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February 8, 1983

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Attn: Mr. Steven A. Varga, Chief
Operating Reactors Branch No. 1
Division of Licensing
Washington, DC 20555

Reference: Beaver Valley Power Station, Unit No. 1
Docket No. 50-334, License No. DPR-66
Reactor Vessel Overpressure Protection Technical
Evaluation Report, EGG-EA-5826, March 1982

Gentlemen:

Duquesne Light Company has reviewed the referenced document forwarded by your letter of January 12, 1983, which compares the design of the Beaver Valley Unit 1 overpressure protection system against the staff requirements for overpressure mitigation systems. The Technical Evaluation Report (TER) identified two open items in sections 3.4, Single Failure Criteria, and 3.5, Seismic Design, for which a response has been provided in an attachment to this letter.

We believe that the existing design of the system, in conjunction with the specific procedures and tests which we conduct prior to placing the system in service, will adequately limit both the likelihood and consequences of overpressure events to an acceptable level. We note that there have been no overpressure events at Beaver Valley Unit 1 since we defeated the high head injection flow path in MODE 5 without the benefit of the present RVOPS. We do not believe that the additional expenditure in engineering and capital resources required to fully satisfy the staff requirements as detailed in NUREG-0224 as appended by BTP-RSB 5-2 will measurably reduce the probability of overpressure events at Beaver Valley. We are concerned that the concentration of our resources on matters of this type could impact prompt resolution of more significant safety issues evolving from the TMI Action Plan.

Therefore, we respectfully request that the NRC staff evaluate this submittal against the TER and accept the existing design on the basis of the information provided in this and past submittals.

Sincerely,

J. J. Carey A010

J. J. Carey
Vice President, Nuclear

cc: Mr. W. M. Troskoski, Resident Inspector
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U. S. Nuclear Regulatory Commission
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Beaver Valley Power Station
Unit No. 1

Response to NRC Letter
dated January 12, 1983

ATTACHMENT

Open Item No. 1: Single Failure Criteria

The specified single failure criteria for the overpressure mitigating system is that it should be designed to protect the vessel given a single failure in addition to the failure that initiated the pressure transient. The Beaver Valley RVOPS meets this criteria for all cases reviewed except for the case where the initiating event is a loss of power from one 125V DC bus. This loss of power would result in isolation of the letdown line and one PORV failing to open upon request. Because the other PORV is powered from the other DC bus, it will remain functional. However, when a single failure is postulated in the remaining PORV, no low-temperature overpressure protection is afforded the plant.

Beaver Valley Unit 1 is susceptible to this scenario when the letdown path is the normal letdown via the Chemical and Volume Control System (CVCS). Letdown via the excess letdown heat exchanger and via the Residual Heat Removal System (RHR) are not affected because of the use of the motor-operated valves that fail in the "as is" position upon loss of control power.

DLC maintains a vapor space in the pressurizer during plant cooldown by establishing a nitrogen volume as the steam bubble is being collapsed. The nitrogen volume reduces the amount of time that the plant is in a water-solid condition, which provides a buffer against overpressurization of the reactor coolant system (RCS). This buffer allows the operator time to take corrective action to prevent exceeding the Appendix G limits. However, there are periods of time when no steam or nitrogen volume exist in the pressurizer and the plant is in a water-solid condition (i.e., during the fill and vent procedure). There could also be periods of time when the gas or vapor volume is of insufficient size to allow the required 10 minutes after the operator is alerted to a pressure transient before he must take action to preclude exceeding the Appendix G limits. During these periods, there would be no protection for an overpressure transient at Beaver Valley Unit 1.

There is a safety valve in Beaver Valley's RHR system with sufficient capacity to mitigate this scenario, however, it is set to lift at 600 psig, which is above the Appendix G limits for low temperatures, and the RHR system is automatically isolated at a pressure of 630 psig. Therefore, no credit can be taken for this system in mitigating overpressure transients.

We conclude that the Beaver Valley RVOPS meets the single failure criteria except for those times when an insufficient steam or nitrogen volume exists in the pressurizer to allow for the 10 minute delay between when the operator is alerted and when he must take action to mitigate a pressure transient. DLC is presently formulating a response to this item.

