September 14, 1982

Docket No. 50-155
LS05-82-09-040

Mr. David VandeWalle
Nuclear Licensing Administrator
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Dear Mr. VandeWalle:

SUBJECT: STATUS OF GENERIC ITEM B-24, CONTAINMENT PURGING/VENTING DURING NORMAL OPERATIONS - BIG ROCK POINT

In our letter of November 29, 1978, we identified the generic concerns of purging and venting of containments to all operating reactor licensees and requested your response to these concerns. Our review of your response was interrupted by the TMI accident and its demands on staff resources. Consequently, as you know, an Interim Position on containment purging and venting was transmitted to you on October 23, 1979. You were requested to implement short-term corrective actions to remain in effect pending completion of our longer-term review of your response to our November 29, 1978 letter.

Over the past several months we and our contractors have been reviewing the responses to our November 1978 letter to close out our long-term review of this rather complex issue. The components of this review are as follows:

1. Conformance to Standard Review Plan Section 6.2.4 Revision 1 and Branch Technical Position CSB 6-4 Revision 1.

   These documents were provided as enclosures to our November 1978 letter.

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2. Valve Operability

   Although the Interim Position allowed blocking of the valves at partial-open positions, this is indeed an interim position. Earlier we requested a program demonstrating operability of the valves in accordance with our "Guidelines for Demonstrative Operability in Purge and Vent Valves." These Guidelines were sent to you in our letter of September 27, 1979. There is an acceptable alternative which you may wish to consider in lieu of completing the valve qualification program for the large butterfly-type valves. This

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would be 8 inches or smaller that would bypass the larger valves. Such a system change might prove more timely and more cost-effective. The system would meet BTP CSB-6-4 Item B.1.c.

3. Safety Actuation Signal Override

This involves the review of safety actuation signal circuits to ensure that overriding of one safety actuation signal does not also cause the bypass of any other safety actuation signal.

4. Containment Leakage Due to Seal Deterioration

Position B.4 of the BTP CSB 6-4 requires that provisions be made to test the availability of the isolation function and the leakage rate of the isolation valves in the vent and purge lines, individually, during reactor operations. But CSB 6-4 does not explain when or how these tests are to be performed. Enclosure 1 is an amplification of Position B.4 concerning these tests.

The status of our long-term review of the above items for Big Rock Point is as follows:

1. Conformance to Standard Review Plan Section 6.2.4 Revision 1 and Branch Technical Position CSB 6-4 Revision 1

The issuance of the enclosed Safety Evaluation Report (Enclosure 2) resolves this item subject to the three conditions discussed therein and provided below:

a. Provide an acceptable method of ensuring that the containment valves in the purge supply and exhaust lines will bot be prevented from closing or properly seating by debris. An acceptable method is the installation of debris screens in these lines.

b. As a general philosophy, the NRC believes that the containment integrity should always be intact during power operation. Operation of the purge system at Big Rock Point introduces a pathway for leakage which has to be closed by mechanical equipment in the event of an accident. Since a containment that operates with the purge valves closed requires no actions to achieve containment isolation, the staff recommends that licensees limit purging as much as possible. You should limit purging to the minimum time commensurate with identified safety needs. Therefore, commit to limit the use of the purge system to a specified annual time that is commensurate with identified safety needs.

c. You should propose a Technical Specification which requires that you perform leakage tests of the isolation valves in the containment purge lines at least once every three months. A model for this Technical Specification is included as part of Enclosure 3.

You are requested to respond to the above three items within 60 days of receipt of this letter.

2. Valve Operability

Your submittals of October 24, 1980, April 20, 1981 and May 26, 1981, are under review by the NRC staff.

3. Safety Actuation Signal Override

Our Safety Evaluation Report on this item was sent to you by a letter dated November 24, 1981 from Crutchfield to Hoffman under SEP Topic VI-4, "Containment Isolation System (Electrical)." That letter and SER concluded that your facility satisfies our electrical requirements with regard to this issue and is, therefore, acceptable.

4. Containment Leakage Due to Seal Deterioration

This issue is covered by 1.c above.

In closing, you may have noted the similarity of this long-term generic issue with Item II.E.4.2 of NUREG-0737, TMI Action Plan. Except for Positions 6 and 7 of Item II.E.4.2, the review of the remaining outstanding positions of Item II.E.4.2 will be completed by this purge and vent review. Our schedule of the purge and vent review agrees with the schedule for Item II.E.4.2. Our acceptance of Big Rock Point with respect to Item II.E.4.2(5) has been documented in our letter dated August 5, 1981. Thus, your assistance in completing the oustanding purge and vent items, noted above, is necessary to complete Item II.E.4.2.

