

ENCLOSURE II

8205030293

EFFECTIVE DATE \_\_\_\_\_

REACTOR COOLANT GAS VENT SYSTEM

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Attachment 1 1	NEW
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REACTOR COOLANT GAS VENT SYSTEM

1.0 OBJECTIVE

- 1.1 It is the purpose of this procedure to give a method of operating the Reactor Coolant Gas Vent System (RCGVS) to vent the RCS and Pressurizer under RCS filling and venting conditions and Post Accident conditions.
- 1.2 It is also the purpose to give a method for leak detection in the RCGVS.

2.0 REFERENCES

- 2.1 Procedural Guidelines, 1370-PE-PR07
- 2.2 P & I Dwg. 40111, "Reactor Coolant System"
- 2.3 FSAR Section 9.3.7
- 2.4 Elementary 30582, 30583 "Reactor - Reactor Head & Pressurizer Head Vent Valves"
- 2.5 S023-3-1.6, "RCS Hot Leak Test"
- 2.6 S023-3-2.28, "Containment Combustible Gas Control System"
- 2.7 Technical Specification 3.4.5.2

3.0 PREREQUISITES

- 3.1 Check-Off List #1 has been completed prior to operation of the vent system.
- 3.2 Ensure this instruction is up to date by checking it against a controlled copy.

4.0 PRECAUTIONS

- 4.1 Monitor hydrogen levels during venting in order to prevent a hydrogen explosion.
- 4.2 Care should be used when venting the RCS in order to not depressurize the RCS.
- 4.3 The RCS vent valves shall be deenergized when not in use by this procedure.

5.0 CHECK-OFF LIST

- 5.1 Check-Off List #1, "Reactor Coolant Gas Vent System"

6.0 PROCEDURE

6.1 Venting of the RCS While Draining

- 6.1.1 Check-off List #1 completed.
- 6.1.2 After the RCS draining has commenced open up the pressurizer vent valves (HV-0297A or HV-0297B) and vent to containment valve (HV-0298).
- 6.1.3 When the pressurizer level indication indicates the pressurizer is empty, open the reactor vessel vent valves (HV-0296A or HV-0296B).
- 6.1.4 After drain-down is complete close RCGVS valves and remove the refueling spool-piece from the system.

6.2 Venting of the RCS While Filling

NOTE: This method requires pressure in the RCS. If no pressure is available, refer to section 6.5.

- 6.2.1 Complete Check-off List #1.
- 6.2.2 Open the Reactor Vessel head vent HV-0296A or HV-0296B.
- 6.2.3 Open quench tank vent valve HV-0299.
- 6.2.4 Complete system filling.
- 6.2.5 When the quench tank indicates liquid flow close valve HV-0296A or HV-0296B and open the pressurizer vent valve HV-0297A or HV-0297B.
- 6.2.6 When the pressurizer is full, close valves HV-0297A or HV-0297B and HV-0299.
- 6.2.7 Realign RCS vent valve power supplies per Check-Off List #2.

6.3 Emergency RCGVS Operation

CAUTION DO NOT USE THE RCGVS DURING EMERGENCY CONDITIONS UNLESS APPROVAL IS FIRST OBTAINED FROM THE NRC

- 6.3.1 Verify completed or completed the following.
  - 6.3.1.1 NRC approval to use system obtained.
  - 6.3.1.2 Place the hydrogen recombiners in operation per Operating Instruction S023-3-2.28.
  - 6.3.1.3 Complete checkoff list #1.

6.3.2 Selection of Vent Path

- .1 With only one power source available vent through the powered solenoid valves.

TCN  
No. 1

TCN  
No. 1

6.0 PROCEDURE (Continued)

6.3.2.2 With power available to both sets of solenoid valves and the quench tank rupture disc blown, vent to the quench tank if there is water in the tank to take advantage of the cooling provided by this water.

