AP 1001
Figure 1001-8

Three Mile Island Nuclear Station
Special Operating Procedure

SIDE 1

SOP No. Z-110
(From SOP Log Index)

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

Unit No. TWO

Date ~~4/29/79~~ 4/29/79

1. Title Establishing Water/Water Heat Removal Mode on the "B" OTSG

2. Purpose (include purpose of SOP)

To convert the "B" steam generator from an isolated secondary side condition to a heat removal mode with the secondary side filled with water and rejecting heat to the main condenser.

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

4. Generated by TSPG Date 4/29/79 ~~4/29/79~~

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 _____ ☐

(b) SOP is not valid after _____ ☐
(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

Approved — Shift Supervisor _____ Date

Reviewed — List members of PORC contacted _____ Date

_____ Date

_____ Date

Approved - Unit Superintendent _____ Date

8. SOP is Cancelled

_____ _____
Shift Supervisor/Shift Foreman Date

ESTABLISHING WATER/WATER HEAT REMOVAL MODE ON THE "B" OTSG

1.0 PURPOSE

1.1 To convert the "B" steam generator from an isolated secondary side condition to a heat removal mode with the secondary side filled with water and rejecting heat to the main condenser.

The overall sequence of operations is:

- Fill the secondary side of OTSG "B" with water, overflowing into the Main Steam and bypass line.
- Establish feedwater flow to the main condenser through the the turbine bypass lines.

2.0 REFERENCES

2.1 Main and Reheat Steam System; Flow Diagram, 2002.

2.2 Feedwater and Condensate; Flow Diagram; 2005.

2.3 Feedwater Heater Drains, Flow Diagram 2555

.0 LIMITATIONS AND PREC UTIONS

3.1 Determine the need or requirements for lube oil to the main feed pump and turbine during windmilling.

3.2 Establish and maintain optimum condensate pump flow for indefinite operation. If necessary, use the condensate booster pump(s) recirculation lines to the condenser (CO-V35A, B, and C and/or their associated manual isolation valves, CO-V36A, B and C) and/or either or both S/G. F. W. pump recirculation lines to the condenser (FW-V12A and FW-V12B).

3.3 Monitor condensate pump suction strainer delta P periodically.

3.4 While filling the B S/G or during any operations involving feedwater flow changes to the B S/G, adjustments of the steaming rate from the A S/G shall be made as necessary to maintain a near constant RCS temperature.

3.5 The bulk water/steam temperature in the steam generator should be within 60°F of the steam generator wall temperature to avoid creating tube stresses. (Temperature limit of concern is the ΔT between average S/G shell temperature as read on computer, and RCS T_{ave}).

3.6 The auxiliary feed lines are assumed dry by this procedure. If full, then the time required will be reduced to complete fill. Fill completion will be indicated by increasing steam generator pressure on installed gauge.

3.7 Sufficient condensate/condensate makeup is available to complete this procedure.

3.8 Because the B S/G contains contaminated water, during the performance of this procedure and until the entire secondary system is returned to acceptable activity levels, normal Health Physics practices for contaminated systems shall be observed.

4.0 PREREQUISITES

4.1 Initial conditions

4.1.1 Primary

a. RCS in natural circulation _____

b. The primary system temperature is being maintained as low as practical by steaming heat removal methods on steam generator "A" _____

4.1.2 Secondary

a. The following valves associated with the Feedwater System are closed:

- FW Control valve isolation valves:
  FW-V14B _____
  FW-V17B _____
- FW control valve:
  FW-V30B _____
- FW startup line isolations:
  FW-V19B _____
  FW-V26B _____
- S/G Emergency FW isolation valves:
  EF-V12B _____
  EF-V33B _____
- FW startup flow control valve:
  FW-V25B _____
- FW control valve warm-up bypass isolation:
  FW-V66B _____

b. The following valves associated with the Feedwater system are open:

