

ATTACHMENT 1

Consumers Power Company
Palisades Plant
Docket 50-255

PROPOSED PORV TECHNICAL SPECIFICATIONS

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3.1.8 POWER OPERATED RELIEF VALVES (PORVs)

Specifications

3.1.8.1 Two PORV flow paths, each consisting of an OPERABLE PORV and an OPERABLE block valve, shall be OPERABLE.

Applicability

Specification 3.1.8.1 is applicable at HOT STANDBY and above.

Action

- a. With one PORV flow path inoperable:
 1. For an inoperable block valve, place the associated PORV control in the "CLOSE" position within 1 hour.
 2. For an inoperable PORV, close the associated block valve within 1 hour.
 3. Restore both PORV flow paths to OPERABLE status within 7 days.
- b. With two PORV flow paths inoperable:
 1. For an inoperable block valve, place the associated PORV control in the "CLOSE" position within 1 hour.
 2. For an inoperable PORV, close the associated block valve within 1 hour.
 3. Restore one PORV flow path to OPERABLE status within 2 hours.
- c. If any action required by 3.1.8.1 is not met AND the associated completion time has expired, the reactor shall be placed in HOT SHUTDOWN within 12 hours.

3.1.8 POWER OPERATED RELIEF VALVES (PORVs)

Specification

- 3.1.8.2 Two PORV flow paths, each consisting of an OPERABLE PORV, with a lift pressure less than specified in Figure 3-4, and an OPERABLE block valve, shall be OPERABLE.

Note: The provisions of Specifications 3.0.4 and 4.0.4 are not applicable.

Applicability

Specification 3.1.8.2 is applicable when the temperature of either of the PCS cold legs is $< 430^{\circ}\text{F}$, unless the PCS is vented through a path capable of relieving 167 gpm at a PCS pressure of 315 psia.

Action

- a. With one PORV flow path inoperable:
1. For an inoperable block valve, place the associated PORV control in the "CLOSE" position within 1 hour.
 2. For an inoperable PORV, close the associated block valve within 1 hour.
 3. Restore both PORV flow paths to OPERABLE status:
 - a. within 24 hours with pressurizer water level $> 57\%$, or
 - b. within 7 days with pressurizer with water level $\leq 57\%$.
- b. With two PORV flow paths inoperable:
1. For an inoperable block valve, place the associated PORV control in the "CLOSE" position within 1 hour.
 2. For an inoperable PORV, close the associated block valve within 1 hour.
 3. Restore one PORV flow path to OPERABLE status within 2 hours.
- c. If any action required by 3.1.8.2 is not met AND the associated completion time has expired, depressurize and vent the PCS through a path capable of relieving 167 gpm at a PCS pressure of 315 psia, within 8 hours.

3.1.8 POWER OPERATED RELIEF VALVES (PORVs)

Basis 3.1.8

Specification 3.1.8 assures that the PORVs are available as a pressure relief path for the PCS and that the PORV block valves are available to terminate a spurious opening of the PORVs. Specification 3.1.8.1 applies at HOT STANDBY and above; 3.1.8.2 applies when the temperature of either PCS cold leg is below 430°F, unless the PCS is vented through a path capable of relieving 167 gpm at a PCS pressure of 315 psia.

If an inoperable PORV or block valve cannot be repaired within the specified completion time, Specification 3.1.8.1 requires the plant to be placed in HOT SHUTDOWN. It does not require a cooldown, which would place the plant in a condition where the PORVs provide the required automatic pressure protection. Time is allowed for repair of the valve, if possible, or to plan a cooldown with limited overpressure protection available. Specification 3.0.4 prohibits startup with a PORV or block valve inoperable.

If a cooldown must be made to repair the inoperable valve, the specified completion times of 3.1.8.2 allow a slow controlled evolution to occur.

The PORVs and their block valves must provide two safety functions; maintenance of PCS integrity and PCS pressure control capability. If either of these safety functions is unavailable, corrective action must be taken.

When the plant is at HOT STANDBY or above, the PORV flow paths provide assistance to the operator in mitigating an accident; at or below 430°F, the PORV flow paths provide protection against an accident. Therefore, the OPERABILITY of the PORVs and block valves is more important when below 430°F than when above.

Each completion time starts when it is discovered that the particular action statement applies. The specified times are based on those in the model Technical Specifications provided in Generic Letter 90-06.

3.1.8.1

When PCS temperature is at or above 430°F, the maximum allowable PCS pressure is the Safety Limit of 2750 psia. The pressurizer safety valves, required by Specification 3.1.7, prevent exceeding this pressure. The PORVs are required to be OPERABLE at HOT STANDBY and above to support Emergency Procedure operation in case of the need for Once Through Cooling. The PORVs are not assumed to function by the plant safety analyses.

