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Georgia Power
the southern electric system

L. T. Gucwa
Manager Nuclear Engineering
and Chief Nuclear Engineer

NED-84-281

June 7, 1984

Director of Nuclear Reactor Regulation
Attention: Mr. John F. Stolz, Chief
Operating Reactors Branch No. 4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

NRC DOCKET 50-366
OPERATING LICENSE NPF-5
EDWIN I. HATCH NUCLEAR PLANT UNIT 2
RESPONSE TO NRC STAFF QUESTIONS ON
PROPOSED ATTS TECHNICAL SPECIFICATION CHANGES

Gentlemen:

On May 17, 1984, Georgia Power Company along with several other engineering support organizations met with members of the NRC staff by telephone to discuss specific aspects of the proposed Analog Transmitter Trip System (ATTS) Technical Specification package which was submitted on January 23, 1984 (NED-84-017). Attachment 1 provides a list of persons involved in that discussion. The NRC asked fourteen specific questions concerning ATTS design and licensing, to which GPC provided partial answers during the teleconference. Attachment 2 to this letter provides a summary of those questions and documents the final GPC response to each individual item. Attachment 3 provides information prepared by the ATTS vendor (General Electric Company) which addresses setpoint calculation methodology, and which also addresses the applicability to Plant Hatch of ten open issues between the NRC and GE regarding the setpoint methodology for NTOL plants, which differs from that used for Plant Hatch in several important areas.

Attachment 3 contains information which is considered proprietary by the General Electric Company. Therefore, that portion of this submittal should be withheld from public disclosure for the reasons stated in the enclosed affadavit (Attachment 4).

Sincerely yours,

L. T. Gucwa

L. T. Gucwa

CBS
Enclosures
xc: J. T. Beckham, Jr.
H. C. Nix, Jr.
J. P. O'Reilly (NRC- Region II)
Senior Resident Inspector

A001 Change for DPTS & NSIC & PDR Non Prop Portion Only!
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ATTACHMENT 1

NRC DOCKET 50-366
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The following persons were involved in the May 17, 1984 telephone conference on the Hatch-2 ATTS:

Nuclear Regulatory Commission:

Prasad Kadambi
Marty Virgillo
Jerry Mauck

Georgia Power Company:

Ray Baker
Chris Shiver

Southern Company Services:

Tom Milton
Charles Pierce
Karen Lundell

Bechtel Power Corporation:

Doug Dismukes
John Yee
Marty Schwartz
Larry Rowe
Damir Udbinack
Randy Snapp
Charles Feltman

General Electric Company:

Jerry Dain
Larry Chi
Al Wang

JUN 07 1984

ATTACHMENT 2

NRC DOCKET 50-366
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QUESTION 1-1

Please supply information relating to the power supply arrangement for the ATTS units within the RPS system on both the primary and backup power systems. Also, please supply information with regard to the RPS and ECCS on how GPC ensures that an undervoltage condition could not exist which would incapacitate the trip functions for those systems.

RESPONSE 1-1

The RPS portion of the ATTS is supplied, as is the remainder of the RPS, from the RPS MG set which has a class 1E undervoltage trip that initiates a scram on undervoltage. The system itself is a fail-safe system; therefore, with a loss of power, all instruments go to their safety positions. This arrangement is consistent with the original design bases of the plant.

The ECCS portion of the ATTS is powered off the plant batteries. The class 1E batteries are divisionalized and supplied by chargers that are powered off the emergency buses. The batteries are sized per FSAR Section 8.3.2.1.1.a for 2 hours continuous duty without the charger. The power supply for the ECCS portion of ATTS is consistent with the original design basis of the plant.

The installation of the ATTS system has not affected the design of the Plant Hatch ECCS and RPS power supplies. Undervoltage protection for the ECCS portion of the system is provided by the Class 1E batteries which are supplied by chargers that are powered from the emergency buses. The RPS portion of the ATTS system is protected by redundant Class 1E output breakers which will deenergize the RPS bus on an undervoltage condition. The minimum voltage that the batteries would ever show based on the FSAR requirement is 105 vdc. The ATTS has voltage converters which work from 105 to 140 vdc on the input-output to give a nominal output of 25 vdc and a full load voltage of 23.5 vdc. The ATTS is designed to operate with a minimum voltage of 23.5 vdc; therefore the ATTS function is assured.

