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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

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
Potentially Invalid Leak Detection Tests Used as an Alternative for Required ASME, Section XI Hydrostatic Tests (Supplement Report)

In our submittal of March 15, 1991, we provided an operability assessment for Beaver Valley, Unit No. 1 to supplement our May 3, 1990, submittal concerning potentially invalid leak detection testing. We also stated that we were evaluating all piping that was excluded from the Instrumented Inspection Technique (IIT) Program to determine if any additional piping should have been included. We have completed this review and have determined that the following Unit No. 1 piping should have been tested:

- Component Cooling Water Subsystems (Containment Air Recirculation Cooling Coils*, Containment Air Compressor Aftercooler, Control Room Redundant Cooling Coils*, "C" Reactor Coolant Pump Cooling Lines)
- Fuel Pool Cooling System*
- Portions of the Chemical and Volume Control System (CVCS) (VCT, Non-Regenerative and Excess Letdown Heat Exchangers, Boric Acid Transfer Pump Lines, and Associated Piping)
- Portions of the CVCS (Regenerative Heat Exchanger Piping)
- Portions of the Auxiliary Feedwater System
- Steam Generator Blowdown Sample Lines
- Portions of the River Water System

Three of these systems were exempted from the pressure testing program during the first period of the second ten year interval at Unit No. 1 because the IIT requirements were still in place and being followed. These are identified above with an asterisk (*).

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Attached are operability assessments for the above piping which conclude that the piping is structurally sound and functionally operable. These operability assessments have been reviewed by the Onsite Safety Committee.

Although the justification for excluding these lines from the first ten year interval pressure testing program (i.e., hydrostatic and leakage testing) is considered valid and was handled in accordance with requirements established during the IIT licensing process, we will include these lines in the ASME Section XI second ten year interval pressure testing program or otherwise file for relief in accordance with 10 CFR 50 as warranted.

If you have any questions, please contact Mr. Steve Sovick at (412) 303-5211.

Sincerely,

J. D. Sieber
Vice President
Nuclear Group

Attachment: Supplemental Report

cc: Mr. J. Beall, Sr. Resident Inspector
Mr. T. T. Martin, NRC Region I Administrator
Mr. A. W. DeAgazio, Project Manager
Mr. R. A. McBrearty, NRC Region 1 Inspector

SUPPLEMENTAL REPORT

System Operability Assessment
for the BV-1 Component Cooling Subsystems

The Control Room Redundant Cooling Coils, Containment Air Recirculating Cooling Coils (with exception to the containment penetrations), and the Containment Air Compressor After Cooler lines are considered to have maintained structural integrity and functional operability based on the following activities and surveillances:

- The operating pressures of the piping subsystems were compared with the pressure ratings for the pipe sizes and schedules. The smallest margin between the values was approximately 1024 psig. Ample margin exists in the design of this line to accommodate operating pressures.

- Operations Surveillance Test (OST 1.44C.2) Containment Air Recirculation Cooler Test is performed monthly. Leakage through the subject lines would be detected by this OST.

- Component cooling subsystems are in continuous operation during the life of the station. Routine pre-startup inspections are performed along with periodic observation and monitoring of system parameters during operation.

- Components and systems served by the component cooling water subsystems are monitored; therefore, any malfunctions causing low flow, low pressure, high temperature, or high radioactivity levels could be detected. The affected components and systems causing the increased levels will be isolated, shutdown and repaired.

- Any leakage in the Containment Air Recirculating Cooling Coils or the Containment Air Compressor After Cooler lines would increase the containment sump levels and containment sump pump cycling rate.

- Leakage examinations at operating pressure were performed on all of the piping in question as required by ASME Section XI during the first two periods of the first 10 year inspection interval.

- Leakage examination at operating pressure was performed on the Control Room Redundant Cooling Coils as required by ASME Section XI during the second period of the second 10 year inspection interval.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro-testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the above, the Control Room Redundant Cooling Coils, Containment Air Recirculating Cooling Coils, and the Containment Air Compressor After Cooler lines have been determined to be structurally sound and functionally operable.

