Docket File 50-286

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

November 28, 1978

Docket No. 50-286

Power Authority of the State of New York
ATTN: Mr. George T. Berry
General Manager and
Chief Engineer
10 Columbus Circle
New York, New York 10019

Gentlemen:

RE: CONTAINMENT PURGING DURING NORMAL PLANT OPERATION

A number of events have occurred over the past several years which directly relate to the practice of containment purging during normal plant operation. During recent months, two specific events have occurred which have raised several questions relative to potential failures of automatic isolation of the large diameter purge penetrations which are used during power operation. On July 26, 1978, the Northeast Nuclear Energy Company reported to the NRC such an event at Millstone Unit No. 2, a pressurized water reactor located in New London County, Connecticut. On September 8, 1978, the Public Service Electric and Gas Company reported a similar event at Salem Unit No. 1, a pressurized water reactor located in Salem County, New Jersey.

During a review of operating procedures on July 25, 1978, the licensee discovered that since May 1, 1978, intermittent containment purge operations had been conducted at Millstone Unit No. 2 with the safety actuation isolation signals to both inlet and outlet redundant containment isolation valves (48 inch butterfly valves) in the purge inlet and outlet penetrations manually overridden and inoperable. The isolation signals which are required to automatically close the purge valves for containment integrity were manually overridden to allow purging of containment with a high radiation signal present. The manual override circuitry designed by the plant's architect/engineer defeated the high radiation signal and all other isolation signals to these valves. To manually override a safety actuation signal, the operator cycles the valve control switch to the closed position and then to the open position. This action energized a relay which blocked the safety signal and allowed manual operation independent of any safety actuation signal. This circuitry was designed to permit reopening these valves after an accident to allow manual operation of certain safety equipment.

On September 8, 1978, the staff was advised that, as a matter of routine, Salem Unit No. 1 has been venting the containment through the containment ventilation system valves to reduce pressure. In certain instances this venting has occurred with the containment high particulate radiation monitor isolation signal to the purge and pressure-vacuum relief valves overridden. Override of the containment isolation signal was accomplished by resetting the train A and B reset buttons. Under these circumstances, six valves in the containment vent and purge systems could be opened with a high particulate isolation signal present. This override was performed after verifying that the actual containment particulate levels were acceptable for venting. The licensee, after further investigation of this practice, determined that the reset of the particulate alarm also bypasses the containment isolation signal to the purge valves and that the purge valves would not have automatically closed in the event of an emergency core cooling system (ECCS) safety injection signal.

These events and information gained from recent licensing actions have raised several concerns relative to potential failures affecting the purge penetration valves which could lead to a degradation in containment integrity and, for PWR's, a degradation in ECCS performance. Should a loss-of-coolant accident (LOCA) occur during purging there could be insufficient containment backpressure to assure proper operation of the ECCS. As the practice of containment purging during normal operation has become more prevalent in recent years, we have required that applicants for construction permits or operating licenses provide test results or analyses to demonstrate the capability of the purge isolation valves to close against the dynamic forces of a design basis LOCA. Some licensees have Technical Specifications which prohibit purging during plant operation pending demonstration of isolation valve operability.

In light of the above, we request that you provide within 30 days of receipt of this letter your commitment to cease all containment purge during operation (hot shutdown, hot standby, startup and power operation) or a justification for continuing purging at your facility. Specifically, provide the following information:

(1) Propose an amendment to the plant Technical Specifications based upon the enclosed model Technical Specification, or

(2) If you plan to justify limited purging, you must propose a Technical Specification change limiting purging during operation to 90 hours per year as described in the enclosed Standard Review Plan Section 6.2.4, Revision 1. Your justification must include a demonstration (by test or by test and analysis similar to that required by Standard Review Plan 3.9.3) of the ability of the containment isolation valves to close under postulated design basis accident conditions. Within thirty days of receipt of this letter, you are requested to provide a schedule for completion of your evaluation justifying continuation of limited purging during power operation.