.2.1 If there is no water in the quench tank vent to atmosphere to provide more complete mixing with the containment atmosphere and quicker access to the hydrogen recombiners.

.3 With power available to both sets of valves, the quench tank rupture disc intact and there is water in the quench tank, vent to the quench tank.

NOTE: Venting the Reactor Vessel should take priority over containment hydrogen limits due to the potential for interruption of core cooling with hydrogen in the vessel.

NOTE: Venting of the pressurizer should not take priority over containment hydrogen limits unless the pressurizer bubble is interfering with the ability to maintain pressure control.

6.3.3 Venting the Reactor Vessel to the Quench Tank or Containment

.1 Charge to the RCS as necessary to maintain the pressurizer level at or above 33%.

.2 If available energize the pressurizer backup heaters as required to maintain a subcooled margin of 50°F.

.3 If the quench tank is available open the quench tank inlet valve HV-0299. If the quench tank is not available open the vent to containment HV-0298.

.4 Open the reactor head vent valve HV-0296A or HV-0296B.

.5 Monitor the hydrogen level in the containment while venting.

.6 Continue venting until shutdown cooling is established. Then close the reactor head vent valve opened in step 6.3.3.4.

.7 Close the valve opened in step 6.3.3.3.

.8 Realign RCS vent power supplies per Check-Off List #2.

6.3.4 Venting of the Pressurizer to the Containment

6.0 PROCEDURE (continued)

- 6.3.4.1 Insure there is sufficient water in the pressurizer to conduct the vent without uncovering the pressurizer heaters.
- .2 Use the pressurizer backup heaters to maintain RCS pressure  $\pm$  25 PSIA from existing plant pressure while venting.
  - .3 Charge as necessary to maintain pressurizer level greater than 33%.
  - .4 Open containment vent valve HV-0298.
  - .5 Open valve HV-0297A or HV-0297B long enough to remove the mass equivalent to the steam bubble in the pressurizer then close valve HV-0297A or HV-0297B. During vent monitor containment hydrogen levels.

NOTE: It may be necessary to secure venting temporarily to re-establish pressurizer level if large gas bubbles are to be vented.

- .6 Close the containment vent valve HV-0298.
- .7 Evaluate the effectiveness of the vent on bubble removal, repeat steps 6.3.5 and 6.3.6 if necessary.
- .8 Realign RCS vent valve power supplies per Check-Off #2.

6.3.5 Venting the Pressurizer to the Quench Tank

- .1 Insure there is sufficient water in the pressurizer to conduct the vent without uncovering the pressurizer heaters.
- .2 Use the pressurizer backup heaters to maintain RCS pressure  $\pm$  25 psia from existing plant pressure while venting.
- .3 Charge as necessary to maintain pressurizer level greater than 33%.
- .4 Open the quench tank vent valve HV-0299.
- .5 Open valve HV-0297A or HV-0297B long enough to remove the mass equivalent to the steam bubble in the pressurizer then close valve HV-0297A or HV-0297B. During vent monitor the containment hydrogen levels.

NOTE: It may be necessary to secure venting temporarily to reestablish pressurizer level if large gas bubbles are to be vented.

6.0 PROCEDURE (continued)

- 6.3.5.6 Close quench tank vent valve HV-0299.
- .7 Evaluate the effectiveness of the vent on bubble removal, repeat steps 6.3.5 and 6.3.6 if necessary.
- .8 Realign RCS vent valve power supplies per Check-Off List #2.

6.4 RCGVS Valve Leakage

6.4.1 Indications

- .1 Pressure indicator PI-0298 at Control Room shows a pressure increase and PSH-0298 will generate high pressure alarm.

