Enclosure

CONFORMANCE TO REGULATORY GUIDE 1.97
VOGTLE ELECTRIC GENERATING PLANT, UNIT NOS. 1 AND 2

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Published January 1985

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Prepared for the
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Under DOE Contract No. DE-AC07-76ID01570
FIN No. A6493

ABSTRACT

This EG&G Idaho, Inc., report reviews the submittal for Regulatory Guide 1.97, Revision 2, for the Vogtle Electric Generating Plant, Unit Nos. 1 and 2. Exceptions to these guidelines are evaluated and areas where sufficient basis for acceptability is not provided are identified.

FOREWORD

This report is supplied as pa of the "Program for Evaluating Licensee/-Applicant Conformance to RG 1.97," being conducted for the U.S Nuclear Regulatory Commission, Office of Nuclear Reactor Regulation, Division of Systems Integration, by EG&G Idaho, Inc., NRC Licensing Support Section.

The U.S. Nuclear Regulatory Commission funded the work under authorization B&R 20-19-40-41-3.

Docket Nos. 50-424 and 50-425

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1. INTRODUCTION

On December 17, 1982, Generic Letter No. 82-33 (Reference 1) was issued by D. G. Eisenhut, Director of the Division of Licensing, Nuclear Reactor Regulation, to all licensees of operating reactors, applicants for operating licenses and holders of construction permits. This letter included additional clarification regarding Regulatory Guide 1.97, Revision 2 (Reference 2), relating to the requirements for emergency response capability. These requirements have been published as Supplement 1 to NUREG-0737, "TMI Action Plan Requirements" (Reference 3).

Georgia Power Company, the applicant for the Vogtle Electric Generating Plant, provided a response to the generic letter on April 14, 1983 (Reference 4). This submittal refers to the Vogtle Final Safety Analysis Report (FSAR) (Reference 5) for a review of the instrumentation provided for conformance to Regulatory Guide 1.97.

This report provides an evaluation of these submittals.

2. REVIEW REQUIREMENTS

Section 6.2 of NUREG-0737, Supplement 1, sets forth the documentation to be submitted in a report to the NRC describing how the applicant meets the guidance of Regulatory Guide 1.97 as applied to emergency response facilities. The submittal should include documentation that provides the following information for each variable shown in the applicable table of Regulatory Guide 1.97.

1. Instrument range
2. Environmental qualification
3. Seismic qualification
4. Quality assurance
5. Redundance and sensor location
6. Power supply
7. Location of display
8. Schedule of installation or upgrade

Furthermore, the submittal should identify deviations from the guidance in the Regulatory Guide and provide supporting justification or alternatives.

Subsequent to the issuance of the generic letter, the NRC held regional meetings in February and March 1983, to answer licensee and applicant ques tions and concerns regarding the NRC policy on this matter. At these meet ings, it was noted that the NRC review would only address exceptions taken to the guidance of Regulatory Guide 1.97. Furthermore, where licensees or applicants explicitly state that instrument systems conform to the provisions of the guide it was noted that no further staff review would be necessary.

Therefore, this report only addresses exceptions to the guidance of Regulatory Guide 1.97. The following evaluation is an audit of the applicant's submittal based on the review policy described in the NRC regional meetings.

3. EVALUATION

In the applicant's response to NRC generic letter 82-33, Section 7.5 of the FSAR is identified as containing (a) the description of the Post-Accident Monitoring System (PAMS), (b) tables which identify the monitored parameters, and (c) compliance to or deviations from the guidance of Regulatory Guide 1.97 along with the supporting justification or alternatives. This evaluation is based on the information provided in Section 7.5 of the FSAR.

3.1 Adherence to Regulatory Guide 1.97

Within Table 7.5.2-1 of the FSAR, the applicant has identified where the post-accident monitoring instrumentation conforms to Regulatory Guide 1.97, Revision 2, and where deviations have been taken. It is concluded that the applicant has made an explicit commitment to conform to the guidelines of Regulatory Guide 1.97 with the exception of the identified deviations noted in Section 3.3 of this report.

3.2 Type A Variables

Regulatory Guide 1.97 does not specifically identify Type A variables, i.e., those variables that provide information required to permit the control room operator to take specific manually controlled safety actions. The applicant classifies the following instrumentation as Type A variables.

1. Reactor coolant pressure (wide range)
2. Reactor coolant system wide range T_{Hot}
3. Reactor coolant system wide range T_{Cold}
4. Wide range steam generator water level
5. Narrow range steam generator water level

6. Pressurizer level

7. Containment pressure

8. Steamline pressure

9. Refueling water storage tank level

10. Containment water level-narrow range

11. Containment water level-wide range

12. Condensate storage tank level

13. Auxiliary feedwater flow

14. Containment radiation level-wide range

15. Containment radiation level-narrow range

16. Steamline radiation monitor

17. Core exit temperature

18. Degrees of subcooling

19. Condenser air ejector radiation

The above variables are also included as Type B, C, D or E variables. The applicant has committed that were a variable is included in one or more of the five classifications, the equipment monitoring the variable is specified in accordance with the highest category identified. All of the above variables are identified as conforming to Regulatory Guide 1.97, Revision 2, and, with the exception of degrees of subcooling and condenser air ejector radiation, are Category 1 as required for Type A variables. Variables 18 and 19 are specified as Category 2.

