Consumers Power Company

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August 8, 1980

Mr James G Keppler
Office of Inspection and Enforcement
Region III
US Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT - RESPONSE TO SUPPLEMENT NO 1 TO IE BULLETIN NO 80-17 - FAILURE OF 76 OF 185 CONTROL RODS TO FULLY INSERT DURING A SCRAM AT A BWR

Supplement No 1, dated July 18, 1980, to IE Bulletin No 80-17, "Failure of 76 of 185 Control Rods To Fully Insert During a Scram at a BWR" (July 3, 1980) requested that Consumers Power Company take actions specified by Section A within 20 days and Section B by September 1, 1980.

Consumers Power Company on July 30, 1980 made a presentation on Supplement No 1 actions to NRC Region III and NRR personnel at their request. The presentation provided a status of actions taken with respect to all requested actions of the bulletin and its supplement(s). A discussion of the scram system operation was made and drawings were provided to reflect the "as-built" scram discharge volume (SDV) system.

It was emphasized in the presentation that Big Rock Point, a BWR-I type GE nuclear steam supply system, has a significantly different scram system than the BWR-II and later plants. Big Rock Point uses a 175-gallon scram dump tank (SDT) for collection of scram discharge water from its thirty-two (32) control rod drives. The SDV piping with a loop seal at the entrance of the SDT remains essentially full at all times and is not considered as part of the volume required to accept scram discharge water during a scram event. The piping from the scram valves to the SDT is sized to minimize flow losses in the system by using increasing sizes of piping as scram water is accumulated prior to discharge into the SDT. The SDT has drain and vent valves which are left normally open and close upon reactor protection system (RPS) trip to eliminate uncontrolled discharge of primary coolant from the scram system. In their normal position, these valves assure that the full SDT capacity is available for the scram function. Additionally, in response to Supplement

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No 2 (July 22, 1980) of the bulletin, a vent path to the reactor building atmosphere has been provided. SDT instrumentation indicates in the control room the presence of water at a two-inch (2") level (approximately equal to 7.5 gallons) in the SDT with one sensor and initiates an automatic scram of the RPS based on a 1-of-2 taken twice logic with four sensors located at 5/16 inch below center line of the tank (approximately equal to 84 gallons). With half of the tank capacity remaining, sufficient volume exists to accept one full scram of all thirty-two (32) control rod drives. These instrumentation features provide for operator remedial action and automatic reactor shutdown without operator action.

Specific responses to Sections A and B of Supplement No 1 of the bulletin are provided by Appendix A attached. Ten (10) copies of the "as-built" drawings referenced in Appendix A are provided with this submittal to Region III. Additional copies will be provided upon request.

Consumers Power Company believes that the current Big Rock Point scram discharge system meets the requirements set forth in IE Bulletin No 80-17 and its supplements. The design of the system and successful completion of the manual and automatic scram tests conducted pursuant to Item 2 of the bulletin justify this conclusion. Therefore, except as noted in Appendix A, Consumers Power Company considers all actions with respect to IE Bulletin No 80-17 and its supplements complete.

David P Hoffman (Signed)

David P Hoffman
Nuclear Licensing Administrator

CC Director, Office of Nuclear Reactor Regulation
Director, Office of Inspection and Enforcement
NRC Resident Inspector-Big Rock Point Plant

Attachment - 6 pages

CONSUMERS POWER COMPANY

Big Rock Point Plant

IE Bulletin 80-17
Supplement No 1

Docket 50-155
License DPR-6

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended, and the Commission's Rules and Regulations thereunder, Consumers Power Company submits our response to Supplement No 1 dated July 18, 1980, to IE Bulletin 80-18 entitled, "Failure of 76 of 185 Control Rods to Fully Insert During a Scram at a BWR". Consumers Power Company's response is dated August 8, 1980

CONSUMERS POWER COMPANY

By R B DeWitt (Signed)
R B DeWitt, Vice President
Nuclear Operations

Sworn and subscribed to before me this 8th day of August, 1980.

