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January 28, 1997

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
NRC Generic Letter 96-06

Duquesne Light Company (DLC) is responsible for the operation of Beaver Valley Power Station (BVPS) Units No. 1 and No. 2. Attachment 1 provides the DLC response to NRC Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions."

If you have any questions on this response, please contact Mr. Roy K. Brosi, Manager, Nuclear Safety Department, at (412) 393-5210.

Sincerely,

Sushil C. Jain

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

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DELIVERING QUALITY ENERGY

AFFIDAVIT FOR APPLICATION

OF AMENDMENT

COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF BEAVER)

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
NRC Generic Letter 96-06

Before me, the undersigned notary public, in and for the County and Commonwealth aforesaid, this day ·rsonally appeared Sushil C. Jain, to me known, who being duly sworn according to law, deposes and says that he is Division Vice President, Nuclear Services of the Nuclear Power Division, Duquesne Light Company, he is duly authorized to execute and file the foregoing submittal on behalf of said Company, and the statements set forth in the submittal are true and correct to the best of his knowledge, information and belief.

Sushil C. Jain

Subscribed and sworn to before me

on this 28th day of January 1997

Tracey A Baczek

Notary Public

Notarial Seal
Tracey A. Baczek, Notary Public
Shippingport Boro, Beaver County
My Commission Expires Aug. 16, 1997
Member, Pennsylvania Association of Notaries

ATTACHMENT 1

Beaver Valley Power Station Unit 1 & 2 Response to NRC GENERIC LETTER 96-06:

Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," requested the following:

(1) Determine if containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions;

(2) Determine if piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

A written response was requested within 120 days of the date of the generic letter stating what actions were taken in response to the requested actions noted above, conclusions that were reached relative to susceptibility for waterhammer and two-phase flow in the containment air cooler cooling water system and overpressurization of piping that penetrates containment, the basis for continued operability of affected systems and components as applicable, and corrective actions that were implemented or are planned to be implemented. If systems were found to be susceptible to the conditions that are discussed in this generic letter, identify the systems affected and describe the specific circumstances involved.

Response

This report provides a summary of the scope and results of evaluations completed in response to NRC Generic Letter 96-06 "Assurance of Equipment Operability and Containment Integrity During Design Basis Accident (DBA) Conditions."

Beaver Valley Power Station (BVPS) was specifically identified in the Generic Letter 96-06 as initially identifying the concern for over-pressurization of the containment penetrations and challenging containment integrity.

As described in our LER submittal relative to containment penetrations (LER # 1-96-009 Rev 1), an engineering review determined that some BVPS Unit 1 and Unit 2 liquid filled lines passing through the Containment were not designed to compensate for the effects of liquid filled thermal expansion during a DBA. This could result in the pressures exceeding the system design pressure. A multidisciplinary task force performed a design basis review and identified corrective actions with respect to thermal overpressurization during a DBA for BVPS Unit 1 and Unit 2 penetrations. These corrective actions are identified within the LER.

This event was reported in accordance with 10 CFR 50.72 (b) (1)(ii) (B) on July 3, 1996. An update was provided on July 31, 1996 and Revision 1 to LER 96-009 was subsequently issued. This event was also reportable in accordance with 10 CFR 50.73 (a) (2) (ii) (B). These reports were made based on the fact that the design of the liquid filled lines passing through containment was not in accordance with the UFSAR, placing them outside the design of the plant.

The identified concerns described in Generic Letter 96-06 are based on NRC inspection activities, licensee notifications and event reports. The three specific concerns identified are listed as (1) hydrodynamic effects of waterhammer on containment air coolers during a Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB), (2) the effects of two-phase flow on cooling water systems serving containment air coolers and, (3) thermally induced overpressurization of isolated water-filled piping sections in containment which could jeopardize safety functions or containment integrity.

Discussion on the scope of review necessary to meet the intent of this generic letter were held at industry meetings between the NRC staff and utility representatives on October 29, 1996 and December 19, 1996. Based on the responses provided by the NRC to questions asked by the utility representatives at these meetings, the scope of the evaluation was determined to include postulated plant conditions within the licensing basis which may result in conditions that could lead to thermally induced challenges to the operability of equipment or containment integrity. This includes the following considerations:

- Postulated conditions include normal operations and any accident conditions with and without offsite power available.

- Equipment includes all equipment which has a specific safety function including containment isolation, any equipment which may impact the accomplishment of safety functions and, any equipment which may be called upon by procedures for recovery following an accident.

Summary and Conclusions:

With regard to the Overstressing of Containment Penetrations, the corrective actions for BVPS Unit 1 and Unit 2 have been previously identified in the LER # 1-96-009 Revision 1 submittal.