6.4.2 Response

- .1 Perform RCS leak rate test in accordance with S023-3-1.6. Compare leak rate determination with a determination made prior to pressure increase on PI-0298. If there is no difference between the two, either the pressure gage is faulty or leakage has been contained by second isolation valve. An increase in the leak rate indicates not only if leakage is occurring, but it is also leaking past the second isolation valve, HV-0298, Vent to Containment.
- .2 If leakage is contained by second isolation valve, repair when plant conditions permit.
- .3 If leakage is not contained then compare leak rate to the Technical Specification limits (Tech. Spec. 3.4.5.2). If the leak rate is higher than the limits shutdown and repair the valves. If the leak rate is not above the limits then monitor containment activity and quench tank parameter to determine if leakage is to the quench tank or containment. Leaking valves should be repaired at earliest opportunity.

6.5 Alternate Method of Venting the RCS While Filling

- 6.5.1 Check normal head vent valves closed HV-0296A and HV-0296B.
- 6.5.2 Verify the availability of the Containment Purge System and obtain a release permit for gases vented from the Reactor Coolant System via the Containment Purge Exhaust.
- 6.5.3 Connect the discharge line from the vent rig to a Containment Purge Exhaust duct.

6.0 PROCEDURE (Cont'd)

**NOTE:** The vent rig may be of various design but should include a line with a poly bottle designed so the vented gases can go through the bottle. Liquid can be detected in the bottle so the vent valve can be closed before flooding the ventilation duct.

- 6.5.4 Have the blank removed from the reactor head vent line drain. (The reactor head vent line drain valve, S2(3)1201MU150, should remain closed.)
- 6.5.5 Have the vent rig connected to the reactor head vent line drain line flange.
- 6.5.6 Ensure Containment Purge System is in service.

**CAUTION:** The Containment Purge Exhaust must remain in service throughout this mode of venting to reduce the possibility of airborne contamination in the containment.

- 6.5.7 Open the reactor head vent line drain valve, S2(3)1201MU150.

**CAUTION:** Watch the bottle in the vent rig closely and close the valve if water starts filling the bottle rapidly.

- 6.5.8 When bottle is filling with water, close the reactor head vent line drain valve, S2(3)1201MU150.
- 6.5.9 Evaluate vent and repeat steps 6.5.7, and 6.5.8 if necessary. Vent rig bottle may have to be emptied if revent is necessary.
- 6.5.10 Have vent rig removed and blind flange replaced on the reactor head vent line drain line.

7.0 RECORDS

- 7.1 Forward completed Check-off List to the Watch Engineer for review and filing in the Watch Engineers Compliance File.
- 7.2 Completed records shall be periodically transferred to CDM in accordance with applicable station administrative procedures.



8.0 ATTACHMENTS

- 8.1 Check-Off List #1, "RCGVS Alignment for Use" (2 pages)
- 8.2 Check-Off List #2, "RCGVS Alignment When Not In Use" (1 page)
- 8.3 Attachment 1, "Vent Duration @ 2250 PSIA" (1 page)
- 8.4 Attachment 2, "Vent Duration @ 1000 PSIA" (1 page)
- 8.5 Attachment 3, "Vent Duration @ 250 PSIA" (1 page)
- 8.6 Attachment 4, "Steam Flowrate" (1 page)
- 8.7 Attachment 5, "Hydrogen Flowrate" (1 page)

H. E. MORGAN  
STATION OPERATIONS MANAGER

RM:pf  
NUS:230008

REACTOR COOLANT GAS VENT SYSTEM ALIGNMENT FOR USE

UNIT \_\_\_\_\_ (2 or 3) DATE \_\_\_\_\_  
MODE \_\_\_\_\_ (1-6) TIME \_\_\_\_\_

1.0 PREREQUISITES INITIALS

- 1.1 On shift Watch Engineer approval obtained. (W.E. initials) \_\_\_\_\_
- 1.2 This copy of Check-Off is current, the date and revision number match the controlled copy. \_\_\_\_\_
- 1.3 Temporary Change Notices affecting this procedure have been reviewed and changes incorporated. \_\_\_\_\_
  - 1.3.1 List any applicable TCNs or write N/A. \_\_\_\_\_

