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August 29, 2005
L-05-149

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

Subject: Beaver Valley Power Station, Unit Nos. 1 and 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
Response to Request for Additional Information in Support of LAR Nos. 327 and 197 Steam Generator Level Allowable Value Setpoints

This letter provides as Enclosure 1 the FirstEnergy Nuclear Operating Company (FENOC) response to an NRC request for additional information (RAI) dated August 1, 2005, relating to FENOC letter L-04-127 dated October 5, 2004.

FENOC letter L-04-127 submitted License Amendment Request (LAR) No. 327 for Beaver Valley Power Station (BVPS) Unit No. 1 and LAR No. 197 for BVPS Unit No. 2. This amendment request proposed changes to the BVPS Unit Nos. 1 and 2 Technical Specifications that would modify steam generator allowable value setpoints used in the Reactor Trip System and Engineered Safety Feature Actuation System instrumentation to address identified non-conservative setpoints. The proposed changes address recent generic issues involving new steam generator level uncertainty considerations and margins associated with Westinghouse designed steam generators.

The information provided with this submittal does not change the evaluations or conclusions of the No Significant Hazards Consideration presented in FENOC letter L-04-127. The regulatory commitment associated with this submittal is provided in Enclosure 2. If there are any questions concerning this matter, please contact Mr. Henry L. Hegrat, Supervisor - Licensing, at 330-315-6944.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on August 29, 2005.

Sincerely,

L. William Pearce

Enclosures:

1. FENOC Response to Request for Additional Information Dated August 1, 2005
2. Commitment List

c: Mr. T. G. Colburn, NRR Senior Project Manager
Mr. P. C. Cataldo, NRC Senior Resident Inspector
Mr. S. J. Collins, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

L-05-149 ENCLOSURE 1

Request for Additional Information
Beaver Valley Power Station, Unit Nos. 1 and 2 (BVPS-1 and 2)
Steam Generator (SG) Level Allowable Value (AV) Setpoints,
NRC Method 3 Concerns

During reviews of proposed license amendment requests (LARs) that contain changes to limiting safety system settings (LSSS) setpoints, the Nuclear Regulatory Commission (NRC) staff identified concerns regarding the method used by some licensees to determine the AVs identified in the technical specifications (TSs). AVs are typically identified in the TSs as LSSSs to provide acceptance criteria for determination of instrument channel operability during periodic surveillance testing. The NRC staff's concern relates to one of the three methods for determining the AV as described in the ISA's (Instrument Society of America's) recommended practice, ISA-RP67.04, Part II, "Methodologies for Determination of Setpoints for Nuclear Safety-Related Instrumentation."

The NRC staff has determined that to ensure a plant will operate in accordance with the assumptions upon which the plant safety analyses have been based, additional information is required regardless of the methodology used to establish LSSS values in the TSs. Details about the NRC staff's concerns are available on the NRC's public website under Agencywide Documents Access and Management System (ADAMS) Accession Numbers ML041690604, ML041810346, and ML050670025.

In order for the NRC staff to assess the acceptability of your LAR for SG level AV setpoints related to this issue, the NRC staff requests the following additional information:

1. **Discuss the setpoint methodology used at BVPS-1 and 2 to establish AVs associated with LSSS setpoints.**

Response:

Methodologies documented in WCAP-11419 and WCAP-11366 for the uncertainty calculations and the Allowable Values (AVs) were submitted to the NRC for review in support of BVPS-1 and BVPS-2 License Amendments 239 and 120 respectively. The WCAP reference for BVPS-1 is WCAP-11419 Rev. 2, "Westinghouse Setpoint Methodology for Protection Systems Beaver Valley Power Station – Unit 1" dated December 2000, and the WCAP for BVPS-2 is WCAP-11366 Rev. 4, "Westinghouse Setpoint Methodology for Protection Systems Beaver Valley Power Station – Unit 2" dated December 2000. As stated in the NRC Safety Evaluation for License Amendments 239 and 120, dated July 20, 2001, the NRC staff found the methodology described in WCAP-11419 and WCAP 11366 acceptable and in compliance with 10 CFR 50.36, Paragraph (c)(1)(ii)(A).

