THE CLEVELAND ELECTRIC ILLUMINATING COMPANY

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ANSWERBACK: CEI PRYO

Al Kaplan

VICE PRESIDENT
NUCLEAR GROUP

Serving The Best Location in the Nation
PERRY NUCLEAR POWER PLANT

March 14, 1989
PY-CEI/NRR-1146 L

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 205[illegible]

Perry Nuclear Power Plant
Docket No. 50-440
Supplementary Information on the
RHR/RCIC Steamline Flow-High
Technical Specification Change Request

Gentlemen:

The Cleveland Electric Illuminating Company (CEI), on February 8, 1988 submitted to the NRC an amendment request (PY-CEI/NRR-0765L) for the Perry Nuclear Power Plant (PNPP) Unit 1 Technical Specifications (TS) changing the Residual Heat Removal/Reactor Core Isolation Cooling (RHR/RCIC) steamline flow-high trip setpoint and allowable value to reflect the values actually measured during the Startup Test Program. This letter reiterates CEI's desire to pursue this change request, and provides additional information on the basis for the proposed setpoint and allowable values, as requested in the NRC's request for additional information dated April 28, 1988.

Attachment 1 and 2 provide a discussion of the calculation of the RHR/RCIC steamline flow-high trip setpoint and allowable value, and provides a discussion of the type of method used to detect RHR/RCIC flow.

Attachment 2 contains information considered Proprietary by the General Electric Company. This Attachment should be handled in a proprietary manner in accordance with 10 CFR 2.790(a)(4). The General Electric Company has previously complied with 10 CFR 2.790(b) by submittal of an application for withholding of their Instrument Setpoint Methodology. A copy of their previous application is attached to this letter and is applicable for withholding of Attachment 2 to this letter.

If you have any questions, please feel free to call.

Very truly yours,

Al Kaplan
Vice President
Nuclear Group

AK:njc
Attachments

Attachment 2 contains
10 CFR 2.790(a)(4) material

cc: T. Colburn
P. Hiland
USNRC Region III
J. Harris (State of Ohio)

A001
1/1

Calculation of the Proposed RHR/RCIC Steamline Flow-High Setpoints Using the GE Instrument Setpoint Methodology (Non-Proprietary Portion)

The Trip Setpoint and Allowable Value has been calculated using the General Electric Instrument Setpoint Methodology described in NEDC-31336. This report provides the development of the formulas and the instrumentation accuracies assumed in the setpoint determination, and responds to the questions posed in the NRC's request for additional information dated April 28, 1988.

An allowable value (technical specification limit) and nominal trip setpoint are established from each analytical limit by accounting for instrument accuracy, calibration and drift uncertainties, as well as process measurement accuracy, and primary element accuracy. A nominal trip setpoint that provides LER avoidance can be determined by taking into account the standard deviation of the process variable and by applying statistics, offset this setpoint (in the conservative direction) from the value determined as the nominal trip setpoint.

NRC's Request Number 1:

Describe the relevant portion of the startup test program which was the basis for your proposed revision of the RHR/RCIC Steamline Flow-High Trip Setpoint in Item 6.C of Table 3.3.2-2 of the Perry Technical Specifications. State the value of the mass steam flow measured in the startup test as a percentage of the full power value.

CEI's Response:

The setpoint for the RHR/RCIC steamline flow-high trip was derived from measured data obtained during STI E12-T071 Section 8.1, TSN 163, "RHR Steam Condensing Capacity."

This test ran both Residual Heat Removal (RHR) heat exchanger loops in the steam condensing mode simultaneously. The steam lines to the RHR heat exchangers and to the RCIC turbine do not provide for direct measurement of the steam flows. A mass flow rate of steam to the RHR heat exchangers is calculated by performing a heat balance across the heat exchangers. From this calculation the mass flow rate of steam going to the RHR heat exchangers was determined to be 174.1×10^3 lbm/hr. It is necessary to add the flow rate of steam going to the RCIC turbine to this value, since RCIC must be operating when RHR is in the steam condensing mode. The mass flow rate in the RCIC line was determined to be 27.6×10^3 lbm/hr as obtained from the process flow diagram (USAR Figure 5.4-10). This resulted in a total value of 201.7×10^3 lbm/hr for the test case. This number is then compared to the maximum design values

on the process diagrams (USAR Figure 5.4-10, and Figure 6.3-3). From the process diagrams the maximum design flow values with RHR in the steam condensing mode on both loops would be 193×10^3 lbm/hr for RHR, and 34.2×10^3 lbm/hr for RCIC for a total of 227.2×10^3 lbm/hr. Therefore, the test condition resulted in approximately 88.8% of the maximum design steam flow.

NRC's Request Number 2:

Describe how you extrapolate the value measured in Item 1 above to the stated basis for isolating the residual heat removal (RHR) system (i.e., 125 percent of the total maximum RCIC and RHR steam condensing steam flow).

