Enclosure

CONFORMANCE TO REGULATORY GUIDE 1.97
JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NOS. 1 AND 2

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ABSTRACT

This EG&G Idaho, Inc. report provides a review of the Joseph M. Farley Nuclear Plant, Unit Nos. 1 and 2, submittal for Regulatory Guide 1.97 and identifies areas of nonconformance to the guide. Any exceptions to the guidelines are evaluated and those areas where sufficient basis for acceptability is not provided are identified.

FOREWORD

This report is supplied as part of the "Program for Evaluating Licensee/Applicant Conformance to R.G. 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.

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CONFORMANCE TO REGULATORY GUIDE 1.97
JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NOS. 1 AND 2

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).

Alabama Power Company, the licensee for the Joseph M. Farley Nuclear Plant, Unit Nos. 1 and 2, provided a response to the Regulatory Guide 1.97 portion of the generic letter on June 29, 1984 (Reference 4) and March 30, 1984 (Reference 5).

This report provides an evaluation of those submittals.

2. REVIEW REQUIREMENTS

Section 6.2 of NUREG-0737, Supplement 1, sets forth the documentation to be submitted in a report to NRC describing how the licensee 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

Further, 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 questions and concerns regarding the NRC policy on this matter. At these meetings, it was noted that the NRC review would only address exceptions taken to the guidance of Regulatory Guide 1.97. Further, 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 licensee's submittals based on the review policy described in the NRC regional meetings.

3. EVALUATION

The licensee provided a response to the NRC generic letter 82-33 on June 29, 1984 (Unit 1) and March 30, 1984 (Unit 2). This evaluation is based on those submittals.

3.1 Adherence to Regulatory Guide 1.97

The licensee stated that compliance with Regulatory Guide 1.97 is indicated on their review checklist which summarizes each variable's compliance with the Regulatory Guide 1.97 provisions. That compliance report presents justification, modifications or ongoing evaluations that are provided as resolutions for any identified deviations. Therefore, it is concluded that the licensee has provided an explicit commitment on conformance to the guidance of Regulatory Guide 1.97. Exceptions to the regulatory guide are noted in Section 3.3.

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 licensee classifies the following instrumentation channels as Type A variables:

1. Reactor coolant system (RCS) pressure (wide range)

2. RCS hot leg temperature (wide range)

3. RCS cold leg temperature (wide range)

4. Steam generator level (wide range)

5. Steam generator level (narrow range)

6. Pressurizer level

7. Containment pressure (normal range)

8. Main steamline pressure

9. Refueling water storage tank level

10. Containment water level

11. Condensate storage tank level

12. Auxiliary feedwater flow

13. Core exit temperature

14. Core subcooling monitor

All of the above variables are also included as Type B, C, and D variables and meet Category 1 requirements consistent with the requirements for Type A variables except as noted in Section 3.3.

3.3 Exceptions to Regulatory Guide 1.97

The licensee identified the following exceptions to the requirements of Regulatory Guide 1.97.

3.3.1 Environmental Qualification Requirement Deviation

The licensee has indicated that environmental qualification is not applicable for the following Category 1 and 2 instrumentation. However, no justification was submitted for this deviation.

Main steamline pressure
Refueling water storage tank level
Condensate storage tank level
Plant vent stack flow
Condenser SJAE radiation

Plant vent effluent radiation
Accessible area radiation
Main steam effluent radiation
TDAFW effluent radiation
HVAC emergency damper position--control room
Pressurizer heater breaker position
Status of standby power and other energy sources important to safety

Environmental qualification has been clarified, subsequent to the issuance of Regulatory Guide 1.97, by the environmental qualification rule, 10 CFR 50.49. It is concluded that the guidance of the regulatory guide has been superseded by a regulatory requirement. Any exception to this rule is beyond the scope of this review and should be addressed in accordance with 10 CFR 50.49.

Deviations other than environmental qualification for these variables are listed elsewhere in this report.

