Docket No. 50-336

ATTACHMENT 2

MILLSTONE NUCLEAR POWER STATION

UNIT NO. 2

PLANT PROCEDURE 0P 2398

RCS VENTING PROCEDURE

August, 1982

E.J. Mroczka
Form Approved by Station Superintendent

12-28-81
Effective Date

STATION PROCEDURE COVER SHEET

A. IDENTIFICATION

Number OP 2398 Rev. 2

Title RCS VENT PROCEDURE

Prepared By S. E. Scace

B. REVIEW

I have reviewed the above procedure and have found it to be satisfactory.

TITLE	SIGNATURE	DATE
DEPARTMENT HEAD	SEScace	8/20/82

C. UNREVIEWED SAFETY QUESTION EVALUATION DOCUMENTATION REQUIRED:

(Significant change in procedure method or scope as described in FSAR) YES [ ] NO [~~X~~]
(If yes, document in PORC/SORC meeting minutes)

ENVIRONMENTAL IMPACT

(Adverse environmental impact) YES [ ] NO [~~X~~]
(If yes, document in PORC/SORC meeting minutes)

D. PORC/SORC APPROVAL

PORC/~~SORC~~ Meeting Number 2-82-135

E. APPROVAL AND IMPLEMENTATION

The attached procedure is hereby approved, and effective on the date below:

Station/Service/Unit Superintendent

Effective Date

SF-301
Rev. 5

RCS VENT PROCEDURE

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1. OBJECTIVE

1.1 The actions required to remove non-condensable gases from the reactor coolant system by operation of the reactor coolant system venting system are specified.

1.2 Implementation of this procedure will occur from performance of a step in an emergency or general operating procedure during or in recovery from an accident.

1.3 Venting can be performed from the reactor vessel head or the pressurizer (see figure 10.3). The specific venting location(s) will be determined by use of the entry emergency or general operating procedure.

2. LICENSE REQUIREMENTS

2.1 None

3. REFERENCES

3.1 NUREG 0577, Section 2.1.9

3.2 NUREG 0737, Section 2.1.9

4. PLANT OPERATING REQUIREMENTS

4.1 None

5. PREREQUISITES

5.1 Abnormal reactor coolant system conditions exist symptomatic of non-condensable gas accumulation.

5.1.1 Indication of a non-condensable void exists in the reactor head.

5.1.2 Pressurizer pressure response is indicative of non-condensable gases.

5.1.3 Direct measurement from the pressurizer steam space by sampling verified non-condensables.

5.2 Use of this procedure has been directed while in an accident condition during performance of an emergency or general operating procedure. Concurrence shall be obtained from the Director of Station Emergency Operations.

5.3 The hydrogen sampling system is in operation.

5.4 Place the hydrogen recombiners in service per OP 2313C, Containment Post Incident Hydrogen Control. (C01)

6. PRECAUTIONS

6.1 Do not start any idle reactor coolant pumps during venting operations.

6.2 If the reactor coolant pumps are secured during venting operations, discontinue the venting and verify the establishment of natural circulation. Reassess the need for additional venting after natural circulation is established or if unable to establish natural circulation.

6.3 Limit venting time to that required to remove non-condensable gases from the reactor vessel head and/or restore pressurizer pressure control.

6.4 Do not exceed venting times determined using Figures 10.1 and 10.2 until sampling confirms containment hydrogen concentration is below 3.0%.

6.5 Monitor pressurizer pressure, level and subcooling closely during venting operations for indications of void formation. Do not allow venting of the pressurizer to reduce pressure sufficiently to form a void in another part of the reactor coolant system.

6.6 Attempt to avoid change of status of equipment in containment during venting to preclude arcing as a potential ignition source.

7. PROCEDURE

7.1 Establish as close to stable conditions as possible in the reactor coolant system and terminate ongoing evolutions (where possible) that will change reactor coolant system conditions.

7.2 Ensure all steps specified in the entry emergency or general operating procedure have been taken to eliminate condensable voids in reactor coolant system components other than the pressurizer.