Response

Upon reviewing the Technical Evaluation Report (TER), some clarification is needed to elaborate on the unlikely set of events described in the above scenario. The report properly states that Unit 1 is susceptible to this scenario when the letdown path is the normal letdown via the Chemical and Volume Control System (CVCS), however, credit for letdown via the Residual Heat Removal System (RHR) has not been fully recognized. When performing the fill and vent procedure, the RHR System is in operation with letdown established through MOV-CH-142. Refer to Updated FSAR Figure 9.1-1A. In this configuration, a battery failure which would isolate the normal letdown path would not necessarily isolate letdown via the RHR System, therefore letdown may still exist. Station batteries, numbers 1 and 2, provide 125 VDC to components associated with the RVOPS and letdown systems. If station battery bus number 1 fails, letdown from the reactor coolant system (RCS) would be isolated via the letdown orifice isolation valves, and one train of the RVOPS would be disabled, however, letdown of the RCS would still exist through the RHR system feeding the CVCS through valves MOV-CH-142 and TV-CH-204. Since the letdown orifice differential pressure is approximately 1950 psid at normal operating pressure, the majority of the letdown flow is provided by the RHR System in MODE 5. Therefore, this failure does not meet the above scenario. If station battery bus number 2 fails, TV-CH-204 would fail closed isolating all letdown and disabling one train of the RVOPS. Therefore, it should be recognized that failure of <u>either</u> station battery bus numbers 1 or 2 will not result in this scenario, only the failure of station battery bus number 2. A review of the 125 VDC buses history has revealed that a loss of a 125 VDC bus through equipment failure has never occurred.

We consider this scenario highly unlikely since four low probability events or conditions must exist at the same time to produce an overpressure condition. They are:

- the RCS must be in a water solid condition
- DC panel, switchboard number 2, must be de-energized to interrupt power to a PORV and isolate letdown
- the remaining PORV must be isolated or fail to actuate
- the operator would have to fail to react to alarms on loss of letdown, loss of the DC panel, loss of indicating lights on Train B equipment and related process valve closure alarms and fail to stop the charging pump.

In the present DC design, battery buses 1 and 2 are Train "A" and Train "B", respectively. Redesign of the system to meet the staff requirements could have a tendency to degrade battery buses 3 or 4, depending on which was utilized, since it would necessitate tie in of these circuits to one of the PORVs or letdown isolation valves which are in containment, thereby creating a condition underwhich multiple (3) 125 VDC and 120 VAC vital sources of power would be challenged under a hostile containment atmosphere during a LOCA.

However, to harden our existing capability in mitigating the potential for this type of event, we will commit to providing a dedicated operator at the benchboard when the RCS is in a water solid condition (pressurizer not vented) when a charging pump is in service. The necessary procedures for implementing this requirement will be in effect at the next scheduled refueling outage (presently scheduled for June 1983) contingent on staff approval of the existing RVOPS design.

Open Item No. 2: Seismic Design

The specified seismic criteria is that the overpressure protection system should be designed to function during an Operating Basis Earthquake. The RVOPS installed at Beaver Valley Unit 1 is Seismic Category I with the exception of the PORV operators which have not been specifically qualified for operation through an OBE. The PORVs were purchased to a Westinghouse E Spec. which required the valve operators and valve assemblies to withstand seismic loadings equivalent to 3.0g in the horizontal direction and 2.0g in the vertical direction and to be capable of performing all intended functions, but they were not procured nor analyzed as Seismic I components.

We conclude that the Beaver Valley RVOPS meets the seismic criteria with the exception of the PORV operators. DLC states that an OBE for Beaver Valley is defined as a normalized acceleration of 0.06g and a DBE is defined as a normalized acceleration of 0.125g. This issue is under consideration by the NRC.

Response

The pressurizer PORVs and their operators are designed and analyzed to remain structurally sound and capable of performing all of their intended functions when exposed to seismic loading. As a minimum, this means that pressure boundary joints remain leak-tight and that yokes, frames, and similar structures will not break. Actuators will not freeze or bind and the structural integrity of the value internals will not be degraded.

We do not believe that a seismic event has the capability to create a failure in both PORVs and simultaneously cause a heat or mass input to the RCS considering the relatively short periods of time that the pressurizer is in a water solid condition on an annual basis. Information regarding the frequency and intensity of seismic events in this area is detailed in Section 2.5 and Appendix 2c of the Updated FSAR.