

February 6, 1990

Docket No. 50-334

Mr. J. D. Sieber, Vice President  
Nuclear Group  
Duquesne Light Company  
Post Office Box 4  
Shippingport, Pennsylvania 15077

Dear Mr. Sieber:

SUBJECT: BEAVER VALLEY UNIT 1 - ISSUANCE OF AMENDMENT (TAC NO. 75148)

The Commission has issued the enclosed Amendment No. 150 to Facility Operating License No. DPR-66 for the Beaver Valley Power Station, Unit No. 1, in response to your application dated October 16, 1989.

The amendment revises the Technical Specifications to clarify and specify reactor coolant boron dilution requirements.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's bi-weekly Federal Register notice.

Sincerely,

/s/

Peter S. Tam, Senior Project Manager  
Project Directorate I-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 150 to DPR-66
- 2. Safety Evaluation

cc w/enclosures:  
See next page

FC	:LA:PDI-4	:PM:PDI-4	:PD:PDI-4	:OGC		
NAME	:SNorris	:PTam: 1m	:JStolz			
DATE	:1/23/90	:1/25/90	:2/6/90	:2/2/90		

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Mr. J. Sieber  
Duquesne Light Company

Beaver Valley Power Station  
Units 1 & 2

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DATED: February 6, 1990

AMENDMENT NO. 150 TO FACILITY OPERATING LICENSE NO. DRP-66

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

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. 150  
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 October 16, 1989 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.

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2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. DPR-66 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 150, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

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

FOR THE NUCLEAR REGULATORY COMMISSION



John F. Stolz, Director  
Project Directorate I-4  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: February 6, 1990

ATTACHMENT TO LICENSE AMENDMENT NO. 150

FACILITY OPERATING LICENSE NO. DPR-66

DOCKET NO. 50-334

Replace the following pages of Appendix A (Technical Specifications) with the enclosed pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove

3/4 1-4

3/4 4-2c

3/4 4-3

3/4 4-4

3/4 9-8

B3/4 4-1a

Insert

3/4 1-4

3/4 4-2c

3/4 4-3

3/4 4-4

3/4 9-8

B3/4 4-1a

## REACTIVITY CONTROL SYSTEMS

### BORON DILUTION

#### LIMITING CONDITION FOR OPERATION

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3.1.1.3 The flow rate of reactor coolant through the core shall be  $\geq$  3000 gpm whenever a reduction\* in Reactor Coolant System boron concentration is being made.

APPLICABILITY: All MODES.#

#### ACTION:

With the flow rate of reactor coolant through the core  $<$  3000 gpm, immediately suspend all operations involving a reduction\* in boron concentration of the Reactor Coolant System.

#### SURVEILLANCE REQUIREMENTS

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4.1.1.3 The flow rate of reactor coolant through the core shall be determined to be  $\geq$  3000 gpm prior to the start of and at least once per hour during a reduction\* in the Reactor Coolant System boron concentration by either:

- a. Verifying at least one reactor coolant pump is in operation, or
- b. Verifying that at least one RHR pump is in operation and supplying  $\geq$  3000 gpm through the core.

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\* For purposes of this specification, the addition of borated water to the RCS does not constitute a reduction in RCS boron concentration provided the boron concentration of the borated water being added is greater than the minimum required to satisfy the requirements of one of the following applicable specifications: 3.1.1.1 for Modes 1,2,3 and 4; or 3.1.1.2 for Mode 5; or 3.9.1 for Mode 6.

# With fuel in the vessel.

# REACTOR COOLANT SYSTEM

## SHUTDOWN

### LIMITING CONDITION FOR OPERATION

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- 3.4.1.3 a. At least two of the coolant loops listed below shall be OPERABLE:
1. Reactor Coolant Loop (A) and its associated steam generator and reactor coolant pump,
  2. Reactor Coolant Loop (B) and its associated steam generator and reactor coolant pump,
  3. Reactor Coolant Loop (C) and its associated steam generator and reactor coolant pump,
  4. Residual Heat Removal Pump (A) and a heat exchanger,\*\*
  5. Residual Heat Removal Pump (B) and a second heat exchanger.\*\*
- b. At least one of the above coolant loops shall be in operation.\*\*\*

APPLICABILITY: Modes 4 AND 5

#### ACTION:

- a. With less than the above required loops OPERABLE, immediately initiate corrective action to return the required loops to OPERABLE status as soon as possible; be in COLD SHUTDOWN within 20 hours.
- b. With no coolant loop in operation, suspend all operation involving a reduction in boron concentration of the Reactor Coolant system and immediately initiate corrective action to return the required coolant loop to operation. Refer to Specification 3.4.1.6 for additional limitations.