System Operability Assessment
for the BV-1 Component Cooling Subsystems
(Piping between TV-CC-105C & 1CCR-296, 299, 302)

The portion of the Unit 1 Reactor Plant Component Cooling System not tested (i.e., piping from valve TV-CC-105C and 1CCR-296, 299 and 302) is considered to have maintained structural integrity and its functional operability based on the following activities and surveillances:

- The operating pressures of the piping subsystems were compared with the pressure ratings for the pipe sizes and schedules. The smallest margin between the values was approximately 984 psig. Ample margin exists in the design of this line to accommodate operating pressures.

- Component cooling water to the Reactor coolant Pumps is in continuous operation during the life of the station. Routine pre-startup inspections are performed along with periodic observation and monitoring of system parameters during operation.

- The "C" Reactor Coolant Pump served by the component cooling water subsystem is monitored, therefore, any malfunctions causing low flow, low pressure, high temperature, or high radioactivity levels, could be detected. The affected components and systems causing the increased levels will be isolated, shutdown and repaired.

- Any leakage in the "C" Reactor Coolant Pump CCR piping would increase the containment sump levels and containment sump pump cycling rate.

- Leakage examinations at operating pressure were performed on all of the piping in question as required by ASME Section XI during each period of the first 10 year inspection interval. These exams were performed by certified VT-2 personnel.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro-testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the considerations listed above, the portion of the "C" Reactor Coolant Pump Cooling lines identified have been determined to be structurally sound and functionally operable.

System Operability Assessment
of the BV-1 Fuel Pool Cooling System

On 4/11/86, a system hydrostatic test (IT-20-221-1) was performed to fulfill the testing requirements of DCP 221 (the addition of valve 1PC-145 to the fuel pool cooling system). The piping that was tested was bounded by valves 1PC-145, 1PC-110, 1PC-111, 1PC-115 and 1PC-116. A VT-2 inspection was performed on this piping by a certified inspector and documented on visual examination reports VER # V13092 and VER # V13093. The piping bounded by valves 1PC-110, 1PC-111 and 1PC-105 (i.e., the fuel pool suction lines) were not covered by hydrostatic test (IT-20-221-1). This portion of piping is considered to have maintained its structural integrity and functional operability based on the following activities and surveillances:

- The operating pressures of the piping subsystems was compared with the pressure ratings for the pipe sizes and schedules. The smallest margin between the values was approximately 587 psig. Ample margin exists in the design of this line to accommodate operating pressures.

- This portion of the subject line is pressurized to normal system operating pressure during normal system arrangement.

- Normal plant tours by operations personnel are performed on a shift basis in the plant areas where this line is accessible. Any major pressure boundary leakage could, in conjunction with installed instrumentation, be detected during these tours.

- A leak in the subject line would result in a decreasing level in the spent fuel pool which would be detected in the control room with a low level annunciator. An annunciator for high fuel pool temperature also is in the control room.

- Station logs monitor fuel pool level and temperature on a shift basis.

- The Fuel Pool Cooling System is a radioactive system. Therefore, any major leakage from this piping would result in an increase in airborne radioactivity which would be detected by various plant radiation monitors.

- Any leakage from this piping would end up in the fuel building sump which would result in increased sump levels or sump pump cycling rate.

- A weekly Operations Surveillance Test (OST 1.20.1) is performed to verify the "spent fuel pool level low" annunciator is not illuminated.

- Leakage examinations at operating pressure were performed on these lines in the first two periods of the first inspection interval at Unit 1 per the requirements of ASME Section XI. These exams were performed by VT-2 certified personnel.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro-testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the above, the subject line has been determined to be structurally sound and functionally operable.

System Operability Assessment
of the BV-1 Chemical and Volume Control System (CVCS)
(VCT, Non-Regenerative and Excess Letdown Heat
Exchangers, Boric Acid Transfer Pumps, and
Associated Piping)

The portion of the CVCS not tested is considered to have maintained structural integrity and is functionally operable based on the following activities and surveillances:

- The operating pressures of the piping subsystems was compared with the pressure ratings for the pipe sizes and schedules. The smallest margin between the values was approximately 318 psig. Ample margin exists in the design of this line to accommodate operating pressures.

