

AP 1001

Figure 1001-8

Three Mile Island Nuclear Station  
Special Operating Procedure

SIDE 1

SOP No. 2-107

(From SOP Log Index)

Unit No. 2

Date 4-19-79

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

Rev 0  
NRC

1. Title TEST METHOD #2 FOR ALTERNATE PZR. LEVEL

2. Purpose (include purpose of SOP)

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

N/A

B. Prerequisites

C. Procedure

4. Generated by Shift Supervisor Date 4/19/79

Duration of SOP - Shall be no longer than 90 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 4/20/79

(b) SOP is not valid after 4/20/79   
(fill 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 4/20/79

NRC J.P. Davis Approved - Shift Supervisor X/K. J. Clift 4/20/79

8. W. J. P. Davis / Reviewed - List members of PORC contacted

ALARA 4/20/79 G.P. Kunder per tel JK P. Davis 4/20/79

4/20/79 (P-C) J.D. Miller 4/20/79

R.P. Warren per tel J.H. Brown (P) 4/20/79

Approved - Unit Superintendent G.P. Kunder 4/20/79

Approved - PORC G.P. Kunder 4/20/79

d. SOP is Cancelled

Shift Supervisor/Shift Foreman

Date

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**TITLE: Test of Alternate Pressurizer Level Indication****.0 Purpose**

To provide an alternate method of monitoring pressurizer level in the event of loss of the permanent plant pressurizer level measurement.

To insure the validity of the alternate measurement by comparing it to the active level measurements of the pressurizer.

**2.0 Required Equipment**

- 1) Dead weight pressure testor capable of maintaining a pressure of 0-3000 psi within  $\pm 1$  psi on a continuus basis (5 psi incremental changes of weights are acceptable).
- 2) Differential Pressure Read Out device capable of reading -350 inches WC/0/+350 inches WC with an accuracy of at least  $\pm 0.5\%$  and a pressure casing suitable to withstand system pressure.
- 3) Temperature trend capability to detect pressurizer liquid space temperature changes of  $0.1^{\circ}\text{F}$  (The device should be capable of repeatable measurements within an accuracy of  $0.1^{\circ}\text{F}$ . An absolute temperature measurement is not required but is desirable)
- 4) Purge capability as necessary to minimize contamination and exposure effects.
- 5) Direct communication links are required between the location of the differential pressure read out device, temperature trend read out device, dead weight testor and the control room.

- 6) Heise gage 0-1000 psi  $\pm$  0.1%.
- 7) Wheatstone bridge or equivalent for Pressurizer liquid space temperature measurement.

### 3.0 Pre-requisites

- 3.1 The estimated level (elevation) of the pressurizer steam space sample nozzle is \_\_\_\_\_. (Elevation is to be recorded at this point.)
- 3.2 The estimated level (elevation) of the pressurizer liquid space sample nozzle is \_\_\_\_\_. (Elevation is to be recorded at this point).
- 3.3 The estimated level (elevation) of the differential pressure read out device is \_\_\_\_\_. (Elevation is to be recorded at this point.)
- 3.4 The test should be performed at times when the pressurizer level and liquid space temperatures are stable. Spray should be at a minimum during testing.
- 3.5 The dead weight testor will be set at a location higher than the differential read out device. The elevation of the dead weight testor is \_\_\_\_\_. (Elevation is to be recorded at this point).
- 3.6 All data will be taken with a 30 second time span. Simultaneous readings are desirable.
- 3.7 At least one plant pressurizer level measurement channel is active and considered reliable.
- 3.8 Manual valves as required per sketch (attached).
- 3.9 Steam Tables

3.10 Temporary piping has been checked for leaks and hydroed to at least system pressure.

4.0 Limits and Precautions

4.1 Enter high radiation areas only when necessary to read pressure indications. Proceed to lower radiation areas when not taking data.

4.2 If radiation levels in the general area exceed 1 rem/hr. remote monitoring equipment (e.g., television cameras) should be used for routine readings.

4.3 Communications with the control room (CR) shall be established such that the data is taken when CA-V3 is opened and the gage readings have stabilized.

4.4 A RCS sample cannot be taken with this procedure in effect.

4.5 Installed pwr level indication must be greater than 117.5".

4.6 Procedure Z-50 readings must be discontinued while these readings are taken.

4.7 If system pressure changes beyond the range of the differential pressure device, the dead weight testor must be set to the new pressure range.