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\*\* The normal or emergency power source may be inoperable in MODE 5.

\*\*\* All reactor coolant pumps and Residual Heat Removal pumps may be de-energized for up to 1 hour provided: 1) no operations are permitted that would cause dilution of the reactor coolant system boron concentration and 2) core outlet temperature is maintained at least 10°F below saturation temperature. For purposes of this specification, the addition of borated water to the RCS does not constitute dilution of the RCS boron concentration provided the boron concentration of the borated water being added is greater than the minimum required to satisfy the requirements of specification 3.1.1.1 for Mode 4; or 3.1.1.2 for Mode 5.

## REACTOR COOLANT SYSTEM

### ISOLATED LOOP

#### LIMITING CONDITION FOR OPERATION

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3.4.1.4. The RCS isolated loop stop valves shall have power removed from the associated valve operators\*.

#### APPLICABILITY:

Whenever an RCS loop has been isolated, Modes 5 and 6#.

#### ACTION:

With the requirements of the above specification not satisfied, remove power from the isolated loop stop valve operators\* within 1 hour.

#### SURVEILLANCE REQUIREMENTS

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4.4.1.4 Verify at least once per 7 days that power is removed from the RCS isolated loop stop valve operators\*.

\* Power may be restored to the associated RCS isolated loop stop valve operators provided the requirements of surveillance requirement 4.4.1.5.3 have been satisfied.

# With fuel in the vessel.

REACTOR COOLANT SYSTEM

ISOLATED LOOP STARTUP

LIMITING CONDITION FOR OPERATION

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- 3.4.1.5 The RCS cold leg stop valve shall remain closed until:
- a. The isolated loop has been operating on a recirculation flow of  $\geq 125$  gpm for at least 90 minutes and the temperature at the cold leg of the isolated loop is within 20°F of the highest cold leg temperature of the operating loops.
  - b. The reactor is subcritical by at least 1 percent  $\Delta k/k$ .
  - c. The isolated loop boron concentration is greater than or equal to minimum required to satisfy the applicable requirements of Specification 3.1.1.2 for Mode 5 or Specification 3.9.1 for Mode. 6.

APPLICABILITY: Modes 5 and 6\*.

ACTION:

With the requirements of the above specification not satisfied, suspend startup of the isolated loop.

SURVEILLANCE REQUIREMENTS

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4.4.1.5.1 The isolated loop cold leg temperature shall be determined to be within 20°F of the highest cold leg temperature of the operating loops within 30 minutes prior to opening the cold leg stop valve.

4.4.1.5.2 The reactor shall be determined to be subcritical by at least 1 percent  $\Delta k/k$  within 30 minutes prior to opening the cold leg stop valve.

4.4.1.5.3 The isolated loop boron concentration shall be determined to be greater than or equal to the minimum required to satisfy the applicable requirements of Specification 3.1.1.2 for Mode 5 or Specification 3.9.1 for Mode 6 within 30 minutes prior to opening the hot leg stop valve and again within 30 minutes prior to opening the cold leg stop valve.

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\* With fuel in the vessel.

REFUELING OPERATION

3/4 9.8 RESIDUAL HEAT REMOVAL AND COOLANT CIRCULATION

LIMITING CONDITION FOR OPERATION

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3.9.8.1 At least one residual heat removal (RHR) loop shall be in operation.

APPLICABILITY: MODE 6 #

ACTION:

- a. With less than one residual heat removal loop in operation, except as provided below, suspend all operations involving an increase in the reactor decay heat load or a reduction<sup>□</sup> in boron concentration of the Reactor Coolant System. Close all containment penetrations providing direct access from the containment atmosphere to the outside atmosphere within 4 hours.
- b. The residual heat removal loop may be removed from operation for up to 1 hour per 8 hour period during the performance of CORE ALTERATIONS in the vicinity of the reactor pressure vessel (hot) legs.
- c. The residual heat removal loop may be removed from operation for up to 4 hours per 8 hour period during the performance of Ultrasonic In-service Inspection inside the reactor vessel nozzles provided there is at least 23 feet of water above the top of the reactor vessel flange.
- d. The provisions of Specification 3.0.3 are not applicable.

SURVEILLANCE REQUIREMENTS

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4.9.8.1 Verify at least one residual heat removal loop is in operation and circulating reactor coolant at:

- a. A flow rate  $\geq$  1000 gpm twice per shift when the Reactor Coolant System is in a reduced inventory condition\*.
- b. A flow rate  $\geq$  3000 gpm prior to the start of and once per hour during a reduction<sup>□</sup> in the Reactor Coolant System boron concentration.