The same setpoint methodology is used for the proposed Steam Generator Water Level setpoint change. The methodology will continue to be used for the Containment Conversion, Extended Power Uprate, Improved Standard Technical Specifications, and Replacement Steam Generator projects as documented in WCAP-11419, Revision 4, and WCAP-11366, Revision 6.

The uncertainty components for instrument channels include an appropriate combination of those groups of uncertainties which are statistically and functionally independent. Those uncertainties which are not independent are conservatively treated by arithmetic summation and then systematically combined with the independent terms. This technique, or another of a similar nature, has been used in WCAP-10395, "Statistical Evaluation of LOCA Heat Source Uncertainty" and WCAP-8567, "Improved Thermal Design Procedure." The Improved Thermal Design Procedure (WCAP-8567) was approved by the NRC noting acceptability of statistical techniques for the application requested.

The generalized relationship between the uncertainty components and the calculated uncertainty for a channel is noted in the following equation:

$$CSA = \{PMA^2 + PEA^2 + SRA^2 + (SMTE + SD)^2 + (SMTE + SCA)^2 + SPE^2 + STE^2 + RRA^2 + (RMTE + RD)^2 + (RMTE + RCA)^2 + (RMTE + RCSA)^2 + RTE^2\}^{1/2} + EA + BIAS$$

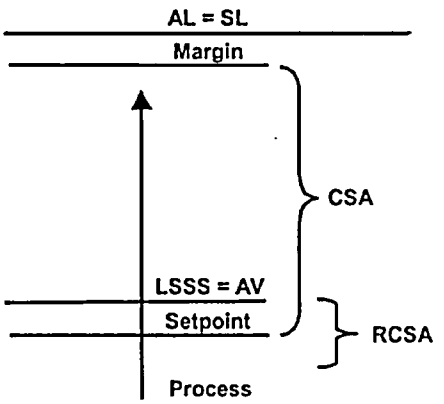
where:

CSA = Channel Statistical Allowance
PMA = Process Measurement Accuracy
PEA = Primary Element Accuracy
SRA = Sensor Reference Accuracy
SMTE = Sensor Measurement and Test Equipment Accuracy
SD = Sensor Drift
SCA = Sensor Calibration Accuracy
SPE = Sensor Pressure Effects
STE = Sensor Temperature Effects
RRA = Rack Reference Acuracy
RMTE = Rack Measurement and Test Equipment Accuracy
RD = Rack Drift
RCA = Rack Calibration Accuracy
RCSA = Rack Comparator Setting Accuracy
RTE = Rack Temperature Effects
EA = Environmental Allowance
BIAS = One directional, known magnitude allowance

Each of the above terms is defined in WCAP-11419 and WCAP-11366 and the values are reported in the tables included in Section 3 of the WCAPs.

The methodology to determine the AVs for the BVPS-1 and BVPS-2 technical specification protection setpoints is not based on any of the methods as described in the ISA recommended practice document (ISA-RP67.04-1994, Part II or ISA-RP67.04.02-2000). The Westinghouse method used for the BVPS-1 and BVPS-2 technical specifications determines a performance based AV. As noted in WCAP-11419 Rev. 2, and WCAP-11366 Rev. 4, the AV is satisfied by verification that the channel "as-left" and "as-found" conditions about the nominal trip setpoint are within the Rack Comparator Setting Accuracy (RCSA). The AVs are used as the technical specification Limiting Safety System Setting (LSSS) values and are reflective of the RCSA value utilized in the CSA equation above. The Analytical Limit (AL), surrogate for the Safety Limit (SL) is protected by determining a Setpoint (SP) established on the conservative side of the AL such that the difference between the SP and AL will support the CSA, with some additional unassigned margin quantified in WCAP-11419 and WCAP-11366.

