AP 1001

...ure 1001-8

Three Mile Island Nuclear Statio[n]

Special Operating Procedur[e]

SIDE 1

SOP No. 7-57 Rev 3
(From SOP Log Index)

Unit No. 2

Date 4/11/79

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

NRC

1. Title Pressure ~~[illegible]~~ Reduction during Degasification

2. Purpose (include purpose of SOP) To provide a controlled, monitored decrease RCS pressure to enhance degasification of RCS

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

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F...E COPY

Generated by EGWALLACE Date 4/11/79

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)

N/A

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 3 of this Form) . . . . Yes ☐ No ☐

(c) Does the procedure affect radiation exposure to personnel? . . . . Yes ☐ No ☐

N/A

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

B&W [signature]

ALARA [signature] 4/11/79

NRC [signature] 4/11/79

[signature] 4-11-79

Approved – Shift Supervisor [signature] 4/11/79 Date

Reviewed – List members of PORC contacted [signature] 4/11/79 Date

R W Bensel 4-11-79 Date

[signature] 4-11-79

[signature] 4-11-79 Date

Approved - Unit Superintendent [signature] 4/11/79 Date

...P is Cancelled

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F. B&W Telex, "Reduction of Reactor Pressure to 300 PSIG for Gas Removal", dated 4/11/79, 0240

3. REFERENCES

(Att)

A. Reference 79, B & W telex, "Pressure Reduction," dated April 4, [illegible] a.m.

B. Reference 110, B&W telex, "Pressure Reduction during Degas" dated April 5, 1979, 0802

C. Reference 116, " " " " " " April 7, 1979, 0450

D. " 117 " " , "Operation at Min. Pressure during Degas" April 9, 1979, 1515

4. Attachments

a. Reactor coolant pump pressure/temperature operation curve
b. Pressure reduction procedure log
c. Procedure reference A

5. Limits and Precautions

a. Pressure reductions should be conducted in a slow, controlled manner. Attempt to maintain a 5 psi/min rate.

b. Nominal pressure reductions should ~~not exceed 50 psi increments.~~ not exceed 50 psi in 25 psi increments

c. Minimum pressure for RCP operation is shown on attachment (a). Operation below the unrestricted pump curve and above the 3% head loss curve should be kept to a minimum. Total operation at these conditions shall not exceed five (5) hours. Actual system pressure at 275°F must be greater than 265 psig (referenced to the A loop pressure transmitter) Instrument measurement errors must be added to this pressure (± 8 psi for PI, ± 2.5 psi if measured by DVM) (273 PSIG).

d. RCP vibration limits shall not be exceeded. The vibration limit is 30 mils. See note after step 7.f. In addition, if RCP current indicates 100 amp fluctuations, immediately increase pressure to the next pressure increment.

e. While adjusting pressure downward, spray flow pressure reduction must be contunously monitored to prevent an underpressure condition.

f. Terminate plant pressure reduction by this procedure if pressurizer level drops below 125 inches.

g. Terminate plant pressure reduction by this procedure if All normal pressurizer level indication is lost or becomes erratic. Following evaluation, this procedure can be resumed.

h. Any unusual changes in pressurizer level should be evaluated to determine if a bubble has reformed.

i. If noise monitoring indicates the presence of a bubble at any step, stop and evaluate before going to the next pressure increment.

OR IF ANY TWO OF THE INCORE THERMOCOUPLES EXCEED AN INDICATED TEMPERATURE OF 500°F,

k. Reactor Coolant Thermocouples should be stable after each pressure change. If any thermocouple becomes unstable in its indication or exceeds T_{sat} by 50°F or if the six highest TEMPERATURE INDICATING thermocouples exceed 460°F, immediately increase pressure to the next pressure increment.

l. Hot leg temperatures shall be maintained at 75°F subcooled for primary system pressure. Increase pressure if this limit is violated.

Pressure (PSIA)	T_{sat} (°F)
250	411
290	414
300	417
350	431
400	445

m. RCS loop A pressure instrument RC 3A-PT4 (computer point 349) should be used as the controlling pressure readout during this procedure when above 500 psig. Below 500 psig, use RC 3A-PT4 and the installed pressurizer pressure Heise gauge. If RC 3A-PT4 varies more than 27 psi from the Heise gauge pressure reading, return to the next higher pressure increment. 3

n. Pressure control shall be maintained at ± 50 psig around the nominal pressure.

o. During the final step to 300 psig, pressure shall be maintained at 300 + 50, −0 psig.

p. If pressure control is lost do not secure the RCP.