(3) If you plan to justify unlimited purging you need not propose a Technical Specification change at this time. You must, however, provide the basis for purging and a schedule for responding to the issues relating to purging during normal operation as described in the enclosed Standard Review Plan Section 6.2.4, Revision 1, and the associated Branch Technical Position CSB 6-4. As discussed in these documents, purging during normal operation may be permitted if the purge isolation valves are capable of closing against the dynamic forces of a design basis loss-of-coolant accident. Also, basis for unlimited purging must include an evaluation of the impact of purging during operation on ECCS performance, an evaluation of the radiological consequences of any design basis accident requiring containment isolation occurring during purge operations, and an evaluation of containment purge and isolation instrumentation and control circuit designs. Within thirty days of receipt of this letter, you are requested to provide a schedule for completion of your evaluation justifying continuation of unlimited purging during power operation.

Pending completion of the NRC staff review of the justification for continued purging in (2) or (3) above, you should commit to either cease purging or limit purging to an absolute minimum, not to exceed 90 hours per year.

The staff believes that both the Millstone and Salem events resulted from lack of proper management control, procedural inadequacies, and possible design deficiencies. While the containment atmosphere was properly sampled and the purging (venting) discharges at both facilities were within regulatory requirements, the existing plant operating procedures approved by the licensee's management did not adequately address the operability of the purge valves and the need for strict limitations on (or prohibition of) overriding a safety actuation closure signal. The requirements for valve operability were not discussed and the related Technical Specifications were not referenced in the procedures. Design deficiencies probably contributed to the events as the safety actuation bypass condition is not annunciated nor is a direct manual reset of the safety actuation signal available. Consequently, we have developed the position specified below to assure that the design and use of all override circuitry in your plant is such that your plant will have the protection needed during postulated accident conditions.

Whether or not you plan to justify purging, you should review the design of all safety actuation signal circuits which incorporate a manual override feature to ensure that overriding of one safety actuation signal does not also cause the bypass of any other safety actuation signal, that sufficient physical features are provided to facilitate adequate administrative controls, and that the use of each such manual override is annunciated at the system level for every system impacted. Within thirty days of receipt of this letter, you are requested to provide (1) the results of your review of override circuitry and (2) a schedule for the development of any design or procedural changes imposed or planned to assure correction of any non-conforming circuits. Until you have reviewed circuitry to the extent necessary to verify that operation of a bypass will affect no safety functions other than those analyzed and discussed on your docket, do not bypass that signal. Our Office of Inspection and Enforcement will verify that

you have inaugurated administrative controls to prevent improper manual defeat of safety actuation signals as a part of its regular inspection program.

Sincerely,

Original Signed By

A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors

Enclosures:
1. Model Technical Specification
2. Standard Review Plan
3. Branch Technical Position CSB 6-4

cc: w/enclosures
See next page

DISTRIBUTION
Docket File

NRC PDR
Local PDR
ORB1 Rdg
A. Schwencer
C. Parrish
Project Manager
M. Mlynczak
W. Russell
I&E (3)
D. Eisenhut
OELD
B. Grimes
TERA
J. Buchanan
ACRS (16)

Oral concurrence by AS 11/29/78

OFFICE	DOR:ORB1	DOR:ORB1				
SURNAME	Proj. Mgr.	A. Schwencer				
DATE	11/29/78	11/29/78				

cc: White Plains Public Library
100 Martine Avenue
White Plains, New York 10610

Leonard M. Trosten, Esquire
LeBoeuf, Lamb, Leiby & MacRae
1757 N Street, NW
Washington, D.C. 20036

Anthony Z. Roisman
Natural Resources Defense Council
917 - 15th Street, NW
Washington, D.C. 20005

Paul S. Shemin, Esquire
Assistant Attorney General
State of New York
Department of Law
Two World Trade Center
New York, New York 10047

Sarah Chasis, Esquire
Natural Resources Defense Council
122 East 42nd Street
New York, New York 10017

Mr. George M. Wilverding
Licensing Supervisor
Power Authority of the State
of New York
10 Columbus Circle
New York, New York 10019

