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

**Subject: Beaver Valley Power Station, Unit No. 2
Docket No. 50-412, License No. NPF-73
License Amendment Request No. 142**

Pursuant to 10 CFR 50.90, Duquesne Light Company requests an amendment to the above license. The proposed amendment would add license condition 2.C(12) to provide a one time extension of the steam generator inspection interval to coincide with the eighth refueling outage scheduled to begin in September 2000.

The proposed license condition is presented in Attachment A. The safety analysis (including the no significant hazards evaluation) is presented in Attachment B. The extended interval is requested for the surveillance referenced in Attachment C.

These changes have been reviewed by the Beaver Valley review committees. These changes were determined to be safe and do not involve a significant hazard consideration as defined in 10 CFR 50.92 based on the evaluation presented in Attachment B. An implementation period of up to 60 days is requested following the effective date of this amendment.

If there are any questions concerning this matter, please contact Mr. Mark S. Ackerman, Manager, Safety & Licensing Department at 412-393-5203.

Sincerely,


James E. Cross

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c: Mr. D. S. Collins, Project Manager
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ATTACHMENT A

Beaver Valley Power Station, Unit No. 2
License Amendment Request No. 142

Add License Condition 2.C(12) as follows:

- (12) Steam Generator Surveillance Interval Extension
The performance interval for the steam generator surveillance requirement identified in the licensee's request for surveillance interval extension dated November 29, 1999, shall be extended to coincide with the Cycle 8 refueling outage (prior to first entry into Mode 4 after the outage) or the end of 650 effective full power days, whichever is sooner. This surveillance will not extend beyond November 30, 2000.

ATTACHMENT B

Beaver Valley Power Station, Unit No. 2
License Amendment Request No. 142
CYCLE 8 STEAM GENERATOR SURVEILLANCE INTERVAL EXTENSION

A. DESCRIPTION OF AMENDMENT REQUEST

Surveillance requirement (SR) 4.4.5.3.a specifies that steam generator (SG) inspections occur no more than 24 calendar months after the last inspection. This surveillance was last performed during the 1998 extended outage (surveillance completed September 2, 1998) and was not performed during the 7th refueling outage (2R7) in March 1999, since SR 4.4.5.3.a also requires a minimum interval of 12 months before performing a subsequent inservice inspection. Therefore, this surveillance must be performed during the next scheduled refueling outage (2R8).

The next 24 month inspection is due by September 2, 2000. 2R8 is currently scheduled to begin September 30, 2000. The requested extension of the SR 4.4.5.3.a interval would enable Cycle 8 power operation to continue until the end of the cycle without interruption for steam generator tube inspection. An additional 3 months (until November 30, 2000) is requested to extend the surveillance to the outage and allow sufficient time to perform the SG inspection. This would increase the interval specified in SR 4.4.5.3.a by approximately 3 calendar months (from September 2, 2000, to November 30, 2000). The inspection interval would increase from 24 months but not exceed 27 months. The SGs have been evaluated for > 650 effective full power days (EFPD) of operation. Therefore, the operating time on the SGs will also be limited to 650 EFPD from the last SG inspection. The performance of the SG tube inspection and repair normally takes several weeks and requires the coordination of vendor support onsite. The deadline of November 30, 2000, was selected to accommodate any delays in the start of 2R8 and establish a calendar time limit for the requested extension. The proposed extension would allow the inspection to be performed during the next scheduled refueling outage and avoid an additional plant shutdown that would otherwise be required solely to perform this surveillance.

This license amendment request would, therefore, add License Condition 2.C(12) to provide a one time extension of the surveillance interval for performing SR 4.4.5.3.a identified in Attachment C. The revised license condition would extend the SG surveillance interval to the end of 2R8 (first entry into Mode 4 after the outage) or 650 EFPD, whichever is sooner. The plant is not expected to exceed 650 EFPD even with the requested extension in Cycle 8. In any case, this SR will be completed prior to entry into Mode 4 from 2R08.

B. DESIGN BASES

Specification 3/4.4.5 "Steam Generators" supports the Design Basis Accident (DBA) analysis discussed in UFSAR, Section 15.6.3,

"Steam Generator Tube Failure." The purpose of SR 4.4.5.3.a is to provide reasonable assurance of equipment integrity as necessary to operate without experiencing tube rupture or tube leakage in excess of specified limits, by identifying and removing from service defective and potentially defective SG tubes.