The following figure shows the relative relationships for a rising process and high limit.



where:

AL = Analytical Limit surrogate for SL, Safety Limit

Margin = Unassigned allowance between the AL and the Setpoint

CSA = Channel Statistical Allowance, Square Root Sum of Squares (SRSS) calculation of the total loop uncertainty

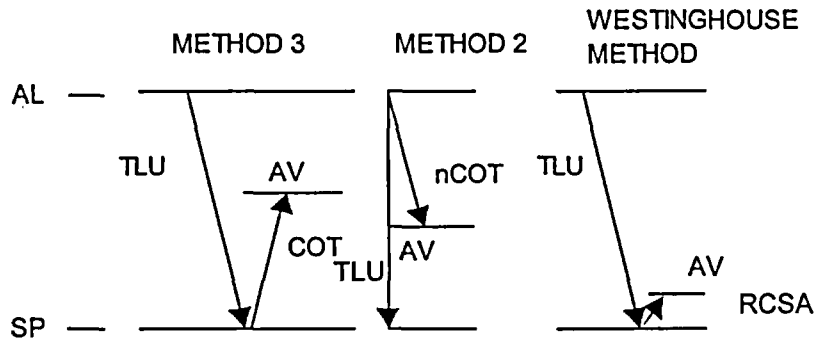
LSSS = 10CFR 50.36 Limiting Safety System Setting

AV = LSSS in the non-conservative process direction and is equal to the calibration tolerance of the device under surveillance (RCSA) used in calculating the CSA

Process = Represents the plant process variable being monitored

RCSA = Rack Comparator Setting Accuracy

Using the simplified comparison charts from ADAMS Document ML041810346 page 32, the following chart compares the Westinghouse Setpoint Methodology against the methodologies as described in documents identified under ADAMS Accession Numbers ML041690604, ML041810346, and ML050670025:



AL = Analytical Limit
SP = Computed Trip Setpoint
TLU = Total Loop Uncertainty
COT = Channel Operability Test
AV = Allowable Value
nCOT = Uncertainty remaining in the components included in the COT after the COT has been concluded.
RCSA = Rack Comparator Setting Accuracy
MTP = Maximum Trip Point

Using the above chart and the numerical example of Containment Pressure provided from ADAMS Document ML041690604 Enclosure page 2, the AV for Containment Pressure is derived using all three methods shown above:

Methodologies		AL(1)	TLU	COT	nCOT	MARGIN	SP(2)	RCSA(3)	AV(4)	MTP(5)
Method 3	NRC Example AV3 (AV = SP + COT)	6.00	1.39	1.1	0.85	0	4.61	N/A	5.71	6.56
Method 2	NRC Example AV2 (AV = AL- nCOT)	6.00	1.39	1.1	0.85	0	4.61	N/A	5.15	6.00
Westinghouse Method	BVPS (AV = SP + RCSA)	6.00	1.39	1.1	0.85	0	4.61	0.325	4.91	5.76

Notes:

(1) The values of AL, TLU, COT, nCOT, and MARGIN are obtained from ADAMS Document ML 041690604, Enclosure page 2 (PSIG units).

(2) All methodologies calculate the Setpoint using the equation SP = AL - TLU - MARGIN from ADAMS Document ML041810346, page 32.

(3) Rack Comparator Setting Accuracy (RCSA) is converted to PSIG units by the equation 0.5% rack calibration tolerance x 65 psig instrument span = 0.325 PSIG.

(4) The calculation of Allowable Values for Methods 2 and 3 are derived from the NRC presentation "US NRC - Instrument Setpoints and Allowable Values," ADAMS Document ML041810346, page 32.

(5) MTP = Maximum Trip Point is derived from information in ADAMS Document ML 041690604, Enclosure page 2: MTP = AV + nCOT.

2. Regardless of the methodology used, the NRC staff has the following questions regarding the use of the methodology at BVPS-1 and 2:

a. Discuss how the methodology and controls you have in place ensure that the analytical limit (AL) associated with an LSSS will not be exceeded (the AL is a surrogate that ensures the safety limits will not be exceeded). Include in your discussion information describing the controls you employ to ensure the trip setpoint established after completing periodic surveillances satisfies your methodology. If the controls are located in a document other than the TSs, discuss how those controls satisfy the requirements of Title 10 of the *Code of Federal Regulation* (10CFR), Part 50, Section 50.36, as they apply to LSSSs.

The NRC staff requests the licensee discuss current requirements or procedures for returning the as-left instrument settings to settings within the tolerances band for the trip setpoint established to protect the applicable safety limits.