- FW heater 3B isolation valves:
  FW-V9B _____
  FW-V13B _____

- FW pump B suction & discharge isolation valves:
  CO-V52B _____
  FW-V8B _____

- FW pumps A&B common suction isolation:
  CO-V55 _____

c. The following valves associated with the Main and Reheat Steam system are closed:

- Main steam isolation valves:
  MS-V4B _____
  MS-V7B _____

- Turbine Bypass isolation valve: MS-V15B _____

- Turbine bypass control and isolation valves:
  MS-V23B _____
  MS-V24B _____
  MS-V25B _____
  MS-V26B _____

- Moisture Separator-Reheater Isolation Valves:
  MS-V32A _____
  MS-V33A _____
  MS-V32B _____
  MS-V33B _____

- Emergency S/G FWP isolation valves:
  MS-V11B _____
  MS-V207 _____

- Main FWP (FW-U1A) Steam Inlet isolation and stop valves:
  MS-V21B _____
  MS-V49A _____

- Atmospheric Dump Valve Isolations:
  MS-V1B _____
  MS-V2B _____

D. Isolate the following turbine bypass line steam traps:
  MS-U31B _____
  MS-U34B _____
  MS-U35B _____

e. Condenser vacuum* is established and the vacuum pump(s) discharge is through a filtration system _____

*Maintaining condenser vacuum throughout the filling and recirculation modes herein is desirable for two reasons:

- It will facilitate deaeration of the feedwater and minimize build-up of a noncondensible gas bubble in the OTSG.

- It will aid in cooling feedwater that returns from the OTSG.

4.2 MODIFICATIONS

4.2.1 All automatic transfers from the Bypass Control Valves to the Atmospheric Dump Valves have been defeated: _____

4.2.2 All necessary modifications to the feed and steam system piping (i.e., isolable flange connections) to facilitate future installation of the proposed closed cooling loop are installed. _____

5.0 Special EQuipment

5.1 None

6.0 Method

6.1 Filling Secondary Side of Generator with Water

6.1.1 Water source to be used for fill operations is available (approx. 28,000 gallons). _____

NOTE: It is expected that additional amounts of hydrazine will be required to provide and maintain proper chemistry in the "B" OTSG. Provide chemical additions as directed by the Chemistry Department.

6.1.2 Open the FW startup flow control valve isolation valve:

FW-V19B _____

NOTE: It is estimated that full flow through FW-V-66B will be a maximum of 80 gpm with valve full open. It is desired to limit flow to approximately 50 gpm.

NOTE: If alternate S/G level indication is available, monitor S/G level increase and adjust FW-V66B as necessary to obtain 1" per minute S/G level increase. (This is approximately equal to 42 gpm)

6.1.3 Throttle open the FW control valve warmup bypass isolation, FW-V66B, to approximately 1/2 to 3/4 open.

FW-V66B throttled _____

6.1.4 Open the turbine bypass line isolation:

MS-V15B _____

NOTE: As the S/G approaches a solid condition, S/G pressure will increase.

6.1.5 When the S/G and associated steam lines indicate being solid, as observed by the local pressure gauge or steam line pressure readings off computer point 474, perform the following:

a. Throttle open the turbine bypass control isolation: MS-V23B

MS-V23B throttled open _____

CAUTION: During operations involving flow changes through MS-V25B an operator should be stationed at these valves to report any valve cavitation to the control room.

