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United States Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. George W. Knighton, Chief
Licensing Branch 3
Office of Nuclear Reactor Regulation

SUBJECT: Beaver Valley Power Station - Unit No. 2
Docket No. 50-412
Response to DSER Open Items

Gentlemen:

This letter forwards responses to the issues listed below. The following items are attached:

Attachment 1: Response to Outstanding Issue 65 of the Beaver Valley Power Station Unit No. 2 Draft Safety Evaluation Report.

Attachment 2: Response to Outstanding Issue 72 of the Beaver Valley Power Station Unit No. 2 Draft Safety Evaluation Report.

Attachment 3: Response to Outstanding Issue 115 of the Beaver Valley Power Station Unit No. 2 Draft Safety Evaluation Report.

Attachment 4: Response to Outstanding Issue 120 of the Beaver Valley Power Station Unit No. 2 Draft Safety Evaluation Report.

DUQUESNE LIGHT COMPANY

By E. J. Woolever
E. J. Woolever
Vice President

KAT/wjs
Attachments

SUBSCRIBED AND SWORN TO BEFORE ME THIS
27th DAY OF July, 1984.
Anita Elaine Reiter
Notary Public

ANITA ELAINE REITER, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

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COMMONWEALTH OF PENNSYLVANIA)
) SS:
COUNTY OF ALLEGHENY)

On this 27th day of July, 1984, before me, a Notary Public in and for said Commonwealth and County, personally appeared E. J. Woolever, who being duly sworn, deposed and said that (1) he is Vice President of Duquesne Light, (2) he is duly authorized to execute and file the foregoing Submittal on behalf of said Company, and (3) the statements set forth in the Submittal are true and correct to the best of his knowledge.

Anita Elaine Reiter
Notary Public

ANITA ELAINE REITER, NOTARY PUBLIC
ROBINSON TOWNSHIP, ALLEGHENY COUNTY
MY COMMISSION EXPIRES OCTOBER 20, 1986

ATTACHMENT 1

Response to Outstanding Issue 65 of the
Beaver Valley Power Station Unit No. 2
Draft Safety Evaluation Report

Draft SER Section 7.3.3.13: IE Bulletin 80-06 Concerns

IE Bulletin 80-06 requests a review of all systems serving safety-related functions to ensure that no device will change position solely because of the reset of an ESF actuation signal. The applicant was requested to respond to IE Bulletin 80-06.

The staff has reviewed the applicant's response in FSAR Amendment 4 and finds that the applicant has reviewed only the specific potential problems listed in IE Bulletin 80-06. The intent of IE Bulletin 80-06 and NRC Question 420.3 was to require all safety-related systems to be reviewed. This item is open until a complete response is provided by the applicant.

Response:

The safety-related systems at Beaver Valley Power Station Unit 2 (BVPS-2) were reviewed with action taken as noted in the response to FSAR Question 420.3. The review included all safety-related systems. Circuit modifications were necessary only in the cases noted in the response to Question 420.3. The proper functioning of this circuitry will be verified in the test program prior to fuel load.

ATTACHMENT 2

Response to Outstanding Issue 72 of the
Beaver Valley Power Station Unit No. 2
Draft Safety Evaluation Report

Draft SER Section 7.5.2.2: IE Bulletin 79-27

Accordingly, to provide assurance that the concerns of Bulletin 79-27 have been adequately addressed, the staff requires the following information:

1. an affirmative or clearly implied statement of conformance to all the Bulletin requirements

2. a list of instrumentation and control power buses reviewed, or a positive statement that all required buses were reviewed

3. an affirmative or clearly implied statement that loss of bus alarms and indications in the control room have been reviewed

4. an implemented or proposed design change for all deficiencies identified

5. a schedule for completion of proposed design changes, if applicable

Response:

1. The following statements demonstrate Duquesne Light Company's conformance to IE Bulletin 79-27.

   1.1.A. IEB 79-27:

   For all power reactor facilities with an operating license and for those nearing completion of construction (North Anna 2, Diablo Canyon, McGuire, Salem 2, Sequoyah, and Zimmer):

   1. Review the class 1-E and non-class 1-E buses supplying power to safety and non-safety related instrumentation and control systems which could affect the ability to achieve a cold shutdown condition using existing procedures or procedures developed under item 2 below. For each bus:

      a. identify and review the alarm and/or indication provied in the control room to alert the operator to the loss of power to the bus

      b. identify the instrument and control system loads connected to the bus and evaluate the effects of loss of power to these loads including the ability to achieve a cold shutdown condition

c. describe any proposed design modifications resulting from these reviews and evaluations, and your proposed schedule for implementing those modifications

