FENOC

FirstEnergy Nuclear Operating Company

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July 24, 2008
L-08-213

10 CFR 54

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

SUBJECT:
Beaver Valley Power Station, Unit Nos. 1 and 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Reply to Request for Additional Information for the Review of the Beaver Valley Power Station, Units 1 and 2, License Renewal Application (TAC Nos. MD6593 and MD6594) and License Renewal Application Amendment No. 19

Reference 1 provided the FirstEnergy Nuclear Operating Company (FENOC) License Renewal Application (LRA) for the Beaver Valley Power Station (BVPS). Reference 2 requested additional information from FENOC regarding BVPS license renewal information in Sections B.2.7, B.2.9, B.2.15, B.2.16, B.2.17, B.2.20, B.2.22, 4.7.6 and Table 3.3.2-14 of the BVPS LRA. Additional information is also provided for BVPS LRA Section B.2.38.

The Attachment provides the FENOC reply to the U.S. Nuclear Regulatory Commission request for additional information. The Enclosure provides Amendment No. 19 to the BVPS License Renewal Application.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Clifford I. Custer, Fleet License Renewal Project Manager, at 724-682-7139.

I declare under penalty of perjury that the foregoing is true and correct. Executed on July 24, 2008.

Sincerely,

Roy K. Brosi

A108
NRR

References:

1. FENOC Letter L-07-113, "License Renewal Application," August 27, 2007.
2. NRC Letter, "Request for Additional Information for the Review of the Beaver Valley Power Station, Units 1 and 2, License Renewal Application (TAC Nos. MD6593 and MD6594)," May 22, 2008.

Attachment:

Reply to Request for Additional Information Regarding Beaver Valley Power Station, Units 1 and 2, License Renewal Application, Sections B.2.7, B.2.9, B.2.15, B.2.16, B.2.17, B.2.20, B.2.22, B.2.38, 4.7.6 and Table 3.3.2-14

Enclosure:

Amendment No. 19 to the BVPS License Renewal Application

cc: Mr. K. L. Howard, NRC DLR Project Manager
Mr. S. J. Collins, NRC Region I Administrator

cc: w/o Attachment or Enclosure
Mr. B. E. Holian, NRC DLR Director
Mr. D. L. Werkheiser, NRC Senior Resident Inspector
Ms. N. S. Morgan, NRC DORL Project Manager
Mr. D. J. Allard, PA BRP/DEP Director
Mr. L. E. Ryan, PA BRP/DEP

Section B.2.7

Question RAI B.2.7-1

a) Clarify which components are included within the scope of this AMP, and whether the scope includes all Class 1 nickel alloy locations.

b) For in-scope nickel alloy locations (if any), clarify whether the examinations will be implemented through this AMP or some other BVPS AMP in the LRA. If another AMP will be used for specific components, clarify which AMP will be implemented for the examination.

c) Clarify which programs will be used to evaluate the evidence of leakage that is detected through this AMP or other AMPs.

d) For the in-scope components, clarify what type of visual examinations (i.e., specify whether VT-1, VT-2 or VT-3, and whether the visual examinations are enhanced, bare-surface, qualified, etc.) will be performed on the components.

RESPONSE RAI B.2.7-1

a) No nickel-alloy components, including Class 1 nickel-alloy locations, credit the Boric Acid Corrosion (BAC) Program for aging management for license renewal. The components that credit the BAC Program for license renewal are made of other materials, listed as follows:

- Aluminum
- Copper alloy > 15% Zinc
- Galvanized Steel
- Gray Cast Iron
- High-strength low-alloy steel
- High-strength steel
- SA508-Cl 2 forgings clad with stainless steel using a high-heat-input welding process
- Steel
- Steel with stainless steel cladding
- Various metals used for electrical connectors

The component types that credit the BAC Program for license renewal include, as examples, piping, valve bodies, and bolting. The components within the scope of this aging management program (AMP) are inspected for evidence of boric acid leakage, loss of material due to boric acid corrosion, and, for electrical components, loss of circuit continuity due to boric acid corrosion.

b) There are no nickel alloy components within the scope of this AMP (Boric Acid Corrosion Program) for license renewal. The components within the scope of the BAC Program are inspected for evidence of boric acid leakage, loss of material due to boric acid corrosion, and, for electrical components, loss of circuit continuity due to boric acid corrosion. Aging management of nickel alloy components is accomplished through other AMPs. The following AMPs are credited with managing various nickel alloy components:

- B.2.2.... ASME Section XI Inservice Inspection, Subsections IWB, IWC, and IWD
- B.2.9.... Closed-Cycle Cooling Water System
- B.2.15... External Surfaces Monitoring
- B.2.22... Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components
- B.2.29... Nickel-Alloy Penetration Nozzles Welded to the Upper Reactor Vessel Closure Heads
- B.2.30... One-Time Inspection
- B.2.32... Open-Cycle Cooling Water System
- B.2.38... Steam Generator Tube Integrity
- B.2.42... Water Chemistry

In addition to these programs, as specified in NUREG-1801, FirstEnergy Nuclear Operating Company (FENOC) has included commitments in the Beaver Valley Power Station (BVPS) License Renewal Application (LRA) to develop plant-specific aging management programs prior to the period of extended operation for management of certain nickel-alloy components. A commitment has been made to develop a Nickel-Alloy Nozzles and Penetrations Program, and a Pressurized Water Reactor (PWR) Reactor Vessels Internals Program.

c) The BAC Program includes provisions for engineering evaluations and corrective actions. If borated water leakage is discovered, either by programmatic inspections or by other activities, it is evaluated and resolved using the FENOC Corrective Action Program.

d) The components within the scope of this AMP are inspected for evidence of boric acid leakage, loss of material due to boric acid corrosion, and, for electrical components, loss of circuit continuity due to boric acid corrosion. Upon discovery of a leak, boric acid leakage inspections are performed by qualified boric acid corrosion control inspectors. As part of their training, inspectors complete a VT-2 General Training course, but are not VT-2 qualified. BAC Program inspections completely (360 degrees) examine the identified item using a direct visual inspection (within 6 feet) using adequate illumination. Remote visual inspection may be used, provided resolution capability is determined to be equivalent to that of a direct visual inspection. BAC inspections are documented on a Boric Acid Corrosion Control Leakage Inspection Report Form and are retained on file.

Section B.2.9

Question RAI B.2.9-1

The B.2.9 Program Description identifies the closed cooling water systems that credit the Closed-Cycle Cooling Water System to manage the effects of aging. AMR Tables also identify systems that credit the Closed-Cycle Cooling Water System as an AMP; however, there are some system names that appear within the AMR Tables that are absent from B.2.9 Program Description. They are: Reactor Coolant, Chemical Volume and Control, Boron Recovery and Primary Grade Water, Reactor Plant Vents and Drains, Residual Heat Removal, Containment Depressurization, Liquid Waste Disposal, Gaseous Waste Disposal, Fuel Pool Cooling and Purification, Steam Generator Blowdown, Auxiliary Steam, Radiation Monitoring, Reactor Plant Sample, Post Accident Sample, Service Water, Area Ventilation – Control Area and Area Ventilation – Other. Explain the disparity between B.2.9 and the AMR Tables.

