearances are not exceeded and this is verified by QC prior to crimping.

6.7 PRE-ASSEMBLY FIT-UP, INSPECTION AND PACKAGING

- 6.7.1 FOR EACH TUBE TO BE STABILIZED, SELECT THE MAKEUP OF EACH STABILIZER ASSEMBLY AS PER TABLE 1, SEC. 6.1.
- 6.7.2 ASSEMBLE EACH STABILIZER ASSEMBLY, HAND TIGHT, AND RECORD ON ATTACHMENT 7.1, THE REQUIRED INFORMATION. CRIMP SEGMENTS AS APPLICABLE TO FACILITATE JUMP PACK ASSEMBLY.
- 6.7.3 MEASURE THE OVERALL ASSEMBLED LENGTH AND RECORD THIS MEASUREMENT ON ATTACHMENT 7.1.
- 6.7.4 INSPECT EACH THREADED JOINT AND VERIFY APPROX 0.005" MAXIMUM AXIAL OFFSET, OR BLENDED TO EACH OTHER WITH AN APPROX 3:1 TAPER.
- 6.7.5 DISASSEMBLE THE STABILIZER ASSEMBLY, AND PLACE THE SEGMENTS IN THE "JUMP PACK" POUCH IN ORDER OF DISASSEMBLY AS FOLLOWS:
- a. ALL END ROD (NOSE) SHALL BE INSTALLED WITH ROUNDED END EXPOSED.
 - b. ALL SEGMENTS SHALL BE INSTALLED WITH MALE THREADS EXPOSED.
 - c. ALL CAPS SHOULD BE INSTALLED TAPERED HEAD EXPOSED.
 - d. RECORD EACH PIECE HEAT I.D. NUMBER ON ATTACHMENT 7.1.

6.7.6 A FLAG MARKER, AS SPECIFIED IN SECTION 6.3, SHALL BE INSTALLED INTO THE WELD CAP HEAD, HAVING BEEN PROPERLY MARKED AS SPECIFIED IN SECTION 6.5.

THE SAME NUMBER SHALL BE AFFIXED TO THE FLAP OF THE "JUMP PACK".

6.7.7 UPON COMPLETION OF AN ENTIRE PRE-ASSEMBLY JUMP PACK, THE POUCH SHOULD BE ROLLED AND SECURED, AND PLACED IN AN AREA TO ASSURE THAT CLEANLINESS REQUIREMENTS ARE MAINTAINED.

6.7.8 A SEPARATE ATTACHMENT 7.1 SHALL BE COMPLETED FOR EACH STABILIZER PRE-ASSEMBLY, AND Q.C. VERIFICATION SHALL BE IMPOSED FOR EACH PRE-ASSEMBLY AND JUMP PACK ASSEMBLY.

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7.0 ATTACHMENTS

7.1 OTSG STABILIZER FIT-UP/PRE-ASSEMBLY SHEET (SAMPLE)

7.2 ASSEMBLY TOOL VERIFICATION DATA SHEET (SAMPLE)

7.3 INSTRUCTION SHEET FOR QUALIFICATION OF ASSEMBLY
CRIMPER & HOLDER TOOLS

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V.A # A25K-51512

OTSG
ROW/TUBE _____

PACKET STYLE _____

ATTACHMENT 7.1
OTSG STABILIZER FITUP/PRE-ASSEMBLY

DATE _____

SEGMENT NUMBER

HEAT OR
ID NUMBER

SEGMENT
LENGTH

1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

CAP EFFECTIVE LENGTH _____

STABILIZER ASSEMBLED LENGTH _____ PRE-ASSEMBLY _____ YES _____ NO

OVERALL EFFECTIVE LENGTH _____

TUBE MARKER INSTALLED _____ CRIMPER NUMBER _____ /DATE CRIMPED _____

STRAIGHTNESS CHECK PERFORMED _____ YES _____ NO

PACKET ASSEMBLED BY _____
QC VERIFIED BY _____

NOTE: Pre-assembly crimps performed on styles E, F, G, and J only.

NOTE: Pre-assembly crimps may also be performed on jump price
styles M, N, P provided individual dome clearances are not
exceeded and this is verified by QC prior to crimping.

ATTACHMENT 7.2

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[illegible]

Crimper Qualification

- (1) Place tested vice grip holder in the middle of the stabilizer part of the crimp tool qualification device.
- (2) Insert the Modified Bolt into the other end.
- (3) Crimp the joint with a special vice grip crimping tool previously adjusted.
- (4) Using a torque wrench on the bolt specified in Step (2), measure the torque required to cause the joint to rotate. This must be greater than 8 ft/lbs.
- (5) If crimp slips at less than 8 ft/lbs, adjust the vice grip crimping tool accordingly and repeat Step (4).
- (6) Upon satisfactory crimp test, lock (weld) the crimping tool adjustment screw and lock nut.

Holder Qualification

- (1) Clamp a special vice grip holder onto the modified bolt of crimp tool qualification device.
- (2) Apply a torque to the bolt head using a torque wrench until the modified bolt held with the special vice grip holder slips, or until a maximum of 20 ft/lbs is reached.
- (3) If 20 ft/lbs is reached without slippage, adjust the special vice grip holders to ensure slippage occurs at less than 20 ft/lbs, but greater than 10 ft/lbs.
- (4) Upon satisfactory testing, securely tighten the adjustment screw lock nut.
- (5) Repeat Steps (1) through (4) for additional special vice grip holders, as required.

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TMI UNIT NO. 1
M&C TRANSMITTAL

Plant Maint. N/A
Charge No. (If Applicable)

JON No. 80161
(If Applicable)

W.A. No. A25K-51512

B.A. No. 120012

J.O. No. A25K-V1512

E.D. No. N/A

Authorization For Production Work To Be Accomplished By: M&C PROD.
(Installation Organization)

Assigned To: NICKEL
Job Supervisor

Approved By: ZUBEY
Area Supervisor

This Transmittal Provides:

- ☐ Initial Job Order Issue
☒ Change To Existing Job Order (Supp. # 6)
☐ WA-ADL Update (As of / /)
☐ IWL Item For Closeout: Released By: M&C P&S Manager
☐ Other: _____

DISTRIBUTION:

*Master and 2
Field Copies To: SUE KLUKAS M&C PROD. DOC. CONT. 3/19/83
(Name) (Dept) Date

Copy To: (check), If Applicable

M&C Tech. Support N.R. Hollerbush.....(✓)	M&C Admin. D.H. Campbell.....(✓)
MOD/OPS QC R.F. Fenti.....*(✓)	M&C Production L.M. Zubey.....(✓)
Plant Maintenance D.M. Shovlin.....()	Startup T.M. Hawkins.....()
M&C Work Load & Control D.S. Lowry....(✓)	Plant Engineering J.J. Colitz.....*(✓)
M&C Planning & Sched. J.T. Faulkner...(✓)	M&C Scheduling P.A. Lipinsky.....(✓)
M&C Estimating & Cost K.W. Feather....(✓)	M&C Planning G.J. Troffer*(✓)
M&C Planner <u>G.A. Kull</u> *(✓)	M&C Tech. Support C.D. Brumbach.....()
<u>F. YOUNG - NRC</u> *** (✓)	<u>D. LANGAN QA</u> *(✓)
_____ ()	_____ ()

* = w/all attachments ** = w/Tie-In Doc. only *** = IP ONLY

Brief, Program Support Branch, 1B
es, Region 1

Notification/Subject Description of Items or Events

3/3 SMI fax
Once Through Steam
Generator (OTSG) tube
Degradation Update

7071-1

Completion of tube stabilization and plugging is expected during this week. Tubes stabilized and plugged were those tubes that could not be repaired using the kinetic expansion process. Preparations are being made to perform a leak test on both OTSG's. A drip test will check the tightness of the new mechanical seals formed by kinetic expansion, rolled plugs and stabilized tubes (which have also been plugged). The test will be performed by filling the secondary side of the OTSG's with water (covering all of the tube surface area) and applying a 150 psig nitrogen over-pressure to the secondary side. The tube bundle is observed in the lower head of the OTSG on the primary side (reactor coolant side (RCS) side) for any leakage. After the drip test, a final free path check of tubes using eddy current probes will be conducted during April 1983. Subsequent planned evolutions are RCS fill/vent, OTSG bundle test and RCS cleanup. The progress on the OTSG is on schedule to support hot functional testing of both OTSG's by June 1, 1983.

3/29 SMI phone

A spill of radioactive resin and water occurred about 10 p.m. on 3/28 when a sight glass broke during resin transfer operations. The resin and water were confined to the area surrounding the spent resin metering tank (inside the auxiliary building) and the floor drains. No gaseous releases occurred. An operator was slightly contaminated when he entered the area to investigate. The source of the resin was the miscellaneous waste ion exchanger, which processes floor drains and other low level wastes. The licensee has isolated the affected area (resin on floor measures up to 0.2 Bq/cm and is making plans to decontaminate).

3/30 ERI fax

About 8:30 a.m. on 3/29, welding on the outside of the torus shell caused a herculite step off pad inside the torus to overheat and smolder. The smoldering herculite was removed by the plant fire brigade within 10 minutes and no activation of the fire suppression system was required.

MORNING REPORT - REGION 1
3-30-83

PRIORITY ATTENTION REQUIRED

-2-

Notification/Subject Description of Items or Events

3/29 licensee phone
to RI

Planned peaceful demonstration by the "Coalition for Nuclear Power Postponement" on April 4, 1983 at the Salem site.

GENERAL PUBLIC UTILITIES
OTSG REPAIRS

DATE 3/21/83

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	<u>DATE REQUIRED</u>
-------------	--------------------	-----------------------	----------------------

① ← TBD	Round Robin Samples-NWT Lab <ul style="list-style-type: none"> . Spent Fuel . BWST . Decay Heat - Monthly Samples . Ship Next Monthly Samples 	J. Colitz	End of Month 3/31
---------------	--	-----------	----------------------

2. Restoration Secondary Side
A. Temp. Chem. System

3. Ops OTSG Status
 . A and B OTSG Full Wet Layup 2/7
 . Receive Backing Plates for "A" Upper Manway 4/1

4. Post Expansion
 . Felt Plug Blowing Device-Store at Reactor Bldg
 . Final Freepath - Blow Plugs from Top
 . B&W Equipment
 . B&W Proposal
 . Mt. Vernon Test
 . Technique for Marking Plugs

APRIL 1, 1983
TBD
3/27
3/23

5. Immuno1 Flush System
 . Revised Spec for Flushing

T. Functions TBD

6. Tube Plug Stabilization
 . M&C Procedure Requirements

Immediate Review	IP4 Rev. • Remove W Roll Plugs	G. Kull	TBD
	IP5 Rev. • Tapered Plug Removal (A OTSA)	G. Kull	TBD
art	IP7 Rev. • Jump Pack Assembly	G. Kull	3/18
	IP8 Rev. • Exp. Plugging, Lower Hd.	G. Kull	3/18
	. Receive Eddy Current Templates		3/18
	. Explosive Plugs On-site		3/21

250 plug

231 A 4mmol drop on 69-128 92-129 64-130 3mmol
 79 B 77-144

B remove 4 stabilizers

Important plug on E tomorrow / Welding on Wednesday

-2-
OTSG REPAIRS

DATE 3/21/83

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>RESPONSIBILITY</u>	<u>DATE REQUIRED</u>
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7. Miscellaneous Items to Resolve
 . Hydrogen Peroxide Tube Soak

8. Waiting Documentation
 MNCR

Responsibility

215-82	Plug Exploded at Wrong Area of Tube	B&W
345-82	2 Tubes Plugged Incorrectly	
354-82	Documentation for Immunol-1st Batch	Eng
426-82	Wire Brush B6-1	
009-83	Immunol at Cold Legs	
041-83	Tube Ends	Eng.
059-83	Stabilizers in Wrong Tubes	
	<i>Drip Rods</i>	

9. Tube Endmilling

10. Rad Con Exposure Data (Based on SRDs) as of 3/18
 . Total OTSG Exposure since 1st Blast - 692.4 Man Rem 697.6
 . Total OTSG Exposure since Nov 1981 - 868.6 Man Rem 873.8
 under estimate

11. Bubble and Drip Test *to be issued this week*
 Final Detailed Spec
 Possible drip test this weekend
 T. Reichter 3/25

12. Cleaning of the Cold Legs
 Issue Purchase Requisition for Vendor

Hydro laser the Pen

13. Anticipated Jumps
- | <u>Date</u> | <u>Description</u> | <u>Responsibility</u> |
|-------------|------------------------------|-----------------------|
| 3/21 | A - Upper - <i>1 staking</i> | Levin/Catalytic |
| | A - Lower - | |
| 3/21 | B - Upper - | |
| | B - Lower - | |

Inter-Office Memorandum



Date March 21, 1983

Subject Request for copies of
Documentation

To C. W. Smyth
Licensing Department
Trailer 68
Unit I

Location TMIN5

On 3-21-83, S. Young requested copies of the following:
(date) (name)

MNCR's # 0215-82
0345-82
0041-83

Attached you will find copies of the above documentation, please forward.