The length of operation for Cycle 8, based on core design, has been determined to be a period of 469 nominal EFPD. This is approximately equal to an 18 month fuel cycle consisting of 16.5 months of full power operation with a 95% capacity factor and a 1.5 month refueling outage. Based on a deterministic operational assessment (described later) of SG tubing, an operating length of > 650 EFPD can be supported. Cycle 8 operation did not begin until April 1999. Cycle 8 was initially scheduled to end in the spring of 2000; however, Cycle 8 is currently scheduled to end in the fall of 2000. The 8th (2R8) refueling outage is currently scheduled to begin at this time. The extension of the SG surveillance interval, as requested in this proposed license amendment, would allow delaying the SG tube inspection to the end of 2R8 or 650 EFPD, whichever is sooner. However, this request would not allow the surveillance interval to be extended beyond November 30, 2000.

C. JUSTIFICATION

The proposed change is temporary and allows a one time extension of the time interval in SR 4.4.5.3.a. The Unit 2 SG operational assessment has projected reliable SG performance within a power operating span of > 650 EFPD. The expiration of the current surveillance interval for SR 4.4.5.3.a (September 2, 2000) would require an additional plant shutdown. This additional plant shutdown would be unnecessary since the operational assessment has conservatively projected reliable SG performance with a plant operating time of > 650 EFPD.

The SG inspection interval extension is intended to compensate for the extended duration of the 1998 forced outage by extending the SG inspection interval to coincide with 2R8. The maximum surveillance interval increase is three calendar months. This surveillance interval extension will not affect the reliability established by surveillance inspections performed at previous intervals. An operating cycle length of > 650 EFPD for Cycle 8 is based on an operational assessment that evaluated degradation growth rates.

In August 1998 the SGs were comprehensively inspected (inspection completed September 2, 1998), using advanced methods and equipment, in accordance with SR 4.4.5.3.a. This examination was sufficiently thorough to assess the overall condition of the SGs. After this inspection, plant systems were prepared for power operation and the unit restarted in September 1998.

Due to uncertainty that existed regarding the restart date following the unit shutdown in December 1997, a vacuum was maintained on the main condenser. With this vacuum, the capability to maintain a continuous recirculation pathway through the condensate/feedwater system and the SGs was provided. This was accomplished via the SG blowdown system. A fresh continuous source of high purity, deaerated water with a constant renewal of the SG hydrazine residual was provided. Oxygen values were maintained less than 100 ppb in the SGs during this period and chemicals were added to maintain elevated pH and hydrazine. As a result, oxygen ingress and thus the potential for corrosion was minimized not only for the SGs but for the entire secondary system.

In early March 1998, it became necessary to break condenser vacuum to allow repairs on various secondary system components. The SGs were then treated to full wet lay-up values in accordance with EPRI guidelines and isolated. The SGs were maintained for the duration of the outage in a condition where the potential for corrosion was minimized.

During the subsequent operational period, minor condenser inleakage was experienced. This resulted in SG contaminants, primarily sodium and sulfate, measured at values above station administrative limits but below EPRI Action Level 1 values. This condenser inleakage was corrected in October 1999. Operating below Action Level 1 values provides a greater degree of assurance that corrosive conditions will be minimized. Therefore, a high level of confidence is maintained that detectable amounts of new corrosion were not initiated during the shutdown period or the subsequent operational period and the SGs are prepared to operate for the duration of the cycle. In support of this conclusion, the following information should be considered:

MIDCYCLE SG TUBE INSPECTION

The August/September 1998 SG eddy current inspection was an extensive examination that was documented by letters L-98-188 dated September 21, 1998, and L-99-086 dated May 28, 1999. A 100% inspection of the in-service tubes in Rows 3 through 46 from each SG were examined to the maximum extent practical (full length) with bobbin coil probes. Tubes in Rows 1 and 2 were examined with bobbin coil probes to the top tube support plate in each leg. The U-bend regions of the in-service tubes in Rows 1 and 2 were examined with a Zetec single coil Plus Point probe. A 20% random sample of the Row 3 U-bend region was also examined with a Zetec single coil Plus Point probe. All inservice hot leg expansion transitions and sludge pile regions in all three SGs were examined with a three coil Plus Point probe.

