



FirstEnergy Nuclear Operating Company

Beaver Valley Power Station
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Lew W. Myers
Senior Vice President

724-682-5234
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March 28, 2001
L-01-043

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

**Subject: Beaver Valley Power Station, Unit No. 1 and No. 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. 286 and 158**

This letter provides the Beaver Valley Power Station (BVPS) response to a NRC request for additional information in support of License Amendment Requests (LARs) 286 and 158. These LARs were submitted to the NRC by letter L-00-143 dated December 27, 2000. LARs 286 and 158 revise Reactor Trip System Instrumentation and Engineered Safety Feature Actuation System Instrumentation trip setpoints and allowable values; utilize the Revised Thermal Design Procedure (RTDP) to generate additional Departure from Nucleate Boiling (DNB) margin to allow a revision to the core safety limits, DNB parameters and Overtemperature and Overpower ΔT trip setpoints; relocate certain requirements from the Technical Specifications to either the Core Operating Limits Report (COLR) or Licensing Requirements Manual (LRM); revise the associated Bases sections to reflect the proposed changes; and also include miscellaneous changes to the Technical Specifications and Bases sections.

On February 28, 2001, a meeting was held between NRC, BVPS and Westinghouse personnel for the purpose of reviewing LARs 286 and 158. Subsequently, the NRC staff transmitted eight specific questions pertaining to LARs 286 and 158. These specific questions along with the BVPS response to each question are provided in Attachment A-2 of this letter.

The Proprietary Information Notice, Copyright Notice, a Westinghouse application for withholding proprietary information (CAW-01-1444), applicable to the document provided in Attachment A-2, is presented in Attachment A-1. A document titled "Request for Additional Information for the Westinghouse Revised Thermal Design Procedures Instrument Uncertainty Methodology for Beaver Valley Unit 1 and Unit 2 License Amendment Request" (Westinghouse Proprietary Class 2) is presented in Attachment A-2. A document titled "Request for Additional Information for the Westinghouse Revised Thermal Design Procedures Instrument Uncertainty Methodology for Beaver Valley Unit 1 and Unit 2 License Amendment Request" (Westinghouse Class 3 Non-Proprietary) is presented in Attachment A-3.

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As the document provided in Attachment A-2 contains information proprietary to Westinghouse Electric Company, it is supported by an affidavit signed by Westinghouse, the owner of the information. This affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of Section 2.790 of the Commission's regulations. Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to the copyright or proprietary aspects of the item listed above or the supporting Westinghouse Affidavit should reference CAW-01-1444 and should be addressed to J. S. Galembush, Acting Manager, Regulatory and Licensing Engineering, Westinghouse Electric Company, LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

If there are any questions concerning this matter, please contact Mr. Thomas S. Cosgrove, Manager Regulatory Affairs at 724-682-5203.

Sincerely,


Lew W. Myers

Attachments

c: Mr. L. J. Burkhart, Project Manager
Mr. D. M. Kern, Sr. Resident Inspector
Mr. H. J. Miller, NRC Region I Administrator
Mr. D. A. Allard, Director BRP/DEP
Mr. L. E. Ryan (BRP/DEP)

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In Support of LAR Nos. 286 and 158**

I, Lew W. Myers, being duly sworn, state that I am Senior Vice President of FirstEnergy Nuclear Operating Company (FENOC), that I am authorized to sign and file this submittal with the Nuclear Regulatory Commission on behalf of FENOC, and that the statements made and the matters set forth herein pertaining to FENOC are true and correct to the best of my knowledge and belief.

FirstEnergy Nuclear Operating Company



Lew W. Myers
Senior Vice President - FENOC

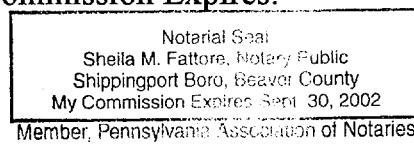
COMMONWEALTH OF PENNSYLVANIA

COUNTY OF BEAVER

Subscribed and sworn to me, a Notary Public, in and for the County and State above named, this 28 th day of March, 2001.



