

AP 1001

Figure 1001-8

Three Mile Island Nuclear Station  
Special Operating Procedure

NOTE: Instructions and guidelines in AP 1001  
must be followed when completing  
this form.

SIDE 1

SOP No. 7-92

(From SOP Log Index)

Unit No. 2

Date 5/6/79

1. Title LETDOWN FLOWRATE CALCULATIONS

2 Purpose (include purpose of SOP)

To provide a means to determine letdown flowrate using a mass balance  
of the Makeup Tank.

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

A. Limitations and Precautions

1. Nuclear Safety
2. Environmental Safety
3. Personnel Safety
4. Equipment Protection

B. Prerequisites

C. Procedure

*Attachment NRC*

4. Generated by TSPG Date 5/6/79

Duration of SOP - Shall be no longer than 60 days from the effective date of the SOP or (a) or (b) below - whichever occurs first.

(a) SOP will be cancelled by incorporation into existing or new permanent procedure submitted by *5/17/79*

(b) SOP is not valid after *5/17/79*   
(III in circumstances which will result in SOP being cancelled)

6. (a) Is the procedure Nuclear Safety Related?

If "yes", complete Nuclear Safety Evaluation. (Side 2 of this Form) Yes  No

(b) Does the procedure affect Environmental Protection?

If "yes", complete Environmental Evaluation. (Side 2 of this Form) Yes  No

(c) Does the procedure affect radiation exposure to personnel?

Yes  No

NOTE: If all answers are "no", the change may be approved by the Shift Supervisor. If any questions are answered "yes", the change must be approved by the Unit Superintendent.

7. Review and Approval

Approved - Shift Supervisor

NRC *AG. Sads* Reviewed - List members of PORC contacted *John Cleecum 5/9/79* Date  
*John Cleecum 5/15/79* *M. Clegg 5/15/79* *J. W. L. 5/15/79* *J. W. L. 5/15/79* Date  
*John Cleecum 5/15/79* *M. Clegg 5/15/79* *J. W. L. 5/15/79* *J. W. L. 5/15/79* Date  
*John Cleecum 5/15/79* *M. Clegg 5/15/79* *J. W. L. 5/15/79* *J. W. L. 5/15/79* Date

Approved - Unit Superintendent

*John Cleecum 5/9/79* Date  
*John Cleecum 5/9/79* Date  
*John Cleecum 5/9/79* Date  
*John Cleecum 5/9/79* Date

8. SOP is Cancelled

Shift Supervisor/Shift Foreman

Date

LETODOWN FLOWRATE CALCULATIONS

1.0 PURPOSE

To provide a means to determine letdown flowrate using a mass balance of the Make-up Tank (MUT).

2.0 REFERENCES

None.

3.0 LIMITATIONS AND PRECAUTIONS

None.

4.0 PREREQUISITES

- 4.1 The RCS shall have a bubble in the pressurizer.
- 4.2 No RCS sampling operations or sample line recirculation shall be in progress during conductance of this procedure.
- 4.3 No MUT sampling operations shall be in progress during conductance of this procedure.
- 4.4 Make-up water to the MUT from the RC bleed tanks and boric acid mix tank must be zero during conductance of this procedure.
- 4.5 RCS pressure should be kept as constant as possible during this procedure.
- 4.6 RCS make-up through MU-V17/18 must be isolated throughout this procedure.
- 4.7 Pressurizer level is 375 + 25 inches.

5.0 SPECIAL EQUIPMENT

None.

6.0 METHOD

- 6.1 Shut or check shut MU-V17 and MU-V18.
- 6.2 Shut or check shut MU-V16-(A/B/C/D).
- 6.3 Verify MU-V8 is aligned for letdown flow to the MUT.
- 6.4 Verify no RCS sampling, RCS sample line recirculation, or MUT sampling is in progress.

- 6.5 Verify no make-up to the MUT from the RC bleed tank or boric acid mix tank is in progress.

NOTE: The following steps refer to Attachment 1 for data collection.

- 6.6 Record date, time, and RCS pressure. (lines 1, 2, and 3)

- 6.7 Read and record each RCP seal injection and seal return flow rate, and add up the total. (lines 4 and 5)

NOTE: RCP seal injection or return should not be altered until completion of this procedure.

- 6.8 Read MUT level and time, and record on line 7 for "Initial" MUT level.

- 6.9 Wait about 30-60 minutes and repeat step 6.8, recording the data for the "Final" MUT level. (line 6)

- 6.10 Open MU-V17/18 as necessary to maintain PZR level.

- 6.11 Subtract the initial values from the final values of MUT level and time to obtain (L) change in MUT level and (T) time. (line 8)

NOTE 1: L will be negative if MUT level decreases and positive if MUT level increases.

NOTE 2: T units are in minutes; L units are in inches.

- 6.12 Calculate the rate of change of MUT level using the method in Attachment 1. The conversion factor "30.8" relates gallons to inches of level in the MU tank.

- 6.13 Calculate letdown flowrate using the method in Attachment 1.

- 6.14 Submit data sheets to GPU Technical Support trailer.

~~ATTACHMENT~~

Z-92

LETDOWN FLOW CALCULATIONS

(1) Date / /

(2) Time \_\_\_\_\_

(3) RCS PRESSURE \_\_\_\_\_

SEAL INJECTION (GPM)

RCP - 1A \_\_\_\_\_

RCP - 1B \_\_\_\_\_

RCP - 2A \_\_\_\_\_

RCP - 2B \_\_\_\_\_

SEAL RETURN (GPM)

RCP - 1A \_\_\_\_\_

RCP - 1B \_\_\_\_\_

RCP - 2A \_\_\_\_\_

RCP - 2B \_\_\_\_\_

(4) TOTAL \_\_\_\_\_

(5) TOTAL \_\_\_\_\_

(6) MUT Level (Inches) (Final) \_\_\_\_\_

@ Time \_\_\_\_\_ (Final) \_\_\_\_\_

(7) MUT Level (Inches) (Initial) \_\_\_\_\_

@ Time \_\_\_\_\_ (Initial) \_\_\_\_\_

(8) MUT Level L (Inches) \_\_\_\_\_

T= \_\_\_\_\_ (Min.)

NOTE: L will be negative if MUT level decreases, and positive if MIT level increases.

$$\text{Rate of Change of MUT Level} = \frac{(L) (*30.8)}{\text{Time}} = \frac{(\ ) (*30.8)}{\text{Time}} = \text{_____ (GPM)}$$

\*MUT Volume = 30.8  
(gal/in)

$$\text{Letdown Flow Rate} = [\text{Seal Injection}] - [\text{Seal Return} + (\text{MUT Level Rate of Change})]$$

$$\text{_____ (GPM)} = \frac{\text{Seal Inj.}}{\text{(gpm)}} - \frac{\text{Seal Ret.}}{\text{(gpm)}} + \frac{\text{Rate of Change of MIT Level}}{\text{_____}}$$

Performed By \_\_\_\_\_

/ Date \_\_\_\_\_

Verified By \_\_\_\_\_

/ Date \_\_\_\_\_