A handwritten signature in cursive script, appearing to read "T.F. Graham".

T.F. Graham
QC Receiving & Programs Supervisor

TFG/dal
cc:
QC File
CARIRS

OK

A handwritten signature in cursive script, appearing to read "Carl Stephens".

3/21/83

40000648

115

MNCR TRANSMITTAL FORM

QC Manager

Date: 6-28-82

J. J. Colitz

(Action Addressee)

ct: MNCR No.: 0215-82

File No.:

The attached MNCR has been evaluated by QC and found potentially reportable. Please review the MNCR and take action you consider necessary to inform Regulatory Agencies, Upper Management and GRC/PORC Committee Chairman. You are requested to furnish written acknowledgement of the receipt of this notification. Please provide copy of completed evaluation report to QC Manager for placement in MNCR file.

The attached MNCR is forwarded for evaluation and disposition. Please arrange for the completion of Section 3 of the MNCR, taking care to identify and notify the individuals/organizations responsible for implementing material disposition and other corrective action and providing a date by which corrective action should be completed. Return the MNCR, with Section 3 completed, to the QC Manager. You are requested to furnish written acknowledgement of the receipt of this transmittal.

For Your Information.

The attached MNCR and supporting documents are forwarded for your retention as QA Record and are to be retained for the life of Unit I/II. You are requested to furnish written acknowledgement of the receipt of this transmittal.

Examination of our records indicates that this MNCR disposition is incomplete, please provide an estimated completion date to the QC Manager.

The attached MNCR is forwarded for resolution of the identified vendor nonconformances

Other/Additional:

Receipt Acknowledgement Required: ☐ Yes ☒ No

If receipt acknowledgement from addressee is required, sign the following statement and return this form to the QC Manager.

I hereby acknowledge receipt of this transmittal.

From: _____
MNCR No.: _____

Date: _____

() Operations Manager U-I/II	() Technical Functions U-I/II
() Maintenance Director U-I/II	() QA Department - Parsippany
() Director-Site Operations U-I/II	() Manager-Admin. & Services U-I/II
() Supervisor-Licensing	() PORC TMI U-I/II
() Director Material Manager	() GRC TMI U-I/II
() Manager-Maint. & Constr. U-I/II	() Nuclear Safety Assessment Director
() Manager-QA Mod/Ops	() Other: _____
() Plant Engineering U-I/II	

MATERIAL NON-CONFORMANCE REPORT (MNCR) Part A -- Initiation

1. DESCRIPTION OF NONCONFORMANCE (Completed by Initiator)

a. Unit: TMI-1 Initiator: DAVID L. LANGAN Mac/CPS QA 6-22-82/11:00
 Name Section Date/Time

Material, Part, Component, etc.: A CTSC, Row 143 - Tube 61, 30-20 in

Location: LOWER HEAD, A CTSC

Manufacturer: BARCOCK & WILCOX
 Name Code

b. Purchase Requisition No.: NA Line Nos. NA Specification No.: NA

System: REACTOR COOLANT System Tag No.: NA

Drawing No.: FSU 12-1001407 Heat Code No.: NA Other: NA

c. Requirement(s):
3.3 of F25B-S1512-IPV attachment 2 - Note requires plugs to be inserted midway into the tubesheet

d. Conditions:
The explosion plug detonated in Row 143 tube 61 at the bottom of the "A" CTSC and slid down from its placed position prior to detonation and was partially out of the tube when detonated. See attached sketch for approximate position and condition of the plug and tubesheet. (pg. 3)

e. Possible Causes:
Plugs were being held in place with tape and tape did not hold.

HAND CARRY TO QC MANAGER (OR SHIFT SUPERVISOR ON WEEKEND/BACKSHIFTS)

2. Evaluation by QA/QC

Important to Safety:

Potential 10 CFR 50:

Potential 10 CFR 21:

Potential 10 CFR 71:

Potential L.E.R.:

Potential 10 CFR 73.71:

Q.C. Manager's Concurrence:

If evaluated to be potentially reportable notify Unit Operations Director and send copy of MNCR to Supervisor Licensing.

Date/TMI Unit Manager Notified: N/A

Licensing Supervisor Notified: Yes ☐ No ☒ Date/Time

Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Hold Tags Issued

Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Hold Tag Nos.

Evaluated by: L. L. Luten QC 622-82 1456
 Name/Title Date/Time

MNCR No. 0215-82

3. ACTION PARTY EVALUATION AND DISPOSITION:
a. Evaluation of cause: Mk. 1 explosive plugged slipped out of tube and detonated at app. tubesheet level. Plug was forced out of position by adjacent exploding tubes.
b. Disposition ☒ Rework ☐ Repair ☐ Use As Is ☐ Scrap ☐ Obtain Document ☐
* Requires Engineering Approval and Evaluation
Evaluated by: J. Paulowicz 6-23-82
Name/Organization/Date
Unit: Mech. Eng.

4. ENGINEERING EVALUATION AND DISPOSITION
a. Disposition Concurrence: Yes ☒ No ☐
If no, recommendation is: ☐ Rework ☐ Repair ☐ Use As Is ☐ Scrap ☐ Obtain Document ☐
b. Technical Justification: Additional information on plug position and seal weld condition to determine course of action for this plug/tube. In order to obtain this information, the following steps must be taken: (cont)
c. Re-inspection/Retest Requirements (As Applicable): QC to perform liquid penetrant after machining. Report indicative to plant engineering.
d. Technical Corrective Action (As Applicable) see attached
Check, as appropriate, if corrective action requires change to:
Design ☐ Procedure ☐ Specification ☐ As Built Drawing ☐
FSAR ☐ Manual ☐ Tech. Spec. ☐ Document No. _____
e. Evaluated by J. J. Cant 6-23-82
Name/Organization/Date

5. DISPOSITION CONCURRENCE: _____ Conditional Release Issued _____
Reject Tag No. _____
QC Manager/Date Interim concurrence to allow end milling only - J. Kietjen QC. 6-23-82

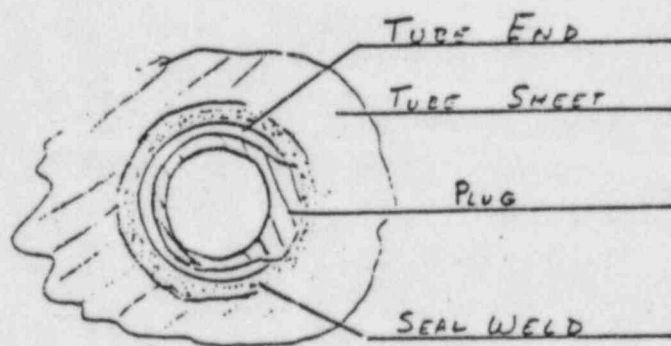
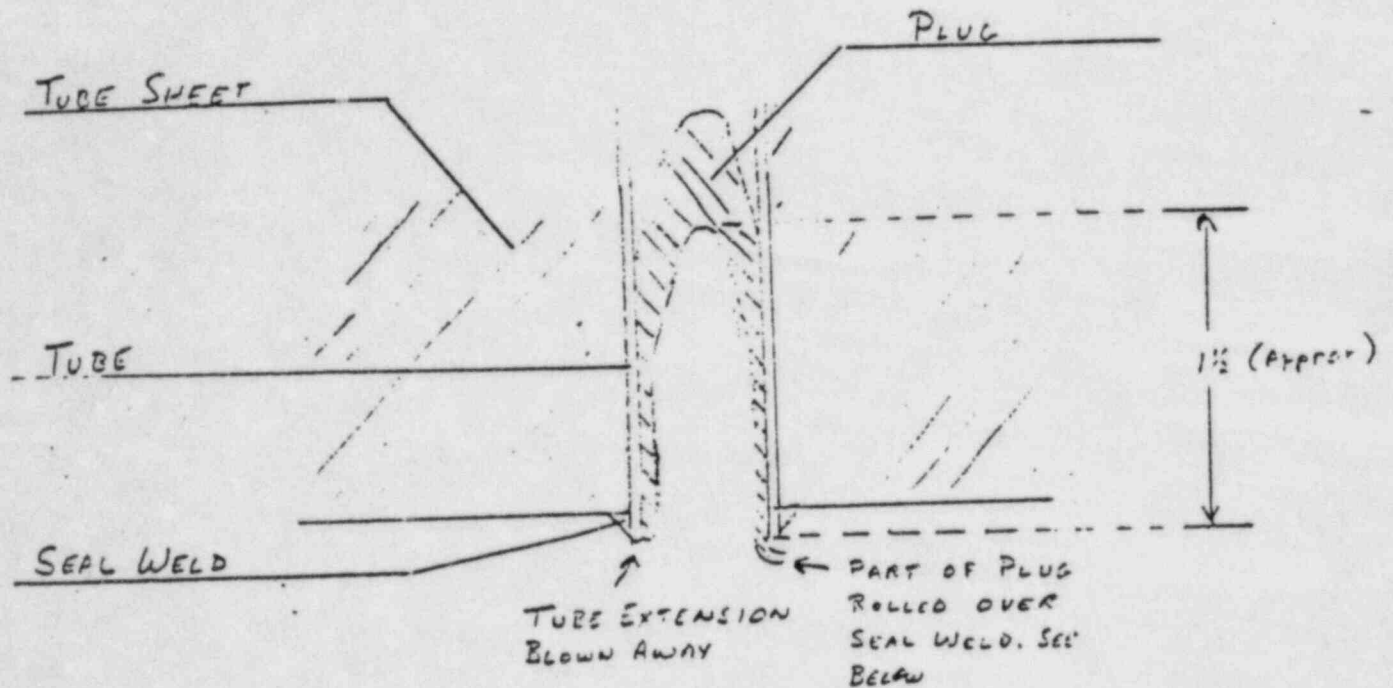
6. QC VERIFICATION AND CLOSE-OUT
a. Verification of satisfactory completion of material disposition and technical corrective action.
Verification Method: _____

Complete Following Details As Appropriate:
Inspection Report No.: _____ Inspections: _____
Test Report No.: _____ Tests: _____
Work/Shipping Order No.: _____ Other _____
Tags Removed by: _____ Date _____
Name/Title
Verified by: _____ Name/Title/Date

Sat.	Unsat.	Not Applic.

7. FINAL PACKAGE REVIEW:
Reviewed by: _____ QC Manager/Date _____
Date Computer Input Card Completed: _____

SKETCH



b. (cont.)

- (1) Machine the tube end and remaining explosive plug in accordance with Attachment #2 to I.P. A250-51512-IP 1. This will allow 80 miles of the original weld to remain ~~with~~ while removing the damaged material. ^{may be reduced to 60 miles at}
- (2) Measure depth of plug inside the ^(continues page) tube. This will be done by inserting a wire into the plug and then measuring this length of wire. This information will allow B & W to determine if a satisfactory weld is achieved. Depth ^{may be} measured.
- (3) Perform liquid penetrant test of tube, plug end, remaining weld and tube sheet adjacent to weld. Report any indications to Plant Engineering.

^{interim} This resolution to this MNCR release the tube end for milling and liquid penetrant exam only. This information is needed to determine final disposition of this MNCR.

No document changes needed. B & W Mk. 3 plugs have internal clips to prevent recurrence of dropping explosive plugs.

B. Elam of GPUNC Tech Functions agrees with the above disposition which is based on B&W recommendations.

Evaluated by:

Frank Paulewicz

6-23-82

Unit, Mech. Eng.

JJ cont
6-23-82

(cont.) direction of Plant Engineering.

J.J. Colitz

(Action Addressee)

Subject: MNCR No.: 0345-82

File No.: _____

The attached MNCR has been evaluated by QC and found potentially reportable. Please review the MNCR and take action you consider necessary to inform Regulatory Agencies, Upper Management and GRC/PORC Committee Chairman. You are requested to furnish written acknowledgement of the receipt of this notification. Please provide copy of completed evaluation report to QC Manager for placement in MNCR file.

The attached MNCR is forwarded for evaluation and disposition. Please arrange for the completion of Section 3 of the MNCR, taking care to identify and notify the individuals/organizations responsible for implementing material disposition and other corrective action and providing a date by which corrective action should be completed. Return the MNCR, with Section 3 completed, to the QC Manager. You are requested to furnish written acknowledgement of the receipt of this transmittal.

For Your Information.

The attached MNCR and supporting documents are forwarded for your retention as QA Record and are to be retained for the life of Unit I/II. You are requested to furnish written acknowledgement of the receipt of this transmittal.

Examination of our records indicates that this MNCR disposition is incomplete, please provide an estimated completion date to the QC Manager.

The attached MNCR is forwarded for resolution of the identified vendor nonconformances

Other/Additional: _____

Receipt Acknowledgement Required: ☒ Yes ☐ No

If receipt acknowledgement from addressee is required, sign the following statement and return this form to the QC Manager.