RESPONSE RAI B.2.9-1

The LRA Section B.2.9, "Closed-Cycle Cooling Water," program description text that introduces the list is: "This program manages loss of material, cracking, and reduction of heat transfer for components exposed to closed cooling water systems (Primary Component and Neutron Shield Tank Cooling Water, Chilled Water...).", The list identifies the systems that contain a source of closed-cycle cooling water, not a list of the systems that credit the program. Other systems contain components (most commonly, heat exchangers) that are supplied by a closed cycle cooling water system, or have some other interface with one of the sources listed in B.2.9. As an example, the Radiation Monitoring System (Table 3.3.2-25) includes piping components that sample and monitor the Primary Component Cooling and Neutron Shield Tank Cooling Water Systems (and are exposed to a closed cycle cooling water system source). However, the Radiation Monitoring system is not included in the Section B.2.9 program description list because it is not a source of closed cycle cooling water.

Question RAI B.2.9-2

LRA Tables A.4-1 and A.5-1 "Unit 1(2) License Renewal Commitments and B.2.9 state that the Unit 1 Diesel Driven Fire Pump and the Unit 2 Diesel Driven Standby Air Compressor will be added to the AMP as an enhancement. Further, B.2.9 does not identify any exceptions to the AMP. GALL XI.M21, "Parameters Monitored/Inspected," identifies that for pumps, parameters monitored include flow, discharge pressure, and suction pressures. Explain whether the closed-cycle cooling water pumps for the Unit 1 Diesel Driven Fire Pump and the Unit 2 Diesel Driven Standby Air Compressor will undergo this parameter monitoring or explain why this is not an exception to GALL XI.M21.

RESPONSE RAI B.2.9-2

While the diesel driven fire pump and the Unit 2 diesel driven standby air compressor engines do not have installed instrumentation for all of the parameters identified, the engines are provided with coolant temperature indications that permit monitoring and trending of the pumps' function. The closed-cycle cooling water system is an integrated part of the self-contained diesel engine. For the Unit 1 Diesel Driven Fire Pump, the effectiveness of the cooling system is monitored by observing engine coolant temperature during operational tests and maintenance. For the Unit 2 Diesel Driven Standby Air Compressor, the effectiveness of the cooling system is monitored by observing engine coolant temperature during operational tests and maintenance. This monitoring is consistent with the Electric Power Research Institute (EPRI) guidance recommended by NUREG-1801, Section XI.M21, "Closed-Cycle Cooling Water System," and is not considered an exception.

NUREG-1801, Section XI.M21, under "Parameters Monitored / Inspected," recommends testing and inspection in accordance with the guidance in EPRI 107396. Revision 1 of that document is "Closed Cooling Water Chemistry Guideline: Revision 1 to TR-107396, Closed Cooling Water Chemistry Guideline," issued with new number EPRI 1007820. The EPRI document relies primarily on chemistry control and internal inspections to prevent and identify fouling. Monitoring is used where practical to provide additional assurance that the system chemistry is effective in precluding fouling. The monitoring parameters listed in NUREG-1801, Section XI.M21, are specified in EPRI 1007820, Section 8.4.4 "Heat Transfer:"

> *"Performance monitoring is typically part of the engineering program. It can be used to confirm that conditions in the CCW system are not degrading heat exchanger performance. System health reports should show trends of system parameters such as temperature, flow, pressure, and heat exchanger efficiency as a function of time. They should also evaluate any seasonal effects that might present themselves in the data."*

Section 8.5 "Trending" includes clarification of monitoring parameters:

> *"The logging and trending of data is an important part of the CCW system monitoring program. The data to be trended will depend on the system design, chemical treatment program, and monitoring in place."*

Finally, section 8.2 "Fouling" describes the purpose of the monitoring:

> *"Fouling in CCW systems will most likely be the result of either corrosion or microbiological growth. Control of both of these mechanisms will prevent fouling of the system. There are no specific guidelines for the amount of fouling allowed in CCW systems. It should be minimal and not interfere with heat transfer. For plant performance monitoring purposes, the assumption should be verified that fouling on the CCW side is minimal. Fouling must be limited below the amount that would cause the fouling factor to be raised above design assumptions in heat exchanger sizing calculations. It might be possible with installed plant equipment (temperature, pressure, and flow gauges) to assess relative fouling in certain portions of the system. Flow monitoring can also be performed using hand-held, adjacent-to-line, acoustic flow monitors. Measurements made over several months can assess changes in flow or temperature differentials."*

Therefore, Revision 1 to EPRI 107396 provides guidance to monitor and trend available system indications (temperature, flow, and differential pressure) associated with closed-cycle cooling systems to confirm that changes in system performance do not result in a loss of function. EPRI 107396 does not recommend installation of additional instrumentation beyond that present in the system. Additionally, the EPRI guidance does not identify specific parameters to be monitored for pump performance. Instead, the guidance document addresses use of available instrumentation to monitor and trend system performance. Temporary flow instrumentation is not practical for use on the integral cooling water subsystems of engines.

FENOC identified enhancements to the B.2.9 Closed-Cycle Cooling Water program that will detail performance testing of closed-cycle cooling water system and identify the parameters that will be trended to determine if system performance is degrading (including those associated with the diesel driven fire pump and the Unit 2 diesel driven standby air compressor engines). These parameters can identify degradation of overall cooling system performance, whether the degradation is due to heat exchanger fouling or degradation of pump performance. Therefore, with the enhancements identified, the Parameters Monitored / Inspected and Detection of Aging Effects elements of the Closed-Cycle Cooling Water System program will be consistent with NUREG-1801, Section XI.M21.

In addition to the above two pumps, the small, system-specific closed-cycle cooling pumps associated with the emergency diesel generators, the Emergency Response Facility diesel generator, and the security diesel generator do not have installed instrumentation that would permit monitoring for suction pressure, discharge pressure and/or flow. Proper operation of these pumps is confirmed by system performance during operation or testing. Additionally, small, system-specific closed-cycle cooling subsystem pumps associated with the primary sampling system, and boron recovery and liquid waste evaporator bottoms coolers perform only a 10 CFR 54.4(a)(2) leakage boundary function. The active functions of these subsystems are not within the scope of License Renewal.

In the case of these subsystems, the specific parameters recommended by NUREG-1801 cannot be monitored, because the available instrumentation and configuration of the components does not allow for it. However, the parameters that can be monitored and BVPS operating experience provide reasonable assurance that intended functions will be maintained consistent with the current licensing basis for the period of extended operation.

Question RAI B.2.9-3

LRA Tables A.4-1 and A.5-1 "Unit 1(2) License Renewal Commitments and B.2.9 state that the Unit 1 Diesel Driven Fire Pump and the Unit 2 Diesel Driven Standby Air Compressor will be added to the AMP as an enhancement. Further, B.2.9 does not identify any exceptions to the AMP. GALL XI.M21, "Parameters Monitored/Inspected," identifies that for heat exchangers, parameters monitored include flow, inlet and outlet temperatures, and differential pressures. Explain whether the closed-cycle cooling water heat exchangers for the Unit 1 Diesel Driven Fire Pump and the Unit 2 Diesel Driven Standby Air Compressor will undergo this parameter monitoring or explain why this is not an exception to GALL XI.M21.

RESPONSE RAI B.2.9-3

[Underlining added for emphasis.]

While the diesel driven fire pump and the Unit 2 diesel driven standby air compressor engines do not have installed instrumentation for all of the parameters identified, the engines are provided with coolant temperature indications that permit monitoring and trending of the heat transfer intended function. Most of the heat exchangers that constitute the loads on the Primary Component and Neutron Shield Tank Cooling Water System (LRA Section 2.3.3.24) do not have installed instrumentation corresponding to all of the parameters listed in NUREG-1801, Section XI.M21, "Closed-Cycle Cooling Water System," under the heading "Parameters Monitored / Inspected."

