

CONFORMANCE TO REGULATORY GUIDE 1.97
WASHINGTON PUBLIC POWER SUPPLY SYSTEM, NUCLEAR PROJECT NO. 1

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ABSTRACT

This EG&G Idaho, Inc., report reviews the submittal for Regulatory Guide 1.97, Revision 2 for Washington Public Power Supply System, Nuclear Project No. 1 and identifies areas of nonconformance to the regulatory guide. Exceptions to Regulatory Guide 1.97 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 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.

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CONTENTS

| | |
|---|----|
| ABSTRACT | 11 |
| FOREWORD | 11 |
| 1. INTRODUCTION | 1 |
| 2. REVIEW REQUIREMENTS | 2 |
| 3. EVALUATION | 4 |
| 3.1 Adherence to Regulatory Guide 1.97 | 4 |
| 3.2 Type A Variables | 4 |
| 3.3 Exceptions to Regulatory Guide 1.97 | 5 |
| 4. CONCLUSIONS | 11 |
| 5. REFERENCES | 12 |

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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 No. 1 to NUREG-0737, "TMI Action Plan Requirements" (Reference 3).

Washington Public Power Supply System, the applicant for the Supply System Nuclear Project No. 1, provided a response to the Regulatory Guide 1.97 portion of the generic letter on April 15, 1983 (Reference 4).

This report provides an evaluation of that submittal.

2. REVIEW REQUIREMENTS

Section 6.2 of NUREG-0737, Supplement No. 1, sets forth the documentation to be submitted in a report to the NRC describing how the applicant complies with 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 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 subject. At these meetings, it was noted that the NRC review would only address exceptions taken to Regulatory Guide 1.97. Furthermore, where licensees or applicants explicitly state that instrument systems conform to the regulatory guide, it was noted that no further staff review would be

necessary. Therefore, this report only addresses exceptions to 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

The applicant provided a response to the NRC generic letter 82-33 on April 15, 1983. This evaluation is based on that submittal.

3.1 Adherence to Regulatory Guide 1.97

The applicant states that their instrumentation does not provide full compliance with Regulatory Guide 1.97, Revision 2. The applicant plans to provide full compliance. Table 7.5-4 was included in the submittal to list the parameters applicable to this unit. When the design details are completed, the table will be modified by the applicant to provide the supporting information. Therefore, it is concluded that the applicant has provided an explicit commitment on conformance to Regulatory Guide 1.97. Deviations from and exceptions to the regulatory guide are noted below.

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.

1. Steamline radiation
2. Borated water storage tank level
3. High pressure injection flow
4. Reactor coolant system (RCS) hot leg water temperature
5. RCS pressure
6. RCS cold leg water temperature

7. Steam pressure
8. Steam generator level
9. Pressurizer level
10. Demineralized water storage tank level

The above variables meet Category 1 requirements consistent with the requirements for Type A variables, except for steamline radiation. This is listed as a Type A variable with the design category to be provided later. Based on the applicant's commitment to conform to the recommendations of Regulatory Guide 1.97, we assume that Category 1 instrumentation will be provided for the steamline radiation instrumentation.

3.3 Exceptions to Regulatory Guide 1.97

The applicant identified the following deviations and exceptions to Regulatory Guide 1.97. These are discussed in the following paragraphs.

3.3.1 Information to be Provided Later

Below are instruments from Table 7.5-4 of the applicant's submittal where the indicator range and design category will be provided later.

1. Steamline radiation (design category later)
2. Neutron flux
3. Coolant level in reactor
4. Radioactivity concentration or radiation level in circulating primary coolant
5. Pressurizer heater status

6. Quench tank temperature (range later)
7. Emergency ventilation damper position (design category later)
8. Status of standby power and other energy sources important to safety (design category later)
9. Vent from steam generator safety relief valves or atmospheric dump valves
10. Radiation exposure meters
11. Airborne radiohalogens and particulates
12. Plant and environs radiation
13. Plant and environs radioactivity

The applicant should provide this information, identify any deviations from Regulatory Guide 1.97 and justify those identified deviations.

3.3.2 Radiation Monitoring Instrumentation

The applicant takes exception to the design category recommended by Regulatory Guide 1.97 for two Type C and four Type E radiation monitoring instruments. They are:

1. Radiation exposure rate (Type C)
2. Effluent radioactivity-noble gases (Type C)
3. Radiation exposure rate (Type E)
4. Condenser air removal system exhaust (Type E)

5. Common plant vent (Type E)
6. All other identified release points (Type E)

Regulatory Guide 1.97 recommends Category 2 instrumentation for these variables. The applicant has installed instrumentation that except for environmental qualification meets this recommendation. The applicant justifies this exception by stating the instrumentation has been designed to survive the environment to which it will be exposed.

Environmental qualification has been clarified by the Environmental Qualification Rule, 10 CFR 50.49. We conclude that Regulatory Guide 1.97 has been superseded by a regulatory requirement. Any exception to this rule is beyond the scope of this review and should be addressed in such accordance with 10 CFR 50.49.