100% of dents & free-span dings > 2.00 volts, located between the top of the hot leg tubesheet and the third hot leg support plate,

were examined with the 3 coil Plus Point probe. In addition, 100% of the dents > 5.00 volts, located at tube support plate intersections, were also examined with the 3 coil Plus Point probe.

None of the Anti-Vibration Bar (AVB) wear indications exceeded the TS repair limit of 40% through wall. Also, no indications indicative of Cold Leg Thinning were observed.

All examination techniques were qualified for detection under Appendix H of Electric Power Research Institute (EPRI) document NP-6201, "PWR Steam Generator Examination Guidelines." In addition, the bobbin coil techniques utilized for AVB wear demonstrated satisfactory uncertainty values such that the bobbin coil was used for sizing. As stated above, no AVB wear indications exceeded the 40% through wall repair criteria specified in the technical specifications. All other degradation mechanisms were repaired on detection. This extensive level of inspection and the conservatism inherent in the repair criteria provide a high level of assurance that the SGs are prepared to operate a full cycle. Additionally, sludge lancing was performed in all three SGs with approximately 64 pounds of sludge removed. This relatively low quantity of removed sludge combined with the visual observations, performed during foreign object search and retrieval (FOSAR) examinations, provides evidence of the effectiveness of the secondary water chemistry program in achieving low iron transport from secondary systems and otherwise minimizing sludge accumulation. Control of sludge accumulation minimizes the propensity for outside diameter stress corrosion cracking (ODSCC).

DETERMINISTIC OPERATIONAL ASSESSMENT OF SG TUBING

An operational assessment documented an evaluation of the SG tubing. The severity of degradation at the end of Cycle 8 was projected to determine if required structural or leakage integrity margins would be maintained. The scope of this evaluation included the following forms of tubing degradation 1) Wear at AVBs, 2) Axial ODSCC in the Sludge Pile Region, 3) Circumferential ODSCC at Expansion Transitions, and 4) Volumetric Indications. The evaluation concluded that the forms of degradation listed above did not present a challenge to the 3AP structural margin requirement specified by Regulatory Guide 1.121 at the end of Cycle 8. The evaluation also concluded that the Regulatory Guide 1.121 structural margin, (i.e., the degraded tube burst strength of 3 times the operating pressure differential) would be maintained after > 650 EFPD of operation.

REDUCED TEMPERATURE

Intergranular attack/stress corrosion cracking growth is well understood to be accelerated by increasing the temperature, and reducing temperature is a proven method to slow both initiation

and growth. The effect of reduced temperature can be estimated using the Arrhenius equation and assuming an average value of activation energy of 57 kcal/mole. This results in a decrease by a factor of two in the corrosion rate for each 18°F temperature reduction. Since the SGs were maintained in wet lay-up at approximately 80°F, instead of the normal operational hot leg temperature of 607°F, the corrosion rate during the lay-up period can be considered to have been essentially halted.

WATER CHEMISTRY

Throughout the forced outage, there was no evidence of any significant contaminant intrusions. Sodium values were routinely monitored throughout the forced outage, with values typically less than 5 ppb, which is indicative of high purity conditions throughout the SG. Sodium and sulfate contaminant levels for the period of power operation immediately following the forced outage were low, indicating again that there was no significant contaminant intrusion during the period of shutdown. This control of impurities provides added confidence that there was no significant change in the condition of the SG tubes during lay-up.

During the subsequent operational period, minor condenser inleakage was experienced. This resulted in SG contaminants, primarily sodium and sulfate, measured at values above station administrative limits but below EPRI Action Level 1 values. This condenser inleakage was corrected in October 1999. Operating below Action Level 1 values provides a greater degree of assurance that corrosive conditions will be minimized. A high level of confidence is maintained that detectable amounts of new corrosion were not initiated during the operational period and the SGs are prepared to operate for the duration of the cycle.