NUREG-1801, Section XI.M21, under the heading "Parameters Monitored / Inspected," recommends testing and inspection in accordance with the guidance in EPRI 107396, "Closed Cooling Water Chemistry Guideline." Revision 1 of that document is "Closed Cooling Water Chemistry Guideline: Revision 1 to TR-107396, Closed Cooling Water Chemistry Guideline," issued with new number EPRI 1007820. The EPRI Revision 1 document relies primarily on chemistry control and internal inspections to prevent and identify fouling. Monitoring is used where practical to provide additional assurance that the system chemistry is effective in precluding fouling. The monitoring parameters listed in NUREG-1801 XI.M21 are specified in EPRI 1007820, Section 8.4.4 "Heat Transfer:"

> *"Performance monitoring is typically part of the engineering program. It can be used to confirm that conditions in the CCW system are not degrading heat exchanger performance. System health reports should show trends of system parameters such as temperature, flow, pressure, and heat exchanger efficiency as a function of time. They should also evaluate any seasonal effects that might present themselves in the data."*

EPRI 1007820, Section 8.5, "Trending," includes clarification of monitoring parameters:

> *"The logging and trending of data is an important part of the CCW system monitoring program. The data to be trended will depend on the system design, chemical treatment program, and monitoring in place."*

Finally, EPRI 1007820, Section 8.2, "Fouling," describes the purpose of the monitoring:

> *"Fouling in CCW systems will most likely be the result of either corrosion or microbiological growth. Control of both of these mechanisms will prevent fouling of the system. There are no specific guidelines for the amount of fouling allowed in CCW systems. It should be minimal and not interfere with heat transfer. For plant performance monitoring purposes, the assumption should be verified that fouling on the CCW side is minimal. Fouling must be limited below the amount that would cause the fouling factor to be raised above design assumptions in heat exchanger sizing calculations. It might be possible with installed plant equipment (temperature, pressure, and flow gauges) to assess relative fouling in certain portions of the system. Flow monitoring can also be performed using hand-held, adjacent-to-line, acoustic flow monitors. Measurements made over several months can assess changes in flow or temperature differentials."*

Therefore, Revision 1 to EPRI 107396 provides guidance to monitor and trend available system indications (temperature, flow, and differential pressure) associated with heat exchangers, augmented by hand-held instrumentation where necessary, to confirm that changes in heat exchanger performance caused by fouling do not result in a loss of function. It does not recommend installation of additional instrumentation beyond that present in the system.

FENOC identified enhancements to the B.2.9 Closed-Cycle Cooling Water Program that will detail performance testing of heat exchangers and identify the closed-cycle cooling water system parameters that will be trended to determine if heat exchanger tube fouling or corrosion product buildup exists for applicable heat exchangers that perform a heat-transfer intended function (including those associated with the diesel driven fire pump and the Unit 2 diesel driven standby air compressor engines). Therefore, with the enhancements identified, the Parameters Monitored / Inspected and Detection of Aging Effects elements of the Closed-Cycle Cooling Water System Program will be consistent with NUREG-1801 XI.M21.

Question RAI B.2.9-4

B.2.9 Operating Experience explains that EDG Jacket Water system bolting for the temperature control valve may be subject to unexpected corrosion as indicated by INPO and manufacturer notifications. Further, it states that BVPS is tracking this operating experience with the Corrective Action Program. The staff noted that there is no bolting subject to Jacket Water or managed by the Closed-Cycle Cooling Water Program in the LRA. Explain where this bolting is described in the LRA.

RESPONSE RAI B.2.9-4

The Emergency Diesel Generator (EDG) jacket water system bolting in question is valve internal bolting, and is not part of the valve body or pressure boundary corresponding to NEI 95-10, Appendix B, item 106. It is part of the active assembly and is not subject to aging management review per 10 CFR 54.21(a)(1)(i). It is therefore not subject to aging management review, and is not described or discussed in the LRA.

The operating experience example is given in the LRA to demonstrate an instance where FENOC documented an assessment of industry operating experience in the Corrective Action Program. This operating experience provides an example of objective evidence that the program will be effective at managing aging effects for the period of extended operation because it shows that the program evaluates industry operating experience.

<u>Section B2.15</u>

Question RAI B.2.15-1

The GALL AMP XI.M36 is credited for managing the aging effect of loss of material due to general, pitting and crevice corrosion for steel components.

a) Please justify how this program will manage reduction of heat transfer of ERF diesel generator jacket water radiator fins.

b) Please justify how this program will manage hardening, loss of strength and cracking of elastomers.

c) The LRA is crediting this program for managing loss of material for aluminum, CASS, stainless steel, copper alloy and nickel alloy also. Please justify why this is not considered an enhancement to the GALL Report.

RESPONSE RAI B.2.15-1

a) The program will require inspection of radiators associated with diesel engines and diesel-driven equipment. The radiator fins are externally visible and can be inspected for build-up of dust, dirt, and debris that could result in reduction of heat transfer.

   Also see the FENOC response to RAI-3.3.2.7-01 in FENOC Letter L-08-190 dated June 9, 2008.

b) In response to RAI-3.3.2.3-03 / 3.4.2.3-3 (see FENOC Letter L-08-212 dated July 21, 2008), FENOC has provided a commitment to perform repetitive maintenance tasks to replace elastomer components in mechanical systems, with the exception of flexible connections in ventilation systems. Therefore, the scope of aging management of elastomer components is limited to flexible connections in ventilation systems.

   In response to RAI-3.3.2.2.5.1-01 / 3.4.2.3-1A (see FENOC Letter L-08-212 dated July 21, 2008), FENOC has provided a ten-element summary description of the enhanced implementation of aging management for flexible elastomer ventilation connections by the External Surfaces Monitoring Program. Excerpts are provided here:

   Physical manipulation of elastomer components, such as by pinching or prodding flexible connections in ventilation systems, will aid in identification of elastomer aging effects. Cracking of elastomer components becomes evident at the outside radius of elastomer deformations as the cracks open. Changes in material properties, such as hardening and loss of strength, can be detected during manipulation of elastomer components by the relative inflexibility of the component, or by the failure of the component to return to its previous shape or configuration. Additionally, as the external environment of ventilation systems is similar to the internal environment, the condition of the external surface is expected to be representative of the internal surface condition.

c) Loss of material from an external surface of stainless steel (or other metals) will be evident by surface irregularities or localized discoloration before loss of function occurs. Although materials other than steel are not discussed in NUREG-1801 for this program, identification of the loss of material aging effect for other metals is amenable to the same types of visual inspections. Therefore, inclusion of other metals was not considered an exception or an enhancement to NUREG-1801.The proposed External Surfaces Monitoring Program includes the following inspection parameters:

- corrosion and material wastage (loss of material);
- leakage from or onto external surfaces;
- worn, flaking, or oxide-coated surfaces;
- corrosion stains on thermal insulation; and,
- protective coating degradation (cracking and flaking).

The proposed program provides qualification requirements for personnel associated with visual inspection activities in accordance with site controlled procedures and processes.

Therefore, the External Surfaces Monitoring Program is capable of managing loss of material for aluminum, CASS, stainless steel, copper alloy and nickel alloy.

Section B.2.16

Question RAI B.2.16-1

LRA B.2.16, Fire Protection Program, in the Exception paragraph, it states:

Previous inspections and testing of the halon and carbon dioxide systems at the 18- month frequency have not identified aging degradation issues...However, to ensure the optimum integrity of the in-scope halon and carbon dioxide systems, each will be inspected at least once every 6 months during the period of extended operation.

Since the above implies that the existing inspection interval is 18 months, please confirm if the program will be enhanced to change this inspection interval to 6 months. If so, please justify why this enhancement has not been identified as an enhancement in LRA Section B 2.16.