- The Volume Control Tank (VCT) and Non-Regenerative Heat Exchanger piping are pressurized to normal system operating pressure during normal system arrangement.

- The control room operators perform Operating Surveillance Test (OST) 1.6.2 "Reactor Coolant System Water Inventory Balance" every three (3) days when the plant is operating at steady state conditions. Leakage through the subject lines would be detected by this OST.

- The inventory in the liquid waste system is logged daily (log L3-11). Since leakage from these lines would be collected by the liquid waste system, a through-wall leak would be apparent in this inventory. The inventory is reviewed daily by the Shift Supervisor and weekly by the Site Radwaste Coordinator. Radiation monitors within the liquid waste system would also detect any leakage from these lines.

- Monthly, the Radiological Control Department personnel perform routine radiation surveys outside containment. Seepage from the VCT, Non-Regenerative and Boric Acid Transfer Pump piping that may not be detected by OST 1.6.2 or the liquid waste inventory would be detected during this survey.

- The CVCS is a radioactive system; and, therefore, any major leakage from this piping would result in an increase of airborne radioactivity which would be detected by various plant radiation monitors.

- The VCT and Non-Regenerative piping are readily isolable should a leak occur. The piping has double-valve isolation from the primary system on a pressurizer low level signal. It could be easily isolated by the control room operators should the line be discovered to be leaking.

- The Excess Letdown Heat Exchanger piping is normally double valve isolated from the reactor coolant system.

- Leakage exams at operating pressure were performed on these lines periodically as required by ASME XI during the first two periods of the first 10 year Interval. These exams were performed by certified VT-2 personnel.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro-testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the above, the subject lines have been determined to be structurally sound and functionally operable.

System Operability Assessment
for the BV-1 Chemical and Volume Control System (CVCS)
Portions of the Regenerative Heat Exchanger Piping)

The portion of the CVCS (lines 2" CH-1-1502-Q1, 2" CH-143-1502-Q1, 2" CH-149-1502-Q1, and 2" CH-144-1502-Q1 between valve LCV-CH-460B and valves TV-CH-200A, -200B, and -200C) not tested is considered to have maintained structural integrity and is functionally operable based on the following activities and surveillances:

- The operating pressures of the piping subsystems was compared with the pressure ratings for the pipe sizes and schedules. The smallest margin between the values was approximately 781 psig. Ample margin exists in the design of this line to accommodate operating pressures.

- The portion of the noted lines is pressurized to normal system operating pressure during normal system arrangement.

- The control room operators perform Operating Surveillance Test (OST) 1.6.2 "Reactor Coolant System Water Inventory Balance" every three (3) days when the plant is operating at steady state conditions. Leakage through the subject lines would be detected by this OST.

- The inventory in the liquid waste system is logged daily (log L3-11). Since leakage from these lines would be collected by the liquid waste system, a through-wall leak would be apparent in this inventory. The inventory is reviewed daily by the Shift Supervisor and weekly by the Site Radwaste Coordinator. Radiation monitors within the liquid waste system would also detect any leakage from these lines.

- The portion of the noted lines is readily isolatable should a leak occur. The portion has double-valve isolation from the primary system on a pressurizer low level signal. It could be easily isolated by the control room operators should the line be discovered to be leaking.

- Leakage exams at operating pressure were performed on these lines periodically as required by ASME XI during the first two periods of the first 10 year Interval. Also, these lines were included in the Boric Acid Walkdown performed in September 1989 (7R). In all these cases, a VT-2 examination, by certified examiners, was performed.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro-testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the above, the subject lines have been determined to be structurally sound and functionally operable.

System Operability Assessment
for the BV-1 Auxiliary Feedwater System

The portion of the Unit 1 Auxiliary Feedwater System not tested (i.e., piping bounded by valves FCV-FW-103A and 1FW-606 ; FCV-FW-103B and 1FW-608) is considered to have maintained structural integrity and its functional operability based on the following activities and surveillances:

- The lines in question are schedule 80S and rated at 1662 psig. The maximum operating pressure to which these lines will be exposed under normal and emergency operating conditions is 1155 psig. Ample margin exists in the design of these lines to accommodate operating pressures.

