

DUQUESNE LIGHT COMPANY

Beaver Valley Power Station

UNIT 1

10M-53C.4.1.6.4(ISS3A)

Steam Generator Tube Leakage

Issue 3A Revision 8

Prepared by M. P. Flynn	Date 12/18/96	Pages Issued 1 through 13	Effective Date APR 09 1997
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CONTROLLED
BVPS UNIT 1*213* 3/24/97

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A. PURPOSE

This procedure provides symptoms and actions to be taken in event of a small steam generator tube leak.

B. SYMPTOMS OR ENTRY CONDITIONS

1. Rising radiation levels or alarm conditions on any of the following radiation monitors:
 - [RM-1BD-100] Steam Generator Blowdown Tank Effluent Radiation Monitor
 - [RM-1SV-100] Condenser Air Ejector Vent
 - [RM-1SS-100] Steam Generator Blowdown Sample
 - [RM-1DA-100] Aux Feed Drains Tank
 - [RM-1BD-101] High Capacity SG Blowdown System Monitor (at SPING CT-1)
 - [RM-1MS-102A,B,C] N-16 Steam Generator Leak Monitor
2. Secondary side activity detected by routine chemistry monitoring procedures.

C. AUTOMATIC ACTIONS

1. [RM-1SV-100] Condenser Air Ejector Vent High-High Level causes the following:
 - Closes [TV-1SV-100B] Air Ej Disch To GW Sys TV
 - Opens [TV-1SV-100A] Air Ej Disch To CNMT TV
2. [RM-1DA-100] Aux Feed Drains Tank High Level causes the following:
 - Closes [TV-1DA-105B] Turb Plant Oil Separator Isol
 - Open [TV-1DA-105A] Tunnel Sump Isol

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p style="text-align: center;"><u>NOTE</u></p> <p>This procedure may be performed in conjunction with AOP 1.51.1, "Emergency Shutdown".</p>		
1.	<p><u>Request Chemistry Support</u></p> <p>a. Calculate SG primary-to-secondary leakrate.</p> <p>b. Perform isotopic analysis for dose equivalent I-131 for the leaking SG.</p>	
2.	<p><u>Primary-To-Secondary Leakrate Should Be Closely Monitored During The Performance Of This Procedure</u></p> <p>a. The leakrate can be determined using the N-16 monitor (preferable) or Chemistry sample results. (There is no need to wait for Chemistry to verify the N-16 monitor readings.)</p> <p>b. The leakrate should be plotted and the rate of change determined.</p> <p>c. IF SG primary-to-secondary leakrate exceeds 150 GPD in any one SG, <u>THEN</u> shutdown to Mode 3 within 6 HOURS.</p>	
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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
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2.

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d. IF SG primary-to-secondary leakrate exceeds 30 GPD in any one SG, THEN perform the following:

- 1) Have Chemistry increase sample monitoring to requantify SG primary-to-secondary leakrate.
- 2) Have Health Physics monitor radiation monitors and estimate SG primary-to-secondary leakrate by converting CPM to GPD every 15 minutes.

- [RM-1SV-100]
- [RM-1BD-101]

e. The following actions should be based on the highest primary-to-secondary leakrates obtained from N-16 monitor, Chemistry or Health Physics estimates:

Primary-To-Secondary Leakrate For Any One SG	Required Actions
SG leakrate rate of rise ≥ 60 GPD/HR	Perform an emergency shutdown in accordance with AOP 1.51.1, "Emergency Shutdown" and be in Mode 3 as quickly as possible.
SG leakrate ≥ 150 GPD AND rate of rise < 60 GPD/HR	Shutdown plant and be in Mode 3 within 6 hours.