4.8 See ALARA comments attached (2 pages).

5.0 Method

5.1 Perform the following valve line-up.

<u>OPEN</u>	<u>CLOSE</u>
SN-V181	CAV-10
SN-V1	CAV 3
SN-V3	SN V214
SN-V101	SN V215
SN-VT 1	SN V2
SN-VT 51	SN V3
	SN V5
	SN V109
	SN V6
	SN V161
	SN V174
	SN V7
	SN V8
	SN V110
	SN VT 2
	SN VT 3
	SN VT 4
	SN VT 5
	SN VT 21
	SN-VT 31
	SN-VT 41
	SN-VT61

5.2 Purge and vent the added test piping as follows:

- 5.2.1 Open SH-VT3, SN-VT 21, and SH-VT 61.
- 5.2.2 Start the Hydro Pump
- 5.2.3 When water flows from the vent at SH-VT61, open SH-VT41 then close SH-VT61.
- 5.2.4 When water flows from the vent at SH-VT41, open SH-VT31 then close SH-VT41.
- 5.2.5 When water flows from the vent at SH-VT31, stop the hydro pump and close SH-VT3, SH-VT31 and SH-VT 21 in that order quickly.

5.3 Establish steady state conditions in the pressurizer (spray at a minimum).

- 5.3.1 Record pressurizer liquid space temperature on attached data sheet.
- 5.3.2 Establish the gage saturation pressure of the pressurizer (psig) by use of steam tables and recorded liquid space temperature. Record on data sheet
- 5.3.3 Set the dead weight tester to the recorded pressurizer saturation pressure  $\pm$  2.5 psi. Record the dead weight tester pressure and Heise gage reading on data sheet.

5.4 Close SH-VT 51

5.5 Open the following valves in this order

- 5.5.1 CA-V10
- 5.5.2 CA-V3
- 5.5.3 SN-VT2
- 5.5.4 SH-VT21

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5.6 Quickly and as near simultaneously as possible record on the data sheet

5.6.1 Time

5.6.2 Pressurizer liquid space temperature

5.6.3 Differential pressure.

5.6.4 Active plant pressurizer level indications

5.7 Close the following valves in this order:

5.7.1 CA-V3

5.7.2 CA-V10

5.7.3 SII-VT21

5.7.4 SII-VT2

5.8 Open SN-VT 51

5.9 For subsequent readings, repeat steps 5.3 through 5.8.

## 6.0 Principle of operation and corrections

6.1 The purpose of the dead weight tester is to simulate a reference leg at pressurizer pressure on one chamber of the differential pressure device. This will provide an expansion of the read out capability and a reduction in the readout error.

6.2 The liquid space sample line to the other chamber of the read out device must be corrected to eliminate the effect of the difference in elevation between the pressurizer sample tap and the differential pressure device and the plant level instrument tap. This is accomplished by measuring control room indicated level and comparing it to calculated level.

6.3 Apparent level changes caused by a change in pressure can be corrected for by the simultaneous readings of liquid space temperature and correcting for pressure changes as obtained from steam tables.

7.0 Level Calculation

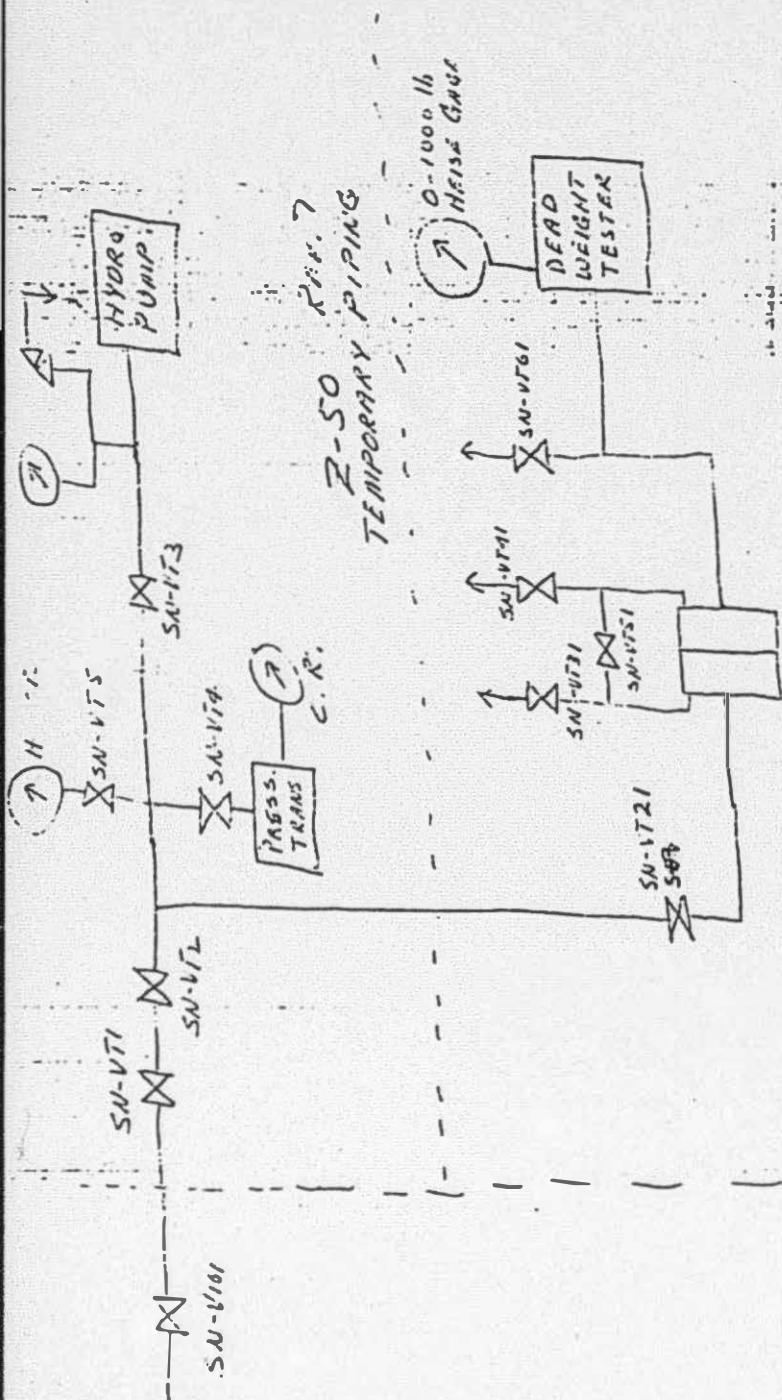
7.1 Determine pressure offset by subtracting dead weight pressure reading from the saturation pressure reading obtained in step 5.32 Column 4 minus column 5. Record this value in column 10.