1.1.B. BVPS-2:

1. A review was conducted of the class 1-E and non-class 1-E buses supplying power to safety and non-safety related instrumentation and control systems which could affect the ability to achieve a cold shutdown condition for BVPS-2.

   a. The alarms and indications provided in the control room were reviewed and evaluated to be sufficient to provide the operator adequate assessment capability to determine the plant electric bus system status. The Class 1E and non-Class 1E bus parameters which are alarmed, metered, and monitored in the control room are provided in Table 420.2-1 from the previous question response 420.2 in Amendment 4 of the BVPS-2 FSAR. The title of this table will be clarified in a future FSAR amendment to read "Class 1E and non-Class 1E bus..."

   b. FSAR Appendix 5A describes BVPS-2 ability to bring the plant to safe shutdown conditions. While the safe shutdown design basis for BVPS-2 is hot standby, the cold shutdown capability of the plant has been evaluated in order to demonstrate how the plant can achieve cold shutdown conditions assuming loss-of-offsite power and the most limiting single failure. In determining the most limiting single failure, failures of individual buses and its effects of loss of power to the connected loads were evaluated. Appendix 5A in the FSAR describes the numerous methods and manners available at BVPS-2 to accomplish core heat removal, boration, inventory control, and depressurization. It is shown that the plant is capable of achieving Residual Heat Removal (RHR) System initiation conditions within 36 hours.

   Section 5.4.7.2.6 of the FSAR describes the RHR System reliability considerations and the arrangement of the class 1-E power sources for the RHR Components. BVPS-2 can achieve a cold shutdown condition without the use of a non-class 1-E power source. The station is designed in compliance with Regulatory Guide 1.53. Since all equipment required to achieve cold shutdown is redundant and powered from redundant class 1-E buses, the single failure is satisfied.

   An exception to the single failure criteria on redundant buses is the RHR pump suction valves. The primary function of the RHR pump suction isolation valves is to isolate the Reactor Coolant System from the lower pressure RHR System. For this purpose, two redundant series-connected valves are provided in each pump suction line to assure that the RHR System could be isolated on high reactor coolant pressure even if one of the two suction valves failed to close. The two suction valves in each pump suction line are normally closed during power operation and must open to allow operation of the RHR system. If the suction valves are closed and a single failure, such as a loss of one of the two redundant class 1-E buses powered by diesel generators, were to occur, then the suction valve which is powered from the failed bus will not open rendering the RHR System inoperable. To overcome this condition, the suction valve which is normally powered from the failed bus may now be supplied by operating one of the two manual transfer switches with a key interlock scheme. Thus, the suction valve's electric power can be switched to the unaffected power source so that both suction valves can be opened for operation of one train of the RHR System.

Although Section 5.4.7.2.6 also describes other failures which could result in delaying initiation of the RHR system, none of the delays have any adverse safety impact because of the capability of the Auxiliary Feedwater System and steam generator PORV's to continue to remove residual heat and in fact to continue plant cooldown while manual action is taken.

c. No deficiencies have been identified throughout the reviews and evaluations which were conducted and thus no design modifications are proposed.

1.2.A. IEB 79-27:

1. Prepare emergency procedures or review existing ones that will be used by control room operators, including procedures required to achieve a cold shutdown condition, upon loss of power to each class 1-E and non-class 1-E bus supplying power to safety and non-safety related instrument and control system. The emergency procedures should include:

   a. the diagnostics/alarms/indicators/symptom resulting from the review and evaluation conducted per Item 1 above

   b. the use of alternate indication and/or control circuits which may be powered from other non-class 1-E or class 1-E instrumentation and control buses

c. methods for restoring power to the bus

Describe any proposed design modification or administrative controls to be implemented resulting from these procedures, and your proposed schedule for implementing the changes.

1.2.B. BVPS-2

Procedures that address the operator actions for response to the plant transients as postulated in the IEB will be contained in the emergency operating procedures, abnormal operating procedures, alarm response procedures, and station shutdown procedures. These four procedure types are tentatively scheduled for completion by August 1984, April, 1984, November 1984, and May 1985, respectively.

These BVPS-2 procedures will incorporate similar procedure modifications as incorporated into the Beaver Valley Unit 1 procedures as a result of the Beaver Valley Unit 1 review of IE Bulletin 79-27 described in the responses issued to the NRC on March 4, 1980, and October 21, 1980.