Response:

Methodology in place to ensure the Analytical Limit associated with an LSSS will not be exceeded

Adding (or subtracting) the calibration tolerance of the device to be tested during the Channel Functional Test to the nominal trip setpoint contained in the Licensing Requirements Manual determines the Allowable Values (AVs) for BVPS-1 and 2. The nominal trip setpoints are determined via the Channel Statistical Allowance (CSA) equation identified in Response to Question 1 above and documented in WCAP-11419 (for BVPS-1) and WCAP-11366 (for BVPS-2).

The AVs are contained within the technical specifications as the LSSSs and repeated in plant procedures with the applicable calibration tolerances used in the CSA analyses. The criterion for the performance based AV is controlled by plant procedures, the Licensing Requirements Manual, and the Technical Specifications.

In the BVPS technical specifications, Sections 3/4.3.1 and 3/4.3.2, the requirement is to verify that the instrumentation is operable. This verification is typically performed every 92 days by performance of the Channel Functional Test. The Channel Functional Test confirms that the channel meets the technical specification AV. Since the channel remains within the calibration tolerance defined within the instrument uncertainty analysis that determined the appropriate trip setpoint the preservation of the integrity of the analytical limit is achieved.

The uncertainty calculations assume that the "as-left" tolerance (conservative and non-conservative direction) is satisfied on a reasonable, statistical basis, not that the nominal condition is satisfied exactly. Approved plant procedures explicitly require recalibration any time the "as-found" condition of the device or channel is outside of the surveillance procedure tolerance. A device or channel may not be left outside the surveillance procedure tolerance without declaring the channel "inoperable" and appropriate action taken.

Controls used at BVPS to protect the Analytical Limit

At BVPS a defense in depth strategy is used to programmatically protect the analytical limits for Reactor Trip and Engineered Safety Features Actuation System (ESFAS) setpoints. The strategy includes the use of scaling calculations, engineering change packages, surveillance procedures, corrective action program, and drift monitoring programs. A brief discussion of each program follows:

- Scaling Calculations: For each Reactor Trip/ESFAS parameter, scaling calculations have been developed. The scaling calculations translate the AV and Setpoint from engineering units to equivalent voltage units. The intent of the scaling calculations is to ensure the actual values used in surveillance procedure acceptance criteria have a verified design basis.

- Engineering Change Package (ECP): An ECP is the engineering documentation used to incorporate the design and licensing basis into surveillance procedures, and ensure Technical Specification requirements are met. ECPs are developed to incorporate AV and Setpoint voltage units into the acceptance criteria for a particular surveillance procedure.

- Surveillance Procedures: Each surveillance procedure incorporates the required setpoint (in voltage units) from the scaling calculations onto calibration data sheets. Additionally, each Reactor Trip/ESFAS surveillance procedure contains an additional sheet that contains the AV acceptance criteria (also in voltage units obtained from the scaling calculations). During each performance of a surveillance procedure, the technician is required to compare the "as-found" voltage value to the AV voltage value. If the "as-found" voltage value is found outside the AV range, the technician notifies the shift manager and initiates a Condition Report to identify the condition adverse to quality. Approved plant procedures do not permit a technician to return to service any equipment which cannot be calibrated to the within the calibration accuracy stipulated in the surveillance procedure. The calibration data from surveillance procedures is entered into the site's drift monitoring program for additional engineering evaluations.

- Drift Monitoring Programs: Each Reactor Trip/ESFAS source device (transmitter, switch) is routinely monitored for drift. Technicians enter the "as-found"/"as-left" calibration data sets into a database program. The software program is entitled Maintenance Monitoring Database or MMD. After data entry, the MMD program automatically calculates the device drift using the previous and present calibration data sets. The program compares the actual drift value against the drift value used in the instrument uncertainty calculation to determine the CSA term. If the actual drift exceeds the drift value in the calculation, the data set is flagged "Exceeds Drift Limit." The technician then initiates a condition report to identify the adverse drift condition. Additionally, engineering maintains a database of calibration data for the electronic modules. Each module is routinely monitored for drift trends. The corrective action program is used to identify electronic modules with degrading trends. Work orders to replace a device are promptly initiated if a degrading trend is identified.