3.3.2 Seismic Qualification Requirement Deviation (Unit No. 2)

The licensee has identified a main control room board and/or MCB termination cabinets as a seismic qualification deviation for the following Unit No. 2 variables:

RCS pressure (wide range)
RCS hot leg temperature (wide range)
RCS cold leg temperature (wide range)
Steam generator level (wide range)
Steam generator level (narrow range)
Pressurizer level
Containment level (normal range)
Main steamline pressure
Refueling water storage tank level
Containment water level
Condensate storage tank level
Auxiliary feedwater flow

Containment pressure (extended range)
Containment isolation valve position (42 of the 60 listed)
Main steam flow
Pressurizer pressure
Accumulator tank isolation valve position
Pressurizer PORV position
Pressurizer safety valve position
HVAC emergency damper position-piping penetration room
Pressurizer heater breaker position

The licensee submitted the following justification for these deviations. "A seismic qualification program to verify the seismic structural adequacy of the main control board, the MCB termination cabinets, and to verify the seismic qualification of R.G. 1.97 display devices on the main control board is in progress. Preliminary results of this program indicate that the main control board structure can be shown to be qualified to the requirements of IEEE 344-1971."

The licensee should submit the results of the seismic qualification program that is currently ongoing and commit to making any necessary changes that are required to comply to Regulatory Guide 1.97 seismic recommendations. Deviations other than seismic qualification for these variables are listed elsewhere in this report.

3.3.3 Neutron Flux (Intermediate Range)

The installed neutron flux instrumentation does not completely meet the redundancy requirements of Regulatory Guide 1.97. Both instrument loops are powered from the same DC power supply train (Train A). The power supplies to the instrument loops are provided by separate inverters, and the outputs of these inverters are physically separated and backed up by diesel Generator A. In addition, an alternate source of power, other than the inverters, is provided to both instrument loops from a Solatron voltage regulator. The licensee is installing a third channel of wide range instrumentation to resolve ambiguity between the existing instrumentation should one loop fail. This new instrumentation loop, however, will be powered from the same

power supply train (Train A) as the two existing neutron flux monitoring loops. The licensee also states that the existing electrical independence of the neutron monitors is consistent with the design criteria of the reactor protection system.

While the diverse methods of maintaining power to this instrumentation make it unlikely that these instrumentation loops will be lost, a power Train A bus fault would disable all neutron flux instrumentation. This deviation is unacceptable. The licensee should commit to changing the power supply for one of the neutron flux instrumentation loops to the Train B power source.

3.3.4 RCS Soluble Boron Concentration

Regulatory Guide 1.97 recommends Category 3 instrumentation, with a range of 0 to 6000 ppm, for this variable. The licensee takes credit for the post-accident sampling system meeting this recommendation.

The licensee 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.

3.3.5 RCS Cold and Hot Leg Water Temperature

The maximum indication of the instrumentation for these variables is 700°F, 50°F less than the Regulatory Guide 1.97, Revision 2, range guidelines (50 to 750°F).

Regulatory Guide 1.97, Revision 3, May 1983 (Reference 6) recommends a range of 50 to 700°F for these variables. The instrumentation supplied by the licensee meets this recommended range and is, therefore, acceptable.

3.3.6 Coolant Level in Reactor (Unit No. 2)

The licensee states that they participated in a pilot project for non-invasive reactor vessel level system. This unsuccessful demonstration led the licensee into a detailed review of commercially available reactor vessel level systems. The results of this ongoing review indicate to the licensee that no commercially available reactor vessel level system has been accepted by the NRC for operational use.

It is our understanding that two systems are now commercially available for reading reactor vessel level in a pressurized water reactor. One system uses heated junction thermocouples (NUREG/CR-2627, Reference 7) and the other system uses differential pressure (NUREG/CR-2628, Reference 8). The licensee takes exception to the guidance of Regulatory Guide 1.97 with respect to this variable. 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 (Inadequate Care Cooling). The acceptance criteria for item II.F.2 is the same as Category 1 for Regulatory Guide 1.97.

3.3.7 Degrees of Subcooling

The licensee has identified degrees of subcooling as a Type A variable. As such, it should meet Category 1 requirements. The licensee states that their core subcooling monitor meets Category 2 requirements.

The NRC is reviewing the acceptability of this variable 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.