CAUTION: DO NOT ENERGIZE PRESSURIZER HEATERS IF SAFETY INJECTION HAS BEEN INITIATED AS THE PRESSURE INCREASE MAY IMPEDE SAFETY INJECTION FLOW.

7.3 If a minimum of 50°F reactor coolant system subcooling does not exist, continue attempts to increase subcooling when not directly venting by:

7.3.1 Operation of the pressurizer heaters. (CO3)

7.3.2 Charging (via charging pumps and/or safety injection pumps) to the reactor coolant system. (CO1/CO2)

7.3.3 Cooldown using the operable steam generator(s). (CO5)

7.4 Establish pressurizer level at a minimum of 50% (actual level) if reactor coolant system and equipment status allows. (CO3)

7.5 Re-establish reactor coolant system conditions to as stable a condition as possible.

7.6 Ensure all available containment air recirculation fans are operating and start the the post accident recirculation fans. (CO1)

CAUTION: Do not vent from the reactor head and pressurizer simultaneously.

7.7 Use Figure 10.1 and 10.2 to determine maximum allowable venting time. Use the shorter of the two times determined.

NOTE: Figures 10.1 and 10.2 are based on an assumption that the non-condensable gas is 100% hydrogen. Figure 10.1 considers buildup of hydrogen in the containment. Figure 10.2 considers removal of hydrogen from the pressurizer while minimizing RCS inventory loss.

7.8 If on scale, monitor pressurizer level closely during venting operations and makeup to the reactor coolant system as necessary to maintain pressurizer level.

NOTE: The pressurizer level trend during venting may provide an indication of reactor coolant system status. When venting from the reactor head:

a. Level increasing - Void exists in the reactor coolant system other than the pressurizer.

b. Level constant - No significant void exists in the reactor coolant system.

c. Level decreasing - Void exists in the reactor head.

7.9 Vent the reactor coolant system as follows:

7.9.1 To vent the reactor head, open 2-RC-414 and 2-RC-415 (or 2-RC-416 and 2-RC-417). (C03)

7.9.2 To vent the pressurizer, open 2-RC-422 and 2-RC-423 (or 2-RC-424 and 2-RC-425). (C03)

NOTE: If one or both valves fail to open, close both valves and use the parallel flow path.

7.10 Close both vent isolation valves when:

7.10.1 Pressurizer pressure decreases by 200 PSIA, or

7.10.2 Pressurizer level decreases below 20% (if originally on scale), or

7.10.3 Reactor coolant system subcooling decreases below 20°F (if originally greater than 50°F subcooling), or

7.10.4 The mass equivalent of the pressurizer steam space has been vented (Figure 10.2), or

7.10.5 The reactor vessel head is refilled as indicated by a decrease in depressurization rate or a change in the rate of the pressurizer level trend, or

7.10.6 Acceptable pressurizer pressure response is observed, ie. symptoms of operation with a "hard bubble" are eliminated.

7.11 Obtain H_2 sample results after a minimum of (later) minutes (required for mixing).

7.12 If the containment hydrogen concentration exceeds 1.0%, ensure the hydrogen recombiners are in service. (C01)

7.13 If further venting is required, repeat steps 7.7 through 7.12.

7.14 Upon completion of the reactor coolant system venting, return to the appropriate emergency or general operating procedure.