CEI's Response:

To calculate the Trip Setpoint and Allowable Value the differential pressure readings taken during the test were mathematically adjusted to compensate for maximum design flow and 125% of maximum design flow. Flow is proportional to the square root of the pressure drop. Rearranging the equation and solving for the differential pressure trip setpoint you have,

$$dp_{Trip} = dp_{Test} \times (\text{Design Flow/Test Flow})^2 \times (125\%)^2$$

$$dp_{Trip} = dp_{Test} \times (227.2 \times 10^3 / 201.7 \times 10^3)^2 \times (1.25)^2$$

$$= 29.93 \times 1.269 \times 1.563$$

$$= 59.4 \text{ inches } H_2O$$

where

dp_{Trip} = differential pressure trip
dp_{Test} = differential pressure measured during test = 23.93 inches H_2O

This number was then used as the Analytical Limit. The GE Instrument Setpoint Methodology defined in NEDC-31336 was applied to calculate the Allowable Value of 55.6 inches of H_2O and a nominal Trip Setpoint of 52.1 inches of H_2O. CEI chose to use the LER Avoidance Nominal Trip Setpoint method which adds even more conservatism to the setpoint value obtained.

NRC's Request Number 3:

Describe the possible errors, both random and systematic, in the measured value of the subject parameter. Describe how you treat these errors when extrapolating from the mass steam flow measured in the startup test to your design basis of 125 percent.

CEI's Response:

The answer to this question involves GE proprietary information. See proprietary Attachment 2 for this response.

NRC's Request Number 4:

Describe what adjustments you make in the extrapolated value of the subject parameter to arrive at your proposed values of the trip setpoint and the allowable value in Table 3.2.2-2. In your discussion, demonstrate the conservatism of the proposed values.

CEI's Response:

The answer to this question involves GE proprietary information. See proprietary Attachment 2 for this response.

NRC Request 5:

In addition, if you choose to answer in narrative form, we request for the sake of completeness that you describe the nature of the parameter used as the RHR/RCIC Steamline Flow-High Trip Setpoint (e.g., a pressure drop). Include in this discussion, a description of how and where the value of this parameter is measured during normal operation of the plant.

CEI's Response:

The RHR/RCIC steam flow is determined by using the differential presure at a piping elbow in the ten inch portion of the RCIC steamline upstream of the RCIC inboard containment isolation valve 1E51-F063. This elbow is identified on USAR Figure 5.4-9, Sheet 2 of 2. A differential pressure between the inner and outer walls of the curved section of an elbow is created as steam flows through an elbow. Since flow is proportional to the square root of this pressure drop, by determining the pressure drop, the flow can be determined. Therefore, the differential pressure (DP) across the elbow is sensed and then this DP signal is converted into a flow indication. By performing actual flow tests such as during the startup test program the differential pressure versus flow characteristic of the elbow can be verified.

NJC/CODED/2877

GENERAL ELECTRIC

NUCLEAR ENERGY BUSINESS OPERATIONS
GENERAL ELECTRIC COMPANY • 175 CURTNER AVENUE • SAN JOSE, CALIFORNIA 95125

November 19, 1986

United States Nuclear Regulatory Commission
Office of Nuclear Regulatory Regulation
Washington, D.C. 20555

Attention: Mr. Herbert M. Berkow, Director
Standardization & Special Projects

SUBJECT: GENERAL ELECTRIC REPORT "GENERAL ELECTRIC INSTRUMENT SETPOINT METHODOLOGY' (NEDC-31336) DATED OCTOBER 1986

Reference: Letter from J. F. Carolan (LRG Instrument Methodology Setpoint Group) to T. M. Noval (NRC) , dated June 29, 1984 "Action Plan to answer the NRC staff concerns on setpoint methodology for General Electric protection system Instrumentation".

The referenced letter committed the transmittal to the NRC, by the LRG Instrument Setpoint Methodology Group, of a final report addressing the LRG issue on setpoint methodology for GE supplied protection instrumentation. General Electric, on behalf of the LRG Instrument Setpoint Methodology Group, herein fulfills that commitment by the transmittal of twenty three (23) copies of the report " General Electric Instrument Setpoint Methodology" (NEDC-31336). This document is applicable to the following BWR plants: Limerick, RiverBend, Grand Gulf, Fermi-2, Hope Creek, Nine Mile Point 2, Clinton, and Perry. Included in this transmittal is, pursuant to NRC requirements, a check for $150. for the establishment of a review schedule for this report.

Information contained in NEDC-31336 is of the type which General Electric maintains in confidence and withholds from public disclosure. It has been handled and classified as proprietary by, General Electric as indicated in the affidavit of R. Villa (Attached) and General Electric hereby requests that the report be withheld from public disclosure in accordance with the provision of 10CFR2790.

Very truly yours

R. Villa, Manager
Product Licensing

Attachment

cc: L. S. Gifford, (GE), w/att

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AFFIDAVIT

I Rudolph Villa, being duly sworn, depose and state as follows:

1. I am Manager, Product Licensing, General Electric Company, and have been delegated the function of reviewing the information described in paragraph 2 which is sought to be withheld and have been authorized to apply for its withholding.

2. The information sought to be withheld is contained in the General Electric Report entitled " General Electric Instrument Setpoint Methodology" (NEDC-31336), dated October 1986.