RESPONSE RAI B.2.16-1

Such an enhancement is identified in LRA Section B.2.16, Table A.4-1 (Item 7), and Table A.5-1 (Item 8) of the BVPS LRA.

In the enhancements section of B.2.16, under Scope of Program, Parameters Monitored / Inspected, Detection of Aging Effects, Monitoring and Trending, and Acceptance Criteria, an enhancement is identified that will add NUREG-1801 inspection guidelines and inspection frequencies to the Fire Protection Program administrative procedure. This general enhancement includes aligning the Halon and CO2 systems inspections to the NUREG-1801 recommendation of at least once every six months.

Question RAI B.2.16-2

In LRA Section A.1.16, the applicant provided the USAR supplement for the Fire Protection Program.

NUREG-1800, Rev.1, section 3.X.2.4, FSAR Supplement, states that the summary description of the programs and activities for managing the effects of aging for the period of extended operation in the FSAR Supplement should be sufficiently comprehensive such that later changes can be controlled by 10 CFR 50.59. The description should contain information associated with the bases for determining that aging effects will be managed during the period of extended operation.

The description in LRA Section A.1.16 is not sufficiently comprehensive. It states that the program manages the aging effects; however, it does not state how it manages the aging effects. The LRA states that the program comprised of tests and inspections that follow the applicable National Fire Protection Association (NFPA) recommendations. This does not provide an adequate basis since none of the NFPA standards are identified nor what kind of tests and inspections are performed. Please provide a more comprehensive summary.

RESPONSE RAI B.2.16-2

The summary description of LRA Section A.1.16, "Fire Protection Program," is revised to include additional detail on how the program manages aging effects, as follows:

"The Fire Protection Program is a condition monitoring and performance monitoring program, comprised of tests and inspections that follow the applicable National Fire Protection Association (NFPA) recommendations, as specified in program administrative procedures. The Fire Protection Program manages the aging effects on fire barrier penetration seals; fire barrier walls, ceilings and floors; fire wraps and fire rated doors (automatic and manual) that perform a current licensing basis fire barrier intended function through periodic visual inspections. It also manages the aging effects on the diesel engine-driven fire pump fuel oil supply line through operational testing of the pump, which confirms that the component intended function is maintained. The Fire Protection Program also manages the aging effects on the halon and carbon dioxide fire suppression systems through periodic inspection and functional testing."

The current licensing basis details the requirements for the BVPS Fire Protection Program, including NFPA requirements. The BVPS Updated Final Safety Analysis Reports (UFSARs) identify the BVPS commitments related to General Design Criterion 3, Fire Protection, in Sections 1A.3 (Unit 1) and 3.1.2.3 (Unit 2). Additionally, the UFSARs detail the regulatory requirements for the BVPS Fire Protection Program for each unit in Sections 9.10 (Unit 1) and 9.5.1 (Unit 2).

Therefore, the combination of the modified LRA Appendix A UFSAR Supplement program summary, and the current licensing basis UFSAR descriptions of the Fire Protection Program, are sufficiently comprehensive such that later changes can be controlled by 10 CFR 50.59.

See the Enclosure to this letter for the revision to the BVPS LRA.

Question RAI B.2.16-3

In LRA section B.2.16, the applicant stated that the frequency of functional testing for the BVPS Halon and carbon dioxide systems will be at least once every 18 months, which is less frequent than the NUREG-1801, XI.M26 guideline of at least one test every 6 months for the detection of aging degradation. This is an exception to the GALL AMP XI.M26. The staff reviewed the BVPS UFSAR section 9.10.4 for Unit 1 and section 9.5.1.7.4 for Unit 2 CO2 and Halon systems. The UFSAR only states that in-service inspection and testing will be periodically performed and does not provide any frequencies.

Since the CLB does not specify any frequency, please provide the bases for using a different frequency than the GALL AMP recommended frequency of once every six months.

RESPONSE RAI B.2.16-3

The exception to the NUREG-1801 recommended testing frequency is that the BVPS current licensing basis specifies a different (18-month) testing frequency, and site operating experience indicates that the 18-month testing frequency is adequate to provide assurance that the systems will continue to perform their intended functions during the period of extended operation.

Section 9.10.4 of the BVPS Unit 1 UFSAR, "Tests and Inspections," states:

> *"Testing and inspection of the fire protection system is conducted in accordance with BVPS Administrative Procedures."*

Item 10 of Section 9.5.1.2.3.2 of the BVPS Unit 2 UFSAR, "Fire Suppression Systems," states:

> *"The test requirements identified in BVPS Administrative Procedures provide assurance that the minimum operability requirements of the fire suppression systems are met."*

Additionally, item 10 of Section 9.5.1.3 of the BVPS Unit 2 UFSAR, "Administrative Controls," states:

> *"Surveillance procedures are developed which periodically test the fire detection and suppression systems. Testing and inspection of the fire protection system is conducted in accordance with BVPS Administrative Procedures."*

The current licensing basis includes frequencies for tests and inspections; they are specified in the Fire Protection Program administrative procedure, as stated in both the Unit 1 and Unit 2 UFSAR.

The exception to the NUREG-1801 testing frequency is justified because previous inspections and testing of the halon and carbon dioxide systems at the 18- month frequency have not identified aging degradation issues. Continued testing and inspection at the current frequency is not expected to reduce the functional reliability of either system during the period of extended operation. Also, the in-scope halon and carbon dioxide systems will be inspected at least once every 6 months during the period of extended operation as noted in the response to RAI B.2.16-1 (this letter).

BVPS operating experience and inspection of the systems at least every 6 months provide reasonable assurance that the halon and carbon dioxide systems will continue to perform their intended functions during the period of extended operation.

Section B.2.17

Question RAI B.2.17-1

The LRA Section B.2.17 in the subsection on Enhancements, in the "detection of aging effects" element, last bullet states:

"Also, the program enhancement described under the Scope of Program program element is necessary for consistency with this program element."

However, there is no enhancement described under the "scope of program" element. Please clarify.

RESPONSE RAI B.2.17-1

The paragraph indicated above in LRA Section B.2.17 contains an error; there is no enhancement under the "Scope of Program" program element. The subject sentence should refer to the "Parameters Monitored / Inspected" program element. The LRA subject sentence is revised as follows:

> *Also, the program enhancement described under the Parameters Monitored / Inspected program element is necessary for consistency with this program element.*

See the Enclosure to this letter for the revision to the BVPS LRA.

Question RAI B.2.17-2

LRBV-PED-XI.27, item 4.10, gasket inspection states that unit 1 gasket inspections are performed every 18 months, however it is not considered as an exception to the GALL AMP frequency of 12 months, because gaskets were considered consumables and will be replaced as necessary. The document also cites Table 2.1-3 of SRP-LR to justify the above. However, in the Statement of Consideration, it states that this does not intend to preclude a license renewal applicant from providing site-specific justification in a license renewal application that a replacement program on the basis of performance or condition for a passive structure or component provides reasonable assurance that the intended function of the passive structure or component will be maintained in the period of extended operation.

Please justify why this frequency difference is not considered an exception.

RESPONSE RAI B.2.17-2

As stated in the BVPS LRA, Section 2.1.2.4.1, gaskets are typically used to provide a leakproof seal when components are mechanically joined together. They are commonly found in components such as valves, pumps, heat exchangers, ventilation units or ducts, and piping segments. Based on ANSI B31.1 and the ASME Boiler and Pressure Vessel Code, Section III, the subcomponents of pressure retaining components are not pressure retaining parts. Therefore, these subcomponents are not relied on to form a pressure-retaining function and are not subject to aging management review.