8. ALARMS AND MALFUNCTIONS

8.1 None

9. CHECKOFF LISTS

9.1 None

10. FIGURES

10.1 Figure 10.1 Millstone Unit 2 RCS Vent (Hydrogen Consideration)

10.2 Figure 10.2 Millstone Unit 2 RCS Vent (Mass Equivalent Consideration)

10.3 Figure 10.3 Millstone Unit 2 RCS Vent System Schematic

SES:jlc

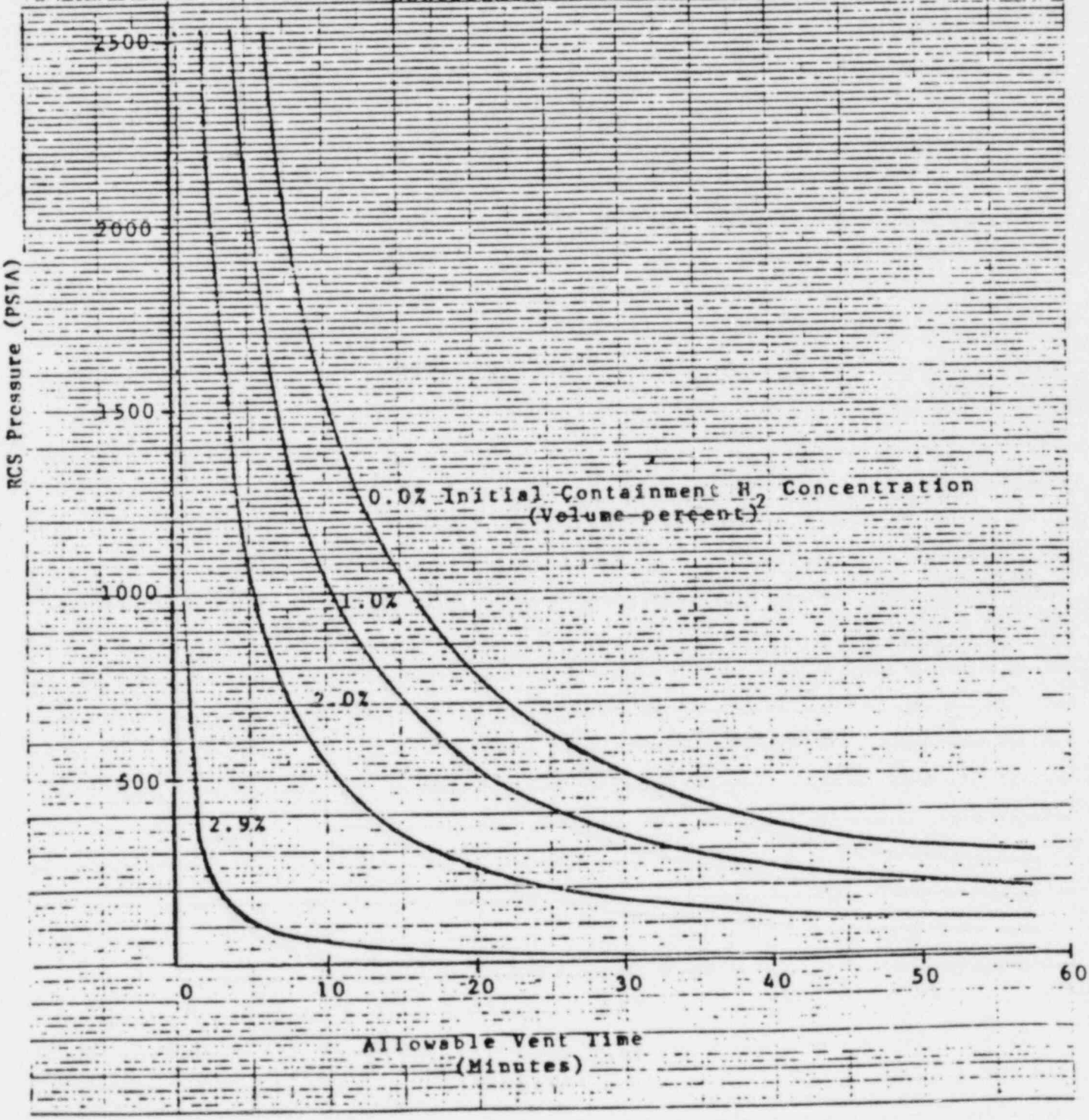
Millstone Unit 2 RCS Vent

RCS Pressure Vs Allowable Vent Time

(Hydrogen Only)

Curves Valid Only If:

- RCS outlet temp. ≥ 212°F
- RCS pressure ≤ 2500 PSIA
- Containment temp. ≤ 225°F
- Containment pressure ≥ 14.7 PSIA
- Containment H_2 conc. ≤ 2.9% vol
- Containment fans on