For the issues of waterhammer/voiding of piping due to containment environments, safety related heat exchangers, non-safety related heat exchangers, and isolated piping sections located in the containment of BVPS Unit 1 and Unit 2 were analyzed. As a result of these subsequent component evaluations, there are no additional corrective actions warranted in response to the items contained in this Generic Letter for either BVPS unit. Attached is a summarized analysis of the components evaluated and the criteria utilized in their disposition.

BVPS UNIT 1
COMPONENTS EVALUATED FOR GL 96-06

- **Containment Penetrations, Associated Piping, and Relief Valves.**
  The evaluations considered Normal System Arrangement (NSA), single failures, and Design Basis Accident (DBA), Loss of Offsite Power (LOOP) scenarios. Results, contingencies, and corrective actions were submitted to the NRC in LER 96-009 Rev 1.

- **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-2 A, 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.

- **Water to Water Heat Exchangers Located in Containment.**
  The following is a summary of the evaluations 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 EOPs as an "Action/Expected Response Column" item (i.e. primary equipment desirable to function):

  RH-E-1A, B (Residual Heat Release (RHR) Heat Exchanger)
  RH-P-1A, 1B (RHR Pump Bearing Cooler)
  CH-E-3 (Regenerative Letdown Heat Exchanger)
  RCP Upper and Lower Lube Oil Coolers

  Heat exchangers not required to perform safety function during a DBA but are called upon in the EOPs as a "Response Not Obtained Column" item (i.e. backup equipment).:

  NS-E-1 (Neutron Shield Tank Cooler)
  CH-E-4 (Excess Letdown Heat Exchanger)

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

  DG-E-2 (Primary Drains Cooler)

  These heat exchangers were evaluated for the same scenarios as the air to water heat exchangers (NSA, LOOP, and DBA) along with other conditions that could cause overheating of the downstream piping or flashing in the heat exchangers.

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

- **Isolated Piping Sections Located in Containment (exclusive of Containment Penetrations).**
  The piping sections were evaluated for NSA, LOOP, and DBA scenarios that could cause thermally induced overpressurization and possible adverse consequences to safety functions. Results show that either the piping is not required to be functional during a DBA (i.e., has no impact on safety functions) or that relief protection exists in the isolated portion.

BVPS UNIT 2
COMPONENTS EVALUATED FOR GL 96-06

- **Containment Penetrations, Associated Piping, and Relief Valves.**
  The evaluations considered NSA, single failures, and DBA/LOOP scenarios. Results contingencies, and corrective actions were submitted to the NRC in LER 96-009 Rev 1.

- **Air to Water Heat Exchangers Located in Containment.**
  The following is a summary of the evaluations 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 EOPs as an "Action/Expected Response Column" item (i.e. primary equipment desirable to function):
  HVR-FN202 A, B, C (CRDM Coolers)
  RCP Motor Stator Cooler

  Heat exchangers not required to perform safety function during a DBA and not called upon by the EOPs:
  HVR-FN201A, B, C (Air Recirculation Coolers)

  The evaluations considered these heat exchangers in the containment under NSA, LOOP, DBA (LOCA or MSLB which results in a CIB initiation) and minor accidents occurring prior to CIB initiation conditions. The conditions evaluated included considerations for containment pressure/temperature, system flow, whether flow restarts on 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, and piping design temperature limits to ensure that the existing stress analysis is valid.

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

- **Water 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 EOPs as an "Action/Expected Response Column" item (i.e. primary equipment desirable to function):

  2RHS-E21A, B (RHR Heat Exchanger)
  2CCP-E25 (RHR Pump Bearing Cooler)
  CHS-E23 (Regenerative Letdown Heat Exchanger)
  RCP Upper and Lower Lube Oil Coolers

  Heat exchangers not required to perform safety function during a DBA but are called upon in the EOPs as a "Response Not Obtained Column" item (i.e. backup equipment):

  2NSS-E21 (Neutron Shield Tank Cooler)
  2CHS-E24 (Excess Letdown Heat Exchanger)

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

  2DGS-E22 (Primary Drains Cooler)

  These heat exchangers were evaluated for the same scenarios as the air to water heat exchangers (NSA, LOOP, and DBA) along with other conditions that could cause overheating of the downstream piping or flashing in the heat exchangers.

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

- **Isolated Piping Sections Located in Containment (exclusive of Containment Penetrations).**
  The piping sections were evaluated for NSA, LOOP, and DBA scenarios that could cause thermally induced overpressurization and possible adverse consequences to safety functions. Results show that either the piping is not required to be functional during a DBA (i.e., has no impact on safety functions) or that relief protection exists in the isolated portion.