I hereby acknowledge receipt of _____

Signed: _____

From: _____

MNCR No.: 0345-82

Date: _____

() Operations Manager U-I/II	(<input checked="" type="checkbox"/>) Technical Functions <u>U-I/II</u>
() Maintenance Director U-I/II	() QA Department - Parsippany
() Director-Site Operations U-I/II	() Manager-Admin. & Services U-I/II
() Supervisor-Licensing	() PORC TMI U-I/II
() Director Material Manager	() GRC TMI U-I/II
() Manager-Maint. & Constr. U-I/II	() Nuclear Safety Assessment Director
(<input checked="" type="checkbox"/>) Manager-QA Mod/Ops	(<input checked="" type="checkbox"/>) Other: <u>n. Hollerbush</u>
() Plant Engineering U-I/II	<u>D. Langdon</u>

MATERIAL NON-CONFORMANCE REPORT (MNCR) Part A - Initiation

1. DESCRIPTION OF NONCONFORMANCE (Completed by Initiator)

a. Unit: I Initiator: DAVID L. LANGAN OPS QA 9-21-82/

Name

Section

Date/Time

Material, Part, Component, etc: CTSC "A" Tube 1-9 and 114-105

Location: Plant and Design

Manufacturer: BEW Code

Name

Code

b. Purchase Requisition No: NA Line Nos. NA Specification No.: SP-1101-12-030
System: Resistor Coolant System Tag No.: NA
Drawing No.: NA Heat Code No.: NA Other: NA

c. Requirement(s):
Attachment 1 of Specification SP-1101-12-030 specifies these tubes to be plugged using BEW welded cap with strain-line at the top and BEW explosion plug at the bottom.

d. Conditions:
Tube 1-9 and 114-106 were listed to be plugged but tube 1-9 and 114-105 were incorrectly plugged using welded plugs at the top. An obstruction is not approximately 2 ft. from the lower tubsheet on tubes 1-9 and 114-106. This tube are protected with safety equipment indicating that they are explosion only plugged at the bottom.

e. Possible Causes:
Probable cause is operator error during the weld milling process in that the tube markers for these two tubes may have been accidentally removed and replaced in an adjacent tube.

HAND CARRY TO QC MANAGER (OR SHIFT SUPERVISOR ON WEEKEND/BACKSHIFTS)

2. Evaluation by QA/QC

Important to Safety:
Potential 10 CFR 50:
Potential 10 CFR 21:
Potential 10 CFR 71:
Potential L.E.R.:
Potential 10 CFR 73.71:

Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Hold Tags Issued

Yes	No
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Hold Tag Nos.

Evaluated by J. H. Tipton QC 9-20-82 1030

Name/Title

Date/Time

Q.C. Manager's Concurrence: J. H. Tipton
If evaluated to be potentially reportable notify Unit Operations Director and send copy of MNCR to Supervisor Licensing.

Date/TMI Unit Manager Notified: _____

Licensing Supervisor Notified: Yes ☐ No ☒ Date/Time _____

MNCR No. 0345-A2

3. ACTION PARTY EVALUATION AND DISPOSITION:

a. Evaluation of cause: _____

b. Disposition
Rework ☐ Repair* ☐ Use As Is* ☐ Scrap ☐ Obtain Document ☐

* Requires Engineering Approval and Evaluation

Evaluated by: _____
Name/Organization/Date

4. ENGINEERING EVALUATION AND DISPOSITION

a. Disposition Concurrence: Yes ☐No* ☐ If no, recommendation is:Rework ☐ Repair ☐ Use As Is ☐ Scrap ☐ Obtain Document ☐

b. Technical Justification: _____

c. Re-inspection/Retest Requirements (As Applicable) _____

d. Technical Corrective Action (As Applicable)

Check, as appropriate, if corrective action requires change to:

Design ☐ Procedure ☐ Specification ☐ As Built Drawing ☐FSAR ☐ Manual ☐ Tech. Spec. ☐ Document No. _____e. Evaluated by _____
Name/Organization/Date

5. DISPOSITION CONCURRENCE:

Conditional Release Issued _____

Reject Tag No. _____

QC Manager/Date

6. QC VERIFICATION AND CLOSE-OUT

a. Verification of satisfactory completion of material disposition and technical corrective action.

Verification Method: _____

Complete Following Details As Appropriate:

Inspection Report No.: _____

Inspections:

Test Report No.: _____

Tests:

Work/Shipping Order No.: _____

Other _____

Tags Removed by: _____

Date _____

Name/Title

Verified by: _____

Name/Title/Date

Set.	Unset.	Not Applic.

7. FINAL PACKAGE REVIEW:

Reviewed by: _____
QC Manager/Date

Date Computer Input Card Completed: _____

To: C. Shorts (Action Addressee)

Subject MNCR No.: 0041-83 File No.: _____

☐ The attached MNCR has been evaluated by QC and found potentially reportable. Please review the MNCR and take action you consider necessary to inform Regulatory Agencies, Upper Management and GRC/PORC Committee Chairman. You are requested to furnish written acknowledgement of the receipt of this notification. Please provide copy of completed evaluation report to the QC Manager for placement in MNCR file.

☐ The attached MNCR is forwarded for evaluation and disposition. Please arrange for the completion of Section 3 of the MNCR, taking care to identify and notify the individual organizations responsible for implementing material disposition and other corrective action and providing a date by which corrective action should be completed. Return the MNCR, with Section 3 completed, to the QC Manager. You are requested to furnish written acknowledgement of the receipt of this transmittal.

☐ For your information.

☐ The attached MNCR and supporting documents are forwarded for your retention as a QA Record and are to be retained for the life of Unit I/II. You are requested to furnish written acknowledgement of the receipt of this transmittal.

☐ Examination of our records indicates that this MNCR disposition is incomplete, please provide an estimated completion date to the QC Manager.

☐ The attached MNCR is forwarded for resolution of the identified vendor nonconformances

☒ Other/Additional: PER ATTACHED SAFETY EVALUATION CAN YOU DISPOSITION THIS MNCR. PLEASE ADVISE
 Receipt/Acknowledgement required: X Yes No

If receipt acknowledgement from addressee is required, sign the following statement and return this form to the QC Manager.

The receipt of
 is hereby acknowledged.
 Signed: _____

From: _____
 MNCR No.: 0041-83
 Date: _____

- ☐ Operations Manager U-I/II
- ☐ Maintenance Director U-I/II
- ☐ Director-Site Operations U-I/II
- ☐ Supervisor-Licensing
- ☐ Director Material Management
- ☐ Manager-Maintenance & Constr. U-I/II
- ☒ Manager-QA Mod/Ops
- ☒ Plant Engineer U-I/II

- ☐ Technical Functions U-I/II
- ☐ QA Department-Parsippany
- ☐ Manager-Admin. & Services U-I/II
- ☐ PORC TMI U-I/II
- ☐ GRC TMI U-I/II
- ☐ Nuclear Safety Assessment Director
- ☒ Site QA Engineering Manager
- ☒ Other: F. FAIST B&W REP.

D. SLEAR - TECH. FUNCTIONS

(Action Addressee)

MNCR No.: 0041-83

File No.: _____

☐ The attached MNCR has been evaluated by QC and found potentially reportable. Please review the MNCR and take action you consider necessary to inform Regulatory Agencies, Upper Management and GRC/PORC Committee Chairman. You are requested to furnish written acknowledgement of the receipt of this notification. Please provide copy of completed evaluation report to QC Manager for placement in MNCR file.

☒ The attached MNCR is forwarded for evaluation and disposition. Please arrange for the completion of Section 3 of the MNCR, taking care to identify and notify the individuals organizations responsible for implementing material disposition and other corrective action and providing a date by which corrective action should be completed. Return the MNCR, with Section 3 completed, to the QC Manager. You are requested to furnish written acknowledgement of the receipt of this transmittal.

☐ For Your Information.

☐ The attached MNCR and supporting documents are forwarded for your retention as QA Record and are to be retained for the life of Unit I/II. You are requested to furnish written acknowledgement of the receipt of this transmittal.

☐ Examination of our records indicates that this MNCR disposition is incomplete, please provide an estimated completion date to the QC Manager.

☐ The attached MNCR is forwarded for resolution of the identified vendor nonconformances

☐ Other/Additional: _____

Receipt Acknowledgement Required: ☒ Yes ☐ No

Receipt acknowledgement from addressee is required, sign the following statement and return this form to the QC Manager.

I hereby acknowledge receipt of _____
and: _____

From: _____

MNCR No.: 0041-83

Date: _____

(☒) Operations Manager U-I/II
 (☐) Maintenance Director U-I/II
 (☐) Director-Site Operations U-I/II
 (☐) Supervisor-Licensing
 (☐) Director Material Manager
 (☒) Manager-Maint. & Constr. U-I/II
 (☒) Manager-QA Mod/Ops
 (☒) Plant Engineering U-I/II

(☒) Technical Functions U-I/II
 (☐) QA Department - Parsippany
 (☐) Manager-Admin. & Services U-I/II
 (☐) PORC TMI U-I/II
 (☐) GRC TMI U-I/II
 (☐) Nuclear Safety Assessment Director
 (☒) Other: N. Hollerbusch
Fred Faust (BEW rep)

MATERIAL NON-CONFORMANCE REPORT (MNCRI) Part A - Initiation

1. DESCRIPTION OF NONCONFORMANCE (Completed by Initiator)

a. Unit: I Initiator: G. OSWALD Section: QC Date Time: 2-23-83/0930

Material, Part, Component, etc.: OTSG A & B [END MILLING OF TUBES]

Location: REACTOR BLDG UPPER TUBE SHEETS

Manufacturer: B & W Code: N/A

b. Purchase Requisition No.: N/A Line Nos.: N/A Specification No.: 1101-12-049
System: REACTOR COOLANT - PRIMARY System Tag No.: N/A
Drawing No.: N/A Heat Code No.: N/A Other: A25J-V1512
BVA 120012

c. Requirement(s):
PER 1101-12-049 PG.1 "VERIFICATION THAT ALL LOOSE TUBE ENDS
ARE CUT OFF TO TOP OF SEAL WELD."

d. Conditions: REF. AR ME-03079-83
QC INSPECTION OF END MILLING CONSISTED OF A SCAN OF THE
TUBE SHEETS (A & B). GENERAL FINDINGS ARE THAT
1) TUBE ENDS ARE FREE OF LOOSE PARTS & JAGGED EDGES
2) TUBE ENDS WERE REMOVED BY END MILLING DOWN TO OR
CLOSE TO THE SEAL WELDS SUCH THAT APPROXIMATELY
1/16" MAXIMUM OF THE TUBE END WAS LEFT IN PLACE.
NOTE: WHERE EXCEPTIONS TO THE ABOVE FINDINGS WERE
DISCOVERED, THEY WERE CORRECTED & REINSPECTED.
NOTE: REFERENCE ATTACHED CRITERIA SUBMITTED BY RANT ENG.
NOTE: IT IS THE OPINION OF QC THAT AT LEAST 99% OF
THE TUBES (BOTH A & B) CONFORM TO THE FINDINGS ABOVE. IT IS
ALSO THE OPINION OF QC THAT (DUE TO APPEARANCE OF MILLED TUBES)
99.9% OF THE TUBE ENDS (BOTH A & B) HAVE BEEN MILLED TO SOME EXTENT.

e. Possible Causes:
VARIATIONS IN TUBE END HEIGHTS.
WORKING CONDITIONS.

HAND CARRY TO QC MANAGER (OR SHIFT SUPERVISOR ON WEEKEND/BACKSHIFTS)

2. Evaluation by QA/QC

Important to Safety:

Potential 10 CFR 50:

Potential 10 CFR 21:

Potential 10 CFR 71:

Potential L.E.R.:

Potential 10 CFR 73.71:

C.C. Manager's Concurrence:

If evaluated to be potentially reportable notify Unit Operations Director and send copy of MNCRI to Supervisor Licensing.

Date/TMI Unit Manager Notified: N/A

Licensing Supervisor Notified: Yes ☐ No ☒ Date Time N/A

Yes	No
<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Hold Tags Issued

+ HOLD POINT TO BE ISSUED FOR FLUSH

Hold Tag Nos. WHEN STP IS ISSUED

Evaluated by: G. Oswald CS/III Date Time: 2-23-83/0930

Name Title

Date Time

MNCRI No. 0041-83

MATERIAL NON-CONFORMANCE REPORT (MNCR) Part B
 Evaluation, Disposition and Close Out
MNCR No.: 0041-83**3. ACTION PARTY EVALUATION AND DISPOSITION:**a. Evaluation of cause: _____
 _____b. Disposition
 Rework ☐ Repair* ☐ Use As Is* ☐ Scrap ☐ Obtain Document ☐

*Requires Engineering Approval and Evaluation

Evaluated by: _____
 Name/Organization/Date**4. ENGINEERING EVALUATION AND DISPOSITION**a. Disposition Concurrence: Yes ☐No* ☐ If no, recommendation is:Rework ☐ Repair ☐ Use As Is ☐ Scrap ☐ Obtain Document ☐b. Technical Justification: _____
 _____c. Re-inspection/Retest Requirements (As Applicable)

d. Technical Corrective Action (As Applicable)

Check, as appropriate, if corrective action requires change to:

Design ☐Procedure ☐Specification ☐As Built Drawing ☐FSAR ☐Manual ☐Tech. Spec. ☐

Document No. _____

e. Evaluated by _____
 Name/Organization/Date**5. DISPOSITION CONCURRENCE:**_____
 QC Manager/Date

Conditional Release Issued _____

Reject Tag No. _____

6. QC VERIFICATION AND CLOSE-OUT

a. Verification of satisfactory completion of material disposition and technical corrective action.