Please contact your NRC Project Manager, Richard Emch, should you have any questions.

Sincerely,

Original signed by
Walter A. Paulson for/

Dennis M. Crutchfield, Chief
Operating Reactors Branch #5
Division of Licensing

Enclosures:
As stated

*SEE PREVIOUS TISSUE FOR CONCURRENCE

OFFICE		DL: ORB #5*	DL: ORB #5*	DL: ORB #1*	DL: ORB #5	
SURNAME	cc w/enclosures:	REmch:cc	HSmith	EReeves	DCrutchfield	
DATE	See next page	8/3/82	8/6/82	8/5/82	9/14/82	

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Dennis M. Crutchfield, Chief
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Division of Licensing

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As stated

OFFICE	cc w/enclosures: See next page	DL:ORB#5	DL:ORB#5	DL:ORB#1	DL:ORB#5		
SURNAME		REmch	HSmith	EReeves	DCrutchfield		
DATE		8/3/82	8/ /82	8/5/82	/ /82		

cc
Mr. Paul A. Perry, Secretary
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Judd L. Bacon, Esquire
Consumers Power Company
212 West Michigan Avenue
Jackson, Michigan 49201

Joseph Gallo, Esquire
Isham, Lincoln & Beale
1120 Connecticut Avenue
Room 325
Washington, D. C. 20036

Peter W. Steketee, Esquire
505 Peoples Building
Grand Rapids, Michigan 49503

Alan S. Rosenthal, Esq., Chairman
Atomic Safety & Licensing Appeal Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. John O'Neill, II
Route 2, Box 44
Maple City, Michigan 49664

Mr. Jim E. Mills
Route 2, Box 108C
Charlevoix, Michigan 49720

Chairman
County Board of Supervisors
Charlevoix County
Charlevoix, Michigan 49720

Office of the Governor (2)
Room 1 - Capitol Building
Lansing, Michigan 48913

Herbert Semmel
Counsel for Christa Maria, et al.
Urban Law Institute
Antioch School of Law
2633 16th Street, NW
Washington, D. C. 20460

U. S. Environmental Protection
Agency
Federal Activities Branch
Region V Office
ATTN: Regional Radiation Representative
230 South Dearborn Street
Chicago, Illinois 60604

Peter B. Bloch, Chairman
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. Oscar H. Paris
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Frederick J. Shon
Atomic Safety and Licensing Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Big Rock Point Nuclear Power Plant
ATTN: Mr. C. J. Hartman
Plant Superintendent
Charlevoix, Michigan 49720

Christa-Maria
Route 2, Box 108C
Charlevoix, Michigan 49720

William J. Scanlon, Esquire
2034 Pauline Boulevard
Ann Arbor, Michigan 48103

Resident Inspector
Big Rock Point Plant
c/o U.S. NRC
RR #3, Box 600
Charlevoix, Michigan 49720

Hurst & Hanson
311 1/2 E. Mitchell
Petoskey, Michigan 49770

cc
Dr. John H. Buck
Atomic Safety and Licensing Appeal Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Ms. JoAnn Bier
204 Clinton Street
Charlevoix, Michigan 49720

Thomas S. Moore
Atomic Safety and Licensing Appeal Board
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

James G. Keppler, Regional Administrator
Nuclear Regulatory Commission, Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Enclosure 1

PURGE/VENT VALVE LEAKAGE TESTS

The long term resolution of Generic Issue B-24, "Containment Purging During Normal Plant Operation," includes, in part, the implementation of Item B.4 of Branch Technical Position (BTP) CSB 6-4. Item B.4 specifies that provisions should be made for leakage rate testing of the (purge/vent system) isolation valves, individually, during reactor operation. Although Item B.4 does not address the testing frequency, Appendix J to 10 CFR Part 50 specifies a maximum test interval of 2 years.

As a result of the numerous reports on unsatisfactory performance of the resilient seats for the isolation valves in containment purge and vent lines (addressed in OIE Circular 77-11, dated September 6, 1977), Generic Issue B-20, "Containment Leakage Due to Seal Deterioration," was established to evaluate the matter and establish an appropriate testing frequency for the isolation valves. Excessive leakage past the resilient seats of isolation valves in purge/vent lines is typically caused by severe environmental conditions and/or wear due to frequent use. Consequently, the leakage test frequency for these valves should be keyed to the occurrence of severe environmental conditions and the use of the valves, rather than the current requirements of 10 CFR 50, Appendix J.

It is recommended that the following provision be added to the Technical Specifications for the leak testing of purge/vent line isolation valves:

> "Leakage integrity tests shall be performed on the containment isolation valves with resilient material seals in (a) active purge/vent systems (i.e., those which may be operated during plant operating Modes 1 through 4) at least once every three months and (b) passive purge systems (i.e., those which must be administratively controlled closed during reactor operating Modes 1 through 4) at least once every six months."

