

April 16, 1999

Mr. J. E. Cross  
President-Generation Group  
Duquesne Light Company  
Post Office Box  
Shippingport, PA 15077

SUBJECT: BEAVER VALLEY POWER STATION, UNIT NO. 1 (TAC NO. MA4149)

Dear Mr. Cross:

The Commission has issued the enclosed Amendment No. 221 to Facility Operating License No. DPR-66 for the Beaver Valley Power Station, Unit No. 1. This amendment consists of changes to the Technical Specifications (TSs) in response to your application dated November 11, 1998, as supplemented February 26, 1999, which submitted License Amendment Request No. 261.

The amendment modifies License Condition 2.C(9) to allow a one-time extension of the steam generator inspection interval in Technical Specification Surveillance 4.4.5.3.b. This extension allows the steam generator inspection interval to coincide with the thirteenth refueling outage or the end of 500 effective full power days, whichever occurs sooner.

Your submittal of this request with its requested completion date of December 30, 1998, was not timely in that it allowed insufficient time for the NRC staff to complete their reviews and meet the requested completion date. However, your application for this amendment addressed the relevant issues; your response to our request for additional information was timely and provided the requested information. The application's no significant hazard consideration determination was suitable for use without changes and the evaluation of environmental consideration was proper.

A copy of the related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by:  
Daniel S. Collins, Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-334

Enclosures: 1. Amendment No. 221 to DPR-66  
2. Safety Evaluation

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NAME	DCollins:lcc	MO'Brien <i>only</i>	SE dtd	STurke	SBajwa <i>lcc</i>
DATE	4/15/99	4/15/99	3/18/99	4/12/99	4/15/99

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

April 16, 1999

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Duquesne Light Company  
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Shippingport, PA 15077

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Sincerely,

A handwritten signature in black ink that reads "Daniel S. Collins".

Daniel S. Collins, Project Manager, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-334

Enclosures: 1. Amendment No. 221 to DPR-66  
2. Safety Evaluation

cc w/encls: See next page

Mr. J. E. Cross  
Duquesne Light Company

Beaver Valley Power Station, Units 1 & 2

cc:

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Beaver Valley Power Station  
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Shippingport, PA 15077  
ATTN: Kevin L. Ostrowski, Division Vice  
President, Nuclear Operations Group  
and Plant Manager (BV-SOSB-7)



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

DUQUESNE LIGHT COMPANY

OHIO EDISON COMPANY

PENNSYLVANIA POWER COMPANY

DOCKET NO. 50-334

BEAVER VALLEY POWER STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 221  
License No. DPR-66

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Duquesne Light Company, et al. (the licensee) dated November 11, 1998, as supplemented February 26, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, page 6 of Facility Operating License No. DPR-66 is hereby amended by the addition of License Condition 2.C(9) to state:\*

(9) 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 11, 1998, shall be extended to coincide with the cycle 13 refueling outage or the end of 500 effective full power days, whichever is sooner. This surveillance will not extend beyond June 15, 2000.

3. This license amendment is effective as of its date of issuance, to be implemented within 60 days.

FOR THE NUCLEAR REGULATORY COMMISSION



S. Singh Bajwa, Chief, Section 1  
Project Directorate I  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Page 6 of Facility Operating  
License No DPR-66\*

Date of Issuance: April 16, 1999

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\* Page 6 is attached, for convenience, for the composite license to reflect this change.

ATTACHMENT TO LICENSE AMENDMENT NO. 221

FACILITY OPERATING LICENSE NO. DPR-66

DOCKET NO. 50-334

Revise License as follows:

Remove Page

6

Insert Page

6

(6) Systems Integrity

Duquesne Light Company shall implement a program to reduce leakage from systems outside containment that would or could contain highly radioactive fluids during a serious transient or accident to as low as practical levels. This program shall include the following:

1. Provisions establishing preventive maintenance and periodic visual inspection requirements, and
2. Integrated leak test requirements for each system at a frequency not to exceed refueling cycle intervals.

(7) Iodine Monitoring

Duquesne Light Company shall implement a program which will ensure the capability to accurately determine the airborne iodine concentration in vital areas under accident conditions. This program shall include the following:

1. Training of personnel,
2. Procedures for monitoring, and
3. Provisions for maintenance of sampling and analysis equipment.

(8) Backup Method for Determining Subcooling Margin

Duquesne Light Company shall implement a program which will ensure the capability to accurately monitor the Reactor Coolant System subcooling margin. This program shall include the following:

1. Training of personnel, and
2. Procedures for monitoring.

(9) 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 11, 1998, shall be extended to coincide with the Cycle 13 refueling outage or the end of 500 effective full power days, whichever is sooner. This surveillance will not extend beyond June 15, 2000.