3.3 Exceptions to Regulatory Guide 1.97

The following exceptions to the requirements of Regulatory Guide 1.97 have been identified by the applicant.

3.3.1 Reactor Vessel Water Level

Exception has been taken by the applicant to the recommendations of Regulatory Guide 1.97 for the reactor vessel water level variable. Category 2 instrumentation has been provided instead of the recommended Category 1 instrumentation. The applicant states that (a) the reactor vessel water level is not required for safety, but is provided for information purposes only, and (b) the reactor vessel water level is not a key variable but is the preferred backup to the key variable--pressurizer water level.

The applicant takes exception to the guidance of Regulatory Guide 1.97 with respect to the category of the instrumentation. This exception goes beyond the scope of this review and is being addressed by the NRC as part of their review of NUREG-0737, Item II.F.2. The acceptance criteria for Item II.F.2 is the same as Category 1 for Regulatory Guide 1.97.

3.3.2 Containment Isolation Valve Status

Category 2 instrumentation has been provided for this variable by the applicant instead of the recommended Category 1 instrumentation. The applicant states that all variables which indicate actual breach, including containment isolation valve status, have been designated as preferred backup information and are qualified to Category 2 criteria. The applicant designates containment pressure and hydrogen concentration as the key variables for containment boundary verification.

The applicant has not provided acceptable justification for the use of Category 2 instrumentation for this variable. The containment isolation valve status (closed-not closed) is the primary means to detect the actual position

of these safety-related valves. The applicant should commit to upgrade the containment isolation valve status instrumentation to the recommended Category 1 criteria.

3.3.3 Pressurizer Heater Status

The applicant takes exception to the guidance of Regulatory Guide 1.97 with respect to monitoring of the current to the pressurizer heaters.

The applicant states that indication of the pressurizer heater breaker position is adequate indication to the operator that the pressurizer heaters are operable. We find this justification unacceptable.

Section II.E.3.1 of NUREG-0737 requires a number of the pressurizer heaters to have the capability of being powered by the emergency power sources. Instrumentation is to be provided to prevent overloading a diesel-generator. Also, technical specifications are to be changed accordingly. The Standard Technical Specifications, Section 4.4.3.2, requires that the emergency pressurizer heater current be measured quarterly. These heaters, as required by NUREG-0737, should have the current instrumentation recommended by Regulatory Guide 1.97.

3.3.4 Accumulator Tank Level and Pressure

The applicant has specified in Table 7.5.2-1 of the FSAR that their range is 0 to 700 psig, while Regulatory Guide 1.97 recommends 0 to 750 psig. The applicant has not provided justification for this deviation.

The applicant has not included as a monitoring variable the accumulator tank level, the justification being that accumulator pressure indication and valve position indication for the accumulator discharge isolation and accumulator vent valves provide adequate status of the accumulators. The applicant has not listed in Table 7.5.2-1 of the FSAR the accumulator discharge isolation valve nor the accumulator vent valve as monitoring variables, or provided the information requirements of Section 6.2 of NUREG-0737, Supplement 1; therefore, this justification is unacceptable.

The applicant should comply to Regulatory Guide 1.97 by providing Category 2 accumulator tank level instrumentation and provide justification for not complying with the Regulatory Guide 1.97 specified range of 0 to 750 psig for the accumulator tank pressure.

3.3.5 Containment Atmosphere Temperature

The applicant specifies Category 3 instrumentation for this variable instead of Category 2. The applicant states that this is based on the fact that the plant emergency response guidelines do not require the operator to take action that would result in adverse consequences if the containment temperature were indicating an erroneous value.

The containment atmosphere temperature directly indicates the accomplishment of a safety function (containment cooling), and is, therefore, a key variable. As such, Category 2 requirements should be met by the applicant.

3.3.6 Containment Sump Water Temperature

The applicant indicates that this variable is not required, the justification being (a) the variable is not used by the operator to take corrective action, and (b) other parameters demonstrate that the safety injection system is operating properly when taking suction from the containment sump.

We find this justification unacceptable. The applicant should provide the temperature instrumentation for the purpose outlined in the regulatory guide.

3.3.7 Heat Removal by the Containment Fan Heat Removal System

The applicant indicates that this variable is not required. The applicant states that (a) the containment spray flow indication, (b) the containment spray system valve status indication, (c) the containment pressure indication, (d) the containment water level indication, (e) the containment spray sump status indication, (f) the containment fan cooler damper position indication, and (g) the containment fan cooler breaker position all provide indication to allow the operator to determine operability. These variables are identified by the applicant as Category 2. Based on the above diversity, we find the alternate instrument acceptable.