By way of clarification, the above proposed surveillance specification is predicated on our expectation that a plant would have a need to go to cold shutdown several times a year. To cover the possibility that this may not occur, a maximum test interval of 6 months is specified. However, it is not our intent to require a plant to shutdown just to conduct the valve leakage integrity tests. If licensees anticipate long duration power operations with infrequent shutdown, then installation of a leak test connection that is accessible from outside containment may be appropriate. This will permit simultaneous testing of the redundant valves. It will not be possible to satisfy explicitly the guidance of Item B.4 of BTP CSB 6-4 (which states that valves should be tested individually), but at least some testing of the valves during reactor operation will be possible.

It is intended that the above proposed surveillance specification be applied to the active purge/vent lines, as well as passive purge lines: i.e., the purge lines that are administratively controlled closed during reactor operating modes 1-4. The reason for including the passive purge lines is that B-20 is concerned wtih the potential adverse effect of seasonal weather conditions on the integrity of the isolation valves. Consequently, passive purge lines must also be included in the surveillance program.

The purpose of the leakage integrity tests of the isolation valves in the containment purge and vent lines is to identify excessive degradation of the resilient seats for these valves. Therefore, they need not be conducted with the precision required for the Type C isolation valve tests in 10 CFR Part 50, Appendix J. These tests would be performed in addition to the quantitative Type C tests required by Appendix J and would not relieve the licensee of the responsibility to conform to the requirements of Appendix J. In view of the wide variety of valve types and seating materials, the acceptance criteria for such tests should be developed on a plant-specific basis.

Enclosure 2

SAFETY EVALUATION REPORT FOR CONTAINMENT PURGING AND VENTING DURING NORMAL OPERATION OF THE BIG ROCK POINT PLANT, UNIT 1

(Docket No. 50-155)

I. INTRODUCTION

A number of events have occurred over the past several years which directly relate to the practice of containment purging and venting during normal plant operation. These events have raised concerns relative to potential failures affecting the purge penetrations which could lead to degradation in containment integrity, and, for PWRs, a degradation in ECCS performance. By letter, dated November 28, 1978, the Commission (NRC) requested all licensees of operating reactors to respond to certain generic concerns about containment purging or venting during normal plant operation. The generic concerns were twofold:

(1) Events had occurred where licensees overrode or bypassed the safety actuation isolation signals to the containment isolation valves. These events were determined to be abnormal occurrences and were so characterized in our report to Congress in January 1979.

(2) Recent licensing reviews have required tests or analyses to show that containment purge or vent valves would shut without degrading containment integrity during the dynamic loads of a design basis loss of coolant accident (DBA-LOCA).

The NRC position of the November 1978 letter requested licensees to cease purging (or venting) of containment or limit purging (or venting) to an absolute minimum. Licensees who elected to purge (or vent) the containment were requested to demonstrate that the containment purge (or vent) system design met the criteria outlined in the NRC Standard Review Plan (SRP) 6.2.4, Revision 1, and the associated Branch Technical Position (BTP) CSB 6-4, Revision 1.

II DISCUSSION AND EVALUATION

The purge system at the the Big Rock Point Plant, Unit 1 (Big Rock Point) consists of two 24-inch lines for purging the containment atmosphere to allow personnel access and to maintain the containment pressure during normal operation within a prescribed range. The licensee responded to the above cited NRC position letter by stating that the Big Rock Point plant is designed to continuously ventilate the containment building and that continuous ventilation is essential to control containmment atmospheric conditions for access to maintain critical equipment operable.

The Big Rock Point Technical Specifications require that the 24-inch butterfly isolation valves close within six seconds following onset of a loss-of-coolant accident. Therefore, the amount of air and steam released to the environment prior to purge system isolation following a LOCA is minimal for the Big Rock Point Plant.

The licensee has not provided sufficient information concerning the provisions made to insure that isolation valve closure will not be prevented by debris which could potentially become entrained in the escaping air and steam.

III CONCLUSIONS

We have reviewed the Big Rock Point purge system against the provisions of BTP CSB 6-4, Revision 1, "Containment Purging During Normal Plant Operations." Although the licensee has provided justification for unlimited purging during power operations, purging should be limited because the plant is inherently safer with closed purge valves than with open lines which require valve action to provide containment integrity. We, therefore, recommend that the licensee commit to limit usage of the purge system commensurate with identified needs.