Mr. P. W. Lyon
Manager - Nuclear Operations
Power Authority of the State
of New York
10 Columbus Circle
New York, New York 10019

Mr. J. P. Bayne, Resident Manager
Indian Point 3 Nuclear Power Plant
P. O. Box 215
Buchanan, New York 10511

Power Authority of the State of
New York
Environmental Programs
J. W. Blake, Ph.D.
Director
10 Columbus Circle
New York, New York 10019

Theodore A. Rebelowski
USNRC
P. O. Box 38
Buchanan, New York 10511

U.S. NUCLEAR REGULATORY COMMISSION
STANDARD REVIEW PLAN
OFFICE OF NUCLEAR REACTOR REGULATION

SECTION 6.2.4 CONTAINMENT ISOLATION SYSTEM

REVIEW RESPONSIBILITIES

Primary - Containment Systems Branch (CSB)

Secondary - Accident Analysis Branch (AAB)
Instrumentation and Control System Branch (ICSB)
Mechanical Engineering Branch (MEB)
Structural Engineering Branch (SEB)
Reactor Systems Branch (RSB)
Power Systems Branch (PSB)

I. AREAS OF REVIEW

The design objective of the containment isolation system is to allow the normal or emergency passage of fluids through the containment boundary while preserving the ability of the boundary to prevent or limit the escape of fission products that may result from postulated accidents. This SRP section, therefore, is concerned with the isolation of fluid systems which penetrate the containment boundary, including the design and testing requirements for isolation barriers and actuators. Isolation barriers include valves, closed piping systems, and blind flanges.

The CSB reviews the information presented in the applicant's safety analysis report (SAR) regarding containment isolation provisions to assure conformance with the requirements of General Design Criteria 54, 55, 56 and 57. The CSB review covers the following aspects of containment isolation:

1. The design of containment isolation provisions, including:

   a. The number and location of isolation valves, i.e., the isolation valve arrangements and the physical location of isolation valves with respect to the containment.

   b. The actuation and control features for isolation valves.

   c. The positions of isolation valves for normal plant operating conditions (including shutdown), post-accident conditions, and in the event of valve operator power failures.

   d. The valve actuation signals.

   e. The basis for selection of closure times of isolation valves.

f. The mechanical redundancy of isolation devices.

g. The acceptability of closed piping systems inside containment as isolation barriers.

2. The protection provided for containment isolation provisions against loss of function from missiles, pipe whip, and earthquakes.

3. The environmental conditions inside and outside the containment that were considered in the design of isolation barriers.

4. The design criteria applied to isolation barriers and piping.

5. The provisions for detecting a possible need to isolate remote-manual-controlled systems, such as engineered safety features systems.

6. The design provisions for and technical specifications pertaining to operability and leakage rate testing of the isolation barriers.

7. The calculation of containment atmosphere released prior to isolation valve closure for lines that provide a direct path to the environs.

PSB has primary responsibility for the qualification test program for electric valve operators, and the ICSB has primary responsibility for the qualification test program for the sensing and actuation instrumentation of the plant protection system located both inside and outside of containment. The MEB has review responsibility for the qualification test program to demonstrate the performance and reliability of containment isolation valves. The MEB and SEB have review responsibility for mechanical and structural design of the containment isolation provisions to ensure adequate protection against missiles, pipe whip, and earthquakes. The AAB reviews the radiological dose consequence analysis for the release of containment atmosphere prior to closure of containment isolation valves in lines that provide a direct path to the environs. The RSB reviews the closure time for containment isolation valves in lines that provide a direct path to the environs, with respect to the prediction of onset of accident induced fuel failure.

II. ACCEPTANCE CRITERIA

The general design criteria establish requirements for isolation barriers in lines penetrating the primary containment boundary. In general, two isolation barriers in series are required to assure that the isolation function is satisfied assuming any single active failure in the containment isolation provisions.

The design of the containment isolation provisions will be acceptable to CSB if the following criteria are satisfied:

1. General Design Criteria 55 and 56 require that lines that penetrate the primary containment boundary and either are part of the reactor coolant pressure boundary or