Although these gaskets perform no license renewal intended function, their condition is monitored by the Fire Water System Program and they are replaced as necessary. BVPS operating experience shows that the current monitoring frequency for these gaskets is sufficient to provide reasonable assurance that fire hydrants (hose stations) can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur.

Question RAI B.2.17-3

LRPD-PED-XI.M27, item 4.9, fire hydrant hose hydrostatic tests are performed at various frequencies, which are different than the GALL AMP frequencies of once per year. However, it is not considered as an exception to the GALL AMP frequency of 12 months, because hoses were considered consumables and will be replaced as necessary. The document also cites Table 2.1-3 of SRP-LR to justify the above. However, in the Statement of Consideration, it states that this does not intend to preclude a license renewal applicant from providing site-specific justification in a license renewal application that a replacement program on the basis of performance or condition for a passive structure or component provides reasonable assurance that the intended function of the passive structure or component will be maintained in the period of extended operation.

Please justify why this frequency difference is not considered an exception.

RESPONSE RAI B.2.17-3

As stated in Section 2.1.2.4.3 of the BVPS LRA, fire hoses are consumables, and are routinely tested, inspected, and replaced when necessary. They are inspected and hydrostatically tested periodically and must be replaced if they do not pass the test or inspection. Fire protection procedures specify the replacement criterion of these components that are routinely checked by tests or inspections to assure operability. Criteria for inspection and replacement are based on accepted industry standards (e.g., NFPA-1962). Therefore, while these consumables are within the scope of license renewal, they do not require an aging management review.

BVPS operating experience shows that the current testing frequency for these fire hoses is sufficient to provide reasonable assurance that fire hydrants (hose stations) can perform their intended function and provide opportunities for degradation to be detected before a loss of intended function can occur.

Question RAI B.2.17-4

Several CRs have been generated to address pinhole leaks in fire protection piping. The cause of the leaks appears to be loss of material due to MIC. CRs 05-3940, 06-5051, and 07-13290 were reviewed. In CR05-3940, it was found that the chemical treatment of the piping did not eliminate MICs already established in the piping. UT inspections confirmed areas in the piping system having a wall thickness loss of 50% or more.

Please identify what preventive measures will be taken to assure that the program will adequately manage loss of material due to MIC prior to loss of intended function.

RESPONSE RAI B.2.17-4

The condition report from 2005 indicates that further chemical treatment at that time would not have eliminated the MIC that was established in the piping welds. Therefore, because of the large number of potentially susceptible welds in the piping, the entire length of affected pipe was replaced. Continuing chemical treatments, testing, and inspection of the new pipe provide reasonable assurance that MIC will be adequately managed prior to loss of intended function.

The testing of the Fire Water System is performed in accordance with applicable National Fire Protection Association (NFPA) codes and standards, including testing requirements associated with the fire suppression water system, spray and sprinkler system, and fire hose stations. The Fire Water Systems are normally maintained at required operating pressure and monitored such that loss of system pressure is immediately detected and corrective actions initiated. Ultrasonic tests are capable of effectively evaluating pipe wall thickness and inner diameter of the tested piping. These tests are used for verifying fire water subsystem operability, based on operating experience, and as determined by the site Fire Protection System Engineer. Degradation detected by the program is evaluated in the FENOC Corrective Action Program, as demonstrated by the condition reports the staff has reviewed.

Testing, continuous pressure monitoring, inspections, incorporation of site-specific operating experience, ultrasonic testing when necessary, and evaluation of degradation using the Corrective Action Program provide reasonable assurance that the Fire Water System's intended functions will be maintained for the period of extended operation.

Section B.2.20

Question RAI B.2.20-1

B.2.20 takes as an exception to the "Preventive Actions" element of GALL XI.M30 that no biocides, stabilizers, and corrosion inhibitors in fuel oil subsystems in part, because that due to the materials of construction of the fuel oil tank, there would be no benefit from the additives. Identify the fuel oil tanks for which the exception applies, their materials of construction, and provide a summary of the tank's evaluation concerning microbiologically induced corrosion.

RESPONSE RAI B.2.20-1

The BVPS LRA, Section B.2.20 states that the exception is justified in part due to the materials of construction of the tanks, referring to an evaluation weighing the use of biocides, stabilizers, and corrosion inhibitors in the Emergency Diesel Generator fuel oil tanks. The evaluation found that biocides were not needed because testing found no evidence of microorganisms present in the tanks, corrosion inhibitors were not necessary due to the lack of water in the tanks, and metal deactivators were not necessary due to the materials of construction of the tanks.

The fuel oil tanks with materials of construction within the scope of the Fuel Oil Chemistry Program (LRA Section B.2.20) and subject to aging management review are:

- The Diesel Fuel Oil Storage Tank for the BVPS Unit 1 Diesel-Driven Fire Pump is fabricated of carbon steel.
- The Unit 2 Diesel driven air compressor engine fuel oil storage tank is made of carbon steel.
- Each BVPS Unit 1 Emergency Diesel Generator fuel oil storage tank (there are two) and fuel oil day tank (there are two) are constructed of carbon steel.
- Each BVPS Unit 1 Emergency Diesel Generator engine-mounted fuel oil tank (there are two) is constructed of carbon steel.
- Each BVPS Unit 2 Emergency Diesel Generator fuel oil storage tank (there are two) and fuel oil day tank (there are two) are constructed of carbon steel.

- Each BVPS Unit 2 Emergency Diesel Generator engine-mounted accumulator tank (there are two) is constructed of carbon steel.
- The Security Diesel Generator Fuel Oil Storage Tank is fabricated of carbon steel.
- The Security Diesel Generator Fuel Oil Day Tank is fabricated of carbon steel.
- The Emergency Response Facility Diesel Generator Support Systems fuel oil storage tank is fabricated of fiberglass.
- The Emergency Response Facility Diesel Generator Support Systems fuel oil day tank is fabricated of carbon steel.

BVPS operating experience does not indicate a need for biocides, fuel stabilizers, or corrosion inhibitors. A sampling schedule for diesel generator fuel oil tanks has been established, to allow timely identification of concentrations of water and/or particulates, which will minimize tank loss of material. The sampling frequency is adequate based on BVPS operating experience, as evidenced by the relatively few instances of particulate levels exceeding the Technical Specification limit. Particulate testing will provide indication of the presence of corrosion byproducts and microbiological growth. If future fuel oil particulate samples indicate fuel oil breakdown or the presence of corrosion byproducts, the FENOC Corrective Action Program will be used to evaluate, trend, and implement corrective actions. Additionally, the BVPS One-Time Inspection Program will be used to verify the effectiveness of this program at managing loss of material of fuel oil tanks.

Considering the results of previous evaluations and other operating experience related to these fuel oil tanks, there is reasonable assurance that the Fuel Oil Chemistry Program will adequately manage aging effects for the period of extended operation.

Question RAI B.2.20-2

B.2.20 states that BVPS does not use ASTM Standard D2709 as identified in GALL XI.M30, "Parameters Monitored/Inspected." Instead B.2.20 uses ASTM Standard D1796 for guidance on the determination of water and sediment contamination as required by Technical Specifications. Provide a summary of the evaluation for the use of ASTM Standard D1796 criteria instead of D2709 criteria in determining water and sediment contamination. Additionally, since not all fuel oil tanks within the scope of the program are subject to Technical Specification Requirements, identify the specific fuel oil tanks subject to testing for water and sediment.