3.3.8 Accident Sampling (Primary Coolant, Containment Air and Sump)

The applicant notes an exception for this variable. The justification provided by the applicant is that (a) these parameters are not used by the operator to take any manual action to mitigate the consequences of an accident, and (b) these parameters are considered backup variables and are included as part of the post-accident sampling system.

The applicant takes exception to the guidance of Regulatory Guide 1.97 with respect to post-accident sampling capability. This exception goes beyond the scope of this review and is being addressed by the NRC as part of their review of NUREG-0737, Item II.B.3.

3.3.9 Boric Acid Charging Flow

The applicant indicates that this variable is not required. The justification is that (a) the refueling water storage tank level indication, (b) the high-head safety injection flow indication, (c) the low-head safety injection flow indication, (d) the containment water level indication, and (e) the Emergency Core Cooling System (ECCS) valve status monitor the performance of the emergency core cooling system. The normal charging flow and reactor coolant system (RCS) sampling is used to demonstrate that the RCS is being borated. The boric acid charging flow is not a safety injection system, nor is it used for emergency boration. Therefore, we find that this variable is not applicable at the Vogtle Station.

3.3.10 Degrees of Subcooling

The applicant has identified this as a Type A variable. As such, Table 2 of Regulatory Guide 1.97 requires Category 1 instrumentation. The applicant is supplying Category 2 instrumentation. The NRC is reviewing the acceptability of this variable as part of their review of NUREG-0737, Item II.F.2.

3.3.11 Condenser Air Ejector Radiation

The applicant has identified this as a Type A variable. As such, Table 2 of Regulatory Guide 1.97 requires Category 1 instrumentation. The applicant is supplying Category 2 instrumentation. No justification was given. The applicant should provide Category 1 instrumentation.

3.3.12 Areas of Additional Noncompliance

The following variables have not been addressed or indicated in Table 7.5.2-1 by the applicant as complying to the recommendations of Regulatory Guide 1.97, nor has the information required by Section 6.2 of NUREG-0737, Supplement 1 been provided.

1. Reactor Coolant System Soluble Boron Concentration

2. Radioactivity Concentration or Radiation Level in Circulating Coolant

3. Analysis of Primary Coolant (Gamma Spectrum)

4. Containment Effluent Radioactivity

5. Accumulator Isolation Valve Position

6. Reactor Coolant Pump Status

7. Quench Tank Level

8. Quench Tank Temperature

9. Quench Tank Pressure

10. High Level Radioactive Liquid Tank Level

11. Radioactive Gas Holdup Tank Pressure

12. Emergency Ventilation Damper Position

The applicant should provide the information required by Section 6.2 of NUREG-0737, Supplement 1, identify any deviations from the requirements of Regulatory Guide 1.97 and provide justification for any non-compliance.

4. CONCLUSIONS

Based on our review, we find that the applicant conforms to or is justified in deviating from the guidelines of Regulatory Guide 1.97 with the following exceptions:

1. Containment isolation valve status--the applicant should provide Category 1 instrumentation (Section 3.3.2).

2. Pressurizer heater status--the applicant should provide the recommended instrumentation (Section 3.3.3).

3. Accumulator tank level and pressure--the applicant should provide Category 2 accumulator tank level instrumentation; the applicant should provide justification for not complying with the recommended pressure range of C to 750 psig (Section 3.3.4).

4. Containment atmosphere temperature--the applicant should upgrade the instrumentation to Category 2 (Section 3.3.5).

5. Containment sump water temperature--the applicant should provide the instrumentation recommended by the regulatory guide (Section 3.3.6).

6. Condenser air ejector radiation--the applicant should upgrade this instrumentation to Category 1 as required for Type A variables (Section 3.3.11).

7. There are twelve variables for which the licensee should submit the information required by Section 6.2 of NUREG-0737, Supplement No. 1, identify any deviation from the regulatory guide and justify these deviations (Section 3.3.12).

5. REFERENCES

1. D. G. Eisenhut, NRC letter to all licensees of operating reactors, applicants for operating licenses, and holders of construction permits, "Supplement No. 1 to NUREG-0737--Requirements for Emergency Response Capability (Generic Letter No. 82-33)," December 17, 1982.

2. Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident, Regulatory Guide 1.97, Revision 2, U.S. Nuclear Regulatory Commission (NRC), Office of Standards Development, December 1980.

3. Clarification of TMI Action Plan Requirements, Requirements for Emergency Response Capability, NUREG-0737 Supplement No. 1, NRC, Office of Nuclear Reactor Regulation, January 1983.

4. D. Outton to E. G. Adensam, Chief of Licensing Branch #4, Division of Licensing, NRC, Georgia Power Company letter, "NRC Docket Numbers 50-424 and 50-425 Construction Permit Numbers CPPR-108 and CPPR-109 Vogtle Electric Generating Plant-Units 1 and 2 Supplement 1 to NUREG-0737 (Generic Letter No. 82-33)," April 14, 1983.

5. Final Safety Analysis Report (FSAR) for Vogtle Electric Generating Plant, Unit 1 and Unit 2.