Verification Method: _____

Complete Following Details As Appropriate:

Inspection Report No.: _____

Test Report No.: _____

Work/Shipping Order No.: _____

Inspections:

Tests:

Other _____

Sat.	Unsat.	Not Applic.

Tags Removed by: _____ Date _____
 Name/TitleVerified by: _____
 Name/Title/Date**7. FINAL PACKAGE REVIEW:**Reviewed by: _____
 QC Manager/Date

Date Computer Input Card Completed: _____

VISUAL INSPECTION OF ENDMILLED TUBES

QC to inspect tube ends to verify:

1. No loose pieces or jagged edges where pieces are missing.
2. Tube ends are removed down to or close to the seal weld.

The conditions noted above will be verified as indicated by:

1. A relatively smooth finish on the top of the tube/seal weld.
2. Minimal extension of the tube above the seal weld.

Approved: Joseph Colitz Ron Tulcan *David P. For*
 Concluded: David L. Langer *QA 7/29/83*

Document Release Form
Refer to EHP-008Date 2/24/22Page 1 of 1To: DIST A

Release Action

- ☐ Review/Comment
☐ As-Built
☒ Record

- ☐ Construction
☐ Procurement
☐ Operations/Maintenance
☐ Hold Construction

Originator J.A. MARTINHome Base 5310Tel. 3406Unit TML1Budget Activity # 120012WO/SO # 5000-5177

List of Released Items (attached)

Company	Document No.	Sheet	Rev.	Title	DCL
GPU	120012-007		Z	SAFETY EVALUATION REQUIREMENTS FOR CUTTING UPPER OTS & TUBESHAWS	ITS

Special Instructions

RECEIVED

MAR 11 1992

GPU QC

Reference

cc: H.A. SCHWARTZ, C.E. GLE, R. GARDY, F. ASH, J. ALLEN, J.A. MARTIN, D. G. GARDY
 B. GARDY

Original (yellow) to ED & DC

A0001080A 6-82

TITLE REQUIREMENTS FOR CUTTING UPPER OTSG TUBE ENDS

REV	SUMMARY OF CHANGE	APPROVAL	DATE
1	Changed page 2 of 6 paragraph 4 and page 3 of 6 paragraph 1 to delete reference to rasping tool and add reference to B&W single cutter tool. Also expanded words to include operation of tools.	J. Q. Martin M. Lee [Signature] [Signature]	2/16/83 2/16/83 2/14/83 2/6/83
1	Page 3 of 6 paragraph 4 added: "For tubes to be plugged, the seal weld may be milled to .030".	[Signature] [Signature]	2/17/83
2	Added paragraph to page 6 on Disposition of MNCRO043-83. Also added References 12 and 13 to page 7.	J. Q. Martin B. Lee [Signature]	2/25/83 2/25/83 2/26/83

Nuclear Safety/Environmental Impact Evaluation
Summary Sheet
Refer to EP-016

Title REQUIREMENTS FOR CUTTING UPPER OTS 4 TUBE EX

1. (a) Does the change require revision of the systems/component description in the Safety Analysis Report? YES ☐ NO ☒
- (b) Does the change alter procedures from those described in the Safety Analysis Report? YES ☐ NO ☒
- (c) Are tests or experiments conducted which are not described in the Safety Analysis Report? YES ☐ NO ☒

Note: If any of the answers to 1 (a), (b), or (c) are YES, a detailed evaluation must be attached.

2. (a) Has the probability of occurrence or the consequence of an accident or malfunction of equipment important to safety previously evaluated in the Safety Analysis Report been increased? YES ☐ NO ☒
- (b) Has the possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report been created? YES ☐ NO ☒
- (c) Has the margin of safety as defined in the bases for any Technical Specification been reduced? YES ☐ NO ☒

Note: If any of the answers to 2 (a), (b), or (c) are YES, the change must be approved by the NRC.

3. Does this design change, test or experiment adversely effect Nuclear Safety and therefore, is it an "Unrenewed Safety Question" per 10CFR50.581? YES ☐ NO ☒

Note: If the statement in 3 above is checked YES, either redesign or provide supporting documentation which will permit licensing to request the NRC's approval.

4. Does the design change possibly involve a significant environmental impact or an environmental question not having previous regulatory agency review and approval? YES ☐ NO ☒

Note: If the statement in 4 above is checked YES, either redesign or provide supporting documentation which will permit licensing to request the necessary regulatory approval.

John P. Martin
Reviewed by Presiding Engineer

2/25/83
Date

B. Chan
Approved by Section Manager

2/25/83
Date

Items 1 through 4 approval:
DS Sizer per Telecom
BP Chan 2/25/83
Responsible Technical Reviewer

Date

Sam V. Harding
Independent Safety Reviewer

2/25/83
Date

DEC 008794

Title REQUIREMENTS FOR CUTTING UPPER OTSG TUBE ENDS

Safety Evaluation

PURPOSE

Cut off all tube ends that extend beyond seal weld. These tube ends have experienced corrosive attack and should be removed to prevent them from becoming loose parts in the primary system during operation.

SYSTEM AFFECTED

All tubes in upper tube sheet of the TMI-1 OTSG's except the ones which have already been plugged.

EFFECTS ON SAFETY

Since all tubes except the previously plugged ones have been kinetically expanded in the upper tubesheet (UTS) to either 17" or 22" below the primary surface of the UTS, a new leak-tight and load carrying joint is provided at least 11" below the tube to tubesheet weld joint to serve as a new pressure boundary. Qualification results revealed that the load carrying capability of the kinetically expanded joint is adequate to meet the load requirements based on the main steam line break, which is the most stringent axial tensile load imposed on the steam generator tubes. The seal weld at the upper end of tube will no longer be subject to axial tube loads.

An operator using a hand held air motor with piloted tube end facer will be used to cut off all the tube ends. The stall torque of the air motor used to drive the single tube end cutter is approximately 100 ft#f. However, based on tool design practice, it was concluded that a person can hold approximately 20 ft#f of torque with a pistol grip handle. This equates to a person resisting a repetitive force of 60#f at the handle. In order to reach the stall torque of 100 ft#f, a person would have to hold onto a force of 300#. Therefore, it was concluded that the maximum torque will be 30 ft#f. Evaluation of 30 ft#f torque (Ref.1) shows that shear stress, 14,338 psi is less than the yield strength of the material, 35,000 psi.

If 1 (a), (b) or (c) is YES, indicate Task Request assignments below:

	Yes	No	TR#
Does the change require an update of the FSAR?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Does the change require a Technical Specification amendment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Does the change require a Quality Classification List amendment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	_____

B. Chan

3/23/83

Approved by Section Manager

Date

NRC approval has been obtained

N/A

2/5/83

GPUN Licensing

Date

The air motor used by B&W for tube end stabilization has a maximum stall torque of 25 ft#s. However, this tool is positioned on the tube sheet with hardstops and from experience in using this same tool in the past, the tool cannot be stalled, i.e., the person operating the tool would decrease the pressure on the cutter allowing the motor to dwell on the tube and seal weld being cut. It is expected that the running torque of this tool will not exceed 30 ft#s. Operator training will preclude the potential of stalling (Ref. 9).

In addition, the fillet weld and the minimum of 10" kinetic expansion between the tube top and top of 6" qualified kinetic expansion length will transfer the torsion load to the tubesheet so the new joint will not be stressed by the tube end removal process.

The design minimum seal weld vertical leg height is .051". However, previous tube end machining for plugging has shown that the minimum dimension for most welds is .080" or more, so .070" has been set as the nominal height above the tubesheet to which the tubes will be machined. In addition, Reference 7 requires periodic tube end examinations during end milling to confirm that "protruding tube ends are being removed slightly down into the weld". Any tubes which are not machined to the top of the seal weld will be remachined to a lower height within the .070"-.019" tolerance established.

According to B&W's analysis (FCA04-3922), for a kinetically expanded tube, minimum vertical weld dimension of .030" is required to provide adequate fillet weld area for subsequent plugging. For tubes to be plugged, the seal weld may be milled to .030". Since the tube end with the seal weld is nominally allowed to be cut off to 0.070" \pm .010 above the tubesheet
-.019

cladding, there will be more than enough margin to assure that the remaining seal weld will have adequate dimension for future plugging. The removal of the upper tube ends will not impact the tube preload and stresses.

Loose Parts Effects

1. Loose parts from the machining process will vary from fines to approximately $1/32"$ x $1/16"$ x $1/2"$. Larger pieces breaking off the tube end may be as large as $9/64"$ x $5/8"$ x $1/32"$.

Loose parts as a result of the tube end machining will be removed by the following:

- A. Vacuuming during and after machining operation.
- B. Flushing of OTSG per approved flushing step.
- C. Final felt plug blowing down through all tubes remaining in service per approved procedure.
- D. Final inspection and cleaning in the cold legs.

2. Potential loose parts behind the seal weld during operation.

Metallographic examination of tube samples removed from the steam generators has indicated that axial and circumferential cracking of the tube ends extends typically into the portion of tube behind the seal weld. The geometric characterization of this cracking is described below. It is not intended to remove this portion of the tube end because of the lower potential for generation of loose parts from this region (compared to the region above the seal weld). The justification for this is based on the following logic:

- (1) The tube end machining operation and subsequent flushing operation will impose loading on potentially loose pieces behind the seal weld. These operations will tend to remove the pieces with highest potential to fall out.
- (2) The loading on portions behind the seal weld, during normal operation, will consist of fluid dynamic forces. Analysis described below demonstrates that this loading is very unlikely to dislodge loose pieces.
- (3) The "potential effects of loose parts in the RCS" analysis described below demonstrates that any pieces that may be released due to uncertainties in the fluid dynamic/stress analysis (described in (2)) represent an acceptable risk.

For the tube top above the seal weld, GPUN analyzed effects (Ref. 5) of main flow and turbulent pressure pulsations on a tube sliver $1/8"$ high by $1/4"$ long (100% through wall on both sides and 70% through wall on the horizontal portion). It was found that the sliver is stable throughout the plant life assuming no further degradation of tube thickness.

For the tube end behind the seal weld, fine IGASC cracks have been found near the heat affected zone and down in the inside surface of tube approximately $3/8"$ from the top tube end. Loading from the turbulent pressure pulsations on this part of the tube (Ref. 5 appendix 1) during normal operation is calculated to be less than the tube end loading of the sticking out portion by a factor of about 6, because the sliver behind the seal weld will not be exposed to the main flow. Although IGA has been noted in the seal weld HAZ area, the metallurgical analysis typically shows that at least 50% of the tube area in each polished specimen is not affected by the IGA (Ref. 8). Since the amount of ductile material required to maintain stability (i.e., not have tube pieces coming loose due to flow loading) is small, the number of pieces released into the RCS from this tube location over the life of the plant is small, and released in a random manner.

3. Potential Effects of loose Pieces in the RCS

Technical evaluations of the potential effects of loose pieces in the RCS from the OTSG tube ends are given in References 2, 3 and 4. Reference 4 addresses effects on fuel and core components (fuel assemblies, control elements, incore instrumentation, internals vent valves) and Reference 3 addresses effects on mechanical components

in the rest of the primary system (control rod drive, RC pumps, valves).

Based on the analyses described in Section 2 (above) the population of loose pieces will be small and randomly released from the damaged tube walls during operation. Safety risks are considered as those damage effects that have the potential of, by themselves, placing the plant in an unsafe configuration. These include wear of RC pump seals, wear and jamming of control rod drives and code safety valves, and jamming or restricted movement of control rods and internals vent valves.

Variations in coolant flow in the core are not large enough to create significantly preferential flow paths for the pieces. Distribution to fuel and core components will, therefore, also be random. Given these conditions, the technical evaluations conclude that safety risks created by tube and pieces have a low probability of occurrence.

Operational risks, (such as jamming of APSRA's or incore instrumentation strings and wear of valves) have a low to medium probability of occurrence, again assuming the limited population of loose pieces described in Section 2. Certain operational risks, such as fuel assembly flow blockage and breach of fuel rod cladding due to wear, are safety-related but do not directly compromise any safety systems and are controllable and detectable by other means (e.g., Technical Specifications and radiation monitors).

Material Compatibility

Lubricants used in the internals of the machining tools will not come into contact with any surface of the primary system. On machining tools (air driven) that exhaust into OTSG, only glycerine will be used for lubrication which is an approved liquid per IMI-AP-1020. No prohibited material will be introduced into the steam generators during the tube end machining operation.