QUESTION 1-2

Does the MG set on the RPS system also supply some non-class 1E loads, and if so, what type of isolation devices separate the class 1E and non-class 1E systems? Also, what type of surveillance is performed on those isolation devices?

RESPONSE 1-2

The MG set on the RPS system supplies only non-class 1E loads. The RPS system itself is not a class 1E system; however, it does have separate class 1E undervoltage protection. This is consistent with the original design bases of the plant.

The ECCS DC distribution panels which supply essential DC power to the ECCS ATTS cabinets also supply some non-class 1E loads. These distribution panels are supplied from the plant class 1E batteries which are backed up by chargers fed by the emergency buses. Breakers are used to separate the non-class 1E and the class 1E systems. This is also consistent with the original design basis of the plant

The addition of ATTS into the plant design does not modify the original licensing basis of the plant with respect to the application of breakers in the RPS system. The breakers used for undervoltage protection are Class 1E. Surveillance testing is required for these breakers per Unit 2 Technical Specifications Section 4.8.2.7. There is no commitment to perform surveillance testing on other breakers within the system. This is consistent with the original design basis of the plant in that Plant Hatch, Unit 2 is not required to meet Regulatory Guide 1.75.

QUESTION 1-3

Please provide the setpoints for the gross failure alarm.

RESPONSE 1-3

The high/low gross failure setpoints are to be set at values of 30 $\pm$ 0.5 and 1 $\pm$ 0.5 ma., respectively. These values are different than what was provided earlier to the NRC via telecon. The alarms are provided to indicate a short-circuit and open-circuit. Therefore, the setpoint values can be varied significantly outside the saturation range of the transmitter and still provide adequate protection.

35 ± 0.5

QUESTION 1-4

In the GE NEDO document topical report on ATTS, there is a table that talks about the maximum lead length that can be installed in the plant using the wire length and power supply voltage. What are we doing with regard to that table at Plant Hatch?

RESPONSE 1-4

The table in question is presented in the Rosemount, Inc., "Operations Manual-Trip/Calibration System - Model 510DU," 1976. This manual is referenced in NEDO-21617-A. The Plant Hatch design, presented in NEDE-22154-1, does not use Rosemount trip units; GE trip units are used. However, the two trip unit designs are very similar.

The purpose of the maximum lead length requirement is to assure sufficient voltage out of the trip unit to drive the transmitter. Calculations by GE indicate that lead lengths as long as 3820 ft. are acceptable using 16 ga. wire. The maximum length of cable used in the Plant Hatch ATTS design is 1800 ft., utilizing 16 ga. wire.

QUESTION 1-5

Please provide the current status of the ATTS qualification program.

RESPONSE 1-5

The qualification program was completed in December 1983, with GE's issuance of the final qualification report (NEDC-30039).

QUESTION 1-6

Please provide the applicability of Regulatory Guide 1.75 and IEEE 279-1971 with regard to the Plant Hatch ATTS installation.

RESPONSE 1-6

The ATTS design and installation meets the standards of IEEE 279-1971.

GPC is not committed to meet the requirements of Regulatory Guide 1.75 in the original licensing bases. However, with regard to ATTS, GPC attempted to meet Regulatory Guide 1.75 to the maximum practical extent.

However, the ATTS installation does not completely meet Regulatory Guide 1.75 criteria. For example, as discussed in Response 1-2, there are non-class 1E loads being powered from class 1E buses with a circuit breaker as the separation device. As stated earlier, this is consistent with the original design basis for Plant Hatch, inasmuch as Plant Hatch is not a Regulatory Guide 1.75 plant.

Divisional separation is maintained within the cabinet. Class 1E/non-class 1E separation is carried through up to the trip relay. The annunciator trip relays are the separation point between 1E and non-1E; that separation is via the contact to coil separation within the relay.

Within the cabinets, the minimum separation distance is 6 in. up to the relay. Within the relay, one is limited to the distance from the contact to the coil.

The ATTS has been installed consistent with the requirements of Chapter 8 of the FSAR and 10 CFR 50, Appendix R.

QUESTION 1-7

With regard to the setpoint calculations, how are the analytical limits used in the safety analysis?

RESPONSE 1-7

The analytical limits are the values used as inputs to the safety analysis in the FSAR. For Plant Hatch, the analytical limits are selected to prevent violation of the applicable safety limits. For example, the analytical limit for the level 1 reactor water level trip was selected to prevent fuel cladding temperatures in excess of the peak value (2200°F) used in the Plant Hatch Appendix K LOCA analyses.