Since the pressurizer safety valves provide the necessary automatic protection against excessive pressure when the PCS is above 430°F, automatic actuation of the PORVs is not required to be OPERABLE.

3:1.8 POWER OPERATED RELIEF VALVES (PORVs)

Basis 3.1.8.1 (continued)

Normally, during operation at HOT STANDBY and above, the PORV controls are in the CLOSE position, and the block valves are closed. The PORVs and their block valves must be able to be operated by the manual controls in the plant control room.

If either valve in a PORV flow path is inoperable, the other valve in the flow path must provide PCS integrity assurance. When a PORV is inoperable, the block valve must be closed; when a block valve is inoperable, the PORV must have its control placed in the "CLOSE" position.

If a PORV valve is inoperable such that it might open spuriously, the closed block valve provides assurance of PCS integrity. Similarly, if a block valve is inoperable because it cannot be closed, positioning the PORV control in the "CLOSE" position prevents a spurious automatic signal from opening the PORV.

If the inoperable valves cannot be restored to OPERABLE status within the specified completion time, the plant must be placed in HOT SHUTDOWN. The completion times allow the required action to be accomplished without undue haste, yet allow less time when more equipment is inoperable.

3.1.8.2

When PCS is below 430°F, and is not vented through an adequate path, two PORVs are required to be operable to avoid pressures which might lead to failure of the reactor vessel. The allowable pressure limits are determined in accordance with 10 CFR 50, Appendix G, and are referred to as "Low Temperature Overpressure Protection" (LTOP) limits.

One PORV provides sufficient flow area to prevent excessive PCS pressure. Two operable PORVs are specified to meet the "single failure" criteria of 10 CFR 50, Appendix A, Criterion 34.

There are three transients which could cause pressure to exceed these limits if the PORVs were not operable: (1) an imbalance between charging and letdown rates, (2) starting a High Pressure Safety Injection (HPSI) pump, or (3) starting a Primary Coolant Pump (PCP) when steam generator temperature is greater than PCS temperature.

A Safety Injection Signal (SIS) could initiate transients (1) and (2) simultaneously. Analysis (Reference 1) has concluded that even with three charging pumps operating initially, an SIS occurring between 260°F and 430°F would not cause PCS pressure to exceed the Appendix G limit if a PORV opens when the set pressure is reached. Below 260°F the PORVs still provide overpressure protection since inadvertent HPSI pump starts are precluded by Specification 3.3.2g (HPSI pump operability limits). An overpressure event due to occurrence of transient (3) is precluded by Specification 3.1.1h (PCP starting limitations).

3:1.8 POWER OPERATED RELIEF VALVES (PORVs)

Basis 3.1.8.2 (continued)

Since the pressure response to a transient is greater if the pressurizer steam space is small or if PCS is solid, the allowed outage time for a PORV flow path out of service is shorter. The maximum pressurizer level at which credit can be taken for having a bubble (57%, which provides about 700 cubic feet of steam space) is based judgement rather than on analyses. This level provides the same steam volume to dampen pressure transients as would be available at full power. This steam volume provides time for operator action, if the PORVs failed to operate, between an inadvertent SIS and PCS pressure reaching the 10 CFR 50 Appendix G pressure limit. The time available for action would depend upon the existing pressure and temperature when the inadvertent SIS occurred.

References 3 and 4 show that, when the shutdown cooling system is not isolated (MO-3015 and MO-3016 are open), the system will not be pressurized above its design pressure by one of these transients.

This protection is afforded by the combination of relief valves on the shutdown cooling system and Specifications 3.1.1.h (PCP starting limits), 3.1.2a and 3.1.2c (PCS Heatup and Cooldown Rate limits), and 3.3.2g.

The variable setpoint of the LTOP system is programmed and calibrated to ensure opening of the pressurizer PORVs when the PCS pressure is above the limit in Figure 3-4. The pressure limit for each temperature is developed from the heating or cooling limits for the PCS.

The limit in Figure 3-4 includes an allowance for pressure overshoot during the interval between the time pressurizer pressure reaches the limit, and the time a PORV opens enough to terminate the pressure rise. LTOP is provided by two independent channels each consisting of measurement, control, actuation, and valves. Either channel is capable of providing full protection. The actual setpoint of PORV actuation for LTOP will be below the limit in Figure 3-4 to allow for potential instrument inaccuracies, and drift. This will ensure that at no time between calibration intervals will the PCS pressure exceed the limit of Figure 3-4 without PORV actuation.