\* The Reactor Coolant System water level is lower than three feet below the reactor vessel flange.

□ For purposes of this specification, the addition of borated water to the RCS does not constitute a reduction or dilution in RCS boron concentration provided the boron concentration of the borated water being added is greater than the minimum required to satisfy the requirements of specification 3.9.1 for Mode 6.

# With fuel in the vessel.

### 3/4.4 REACTOR COOLANT SYSTEM

#### BASES

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#### 3/4.4.1 REACTOR COOLANT LOOPS, (continued)

of Appendix G by either (1) restricting the water level in the pressurizer and thereby providing a volume for the primary coolant to expand into or (2) by restricting starting of the RCPs to when the secondary water temperature of each steam generator is less than 25°F above each of the RCS cold leg temperatures.

Power is removed from the isolated loop stop valves (hot leg and cold leg) to ensure that no reactivity addition to the core can occur while the loop is isolated due to inadvertent opening of the isolated loop stop valves. Isolated loop startup is limited to Modes 5 and 6 in accordance with the NRC SER on N-1 loop operation. Verification of the isolated loop boron concentration prior to opening the isolated loop stop valves provides a reassurance of the adequacy of the shutdown margin in the remainder of the system. Restoration of power to the hot leg stop valve allows opening this valve to complete the recirculation flowpath in conjunction with the relief line bypassing the cold leg stop valve and ensures adequate mixing in the isolated loop. This enables the temperature and boron concentration of the isolated loop to be brought to equilibrium with the remainder of the system. Limiting the temperature differential between the isolated loop and the remainder of the system prior to opening the cold leg stop valve prevents any significant reactivity effects due to cool water addition to the core.

Startup of an idle loop will inject cool water from the loop into the core. The reactivity transient resulting from this cool water injection is minimized by delaying isolated loop startup until its temperature is within 20°F of the operating loops. Making the reactor subcritical prior to loop startup prevents any power spike which could result from this cool water induced reactivity transient.

#### 3/4.4.2 and 3/4.4.3 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2735 psig. Each safety valve is designed to relieve 345,000 lbs. per hour of saturated steam at the valve set point. The relief capacity of a single safety valve is adequate to



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 150 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 October 16, 1989, Duquesne Light Company (the licensee, acting as agent for the above utilities) proposed an amendment to Facility Operating License No. DPR-66. The proposed amendment furnished information which clarified the reactor coolant system (RCS) boron dilution requirements. The proposal included information concerning requirements for isolated loop startup and operation, as well as verification of the available shutdown margin (as noted in revisions to the surveillance requirements). We have completed our review of the proposed amendment request, noting that the changes follow existing specifications in the D.C. Cook and Millstone 3 Technical Specifications.

2.0 DISCUSSION AND EVALUATION

2.1 Specification 3.1.1.3 - Boron Dilution

The licensee proposed to revise this specification by adding a footnote\* applicable to the word "reduction." This note clarifies the meaning of boron reduction, such that, for purposes of this specification, water added to the RCS will not constitute a reduction in boron concentration as long as the boron concentration of the water being added is greater than the minimum boron concentration that would satisfy the specified mode-dependent minimum shutdown requirement.

The clarification of boron reduction will reduce the delays encountered during residual heat removal system (RHR) testing, RHR startup and in returning an isolated loop to service. Using the proposed clarification, RCS boron concentration reduction (or boron dilution) occurs only if the boron concentration of water added to the RCS is less than that concentration needed to satisfy the minimum shutdown margin requirements for a specific mode of operation. Applicable specifications are referenced to provide the mode-dependent shutdown margin requirements. We find this clarification consistent with our position, and that adequate shutdown margin will continue to be maintained. The footnote\* is therefore acceptable.

The licensee also proposed to add a footnote # to the applicability statement to apply the requirements of this specification only when fuel is in the vessel, because boron dilution is not a concern when there is no fuel in the vessel. This is a reasonable clarification of an existing specification and is acceptable.

## 2.2 Specification 3.4.1.3 - Reactor Coolant System Shutdown

The licensee proposed to revise this specification by adding a note to define the word "dilution." This revision is similar to the note applied to the word "reduction" in Specification 3.1.1.3. We find this clarification to be consistent with our position, and that adequate shutdown margin will continue to be maintained. It is therefore acceptable.