Surveillance Program

An OTSG tube end surveillance program will be put into effect during and after machining. This program will consist of three parts:

- (1) In-process surveillance of a sampling of tube ends (by photographing) during the end milling process.
- (2) Following completion of tube end milling and steam generator flushing a sampling of photographs of tube end will be taken. This sampling will provide information on at least 3% of the total tubes.
- (3) The item (2) will be repeated after 90 full power days of plant operation.

If any missing tube end pieces are detected during the item (1) or (2) surveillance, an engineering evaluation will be conducted prior to allowing commencement of plant operation. The item (3) surveillance will identify any incremental loose parts after 90 days and will be evaluated prior to further plant operation.

- Conclusion
- (1) The tube end machining does not constitute a change to the licensing basis for the OTSG's and it will not impair the safe shut down function of the unit.
 - (2) The tube end machining does not increase the probability of occurrence of an accident previously evaluated in the FSAR, and the possibility of occurrence of an unanalyzed accident has not been introduced.
 - (3) Removal of upper tube ends will not impact the performance of the steam generator.
 - (4) After the several steps of tube end milling, tube flushing and OTSG clearing as planned, the only loose pieces that may be generated will be as a result of flow induced vibration fatigue. Analysis of these forcing functions have shown the probability of loose pieces is sufficiently low so as not to be a safety problem.
 - (5) The small amount and random distribution of debris provides reasonable assurance of the low probability of the occurrence of safety risks as determined in the evaluations of References 3 and 4.

Evaluation of Actual Tube End Condition After
Completion of Machining Operation

Inspection was performed by Site Q.A. and reported by MNCR 0041-83 (Ref. 12). This MNCR has been dispositioned by Technical Functions Engineering and copy of the Engineering disposition to MNCR 0041-83 is attached as Reference 13.

The disposition demonstrates that the conclusion of this SE is unchanged and the OTSG may be returned to service.

References

- (1) GPUR TMI-I OTSG Tube End Calculations 1101-5310-014
- (2) OTSG Loose Pieces Potential WF2948 dated 11/22/82
- (3) Effect of OTSG Primary Side Loose Piece MC-1530 dated 11/22/82
- (4) OTSG Tube End Loose Pieces Potential Effects on Core Components WF3057 dated 2/4/83
- (5) GPUR Calculations #1101X-5320-A43
- (6) GPUR SP1101-12-049 - Requirements for Cutting Upper OTSG Ends
- (7) B&W FCA 620-0005-04-3920-00
- (8) Interim Report "Examination of TMI-I Third Pulling Sequence OTSG Tubes"
KUD:83:5068-03:02
- (9) TMI-I Installation Procedure "Single Tube End Milling A & B OTSG's"
Procedure No. A251-51512-IPI-RO
- (10) B&W FCA 620-0005-04-3922
- (11) B&W Letter TMI-81-115 dated Dec. 8, 1981
"Approval to use Boughto Safe 620 Hydraulic, Neolube and Glycerine in the OTSG"
- (12) WNCR 0041-83 dated 2/23/83
- (13) Engineering Disposition to WNCR 0041-83 dated 2/23/83

Attachment to MNCR0041-83

February 23, 1983

ENGINEERING DISPOSITION OF TUBE END MILLING - OTSG

In order to make an engineering disposition of this MNCR0041-83 and to satisfy Safety Evaluation SE 120012-007 Ref. 1, on the small number of tube ends that have been reported with tube or a quadrant of tube projecting above the seal weld after machining, the writer viewed close-up photos of tube ends representing approximately 1,000 tube ends (7% of total). It was noted that approximately 200 milled tube ends were approximately 1/16 of an inch or less (mostly less) above the seal weld. In some cases, the small tube end projected all the way around tube end and in other cases, only a quadrant of the tube was visible.

All the tube end viewed in the photos appeared to be sound. A definition of a "sound tube end" is described below:

1. No pieces missing from the I. D. of the tube or from the seal weld. This includes:
 - a) The milled tube end that projected into the seal weld
 - b) The milled tube that is just flush with the seal weld
 - c) The milled tube ends that were slightly (less than 1/16 of an inch) above the seal weld
2. No visible cracks were noted in the tube end and/or seal weld.

The writers personal interview with many of the boiler-makers doing the milling operation resulted in comments as follows:

"(expletive) tube blew apart until I milled down to sound metal."

"Tube cut very easily and chips were flying all around until I hit good metal."

"I know when I reached seal weld by the feel."

"There were no pieces missing from the tube when I finished milling."

"Tubes looked very uniform and concentric."

ENGINEERING DISPOSITION OF TUBE END MILLING - OTSG

"The tubes looked like donuts cut in half."

"Some of the tube ends had axial cracks before I milled them. It was not apparent after milling."

"The tube ends came off in small clips and then became coil arcs."

The boilermakers upon being advised that there were small quadrants of tube ends not milled off completely, were very surprised. The general opinion of all those who participated in the milling operation was that the tool machined the tube ends to "sound status", i.e., no cracks or pieces missing.

Further confirmation that the "A" OTSG & "B" OTSG Generator tube ends have been milled to a "sound condition" is the fact that the running torque by the two bladed milling cutter produced an average stress in the tube end of $\frac{14.3 \text{ KSI} - 0 \text{ KSI}}{2} = 7.1 \text{ KSI}$

(Ref. 2) which is seven times the estimated stress a typical projecting piece will experience during the operating condition (1 KSI - Ref. 3), due to postulated fluid dynamic loads.

Based on the above, it is concluded that although visual inspection after the milling operation has indicated that not 100% of the tube ends have been removed flush with the top of the seal weld, the final condition is acceptable for operation of the steam generators. This conclusion is based on:

The cutting operation, due to its nature and the technique used by the operators, has removed tube end material that had the potential to become loose parts in operation, i.e., tube material is in poor condition.

In cases where a short ridge of tube end material remains above the seal weld, it is engineering's opinion that it is sound material for the same reasons, and will not be subjected to fluid momentum forces causing significant stresses in operation.

Reference 1 - SE 120012-007 Rev. 1, Safety Evaluation Requirements for cutting upper OTSG Tube Ends.

Reference 2 - GPUN TMI-I OTSG Tube End Calculations 1101-5310-014

Reference 3 - GPUN Calculations 1101X-5320-A43

J. A. Martin 2/25/83

B. Chen 2/25/83

D. SLEAR - TECH. FUNCTIONS

(Action Addressee)

est: MNCR No.: 0041-83

File No.: _____

☐ The attached MNCR has been evaluated by QC and found potentially reportable. Please review the MNCR and take action you consider necessary to inform Regulatory Agencies, Upper Management and GRC/PORC Committee Chairman. You are requested to furnish written acknowledgement of the receipt of this notification. Please provide copy of completed evaluation report to QC Manager for placement in MNCR file.

☒ The attached MNCR is forwarded for evaluation and disposition. Please arrange for the completion of Section 3 of the MNCR, taking care to identify and notify the individual organizations responsible for implementing material disposition and other corrective action and providing a date by which corrective action should be completed. Return the MNCR, with Section 3 completed, to the QC Manager. You are requested to furnish written acknowledgement of the receipt of this transmittal.

☐ For Your Information.

☐ The attached MNCR and supporting documents are forwarded for your retention as QA Recd and are to be retained for the life of Unit: I/II. You are requested to furnish written acknowledgement of the receipt of this transmittal.

☐ Examination of our records indicates that this MNCR disposition is incomplete, please provide an estimated completion date to the QC Manager.

☐ The attached MNCR is forwarded for resolution of the identified vendor nonconformance:

☐ Other/Additional: _____

Receipt Acknowledgement Required: ☒ Yes ☐ No

Receipt acknowledgement from addressee is required, sign the following statement and return this form to the QC Manager.

I hereby acknowledge receipt of

and: 2 copies for D.S. Slear

From:

MNCR No.: 0041-83

Date: 8-1-83

(✓) Operations Manager U-I/II
() Maintenance Director U-I/II
() Director-Site Operations U-I/II
() Supervisor-Licensing
() Director Material Manager
(✓) Manager-Maint. & Constr. U-I/II
(✓) Manager-QA Mod/Ops
(✓) Plant Engineering U-I/II

(✓) Technical Functions U-I/II
() QA Department - Parsippany
() Manager-Admin. & Services U-I/II
() PORC TMI U-I/II
() GRC TMI U-I/II
() Nuclear Safety Assessment Director
(✓) Other: D. Hollerbusch
Fred Faust (BSU rep)

TMI UNIT NO. 1
M&C TRANSMITTAL

Plant Maint. N/A
Charge No. (If Applicable)

JON No. 80161
(If Applicable)

W.A. No. A25K-51512

B.A. No. 120012

J.O. No. A25K-V1512

E.D. No. N/A

Authorization For Production Work To Be Accomplished By: MFC PROP.
(Installation Organization)

Assigned To: NICKEL
Job Supervisor

Approved By: ZUBAY
Area Supervisor

This Transmittal Provides:

- ☐ Initial Job Order Issue
- ☒ Change To Existing Job Order (Supp. # 7)
- ☐ WA-ADL Update (As of / /)
- ☐ IWL Item For Closeout: Released By: M&C P&S Manager
- ☐ Other: _____

DISTRIBUTION:

*Master and 2
Field Copies To: SUE KLUKAS MFC PROP. DOC. CONT. 3/22/83
(Name) (Dept) Date

Copy To: (check), If Applicable

M&C Tech. Support N.R. Hollerbush.....(✓)	M&C Admin. D.H. Campbell.....(✓)
MOD/OPS QC R.F. Fenti.....*** (✓)	M&C Production L.M. Zubey.....(✓)
Plant Maintenance D.M. Shovlin.....()	Startup T.M. Hawkins.....()
M&C Work Load & Control D.S. Lowry....(✓)	Plant Engineering J.J. Colitz.....*** (✓)
M&C Planning & Sched. J.T. Faulkner...(✓)	M&C Scheduling P.A. Lipinsky.....(✓)
M&C Estimating & Cost K.W. Feather....(✓)	M&C Planning G.J. Troffer ...*** (✓)
M&C Planner <u>G.A. KULL</u> * (✓)	M&C Tech. Support C.D. Brumbach.....()
<u>F. YOUNG</u> <u>NRC</u> *** (✓)	<u>D. LANGAN</u> *** (✓)
()	()

* = w/all attachments

** = w/Tie-In Doc. only

*** = w/IP ONLY

7

Job Order No. A25K-V1512 Supplement No. 7

JON #80161

Description of change or supplementary information:

The purpose of this Supplement is to issue to the field Installation Procedure A25K-51512-IP8, Rev. 0 which deals with the explosive plugging of tubes in both the 'A' & 'B' OTSG's. Also being issued are the Checklists for Tube Identification, Cleaning and Plugging which spells out the specific firing groups in the 'B' OTSG only. Additional "Checklists" will be issued later detailing the firing groups for the 'A' OTSG.

The attached sheets supersede the corresponding sheets currently in the Job order. The superseded sheets are to be marked "Superseded By Supplement # 7". Transfer any existing signatures from the superseded sheets to the replacement sheets. Attach the superseded sheets to this Supplement Form and insert at the very end of the Job Order package for records retention.

WA-ADL # 22-1-7
Page / Sheet 1 OF 3
WA # A25K-51512

Released for Production:

g22antla
P&S Manager

Date 3/22/83

General Instructions, Notes, Limitations, Etc.

REFERENCE DOCUMENTS

Document Description/Number	WA-ADL No.
A25K-51512-IP7, Rev. 0	23-7*
A25K-51512-IP8, Rev. 0	23-8*
Checklist for Tube I.D., Cleaning & Plugging (16 Pgs)	61-15*
1E-224-WM-001, Rev. 3 OTSG 'A' Weld Map	31-1
1E-224-WM-002, Rev. 3 OTSG 'B' Weld Map	31-2*
Tube/Tubesheet Plugging Weld Record 'A' OTSG	32-1
Tube/Tubesheet Plugging Weld Record 'B' OTSG	32-2*
Tube/Tubesheet Plugging Weld Record, Explosive Plugs, 'A' OTSG	32-3
Tube/Tubesheet Plugging Weld Record, Explosive Plugs, 'B' OTSG	32-4*
Welding Engineering Checklist	35-1*
A.N.I. Review Notification	36-1*
WPS #04322, Rev. 1	36-2*
WPS #04323, Rev. 1	36-3*
WPS #04324, Rev. 0	36-4*

S7

* ATTACHED

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Page / Sheet	<u>2 OF 3</u>
WA #	<u>A25K-51512</u>

J.O. Number A25K-V1512 S7

JON #80161

NOTE: Sequential performance of the work steps listed below is not mandatory unless otherwise noted.