6. Prerequisites

a. Confirm RCP 1A is lined up and available to start. This does not require starting RCP 1A. Confirm the availability of the oil lift system of RCP 1A.

b. All available heaters on and in manual at maximum heat rate.

c. Spray valve in manual. Spray flow adjusted to maximize degasification rate for the available heat input by the pressurizer heaters.

d. Pressurizer level about 225 inches. ~~Y~~ 150 inches

e. RCS pressure stable at preselected value (approx. 950 psig.)

f. Normal pressurizer level indication is available in the control room.

g. NRC approval must be obtained prior to commencing pressure reduction and prior to beginning each pressure reduction ~~increment~~.

7. Procedure

50 psig

a. Commence monitoring RCP vibration. Notify the B&W sound and vibration monitoring team. If available, monitor source and intermediate range detector signals by strip chart when below 500 psig nominal pressure.

b. Monitor the rate of pressure decrease continuously.

c. Lower primary system pressure (as read on computer point 399 on RC-3A-PT2) by controlling spray flow and heater operation to decrease pressure in 25 psi increments. Stabilize at the new pressure. If any hot leg temperature indication approaches within 15 ~~25~~ °F of Tsat, increase pressure to the next higher increment.

NOTE

If pressure is increased greater than 100 psig above the last complete pressure step, it is permissible to reduce pressure to within 100 psig of the last complete

NOTE:

At 425 psig and at 350 psig as read on RC-3A PT4 (COMPUTER POINT 399) COMPARE THE PRESSURE READINGS ON BOTH THE HEISE GUAGE and ~~the~~ computer point 399. USE THE LOWER INSTRUMENT WHILE APPROACHING THE FINAL PRESSURE ~~OF 300 PSIG~~. 3

d. Monitor RCS temperature and pressure and plot on Attachment A and record on Attachment B. In addition record RCP mils vibration and RCP current.

e. Lower primary system pressure by ~~[illegible]~~ 25 psi steps ~~[illegible]~~. Record the five hottest INCORE thermocouples on Attachment B, evaluate temperature changes superheat and stability as required by item 5.k.

f. Upon completion of each 50 psi pressure reduction, obtain a report from the sound and vibration monitoring team and perform a bubble check. Bubble check consists of opening the pressurizer vent valve (RC-V137) while at the upper end of the current increment pressure band to allow a pressure drop of 50-75 psig, then shutting RC-V137. If pressurizer level does not increase, then no bubble exists. If pressurizer level increases, degasification at the existing pressure should continue until this test indicates no bubble. If noise monitoring indicates the presence of a bubble, maintain this pressure until noise analysis indicates bubbles are no longer present. Allow incore thermocouple readings to stabilize prior to proceeding to the next pressure increment.

NOTE

If 25 mils vibration is reached, stop and evaluate prior to proceeding to the next pressure increment. If RCP vibration limit of 30 mils is exceeded or if Noise Monitoring Team indicates high vibration in the RCP or any T/C temperature increases to Tsat + 50°F, return to the next higher 50 psig increment pressure level or to 500 psig whichever is higher.

h. Repeat steps a through f (with NRC approval for each step) until the 300 psig primary system pressure step is completed. Do not allow pressure to drop below 300 psig.