3.3.8 Containment Sump Water Level

The licensee has taken exception to the range recommended by Regulatory Guide 1.97 for the containment level instrumentation (bottom of containment to 600,000 gallon level equivalent). The licensee has instrumentation with a

minimum level indication of 62,000 gallons. The following justification for this deviation was submitted by the licensee. "The range of the existing instrumentation is acceptable since this is a float type level measurement device and therefore the minimum level indication is limited by physical installation constraints to 62,000 gallons. There is no need to monitor the containment water level below 62,000 gallons since no operator actions are required below the 62,000 gallon level."

The reactor cavity sump level indication would provide a diverse method of determining a water level increase in the containment. Since no operator action is required at less than the minimum indication available with the existing range, we find this to be an acceptable deviation from Regulatory Guide 1.97.

3.3.9 Containment Isolation Valve Position

The licensee has not provided redundant indication for all of the containment isolation valves. Some isolation valves inside and outside containment for the same penetration have the same power source, and therefore, redundant indication is not provided. The licensee submitted the following justification for this deviation. These valves are normally closed valves and would remain closed in an accident condition until remotely opened by the operator. The power supply at these valves is for position indication as well as power operation of the valve motor operators. The valves are part of a penetration which is redundant to another penetration. At least one of these redundant piping systems must be operational. Therefore, the power for both containment isolation valves on a penetration is from the same power supply to ensure that a single power supply failure will not inhibit both penetrations from operating. Both isolation valves for the second penetration are supplied power from another source.

We find the licensee's justification acceptable. Further, if during an accident condition, a single train of power were to fail resulting in a loss of position indication, the operator could verify that the outside containment isolation valve is closed and containment integrity maintained. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.10 Radioactivity Concentration or Radiation Level in Circulating Primary Coolant

The licensee uses the post-accident sample system to measure this parameter. In a letter dated February 17, 1984, Alabama Power Company stated that procedures exist which relate radionuclide concentrations to core damage. These procedures consider physical parameters such as core temperature and sample locations. Alabama Power Company will implement the calculational method to assess the extent of core damage. This method will utilize the RCS post-accident sampling system in the determination of the status of fuel cladding and the magnitude of any core damage.

Based on the justification provided by the licensee, we conclude that the instrumentation supplied for this variable is adequate, and therefore, acceptable.

3.3.11 Containment Hydrogen Concentration

The licensee has installed Category 3 hydrogen analyzers that do not meet the operating pressure envelope recommended by Regulatory Guide 1.97. The licensee considers this instrumentation acceptable based on the following justification.

> The release and buildup of hydrogen in the containment is a relatively slow process and would not have the potential for jeopardizing containment integrity for several hours. Control room operators utilize containment hydrogen concentration as the basis for verifying the hydrogen removal capability of the hydrogen recombiners. Operation of the hydrogen recombiner minimizes the containment hydrogen concentration during accident conditions.
>
> The EOP's instruct the operators to energize the hydrogen recombiners based on LOCA indications. Hydrogen concentration is not a LOCA indication nor is it used to energize the containment hydrogen recombiners.
>
> In the event that the hydrogen analyzers are unavailable to provide the control room operators with containment hydrogen concentrations, sufficient time is available to determine the containment hydrogen concentration utilizing the containment air post-accident sampling system (CAPASS). Alabama Power Company installed the CAPASS as a part of commitments made in response to

the TMI Action Plan. Periodic samples can be obtained from the CAPASS such that the hydrogen recombiners can be adjusted to minimize containment hydrogen buildup. As stated in letters to the NRC dated January 14, 1981 (Unit 1) and June 20, 1980 (Unit 2), whole body and extremity doses to an individual obtaining a containment air post-accident sample will not exceed 3 and 18-3/4 rems respectively.

The NRC has reviewed the acceptability of this variable as part of their review of NUREG-0737, Item II.F.1.6, and found the hydrogen concentration instrumentation acceptable.

3.3.12 RHR Heat Exchanger Outlet Temperature

Regulatory Guide 1.97, Revision 2, recommends a range of 32 to 350°F. Revision 3 changed the recommended range to 40 to 350°F. The licensee has supplied a range of 50 to 400°F. The instrumentation supplied has a range where the lower limit of the span does not conform to either revision of the regulatory guide. The licensee submitted the following justification for this deviation: "It is not necessary to provide temperature indication below 50°F since the existing range of this instrumentation envelopes the RHR system design parameters."

Based on the justification provided by the licensee, we conclude that the instrumentation supplied for this variable is adequate, and therefore, acceptable.