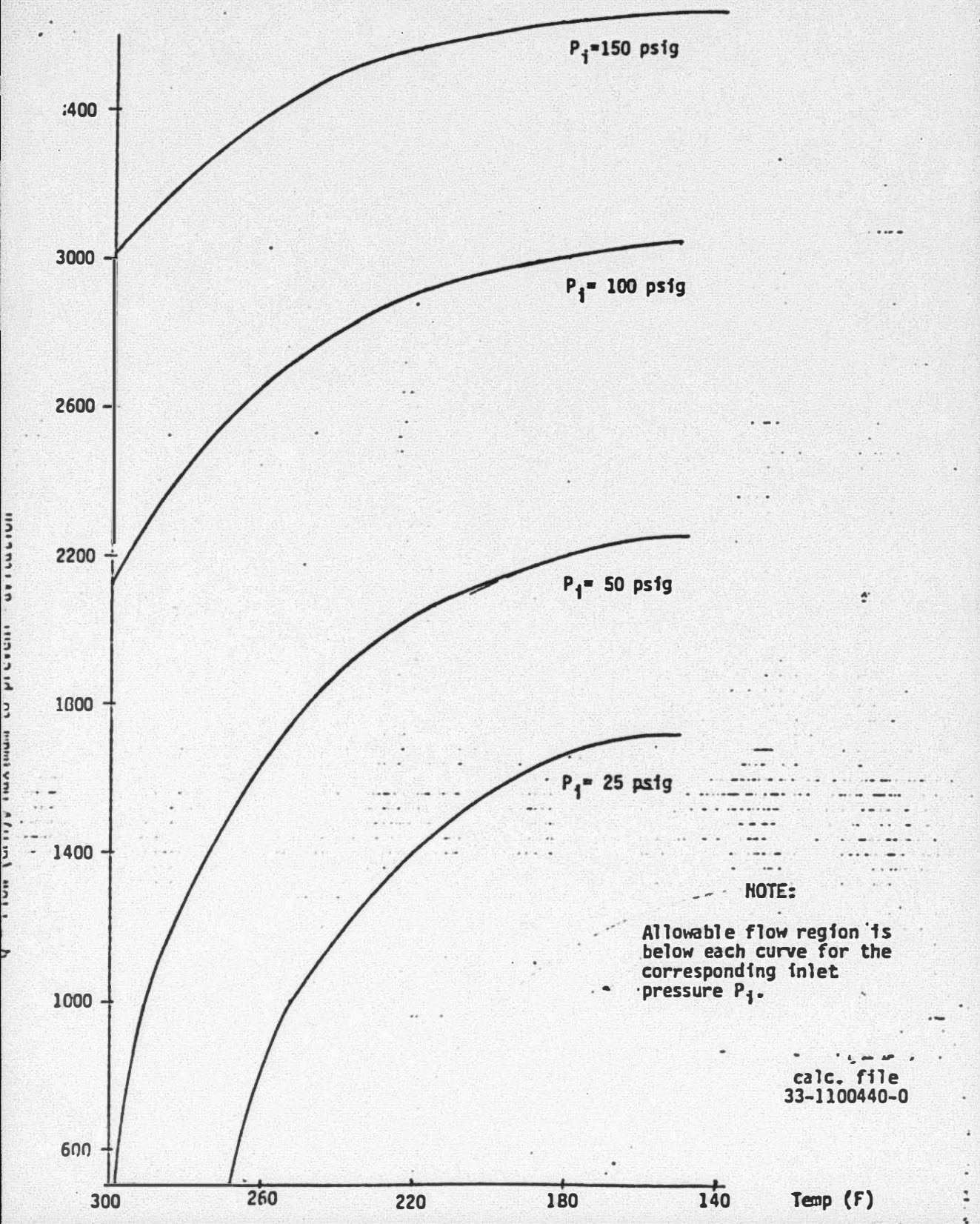
NOTE: The attached curve (Figure 1) is provided as guidance to prevent valve cavitation.

b. Throttle open the turbine bypass control valve MS-V25B, maintaining 10 to 20 psi steam line/S/G pressure indication _____

6.1.6 When it has been verified that the "B" OTSG is providing heat removal, begin transferring load to the "B" OTSG by closing MS-V26A or MS-V25A slowly and opening MS-V25B as necessary to maintain RCS temperature. When MS-V26A and MS-V25A are completely closed, the "A" steam generator is isolated and all heat removal is being accomplished by the "B" steam generator. _____

(choked flow)

