Three Mile Island Nuclear Station
Special Temporary Procedure

Note: Instructions and guidelines in AP1001A must be followed when completing this form.

10. STP No. 1-83-0084

11. Implementation Date 6/9/83.

SS SF Signature

1. Title OTSG Secondary Side Pressurization during H_2O_2 Cleaning

2. Purpose To minimize primary to secondary leakage in the event that O_2 limits on secondary side are exceeded

3. Attach procedure to this form written according to the following format.

Note: If ESAS, EFW, RPS and/or RMS Systems are affected by this STP - insure procedural requirements are satisfied - see AP1001A section 3.6 for details.

A. Limitations and Precautions
   1. Nuclear Safety
   2. Environmental Safety
   3. Personnel Safety
   4. Equipment Protection

B. Prerequisites

C. Procedure

} see attached.

4. Duration of STP - Shall be no longer than 90 days from the implementation data of the STP or (a) or (b) below - whichever occurs first.

(a) STP will be cancelled by incorporation into existing or new permanent procedure submitted by _____ ☐

(b) STP is not valid after 90 days ☑
(Fill in circumstances which will result in STP being cancelled)

5. Is the procedure "Important to Safety"?
If "yes, complete Safety Evaluation. (Side 2 of this Form) ..... Yes ☑ No ☐

6. Does the procedure affect Environmental Protection?
If "yes", complete Environmental Evaluation. (Side 2 of this Form) ..... Yes ☐ No ☑

Review Signatures

7. Generated by HBSnipman HBS 6/9/83 (Signature) 6/4/83 (Date)

8. Reviewed by R. W Paulevich (RTR) (Signature) 6-8-83 (Date)
K O'Reilly (ISR) 6/8/83

9. Approvals (per AP1001A)

1. Note: If the answers to questions #5 and 6 were "no" then the SS may approve the STP

SS Signature Date

2. Note: If the answers to questions #5 and or 6 were "yes" then approvals must be per AP1001A

Mod Nelson 6/9/83
Signature Date

Signature Date

STP is Cancelled

Shift Supervisor Shift Foreman Date

EWP (RDB)

OTSG SECONDARY SIDE PRESSURIZATION DURING H_2O_2 CLEANING

A. LIMITS AND PRECAUTIONS

1. Nuclear Safety - see GPUNC SE 120019-006 (attached).
2. Environmental Safety - N/A
3. Personnel Safety - Observe standard RWP and safe work practices.
4. Equipment Protection -
   (a) Do not pressurize the OTSG secondary side to >200 psig with the OTSG shell temp. $\leq 100^{\circ}F$ (T.S. 3.1.2.2).
   (b) N_2 connection at MSL must be secured/isolated prior to increasing OTSG pressure to >150 psig (piping rated at 150 psig).

B. PREREQUISITES

1. The temporary mechanical jumper is installed between NI-V-32 and FW-V-56A and between NI-V-29 and FW-V-56B. See attached sketch.
2. OTSG A&B in full wet layup (FWLU) with 10-20 psig N_2 being supplied to the main steam lines.
3. OTSG to be pressurized to RCS pressure has an average shell temp. $>100^{\circ}F$ and UTS O_2 concentration >100 ppb.
4. Permission has been received from the Manager, Plant Operations to pressurize the OTSG to >200 psig.
5. The valve line up on the temporary N_2 connection is as follows:

_____	NI-V-29	Closed
_____	NI-V-32	Closed
_____	FW-V-56A	Closed
_____	FW-V-56B	Closed
_____	TV-2A	Closed
_____	TV-2B	Closed
_____	TV-1A	Open