10. Job Order Work Plan

Number	Activity	Performing Craft	Issued M/Hs	Production Completion
37.	Verify that the prerequisites of "IP2" (23-2) are satisfied prior to starting work in the 'B' OTSG.	Prod. Supv.	N/A	
38.	Remove old stabilizers as specified in "IP2" from the 'B' OTSG.	M&C Prod.	N/A	
39.	Verify that the prerequisites of "IP3" (23-3) are satisfied prior to starting work in the 'A' OTSG.	Prod. Supv.	N/A	
40.	Remove remnant of partially inserted plug from row/tube A-143-61 as stated in "IP3".	M&C Prod.	N/A	
41.	Provide support on an as required basis for the assembly of stabilizer jump packs in accordance with "IP7" (23-7).	M&C Prod.	N/A	
42.	Verify that the prerequisites of "IP8" (23-8) are satisfied prior to starting work in the 'A' OTSG.	Prod. Supv.	N/A	
43.	Verify that the prerequisites of "IP8" (23-8) are satisfied prior to starting work in the 'B' OTSG.	Prod. Supv.	N/A	
44.	Provide support on an as needed basis to complete the required explosive plugging in the 'A' OTSG.	M&C Prod.	N/A	
45.	Provide support on an as needed basis to complete the required explosive plugging in the 'B' OTSG.	M&C Prod.	N/A	
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> WA-ADL # <u>22-1-7</u> Page / Sheet <u>3 OF 3</u> WA # <u>A25K-51512</u> </div>				

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Installation Procedure Title:

Page 1 of 29

INSTALLATION OF EXPLOSIVE PLUGS

LIST OF EFFECTIVE PAGES

PAGE	REV.	EFFECTIVE DATE	EXHIBIT	PAGE	REV.	EFFECTIVE DATE
1.0	0	03/21/83	7.1	1.0	0	03/21/83
2.0	0	03/21/83		2.0	0	03/21/83
3.0	0	03/21/83		3.0	0	03/21/83
4.0	0	03/21/83		4.0	0	03/21/83
5.0	0	03/21/83		5.0	0	03/21/83
6.0	0	03/21/83		6.0	0	03/21/83
7.0	0	03/21/83	7.2	1.0	0	03/21/83
8.0	0	03/21/83		2.0	0	03/21/83
9.0	0	03/21/83		3.0	0	03/21/83
				4.0	0	03/21/83
				5.0	0	03/21/83
				6.0	0	03/21/83
			7.3	1.0	0	03/21/83
				1.0	0	03/21/83
			7.4	2.0	0	03/21/83
				3.0	0	03/21/83
				4.0	0	03/21/83
				5.0	0	03/21/83
				6.0	0	03/21/83
				7.0	0	03/21/83

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 Page / Sheet 1 OF 29
 WA # A25K-51512

	SIGNATURE	TITLE/DIVISION/DEPARTMENT	DATE
Originator	<i>[Signature]</i>	Job Planner	3/22/83
Concurrence	<i>[Signature]</i>	Technical Support (ISR)	3/22/83
Reviewed By	<i>[Signature]</i>	Responsible Technical Reviewer	3/22/83
	<i>[Signature] for M.A. NELSON</i>	Plant Review Group V-Chmn.	3/22/83
	<i>[Signature]</i>	Rad Con	3/22/83
Approved By	<i>[Signature]</i>	P&S Manager	3/22/83
	<i>[Signature]</i>	O&M Director or N/A	3-22-83
	<i>[Signature] for R.N.P.</i>	Mod/Ops QC Manager or N/A	3-22-83

FORM A200-ADN-1218.1-1

1.0 INTRODUCTION AND SCOPE

1.1 This procedure shall govern the technique for identifying and plugging once-through-steam-generator tubes which require explosive tube plug welding.

2.0 REFERENCES

- 2.1 AP 1020, Cleanliness Requirements
- 2.2 AP 1030, Control of Access to Primary System Openings
- 2.3 Radiation Protection Plan
- 2.4 GPUN Specification SP-1101-12-030, Rev. 9
- 2.5 GPUN Specification SP-1101-12-039, Rev. 6

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3.0 RESPONSIBILITIES

3.1 M&C Department is responsible for all aspects of this work.

3.2 Plant Engineering will provide assistance as required.

4.0 PREREQUISITES

4.1 OTSG Primary side drained and manway removed.

4.2 Tubes to be explosively plugged have been identified.

4.3 Specific training on explosive plugging must be accomplished prior to plugging into tubes.

4.4 ALARA and RWP requirements have been satisfied.

4.5 Safety Department "Confined Space Entry Requirements" are met.

4.6 Additional LTS template holders installed.

4.7 Welders shall be qualified under current applicable welding procedures.

4.8 Secondary side water level shall be drained to a minimum 12" below the secondary face of the upper tubesheet.

4.9 Work Platforms shall be installed in the lower head.

5.0 SPECIAL/SAFETY PRECAUTIONS

5.1 All personnel performing the actual work described in this procedure should be thoroughly familiar with the procedures, the handling and operation of all special tools and materials, and all applicable safety precautions. Documented evidence of this training will be available for review.

5.1.1 Detailed handling, placement, operation and manner of use of all special tools and material shall be as per the direction of the B&W Supervisor.

5.2 Assure that lower head cold leg covers or plugs are installed prior to any work commencing in the OTSG concerning tube plugging.

5.3 Prior to any plugging activity the following conditions shall exist.

5.3.1 All tubes to be plugged shall be identified on an Engineering drawing firing group. Plant Engineering will review these drawings to verify firing groups.

5.3.2 Attachment 7.3 is completed by the B&WCC Representative in charge of explosive tube plug welding prior to commencement of the tube plugging activity. The firing sequence within each group is to be determined by the B&W Supervisor.

5.4 Attachment 7.3 will be completed during the tube plugging activity.

5.5 An enclosure shall be provided around the opening to the steam generator to ensure that any contaminated air is contained. This area shall be free from oil, scale, chips, wire, grease, chemicals and other foreign materials which may be detrimental to the primary system.

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- 5.6 During work performed in accordance with this procedure, proper control of all tools, equipment, materials and supplies shall be maintained to prevent their loss and/or inadvertent introduction into a system.
- 5.7 An exhaust fan shall be connected to the hand hole located in the top and bottom steam generator head to remove airborne contamination prior to and after detonation.
- 5.8 Each plug installed shall be detonated individually. This method provides the ability to identify misfires if they should occur.
- 5.9 No one shall be permitted to handle the explosive tube plug materials unless authorized by the welding operator.
- 5.10 Other personnel may clean the tubes and install the plugs only after proper instruction.
- 5.11 The explosive plug is classified as "Detonating Fuses, Class "C", and shall be shipped, handled and stored accordingly.
- 5.12 The detonators used for this process are the Exploding Bridge Wire (EBW) type, which require a minimum of 600V to detonate. The detonators are classified as Class "C" explosives.
- 5.13 A single asterisk (*) by a step indicates step completion signature/initials is required on Attachment 7.3.

- 5.14 Any time the primary pressure boundary is breached, the requirements of AP 1030, Control of Access to Primary Openings, must be observed.
- 5.15 Any item entering the OTSG, must meet the cleanliness requirements of Ref. 2.5.
- 5.16 Exercise extreme care to prevent dropping tools or parts inside the OTSG or piping since such an accident will result in lengthy retrieval operations. Use of nylon lanyards or equivalent means of positive capture is required.
- 5.17 Internal surfaces of the OTSG must be protected from foreign materials, debris, dropped tools, etc.
- 5.18 Observe all applicable limits and precautions of the Radiation Protection Plan.
- 5.19 For entry into the OTSG heads for inspection, equipment installation, maintenance, or equipment removal particular attention must be paid to observing the RWP requirements such as Radiation Controls supervision and extremity dosimetry.
- 5.20 If a misfire occurs, Plant Engineering is to be notified as soon as possible. Misfires are to be noted in the comments section of Attachment 7.3.

6.0 INSTALLATION REQUIREMENTS

NOTE: Attachment 7.3 is to ^{BE} used during entire plugging procedure. It will be considered the procedure compliance documentation.

- * 6.1 Clean the ID of all tubes identified in the preceeding sequences using a stainless steel rotary wire brush and drill motor provided by B&W. Clean the tube ID's to a 12" to 15" depth.

NOTE: The ID surface shall be free of moisture prior to installing the plugs per the welding technicians recommendations.

NOTE: The cleaned area of the tube may be swabbed to remove excessive dust *and moisture.*

ROB
3/22/83

- * 6.2 Prepare the explosive plug.

6.2.1 Assemble the detonation train (detonator, firing cable, etc.) and verify electrical continuity prior to installing the plugs.

6.2.2 Securely tape all leg wires, holding devices and connections not designed to be self holding prior to plug installation.

6.2.3 Perform check for stray electrical currents using a blaster's multimeter prior to plug insertion. Document the accomplishment of this check on Attachment 7.3.

- 6.3 Install one (1) explosive plug (serial Number) in Attachment 7.3 in each of the five (5) tubes in the firing group (See Attachment 7.3).

NOTE: Insert the plug(s) into the tube(s), front (nose) first, and position midway into the tubesheet.

- * 6.4 After the last man exists the OTSG head, the qualified detonator ~~of~~ his representative shall verify visually through the manway that all plugs and wires appear to be in place, and were not disturbed by traffic into/out of the OTSG.

NOTE: Plug/Stabilizer insertion will be completed in upper head prior to explosive plugging in the lower head. (Not required when tapered plugs are to be installed in uts.)

- 6.4.1 Perform check for stray electrical currents using a blaster's multimeter prior to electrical hook-up of plugs. Document the accomplishment of this check on Attachment 7.3.

- * 6.5 Install temporary manway cover and explode each explosive tube plug in the preplanned sequence as stated on Attachment 7.3.

NOTE 1: If a misfire occurs or a plug fails to fire, stop procedure at the end of this firing sequence and notify the on site OTSG coordinator for resolution prior to continuing the procedure. The B&W Construction Company representative is trained in steps involved in handling a misfired plug.

NOTE 2: Explosive tube plug ^{welding 685-22-63} ~~welding~~ shall be conducted in accordance with B&W Construction Company Procedure 9-EP-01 "Procedure for Once-Through-Steam-Generator Explosive Tube Plug Welding", except as modified herein.

- 6.6 Repeat Steps 6.2 thru 6.5 until all tubes requiring plugging in the lower tubesheet are plugged.

6.7 PLUG VERIFICATION

- * 6.7.1 Each tube shall be probed by pushing a rod or EC probe against the detonated plug to verify plug location.

8.0

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7.0 ATTACHMENTS

- 7.1 Steam Generator Explosive Handling Procedure
- 7.2 GPUN Letter to Mr. Charles Nork (01/26/83) RE: Blast Plan for Repairs
on Unit 1 OTSG's at TMI-1
- 7.3 Checklist for Tube identification, cleaning and plugging (Sample)
- 7.4 List of tubes to be explosively plugged.

STEAM GENERATOR EXPLOSIVE HANDLING PROCEDURE

ATT.
7.1

1.0 PURPOSE

To provide for the secure and safe storage, handling, and site transportation of the explosive material utilized for the explosive plugging of the TMI-1 OTSG Tubes.

2.0 APPLICABILITY/SCOPE

The procedure defined herein shall be applicable in Unit 1. The scope covers all GPUN personnel and their contractors.

3.0 DEFINITIONS

- 3.1 Magazine - A building or structure used exclusively for the long-term storage of explosives.
- 3.2 Day Box - A structure used exclusively for the storage of a limited quantity of explosives (normally one shift's supply).
- 3.3 Explosives - For the purpose of this procedure explosives will be B&W MK3 explosive plug assemblies and detonator caps.
- 3.4 Licensed Blaster/Welder - Any person duly licensed by the State of Pennsylvania as qualified to detonate explosives in blasting operations. He shall also be a qualified explosive plug welder.
- 3.5 Explosive Handler - That person directly responsible to the Licensed Blaster/Welder for the safe transportation of explosives and maintenance of Day Box inventories.
- 3.6 Explosive Plug Controller - That person directly responsible for the Magazine inventory.

4.0 LIMITATIONS AND PRECAUTIONS

4.1 Prior to receipt of explosives on site all necessary licenses and permits must be available. These include:

- 4.1.1 Magazine Licenses
- 4.1.2 Seller Permit
- 4.1.3 Purchaser Permit
- 4.1.4 Approved Blast Plan

4.2 Separate licensed Magazines for explosive plug assemblies and the detonating caps shall be staged within the Turbine Building at the location specified in Attachment 1.

4.2.1 No flammable material shall be stored within five feet of the Magazines.

4.2.2 The Magazines shall be clearly labeled "Explosives".

4.2.3 No artificial light shall be used in Magazines except portable electric dry cell battery lamps.

4.3 Blasting operations will only be performed by the Licensed Blaster/Welder.

4.4 Explosives must always be stored and transported in non-sparking containers.

4.5 Explosive plugs and detonator caps shall be stored separately until just prior to use when they will be assembled into one unit (explosive plug assembly) and thereafter stored in the Explosive Magazine.

4.6 When opening explosive shipping crates only non-sparking tools shall be utilized.

- 4.7 Smoking is prohibited when handling explosives.
- 4.8 Handling of explosives outside of the Buildings will be discontinued during electrical storms.