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 221 TO FACILITY OPERATING LICENSE NO. DPR-66

DUQUESNE LIGHT COMPANY

OHIO EDISON COMPANY

PENNSYLVANIA POWER COMPANY

BEAVER VALLEY POWER STATION, UNIT NO. 1

DOCKET NO. 50-334

## 1.0 INTRODUCTION

By letter dated November 11, 1998, as supplemented by letter dated February 26, 1999, Duquesne Light Company (DLC) submitted a request to modify License Condition 2.C(9) for Beaver Valley Power Station, Unit 1 (BVPS-1). The proposed amendment would revise the BVPS-1 license to allow a one-time extension of the steam generator (SG) inspection interval in technical specification (TS) 4.4.5.3. The amendment involves a revision to License Condition 2.C(9) to allow the SG inspection interval to coincide with the 13th refueling outage or the end of 500 effective full power days, whichever is sooner. The supplemental letter provided information and did not change the initial proposed no significant hazards consideration determination or expand the amendment request beyond the scope of the initial notice.

BVPS-1 is a Westinghouse three-loop pressurized water reactor with Model 51 SGs. Each SG contains 3388 mill-annealed (MA), Inconel 600 tubes.

## 2.0 BACKGROUND

The applicable surveillance requirement for BVPS-1 at this time is TS 4.4.5.3.b. This requirement specifies that the SG inspections occur every 20 calendar months. The licensee's last surveillance was performed during October 1997 (12th refueling outage). The licensee did not perform an inspection during the forced outage (January 1998 - August 1998) because a minimum interval of 12 months (as stated in Surveillance 4.4.5.3.a) is required before taking credit for a subsequent inservice inspection.

## 3.0 EVALUATION

The objective of the staff's evaluation is to determine the impact of the proposed extended inspection interval on the structural and leakage integrity of the tubes, considering the extended period that the plant was shut down. The staff has focused its evaluation on the

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licensee's evaluations of 1) steam generator tube integrity for the previous and current operating cycles, 2) SG lay-up in accordance with industry guidelines, 3) leakage monitoring and leakage guidelines.

### 3.1 October 1997 Steam Generator Inspection

The licensee performed an extensive eddy current inspection in October 1997 (end of cycle 12). The inspection included 100% bobbin coil examination of inservice tubes. The rows 1 and 2 U-bend regions were inspected using a Zetec single coil plus point probe. A 20% random sample of row 3 U-bend regions were also examined with a Zetec single coil plus point probe. All in-service hot leg expansion transitions and sludge pile regions in all three SGs were examined with a three coil plus point probe. All inservice cold leg expansion transitions and sludge pile regions in one SG were inspected with a three coil plus point probe. A 20% sample of cold leg expansion transitions and sludge pile regions in the remaining two SGs were examined with a three coil plus point probe. In accordance with Generic Letter (GL) 95-05, all bobbin coil indications  $\geq 2$  volts at tube support plates were examined with rotating pancake coil probes. All dents  $\geq 5$  volts and 20% of dents and dings  $\geq 2$  volts were examined with plus point probes. The major degradation mechanisms identified were primary water stress corrosion cracking (PWSCC) at the U-bends of rows 1 and 2, and outer diameter stress corrosion cracking (ODSCC) at the tube support plates. All tubes exhibiting degradation  $\geq 40\%$  through-wall due to wear or cold leg thinning were repaired by plugging. The alternate repair criteria in GL 95-05 were implemented for tube support plate ODSCC cracking indications. All other degradation was plugged upon detection. Prior to tube plugging, the licensee performed in-situ pressure testing on selected tubes having bounding flaws with the following degradation mechanisms to verify tube integrity: axially oriented PWSCC located at the top of tubesheet (TTS), circumferentially oriented ODSCC located at the TTS, axially oriented PWSCC located below the TTS, PWSCC located in the Rows 1 and 2 U-bends, cold leg thinning, and pitting. The in-situ pressure tests showed that the steam generator tubes have maintained adequate structural integrity in accordance with Regulatory Guide (RG) 1.121. One U-bend tube with an indication characterized as PWSCC leaked approximately 22 gallons per day (gpd) at main steam line break (SLB) pressure. All in-situ tested tubes, including the leaking U-bend tube, successfully achieved three times normal operating pressure, thus demonstrating RG 1.121 margins were met over the past operating cycle (cycle 12). On the basis of the licensee's assessment, the staff finds that the structural and leakage integrity of tubes during cycle 12 was acceptable.

