

SAFETY EVALUATION REPORTPALISADES PLANTOVERRIDE OF CONTAINMENT PURGE ISOLATION AND
OTHER ENGINEERED SAFETY FEATURE ACTUATION SIGNALSIntroduction

As a result of Abnormal Occurrence #78-5, the NRC issued a generic letter requesting each licensee to take certain actions.

Evaluation

The enclosed report was prepared for us by EG&G, Idaho, as part of our technical assistance program for SEP. This report provides a technical evaluation of the electrical instrumentation and control design aspects of the override of containment purge valves isolation and other engineered safety feature actuation signals and is based upon review of these design aspects against the six NRC criteria provided for the review. The technical evaluation concludes that with one exception, the modifications made by the licensee at the plant have brought the designs into conformance with our review criteria. The one exception is that a safety injection actuation signal does not initiate containment purge and ventilation system isolation.

At Palisades, all of the containment atmosphere lines are blanked off during plant power operations except for the 12 inch air rooms purge supply. The licensee, in response to NUREG-0737, has committed to make the following changes in the circuitry for this 12 inch line.

Valves CV-1813 and 1814 on the air supply line to the air room are normally closed; however, there is no mechanical device to administratively seal the valves closed. Procurement of key lock switches to seal these valves closed is now in process. Once these key lock switches become available, they will be installed at the first subsequent cold shutdown of the plant. In the interim, links will be opened and tagged to de-energize the power to the hand switches so that these valves cannot be opened. Valves CV-1813 and 1814 are not now included but will be added to MO-29.

(The containment purge valves are verified to be closed at least every 31 days by Technical Specifications Surveillance Program Procedure MO-29.)

Conclusion

Based upon our review of the consultant's technical evaluation, we conclude that the electrical, instrumentation and control design aspects of the override of containment purge valves isolation and other engineered safety feature actuation signals are acceptable.

SEP TECHNICAL EVALUATION

TOPIC VI-4
ELECTRICAL, INSTRUMENTATION, AND CONTROL ASPECTS OF
THE OVERRIDE OF CONTAINMENT PURGE VALVE ISOLATION

FINAL DRAFT

PALISADES PLANT

Docket No. 50-255

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SEP TECHNICAL EVALUATION

TOPIC VI-4

ELECTRICAL, INSTRUMENTATION, AND CONTROL ASPECTS OF THE OVERRIDE OF CONTAINMENT PURGE VALVE ISOLATION

PALISADES PLANT

1.0 INTRODUCTION

Based on the information supplied by the Consumers Power Company (CP) this report addresses the electrical, instrumentation, and control systems design aspects of the Containment Ventilation Isolation (CVI) system.

Several instances have been reported where the automatic closure of the containment ventilation or purge isolation valves would not have occurred because the safety actuation signals were manually overridden or blocked during normal plant operations. Lack of proper management controls, procedural inadequacies, and circuit design deficiencies contributed to these instances. These events also brought into question the mechanical operability of the valves themselves. These events were determined by the Nuclear Regulatory Commission (NRC) to be an Abnormal Occurrence (#78-05) and accordingly, were reported to Congress.

The NRC is now reviewing the electrical override aspects of containment purging and venting for all operating reactors. On November 28, 1978, the NRC issued a letter, "Containment Purging During Normal Plant Operation"¹ to all Boiling Water Reactor and Pressurized Water Reactor licensees, which required a review of these systems by the licensee. CP responded on December 28, 1978², March 1, 1979³, and July 14, 1980⁴. The Final Safety Analysis Report (FSAR) also contains design information reviewed for this report.

2.0 EVALUATION OF THE PALISADES PLANT

2.1 Review Guidelines

The intent of this evaluation is to determine if the actuating signals for the CVI system meet the following NRC requirements:

1. Guideline No. 1--In keeping with the requirements of General Design Criteria 55 and 56, the override^a of one type of safety actuation signal (e.g., radiation) should not cause the blocking of

a. The following definitions are given for clarity of use in this evaluation:

Override: the signal is still present, and it is blocked in order to perform a function contrary to the signal.

any other type of safety actuation signal (e.g., pressure) for those valves that have no function besides containment isolation.

2. Guideline No. 2--Sufficient physical features (e.g., key lock switches) are to be provided to facilitate adequate administrative controls.
3. Guideline No. 3--A system level annunciation of the overridden status should be provided for every safety system impacted when any override is active.

