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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Revised Response to Request for Additional Information
Generic Letter 96-06 Containment Air Recirculation Coolers

Attached is a revised response to an NRC request for additional information (RAI) dated March 20, 1998, to clarify the measures that exist or that have been taken to assure that the containment air recirculation coolers will not be used as an option to mitigate accident conditions at the Beaver Valley Power Station (BVPS).

The RAI concerns the BVPS response to Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions." Our response to the Generic Letter, dated January 28, 1997, indicated that the containment air recirculation coolers are not required for accident mitigation and are not called upon by the Beaver Valley Power Station (BVPS) Emergency Operating Procedures (EOPs). However, during accident conditions, plant operators may elect to take actions that are not specifically called for in the EOPs. The Loss of Coolant Accident (LOCA) and Main Steam Line Break (MSLB) accidents are the events identified in Generic Letter 96-06 that could lead to overpressurizing the cooling water piping serving this system as a result of water hammer or two-phase flow conditions from the high containment temperature. Therefore, the NRC has requested that we identify those measures that exist or that have been taken to assure that the containment air recirculation coolers will not be used as an option to mitigate a LOCA or MSLB.

In our previous response to the RAI, dated June 30, 1998, it was committed that the EOPs would be revised to assure that the containment air recirculation coolers are not used to mitigate the consequences of a LOCA or MSLB accident, with training to be provided on the EOP revisions.

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During actions taken to implement the above described EOP revisions, it was determined that these EOP revisions are not appropriate. A caution will instead be added to the BVPS Severe Accident Management Guidelines (SAMGs) addressing the potential for water hammer within the containment air recirculation cooling system in lieu of any EOP revisions. The basis for this change in the commitment is provided in the attachment. Training will be provided on the SAMG revision to applicable station personnel.

If you have any questions regarding this subject, please contact Mr. M. S. Ackerman at (412) 393-5203.

Sincerely,

Sushil C. Jain

c: Mr. D. S. Collins, Project Manager
Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator

Attachment

Beaver Valley Power Station, Unit No. 1 and No. 2
Basis for Altering Previous RAI Commitment

The Nuclear Regulatory Commission (NRC) issued a request for additional information (RAI) dated March 20, 1998, concerning the measures that exist or that have been taken to assure that the Containment Air Recirculation (CAR) coolers will not be used as an option to mitigate accident conditions. This was an NRC follow-up action from the Duquesne Light Company (DLC) response dated January 28, 1997, to Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident (DBA) Conditions."

DLC's response to the NRC RAI, dated June 30, 1998, committed to revise the Emergency Operating Procedures (EOPs) to assure that the CAR coolers are not used to mitigate the consequences of a Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB). During actions taken to implement the EOP revisions, it was determined that EOP revisions are not appropriate.

The initial DLC response to Generic Letter 96-06 (dated January 28, 1997) provided the following text:

- ***Air to Water Heat Exchangers Located in Containment.***
  The following is a summary of the evaluation criteria and the conclusions for each component:

  Heat Exchangers required to perform safety function during a DBA (i.e., taken credit for in the Safety Analysis): NONE

  Heat Exchangers not required to perform safety function during a DBA but are called upon in the Emergency Operating Procedures (EOPs) as an "Action/Expected Response Column" item (i.e., primary equipment desirable to function):

  VS-F-2A, B, C (Control Rod Drive Mechanism Coolers (CRDM)
  Reactor Coolant Pump (RCP) Motor Stator Cooler
  VS-E-1A9 (Containment Air Compressor Aftercooler)

  Heat Exchangers not required to perform safety function during a DBA and not called upon by the EOPs:

  VS-F-1A, B, C (Containment Air Recirculation Coolers)

  The evaluations considered these heat exchangers in the containment under NSA, LOOP, DBA (LOCA or MSLB which results in a Containment Isolation Phase B initiation) and minor accidents occurring prior to Containment Isolation Phase B (CIB) initiation conditions. The conditions evaluated included considerations for

containment pressure/temperature, system flow, whether flow restarts on Emergency Diesel Generator (EDG) sequencer, overpressure protection and void formation. Also evaluated were cooling water exit temperatures to ensure that the existing stress analysis is still bounding for the piping.

For the cases analyzed above, the air to water heat exchangers show no voiding and the exit temperature rise is within the existing design basis.

The component classification in the DLC response to Generic Letter 96-06, "Heat Exchangers not required to perform safety functions during a DBA and not called upon by the EOPs," (which identified the CAR coolers) was intended to identify that the CAR coolers are not essential for optimized EOP accident recovery. It was not intended to infer that these units are never listed in the EOPs. Presently there are EOP steps that allow (but do not require) the use of these coolers at the discretion of the Nuclear Shift Supervisor/Emergency Director for post LOCA conditions and for aid during recovery from upper vessel head voids. There are no Design Basis conditions that would require the use of the CAR system for accident mitigation.