RESPONSE RAI B.2.20-2

Since the use of ASTM D 1796 is also recommended by NUREG-1801, XI.M30 and has been reviewed by the NRC staff as indicated below, no further evaluation is considered necessary. BVPS has taken exception only to the use of ASTM D 2709, which is also recommended by NUREG-1801, XI.M30. Both standards outline test methods for determining water and sediment concentration by centrifuge. The use of ASTM D 1796 is required by BVPS Technical Specification.

The NRC staff previously reviewed ASTM D 2709 and D 1796 to determine if both standards are necessary to assure fuel oil quality. In the Safety Evaluation Report with Open Items Related to the License Renewal of Wolf Creek Generating Station, the staff noted that both standard test methods use a centrifuge method to determine water and sediment contents using a 100 mL sample. The staff determined that using only ASTM D 1796 is adequate to quantitatively determine water and sediment contents in fuel oil. Additionally, the staff noted that the applicant adheres to the plant's technical specifications, as recommended in NUREG-1801. On this basis, the staff found that this exception to NUREG-1801 is acceptable.

Although the Technical Specifications do not directly govern the testing standards used for all fuel oil tanks within the scope of the program, the requirements of the Technical Specifications (specifically the use of ASTM D 1796 for water and sediment testing) are applied to the analysis of fuel oil samples from all tanks within the scope of the program. FENOC has included enhancements to the program to monitor these parameters for certain tanks, as identified in Section B.2.20 of the LRA.

Question RAI B.2.20-3

B.2.20 states that BVPS does not use a filter with a pore size of 3.0 microns when testing fuel oil for particulates, as identified in GALL XI.M30, "Monitoring and Trending." Instead, B.2.20 states that BVPS uses a .8 micron pore size as recommended by ASTM D 2276 and that ASTM D 2276 is a Technical Specification requirement. Provide the evaluation and basis for using the .8 micron filter instead of the 3.0 micron filter in determining fuel oil particulates. Further, identify which fuel oil tanks are sampled for particulates. Additionally, since not all fuel oil tanks within the scope of the program are subject to Technical Specification Requirements, identify the specific fuel oil tanks subject to testing for particulates.

RESPONSE RAI B.2.20-3

FENOC uses the guidance in ASTM D 2276-78 without modification for filter pore size, as required by the Technical Specifications. The filter used has a smaller pore size than the filter recommended in NUREG-1801, XI.M30. The smaller filter pore size generates more conservative test results than the larger recommended size. This provides reasonable assurance that fuel oil systems will be adequately managed for the period of extended operation.

The NRC staff reviewed the use of a filter pore size of 0.8 microns instead of 3.0 microns in the Safety Evaluation Report Related to the License Renewal of Vermont Yankee Nuclear Power Station, and determined that the use of a filter size of 0.8 microns instead of 3.0 microns when monitoring the presence of particulates in diesel fuel was conservative. Based on the use of the conservative filter pore size, the staff found the testing provided results that were equivalent or superior to those obtained using a 3.0 micron pore size as recommended in NUREG-1801. On this basis, the staff found the exception acceptable.

Although the Technical Specifications do not directly govern the testing standards used for all fuel oil tanks within the scope of the program, the testing standards specified by Technical Specifications (specifically the use of ASTM D 2276 for particulate testing) are applied to the analysis of fuel oil samples from all tanks within the scope of the program. With the enhancements identified in Section B.2.20 of the LRA, all fuel oil tanks within the scope of the program are tested for particulates.

Question RAI B.2.20-4

LRA Tables 3.3.2-14, 3.3.2-17, and 3.3.2-29 identify copper alloy (>15% zn) components in a fuel oil environment that are subject to cracking. For each of the components, the Fuel Oil Chemistry Program, as confirmed by the One-Time Inspection Program is identified as the AMP and points to Note H. Describe how the Fuel Oil Chemistry Program will be used to mitigate the aging effects.

RESPONSE RAI B.2.20-4

FENOC used the EPRI Non-Class 1 Mechanical Implementation Guideline and Mechanical Tools, Rev 1 to identify that the potential for cracking of copper alloy >15% Zn in a fuel oil environment requires the presence of water. The BVPS Fuel Oil Chemistry Program mitigates cracking by periodically testing fuel oil tanks and new shipments of fuel oil for water and contaminants, and taking corrective action if necessary to maintain water and contaminants within acceptance criteria.

Section B.2.22

Question RAI B.2.22-1

The "acceptance criteria" element states that the program will inspect for indications of material degradation such as corrosion, cracking, fouling, etc. and that inspection results not meeting the acceptance criteria will be processed in accordance with the corrective action program However, the acceptance criteria are not defined. Please provide the acceptance criteria.

RESPONSE RAI B.2.22-1

The BVPS LRA, Section B.2.22, under "Acceptance Criteria" is revised to state:

> *"The program will inspect for indications of paint/coating degradation, corrosion, fouling, cracking, and build-up of dust/dirt/debris that could affect component intended function. Acceptance criteria are:*
>
> - *No indications of paint/coating degradation*
> - *No indications of heavy or localized corrosion (a thin, uniform oxide layer is acceptable)*
> - *No indications of blistered or pitted material*
> - *No indications of cracking*
> - *No buildup of dust, dirt, or debris on heat transfer surfaces*
> - *No indications of fouling*
>
> *Conditions not meeting these criteria will be evaluated and/or corrected using the FENOC Corrective Action Program."*

The intent of the original wording in the BVPS LRA, Section B.2.22, was that indications of paint or coating degradation, corrosion, fouling, cracking, or build-up of dust, dirt, or debris that could affect component intended function are not acceptable, and will be further evaluated through the FENOC Corrective Action Program.

For surfaces that are painted or coated, any evidence of damaged or degraded coating is an indicator of possible corrosion damage to the surface underneath. Therefore, evidence of damaged or degraded coatings is unacceptable and will be evaluated through the FENOC Corrective Action Program. Likewise, any indication of cracking or fouling (built up dirt / dust / debris) is unacceptable and will be evaluated using the Corrective Action Program.

For materials susceptible to corrosion, significant corrosion is unacceptable. This means heavy corrosion, localized corrosion, blistered material, pitted material, or visible loss of material due to corrosion. A thin, light, even layer of oxidation can provide protection against further corrosion, is expected in some systems, and is acceptable.

See the Enclosure to this letter for the revision to the BVPS LRA.

Section B.2.38

Question RAI B.2.38-1

LRA B.2.38 for the Steam Generator Tube Integrity Program states that there are no exceptions, nor enhancements to the BVPS Program. Further, the scope of the program claims consistency with GALL XI.M19, Steam Generator Tube Integrity Program.

LRA Table 3.1.1-76 for steel steam generator tube support plate, tube bundle wrapper exposed to secondary feedwater/steam clarifies the components managed by this line in its discussion. The discussion for this AMR line states that feed rings and J-tubes are managed in part, by the Steam Generator Tube Integrity Program. GALL XI.M19 does not include feedrings and J-Tubes within its scope to manage their aging effects. Although the staff understands how the BVPS AMP manages the aging effects of these components, explain why this is not a program enhancement.

RESPONSE RAI B.2.38-1

FENOC considers the subject feed rings and J-tubes to be within the scope of the NUREG-1801, Section XI.M19 program.

NUREG-1801, Section XI.M19 states:

> *"In addition to plant technical specifications, all PWR licensees have committed voluntarily to a SG degradation management program described in the Nuclear Energy Institute (NEI) 97-06, "Steam Generator Program Guidelines." This program references a number of industry guidelines and incorporates a balance of prevention, inspection, evaluation, repair, and leakage monitoring measures."*

Section 3.1.6 of NEI 97-06 states:

> *"Secondary-side steam generator components shall be monitored if their failure could prevent the steam generator from fulfilling its intended safety-*

related function. The monitoring shall include design reviews, an assessment of potential degradation mechanisms, industry experience for applicability, and inspections, as necessary, to ensure degradation of these components does not threaten tube structural and leakage integrity or the ability of the plant to achieve and maintain safe shutdown."