7.2 Calculate the level by multiplying 27.7 times the algebraic difference between columns 7 and 10. Record this value in column 11.

7.3 Determine the elevation correction factor by subtracting the calculated level (column 11) from the indicated level (columns 8 or 9)

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## PRESSURE: P LEVEL PRESSURE/TIME. ALTURE CORRELATION



Annex Z TEMPORARY PIPING

### 3.10.1 Hydro Procedure

#### Valve lineup for Test Rig Hydro

Close

SN-VT2

SN-VT5

SN-VT31

SN-VT41

SN-VT4

SN-VT71

SN-VT61

OPEN

SN-VT3

SN-VT21

SN-VT51

1. Align valves per above line up

2. Start hydro pump and raise pump discharge pressure to max RCS pressure + 50 psig = do not exceed 1500 psig.

3. Stop hydro pump and examine all fittings downstream of SN-VT2 for leaks.

4. Slowly open SN-VT5 and check Heise gage and fittings for leaks. - Close SN-VT5

5. Slowly open SN-VT4 and inspect pressure transmitter and fittings for leaks. - Close SN-VT4

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Hydro

6. Using dead weight tester raise pressure on the dead weight tester Heise gage and associated fittings to pressure used on rest of system per step 2 of this section.

7. Inspect for leaks.

8. Note ~~free~~ pressure hydro performed at.

psi

initials/date

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MONITOR ON THE D/P CELL GA.

- (E) IT IS SUGGESTED THAT CONTROLS; i.e., A TAGCUT, BE PLACED, IN ORDER TO PREVENT OPERATING THIS INSTRUMENT WHICH COULD RESULT IN UNNECESSARY EXPOSURE TO INVESTIGATE AND CORRECT THE SITUATION.
- (F) THE PRIMARY SAMPLE PROCEDURE SHOULD BE REVISED TO REFLECT SPECIFICATIONS AND FREQUENCIES ASSOCIATED WITH INTERFERING VALVE LINE-UPS.

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ALARA REQUIREMENTS - MINIMUM

- ① D/P CELL RIG. SHOULD BE HYDROSTATICALLY TESTED PRIOR TO USE. ANY UNTESTED MECHANICAL JOINTS SHOULD BE BAGGED PRIOR TO USE.
- ② ALL EFFLUENT FROM THE D/P CELL AND PIPING VENTING IS TO BE COLLECTED IN SUITABLE CONTAINERS WITH SODIUM SULFATE SOLUTION ADDED. CONTAINERS TO BE CAPPED AND SEALED AFTER USE.
- ③ THE ASSEMBLY SHALL BE RIDICUOUSLY MOUNTED IN SUCH A MANNER AS TO PRECLUDE DISTURBING MECHANICAL JOINTS.
- ④ USE PORTABLE SHIELDS WHERE POSSIBLE DURING VALVE MANIPULATIONS IN HIGH RADIATION AREAS.
- ⑤ TREAT ALL LEAKAGE AS HIGHLY CONTAMINATED.
- ⑥ AFTER THE UNIT IS ON THE LINE, REFORM A RADIATION SURVEY ON THE ASSEMBLY AND CHANGE POSITION AS REQUIRED.
- ⑦ EVERY EFFORT SHOULD BE MADE TO INSTALL 31261

CONT