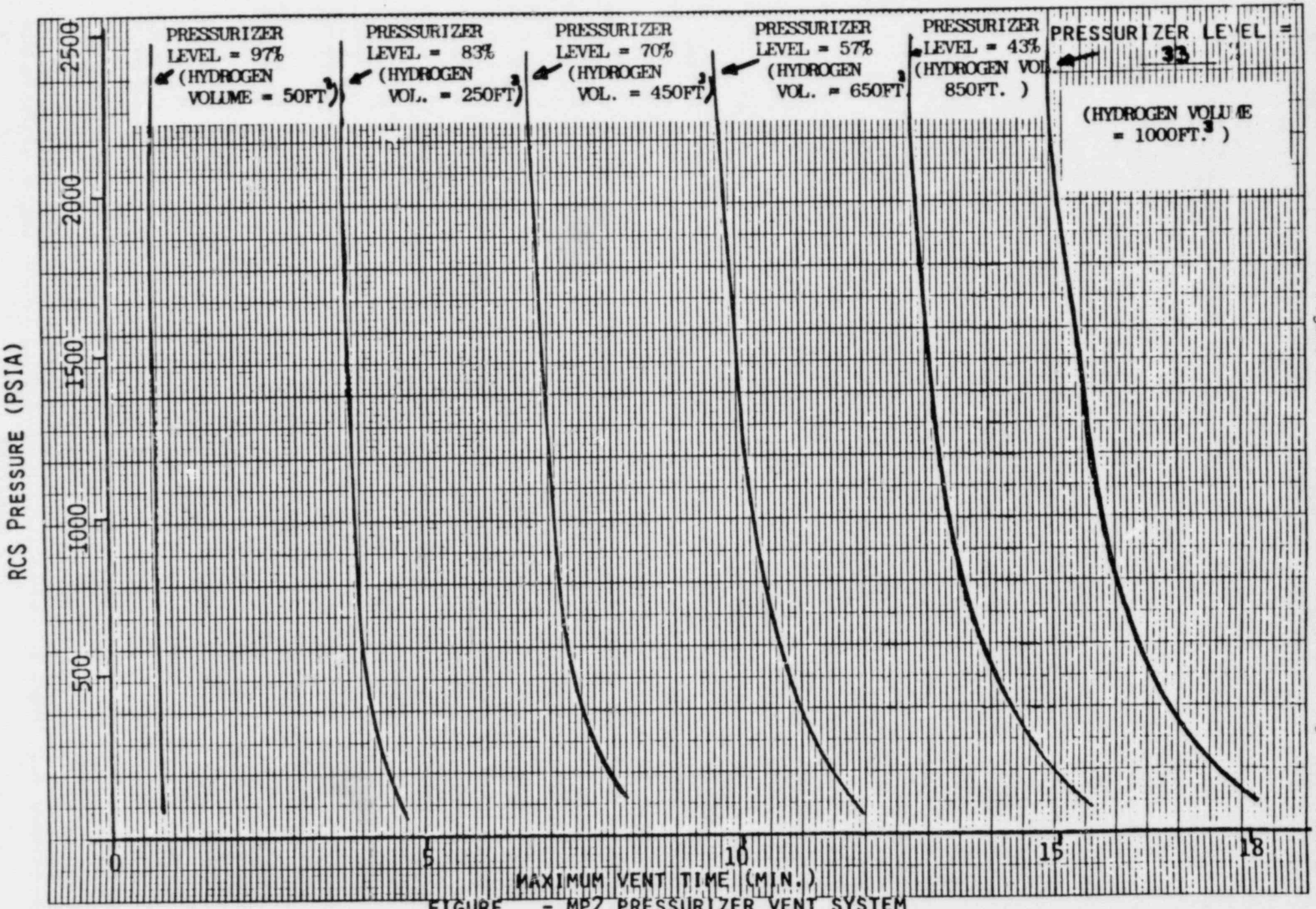
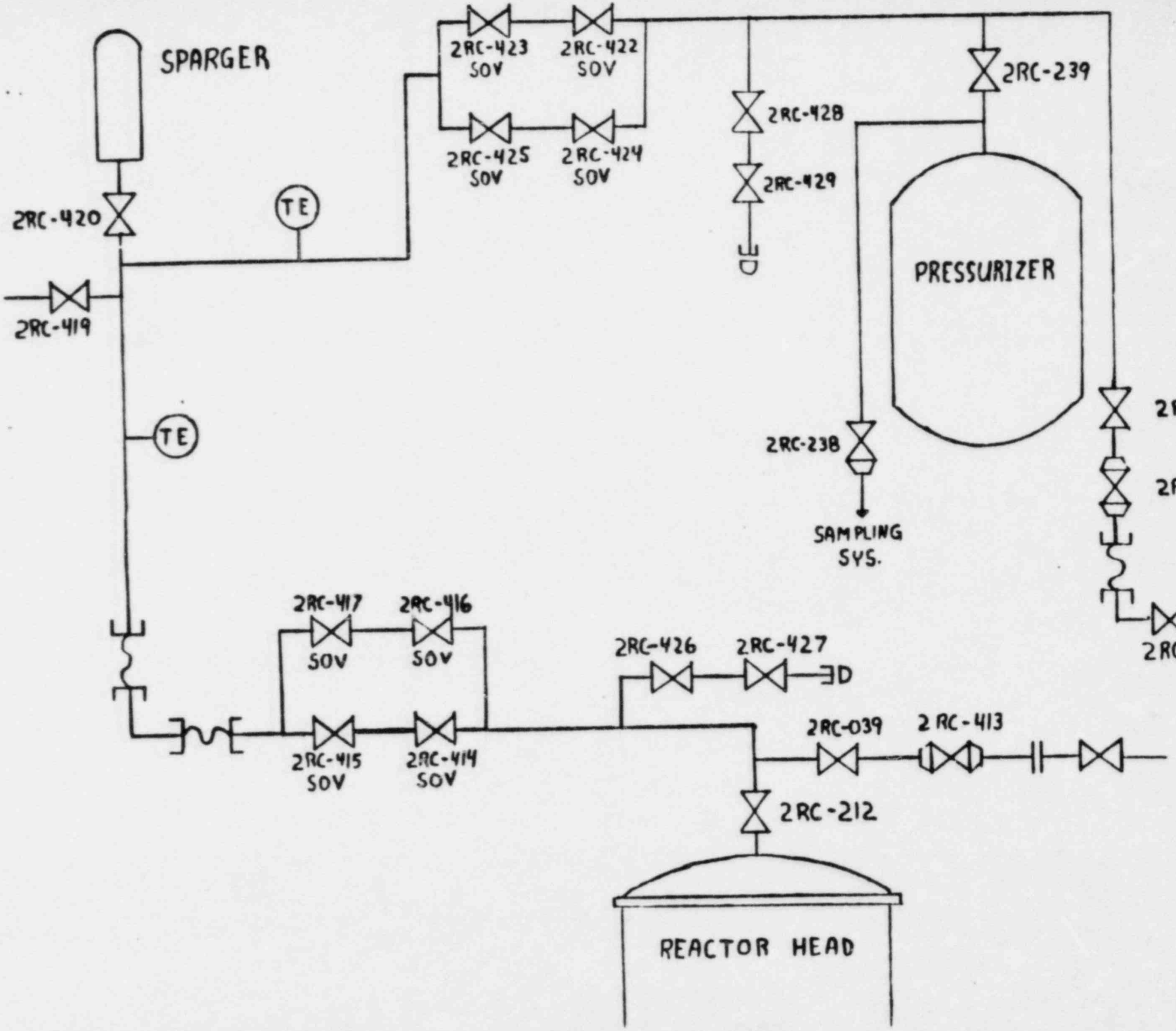


FIGURE - MP2 PRESSURIZER VENT SYSTEM
HYDROGEN VENTING TIME VS. RCS PRESSURE


SPARGER
2RC-423
SOV
2RC-422
SOV
2RC-425
SOV
2RC-424
SOV
2RC-239
2RC-428
2RC-429
DE
2RC-420
TE
2RC-419
PRESSURIZER
TE
2RC-238
SAMPLING
SYS.
2RC-021
2RC-421
2RC-321
2RC-417
SOV
2RC-416
SOV
2RC-426
2RC-427
D
2RC-039
2RC-413
2RC-415
SOV
2RC-414
SOV
2RC-212
REACTOR HEAD