Sheila M. Fattore
My Commission Expires:



ATTACHMENT A-1 to Letter L-01-043



Attached are the following items:

1. Proprietary Information Notice
2. Copyright Notice
3. Application for Withholding Proprietary Information from Public Disclosure

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.790 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) contained within parentheses located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.790(b)(1).

Copyright Notice

The reports transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies of the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.790 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection notwithstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond those necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.



Westinghouse Electric Company, LLC

Box 355
Pittsburgh Pennsylvania 15230-0355

March 21, 2001

CAW-01-1444

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Mr. Samuel J. Collins

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

Subject "Request for Additional Information for the Westinghouse Revised Thermal Design Procedure Instrument Uncertainty Methodology for Beaver Valley Unit 1 and Unit 2, License Amendment Request" (Westinghouse Proprietary Class 2)

Dear Mr. Collins:

The proprietary information for which withholding is being requested in the above-referenced RAIs are further identified in Affidavit CAW-01-1444 signed by the owner of the proprietary information, Westinghouse Electric Company LLC. The affidavit, which accompanies this letter, sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (b)(4) of 10 CFR Section 2.790 of the Commission's regulations.

Accordingly, this letter authorizes the utilization of the accompanying Affidavit by FirstEnergy Nuclear Operating Company.

Correspondence with respect to the proprietary aspects of the application for withholding or the Westinghouse affidavit should reference this letter, CAW-01-1444 and should be addressed to the undersigned.

Very truly yours,

A handwritten signature in black ink, appearing to read "J. S. Galembush". It is positioned above a solid horizontal line.

J. S. Galembush, Acting Manager
Regulatory and Licensing Engineering

Enclosures

cc: S. Bloom/NRR/OWFN/DRPW/PDIV2 (Rockville, MD) 1L

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA:

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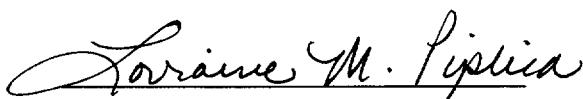
COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared John S. Galembush, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company LLC ("Westinghouse"), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief:

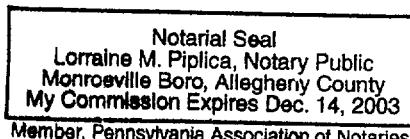


John S. Galembush, Acting Manager
Regulatory and Licensing Engineering

Sworn to and subscribed
before me this 22nd day
of March, 2001



Notary Public



- (1) I am Acting Manager, Regulatory and Licensing Engineering, in Nuclear Services at Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of Westinghouse.
- (2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.790 of the Commission's regulations and in conjunction with the Westinghouse application for withholding accompanying this Affidavit.
- (3) I have personal knowledge of the criteria and procedures utilized by the Westinghouse Electric Company LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.
- (4) Pursuant to the provisions of paragraph (b)(4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.
 - (i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse
 - (ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

- (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.
- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
- (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
- (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.
- (e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.
- (f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

- (a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.
- (b) It is information which is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

- (c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.
 - (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.
 - (e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.
 - (f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.
-
- (iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.790, it is to be received in confidence by the Commission.
 - (iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.
 - (v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in "Request for Additional Information for the Westinghouse Revised Thermal Design Procedure Instrument Uncertainty Methodology for Beaver Valley Unit 1 and Unit 2 License Amendment Request (Class 2)" [Proprietary] being transmitted by FirstEnergy Nuclear Operating Company letter and Application for Withholding Proprietary Information from Public Disclosure, to the Document Control Desk, Attention Mr. Samuel J. Collins. The proprietary information as submitted for use by FirstEnergy Nuclear Operating Company for the Beaver Valley Units is expected to be

applicable in other licensee submittals in response to certain NRC requirements for uprating.