In some cases values were not used directly in the FSAR analysis. In those cases where an analytical limit was not available, engineering judgement or historical data was justified and used.

QUESTION 1-8

With regard to the setpoint calculations, how were the analytical limits derived?

RESPONSE 1-8

Unless otherwise noted in our submittal, the analytical limits used in our setpoint calculations were the original analytical limits used in the HNP Safety Analysis. For those that were changed, we provided a safety evaluation that justified the change to that analytical limit. In no case with these new limits do the FSAR analyzed transients or accidents exceed the safety limits which are specified in the Plant Hatch Technical Specifications.

The conservatisms in the Plant Hatch design basis computer codes were not used in place of the analytical limit for the starting value of the calculations.

QUESTION 1-9

What parameters other than drift are included in the setpoint calculations?

RESPONSE 1-9

The allowable value was obtained by either adding or subtracting (whichever was conservative) the loop accuracy from the analytical limit. The loop accuracy was obtained by taking the square root-of-the-sum-of-the squares of the transmitter accuracy, the trip unit accuracy, and the calibration accuracy. The trip setpoint was calculated by adding or subtracting (whichever was used to obtain the allowable value) the loop drift and the leave alone range from the allowable value.

Each of these terms is a function of other parameters; for instance, the transmitter accuracy reflects transmitter performance with regard to the transmitter basic reference accuracy, transmitter temperature specifications, power supply specifications, and static pressure specifications. Trip unit accuracy is basic reference accuracy. Calibration accuracy consists of the accuracy of applying pressure to the transmitter and measuring its electrical output error band. Thus, trip unit calibration accuracy is a function of the ATTS calibration units and the readout used to adjust the trip setpoints. What we refer to as loop accuracy is developed by taking the square root-of-the-sum-of-the squares of all the terms. These parameters envelope the Plant Hatch Unit 2 requirements.

The methodology which was used is detailed in Attachment 3. Drift of the trip units will be monitored on a monthly basis and drift of the transmitters will be monitored on an operating cycle basis using plant procedures. GPC will evaluate the performance of these trip units and transmitters against the manufacturer's published specifications after two operating cycles. At that time, if necessary, GPC will propose modifications to the surveillance frequencies specified in the Unit 2 Technical Specifications.

QUESTION 1-10

What variables were treated as dependent variables and as independent variables in the setpoint calculations?

RESPONSE 1-10

The transmitter, trip unit, and calibration accuracies are all treated as independent variables between the analytical limit and allowable value. The transmitter and trip unit drifts were treated as independent variables between the allowable value and trip setpoint. The total loop accuracies and the total loop drifts were directly added to obtain the trip setpoint, and were therefore treated as dependent variables.

An additional variable called the leave-alone band was added (treated as a dependent variable) between the allowable value and trip setpoint. This band is set at $\pm$ 0.25 percent of the trip unit range and allows a range of values that the trip unit may vary. A setpoint adjustment is not required when the trip unit setting is within this $\pm$ 0.25 percent range. If the trip unit is out of the range from the setpoint on a monthly calibration functional test, the operator resets the trip unit trip setpoint within the 0.25 percent range. Currently, if the trip unit is outside the $\pm$ 0.60% (sum of leave alone range + trip unit drift) a deficiency report will be generated internally at GPC Plant Hatch. The methodology which was used to generate the setpoints is detailed in Attachment 3.

QUESTION 1-11

Does your setpoint methodology include consideration for a harsh environment?

RESPONSE 1-11

The temperature effects for a harsh environment were explicitly used as one of the variables to determine transmitter accuracy for each loop. The data used were obtained directly from the transmitter performance specifications. No extrapolations were required. The manufacturer's performance specifications envelope the Plant Hatch calculated harsh environment profiles.

The post-accident harsh environment radiation and pressure effects on ATTS transmitter accuracies have been evaluated . The evaluation has shown that these environmental factors have negligible effect on setpoint drift or instrument error (see response 1-12). For Rosemount transmitter applications, an evaluation was performed which allowed exclusion of the radiation harsh environment effects.

QUESTION 1-12

Explain how the harsh environment effects are considered independent with regard to the setpoint analysis.