MONITORS AND TECHNICAL SPECIFICATION LIMITS

Radiation monitors are installed in the condenser air ejector, and in the SG blowdown line. These radiation monitors can be used to measure primary to secondary leakage. In addition, Specification 3.4.6.2 (revised in response to License Amendment No. 101, Alternate Plugging Criteria for Steam Generator Tubing and Reduction of Reactor Coolant System Specific Activity Limits) will limit primary to secondary leakage to 150 gpd for any one SG. The guidance provided by the EPRI Primary to Secondary Leakage Monitoring Guidelines has been incorporated into plant procedures. This guidance provides appropriate action levels for rate of change as well as total leakage. This provides assurance that, should a leak develop during the operating cycle, it would be quickly detected to allow mitigating actions to be taken.

D. SAFETY ANALYSIS

Technical Specification 4.0.2 is an administrative control which ensures that surveillance tests are performed periodically. The basis of this specification describes the SRs as "sufficient to ensure that the reliability associated with the surveillance activity is not significantly degraded beyond that obtained from the nominal specified interval." Because the maximum allowable extension is limited to coincide with 2R8 or the end of 650 EFPD and will not extend beyond November 30, 2000, it can be concluded that the reliability defined by the normal surveillance intervals will not be significantly reduced by the extension. This conclusion is based on the following:

- An operational assessment of Unit 2 has concluded that the required structural margin of the SG tube would be maintained during this cycle of operation. The conservative conclusion provided in this assessment provides confidence that the SGs will perform reliably.
- Primary and secondary water chemistry conditions for the SGs are continually assessed to control the level of impurities and to detect any significant degradation to ensure that the SGs can perform reliably through Cycle 8. Water chemistry monitoring provides added assurance that the reliability of equipment associated with the extended surveillance will not be significantly degraded by this one time extension.
- Current primary and secondary leakage monitoring systems, blowdown monitoring systems, and condenser air ejector radiation monitors provide evidence of continued structural integrity of SG tubes. The above leakage monitoring capability provides assurance that, should a leak develop during the operating cycle, it would be quickly detected to allow mitigating actions to be taken.

The proposed amendment would allow a one time extension of the SG surveillance interval in SR 4.4.5.3.a from August/September 2000 to the end of the 8th refueling outage (first entry into Mode 4 after the outage) or 650 EFPDs, whichever is sooner, but in no case shall the unit operate beyond November 30, 2000, without completion of the surveillance. This extension is requested due to the 1998 extended forced outage, which delayed the start of 2R8. For the duration of the outage, the SGs were maintained in a condition where the potential for corrosion was minimized. The surveillance was last performed in August/September 1998.

Conducting SR 4.4.5.3.a during a surveillance outage based on calendar months would be unnecessary since reliable SG performance is conservatively projected given a plant operating time of > 650 EFPD. Further, an inspection based on an operating time of substantially less than the nominal cycle length would

likely yield results that are less reflective of standard SG performance. SR 4.4.5.3.a is intended to evaluate the structural integrity of the SGs and to identify defective SG tubes. Previous inspections have achieved this.

This proposed license amendment is consistent with license amendments granted by the NRC for other plants such as Salem Unit 2 (TAC No. M99888) and Beaver Valley Unit 1 (TAC No. MA4149), to extend a TS surveillance interval to the next refueling outage. The SG tube inspection completed in 1998, together with the lay-up program in place during the extended outage, ensure that the SGs are in a condition that can be reasonably expected to safely and reliably support full power operation for the entire fuel cycle. However, should an unforeseen circumstance cause leakage which exceeds guidelines, a number of systems are available for timely detection and mitigation. Thus, there is no adverse consequence to public health and safety that might result from granting this request. Therefore, based on the above, it has been determined that this change will not adversely affect the safety of the plant.

E. NO SIGNIFICANT HAZARDS EVALUATION

The no significant hazard considerations involved with the proposed amendment have been evaluated. The evaluation focused on the three standards set forth in 10 CFR 50.92(c), as quoted below:

The Commission may make a final determination, pursuant to the procedures in paragraph 50.91, that a proposed amendment to an operating license for a facility licensed under paragraph 50.21(b) or paragraph 50.22 or for a testing facility involves no significant hazards consideration, if operation of the facility in accordance with the proposed amendment would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or
- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated; or
- (3) Involve a significant reduction in a margin of safety.