_____	TV-1B	Open
_____	TV-4A	Closed
_____	TV-4B	Closed
_____	FW-V-55A	Closed
_____	FW-V-55B	Closed

C. PROCEDURE (Components in parenthesis represent the B OTSG)

A-OTSG	B-OTSG	
_____	_____	1. Verify OTSG average shell temp >100°F and Manager - Plant Operatons permit shell pressurization to >200 psig.
_____	_____	2. Isolate normal MS line N_2 supply by closing MS-V-70A(C) and MS-V-70B(D) and closing NI-V-112A(B).
_____	_____	3. Close N_2 temporary supply valve TV-1A(B).
_____	_____	4. Open N_2 temporary supply valve TV-2A(B).
_____	_____	5. Open FW-V-56A(B).
_____	_____	5a. Open FW-V-55A(B).
_____	_____	6. Establish Auxiliary operators in communication with the control room at the N_2 650 psig supply manifold in the Che. Add. room Aux. Bldg. and at NI-V-32(29).
_____	_____	7. While carefully monitoring N_2 supply pressure and RCS pressure, slowly open NI-V-32(29) to pressurize the OTSG shell. While pressurizing regulators may be reset or bypassed to compensate for flow losses as long as operators are present at the regulator and are aware of RCS/OTSG pressures. Do not attempt to pressurize the OTSG any more rapidly than that which will also maintain an adequate N_2 supply to the RCS.

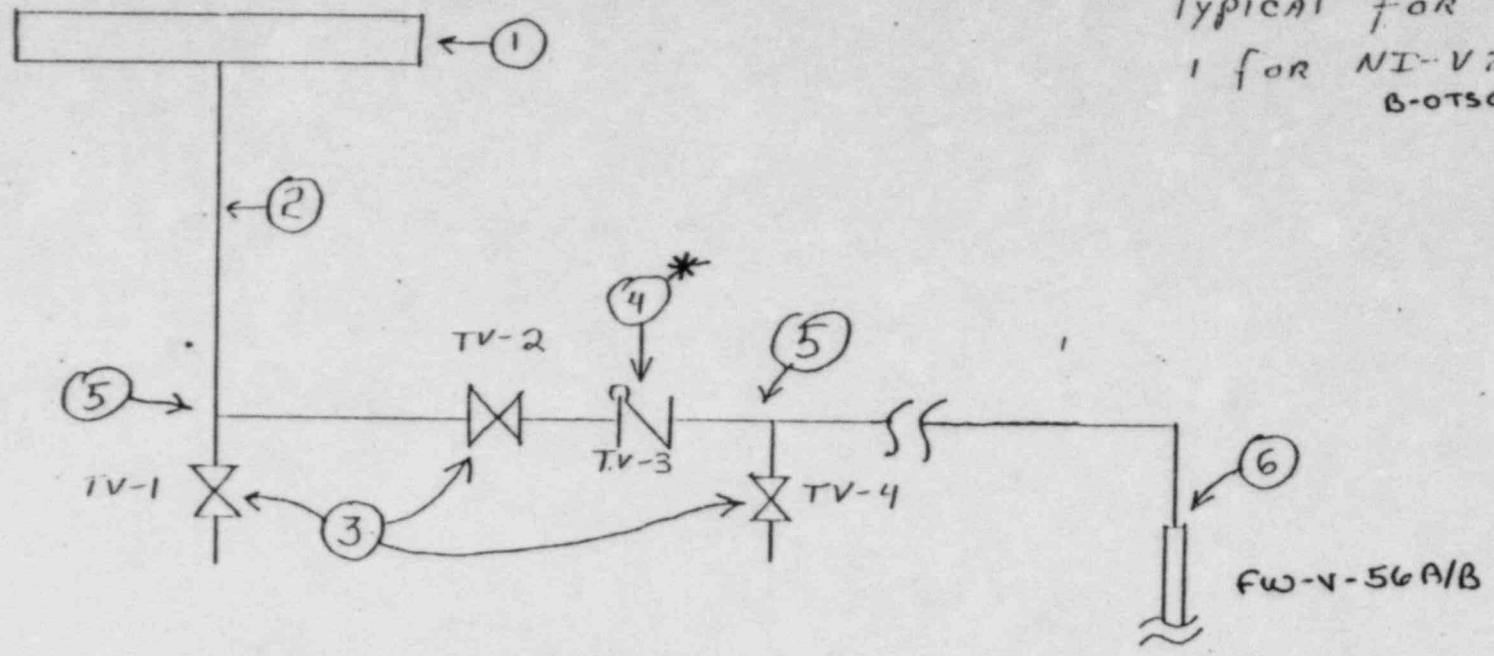
CAUTION: If RCS pressure drops below 299 psig, secure the Reactor Coolant Pumps.

A-OTSG	B-OTSG		
_____	_____	8.	Once desired pressure has been obtained (≈307 ±8 psig) reset the regulators and close the regulator bypasses as necessary to control RCS/OTSG pressure at 307 ± 8 psig.
_____	_____	9.	When it becomes necessary to depressurize the OTSG, close NI-V-32(29) and open TV-4A(B).
_____	_____	10.	Restore OTSG to normal FWLU N_2 pressure supply by closing FW-V-56A/B AND FW-V-55A/B and opening MS-V-70A(C), MS-V-70B(D), and NI-V-112A(B).