Dorothy H Bartkus (Signed) (SEAL)
Dorothy H Bartkus, Notary Public
Jackson County, Michigan
My commission expires March 26, 1983

APPENDIX A

Responses to Supplement No 1 to IE Bulletin No 80-17
for the Big Rock Point Plant

A. Actions to Taken by BWR Licensees Upon Receipt and to be Reported Within 20 Days of the Date of This Letter:

1) Provide to the NRC Regional Office an analysis of the adequacy of the "as-built" SDV system and associated vent and drain systems, including any identified design deficiencies. Include copies of verified "as-built" isometric drawings of the SDV and detailed descriptions of the remainder of the system, verified to be correct, as part of this analysis.

Response

Attachments 1 through 3 are verified, "As-Built" diagrams of the scram dump tank and associated vent, drain, and level indicating piping. Although a true isometric drawing of scram dump tank vent and drain piping could not be located, the field sketch of Attachment 2 is a realistic protrayal of component relative lengths and elevations. Attachments 4 through 6 provide the general arrangement of the control rod drive hydraulic system and were verified as part of the actions required by IE Bulletin No 79-14.

Attachment No	Drawing No/Revision
1	M60-0581-1/Revision 4
2	Field Sketch (Scram Dump Tank Vent & Drain Piping)/ Revision 7/4/80
3	0740040122/Revision N & Drawing Change
4	198E190 Sh. 1/Revision A
5	198E190 Sh. 2/Revision A
6	198E190 Sh. 3/Revision A

The following provides a description of component operation for the SDV system:

The scram dump tank, NC04, is manufactured by the Kaiser Steel Corporation. While normally empty and vented to the atmosphere, it is designed to accomodate water displaced from the 32 control rod drives during SCRAM. The dump tank vent valve, NC11, vents the tank to the enclosure dirty sump, and the dump tank drain valve, NC12, drains the tank to the enclosure clean sump. Both valves are pneumatically controlled; held open by air pressure during NORMAL operation and closed by internal spring pressure when SCRAM is initiated, thus isolating the water within the dump tank until the condition causing SCRAM has been rectified.

A recent modification to the scram dump tank vent piping in response to the NRC 48 hour requirement of July 19, 1980, Supplement No 2 of Bulletin 80-17, was to install a continuous atmospheric vent on the dirty sump standpipe which the vent piping discharges to. This modification could be a radiological hazard due to expulsion of air and water during dump tank venting following scram, although results of the Bulletin Item 2 scram tests did not indi-

cate this to be the case. Accordingly, further modification is in progress to minimize radiological impact without interfering with the continuous atmospheric vent path through use of a baffle device.

There are five liquid level switches, RD08A through RD08E, connected within parallel piping circuits to the scram lump tank. One level switch, RD08E, annunciates dump tank level when it rises 2 inches above the bottom of the tank. The other four liquid level switches, RD08A through RD08D, actuate the safety circuit when liquid level within the dump tank reaches 11-11/16 inches above the bottom of the tank.

The scram dump tank is a floor-mounted, horizontal, cylindrical tank fabricated of coated carbon steel, having a capacity of 175 gallons and a designed working pressure of 1875 psig at 325°F. The tank has welded elliptical heads, one of which is fitted with a handhole to facilitate internal inspection and cleaning. The tank is 2 feet, 1.57 inches wide with an overall length of 8 feet, 5.87 inches, and has an inside diameter of 2 feet. There are five external connections on the tank. Water from the control rod drives enters through a 6-inch buttweld connection at the top of the tank, located 12 inches from the weld of the head fitted with the handhole. A downcover of 6-inch pipe is welded to the inlet connection and extends down into the tank to direct the water, to within 2 inches of the tank bottom. The lower extremity of this pipe is fitted with a flow deflector to protect the interior tank wall from inflowing hydraulic water. The tank drain connection is a 2-inch socket-wels nozzle located at the bottom of the tank and offset 6 inches from the inlet connection. The tank vent connection is a 1-1/2-inch socket-weld connection at the top of the tank, located 18 inches from the inlet connection centerline. The remaining two connections are 2-inch socket-weld nozzles, located vertically one above the other, on the top and bottom of the tank, to which the liquid level piping is connected.

The five liquid level switches, RD08A through RD08E, are Model 102, manufacures by Magnetrol, Incorporated. Each switch consists of a magnetic switch assembly mounted on a float chamber assembly and connected by 2-inch stainless steel piping to the scram dump tank through the two 2-inch connections on the tope and bottom of the tank. Each switch is operated by a vertical float, through a magnetic sleeve and permanent magnet, and has single-pole, double-throw switches set for simultaneous operation. The units are rated for a working pressure of 1668 psi at 800°F. The float of each liquid level switch is set to operate through a range of 1 inch. The switch closes for one detector, RD08E, at 2 inches above tank bottom, and for four detectors, RD08A through RD08D, at 11-11/16 inches above tank bottom.