This information is part of that which will enable Westinghouse to:

- (a) Provide documentation of the analysis, methods, used for determining technical specification setpoints, utilizing the instrumentation uncertainties.
- (b) Calculate the instrumentation uncertainties for the Technical Specification setpoints.
- (c) Establish systematic and random uncertainties in providing Technical Specification setpoints.
- (d) Provide the methods in determining the instrumentation uncertainties.
- (e) Assist the customer to obtain NRC approval.

Further this information has substantial commercial value as follows:

- (a) Westinghouse plans to sell the use of similar information to its customers for purposes of meeting NRC requirements for licensing documentation.
- (b) Westinghouse can sell support and defense of the technology to its customers in the licensing process.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar calculation, evaluation and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the

information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the knowledge of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended for developing analytical methods and performing tests.

Further the deponent sayeth not.

ATTACHMENT A-3 to Letter L-01-043

Attached is a document titled "Request for Additional Information for the Westinghouse Revised Thermal Design Procedures Instrument Uncertainty Methodology for Beaver Valley Unit 1 and Unit 2 License Amendment Request" (Westinghouse Class 3 Non-Proprietary)

WESTINGHOUSE CLASS 3

REQUEST FOR ADDITIONAL INFORMATION FOR THE WESTINGHOUSE REVISED THERMAL DESIGN PROCEDURE INSTRUMENT UNCERTAINTY METHODOLOGY FOR BEAVER VALLEY UNIT 1 AND UNIT 2, LICENSE AMENDMENT REQUEST

First Energy Nuclear Operating Company (licensee) submitted a request on 12/27/2000 for license amendment on Beaver Valley Units 1 and 2 Technical Specifications (TS) changes. In supporting these TS changes, the licensee also submitted four Westinghouse Topical Reports:

- (1) WCAP-11419, "Setpoint Methodology for Protection Systems for Beaver Valley Unit 1"
- (2) WCAP-11366, "Setpoint Methodology for Protection Systems for Beaver Valley Unit 2"
- (3) WCAP-15264, "Revised Thermal Design Procedure Instrument Uncertainty for Unit 1"
- (4) WCAP-15265, "Revised Thermal Design Procedure Instrument Uncertainty for Unit 2"

The following questions are related to the review of these topical reports:

- (1) The setpoint methodology reports (WCAP-11419 & WCAP-11366) stated that the methodologies for Beaver Valley Unit 1 & 2 protection system setpoints are consistent with ISA S67.04, Part 1, 1994, that was endorsed by NRC Regulatory Guide 1.105, Revision 3. However, WCAP-15264 and WCAP-15265 reports reference to RG 1.105, Revision 2. Identify and justify the areas in the instrument uncertainty study that are not conformed with RG 1.105, Revision 3.

The uncertainty calculations documented in WCAP-15264 and WCAP-15265 were performed in a manner consistent or conservative with respect to ISA S67.04, Part 1, 1994. There are no areas in these documents that do not conform to the recommendations of RG 1.105 Revision 3.

- (2) The basic equations of Overpower Delta T for Beaver Valley Units 1 and 2 are different from the Standard Technical Specifications of Westinghouse Plants. Please explain the reason for the difference.

Beaver Valley Unit 1's protection system is an older design. There is a group of older plants, e.g., R. G. Ginna, D. C. Cook, Surry, Turkey Point, Beaver Valley Unit 1 and V. C. Summer where the Overpower ΔT reactor trip did not utilize the lead/lag module on the ΔT side of the bistable and thus it was not included in the as built configuration. An additional difference between Beaver Valley Units 1 and 2 is the absence of lag filters on the ΔT side of the bistable and on the T_{avg} side of the bistable for Unit 1. With respect to the filters, the time constants, τ values, are set to zero and the presence or absence of the filters does not change the response characteristics of the channel. With respect to the lead/lag module, Westinghouse has confirmed that the module is not modeled in the safety analysis for Unit 1. Thus the absence of the lead/lag module does not change the required response characteristics of the channel.