2P 6-8-83

OT G Temporary Nitrogen Pressurization System

Typical for 2 assemblies.
1 for NI-V29, 1 for NI-V3.
B-OTSG A-OTSG



Bill of Materials

Item	Description	SSN	Bin. Loc	Comment
1.	1", 600. Raised Face Flange	252-110-4200-0	2B03F012	2 REQ'd., Blind Flange
2.	½" S.S. Tubing	878-610-4500-1	1H09D002	100 ft. REQ'd.
3.	½" Compression Fitting valves	897-085-1700-1	1D05B031	6 REQ'd.
4 *	⅜" Compression fitting check valves	897-060-9500-0	1B07L102	Requires ⅜"-½" adapters provided by Plt. Eng.
5.	½" Union Tee	852-684-6000-1	1D05A273	4 REQ'd.
6.	½"-to-1" Adapter	As available		

* Optional, if readily available.

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Release No 013380 (2)

Document Release Form

(Refer to EMP-008)

Date 6/3/83

Page 1 of 1

Release Action

To: ED & CC

- ☐ Review/Comment
- ☐ As-Builts
- ☒ Record
- ☐ Construction
- ☐ Procurement
- ☐ Operations/Maintenance
- ☐ Hold Construction

Originator N. C. SHAH Home Base 5360 Tel 2049

Unit TMI-1 Budget Activity # 120019 WO/SO # 5000-51719

List of Released Items (attached)

Company	Document No.	Sheet	Rev.	Title	QCL
GPUN	SE 120019-003	6	1	SAFETY EVALUATION FOR NITROGEN MTS SUPPLY FOR RCS CLEAN-UP	

Special Instructions

References

Approved [signature] Date 6-3-83

cc ALL WITH ATT: N. C. SHAH, M. O. SANFORD, B. D. ELAM, J. F. MOORE, J. R. SIFF, F. FAHLBUSCH, R. O. BARLEY

GPU Nuclear

DOCUMENT NO.
SE-120019-003

TITLE
NITROGEN SUPPLY FOR RCS CLEAN-UP

REV	SUMMARY OF CHANGE	APPROVAL	DATE
1	Changed nitrogen supply connections for OTSG secondary side from main steam line pressure taps to feedwater line vents for ease of installation.	[signature]	6-3-83
		[signature] ISE	6-3-83
		[signature]	6/3/83

SE No. 120019-003

Nuclear Safety/Environmental Impact Evaluation
Summary Sheet
(Refer to EP-018)

Title NITROGEN SUPPLY FOR RCS CLEAN-UP

1.(a) Does the change require revision of the system/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 affect Nuclear Safety and therefore, is it an "Unreviewed Safety Question" (per 10CFR50:59)? 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.

N. C. Shah	5/17/83		5/23/83
Reviewed by Preparing Engineer	Date	Approved by Section Manager	Date
Items 1 through 4 approved:			
	5/18/83		5/24/83
Responsible Technical Reviewer	Date	Independent Safety Reviewer	Date

(5)

GPU Nuclear

Safety Evaluation
TMI-1 Nuclear Station
(Refer to EP-016)

Page 2 of 6
SE No. 120019-003

Title NITROGEN SUPPLY FOR RCS CLEAN-UP

Safety Evaluation

SEE ATTACHED.

References: SAR _____

SDD _____

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?	☐	☒	
Does the change require a Technical Specification amendment?	☐	☒	
Does the change require a Quality Classification List amendment?	☐	☒	
Other _____	☐	☐	

B E Cam 5/24/83
Approved by Section Manager Date

NRC approval ~~has been obtained~~ not needed
J. D. Whitman 5/24/83
GPUN Licensing Date

(6)

1.0 TITLE

Nitrogen Supply for RCS Clean-Up

2.0 PURPOSE

The purpose of this safety evaluation is to address the adequacy of design and safety impact of using nitrogen at a pressure of about 310 psig on (A) primary side (reactor coolant) at the pressurizer, and (B) OTSG secondary side, if necessary. This temporary modification will be used during RCS clean-up operations.