Additionally, this review uses the following NRC design guidelines:

1. Guideline No. 4--Diverse signals should be provided to initiate isolation of the containment ventilation system. Specifically, containment high radiation, safety injection actuation, and containment high pressure (where containment high pressure is not a portion of safety injection actuation) should automatically initiate CVI.
2. Guideline No. 5--The instrumentation and control systems provided to initiate the ESF should be designed and qualified as safety grade equipment.
3. Guideline No. 6--the overriding or resetting^a of the ESF actuation signal should not cause any valve or damper to change position.

2.2 Containment Ventilation Isolation Circuits Design Description

Automatic closure of containment purge and vent isolation valves will occur on any of the following conditions⁴:

1. High containment pressure
2. High containment radiation.

CP has indicated that these signals are derived from safety grade equipment.

The control of the solenoid-operated purge and vent valves use maintained position control switches. Relay interlocks require these switches to be returned to the closed position after an isolation signal before the valve can be re-opened. Valve position lights show the actual valve position. The solenoid valves fail closed on loss of air or on loss of power.

a. The following definitions are given for clarity of use in this evaluation:

Reset: the signal has come and gone, and the circuit is being cleared in order to return it to the normal condition.

The override of the CVI valves automatic closure can only be done by use of jumpers.⁴

The CVI valve control circuits have been modified⁴ to prevent changing position on reset of the actuation signal. Resetting of the actuation signal is by depressing a protected (by an open ring guard) pushbutton switch. Pressing this switch while the actuating condition is present has no effect of the actuation signal.

2.3 Containment Ventilation Isolation System Design Evaluation

Guideline 1 requires that no signal override can prevent another safety actuation signal from functioning. The Palisades plant has no provision for overriding the actuation signals which cause isolation of the CVI valves. The Palisades plant is in conformance with this guideline.

Guideline 2 requires that reset and override switches have physical provisions to aid in the administrative control of these switches. There are no override switches. The reset switches are protected by a ring guard and are of no effect if the actuation signal is still present⁴. This guideline is satisfied.

Guideline 3 requires system level annunciation whenever an override affects the performance of a safety system. In the CP review of other safety actuation signals, they state that system level annunciation is provided for every override at the Palisades plant. This is in conformance with this NRC guideline.

Guideline 4 requires that isolation of the CVI valves be actuated by several diverse signals. This requirement is not met in that only:

1. High pressure in the reactor building will initiate isolation
2. High-level radiation trips will initiate isolation.

Safety injection actuation will not initiate isolation.

Guideline 5 requires that isolation actuation signals be derived from safety grade equipment. The Palisades plant meets this requirement.

Guideline 6 requires that no reset of isolation logic will, of itself, automatically open the isolation valves. The Palisades plant now complies with this guideline.

2.4 Other Related Engineered Safety Feature System Circuits

A review of other related ESF circuits was also made. No other manual overrides have been identified in the review of the material submitted for this audit.

3.0 SUMMARY

The NRC issued a letter, "Containment Purging During Normal Plant Operation," which requested CP to review purging requirements, controls, and procedures for purging at the Palisades plant.

The electrical, instrumentation, and control design aspects of the containment ventilation isolation valves for Palisades plant were evaluated using the design guidelines stated in Section 2.1 of this report. These guidelines are satisfied except that a safety injection will not cause the CVI system to isolate containment.

The NRC should, in its integrated assessment of the Palisades plant, require that this deficiency be corrected.

4.0 REFERENCES

1. NRC/DOR letter (A. Schwencer) to CP&L and all BWR and PWR licensees, "Containment Purging During Normal Plant Operation," dated November 28, 1978.
2. CP letter, D. P. Hoffman, to Director, Nuclear Reactor Regulation, U. S. NRC, "Containment Purging During Normal Plant Operation", December 28, 1978.
3. CP letter, D. P. Hoffman, to Director, Nuclear Reactor Regulation, U. S. NRC, "Containment Purging During Normal Plant Operation", March 1, 1979.
4. CP letter, D. P. Hoffman, to Director, Nuclear Reactor Regulation, U. S. NRC, "Response to SEP Topic VI-4--Containment Isolation System," July 14, 1980.