3. In designating material as proprietary, General Electric utilizes the definition of proprietary information and trade secrets set forth in the American Law Institute's Restatement Of Torts, Section 757. This definition provides:

> "A trade secret may consist of any formula, pattern, device or compilation of information which is used in one's business and which gives him an opportunity to obtain an advantage over competitors who do not know or use it.... A substantial element of secrecy must exist, so that, except by the use of improper means, there would be difficulty in acquiring information.... Some factors to be considered in determining whether given information is one's trade secret are: (1) the extent to which the information is known outside of his business; (2) the extent to which it is known by employees and others involved in his business; (3) the extent of measures taken by him to guard the secrecy of the information; (4) the value of the information to him and to his competitors; (5) the amount of effort or money expended by him in developing the information; (6) the ease or difficulty with which the information could be properly acquired or duplicated by others."

4. Some examples of categories of information which fit into the definition of proprietary information are:

   a. Information that disclosed a process, method or apparatus where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

   b. Information consisting of supporting data and analyses, including test data, relative to a process, method or apparatus, the application of which provide a competitive economic advantage, e.g., by optimization or improved marketability;

   c. Information which if used 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 of a similar product;

d. Information which reveals cost or price information, production capacities, budget levels or commercial strategies of General Electric, its customers or suppliers;

e. Information which reveals aspects of past, present or future General Electric customer-funded development plans and programs of potential commercial value to General Electric;

f. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection;

g. Information which General Electric must treat as proprietary according to agreements with other parties.

5. Initial approval of proprietary treatment of as document is typically made by the Subsection Manager of the originating component, who is most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within the Company is limited on an "need to know" basis and such documents are clearly identified as proprietary.

6. The procedure for approval of external release of such a document typically requires review by the Section Manager, Project Manager, Principal Scientist or other equivalent authority, by the Section Manager of the cognizant Marketing function (or assigned delegate) and by the Legal Operation for technical content, competitive effect and determination of the accuracy of the proprietary designation in accordance with the standards enumerated above. Disclosures outside General Electric are generally limited to regulatory bodies, customers and potential customers and their agents, suppliers and licensee only in accordance with appropriate regulatory provisions or proprietary agreements.

7. The document mentioned in paragraph 2 above has been evaluated in accordance with the above criteria and procedures and have been found to contain information which is proprietary and which is customarily held in confidence by General Electric.

8. The information presented in the proprietary document mentioned in paragraph 2 provides a description of the General Electric methodology for determining instrument setpoints. This material, portions of which have been previously submitted to the NRC and accepted as proprietary, provides the basis for the resolution of the NRC's concern over the establishment of instrument setpoints. Individual detailed design data, calculation procedures, instrumentation drawings, and process data are considered proprietary.

9. The information to the best of my knowledge and belief, has consistently been held in confidence by the General Electric Company, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties have been made pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence.

10. Public disclosure of the information sought to be withheld is likely to cause substantial harm to the competitive position of the General Electric Company and deprive or reduce the profit making opportunities. Specifically:

- The report contains detailed expert responses to specific topics of interest to the NRC. These responses are synergistic in nature. That is, portions of the report contains information available to the public and of little commercial value. However, the development and integration of this information into a consistent and technically viable methodology makes it possible to determine setpoints which provide increased plant operating flexibility while at the same time satisfying a number of potentially conflicting operational and licensing requirements. This ability to satisfy potentially conflicting requirements derives directly from an integrated approach toward plant transient, instrument design and plant systems design aspects such that the technical value of the methodology taken as a whole significantly exceeds that of the individual parts.

- The report combines in comprehensive fashion the methods developed in documents previously submitted under proprietary affidavit to the NRC. The synergistic aspects of the compilation of many documents into a single report provides a total description of the methodology which is useable for virtually any instrument application including BWR applications as well, potentially, as other nuclear and on-nuclear applications.

- The integrated approach contained in the final report represents the combined expert contributions of over 30 individuals and over 10 man-years of effort. The release of the integrated approach supported by these documents would permit competitors to apply the resulting calculations techniques to virtually any reactor plant design and substantially reduce General Electric Company profit making opportunities.

- Actual recent General Electric Company experience with owners of both operating reactors and plants under construction has confirmed that the problem of assembling appropriate expertise and integrating the available knowledge to produce a viable setpoint methodology is indeed a significant technical barrier. A company who had access to the subject information would gain a valuable advantage in overcoming this barrier.

In short, the methodology defined by the information sought to be withheld is a synergistic compilation of significant technical expertise which has significant commercial value to the General Electric Company.

STATE OF CALIFORNIA)
COUNTY OF SANTA CLARA) ss:

Rudolph Villa, being duly sworn, deposes and says:

That he had read the foregoing affidavit and the matters stated herein are true and correct to the best of his knowledge, information, and belief.

Executed at San Jose, California, this 19th day of November, 1986

Rudolph Villa.

Rudolph Villa
General Electric Company

Subscribed and sworn before me this 19th day of November 1986

OFFICIAL SEAL
PAULA F HUSSEY
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
My comm. expires JAN 13, 1989

Paula F. Hussey
NOTARY PUBLIC, STATE OF CALIFORNIA