3.0 SYSTEMS AFFECTED

3.1 GAI Dwg. C-302-720 Nuclear Plant Nitrogen and Hydrogen Supply

3.2 GAI Dwg. C.302-081 Feedwater

3.3 Auxiliary System, FSAR Section 9.0

4.0 EFFECTS ON SAFETY

The temporary modifications required are as follows:

(A) Primary Side Nitrogen Supply

The system will consist of the following components:

1. A pressure regulator at the nitrogen truck, which will supply nitrogen to the TMI-1 nuclear nitrogen system manifold (NI-N3, Flow Diagram, GAI C-302-720) at a pressure of 410 psig, through valve NI-V241.

2. The existing pressure regulators, NI-V80 A&B in series with the above regulator will reduce nitrogen pressure from 410 psig to ~ 320 psig for the RCS pressure control.

3. Existing electromatic relief valve on the pressurizer will be set at 485 psig with NDTT mode switch in auto.

An alternative to adding the regulator at the truck, a properly sized relief valve to be set at 410 psig can be added in the nitrogen piping to provide overpressure protection for an initiating event of the failure of the regulator, NI-V80 A&B.

(B) OTSG Secondary Side Nitrogen Supply

The nitrogen to be used for pressurizing secondary side will be from the same header which supplies nitrogen to the primary side during RCS clean-up. The supply header connection to be used will be at valves NI-V32 or NI-V29 for OTSG's A and B, (Ref. GAI Dwg. C-302-720) by removing the existing spool piece. The nitrogen injection will be at the feedwater vent connection downstream of FW-V56A for OTSG A and FW-V56B for OTSG B (see GAI C-302-081). The nitrogen supply to the OTSG secondary side will be connected using stainless steel tubing.

A check valve will be installed in the nitrogen supply to the RCS to prevent depressurization should a failure occur in the nitrogen supply to the secondary side.

4.1 Description of Important to Safety Function

The reactor coolant system, nuclear nitrogen supply and the OTSG secondary side, affected by this modification, are Important to Safety. Nuclear nitrogen supplies nitrogen for RCS blanketing and for pressurizing core flood tanks.

4.2 Effect of Proposed Modification on Important to Safety Function

This temporary modification will be used during RCS clean-up when the reactor is in cold shutdown condition. The existing system will be returned to its original configuration before power operation.

4.2.1 System Performance

(A) Primary System Nitrogen Supply

Allowable combinations of pressure and temperature during performance of RCS cleaning are within the limitations of Tech. Spec. Fig. 3.1-1, which assures prevention of nonductile failure. As per this figure the maximum allowable pressure at RCS cleanup temperature of 125°F is 410 psig.

An initiating event causing the failure of the regulator at the truck and a single failure of either the remaining regulator or the electromatic relief valve would result in the following:

(a) If the failure of the remaining regulator occurs, the electromatic relief valve will protect the the system by limiting the pressure to 485 psig under upset conditions. This is acceptable per para. 3.1.12.2 of the technical specification.

(b) If the failure of electromatic valve occurs, the second regulator will provide protection against overpressure by limiting the maximum pressure to 410 psig.

The nitrogen pressure at the outlet of the regulator at the truck shall be periodically monitored to provide an indication of regulator failure.

The other relief valves in the system (NI-V47 and NI-V103) are set at 710 psig and would provide protection against gross overpressure in the system. The low pressure relief valve, NI-V118, will be gagged (taken out of service) since its set pressure of 105 psig is lower than the RCS cleanup operating pressure.

(B) OTSG Secondary Side Nitrogen Supply

This temporary modification will supply about 310 psig nitrogen to the OTSG secondary side from the nuclear plant nitrogen supply system during RCS clean-up, in order to reduce primary to secondary side leakage. The OTSG secondary side will be pressurized only if the excessive primary to secondary side leakage exists as determined by Task 9 Advisory Group.

In order to satisfy Tech. Spec. Section 3.1.2.2, secondary side of OTSG shall not be pressurized above 200 psig if the temperature of the shell is below 100°F. This technical specification is not to be violated; pressurization will not be done if the temperature is less than 100°F. The existing main steam line nitrogen, OTSG Drain Pump, WDL-P23 and Wet Lay-Up Tank are to be isolated if the secondary side is pressurized above 75 psig.

4.2.2 Quality Standards

This temporary modification is classified as Not Important to Safety.