3.3.3 Accumulator Tank Level and Pressure

The range of the level instrumentation is not as recommended by Regulatory Guide 1.97 (10 to 90 percent volume). The provided level instrumentation covers a range of 0 to 80 percent of tank volume. The applicant has provided no justification for this deviation.

The accumulators are passive devices. Their discharge into the reactor coolant system (RCS) is actuated solely by a decrease in RCS pressure. We find the instrumentation supplied for this variable adequate to determine that the accumulators have discharged. Therefore, this instrumentation is acceptable.

3.3.4 Main Feedwater Flow

The range of the instrument is not as recommended by Regulatory Guide 1.97 (0 to 110 percent of design flow). The provided instrumentation covers a range of 0 to 9×10^6 lb/hr which is 0 to 109 percent of design flow.

Considering instrumentation accuracy and scaling factors, we find that this deviation is minor, and therefore, acceptable.

3.3.5 Heat Removal by the Containment Fan Heat Removal System

No instrumentation is listed on Table 7.5-4 of the applicant's submittal for this parameter. The applicant has provided no justification for this deviation.

The applicant should identify the method of monitoring heat removal by the containment fan heat removal system or justify why it is not required.

3.3.6 Makeup Flow-In

Regulatory Guide 1.97 recommends environmentally qualified instrumentation for this variable. The applicant's instrumentation is not environmentally qualified. The applicant justifies this deviation, stating that environmental qualification in accordance with Regulatory Guide 1.89 does not exist for make-up flow instrumentation.

Environmental qualification has been clarified by the Environmental Qualification Rule, 10 CFR 50.49. We conclude that Regulatory Guide 1.97 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.

3.3.7 Letdown Flow-Out

Regulatory Guide 1.97 recommends environmentally qualified instrumentation for this variable. The applicant has provided instrumentation that is not environmentally qualified. The applicant justifies this deviation, stating that environmental qualification in accordance with Regulatory Guide 1.89 does not exist for letdown flow instrumentation.

Environmental qualification has been clarified by the Environmental Qualification Rule, 10 CFR 50.49. We conclude that Regulatory Guide 1.97 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.

3.3.8 Volume Control Tank Level

Regulatory Guide 1.97 recommends environmentally qualified instrumentation with a range from the top to the bottom of this tank. The applicant has supplied instrumentation which monitors tank level from the top to the bottom of the cylindrical section of the tank, approximately 80 percent of the tank volume. This range is considered adequate, therefore, this range is an acceptable deviation from Regulatory Guide 1.97.

The applicant has stated that the volume control tank level instrumentation is not environmentally qualified. The applicant justifies this deviation, by stating that environmental qualification in accordance with Regulatory Guide 1.89 does not exist for volume control tank level instrumentation.

Environmental qualification has been clarified by the Environmental Qualification Rule, 10 CFR 50.49. We conclude that Regulatory Guide 1.97 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.

3.3.9 Component Cooling Water Flow to Engineered Safety Features (ESF) System

The range of this instrumentation is not as recommended by Regulatory Guide 1.97 (0 to 110 percent of design flow). The provided instrumentation covers a range of 0 to 107 percent of design flow. The applicant has provided no justification for this deviation.

Considering instrumentation accuracy and scaling factors, we find that this deviation is minor, and therefore, acceptable.

3.3.10 Radiation Exposure Rate

The applicant takes exception to the range recommended by Regulatory Guide 1.97 (10^{-1} to 10^4 R/hr). The provided instrumentation covers a range from 10^{-3} to 10^2 R/hr. The applicant's justification for this deviation is that from a radiological standpoint, should the radiation levels reach or exceed the upper limit of the range of the radiation monitors, personnel would not be permitted access to the areas except for life saving.

We find the justification provided by the applicant for the existing range adequate. Therefore, this is an acceptable deviation from Regulatory Guide 1.97.

4. CONCLUSIONS

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

1. Information to be provided later--the applicant is to provide range and category information for the thirteen listed variables, identify any deviation and justify those identified deviations (Section 3.3.1).
2. Radiation monitoring instrumentation--environmental qualification should be addressed in accordance with 10 CFR 50.49 (Section 3.3.2).
3. Heat removal by containment fan heat removal system--the applicant should identify the method of monitoring heat removal by the containment fan heat removal system or justify why it is not required (Section 3.3.5).
4. Make up flow-in--environmental qualification should be addressed in accordance with 10 CFR 50.49 (Section 3.3.6).
5. Letdown flow-out--environmental qualification should be addressed in accordance with 10 CFR 50.49 (Section 3.3.7).
6. Volume control tank level--environmental qualification should be addressed in accordance with 10 CFR 50.49 (Section 3.3.8).

5. REFERENCES

1. NRC letter, D. G. Eisenhower 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. Washington Public Power Supply System letter, G. D. Bouche to Director of Nuclear Reactor Regulation, NRC, "Nuclear Project No. 1, Response to NUREG-0737, Supplement No. 1," April 15, 1983, G01-83-0149.