3.3.13 Accumulator Tank Level and Pressure

The licensee has accumulator tank level instrumentation that is Category 3 that does not meet the recommended range. The justification submitted by the licensee for this deviation is that the accumulator tank level at the Farley Nuclear Plant was designed solely to verify compliance with the technical specification volume provisions. In the event of RCS depressurization, accumulator tank discharge is verified by monitoring accumulator tank pressure, which meets the Category 2 requirements.

The accumulators are passive and discharge for RCS breaks. The level and pressure measurement channels are not required to protect the integrity of the RCS boundary, to shutdown the reactor to maintain it in a safe shutdown condition or to prevent or mitigate the consequences of an accident which could result in potential exposures. Therefore, we find that the instrumentation supplied for this variable (level and pressure) is adequate to determine that the accumulators have discharged and is acceptable to monitor this variable.

3.3.14 Refueling Water Storage Tank Level

Regulatory Guide 1.97 recommends a range from the top to the bottom of the tank. The licensee does not meet this range and submitted the following justification. The maximum level indication of the existing instrumentation is one foot below the top of the tank. This level indication reads from 0 to 40 feet and envelopes the technical specification volume requirement, which is sufficient to mitigate any design basis event. This indicated range is also adequate to provide the operator with necessary information for normal operations and to perform ECCS switchover from injection to recirculation.

Based on the licensee's justification, we find this level range acceptable.

3.3.15 Pressurizer Level

Regulatory Guide 1.97 recommends a range of bottom to top for this variable. The instrumentation provided by the licensee does not read this full range. The licensee submitted the following justification for this deviation: "The specific range deviation is that the volumes enclosed by the bottom hemispherical head and the upper hemispherical head are not measured. The volume measured represents approximately 89 percent of the pressurizer. The volume measured is sufficient for the operator to take required manual actions and to ensure the proper operation of the pressurizer."

The portion of the pressurizer level that is not indicated (approximately 11 percent) is the upper and lower hemispherical head region, where the volume

to level ratio is not linear. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.16 Pressurizer Heater Status

Regulatory Guide 1.97 recommends electric current instrumentation to determine the operating status of the pressurizer heaters. The licensee does not provide instrumentation to read this current. The justification submitted by the licensee is, "The status of the pressurizer heaters can be adequately determined using a combination of pressurizer heater breaker position and pressurizer pressure."

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.

3.3.17 Quench Tank Level

The range of the existing instrumentation for this variable does not meet the range recommended by Regulatory Guide 1.97 (top to bottom). The licensee's justification for this deviation is that only 5 percent of the total tank volume is not measured and the existing range is sufficient to provide the operator with the necessary information for accident monitoring.

We find the existing level range adequate. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.18 Steam Generator Level

Regulatory Guide 1.97 recommends a range of tube sheet to separators for this variable. The licensee has instrumentation that reads from 12 inches

above the tube sheet to separators. The licensee submitted the following justification for this deviation: "The specific range deviation is that the 12 inches between the top of the tube sheet and the centerline of the low instrument connection is not measured. This is less than 2 percent of the volume between the tube sheet and the upper instrument connection. Therefore the volume not measured is insignificant."

The steam generator is, in effect, empty at 12 inches above the tube sheet; therefore, this deviation is insignificant and the range acceptable.

3.3.19 Steam Generator Pressure

The licensee has identified a range deviation from the regulatory guide recommendations for this variable.

The licensee has instrumentation that is identified in Table 7.5-1 of the FSAR as having a maximum pressure indication of 1300 psig. Regulatory Guide 1.97 recommends a range from atmospheric pressure to 20 percent above the lowest safety valve setting. Thus, the range should be to 1390 psig, as the licensee identifies the range as being 90 psi less than recommended. The licensee provided the following justification for this deviation: "The range of the existing instrumentation is acceptable because the highest actuation setpoint of the Main Steam Safety valves is 1129 psig. Allowing for 3 percent accumulation above this actuation point (1129 psig) the maximum credible steamline pressure is 1163 psig which is within the indicated range of the existing instrumentation." The lowest actuation setpoint is calculated to be 1159 psig based on the recommended range being 1390 psig. This is above the highest actuation setpoint of the safety values.