1.3.A. IEB 79-27

Re-review IE Circular No. 79-02, "Failure of 120 Volt Vital AC Power Supplies," dated January 11, 1979, to include both class 1-E and non-class 1-E safety related power supply inverters. Based on a review of operating experience and your re-review of IE Circular No. 79-02, describe any proposed design modifications or administrative controls to be implemented as a result of the re-review.

1.3.B. BVPS-2

A re-review of IE Circular No. 79-02 was completed for BVPS-2. No design modifications or administrative controls beyond what was implemented by Beaver Valley Unit 1 during its assessment during 1980 are proposed for BVPS-2. The following conclusions were identified during the re-review.

a. No time delay circuitry will be used in the inverter/rectifier protection devices. All equpment input protective devices are either overcurrent actuated or manually actuated and have no adjustable time delays.

   All components of the inverter/rectifier units are designed for operation at greater than 150 percent overload for 30 seconds and greater than 125 percent overload for 2 hours.

b. All components of the vital bus uninterruptible power supply (UPS) system which are ac powered are designed to operate through a voltage range of 414 to 506 V. These levels represent the minimum and maximum voltage limits expected on the 480 V system.

   The dc input circuits are designed to withstand, as a minimum, 4,000 V spikes with a duration of 10 microsec. This represents the maximum transient expected on the station 125 V dc system.

   In addition, the system design will be subjected to a surge withstand capability test as specified in IEEE 472. This test is designed to reveal any weaknesses in the operation of the equipment or its protection devices during transient conditions. The surge withstand will be applied to all incoming and outgoing cables.

c. An alternate 120 V ac power supply to the vital bus is employed at BVPS-2. Automatic transfer to the alternate supply via the static switch is electrically initiated by any of the following:

   1. Inverter commutation failure.

   2. Overvoltage - adjustable from 100 percent to 120 percent of nominal inverter output with a time delay of 0.5 sec.

   3. Undervoltage - adjustable from 90 percent to 100 percent of nominal inverter output.

   4. Overcurrent - adjustable.

   The ranges of adjustability for overvoltage, undervoltage, and overcurrent transfers completely envelopes the range of output for a properly operating inverter through all expected limits of ac and dc input transients.

   Should a transfer occur, the BVPS-2 vital bus alternate source is a regulating power line conditioner with an output voltage regulating capability within 3 percent of nominal throughout an input range of 414 V to 506 V. Therefore, when necessary, the alternate source represents a very acceptable power supply to all vital bus loads.

   Additionally, if the system has transferred to the alternate source, the BVPS-2 static transfer switches are designed to retransfer to the inverter output once the inverter has returned to design limits for a duration of approximately 5 sec. (adjustable).

In summary, DLC believes that problems such as those encountered at Arkansas Nuclear One Unit 2 will not occur at BVPS-2 for the following reasons:

a. The only time delay circuitry in the system exists in the static transfer switch and is designed to optimize availability of a properly operating inverter.

b. The vital bus UPS system is designed to perform properly through all expected system transients.

c. The alternate source is an acceptable power supply to all vital bus loads for continuous operation.

d. The static transfer switch will retransfer to the inverter output upon return to acceptable limits.

2. All buses that supply power to components addressed in Appendix 5A of the BVPS-2 FSAR were reviewed. Appendix 5A addresses the components which BVPS-2 can use to bring the plant to safe shutdown conditions.

3. Table 420.2-1, which was previously provided in the response to Question 420.2 in FSAR Amendment 4, lists Class 1E and non-Class 1E bus parameters which are alarmed, metered, and monitored in the control room. It is clearly implied by including such a table that the loss of bus alarms and indications in the control room have been reviewed. Reiterating the response provided to Question 420.2, DLC believes that the monitoring, metering, and alarms listed in Table 420.2-1 provides adequate assessment capability to determine the plant electrical bus system status. In addition, the control room provides equipment status information which gives additional indirect notification about the availability (or lack) of voltage on the plant's electrical buses.

4. No deficiencies have been identified throughout the reviews and evaluations conducted to address IE Bulletin 79-27 for BVPS-2.

5. Since no deficiencies nor modifications have been proposed, the requested schedule is not applicable.

ATTACHMENT 3

Response to Outstanding Issue 115 of the
Beaver Valley Power Station Unit No. 2
Draft Safety Evaluation Report

Draft SER Section 2.3.1: Regional Climatology (excerpt)

The staff's estimate of the snowpack based on ANSI 58.1-1982, extrapolated from the 50-year return period in the standard to a 100-year return period, produces a weight of near 30 psf. This snowpack weight, when added to the weight produced by the 48-hour probable maximum winter precipitation (about 70 psf) produces a design snowload of 100 psf. This will be an open issue only if the design of the Category I structures cannot accommodate a snowload of 100 psf.