2.0 PROCEDURE

- 2.1 RCGVS refueling spool-piece in place. \_\_\_\_\_
- 2.2 Quench Tank (QT) and associated equipment in operation. \_\_\_\_\_
- 2.3 Verify both of the following BKR's are closed:
  - 2.3.1 2(3)D1P105 for HV-0299, HV-0296A, and HV-0297A \_\_\_\_\_
  - 2.3.2 2(3)D2P105 for HV-0298, HV-0296B, and HV-0297B \_\_\_\_\_
- 2.4 Pressurizer manual vent valve S2(3)1201MU010 open \_\_\_\_\_
- 2.5 Close the applicable disconnect switch on Panel ML-420 or ML-421 as applicable: (N/A valves not aligned) \_\_\_\_\_
  - 2.5.1 Panel ML-420:
    - .1 HV-0299 DS-1 and 2 \_\_\_\_\_
    - .2 HV-0296A DS-3 and 4 \_\_\_\_\_
    - .3 HV-0297A DS-5 and 6 \_\_\_\_\_
  - 2.5.2 Panel ML-421:
    - .1 HV-0298 DS-1 and 2 \_\_\_\_\_
    - .2 HV-0296B DS-3 and 4 \_\_\_\_\_
    - .3 HV-0297B DS-5 and 6 \_\_\_\_\_

SAN ONOFRE NUCLEAR GENERATING STATION  
UNITS 2 & 3

OPERATING INSTRUCTION S023-3-2.33  
REVISION 1 PAGE 2 OF 2  
CHECK-OFF LIST #1

COMPLETED BY: \_\_\_\_\_ DATE/TIME: \_\_\_\_\_  
Operator/Initials

REVIEWED BY: \_\_\_\_\_ DATE/TIME: \_\_\_\_\_  
Watch Engineer

FILE DISPOSITION: Watch Engineer's Compliance File

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

REACTOR COOLANT GAS VENT SYSTEM ALIGNMENT WHEN NOT IN USE

UNIT \_\_\_\_\_ (2 or 3) DATE \_\_\_\_\_

MODE \_\_\_\_\_ (1-6) TIME \_\_\_\_\_

1.0 PREREQUISITES INITIALS

1.1 On Shift Watch Engineer's approval obtained. (W.E. initials) \_\_\_\_\_

1.2 This copy of Check-Off is current, the date and revision number match the controlled copy. \_\_\_\_\_

1.3 Temporary Change Notices affecting this procedure have been reviewed and changes incorporated. \_\_\_\_\_

1.3.1 List any applicable TCNs or write N/A. \_\_\_\_\_

2.0 PROCEDURE

2.1 Open or verify open the following disconnect switches:

2.1.1 Panel ML-420 DS-1, DS-3, DS-5 \_\_\_\_\_

2.1.2 Panel ML-421 DS-1, DS-3, DS-5 \_\_\_\_\_

NOTE: DS-2, DS-4 & DS-6 are left closed for position indication (on each panel.)

COMPLETED BY: \_\_\_\_\_ DATE/TIME \_\_\_\_\_  
(OPERATOR) (INITIALS)

REVIEWED BY: \_\_\_\_\_ -DATE/TIME \_\_\_\_\_  
(WATCH ENGINEER)