## 2.3 Specification 3.4.1.4 - Isolated Loop

This entire specification has been revised to address minimum shutdown requirements for an isolated loop. The new LCO requires removal of power from the associated valve operators to ensure the valves cannot be inadvertently opened to cause a boron dilution event. The removal of power from the associated loop isolation valve operators is a requirement which provides an effective means of ensuring that the boron concentration in the reactor will not be subjected to dilution by mixing with potentially low-concentration borated water from an isolated loop. We consider this to be a satisfactory compensatory measure in lieu of verifying boron concentration once per 24 hours for the isolated loop as required by the previous specification.

To allow startup of an isolated loop, a footnote has been added to the LCO, which allows power to be restored to the isolated loop stop valve operators if the new surveillance requirement 4.4.1.5.3 (below) has been satisfied. This surveillance requirement calls for verification of the isolated loop boron concentration within 30 minutes of the time the hot leg stop valves are to be opened and again within 30 minutes of the time the cold leg stop valves are to be opened. This footnote ensures that the minimum shutdown margin requirements have been met. These changes will eliminate the need for periodic isolated loop boron concentration sampling and reduce the occupational doses associated with sampling and counting. The Action Statement has been written for consistency with the LCO to require removal of power from the isolated valve operators if an operator finds power had been inadvertently restored.

A change to the applicability statement has been made to apply this specification when a loop has been isolated in modes 5 and 6 only. This change places additional limitations on N-1 loop operation, which will allow loop startup only in modes 5 and 6. (The unit is prohibited from operation with less than three loops.

See License Condition 2.C.(3)). The Surveillance Requirement has been written for consistency with the LCO to verify that at least once per 7 days power is removed from the isolated loop stop valves.

We conclude that these measures provide adequate assurance that the minimum shutdown requirements will be maintained during isolated loop operation and are therefore acceptable.

#### 2.4 Specification 3.4.1.5 - Reactor Coolant System Cold Leg Stop Valves

This specification has been revised to address the isolated loop cold leg stop valves. A new item c. is added to require the isolated loop cold leg stop valves be maintained closed until the isolated loop boron concentration is greater than or equal to the minimum requirements for a specific mode of operation. The prerequisites (items a, b and c) to be satisfied prior to returning an isolated loop to service ensure that the isolated loop is homogeneous with respect to boron concentration and temperature; provide adequate shutdown margin requirements for the operating RCS consistent with the shutdown margin requirements for Mode 5 (specification 3.1.1.2); provide adequate shutdown margin requirements for the isolated loop consistent with the shutdown margin for Mode 5 (specification 3.1.1.2). The isolated loop shutdown margin requirements are equivalent to the operating loop requirements, hence, startup of an isolated loop in accordance with the proposed specification ensures that a reactivity transient will not occur. The new item c. therefore further enhances plant safety and is thus acceptable.

The applicability statement has been changed to apply the requirements of this specification during startup of an isolated loop during shutdown conditions (Modes 5 and 6). This is consistent with our safety evaluation on N-1 loop operation for Beaver Valley, Unit 1 (letter, S.A. Varga to the licensee, dated July 20, 1984), which requires the plant to be shutdown to return an isolated loop to service. This change is therefore acceptable.

Surveillance requirement 4.4.1.5.3 has been added to require verification of LCO item c. isolated loop boron concentration within 30 minutes before the hot leg stop valve may be opened, and again within 30 minutes before the cold leg stop valve is opened. This surveillance requirement has been added to ensure that the 1% shutdown margin is maintained in accordance with FSAR accident analyses, and is therefore acceptable.

#### 2.5 Specification 3.9.8.1 and 4.9.8.1- Residual Heat Removal and Coolant Circulation

These specifications have been revised by adding a note  $\alpha$  to the word "reduction". This revision is similar to the note applied to the word "reduction" in Specification 3.1.1.3. We find this clarification to be consistent with our position that adequate shutdown margin be maintained (see discussion in Section 2.1). The changes are therefore acceptable.

A footnote # has been added to "Mode 6". It specifies that the Action items are applicable only when there is fuel in the reactor vessel. This change is consistent with operating requirements and we therefore find this footnote acceptable.

## 2.6 Specification Bases 3/4.4.1 - Reactor Coolant Loops

The licensee has revised the associated bases to reflect the above changes. We found the revised bases acceptable as discussed in Sections 2.1 through 2.5.

## 3.0 ENVIRONMENTAL CONSIDERATION

This amendment changes requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. We have 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. We have previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this 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 this amendment.

## 4.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: Antoinette Massey

Dated: February 6, 1990