Response:

The information used to arrive at the design roof load for BVPS-2 is based on the direction given in Regulatory Guide 1.70 (R.G. 1.70), "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants," Section 2.3.1.2, which states the following:

"Provide estimates of the weight of the 100-year return period snowpack and the weight of the 48-hour Probable Maximum Winter Precipitation for the site vicinity. Using the above estimates, provide the weight of snow and ice on the roof of each safety-related structures."

BVPS-2 FSAR Section 2.3.2.1 presents the weight of the 100-year return period snowpack for the site area as 19.5 lbs/ft^2, developed from ANSI A58.1-1972. The weight of the 48-hour Probable Maximum Winter Precipitation (PMWP) is presented therein as 71.2 lbs/ft^2, developed from Hydrometeorological Report No. 33. A design roof load of 72 lbs/ft^2 was chosen for safety-related structures to reflect the 48-hour PMWP as the larger of the two load estimates.

In addition to R. G. 1.70, published Nuclear Regulatory Commission (NRC) guidance on the selection of snow and ice loads for the design of roofs of safety-related structures consists of the following:

1. 10CFR50, Appendix A, General Design Criterion 2.

2. NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 2.3.1, July 1981.

3. "American National Standard Minimum Design Loads for Buildings and Other Structures," ANSI A58.1-1972 (referenced in NUREG-0800).

The NRC review of this information is described in NUREG-0800, Section 2.3.1, Part III:

"Snow and ice load adequacy is checked for reasonableness against ANSI A58.1-1972 (Ref. 9) and regional data in available References 5,6 and 7."

References 5, 6, and 7 are National Oceanic and Atmospheric Administration publications containing climatological data from National Weather Service stations.

The water equivalent of the 71.2 lbs/ft^2, 48-hour PMWP is 13.7 inches. Since this is far greater than twice the record 24-hour precipitation total for any time of the year at Pittsburgh (8 inches), the use of this information meets the intent of the guidelines.

In addition, NUREG-0800, Section 2.3.1, Part II, indicates that meteorological design information is acceptable if it meets the requirements of 10CFR50, Appendix A, General Design Criterion (GDC) 2, which includes:

"Appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated."

The design snow load of 72 lbs/ft^2 based on the 48-hour PMWP is more than 3.5 times the weight of the snowpack which is expected to occur once in 100 years based on historical data in the site area. This load clearly provides "sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated: as stated in 10CFR50, Appendix A, GDC #2. Likewise, the 48-hour PMWP itself meets the intent of GDC #2 by being more than 1.5 times larger than the record <u>monthly</u> precipitation total for any time of the year at Pittsburgh (8.2 <u>inches</u>).

If the more recent snow load information given in ANSI A58.1-1982 is used for the BVPS-2 design, there is no change in the maximum load. Based on ANSI A58.1-1982, the weight of the 100-year return period snowpack at BVPS-2 should be approximately 30 lbs/ft^2. The design value of 72 lbs/ft^2 is still larger than this updated snowpack load (by a factor of 2.4). Even if rain on top of the 100-year snowpack is considered, ANSI A58.1-1982 recommends adding only 5 lbs/ft^2, resulting in a total weight of 35 lbs/ft^2. The design snow load would be equalled only if the record <u>monthly</u> precipitation total for Pittsburgh for any time of the year (8.2 inches) were assumed to be completely absorbed by the 100-year return period snowpack (30 lbs/ft^2 or approximately 6 inches of water) without melting or runoff. Therefore, the BVPS-2 design snow load clearly meets the intent of NRC regulations.

ATTACHMENT 4

Response to Outstanding Issue 120 of the
Beaver Valley Power Station Unit No. 2
Draft Safety Evaluation Report

Draft SER Section 11.3.1.5: Containment Vacuum System Exhaust (excerpt)

The containment vacuum system exhaust has not been adequately addressed in the FSAR as a source of radioactive gaseous release. Consequently, no iodine removal credit can be allowed for this system. The applicant should privide an alternate discharge path for this flow stream (such as upstream of the SLCRS filter units) and provide an analysis to include the dose contributions for this source with all the other sources.

Response:

As indicated in response to NRC Question 460.7.4, no iodine removal credit is taken for BV-1 gaseous waste disposal charcoal filter when evaluating annual site bound doses due to the containment vacuum pump operation. This analysis clearly indicates that the site boundary dose contribution from the operation of the containment vacuum system is negligible.