The requirement for the PCS to be depressurized and vented when one or both PORVs are inoperable ensures that the 10 CFR 50, Appendix G, pressure limits will not be exceeded. Reference 1 has determined that any vent path capable of relieving 167 gpm at a PCS pressure of 315 psia is acceptable. The following vent path examples are acceptable:

1. Removal of the reactor vessel head,
2. Removal of a Steam Generator primary manway,
3. Removal of the pressurizer manway,
4. Removal of a pressurizer safety valve,
5. Both PORVs and associated block valves open,
6. Opening of both PCS vent valves PC-514 and PC-515.

3:1.8 POWER OPERATED RELIEF VALVES (PORVs)

Basis - 3.1.8.2 (continued)

Reference 2 determined that venting the PCS through PC-514 and PC-515 provided adequate flow area. The other listed examples provide greater flow areas with less piping restriction and are therefore acceptable. Other vent paths shown to provide adequate capacity could also be used.

If the PORVs are elected as the vent path, both valves must be used to meet the single failure criterion, since the PORVs are held open against spring pressure by energizing the operating solenoid.

The 167 gpm flow area is based on an assumed charging imbalance due to interruption of letdown flow with three charging pumps operating, a 40°F per hour PCS heatup rate, a 60°F per hour pressurizer heatup rate, and an initially depressurized and vented PCS. The PCS heatup rate is limited to 40°F per hour by Specification 3.1.2a; the pressurizer heatup rate is limited to 60°F per hour by Specification 3.1.2c. Neither HPSI pump nor PCP starts need to be assumed with the PCS initially depressurized, because Specification 3.3.2g requires both HPSI pumps to be inoperable and operating procedures prohibit PCP operation.

References

1. Consumers Power Company Engineering Analysis, EA-FC-809-13, Rev 1
2. Consumers Power Company Engineering Analysis, EA-TCD-91-01-01.
3. Consumers Power Company Engineering Analysis, EA-PAL-89-040-1
4. Consumers Power Company Corrective Action Document, A-PAL-91-011

Table 3.17.4 (Cont'd)

<u>No</u>	<u>Functional Unit</u>	<u>Minimum Operable Channels</u>	<u>Minimum Degree of Redundancy</u>	<u>Permissible Bypass Conditions</u>
8.	Pressurizer Wide Range Water Level Indication	2 ^(m, p, q)	None	Not required in Cold or Refueling Shutdown
9.	Pressurizer Code Safety Relief Valves Position Indication (Acoustic Monitor or Temperature Indication)	1 per Valve	None	Not Required below 325°F
10.	Power Operated Relief Valves (Acoustic Monitor or Temperature Indication)	1 per Valve	None	Not required when PORV isolation valve is closed and its indication system is operable
11.	PORV Block Valve Position Indication	1 per Valve	None	Not required when reactor is depressurized and vented in accordance with Specification 3.1.8
12.	Subcooling Margin Monitor	1	None	Not required below 325°F
13.	Auxiliary Feed Flow Rate Indication	1 per flow ^(h) Control Valve	None	Not required below 325°F
14.	Auxiliary Feedwater Actuation System Sensor Channels	2 per steam generator ^(e)	1	Not required below 325°F
15.	Auxiliary Feedwater Actuation System Actuation Channels	2 ^(f)	1	Not required below 325°F
16.	Excure Detector Deviation Alarms	1 ^(g)	None	Not Required Below 25% of Rated Power
17.	Axial Shape Index Alarm	2 ⁽ⁱ⁾	1	Not Required Below 25% of Rated Power
18.	Reactor Vessel Water Level	2 ^(j,k,l,m)	None	Not Required Below 325°F

4.1 INSTRUMENTATION AND CONTROL

Applicability

Applies to the reactor protective system and other critical instrumentation and controls.

Objective

To specify the minimum frequency and type of surveillance to be applied to critical plant instrumentation and controls.

Specifications

Calibration, testing, and checking of instrument channels, reactor protective system and engineered safeguards system logic channels and miscellaneous instrument systems and controls shall be performed as specified in 4.1.1 and in Tables 4.1.1 to 4.1.3.

4.1.1 Overpressure Protection Systems

- a. In addition to the requirements of Specification 4.0.5, each PORV shall be demonstrated OPERABLE by:
 1. Performance of a channel functional test on the PORV actuation channel, but excluding valve operation, at least once per 31 days.
 2. Performance of a channel calibration on the PORV actuation channel at least once per 18 months.
 3. Verifying the associated block valve is open at least once per 72 hours when the PORV is being used for overpressure protection.
 4. Testing in accordance with the inservice inspection requirements for ASME Boiler and Pressure Vessel Code, Section XI, Section IWV, Category C valves.
 5. Performing a complete cycle of the PORV prior to each entry into conditions where the valves are required for LTOP unless cycled within the previous 92 days, and at least once per 18 months.
- b. Each PORV block valve shall be demonstrated OPERABLE by:
 1. Performing a complete cycle of the block valve at least once per 18 months.