Therefore, based on the information available to us, we cannot find the deviation acceptable. The licensee should clarify the range and the extent of the deviation, identify the lowest safety valve actuation setpoint and provide any additional justification deemed necessary.

3.3.20 Volume Control Tank Level

The licensee takes exception to the range recommended by Regulatory Guide 1.97 for this variable (top to bottom). The transmitters measure the full range between the instrument connections, however, these connections are not at the top and bottom of the tank. The justification submitted by the licensee is that for operational purposes, level indication at either end of the scale is considered full or empty. Also, the existing range of the volume control tank level envelopes all automatic action of the level control system.

We find that the level indication is adequate. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.21 High Level Radioactive Liquid Tank Level

Regulatory Guide 1.97 recommends a range of top to bottom for this variable. The transmitters for these tanks measure the full range between the instrument connections; however, these connections are not at the top and bottom of the tank. The licensee's justification for this deviation is that at least 90 percent of the tank volume is measured and the range is sufficient to provide the operator with the necessary information for accident monitoring.

We find that the range is adequate. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.22 Radioactive Gas Holdup Tank Pressure

The licensee takes exception to the range recommended by Regulatory Guide 1.97 for this variable (0 to 150 percent design pressure). The licensee has instrumentation for this variable that reads from 0 percent to the design pressure of the tank (150 psig). The licensee submitted the following justification for this deviation: "The range of the existing instrumentation is acceptable because relief valves are installed on each tank to prevent pressure from exceeding the tank design value of 150 psig. The existing

instrumentation can measure up to the design pressure of the tank. Measurement of tank pressures in excess of the design pressure which is the relief valve setpoint is not necessary."

Based on the justification provided by the licensee, we conclude that the instrumentation provided for this variable is adequate, and therefore, acceptable.

3.3.23 Radiation Exposure Rate

The licensee identified two deviations for this variable. First, of the plant areas which are accessible post-accident, only the control room has a permanently installed radiation monitor. Second, the maximum radiation level indication of the control room radiation monitor is below the maximum specified by Regulatory Guide 1.97 (10^{-1} R/hr to 10^{4} R/hr). The licensee did not identify the actual range. The licensee provided the following justification for these deviations: "The existing instrumentation is acceptable because portable instrumentation is available to survey areas where personnel access is required. For the control room the maximum calculated post-accident radiation level is 0.015 rem/hr. The upper range specified by R.G. 1.97 is not reasonable for this area which is continuously manned since a person would not be expected to function in an environment that has a radiation exposure above the existing range."

While an operator preparing to enter one of these areas would be equipped with portable instrumentation, portable instrumentation cannot accomplish the functions for this variable as listed in the regulatory guide. The licensee should install instrumentation for this variable in all areas where access is required to service equipment important to safety. The licensee should identify the range of the control room rate monitor.

3.3.24 Plant and Environs Radiation (Portable Instrumentation)

Regulatory Guide 1.97 recommends a range of 10^{-3} to 10^{4} rads/hr, for beta radiation and low energy photons. The licensee states that the maximum indication of the existing portable instrumentation is below the recommended maximum level. The licensee submitted the following justification for this deviation: "The existing ranges of these portable instruments are sufficient to monitor the radiation levels in areas of the plant where post-accident access is necessary by plant personnel."

This instrumentation is portable and would not be used to assess levels of radiation greater than the range provided by the licensee. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.25 Plant and Environs Radioactivity (Portable Instrumentation)

The licensee does not have a portable multichannel gamma-ray spectrometer, as recommended by Regulatory Guide 1.97, Revision 2, for this variable. Regulatory Guide 1.97, Revision 3, states that portable instrumentation should be provided for isotopic analysis of plant and environs radioactivity. The licensee has also not provided portable instrumentation for isotopic analysis. However, the licensee does have two non-portable multichannel analyzers (MCA) located in the Counting Room of the plant. The MCAs are equipped with a germanium-lithium detector so as to provide accurate isotopic analysis of the plant and environ samples. The MCAs have the capability to analyze samples in less than 15 minutes from the time the sample is delivered to the MCAs. The MCAs located in the plant are used during normal plant operations are accessable post-accident, and are instruments familiar to plant personnel.