- Leakage exams at operating pressure were performed on these lines periodically as required by ASME XI during the first two periods of the first 10 year interval and the first period of the second 10 year interval.

- Operational Surveillance Tests (OST 1.24.2 and 1.24.3), "Motor Driven Auxiliary Feed Pump Test [1FW-P-3A]" and "Motor Driven Auxiliary Feed Pump Test [1FW-P-3B]" respectively are performed quarterly. Leakage through the subject lines would be detected by these OST's.

- Operational Surveillance Test (OST 1.24.8), "Motor Driven Auxiliary Feed Pump Check Valves and Flow Test" is performed during each refueling. Leakage through subject lines would be detected by this OST.

- Functional Tests (TOP 1-88-06 and TOP 1-89-22) were performed on the subject lines during the first period of the second interval with no detection of leakage.

- Valves 1FW-606 and 1FW-608 are normally open and provide an uninhibited recirculation flow path to the Primary Plant Demineralized Water Storage Tank. In all practicality, the subject lines could be considered as open-ended piping where an unimpared flow verification would fulfill the hydrostatic testing requirement.

- Any leakage from this piping would end up in the safeguards area sump which would result in increased sump levels or sump pump cycling rate.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the above, the subject lines have been determined to be structurally sound and functionally operable.

System Operability Assessment
for the BV-1 Steam Generator Blowdown Sample Lines

The portion of the Unit 1 Steam Generator Blowdown Sample System (i.e., tubing bounded by valves 1BD-13 and TV-SS-117B ; 1BD-14 and TV-SS-117C ; 1BD-15 and TV-SS-117A) are considered to have maintained structural integrity and its functional operability based on the following activities and surveillances:

- The operating pressures of the Steam Generator Blowdown Sample System tubing were compared with the pressure ratings for the tubing sizes and schedules. The smallest margin between the values was approximately 4246 psig. Ample margin exists in the design of these lines to accommodate operating pressures.

- Leakage examinations at operating pressure were performed on all of the tubing in question as required by ASME Section XI during the first two periods of the first 10 year inspection interval.

- Leakage examinations at operating pressure were performed on the Steam Generator Blowdown Sample lines as required by ASME Section XI during the first period of the second 10 year inspection interval.

- Per Chemistry Manual Chapter 3 procedure 1-3.49. Sampling and Testing of the Steam Generator Blowdown is performed on a daily basis. Leakage through the subject lines would be detected by this procedure.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro-testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the activities from above, the Unit 1 Steam Generator Blowdown Sample System Tubing (i.e., piping bounded by valves 1BD-13 and TV-SS-117B ; 1BD-14 and TV-SS-117C ; 1BD-15 and TV-SS-117A) have been determined to be structurally sound and functionally operable.

System Operability Assessment for the BV-1 River Water System

The portion of the Unit 1 River Water System not tested (i.e., piping bounded by 1RW-206 and 1RW-207) is considered to have maintained structural integrity and its functional operability based on the following activities and surveillances:

- The line in question is schedule 40S and rated at 1793 psig. The maximum operating pressure to which this line will be exposed under normal and operating conditions is 100 psig. Ample margin exists in the design of this line to accommodate operating pressures.

- Leakage exams at operating pressure were performed on these lines periodically as required by ASME XI during the first two periods of the first 10 year interval.

- In order to properly perform HAFA Test procedures IIT 24.4 and 30.2, the subject line was filled and vented. At the time of test set-up, any leakage from this piping would have been detected.

- A Working Group of the ASME XI Committee has recommended that a leak test (normal operating pressure) be required in lieu of current hydro testing. This is based on experience showing minimal elevated pressure tests do not generate adequate stress loads to propagate existing defects. This recommendation was passed by the Code Sub-Committee and is presently under review by the Main Code Committee.

Based on the above, the subject line has been determined to be structurally sound and functionally operable.