- Corrective Action Program: A Condition Report initiated due to exceeding an AV is evaluated by the engineering organization. The condition report process is used to document the adverse condition and evaluate plant equipment for operability. Additionally, Condition Reports are initiated from the drift monitoring programs and additional engineering evaluations are performed for device operability.

How LSSS Controls Satisfy 10 CFR 50.36

The AVs are the LSSSs and are contained in technical specification Tables 3.3-1 and 3.3-3. These controls satisfy 10 CFR 50.36 requirements as they apply to LSSSs.

b. Discuss how the TS surveillances ensure the operability of the instrument channel. This should include a discussion on how the surveillance test results relate to the TS AV and describe how these are used to determine the operability of the instrument channel. If the requirements for determining operability of the LSSS instrument being tested are in a document other than the TSs (e.g., plant test procedure), discuss how this meets the requirements of 10 CFR 50.36 as they relate to LSSSs.

Additionally the NRC staff request the licensee's response to include a discussion of the requirements and methods the licensee has in place to assess the operability of tested instrumentation giving consideration to the previous as-left setting and accounting for uncertainties associated with the testing and calibration of the instruments.

Response:

How the TS Surveillances ensure the operability of the instrument channel

An operability assessment is performed every time a Reactor Trip/ESFAS surveillance procedure is performed. The surveillance procedures require the Allowable Values (AVs) identified in the technical specifications to be compared to the "as-found" calibration data. The AVs have been translated into voltage values in the surveillance procedure to facilitate technician evaluation. The technician is required to verify that "as-found" data is bounded by the AV acceptance criteria. Additionally, a technician cannot return the instrument loop to service unless the loop has been calibrated to within the calibration tolerances defined in the surveillance procedure.

The instrument technicians make reasonable attempts to achieve the nominal trip setpoint as an "as-left" condition at the start of each process rack's surveillance interval. Recalibration is explicitly required any time the "as-found" condition of the device or channel is outside of the "as-left" procedural tolerance. A device or channel may not be left outside the "as-left" tolerance without declaring the channel "inoperable" and appropriate action taken. Thus an "as-left" tolerance may be considered as an outer limit for the purposes of calibration and instrument uncertainty calculations.

For those rare occasions where the device "as-found" calibration data is outside the AV, the adverse condition is identified using the corrective action program and Engineering personnel perform an operability assessment.

Methods used at BVPS to Assess the Operability of Tested Instrumentation

The reason the "as-found" settings are rarely outside the AV limit is due to instrument drift monitoring. Since each Reactor Trip/ESFAS device's calibration data is monitored

and assessed routinely, adverse drift trends are identified prior to a device drifting beyond the AV. The monitoring includes evaluation of previous "as-left" data compared to "as-found" data. The expectation is for actual device drift to be bounded by the calibration tolerance or the drift value assumed in the uncertainty calculation. The evaluation used in the drift monitoring process does not include additional measurement errors. Work orders are promptly written for those devices that exhibit drift that could challenge the AV.

In answering the above questions, as part of the discussion on the setpoint methodology used to establish AVs, the NRC staff requests that the licensee discuss consideration of the Technical Specification Task Force (TSTF) traveler being developed on this subject and to what extent the licensee would consider adopting the TSTF when issued.

Response:

Within 120 days following notice of availability for adoption of the setpoint methodology TSTF, issued under the Consolidated Line Item Improvement Process (CLIIP), the TSTF will be reviewed to determine if it should be adopted at BVPS.

L-05-149 ENCLOSURE 2

Commitment List

The following list identifies those actions committed to by FirstEnergy Nuclear Operating Company (FENOC) for Beaver Valley Power Station (BVPS) Unit Nos. 1 and 2 in this document. Any other actions discussed in the submittal represent intended or planned actions by FENOC. They are described only as information and are not regulatory commitments. Please notify Mr. Henry L. Hegrat, Supervisor - Licensing at 330-315-6944 of any questions regarding this document or associated regulatory commitments.

Commitment	Due Date
The TSTF on Setpoint Methodology issues will be reviewed to determine if it should be adopted at BVPS.	Within 120 days following the notice of availability for adoption of the subject TSTF issued under the consolidated line item improvement process (CLIIP).