- CAUTION -

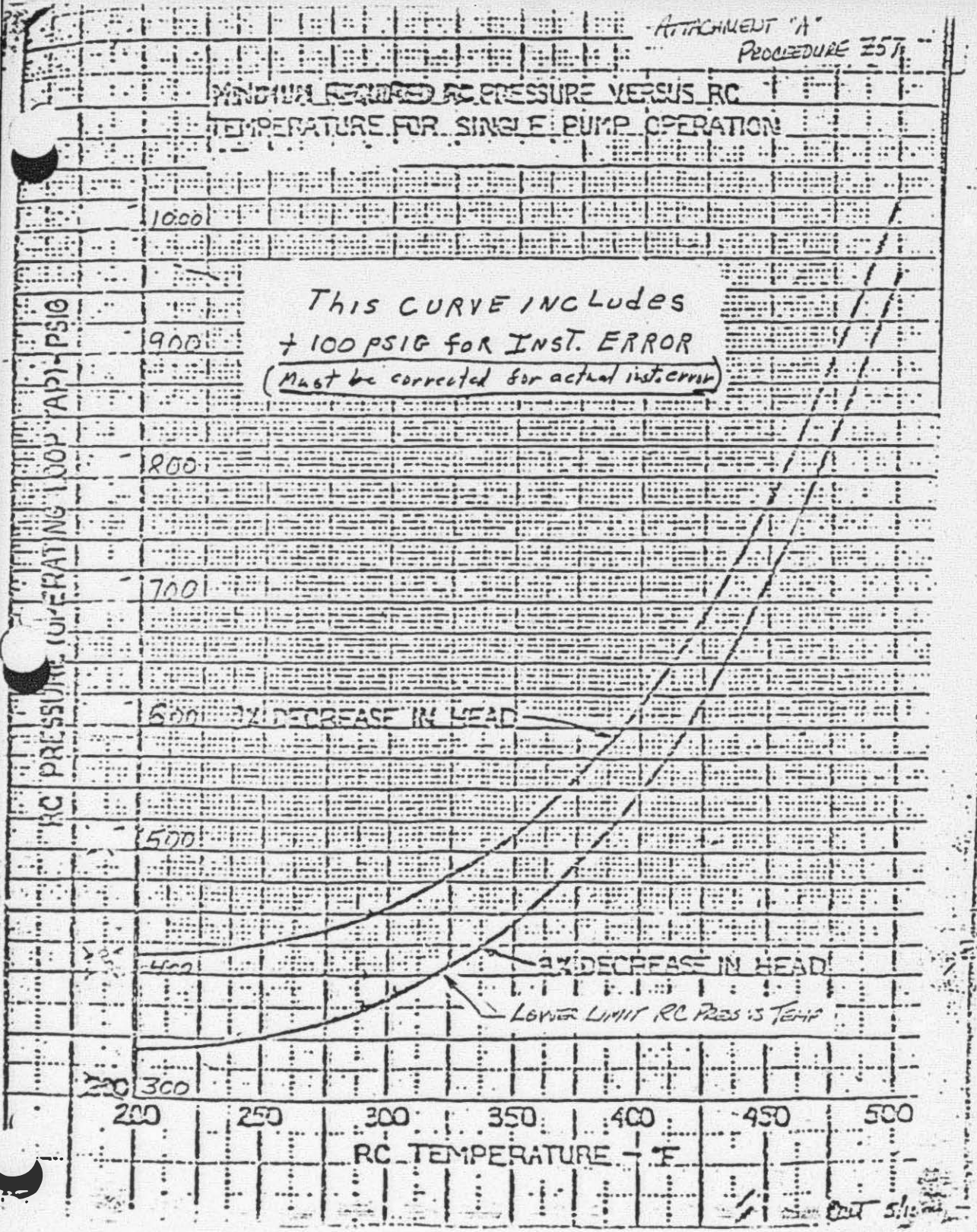
If RCS pressure drops below 300 psig, immediately secure spray flow and pressurizer venting and increase pressure above 300 psig using maximum pressurizer heaters. Monitor RCP vibration and current continuously while below 300 psig. If spray flow or venting cannot be secured, follow ~~Procedure of Choice~~ per EP-17, 18, or 30.

- DO NOT SECURE REACTOR COOLANT PUMP -

i. Return primary system pressure to 1000 ± 50 psig after degasification is complete at 300 psig.

ATTACHMENT "A"
PROCEDURE 25T

MINIMUM REQUIRED RC PRESSURE VERSUS RC TEMPERATURE FOR SINGLE PUMP OPERATION



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Attachment "B"

Proc No. E-57

Sheet No. ___ of ___

Pressure Reduction During Degassification

Time	R.C Press. [PSIG] (NOMINAL)	R.C Temp. [°F] AVE.	Pressurizer Level [Inches]	In-Core Temp. [°F] TC#	TEMP	TC#	TEMP	TC#	TEMP	TC#	TEMP	TC#	TEMP

3F-108

Attachment B (cont)

RCP

Time	Vibration mils	Current Amps	Current fluctuation