The original DLC evaluation had included the CAR coolers and system within the scope of the calculations used as the basis for the DLC response to Generic Letter 96-06 dated January 28, 1997 (calculations 8700-DMC-3157-0, 10080-N-752-0). The BVPS Unit No. 1 and Unit No. 2 CAR units, along with all other heat exchangers located within containment, had been evaluated for containment environmental temperatures. In all cases, the heat exchangers and systems (including the CAR system), were found to be capable of withstanding the environmental conditions. In the case of the CAR system, the evaluation considered two conditions. The first condition considered operation of the CAR system at containment temperatures up to the saturation temperature corresponding to the Containment Isolation Phase B (CIB) setpoint (8 psig). This evaluation demonstrated that the fluid exit temperature would not exceed piping design and the fluid remained as single phase and, therefore, no water hammer concerns were identified. The second condition considered the units in a non-operating mode (post CIB condition) and the effects of the associated high temperature environment on an isolated system. For this condition it was determined that adequate relief protection of the piping system was present to mitigate any overpressure concerns due to thermal expansion of the isolated fluid system. These evaluations addressed the potential effects on the CAR system in a manner corresponding to their potential use in the EOPs and associated containment conditions. This level of detail relative to the analysis of these units was not made explicit in the DLC response to the NRC dated January 28, 1997.

Based on the RAI from the NRC dated March 20, 1998, the NRC apparently did not recognize that this type of analysis had been performed for the CAR system, since the

RAI singled out the CAR heat exchangers for additional actions needed to prevent their use during accident conditions.

The DLC response (dated June 30, 1998) to the RAI committed to revise the EOPs to assure that the CAR coolers are not used to mitigate the consequences of a LOCA or MSLB accident. At that time, it was believed that this would easily address the NRC RAI concern even though the analyses applied to all heat exchangers inside containment indicated no unique concerns or unacceptable conclusions for the CAR heat exchangers. However, upon further review, the removal from the EOPs of the few places that CAR fans may be (optionally) utilized and the addition of a note or caution precluding any use of the CAR system is not desirable. The EOPs now do not require the use of the CAR heat exchangers to mitigate the consequences of a LOCA or MSLB. The CAR system is not required to be used in any Design Basis Accident. Operators' training reinforces that the CAR system is non-safety related, isolated on a CIB signal and operator training already stresses that systems and components isolated by a safety related isolation signal shall not be bypassed or overridden. It is not credible to postulate that operators would elect to take actions to bypass or override a safety related containment isolation signal to open a containment boundary to operate a non-safety related system whose operation is not required. Similarly, it is contrary to normal EOP guidance and precedent to place an instruction, note or caution in the EOPs on a system stating to not perform an action which is counter to normal operator training/principles. Adding such unprecedented information to the EOPs could potentially infer unintended and unwarranted implications about other systems which should also not be operated, but which have no negative instruction, note or caution.

Thus DLC believes that the CAR heat exchangers fall within the same scope and conclusions of the evaluation performed for other heat exchangers in response to Generic Letter 96-06 and no further EOP revisions are warranted or necessary to address design basis accidents.

There are possibilities far beyond Design Basis Accidents that could present an unforeseen situation whereby the Nuclear Shift Supervisor/Emergency Director could possibly decide to initiate flow at high containment temperatures. For example, if a Quench Spray or Recirculation Spray System train fails, the EOPs only direct plant operators to attempt recovery of the failed train or another Quench Spray/Recirculation Spray train. It is conceivable that an operator may potentially consider using the non-safety related containment air recirculation coolers at BVPS if both safety-related trains of Quench Spray System and both safety-related trains of the Recirculation Spray were to fail. This scenario is well beyond the design basis LOCA and MSLB accident. Such postulated scenarios could potentially lead to core damage and the operator exiting the

EOPs and entering the Severe Accident Management Guidelines (SAMGs). Even in this low probability scenario beyond the design basis of the plant, the effectiveness of the containment air recirculation coolers to control containment pressure/temperature is considered limited. However, to address this very low probability occurrence, the BVPS SAMGs which address containment condition control (53E.1.SAG-6) will be revised to add a caution that use of the containment air recirculation coolers should consider the potential for water hammer following an adverse containment environment.

In conclusion, no changes to the EOPs are being considered. A caution will be added to the BVPS SAMGs addressing the potential for water hammer within the containment air recirculation cooling system following an adverse containment environment. Training will be provided on the SAMG revision to applicable station personnel to make them aware of the potential for water hammer within the non-safety related containment air recirculation coolers and its potential consequences during adverse containment environments, even though this system is not expected to be used during any accident.