The following evaluation is provided for the no significant hazards consideration standards.

1. Does the change involve a significant increase in the probability or consequences of an accident previously evaluated?

The proposed change is temporary and allows a one time extension of the steam generator (SG) surveillance

requirement (SR) for Cycle 8 to allow surveillance testing to coincide with the 8th refueling outage (2R8). The proposed surveillance interval extension will not cause a significant reduction in system reliability nor affect the ability of a system to perform its design function. Current monitoring of plant conditions and the surveillance monitoring required during normal plant operation will be performed as usual to assure conformance with technical specification (TS) operability requirements.

The TS SG tube inspection is intended to prevent the "Steam Generator Tube Failure" analyzed in UFSAR Section 15.6.3 by maintenance of the integrity of the primary to secondary coolant boundary represented by SG tubes. The process by which this integrity is maintained is inspection of SG tubes at prescribed intervals, and the repair or removal of defective tubes from service. Inspection intervals are based on preventing corrosion growth from exceeding tube structural limits, thereby preventing tube failure. The 1998 SG inspection characterized existing tube degradation, and degraded tubes were removed from service at that time. Degradation growth rates were evaluated for the next operating interval and it was determined that the steam generator tube structural integrity is maintained. Degradation of SG tubes was prevented during the extended outage by a corrosion prevention program.

The surveillance extension does not involve a change to plant equipment and does not affect the performance of plant equipment used to mitigate an accident. This change, therefore, does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the change create the possibility of a new or different kind of accident from any accident previously evaluated?

Extending the surveillance interval for the performance of specific inspections will not create the possibility of any new or different kind of accidents. No change is required to any system configurations, plant equipment or analyses.

SG tube inspections determine tube integrity and provide reasonable assurance that a tube rupture or primary to secondary leak will not occur. The only type of accident that can be postulated from extending the SG inspection interval would be a tube leak or rupture and these are analyzed in the UFSAR. No new failure modes are created by the surveillance extension. Therefore, this change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the change involve a significant reduction in a margin of safety?

Surveillance interval extensions will not impact any plant safety analyses since the assumptions used will remain unchanged. The safety limits assumed in the accident analyses and the design function of the equipment required to mitigate the consequences of any postulated accidents will not be changed since only the surveillance interval is being extended. Extending the surveillance interval for the performance of these specific inspections does not involve a significant reduction in the margin of safety derived from the required surveillances.

The margin of safety depends upon maintenance of specific operating parameters within design limits. In the case of SGs, that margin is maintained through assurance of tube integrity as the primary to secondary boundary. Assurance of tube integrity is provided through periodic in-service inspection of tubes and repair or removal of defective tubes from service. Radiation monitors provide a detection capability of primary to secondary leakage to enable a prompt response. The water chemistry of the steam generators during shutdown was maintained as described previously in Section C. Maintenance of the SG water chemistry during power operation in accordance with Electric Power Research Institute (EPRI) guidelines provides additional margin of safety. Therefore, the plant will be maintained within the analyzed limits and the proposed extension will not significantly reduce the margin of safety.

F. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

Based on the considerations expressed above, it is concluded that the activities associated with this license amendment request satisfy the requirements of 10 CFR 50.92(c) and, accordingly, a no significant hazards consideration finding is justified.

G. ENVIRONMENTAL CONSIDERATION

This license amendment request changes a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. It has been determined that this license amendment request involves no significant increase in the amounts, and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. This license amendment request may change requirements with respect to installation or use of a facility component located within the restricted area or change an inspection or surveillance requirement; however, the category of this licensing action does not individually or cumulatively have a significant effect on the human environment. Accordingly,

this license amendment request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this license amendment request.

H. UFSAR CHANGES

No UFSAR changes are required to implement this proposed amendment.

ATTACHMENT C

Beaver Valley Power Station, Unit No. 2
License Amendment Request No. 142
CYCLE 8 STEAM GENERATOR SURVEILLANCE INTERVAL EXTENSION

Surveillance interval extension is requested for the following SR:

<u>Surveillance</u>	<u>Description</u>	<u>Due</u>
4.4.5.3.a	Steam Generator inspection	9/2/00