The licensee does not believe that a portable multichannel gamma-ray spectrometer would enhance the capability to perform isotopic analysis. A portable device can only provide "scoping" of the radionuclide content and cannot provide a quantitative measurement. The existing non-portable MCAs at

the Farley Nuclear Plant would provide a quantitative measurement of the radionuclide content.

The two existing multichannel analyzers are sufficient to provide for isotopic analysis and an adequate and timely assessment of radioactive releases at this station. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

3.3.26 Wind Speed

Regulatory Guide 1.97, Revision 2, recommends a range of 0 to 30 meters/second (67 mph) for this variable. The licensee has instrumentation with a range of 0 to 22 meters/second (50 mph). The licensee submitted the following justification for this deviation: "The wind speed instrumentation has historically provided reliable monitoring of wind speed. In accordance with Supplement 1 of NUREG-0737 no changes in the existing meteorological monitoring system are necessary if they have historically provided reliable indications that are representative of meteorological conditions in the vicinity of the plant. Therefore, no wind speed instrumentation modifications are necessary."

Regulatory Guide 1.97, Revision 3, recommends instrumentation with a range of 0 to 22 meters/second (50 mph) for this variable. Since the existing instrumentation meets the Regulatory Guide 1.97, Revision 3 requirement, this deviation is acceptable.

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

The minimum quantifiable concentrations of boron, chlorides, dissolved H_2, total gas and O_2 do not meet Regulatory Guide 1.97 range guidelines. The licensee submitted the following justification for this deviation: "The range of the existing sample analysis capabilities is satisfactory because analysis below the minimums identified would serve no useful purpose for accident analysis, mitigation or recovery."

The minimum quantifiable concentrations of oxygen and hydrogen in the containment air do not satisfy Regulatory Guide 1.97 range guidelines. The

licensee submitted the following justification for this deviation: "The range of the existing sample analysis capabilities is satisfactory because the minimum quantifiable concentrations represent the minimum detectable concentrations. Furthermore, quantification of the concentration below the minimums identified would serve no useful purpose for accident analysis, mitigation or recovery."

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

4.0 CONCLUSIONS

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

1. Environmental Qualification Requirements Deviation--Environmental qualification should be addressed in accordance with 10 CFR 50.49 for the identified variables (Section 3.3.1).

2. Seismic Qualification Requirement Deviation (Unit No. 2)--Results of the ongoing qualification program to verify the structural adequacy of the main control board and the main control board termination cabinets, is needed from the licensee. The licensee should commit to making any changes that are identified as necessary, by the results of this evaluation, to meet Regulatory Guide 1.97 requirements (Section 3.3.2).

3. Neutron Flux (intermediate range)--The licensee should commit to providing redundant power sources for this variable (Section 3.3.3).

4. Pressurizer Heater Status--The licensee should install electric current instrumentation in accordance with the regulatory guide recommendations (see Section 3.3.16).

5. Steam Generator Pressure --The licensee should clarify the range and the extent of the deviation, identify the lowest safety valve actuation setpoint and provide any additional justification deemed necessary (Section 3.3.19).

6. Radiation Exposure Rate--The licensee should install Category 2 instrumentation with a range of 10^{-1} to 10^{4} R/hr in areas where access is required to service equipment important to safety; the licensee should identify the range of the rate monitor in the control room (Section 3.3.23).

5. REFERENCES

1. NRC letter, D. G. Eisenhut 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. Alabama Power Company letter, R. P. McDonald to Director, Nuclear Reactor Regulation, NRC , "Regulatory Guide 1.97 Compliance," June 29, 1984.

5. Alabama Power Company letter, F. L. Clayton, Jr. to Director, Nuclear Reactor Regulation, NRC, "Regulatory Guide 1.97 Compliance," March 30, 1984.

6. Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident, Regulatory Guide 1.97, Revision 3, U.S. Nuclear Regulatory Commission (NRC), Office of Nuclear Regulatory Research, May 1983.

7. Inadequate Core Cooling Instrumentation Using Heated Junction Thermocouples for Reactor Vessel Level Measurement, NUREG/CR-2627, ORNL/TM-8248, March 1982.

8. Inadequate Core Cooling Instrumentation Using Differential Pressure for Reactor Vessel Level Measurement, NUREG/CR-2628, ORNL/TM-8269, March 1982.

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