Beaver Valley Unit 2's protection system is based on Westinghouse 7300 process racks. The major difference between Unit 2's Overpower ΔT reactor trip as described in WCAP-11366 Revision 4 and the generic algorithm of WCAP-8745-P-A is the deletion of the $f(\Delta I)$ input. Westinghouse has modeled the Unit 2 algorithm without the $f(\Delta I)$ input in the Unit 2 safety analyses and uncertainty calculations and has determined acceptable results. This function has been modified in the process racks to remove the $f(\Delta I)$ input and its associated potential uncertainties and the channel scaled accordingly. Thus the Overpower ΔT uncertainty calculation of WCAP-11366 Revision 4 reflects the current plant configuration for this protection function.

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- (3) For the Pressurizer Pressure channel uncertainties in the protection system setpoint study (WCAP-11366), the channel statistical allowance (CSA) is about []^{+a,c} while in the RTDP instrument uncertainty study (WCAP-15265), the CSA is about []^{+a,c}. Explain the difference between these two studies.

The difference in the magnitudes can be accounted for by noting the differences in the number of parameters and how they are combined between Equation 2.1 of WCAP-11366 Revision 4 and Equation 3 of WCAP-15265 Revision 2. The major differences are the inclusion of controller and indication uncertainties for Equation 3 for the determination of the control system uncertainty. These uncertainties are not modeled in the protection channel uncertainty of Equation 2.1.

- (4) Explain the following questions related to WCAP-15265 Table 1, "Pressurizer Pressure Control System Uncertainties": (a) How is CSA calculated? Does it include control and indication? (b) Why are the seismic effects considered for Rosemount transmitter, but not for Barton transmitters? (c) Why are the effects of radiation and temperature not considered? These effects were considered in WCAP-11366 Table 3-9 "Pressurizer Pressure - Low, SI." (d) A footnote stated that (LOE)* is treated as a bias. Another term listed as (bias+LOE). What is the difference between these two terms. (e) Why is (LOE)* for CSA []^{+a,c} while (LOE)* for controller is []^{+a,c}?

- a) The CSA is calculated using the basic equation noted as Equation 3. This calculation includes allowances for control modules and indication on the control board.
- b) []^{+a,c}

c) []^{+a,c}

- d) The limit of error (LOE) is defined as the seismic allowance for the Rosemount transmitter used for control. The bias is defined as the combination of the []^{+a,c}

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temperature compensation error identified by ITT Barton and a conservative assumption for long term negative drift for the Barton transmitter used for indication. Thus the LOE term addresses only the Rosemount seismic allowance. The (bias + LOE) term addresses both the Rosemount and Barton transmitter errors and allowances.

- e) The LOE is a parameter where the magnitude is known, but the direction is not. It is therefore applied conservatively in both directions. The bias is applied in one direction with a fixed magnitude. Thus the CSA LOE could be noted as \pm with the understanding that the uncertainty is applied in both the positive and negative directions as a summation term not a random term. Subsequently the Controller Uncertainty is noted with two LOE terms, one is summed in the negative direction with the bias terms, the other is summed in the positive direction without the bias terms. Therefore, the Controller Uncertainty is defined as [
.]^{a,c}

- (5) When did Beaver Valley Units 1 and 2 have the reactor coolant system's RTD bypass manifolds removed? How does this modification affect the setpoint study on the Tavg channel uncertainties?