5.0 PROCEDURE

5.1 Receipt of Material

- 5.1.1 Upon arrival of a shipment of explosives at the North Gate, Security shall be notified and shall accompany the carrier directly to the Magazines.
- 5.1.2 Prior to offloading the carrier, the Explosive Plug Controller, QC and Warehouse Receiving personnel shall be notified.
- 5.1.3 The Explosive Plug Controller shall supervise the storage of the explosives within the Magazines and shall update the Magazine Inventory List. He shall also inspect for obvious deficiencies.
- 5.1.4 QC and Warehouse Receiving personnel shall complete their necessary receiving forms.
- 5.1.4.1 It will not be necessary to do an individual explosive plug count. A count of shipping containers is required.
- 5.1.5 The Magazines shall be locked and keys maintained by the Explosive Plug Controller and Security.
- 5.1.6 The carrier is then released.

5.2 Transporting Explosive Material from Magazines to Day Boxes

- 5.2.1 At the beginning of every shift, or as necessary to replenish Day Box supplies, the Explosive Handler, the Explosive Plug Controller, and a Security Guard shall open the Magazines.

- 5.2.2 The Explosive Plug Controller will transfer the required quantity of explosives from the Magazine to the custody of the Explosive Handler, update the Magazine inventory, and lock the Magazine.
 - 5.2.3 The Explosive Handler will supervise the transportation of the explosives to the Day Boxes located within the Reactor Building.
 - 5.2.4 The route for moving the explosives from the Magazine to the Day Box will be previously approved by Plant Engineering.
 - 5.2.5 Security will accompany the movement of explosives from the Magazine to the Reactor Building hatch.
 - 5.2.6 The Explosive Handler will store the explosives within the Day Box and update the Day Box inventory accordingly.
 - 5.2.7 The Day Box shall then be locked and the key maintained by the Explosive Handler or Licensed Blaster/Welder.
- 5.3 Moving Explosives from Day Boxes to the OTSG Tent
- 5.3.1 During their work shift, the Explosive Handlers will remove the plug assemblies from the respective Day Boxes for use during the explosive plugging process.
 - 5.3.2 Upon removal of explosives from the Day Box, the Day Box shall be locked and the Day Box inventory updated.
 - 5.3.3 The Explosive Handler will supervise the transport of the Explosive Plug assemblies to the respective OTSG.

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ATT. 7.1

5.4 Explosive Plug Assembly Installation Within the OTSG

5.4.1 Explosive Plug assemblies will be handled within the OTSG's and their respective tents by the Explosive Plug Loader and Tentman in accordance with Reference 7.1.

5.4.2 The Explosive Plug Loader and Tentman will receive prior training in performing their functions and will be certified as being adequately qualified.

5.5 Disposal of Misfires

5.5.1 During the explosive plugging process, some misfires may occur.

5.5.1.1 Misfired explosive plug assemblies shall be removed from the OTSG by the Explosive Plug Loader and given over to the custody of the Explosive Handler.

5.5.1.2 All misfired explosives are to be placed in a storage container (Dud Box) within Containment and the inventory of the Dud Box shall be maintained by the Explosive Handler.

5.5.1.3 At the conclusion of each shift or on a schedule dictated by the Licensed Blaster/Welder, misfires shall be removed from the Dud Box, transported to the Blast Box and detonated. *Update Dud Box inventory. 12013 13/22/83.*

5.5.1.4 The Dud Box shall be locked with keys maintained by the Explosive Handler or Licensed Blaster/Welder.

5.6 Return Shipment of Explosives

5.6.1 Upon the completion of explosive plug operations, all unused explosives shall be returned to the vendor.

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ATT. 7.1

5.6.2 The Explosive Plug Controller and Licensed Blaster/Welder shall be responsible for meeting all required packaging and shipping regulations as dictated by the State of Pennsylvania.

6.0 RECORDS

6.1 The following records shall be completed and maintained.

6.1.1 ~~Blast Record Sheets~~ (required by Ref. 7.1) *Checklist for Tube I.D. Cleaning & Plugging* 1 *DB* 3/24/83

6.1.2 Magazine Inventories

6.1.3 Day Box Inventories

6.1.4 Dud Box Inventory

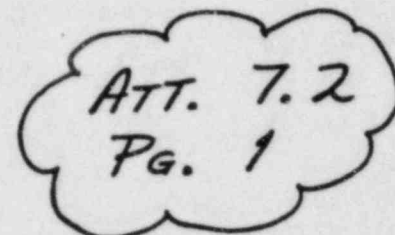
7.0 REFERENCES

7.1 Explosive Plugging Procedure

7.2 TMI-1 Explosive Plugging Blast Plan

7.3 TMI-1 OTSG Repair Safety Evaluation

January 26, 1983



ATT. 7.2
Pg. 1

Mr. Charles Nork
Chief, Explosives Safety Section
Bureau of Mining and Reclamation
PA Dept. of Environmental Resources
P.O. Box 2063
Harrisburg, PA 17120

Dear Mr. Nork:

RE: BLAST PLAN FOR REPAIRS ON UNIT 1
ONCE THROUGH STEAM GENERATORS AT
THREE MILE ISLAND NUCLEAR STATION

The site Blast Plan for explosive plugging of the steam generators is enclosed for your review and approval. Although it is unnecessary to revise the Blast Plan there are several matters which need to be clarified and discussed. They are as follows:

1. The first page of the Blast Plan, which has been stamped proprietary, contains information developed by Babcock & Wilcox in an extensive testing and qualification program for repair of tubes in B&W nuclear plant steam generators. B&W has determined that the development, application, and use of this information results in a competitive advantage to them. Items 1 and 3 on Page 1 of the Blast Plan must, therefore, be kept confidential by PaDER.
2. Item 9, Page 1, of the Blast Plan states that the blast area will be inside the Unit 1 steam generators in tubes located in a two-foot thick tubesheet. This is true with the exception of misfires which will be detonated in the blast box.
3. All magazines have been appropriately licensed following inspection by a representative of the Explosives Safety section of PaDER.

Upon completion of your review please indicate your approval by signing the Blast Plan on Page 3 and return the original to:

Mr. J. J. Colitz
GPU Nuclear Corporation
P.O. Box 480
Middletown, PA 17057

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January 26, 1983

A copy of the approved Blast Plan should be sent to:

Mr. D. G. Slear
TMI-1 Project Engineering Manager
GPU Nuclear Corporation
100 Interpace Parkway
Parsippany, NJ 07054

By concurring with the Blast Plan for the explosive plugging it is understood that we meet with the intent of Pennsylvania's regulation regarding the storage, handling, and use of explosives as applicable to this program.

Your prompt response to this letter will be appreciated. Should you have any questions concerning the Blast Plan or related issues, please contact me at (717) 948-8533.

Sincerely,

J. J. Colitz

J. J. Colitz
Plant Engineering Director, TMI-1

JJC:cm

Enclosure

cc: R. O. Barley, Lead Mechanical Engineer, TMI-1
F. R. Faist, B&W Resident Engineer, TMI-1
D. Hallman, B&W
S. Levin, Manager, M&C Production, TMI-1
D. G. Slear, Manager, TMI Engineering Projects

ATT. 7.2
Pg. 2

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BLAST PLANATT. 7.2
Pg. 3

This Blast Plan is written for the Once Through Steam Generator Explosive Tube Plugging Program at Three Mile Island, Unit 1.

PURPOSE: The purpose of this Blast Plan is to document the handling and transportation of explosive tube plugs and initiators.

GENERAL:

1. The explosive assemblies for this job consist of an inconel cylinder approximately $3\frac{1}{2}$ inches long. This cylinder is loaded with 1.9 grams of nitroguanadine as a main charge and .2 grams of P.E.T.N. as a booster charge. This assembly makes up one (1) explosive plug.
2. The explosive plugs will be assembled by Babcock & Wilcox Construction Company (B&W C.C.) in Apollo, Pennsylvania, and transported to TMI in accordance with federal and state regulations.
3. The total quantity of plugs to be used at TMI is expected to be approximately 600 plugs. The total weight of explosives in the 600 plugs is less than 3 pounds.
4. Detonations will be accomplished through the use of Exploding Bridge Wire Initiators (EBW). One (1) initiator will be used to detonate each explosive plug.
5. General Public Utilities Nuclear (GPUN) is the recipient of this service. Babcox & Wilcox (B&W) is the prime contractor and supplier of this process.
6. The total inventory of explosive plugs and initiators will be maintained in security controlled storage areas and in no case will this exceed 50 pounds of explosives and 1000 initiators.
7. The work area will be under Site Security Force control 24 hours per day, seven days per week, with detonations occurring around the clock with the exception of production problems.
8. Pennsylvania licensed blasters will accomplish all blasting operations.
9. The blast area will be inside the Unit 1 Steam Generators in tubes located in a two-foot thick tubesheet. The open end of the tubes will be contained by the dome of the steam generator which is about $7\frac{1}{2}$ inch thick carbon steel. This dome has a 5" handhole which will be connected to a ventilation exhaust system and a 16" manway which will have a temporary metal cover attached prior to each detonation.
10. Access to the security controlled storage areas will be controlled by designated Security Department personnel and/or the B&W explosive plug controller.

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11. Daily use boxes shall be set up inside the Reactor Building. Not more than one (1) day's supply of explosive plug assemblies will be placed in this location. At no time will this exceed 50 explosive plug assemblies.

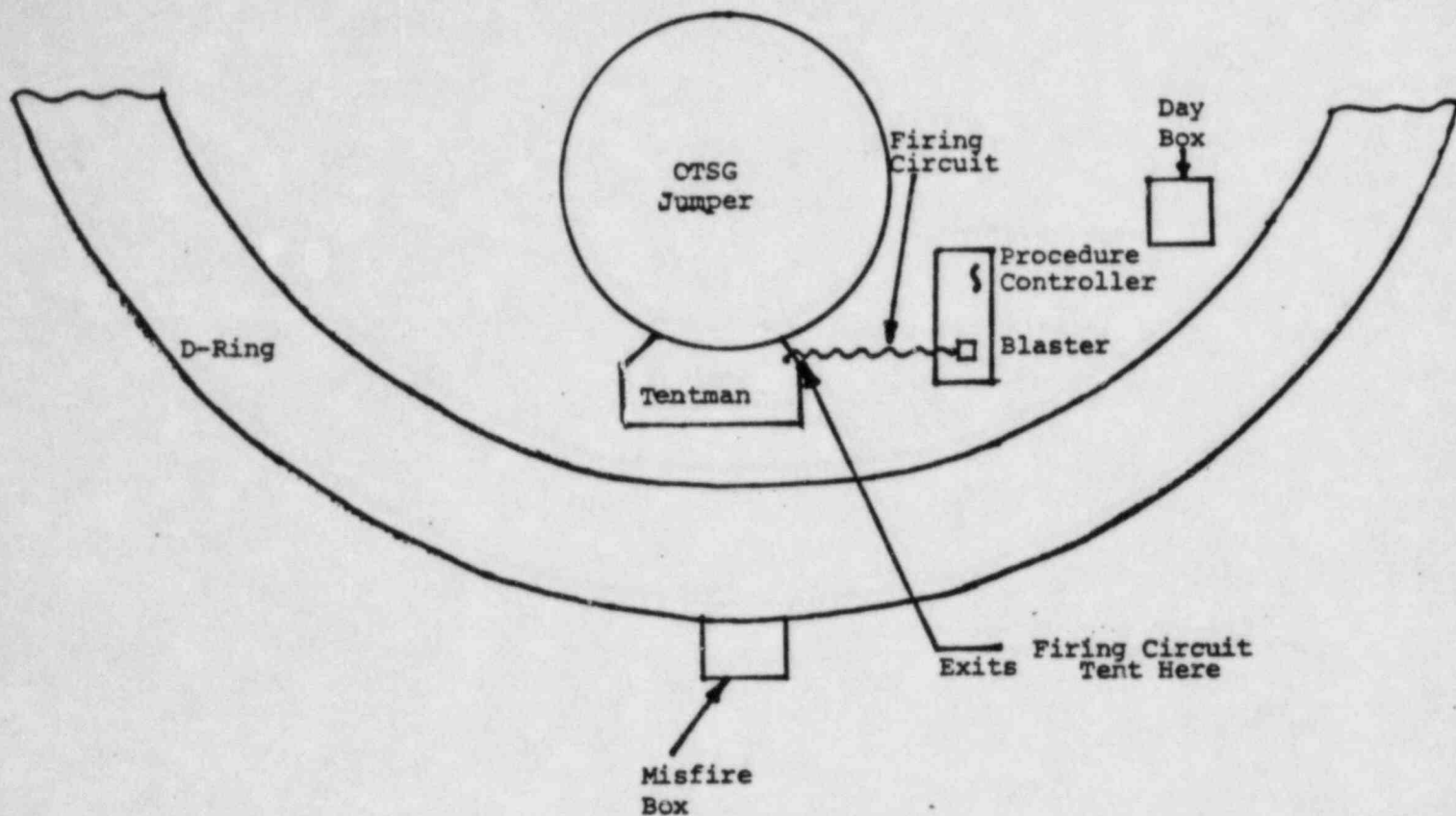
PROCEDURE:

1. Explosive plugs and initiators will be received by the explosive controller and inspected for obvious deficiencies then placed in the security controlled storage areas. The explosive plug controller will be responsible for inventory records for receipts at Three Mile Island and at the security controller storage areas. Site Security will accompany all transfers of explosives outside the Reactor Building.
2. Licensed blasters will complete the pre-assembly of explosive plugs and initiators, to form an explosive plug assembly, in an authorized area outside of the Reactor Building. Explosive plug assemblies will be bagged in groups of five (5) and then stored in a licensed magazine.
3. Explosive handlers will be responsible for replenishing the day boxes at the start of each shift. They will hand-carry explosive plug assemblies from the security controller storage areas to the day boxes. The shift licensed blaster will be responsible for inventory records for the day boxes.
4. During their work shift, the explosive handlers will remove explosive plug assemblies from the day box and deliver them to the explosive weld engineer.
5. The licensed blaster will ensure that the blast initiation area is checked for stray electrical currents using a blaster's multimeter. If currents are detected which exceed 50 milliamperes, the source will be sought and eliminated before explosive plugs are loaded into the steam generator tubes.
6. As the tentman and jumper become ready for explosive plug assemblies to be inserted into the steam generator tubes, the explosive weld engineer will hand them into the tent to the tentman.
7. The tentman and jumper will place the explosive plug assemblies into the tubes as directed by the procedure controller, then hand the bitter ends of the firing circuit leads through a slit in the far side of the tent to the licensed blaster. The temporary manway cover will then be installed and the tentman and jumper will exit the main tent to the designated safe area in the tent annex.
8. Prior to initiation, the licensed blaster will repeat the checks for stray electrical currents using a blaster's multimeter. Again if currents greater than 50 milliamperes are detected, the source will be identified and eliminated. During testing, the blaster will verify that the firing circuit line is disconnected from the capacitor bank and properly shunted.
9. After DER regulatory safety checks are completed and the licensed blaster ensures that all personnel remaining in the area of the steam generator are located in designated safe areas, he will make final firing line continuity checks using a blaster's multimeter, connect the capacitor bank and fire the circuit.
10. Step 9 will be repeated until each individual explosive plug assembly in the group of five (5) has been successfully fired.

11. After detonations, the firing line shall be disconnected from the capacitor bank, the explosive weld engineer or his designated representative will view the blast area visually to verify that all explosive plug assemblies detonated. After the ventilation exhaust system has removed the blast fumes, the sequence in accordance with step 5 through step 11 will be repeated.

If a misfire is detected during the inspection, a waiting period of not less than 15 minutes must be observed before the misfired explosive plug assemblies may be removed under the direction of the licensed blaster for storage in a secure area until disposed of.

Written by RS Pruitt
Reviewed by [Signature]
Reviewed by (B&WCC) LC Cox by MH7 for TELORD 1-27-93
Reviewed by (B&W UPGD) MH7 for OF Hallman
Reviewed by (GPUN) J. J. Colitz
Approved by (PENN) Charles A. Dork
Chief, Explosives Safety Dept.
of Environmental Resources



ATT. 7.2
Pg. 6

Reactor Building

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Explosive
Plug
Storage
Magazine

Detonator
Cap
Storage
Magazine

OTSG _____

CHECKLIST FOR TUBE IDENTIFICATION, CLEANING AND PLUGGING

-----ATTACHMENT 7.3-----

ROW/TUBE	TUBE IDENTIFIED	*TUBE CLEANED	PLUG SER. NO.	PLUG PREPARED	PLUG DETONATED	PLUG VERIFIED	COMMENTS
1) <i>SAMPLE</i>							
2) <i>SAMPLE</i>							
3) <i>SAMPLE</i>							
4) <i>SAMPLE</i>							
5) <i>SAMPLE</i>							

FIRING GROUP _____

SHEET _____ OF _____

* VERIFY ALSO, NO MOISTURE PRESENT.

VERIFIED CORRECT:
(B&W REP.)

MULTIMETER CHECKED PRIOR TO PLUG INSTALLATION

SIGNATURE _____

DATE _____

MULTIMETER CHECKED PRIOR TO PLUG HOOK-UP (ELECT.)

SIGNATURE _____

DATE _____

OTSG A

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Row	Tube	Row	Tube	Row	Tube
1.	1	25.	11	49.	24
2.	1	26.	13	50.	25
3.	2	27.	13	51.	25
4.	2	28.	14	52.	25
5.	2	29.	13	53.	25
6.	3	30.	13	54.	26
7.	4	31.	13	55.	27
8.	4	32.	14	56.	28
9.	4	33.	14	57.	28
10.	4	34.	14	58.	29
11.	4	35.	18	59.	29
12.	5	36.	18	60.	29
13.	6	37.	19	61.	29
14.	6	38.	20	62.	29
15.	7	39.	20	63.	30
16.	7	40.	21	64.	30
17.	8	41.	21	65.	30
18.	8	42.	22	66.	30
19.	9	43.	23	67.	31
20.	9	44.	23	68.	31
21.	10	45.	23	69.	31
22.	10	46.	24	70.	32
23.	10	47.	24	71.	32
24.	10	48.	24	72.	33

ROB
3/22/83

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OTSG A

ATT. 7.4

Pg. 2

	<u>Row</u>	<u>Tube</u>
73.	33	107
74.	34	100
75.	34	104
76.	34	105
77.	34	106
78.	35	87
79.	36	104
80.	36	108
81.	36	112
82.	37	111
83.	37	112
84.	37	114
85.	38	110
86.	38	111
87.	38	113
88.	38	115
89.	39	111
90.	39	112
91.	39	116
92.	40	13
93.	40	112
94.	40	114
95.	40	115
96.	40	116
97.	41	1

	<u>Row</u>	<u>Tube</u>
98.	41	113
99.	41	114
100.	42	113
101.	42	115
102.	42	116
103.	43	114
104.	43	115
105.	43	117
106.	44	116
107.	45	115
108.	45	116
109.	45	120
110.	46	115
111.	46	116
112.	46	118
113.	47	106
114.	47	119
115.	47	120
116.	47	122
117.	48	2
118.	48	77
119.	49	121
120.	49	122
121.	49	123
122.	49	124

	<u>Row</u>	<u>Tube</u>
123.	50	121
124.	50	122
125.	51	113
126.	51	119
127.	51	120
128.	51	123
129.	52	2
130.	53	125
131.	53	126
132.	54	123
133.	54	124
134.	54	125
135.	54	127
136.	55	32
137.	55	121
138.	55	126
139.	56	126
140.	56	127
141.	57	127
142.	58	126
143.	58	128
144.	59	32
145.	59	123
146.	60	17
147.	60	127

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OTSG A

ATT. 7.4
Pg. 3

<u>Row</u>	<u>Tube</u>
148. 62	126
149. 62	127
150. 62	128
151. 64	125
152. 65	128
153. 65	129
154. 66	10
155. 66	124
156. 66	128
157. 66	130
158. 67	124
159. 67	125
160. 67	127
161. 67	128
162. 68	126
163. 68	130
164. 68	131
165. 69	125
166. 69	126
167. 69	127
168. 69	128
169. 69	129
170. 70	125
171. 70	127
172. 70	130

<u>Row</u>	<u>Tube</u>
173. 71	127
174. 73	124
175. 73	125
176. 73	127
177. 74	118
178. 74	122
179. 75	120
180. 76	117
181. 76	120
182. 78	21
183. 78	120
184. 79	3
185. 79	125
186. 79	127
187. 79	128
188. 79	129
189. 80	125
190. 80	129
191. 81	125
192. 81	126
193. 81	128
194. 82	114
195. 82	123
196. 82	129
197. 82	130

<u>Row</u>	<u>Tube</u>
198. 83	129
199. 84	125
200. 84	128
201. 84	129
202. 85	126
203. 85	128
204. 85	130
205. 86	124
206. 86	129
207. 87	125
208. 87	126
209. 87	130
210. 88	126
211. 89	126
212. 90	124
213. 90	125
214. 91	70
215. 91	121
216. 91	123
217. 91	124
218. 91	125
219. 92	93
220. 92	94
221. 92	126
222. 92	127

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OTSG A

ATT. 7.4
Pg. 4

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
223.	92	128	249.	109	110
224.	92	129	250.	109	116
225.	95	18	251.	110	1
226.	95	125	252.	112	99
227.	96	80	253.	112	107
228.	96	124	254.	113	3
229.	96	126	255.	113	106
230.	97	78	256.	113	110
231.	97	123	257.	114	105
232.	97	125	258.	114	109
233.	98	60	259.	116	24
234.	98	123	260.	116	49
235.	98	127	261.	116	107
236.	99	123	262.	116	110
237.	100	123	263.	117	99
238.	100	124	264.	119	100
239.	100	125	265.	119	105
240.	101	121	266.	120	99
241.	101	123	267.	121	95
242.	101	124	268.	121	97
243.	102	91	269.	122	98
244.	102	122	270.	122	99
245.	103	122	271.	123	94
246.	105	122	272.	123	98
247.	106	117	273.	124	90
248.	108	113	274.	124	92
275.	124	95			
276.	125	91			
277.	125	94			
278.	126	81			
279.	126	88			
280.	127	86			
281.	128	69			
282.	128	85			
283.	128	85			
284.	128	89			
285.	128	91			
286.	129	2			
287.	129	84			
288.	129	85			
289.	130	85			
290.	130	86			
291.	130	90			
292.	131	83			
293.	131	87			
294.	131	88			
295.	132	78			
296.	132	80			
297.	132	83			
298.	132	84			
299.	133	82			
300.	133	86			

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3/22/83

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OTSG A

ATT. 7.4
Pg. 5

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>			
301.	134	69	326.	138	71	351.	144	55
302.	134	79	327.	138	72	352.	144	57
303.	134	80	328.	138	73	353.	145	44
304.	134	84	329.	139	3	354.	145	45
305.	135	73	330.	139	72	355.	146	5
306.	135	75	331.	139	74	356.	146	24
307.	135	76	332.	140	2	357.	146	46
308.	135	77	333.	140	63	358.	147	21
309.	135	79	334.	141	52	359.	147	22
310.	135	80	335.	141	61	360.	148	5
311.	135	82	336.	141	63	361.	148	28
312.	136	68	337.	141	67	362.	148	38
313.	136	70	338.	141	68	363.	148	40
314.	136	72	339.	142	3	364.	149	4
315.	136	74	340.	142	56	365.	150	7
316.	136	75	341.	142	59	366.	150	12
317.	136	78	342.	142	60	367.	150	14
318.	136	79	343.	142	62	368.	150	26
319.	137	74	344.	142	64	369.	150	27
320.	137	75	345.	142	65	370.	151	6
321.	137	77	346.	143	45	371.	151	7
322.	138	5	347.	143	60	372.	151	13
323.	138	57	348.	143	62	373.	37	113
324.	138	67	349.	144	9	374.	49	2
325.	138	69	350.	144	46	375.	143	59

OTSG A

<u>Row</u>	<u>Tube</u>		<u>Row</u>	<u>Tube</u>
376.	42	42	394.	77 36
377.	73	40	395.	77 46
378.	99	125	396.	77 52
379.	143	58	397.	71 3
380.	35	105	398.	81 3
381.	26	98	399.	82 1
382.	90	127	400.	85 1
383.	109	100	401.	86 1
384.	30	95		
385.	79	36		
386.	23	93	DELETE. EXPLOSIVE PLUG PREVIOUSLY INSTALLED. ^{YAB} 3/22/83.	
387.	11	65		
388.	140	64		
			} DELETED. WESTINGHOUSE ROLLED PLUGS ^{DAB} 3/22/83 INSTALLED	
389.	9	22		
390.	84	127		
391.	96	79		
392.	75	1		
393.	75	2		

ATT. 7.4

Pg. 7

OTSG B

<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>	<u>Row</u>	<u>Tube</u>
1.	1	6	23.	46	114	45.	95 4
2.	2	12	24.	49	12	46.	96 2
3.	2	13	25.	50	8	47.	99 2
4.	2	14	26.	51	8	48.	99 3
5.	7	20	27.	52	9	49.	100 4
6.	9	46	28.	54	16	50.	100 8
7.	10	48	29.	57	121	51.	101 1
8.	23	7	30.	58	80	52.	101 2
9.	25	4	31.	60	69	53.	101 46
10.	25	11	32.	61	101	54.	103 8
11.	26	5	33.	70	80	55.	105 5
12.	28	68	34.	71	34	56.	105 74
13.	29	83	35.	77	38	57.	108 6
14.	31	22	36.	78	1	58.	108 12
15.	33	3	37.	4	35	59.	109 6
16.	35	63	38.	85	5	60.	110 7
17.	37	66	39.	86	6	61.	111 5
18.	39	19	40.	87	9	62.	118 30
19.	40	73	41.	89	4	63.	120 1
20.	43	12	42.	89	62	64.	122 56
21.	43	115	43.	91	4	65.	125 54
22.	46	73	44.	92	3	66.	126 2

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