4.3 The following aspects of design have been evaluated for the proposed installation:

4.3.1 Seismic Classification - This installation is temporary and classified as non-seismic. The probability of seismic event during the short period (approximately 700 hours) of RCS clean-up operation is very low and therefore a non-seismic design is acceptable.

4.3.2 Design Condition - This installation shall be designed for 485 psig and 150°F based on the operating limits set for RC system clean-up and electromatic relief valve set point with NDTT mode switch in auto.

4.3.3 Environmental Protection - Not applicable.

4.3.4 Fire Protection - This installation will not require any fire protection other than that presently existing. No combustibles added.

4.3.5 Material Compatibility - Materials used in existing RCS are stainless steel and inconel (OTSG tubes). To Be compatible with this requirement, this installation will use stainless materials.

4.3.6 High Energy Line Break - The failure of nitrogen supply may depressurize RCS and/or OTSG secondary side. This will not affect the safety, since the water inventory in the RCS will be maintained under such conditions.

5.0 CONCLUSION

The proposed modification does not reduce the margin of safety and does not adversely affect the nuclear safety for the reasons stated in Section 4.0.

GENERAL PUBLIC UTILITIES
OTSG REPAIRS

DATE 6/10/83

ITEM	DESCRIPTION	RESPONSIBILITY	DATE REQUIRED
1.	Restoration Secondary Side		
	. Temp. Chem. System	S. Levin	TBD
	. Remove Air Compressor	R. Harper	TBD
2.	Ops OTSG Status		
	. OTSG Level "A" ~~575"~~ 18"		
	. OTSG Level "B" Full Wet Layup		
3.	Tube Plugging & Stabilization — 8 taper plugs plugs problem		6/5
	. Reslove Tapered Plug Problem		6/10
	. Issue IP Revision	G. Kull	6/9
	. Issue DRF's	T. Functions	TBD
4.	Snoop & Drip Test @ "A" on hold		TBD
5.	Eddy Current Test		TBD
	. Resolve Blocked Tubes in "A" 17-59; A5-9		
6.	Install Lower Permanent Manway @ "B" finish today		6/7
7.	Miscellaneous Items to Resolve		
	. Decon of Equip		In Progress
	. Revised Spec for Flushing Rev. 5	G. Reed	TBD
	. RCS/OTSG Pressurization TMM	Plt. Eng.	6/8
	. GAP Growth Measurement STP → done in the B OTSG	Plt. Eng.	6/10
	. Ship W Equip.		

8. Waiting Documentation

MNCR		Responsibility
215-82	Plug Exploded at Wrong Area of Tube	QC
091-83	Feltplug Blowing	QC
119-83	Misplugged Tubes - resolved	QC
142-83	Documentation Discrepencies	QC
143-83	Documentation Discrepencies	QC
146-83	B&W Plug Leaks (127-2)	QC
155-83	W Plugs	QC

9. Rad Con Exposure Data (Based on SRDs) as of 6/8
   - Total OTSG Exposure since 1st Blast - 1002.2 Man Rem
   - Total OTSG Exposure since Nov 1981 - 1178.4 Man Rem
   - Final Estimate Exposure Since Nov 1981 - 1204 Man Rem

10. Anticipated Jumps

Date	Description	Responsibility
6/10	A - Upper - unknown (need material)	Levin/Catalytic
	A - Lower - Finish staggered plugs	
6/10	B - Upper -) No work	
	B - Lower -)	

Inter-Office Memorandum

Date June 29, 1983

GPU Nuclear

Subject FINAL OTSG BUBBLE TEST; JUNE 26, 1983

3310-83-175

To R. O. BARLEY, LEAD MECHANICAL ENGINEER, TMI-1

Location Three Mile Island

1.) Background. Prior to final closeout of the A and B OTSG's, a bubble test was performed to document the "As Left" condition of the OTSG's. The bubble test was performed in accordance with STP 1-83-0069, OTSG A/B Bubble Test. In brief, the test was conducted with primary water level approximately 5" above the Upper Tubesheets of each OTSG. Secondary level, after the N_2 pressure was applied, was approximately 480" in the A OTSG and 560" in the B OTSG. The secondary side was pressurized via the Plant Nitrogen System to approximately 150 psig.