As provided in LRA Table 3.1.1, line item number 3.1.1-76, the feed rings, as well as the Unit 2 steam generator J-tubes aging effects are managed with a combination of the Steam Generator Tube Integrity (B.2.38) and Water Chemistry (B.2.42) Programs. The subject feed rings and J-tubes are secondary-side steam generator components and are within the scope of NEI 97-06, and consequently, are within the scope of XI.M19. Therefore, the Steam Generator Tube Integrity Program (B.2.38) does not require an enhancement to include the subject feed rings and J-tubes within the scope of the program.

Question RAI Table 3.3.2-14-1

In Table 3.3.2-14, line 3, stainless steel bolting component in an outdoor air external environment, the LRA has identified the aging effect of loss of material. However, in other Tables such as Table 3.2.2-1, lines 63, 71, 126, etc., the LRA has identified aging effects as "none". Please justify why there is no aging effect identified.

RESPONSE RAI Table 3.3.2-14-1

Most air environments do not support corrosion of stainless steel. However, some specific "Air-outdoor" environment locations were evaluated with the potential for prolonged wetting, along with concentration of contaminants, which may lead to Loss of material due to MIC, or due to Pitting and/or Crevice corrosion.

The Air-outdoor environment generally excludes the potential for prolonged wetting and concentration of contaminants, as alternate wetting and drying resulting from rain has shown a tendency to "wash" the exterior surface material rather than concentrate contaminants (EPRI 1010639 Mechanical Tools, Appendix E, Section 4.3, Stainless Steel paragraphs). However, some specific outdoor areas at BVPS were identified that have the potential for ponding or pooling due to their location or configuration. Stainless steel in those areas was considered to be susceptible to MIC, or to Pitting and/or Crevice corrosion, per EPRI 1010639 Mechanical Tools, Appendix E, Table 4.1 and note 1.

The areas with an environment of Air-outdoor that were identified with the potential for ponding/pooling and had loss of material assigned for stainless steel are:

- At the base of Auxiliary Demineralized Water Storage Tank (1WT-TK-26), described in LRA Table 3.4.2-4, row #18 (with plant-specific note 404 – "This AMP applies only at the base of the tank, where water pooling can result in a concentration of contaminants").
- At the base of Demineralized Water Storage Tank (2WTD-TK23), described in LRA Table 3.4.2-10, row #39 (with plant-specific note 404 – "This AMP applies only at the base of the tank, where water pooling can result in a concentration of contaminants").
- Tubing and Valve body in the Unit 2 Service Water Valve Pit, described in LRA Table 3.3.2-30, row #s 97, 101, and 109. New plant-specific note 323 ("This AMP applies only in the Service Water Valve Pit, where water pooling can result in a concentration of contaminants") has been added to these rows for clarification.
- Bolting in the fuel oil subsystem of the Emergency Diesel Generator system associated with the tank piping connections, and described in LRA Table 3.3.2-14, row #3. Both carbon steel and stainless steel bolting were assumed to exist in the portions of the diesel generator fuel oil subsystem that are outside and potentially susceptible to pooling. However, further evaluation in response to this question concluded that there is no stainless steel bolting in an air-outdoor environment in the diesel generator fuel oil subsystem. LRA Table 3.3.2-14, row #3 will be deleted.

See the Enclosure to this letter for the revision to the BVPS LRA.

<u>Section 4.7.6</u>

Question RAI 4.7.6-1

In Section 4.7.6, the applicant states that two cranes in Unit 1 and three cranes in Unit 2 have TLAAs associated with their design. The LRA further states that total load cycles are well below 20,000 and mean effective load factors are maintained within or below the Service Class A bounds (0.35-0.53) for 60 years. Therefore, crane allowable stress ranges as defined in CMAA-70 will remain valid through the period of extended operation in accordance with 10 CFR 54.21(c)(1)(i).

However, the LRA does not provide any information on how the load cycles were calculated to conclude that the stress ranges remain valid through the period of extended operation. Please provide the projected number of cycles calculated for sixty years for each of these cranes.

RESPONSE RAI 4.7.6-1

As presented in LRA Section 4.7.6, BVPS cranes that have TLAAs associated with their design are listed as follows:

Unit 1

- Fuel cask crane (CR-15)
- Moveable platform and hoists crane (CR-27)

Unit 2

- Polar crane (CRN-201)
- Spent fuel cask trolley (CRN-215)
- Moveable platform with hoists crane (CRN-227)

The 60-year projected cycles including the projection assumptions for the five cranes are provided in the table titled, "60-year Projected Crane Cycles," shown below.

60-Year Projected Crane Cycles							
Applicable Crane / Load	Lift (Tons)	Outage Lift	# Lifts per Outage	# Lifts per year	Cycles in 60 years	Totals	Assumptions (Projected refueling outages are 36 for Unit 1 and 39 for Unit 2)
Unit 1 Spent Fuel Cask Crane (CR-15) Rated for 125 tons							
Spent Fuel Shipping Cask	21.5	No	2.1	N/A	75		Assumed 75 spent fuel shipping casks.
					Total Cycles in 60 years:	*75*	
Unit 1 Moveable Platform and Hoists (CR-27) Rated for 5 tons each							
Fuel Assembly Movements	2.5	Yes	502	NA	18072		Full core offload and onload per outage (157 x 2 x 36). Assumed 30 additional fuel assembly shuffles per outage (30 x 2 x 36). Assumed 64 new fuel assemblies per outage (64 x 2 x 36).
Failed Fuel Assembly Storage Can (Full)	1.5	Yes	2	NA	72		Assumed 1 can per outage.
					Total Cycles in 60 years:	*18144*	
Unit 2 Polar Crane (2CRN-201) Rated for 167 tons							
Reactor Vessel Head and Attachment	134.5	Yes	2	N/A	78		1 lift (on and off) per outage
Upper Internals	40	Yes	4	N/A	156		2 lifts (on and off) per outage
Lower Internals	130	Yes	0.3	N/A	12		1 lift (on and off) per 10 year ISI
Reactor Coolant Pump Motor	40	Yes	2	N/A	78		1 motor (on and off) per outage
Reactor Coolant Loop Iso Valve	15	Yes	2	N/A	78		1 valve (on and off) per outage
Reactor Head Lifting Rig Spreader Assy	3.5	Yes	2	N/A	78		1 lift (on and off) per outage
Reactor Containment Operating Floor Plugs	7.5	Yes	2	N/A	78		1 lift (on and off) per outage
CRDM Missile Shield	42	Yes	2	N/A	78		1 lift (on and off) per outage
Ventilation Fans	1	Yes	2	N/A	78		1 lift (on and off) per outage
Stud Carriers (Full)	3.6	Yes	12	N/A	468		6 Stud Carriers. Assumed 1 lift (on and off) per outage (6 x 2)
Removable Rail and Beam	1.15	Yes	2	N/A	78		1 lift (on and off) per outage
Removable Platform North and South	3	Yes	4	N/A	156		1 lift (on and off) per platform per outage
Containment Air Recirc Fan and Motor	3	Yes	2	N/A	78		1 lift (on and off) per outage