The licensee has not provide sufficient information concerning the provisions made to insure that isolation valve closure will not be prevented by debris which could potentially become entrained in the escaping air and steam. An acceptable resolution, which we recommend, is that debris screens be provided for the purge supply and exhaust lines. The debris screens should be designed to seismic Category I criteria and installed about one-pipe-diameter away from the inner side of each inboard isolation valve. The piping between the debris screen and the isolation valve should also be designed to seismic Category I criteria.

In addition, as a result of numerous reports on the unsatisfactory performance of resilient seats in butterfly-type isolation valves due to seal deterioration, periodic leakage integrity tests of the 24-inch butterfly isolation valves in the purge system are necessary. Therefore, the licensee should also propose a Technical Specification for testing the valves in accordance with the following testing frequency:

> "The leakage integrity tests of the isolation valves in the containment purge lines shall be conducted at least once every three months."

The purpose of the leakage integrity tests of the isolation valves in the containment purge lines it so identify excessive degradation of the resilient seats for these valves. Therefore, they need not be conducted with the precision required for the Type C isolation valve tests in 10 CFR Part 50, Appendix J. These tests would be performed in addition to the quantitative Type C tets required by Appendix J, and would not relieve the licensee of the responsibility to conform to the requirements of Appendix J.

Subject to successful implementation of the above recommended actions, we find the purge system design and operating practices for Big Rock Point to be acceptable.

IV. Acknowledgements

The NRC personnel contributed to this SER: D. Shum, R. Emch

CONTAINMENT SYSTEMS

LIMITING CONDITION FOR OPERATION

3.6.1.7 The containment purge supply and exhaust isolation valves may be open for safety-related reasons [or shall be locked closed]. The containment vent line isolation valves may be open for safety-related reasons [or shall be locked closed].

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:
(For plants with valves closed by technical specification)

With one containment purge supply and/or one exhaust isolation valve open, close the open valve(s) within one hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

(For plants with valves that may be opened by technical specifications)

1. With one containment purge supply and/or one exhaust isolation or vent valve inoperable, close the associated OPERABLE valve and either restore the inoperable valve to OPERABLE status within 72 hours or lock the OPERABLE valve closed.

2. Operation may then continue until performance of the next required valve test provided that the OPERABLE valve is verified to be locked closed at least once per 31 days.

3. Otherwise, be in at least HOT STANDBY within the next six hours and in COLD SHUTDOWN within the following 30 hours.

4. The provisions of Specification 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.6.1.7.1 The __-inch containment purge supply and exhaust isolation valves and the __-inch vent line isolation valves shall be determined locked closed at least once per 31 days.

4.6.1.7.2 The valve seals of the purge supply and exhaust isolation valves and the vent line isolation valves shall be replaced at least one per __ years.

3/4 4.6.3 CONTAINMENT ISOLATION VALVES

LIMITING CONDITION FOR OPERATION

3.6.3 The containment isolation valves specified in Table 3.6-1 shall be OPERABLE with isolation times as shown in Table 3.6-1.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

With one or more of the isolation valves(s) specified in Table 3.6-1 inoperable, maintain at least one isolation valve OPERABLE in each affected penetration that is open and either:

a. Restore the inoperable valve(s) to OPERABLE status within 4 hours or

b. Isolate each affected penetration within 4 hours by use of at least one deactivated automatic valve secured in the isolation position, or

c. Isolate each affected penetration within 4 hours by use of at least one closed manual valve or blind flange; or

d. Be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.6.3.1 The isolation valves specified in Table 3.6-1 shall be demonstated OPERABLE prior to returning the valve to service after maintenance, repair or replacement work is performed on the valve or its associated actuator, control or power circuit by performance of a cycling test, and verification of isolation time.

SURVEILLANCE REQUIREMENTS (Continued)

4.6.3.2 Each isolation valve specified in Table 3.6-1 shall be demonstrated OPERABLE during the COLD SHUTDOWN or REFUELING MODE at least once per 18 months by:

a. Verifying that on a Phase A containment isolation test signal, each Phase A isolation valve actuates to its isolation position.

b. Verifying that on a Phase B containment isolation test signal, each Phase B isolation valve actuates to its isolation position.

4.6.3.3 The isolation time of each power operated or automatic valve of Table 3.6-1 shall be determined to be within its limit when tested pursuant to Specification 4.0.5.

4.6.3.4 The containment purge and vent isolation valves shall be demonstated OPERABLE at intervals not to exceed ___ months. Valve OPERABILITY shall be determined by verifying that when the measured leakage rate is added to the leakage rates determined pursuant to Specification 4.6.1.2.d for all other Type B and C penetration, the combined leakage rate is less than or equal to 0.60La. However, the leakage rate for the containment purge and vent isolation valves shall be compared to the previously measured leakage rate to detect excessive valve degradation.