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
3.	<p><u>Dispatch An Operator To</u> <u>[RM-1MS-102A,B,C] N-16 Steam</u> <u>Generator Leak Monitor (Service Bldg</u> <u>- 752')</u></p> <p>a. Mark [RR-1MS-102] Recorder N-16 Monitoring Lines A, B, & C.</p> <p>b. Notify the NSS/ANSS of the leak rate displayed at [RI-1MS-102A1,B1,C1].</p> <p>c. Request Chemistry perform Chemistry Manual Chapter 5.12, "Enhanced Primary-To-Secondary Leakrate Monitoring Program."</p> <p>d. Monitor SG leakrate as follows:</p> <p>1) Request Health Physics to reset alarm setpoint 30 GPD above existing baseline reading (permits detection of rapidly rising leakrate).</p> <ul style="list-style-type: none">• [RM-1SV-100]• [RM-1BD-101] <p>2) Use a temporary log and monitor leakrate every 10 MINUTES until alarm is cleared.</p>	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
<p>*****</p> <p style="text-align: center;"><u>CAUTION</u></p> <p>10ST-6.2 (10ST-6.2A) and Chemistry leakage estimates will not agree as primary-to-secondary leakage rises greater than 0.5 GPM. Chemistry leakage estimates become less accurate as leakage rises.</p> <p>*****</p> <p>4. <u>Perform Either Of The Following:</u></p> <ul style="list-style-type: none"> • 10ST-6.2, "Reactor Coolant System Water Inventory Balance" <li style="text-align: center;">-OR- • 10ST-6.2A, "Computer Generated Reactor Coolant System Water Inventory Balance" <p>5. <u>Request Chemistry Sample Secondary Coolant For Specific Activity</u></p> <p>6. <u>Verify Compliance With T.S. 3.4.6.2, "Operational Leakage" And 3.7.1.4, "Activity"</u></p> <p style="margin-left: 400px;">Take action in accordance with Technical Specifications.</p> <p style="margin-left: 400px;">Refer to EPP for notification requirements.</p>		

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
7.	<p><u>Dispatch Operator With Key O.F To Isolate Steam Supply From Affected SG To [1FW-P-2], Steam Driven Aux Feed Pump (MSVR)</u></p> <p>a. Close valve for the affected SG:</p> <ul style="list-style-type: none">• SG-A [1MS-15], 1A SG Steam Supply To [1FW-P-2] Isolation• SG-B [1MS-16], 1B SG Steam Supply To [1FW-P-2] Isolation• SG-C [1MS-17], 1C SG Steam Supply To [1FW-P-2] Isolation <p>b. Ensure [1FW-P-2] is capable of being supplied by checking open the following for the two unaffected SGs:</p> <ul style="list-style-type: none">• SG-A [1MS-15], 1A SG Steam Supply To [1FW-P-2] Isolation• SG-B [1MS-16], 1B SG Steam Supply To [1FW-P-2] Isolation• SG-C [1MS-17], 1C SG Steam Supply To [1FW-P-2] Isolation	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
8.	<u>Isolate Atmospheric Steam Release Capability From Affected SG</u>	
a.	Place affected SGs atmospheric steam dumps in MANUAL and verify valves - CLOSED <ul style="list-style-type: none"> • SG-A [PCV-1MS-101A] • SG-B [PCV-1MS-101B] • SG-C [PCV-1MS-101C] 	a. <u>WHEN</u> affected SGs pressure is less than 1035 PSIG, <u>THEN</u> verify SG Atm Stm Dumps close. <u>IF NOT, THEN</u> locally isolate SG Atm Stm Dump for the affected SG by closing the appropriate isolation valve (MSVR - 768'): <ul style="list-style-type: none"> • SG-A [1MS-23] • SG-B [1MS-24] • SG-C [1MS-25]
b.	Close [HCV-1MS-104], Residual Heat Release Control Valve.	b. Perform the following: <ul style="list-style-type: none"> • Manually or locally close [HCV-1MS-104] Residual Heat Release Control Valve (MSVR - 768') <p style="text-align: center;">-OR-</p> <ul style="list-style-type: none"> • Close [1MS-26] Residual Heat Release Isol Vlv (MSVR - 768')
9.	<u>Realign SG Blowdown Flowpath</u>	
a.	Monitor blowdown discharge and perform valve lineup to dump discharge into [1LW-TK-7A & 7B], Steam Generator Drain Tanks by performing the following: <ul style="list-style-type: none"> • Attachment 1, "Processing Blowdown To [1LW-TK-7A(B)]" <p style="text-align: center;">-AND-</p> <ul style="list-style-type: none"> • 10M-17.4.U, "Operating the Steam Generator Drain Tank Subsystem" 	