60-Year Projected Crane Cycles							
Applicable Crane / Load	Lift (Tons)	Outage Lift	# Lifts per Outage	# Lifts per year	Cycles in 60 years	Totals	Assumptions (Projected refueling outages are 36 for Unit 1 and 39 for Unit 2)
Internal Lifting Rig Assembly	10.5	Yes	8	N/A	312		4 lifts (in and out) per outage
Irradiation Specimen Cask	3.5	Yes	2	N/A	78		1 lift (in and out) per outage
RHR Heat Exchanger	9.4	Yes	0.3	N/A	12		1 lift (on and off) per 10 year ISI
RHR Pump	3.9	Yes	0.3	N/A	12		1 lift (on and off) per 10 year ISI
Regenerative Heat Exchanger	3.5	Yes	0.3	N/A	12		1 lift (on and off) per 10 year ISI
Polar Cranes Bottom Block and Hook	5.4	Yes	2	N/A	78		1 lift (on and off) per outage
Reactor Vessel Lead Shielding Boxes	1.5	Yes	2	N/A	78		1 lift (on and off) per outage
Steam Generator Snubbers	2.2	Yes	0.3	N/A	12		1 lift (on and off) per 10 year ISI
					Total Cycles in 60 years:	*2088*	
Unit 2 Spent Fuel Cask Trolley (2MHF-CRN-215) Rated for 125 tons							
Spent Fuel Shipping Cask	100	No	N/A	N/A	50		Assumed 50 spent fuel shipping casks.
Fuel Repair and Inspection Boxes	1.5	Yes	2	N/A	78		1 lift (on and off) per outage
Spent Fuel Shipping Cask Trolley	3.25	Yes	2	N/A	78		1 lift (on and off) per outage
					Total Cycles in 60 years:	*206*	
Unit 2 Moveable Platform and Hoists (2MHF-CRN-227) Rated for 10/10 tons							
Fuel Assembly Movements	3	Yes	502	NA	19578		Full core offload and onload per outage (157 x 2 x 39). Assumed 30 additional fuel assembly shuffles per outage (30 x 2 x 39). Assumed 64 new fuel assemblies per outage (64 x 2 x 39).
Failed Fuel Storage Can	1.5	Yes	2	NA	78		Assumed 1 per outage.
Refueling Canal Weir Gate	1.8	Yes	2	NA	78		Assumed 1 per outage.
Cask Pool Weir Gate	1.5	Yes	2	NA	78		Assumed 1 per outage.
					Total Cycles in 60 years:	*19812*	

ENCLOSURE

Beaver Valley Power Station (BVPS), Unit Nos. 1 and 2

Letter L-08-213

<u>Amendment No. 19 to the</u>
<u>BVPS License Renewal Application</u>

License Renewal Application
Sections Affected

Table 3.3.2-14

Table 3.3.2-30

Table 3.3.2 Notes

Section A.1.16

Section B.2.17

Section B.2.22

The Enclosure identifies the correction by Affected License Renewal Application (LRA) Section, LRA Page No., and Affected Paragraph and Sentence. The count for the affected paragraph, sentence, bullet, etc. starts at the beginning of the affected Section or at the top of the affected page, as appropriate. Below each section the reason for the change is identified, and the sentence affected is printed in *italics* with deleted text ~~*lined-out*~~ and added text <u>*underlined*</u>.

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Table 3.3.2-14	**Page 3.3-383**	**Row No. 3**

LRA Table 3.3.2-14, "Auxiliary Systems – Emergency Diesel Generators—Fuel Oil System – Summary of Aging Management Evaluation," erroneously included a row that identified stainless steel bolting in an outdoor environment for the Emergency Diesel Generator Fuel Oil Subsystem. The row is deleted. LRA Table 3.3.2-14, Row No. 3, is revised to read:

Row No.	Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Volume 2 Item	Table 1 Item	Notes
3	*[Deleted]* ~~Bolting~~	~~Pressure boundary~~	~~Stainless steel~~	~~Air – outdoor-EXT~~	~~Loss of material~~	~~Bolting Integrity (B.2.6)~~	~~N/A~~	~~N/A~~	~~G~~

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Table 3.3.2-30	**Page 3.3-708**	**Row No. 97, Notes**
	Page3.3-709	**Row No. 101, Notes**
	Page3.3-712	**Row No. 109, Notes**

LRA Table 3.3.2-30, "Auxiliary Systems – Service Water System (Unit 2 only) – Summary of Aging Management Evaluation, " requires revision to add Table plant-specific Note 323 to the list of notes for Row Nos. 97, 101 and 109 for clarification. LRA Table 3.3.2-30, Row Nos. 97, 101 and 109, Notes column, is revised to read:

Row No.	Component Type	Notes
97	Tubing	*G,* *323*
101	Valve body	*G,* *323*
109	Valve body	*G,* *323*

Table 3.3.2 Notes	**Page 3.3-748**	**New Note 323**

LRA Table 3.3.2 Notes requires a new plant-specific Note to address the potential for concentration of contaminants due to water pooling in the Unit 2 Service Water Valve Pit. LRA Table 3.3.2 Notes are revised to include new Note 323, which reads:

"*323. This AMP applies only in the Service Water Valve Pit, where water pooling can result in a concentration of contaminants.*"

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Section A.1.16	**Page 3.3-708**	**Row No. 97, Notes**

LRA Section A.1.16, "Fire Protection Program, " requires revision to provide additional details regarding how the aging effects in the Fire Protection System will be managed. LRA Section A.1.16 is revised to read:

"A.1.16 FIRE PROTECTION PROGRAM

The Fire Protection Program is a condition monitoring and performance monitoring program, comprised of tests and inspections that follow the applicable National Fire Protection Association (NFPA) recommendations, as specified in program administrative procedures. The Fire Protection Program manages the aging effects on fire barrier penetration seals; fire barrier walls, ceilings and floors; fire wraps and fire rated doors (automatic and manual) that perform a current licensing basis fire barrier intended function through periodic visual inspections. It also manages the aging effects on the diesel engine-driven fire pump fuel oil supply line through operational testing of the pump, which confirms that the component intended function is maintained. The Fire Protection Program also manages the aging effects on the halon and carbon dioxide fire suppression systems through periodic inspection and functional testing."

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Section B.2.17	**Page B.2-47**	**Detection of Aging Effects Bullet, 5th Paragraph**

LRA Section B.2.17, "Fire Water System, " requires revision to correct a typographical error that directed the reader to the wrong section of the text. LRA Section B.2.17, 5th paragraph under Subheading "Detection of Aging Effects" is revised to read:

"Also, the program enhancement described under the Parameters Monitored / Inspected ~~Scope of Program~~ program element is necessary for consistency with this program element."

Affected LRA Section	LRA Page No.	Affected Paragraph and Sentence
Section B.2.22	**Page B.2-63**	**Acceptance Criteria Bullet, Both Paragraphs**

LRA Section B.2.22, "Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components, " requires revision to define the acceptance criteria for inspections. LRA Section B.2.22, Subheading "Acceptance Criteria," is revised to read:

"*The program will inspect for indications of paint/coating degradation, corrosion, fouling, cracking, and build-up of dust/dirt/debris that could affect component intended function. <u>Acceptance criteria are:</u>*

- *<u>No indications of paint/coating degradation</u>*
- *<u>No indications of heavy or localized corrosion (a thin, uniform oxide layer is acceptable)</u>*
- *<u>No indications of blistered or pitted material</u>*
- *<u>No indications of cracking</u>*
- *<u>No buildup of dust, dirt, or debris on heat transfer surfaces</u>*
- *<u>No indications of fouling</u>*

<u>Conditions not meeting these criteria will be evaluated and/or corrected using the FENOC Corrective Action Program.</u>

~~Inspection results not meeting the acceptance criteria shall be documented and processed in accordance with the Corrective Action Program.~~"