The purpose of the 2-inch level detector, RD08E, is to detect and annunciate abnormal leakage through the scram inlet and outlet valves into the scram dump tank. Abnormal leakage is defined as leakage so great that the scram dump tank would not accommodate the total water leaking through the scram valves and into the tank. The dump tank drain valve, open during NORMAL operation, will accommodate normal leakage. If leakage through the scram valves is beyond the capacity of the drain valve, and the water level rises to 2 inches above the bottom of the tank, level switch RD08E closes, energizing an annunciator light on the main control panel in the reactor control room and serving to warn the operator that a valve, or valves, is malfunctioning.

This detector also provides the operator with a provision for making periodic checks to determine if leakage is occurring past the scram outlet valves during NORMAL operation. This is accomplished by closing the dump tank drain and vent valve without initiating a SCRAM, and determining the amount of water buildup within the tank over a predetermined period of time.

The purpose of the four 11-11/16-inch level detector, RD08A through RD08D is to initiate a SCRAM in the event leakage into the tank raises the water level to 11-11/16-inches, thus ensuring that shutdown is initiated while sufficient volume remains in the dump tank to accommodate water displaced during the SCRAM. Two switches, RD08A and RD08C, are connected to protection circuit number 1, and the remaining two, RD08B and RD08D, are connected to protection circuit number 2. Two switches are provided on each circuit, one to serve as a backup for the other. When one switch on both circuits is opened, an interruption occurs in the dual-channel reactor protection circuit and a SCRAM is initiated. Bypass switches for the liquid level detectors (on the key locked reactor mode switch) are provided in order that the dump tank vent and drain valves may be opened following a SCRAM to permit water within the tank to be drained to the enclosure clean sump.

The adequacy of scram dump tank and associated system design was recently demonstrated by manual and automatic scram testing at power in accordance with the instructions of IE Bullection 80-17, items 2 and 3, of July 3, 1980; The results of this testing have been separately reported (Ref: Submittal dated July 31, 1980). Analysis of test results indicates that the scram dump tank is designed adequately and that associated systems perform as desired and as designed.

2) Revise and implement Operating Procedures as necessary to provide clear guidance to the licensed operator in the control room regarding when he should initiate the SLCS without obtaining prior supervisory approval. Provide a description of the implemented procedural requirements.

Response

At Big Rock Point, initiation of the liquid poison system (Big Rock's equivalent to the SLCS system) is at the discretion of the control room operator without prior supervisory approval. SOP-4, Paragraph 2.C states: "The Liquid Posion System can be initiated by the control operator any time he believes it necessary to maintain the plant in a safe condition. The Reactor Engineer and Plant Superintendent will be consulted, if conditions permit, before taking this action. When the liquid poison system is actuated intentionally, all the poison shall be injected into the reactor." All applicable Big Rock Point Procedures clearly and consistently adhere to this basic guidance; therefore, no procedure revisions are considered necessary.

3) Assure that procedures exist and are implemented for specifying remedial action to be taken if water is found in the SDV system at times when it should be free of water. Provide a description of the implemented procedural requirements.

Response

Remedial action to be taken if water is found in the scram dump tank when it should be free of water is specified by ALP 1.2 Annunciator No 17 ("Scram Dump Tank High Water Level"), as accumulation of water in the tank cannot occur without incurring this alarm and/or, in the case of exceptional accumulation, the scram dump tank high level scram. Action to be taken per ALP 1.2 Annunciator No 17 requires that if the alarm occurs during normal operation, the drain valve NC-12 and vent valve NC-11 are checked open. If either is

closed, this indicates failure of its diaphragm or associated solenoid and the plant will scram due to high water level in the dump tank. If the alarm is due to leaking scram valves, these valves are seated. Following alarm reset, the SDT will be verified to be empty.

4) Revise and implement adminstrative procedures as necessary to ensure that the SLCS key shall be readily available to the licensed operator in the control room. Provide a description of the implemented procedural requirements.

Response

The liquid poison system at Big Rock Point is initiated by operation of two handswitches (HS-7008 and HS-7009) on section "A" of the control console. These switches are not key-locked. Therefore, the instructions of this paragraph do not apply to Big Rock Point.