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
10.	<u>Re-align Blowdown Sample Sink Drain From River Water System To North Sump (Aux Bldg - 735', Primary Sample Room)</u> a. Close [ISS-196], Reactor Plant Panel Drain to River Water. b. Open [ISS-195], Reactor Plant Sample Panel Drain to North Sump.	
11.	<u>Primary-To-Secondary Leakrate - LESS THAN 142 GPD</u> Isolate Turbine Sumps as follows: a. Place [1PL-P-2A and 2C], Ground Floor Turbine Room Sump Pumps in OFF (Turb Bldg - 693', NW). b. Close [1RD-61 and 57], Discharge Isolation for [1PL-P-2A(2C)] (Turb Bldg - 693', NW). c. Place [1PL-P-2B and 2D], Ground Floor Turbine Room Sump Pumps in OFF (Turb Bldg - 693', NE). d. Close [1RD-63 and 59], Discharge Isolation for [1PL-P-2B(2D)] (Turb Bldg - 693', NE). e. Have Health Physics sample before discharging sumps. f. Refer to ODCM Appendix C 4.11.1.1.3, "Liquid Effluents - Concentration" for sample requirements.	

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STEP

ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

12. Request Health Physics Assistance

a. Request Health Physics support for the following:

- 1) Have Health Physics reset alarm setpoints 30 GPD above existing baseline reading (permits detection of rapidly rising leakrate).
- 2) On a predetermined frequency, have Health Physics record and trend readings of radiation monitors listed under SYMPTOMS.
- 3) Perform water and air sampling at various areas in Turbine Building and other areas deemed necessary by Health Physics supervision.
- 4) Survey blowdown water transport path at frequency established by Health Physics to ensure positive radiological control.

13. Determine Need To Transfer Auxiliary Steam From Main Steam System To Unit 2 Auxiliary Steam System

- Refer to 1/20M-27.4A.A, "Supplying Unit 1 With Auxiliary Steam From Unit 2"

14. If The Plant Is In Modes 3, 4, 5 Or 6, And It Is Desired To Cleanup Condensate Or To Process Condensate As Liquid Waste, Perform 10M-22.4.I, "Processing Condensate As Liquid Waste/Condensate Cleanup Using The High Capacity Blowdown System"

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STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED
15.	<u>Continue These Surveillances Until Leaking Steam Generator Is Isolated For Repair</u>	
	- END -	

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Attachment 1

PROCESSING BLOWDOWN TO [1LW-TK-7A(7B)]