FILE DISPOSITION: \_\_\_\_\_

COMMENTS: \_\_\_\_\_

\_\_\_\_\_

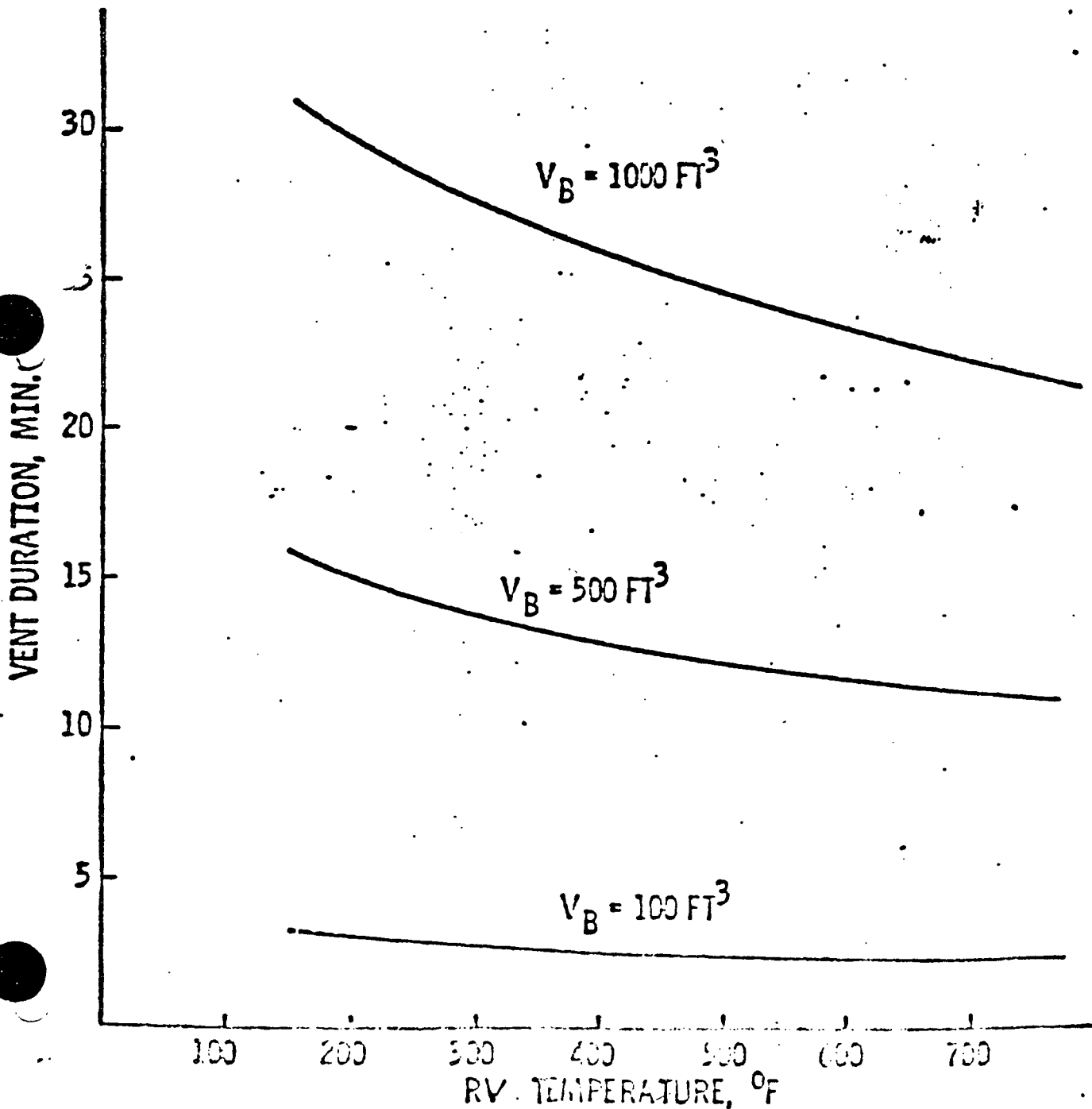
\_\_\_\_\_

\_\_\_\_\_

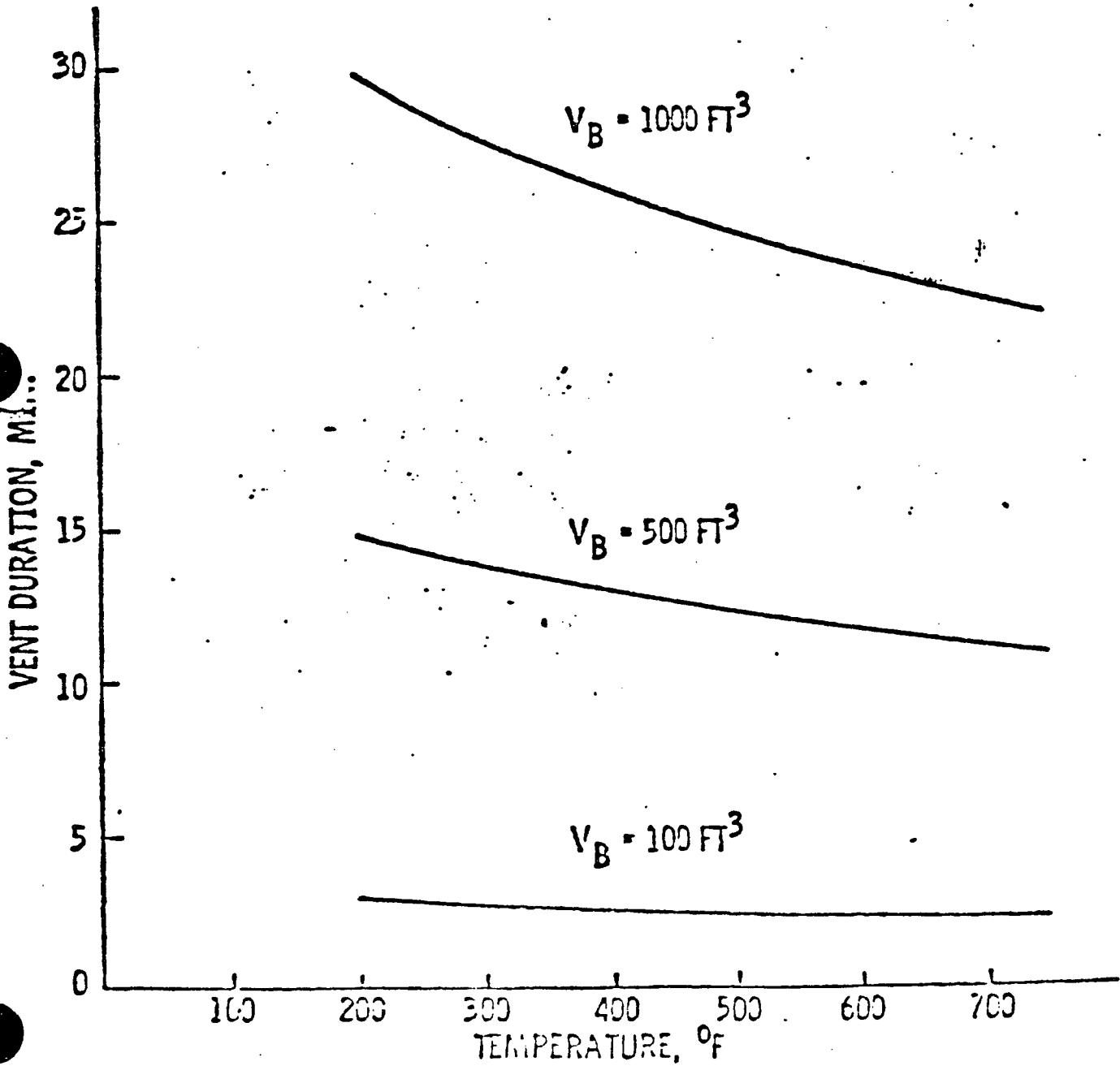