Fig. 1



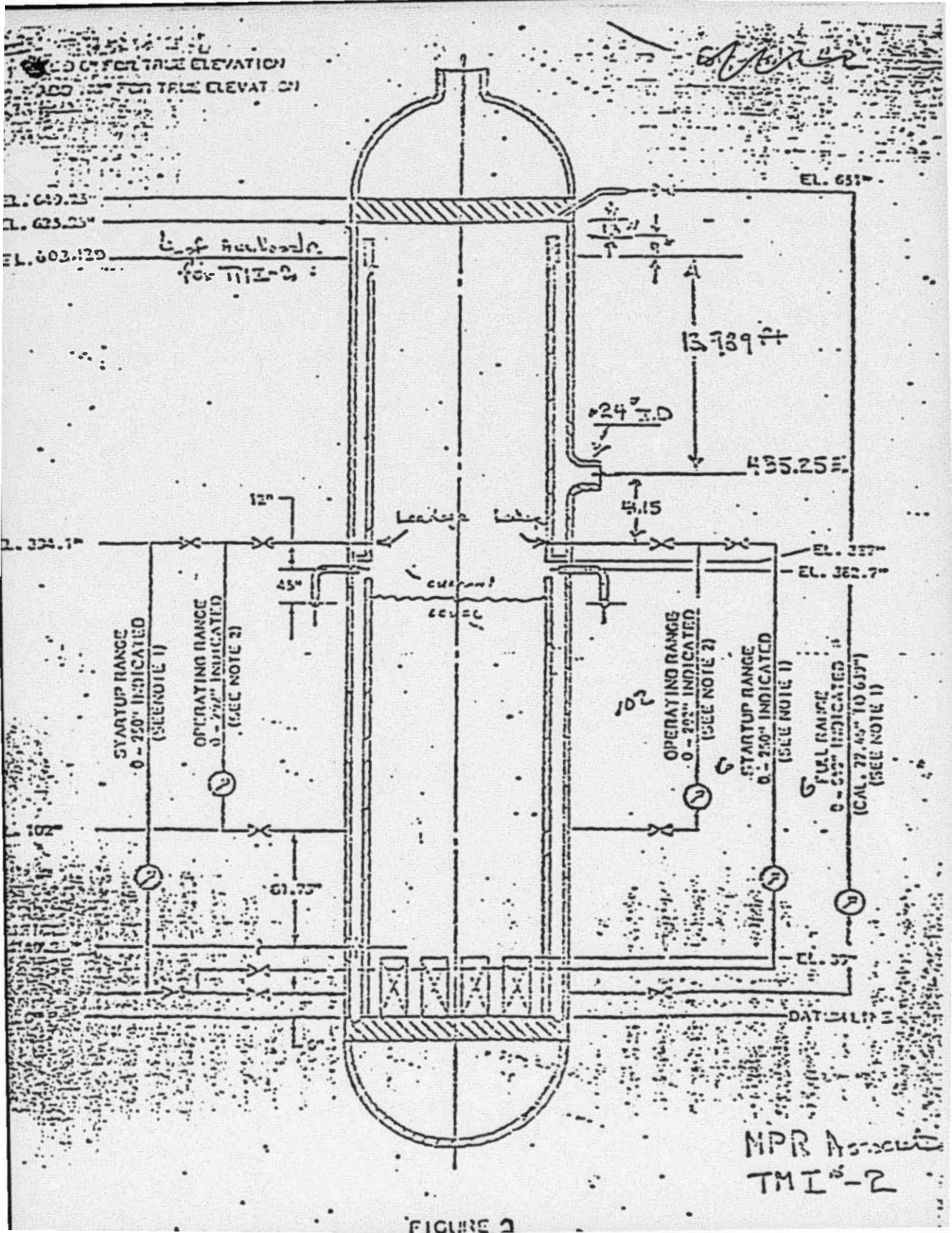

EL. 631"
EL. 603.129
for TMI-2
13.139 ft
24" I.D
35.25"
5.15
12"
45°
EL. 382.7"
START UP RANGE
0 - 250" INDICATED
(SEE NOTE 1)
OPERATING RANGE
0 - 250" INDICATED
(SEE NOTE 2)
61.75"
DATUM LINE
MPR Assoc
TMI-2

FIGURE 2