1. Obtain Key OP3 for [1LW-409(410)].
2. Close [TV-1BD-107A(B)(C)], Flash Tank Inlet for affected SG.
3. Close [PCV-1BD-100], Blowdown Sys Pressure Reg (Turb Bldg - 693', at [1FW-E-1B]).
4. Check open [1LW-300], SG Drain PP [1LW-P-11] Suct Isol (Aux Bldg - 722').
5. Check open [1LW-302], SG Drain PP [1LW-P-11] Disch Isol (Aux Bldg - 722').
6. Close [1LW-400], Disch Drain For [1LW-P-11] (SFGDS - 722', by pump, Key OP3).
7. Close [1LW-411], Tell-Tale Drain (SFGDS - 722', by [1LW-P-11]).
8. Open [1LW-409], Series Isol For [1LW-P-11] (SFGDS - 722', by pump, Key OP3).
9. Open [1LW-410], Series Isol For [1LW-P-11] (SFGDS - 722', by pump, Key OP3).
10. IF desired to use [1LW-TK-7B], THEN perform the following:
 - a. Close [MOV-1LW-11A], SG Bldn To Drain Tk 7A Inlet Isol Vlv.
 - b. Open [MOV-1LW-11B], SG Bldn To Drain Tk 7B Inlet Isol Vlv.
11. Open the following to establish flow to [1FW-E-7] (SFGDS - 765'):
 - a. [1CCR-65], Bldn Drain Hx [1FW-E-7] CCR Inlet Isol.
 - b. [1CCR-66], Bldn Drain Hx [1FW-E-7] CCR Outlet Throttle.
12. Check open [TV-1BD-100A(B)(C)], SG Bldn CNMT Isol Vlv for affected SG.
13. Check open [TV-1BD-101A1(B1)(C1)], SG Bldn Isol Vlv for affected SG.
14. Check open [TV-1BD-101A2(B2)(C2)], SG Bldn Isol Vlv for affected SG.
15. Open [1BD-7(8)(9)], Stm Gen 1A(B)(C) Blowdown To Tank Isol for affected SG (SFGDS - 765', by [1FW-TK-1]).

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Attachment 1 (continued)

16. Throttle open [HCV-1BD-101A(B)(C)], Stm Gen 1A(B)(C) Blowdown Throttle for affected SG to establish flow to [1FW-TK-1] (SFGDS - 765', near tank).
17. Throttle [1BD-29], [PCV-1BD-100] Bypass (Turb Bldg - 693', at [1FW-E-1B] to maintain [1FW-TK-1] SG Blowdown Tank pressure (as indicated on [PIC-1BD-100], at [1FW-TK-1]) less than 50 PSIG.
18. WHEN level in [1FW-TK-1] rises to 50% as locally indicated on [LG-1BD-101], Steam Generator Tank Level, THEN start [1LW-P-11], Steam Generator Drain Pump (SFGDS - 722').
 - a. Adjust [HCV-1BD-101A(B)(C)], Stm Gen 1A(B)(C) Blowdown Throttle to maintain 50% level in [1FW-TK-1] (SFGDS - 722').
19. RETURN TO Step in effect.

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REFERENCES

1. Issue 3, Revision 11: OMDR 1-88-0516, 87-0333, 88-0298, 86-1771, 86-2186; 1985 INPO Evaluation Finding OP.5-1a, 1b Appendix I.
2. Issue 3, Revision 14: OMDR 1-85-0876, 1-86-2003, 2158, 0166, 1-87-0185, 1598, 1-88-1736.
3. Issue 3A, Revision 0: OMDR 1-90-0710, 1-90-0717, 1-89-0737, 1-90-0718, 1-90-0638.
4. Issue 3A, Revision 1: OMDR 1-90-0717, 1-93-0295; Walkthrough Validation Comment (10/24/90), OSC Subcommittee Comments (6/30/93).
5. Issue 3A, Revision 2: OMCN 1-94-02; SOER 93-1; ND1DMS:0252.
6. Issue 3A, Revision 3: OMDR 1-93-0705.
7. Issue 3A, Revision 4: Table Top Validation Comment (3/17/95).
8. Issue 3A, Revision 5: OMCR 1-94-0869, 2-95-0410; TS Amendment 188.
9. Issue 3A, Revision 6: OMCR 1-95-0615; ODCM (Issue 3, Revision 1).
10. Issue 3A, Revision 7: INPO SOER 93-1, "Diagnosis and Mitigation Of Reactor Coolant System Leakage Including Steam Generator Tube Ruptures".
11. Issue 3A, Revision 8: OMCR 1-96-0882, 1-97-0065; EPRI TR-104788, "PWR Primary-To-Secondary Leak Guidelines"; OSC Subcommittee Comment (12/16/96).