\_\_\_\_\_

.. VENT DURATION OF HYDROGEN vs RV.. TEMP.  
AT P = 2250 PSIA

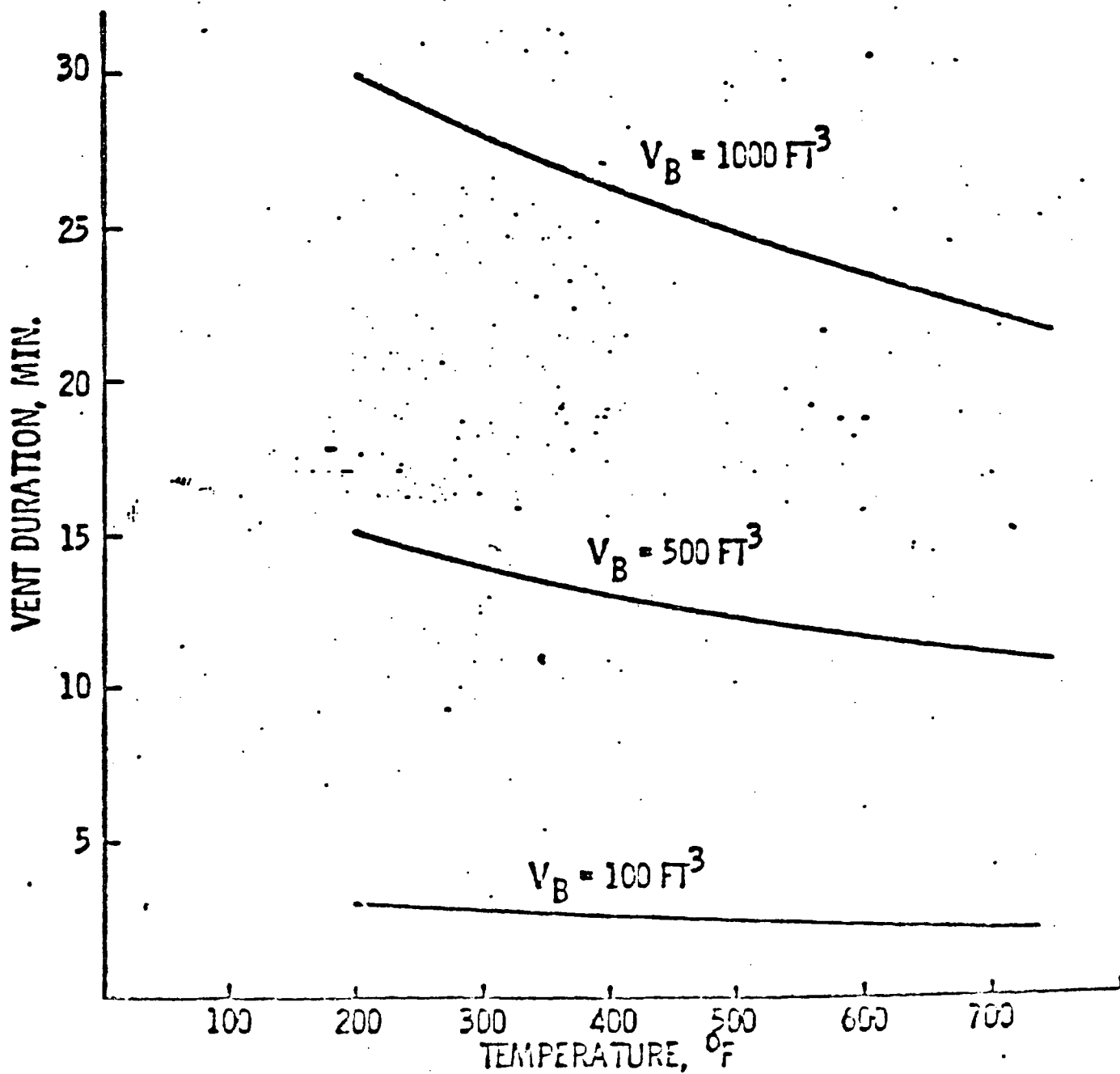
VB = VENTED VOLUME



VENT DURATION OF HYDROGEN vs RV. TEMP.  
AT P = 1000 PSIA  
VB = VENTED VOLUME



VENT DURATION OF HYDROGEN vs RV TEMP.  
AT P = 250 PSIA  
VB = VENTED VOLUME



STEAM (REACTOR)