RESPONSE 1-12

The two areas explicitly considered in the harsh environment effects were radiation and temperature compensation. These were considered as independent effects. The reasoning that they are independent effects is that temperature peaks relatively early in a LOCA event while significant radiation integrated doses occur later. As a result of a GE evaluation for Barton transmitters, it was determined that radiation effects were not a significant effect in the setpoint calculations. Therefore, the setpoint calculations did not explicitly consider radiation as a parameter. SCS performed an evaluation which allowed exclusion of the radiation effect also for those trip functions where Rosemount transmitters are to be installed.

Humidity was not an explicit parameter in the setpoint calculations. The testing program for the transmitters included exposure to a steam environment during the DBE/post-DBE testing phases. Therefore, the effects of humidity are accounted for in the temperature compensation factor.

QUESTION 1-13

What values, if any, have been extrapolated to derive the trip setpoints?

RESPONSE 1-13

The only value extrapolated was setpoint drift. In many cases the transmitter manufacturer's specifications only provided drift values for 6 or 12 month intervals. These values were extrapolated linearly to provide 18 and 24 month drift values for use in the Hatch setpoint calculations. Ongoing vendor test programs demonstrate that linear extrapolation is a conservative approach.

QUESTION 1-14

With regard to the setpoint calculations, was there any component of error for the man-machine interface?

RESPONSE 1-14

No, however, there is a requirement that calibration be performed with instruments of 1/4-percent or better accuracy. This value was assumed in the setpoint calculations.

During monthly channel functional tests, the trip setpoint milliamp value is read directly from the calibration unit. The calibration unit locks in the trip setpoint value and presents a digital display. During channel calibration, the readings are taken with a digital voltmeter. At the calibration checkpoints, sufficient stability of the digital readout is achieved to assure that the human ability to read the display presents insignificant errors in the overall results of the setpoints calculations.

ATTACHMENT 4

NRC DOCKET 50-366
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RESPONSE TO NRC STAFF QUESTIONS ON
PROPOSED ATTS TECHNICAL SPECIFICATION CHANGES

JUN 07 1984

GENERAL ELECTRIC COMPANY

AFFIDAVIT

I, R. Artigas, being duly sworn, depose and state as follows:

1. I am Manager, BWR Project Licensing, Safety and Licensing Operation, 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. "Trip Setpoint Methodology for the Edwin I. Hatch Nuclear Plant Analog Transm.tter Trip System Instrumentation", Enclosures 1 and 2.

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 discloses 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. In addition to proprietary treatment given to material meeting the standards enumerated above, General Electric customarily maintains in confidence preliminary and draft material which has not been subject to complete proprietary, technical and editorial review. This practice is based on the fact that draft documents often do not appropriately reflect all aspects of a problem, may contain tentative conclusions and may contain errors that can be corrected during normal review and approval procedures. Also, until the final document is completed it may not be possible to make any definitive determination as to its proprietary nature. General Electric is not generally willing to release such a document to the general public in such a preliminary form. Such documents are, however, on occasion furnished to the NRC staff on a confidential basis because it is General Electric's belief that it is in the public interest for the staff to be promptly furnished with significant or potentially significant information. Furnishing the document on a confidential basis pending completion of General Electric's internal review permits early acquaintance of the staff with the information while protecting General Electric's potential proprietary position and permitting General Electric to insure the public documents are technically accurate and correct.

6. Initial approval of proprietary treatment of a document is made by the Subsection Manager of the originating component, the man 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 a "need to know" basis and such documents at all times are clearly identified as proprietary.

7. The procedure for approval of external release of such a document is reviewed by the Section Manager, Project Manager, Principal Scientist or other equivalent authority, by the Section Manager of the cognizant Marketing function (or his 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 licensees only in accordance with appropriate regulatory provisions or proprietary agreements.

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

9. The information contained herein is the result of extensive analyses performed at considerable cost to the General Electric Company. The development and verification of these methods, as well as their application and execution cost in excess of $1 million.

STATE OF CALIFORNIA)
COUNTY OF SANTA CLARA) ss:

R. Artigas, being duly sworn, deposes and says:

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

Executed at San Jose, California, this 5th day of June, 1984.

R. Artigas
General Electric Company

Subscribed and sworn before me this 5th day of June 1984.

Ruthe M. Kinnamon
NOTARY PUBLIC, STATE OF CALIFORNIA

OFFICIAL SEAL
RUTHE M KINNAMON
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
My comm. expires APR 26, 1985

175 Curtner Avenue, San Jose, CA 95125

AJW:csc/I06051
6/4/84