The licensee evaluated steam generator tube integrity for the present operating cycle (cycle 13) on the basis of the end of cycle 12 inspection and testing results. The severity of degradation at the end of cycle 13 was projected considering beginning of cycle degradation status, degradation growth rates, and end of cycle (EOC) allowable degradation (all parameters were selected at the bounding 95<sup>th</sup> percentile level). The severity of degradation at EOC 13 was projected to determine if required structural and leakage integrity margins would be maintained. The scope of the licensee's evaluation included the following forms of degradation: 1) cold leg thinning, 2) Anti-vibration bar wear, 3) axial ODSCC in the sludge pile region, 4) PWSCC at Row 1 and Row 2 U-bends, 5) axial PWSCC at expansion

transitions, and 6) circumferential ODSCC at expansion transitions and 7) pitting. The licensee's evaluation concluded that the forms of degradation listed above did not present a challenge to the 3ΔP structural margin criteria for the expected operating cycle length of 1.37 EFPY. The licensee documented the worst case estimate for all degradation mechanisms combined at postulated SLB conditions to be 0.43 gpd which is acceptable. In addition, on April 16, 1998, the licensee submitted a report as a part of the voltage-based alternate repair criteria implemented at Unit 1 in accordance with GL 95-05. The report included an assessment of the structural and leakage integrity of degraded steam generator tubing having ODSCC at the support plate intersections for cycles 12 and 13. The staff finds that the tube locations covered by the alternate repair criteria are acceptable for cycle 13 operation. The staff also concludes that the structural and leakage integrity of the balance of the steam generator tubing is acceptable for the remainder of cycle 13.

### 3.2 Steam Generator Status During Shutdown

After the October 1997 inspection, unanticipated delays extended the Unit 1 restart until January 1998. The SGs were maintained in wet lay-up conditions in accordance with Electric Power Research Institute (EPRI) guidelines. BVPS-1 commenced power operation on January 10, 1998. An unexpected plant shutdown occurred on January 30, 1998, and the plant did not resume operation again until August 1998.

During the initial portion of the forced outage commencing on January 30, 1998, a vacuum on the main condenser provided a pathway to maintain a continuous recirculation through the condensate/feedwater system and the SGs. A fresh continuous source of high purity, deaerated water with a constant renewal of the SG hydrazine residual was provided. Chemicals were added to maintain elevated pH and hydrazine levels. As a result, oxygen ingress and the potential for corrosion was minimized for the SGs and for the entire secondary system. Midway through the forced outage, it became necessary for the licensee to break the 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 in the wet lay-up conditions for the duration of the outage. The staff believes that the licensee's procedures were in accordance with industry guidelines which were designed to minimize the potential for corrosion. The SG inspection interval extension is intended to compensate for the delay of cycle 13 startup (from October 1997 to January 10, 1998) and the forced outage from January 30, 1998, to August 1998. Based on the above, the staff concludes, during shutdown, the steam generators were maintained at reduced temperatures and with water chemistry conditions that should have prevented further degradation of the steam generator tubes.

### 3.3 Leakage Monitoring and Leakage Guidelines

The licensee stated that should unforeseen circumstances cause SG tube leakage, there are multiple methods available to monitor primary-to-secondary leakage through the SGs. They employ radiation monitors in the condenser air ejector, the SG blowdown line, and the main

steam line. In addition, main steam line N-16 monitors are installed, which significantly enhance monitoring of main steam line activity. Furthermore, Technical Specification 3.4.6.2 limits the primary-to-secondary leakage to 150 gpd for any one SG. The licensee also incorporated the EPRI primary-to-secondary leakage monitoring guidelines into the plant procedures. This guidance provides for action to be taken for specified rate of change as well as total leakage. The staff finds the licensee's leakage monitoring and procedures provide assurance that should a leak develop during the operating cycle it would be quickly detected allowing immediate mitigating actions to be taken before tube rupture occurs.

#### 4.0 LICENSE CONDITION MODIFICATION

License Condition 2.C(9), which approved surveillance interval extensions for various surveillances until the end of the cycle 9 refueling outage, was previously deleted by Amendment No. 220.

The licensee proposes to modify License Condition 2.C(9) as follows:

##### (9) 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 11, 1998, shall be extended to coincide with the Cycle 13 refueling outage or the end of 500 effective full power days, whichever is sooner. This surveillance will not extend beyond June 15, 2000.

The staff has reviewed the proposed license condition modification and finds that it is acceptable.

#### 5.0 SUMMARY

Based on the above evaluation, the staff finds that conducting TS 4.4.5.3.b during the mid-cycle surveillance due in April 1999 to be unnecessary. NRC staff concludes that the licensee's proposal to allow a one-time extension to the SG tube inspection interval is acceptable and that there is reasonable assurance that SG tubes will maintain structural and leakage integrity for cycle 13 operation.

#### 6.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendment. The State official had no comments.

#### 7.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment 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. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (63 FR 66593). Accordingly, the amendment 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 the amendment.

## 8.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: A. Keim

Date: April 16, 1999