5) Continue daily monitoring of water levels in all scram discharge volumes until continuous monitoring system(s) (discussed in B.1 below) is (are) installed and operational (this requirement supersedes the requirements of Item 5 of IE Bulletin 80-17 which required daily surveillance for only 6 days).

Response

The existing monitoring system for the SDV is considered adequate as discussed in the subsequent B.1 response. Therefore, the specified daily monitoring will be discontinued after thirty (30) days from the date of this submittal unless directed otherwise. The thirty (30) day period is provided to allow for NRC review of this action and to provide an extended surveillance period to assure adequate functioning of the SDV system.

B. Actions to be Taken by BWR Licensees and Completed by September 1, 1980:

1. Install a system to continuously monitor water levels in all scram discharge volumes. Continuous recording and alarm features must be included in the design. Consideration should be given to use of diverse level sensors in this (these) system(s). The design installed shall represent the design with the highest level of reliability compatible with completion of installation by September 1, 1980. Provide a written description of the system design to the NRC Regional Office.

Response

The existing SDT instrumentation system meets the objective of providing continuous monitoring and alarm features for the SDV. The SDT at Big Rock Point provides the entire volume required to accommodate scram discharge water in the event of a full scram of all thirty-two (32) control rods, thereby making existing monitoring on this tank sufficient to assure adequate SDV capability. Additionally, an automatic scram feature provided by the instrumentation results in the ultimate in assurance of adequate SDV capability. This feature initiates a scram prior to inadequate remaining volume in the SDT. The installed system does not have provisions for a continuous monitoring device, nor is it compatible with the installation of such a device. This is not a concern due to the design of the system which provides both annunication and automatic scram features.

The following provides a description of the SDT instrumentation:

The existing level indication system on the scram dump tank consists of five liquid level switches, RD08A through RD08E (Magnetrol, Model 102), connected within parallel piping circuits to the scram dump tank. Each switch consists of a magnetic switch assembly mounted on a float chamber assembly and connected by 2-inch stainless steel piping to the scram dump tank. Each switch is operated by a vertical float, through a magnetic sleeve and permanent magnet, and has single pole, double-throw switches set for simultaneous operation. The units are rated for a working pressure of 1668 psi at 800°F. The float of each switch is set to operate through a range of 1 inch.

Level switch RD08E serves to detect and annunciate in the control room accumulated water in the scram dump tank in excess of that which can be drained to the enclosure clean sump through the normally open, 2-inch drain path. Its setpoint is 2 inches above the bottom of the scram dump tank (approximately 7.5 gallons). Should accumulated water in the scram dump tank continue to increase, the reactor will be automatically scrammed when the level reaches 11 and 11/16 inches (approximately 84 gallons) above tank bottom (ensuring that shutdown is initiated while sufficient volume remains in the dump tank to accommodate fluid displaced during the scram) through the action of level switches RD08A through RD08D. Two switches, RD08A and RD08C are connected to protection circuit No 1, and the remaining two, RD08B and RD08D, are connected to protection circuit No 2. Scram is initiated by the operation of one switch in each of the two circuits.

2. Perform a study of potential designs for improving the venting system for the scram discharge volumes and submit a description to NRC by September 1, 1980. Improvements such as providing a redundant, independent vent for each significant volume in the system or locally installing vacuum breakers close to each such volume should be considered (some plants already include a design which vents locally to atmosphere). Include an estimate of the time that would be required to accomplish these modifications in your report to be submitted to the NRC Regional Office. We have been told that meetings have already been scheduled by GE to discuss their proposals in this area with licensees.

Response

The atmospheric vent installed in response to Supplement 2 of the bulletin functioned satisfactorily during the manual and automatic scram tests conducted pursuant to Item 2 of the bulletin. The SDV design utilizing a single SDT as the full scram capacity volume eliminates the need to consider additional venting for the SDV piping which would be ineffective due to the loop seal design of the system. The results of the tests conducted and the design of the SDV system justify the adequacy of the modified venting system now in service. The only additional modification to be performed involves the addition of a baffle device to the atmospheric vent to minimize the radiological impact of atmospheric venting without interfering with the continuous vent path. This modification is not considered essential to the proper functioning of the venting system and will be made on a schedule convenient to the plant.