RTD Bypass Elimination (RTDBE) was submitted for Unit 1 via WCAP-12058, 12/88, and approved by the NRC per amendment 145 (TAC 72988). RTDBE was submitted for Unit 2 via WCAP-12478, 12/89, and approved by the NRC per amendment 33 (TAC 76512). RTDBE does affect the uncertainty calculations for temperature related control and protection functions. These effects are described in the two WCAPs noted above. With respect to WCAP-11366 Revision 4, WCAP-11419 Revision 2, WCAP-15264 Revision 3 and WCAP-15265 Revision 2, the effects of RTDBE have been explicitly addressed for Overtemperature ΔT , Overpower ΔT and the Tavg input to the Rod Control system in the manner described in WCAP-12058 and WCAP-12478 and previously approved by the NRC. The secondary effects on RCS Flow – Low reactor trip, and RCS Flow indication have also been addressed in a similar manner.

- (6) In the Tavg uncertainties calculation (Page 7 in WCAP-15265), it stated that the Tavg controller accuracy is the combination of the instrumentation accuracy and the deadband. Why has the "deadband" not been considered in other controller accuracy calculation, such as pressurizer pressure control, RCS flow control, and other secondary side controls?

Westinghouse control system design is generally based on a Proportional/Integral/Derivative (PID) gain approach. This is the design approach for the Steam Generator Water Level, Pressurizer Level and Pressurizer Pressure control systems for Westinghouse plants. Tavg Rod Control is an exception in that the control system includes the use of a deadband to reduce control rod motion due to system noise. Uncertainty calculations for control systems performed by Westinghouse include appropriate characteristics to conservatively model the control system and its response. Thus the inclusion of a deadband for Tavg Rod Control and no deadband in a PID controller.

- (7) The loop RCS flow indication uncertainty study uses the plant computer inputs. Is the uncertainty of the plant computer components considered in the study? When a plant computer is replaced or upgraded, what would be the impact to the uncertainty study?

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The indication of Cold Leg RCS Flow is a plant specific process. For example, Table 6 of WCAP-15264 Revision 3 provides the indication for Unit 1 based on use of the meters on the control board. Table 6 of WCAP-15265 Revision 2 provides the indication for Unit 2 based on use of the plant computer. In both cases, the appropriate uncertainties for the method of indication are identified and provided in Table 6. If the plant changes hardware, be it transmitters, process racks, plant computers or control board meters, the uncertainties for the replacement hardware should be verified to be equivalent or better than the currently installed equipment. In the event this can not be demonstrated, revised uncertainty calculations should be performed. With respect to the use of the plant computer for RCS Flow indication, typical plant computer upgrades result in equivalent or better signal input equipment. The largest uncertainty magnitude is typically associated with the normalization RCS Flow calorimetric, which is independent of the RCS Flow indication. Thus the indication uncertainties would not be expected to change significantly with a process computer changeout.

- (8) Explain the process used to generate and verify the uncertainty numbers listed in the setpoint documents. Describe the process used to update the setpoints when a plant protection system or RTDP instrumentation is modified.

For any uncertainty calculation (protection function or RTDP) performed by Westinghouse, the following information is utilized:

- a) Identification of the equipment – transmitters, process racks, control board meters, etc. This includes the specification sheet data, particularly for transmitters.
- b) Identification of measurement and test equipment used to calibrate the transmitters and process racks. This includes the specification sheet data for the DVMs and precision gauges used by the plant.
- c) Plant calibration and functional test procedures.
- d) Drift data or drift magnitudes for transmitters and process racks.
- e) Plant conditions for which the equipment is scaled.
- f) Plant calorimetric measurement procedures and specifications on the equipment used to perform the measurements (if different from installed equipment).

Westinghouse then develops an uncertainty model for each function and determines the uncertainty for the control, protection or indication function. When equipment is replaced, BVPS must assure that the replacement equipment is equivalent or better than the installed equipment. Verification of equivalency must include the confirmation of the same or better statistical characteristics to assure that the original calculation is still bounding.

ATTACHMENT A-2 to Letter L-01-043



Attached is a document titled "Request for Additional Information for the Westinghouse Revised Thermal Design Procedures Instrument Uncertainty Methodology for Beaver Valley Unit 1 and Unit 2 License Amendment Request" (Westinghouse Proprietary Class 2)