2.) Test Performance. Plant Operations Department performed admirably in manipulating primary and secondary level to facilitate performance of the test. All evolutions which I observed were performed quickly, efficiently, and professionally. The actual testing started about 1600 on June 26, 1983. The testing was completed by 2000, same date.

The initial intent was to videotape the test. This taping was performed on the B OTSG. The A OTSG camera, however, failed almost immediately and leaking tubes in this OTSG were identified manually by the writer and T. Kimmel of Site QC.

3.) Test Results.

(a) A OTSG: (As noted, these tubes were identified manually). Ten leaks were found in the UTS. These leaks are broken down as follows:

Leaking tubes	:	3
Leaking W plugs	:	6
Leaking B&W plugs	:	1

All of the tubes and W plug leaks were very fine streams of tiny bubbles. These streams of bubbles did not cause any surface disturbance when they hit the surface.

The leaking B&W plug, on the other hand, can be classified as a moderate "gurgler". A steady stream of moderately sized bubbles issued from the tubes. The bubbles caused a very noticeable surface disturbance and made tube identification difficult.

A listing of the leaking tubes and plugs are given on Attachment #1.

(b) B OTSG: No leaks were observed on the B UTS. A complete video scan was performed and the UTS was visually inspected from the manway. The results of this test were videotaped.

4.) Discussion. I am unable to determine why the W plug and tube leaks were not identified on previous bubble tests. The only logical argument that I can arrive at is that the very fine streams of bubbles noted were below the resolving capability of the B&W provided camera system. These bubble streams were also observable from the manway.

The leaking B&W plug should have been identified during previous bubble tests. This tube, however, is in an area of the OTSG where extensive plugging and weld repairing was performed. The plug weld could have been damaged during this work and the damage not noticed.

5.) Recommendation. I believe that it would be wise to SNOOP test all welded plugs after they are installed to check for leakage. This is a fast, simple test which can verify that no pinholes, defects, etc., exist on the weld. At present, this test is covered by an STP and is performed as the situation warrants. This test should be made a requirement in any future plug Installation Procedures.

6.) Conclusion. Based on my viewing of the Crystal River tapes and the kinetic expansion test block, the leakage from the tubes and W plug is very minor in nature and will probably be self sealing when the plant is heated up. The leaking B&W welded plug, however, is a direct hole from the primary to the secondary side and should be repaired prior to the H_2O_2 flush.

SUBMITTED BY: F. W. Paulewicz

F. W. PAULEWICZ
Engineer III, TMI-1

FWP:gh
Attachment
cc: A. L. Cazaban, Pressure Components Engineer, Tech. Functions, Parsippany
J. J. Colitz, Plant Engineering Director, TMI-1
F. R. Faist, Resident B&W Engineer
F. S. Giacobbe, Manager - Materials Engr./Fail.Anal. Tech. Functions, Parsippany
C. K. Lee, Heat Transfer Aux. Equip. Manager, Tech. Functions, Parsippany
S. Levin, M&C Director (Acting), TMI-1
T. Richter, Pressure Components Manager, Tech. Functions, Parsippany
M. J. Ross, Manager, Plant Operations, TMI-1
H. B. Shipman, Engineer Senior II, Plant Operations, TMI-1
D. G. Slear, Manager - TMI Engineering Projects, Tech. Functions, Parsippany
R. J. Toole, Operations and Maintenance Director, TMI-1
CARIRS - TMI-1

ATTACHMENT #1

BUBBLE TEST LEAKERS

A OTSG, 6/26/83

Leaking Plugs

	Row-Tube	Type Plug	Date Installed	Comment
1.)	107-1	W	3-82	
2.)	9-21	W	3-82	
3.)	15-12	W	3-82	
4.)	8-10	W	3-82	
5.)	148-8	W	3-82	
6.)	1-11	W	3-82	
7.)	69-126	B&W Kinetic Expansion Stabilizer Cap	4-83	95% T.W. @ 15+22"; 60-65% T.W. @ US+2

Leaking Tubes (See Note 1)

	Row-Tube	Expansion Length	0.510 E.C. Test	0.540 H.G. E.C. Test
1.)	147-45	17"	TOK	TOK
2.)	135-71	17"	US+20/85%/1v	TOK
3.)	138-64	22"	TOK	US+10/95% 1v

NOTE 1: 8x1 and 4x1 E.C. Data not available.

Prepared by:
F. Paulewicz
6-28-83