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INFORMAL REPORT

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

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Prepared for the
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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 submittals for Regulatory Guide 1.97, Revision 3, for the 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.

Docket No. 50-460

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 PWR Licensing-A, by EG&G Idaho, Inc., NRR and I&E Support Branch.

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

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).

The Washington Public Power Supply System, the applicant for Nuclear Project No. 1, provided a response to the Regulatory Guide 1.97 portion of the generic letter on April 15, 1983 (Reference 4). Additional information was provided on February 6, 1986 (Reference 5). Reference 5 addresses conformance to Revision 3, of Regulatory Guide 1.97 (Reference 6).

This report provides an evaluation of these submittals.

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

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. 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 report addressing the Regulatory Guide 1.97 portion of NRC Generic Letter 82-33 on April 15, 1983. Additional information was provided on February 6, 1986. This evaluation is based on those submittals.

3.1 Adherence to Regulatory Guide 1.97

The applicant states that their instrumentation does not provide full compliance with Regulatory Guide 1.97. 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, we conclude that the applicant has provided an explicit commitment on conformance to Regulatory Guide 1.97. Exceptions to and deviations from 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 the 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. Borated water storage tank level
2. High pressure injection flow
3. Reactor coolant system (RCS) hot leg water temperature
4. RCS pressure
5. Steam pressure

6. Steam generator level
7. Pressurizer level
8. Demineralized water storage tank level

This instrumentation meets the Category 1 recommendations consistent with the requirements for Type A variables, except as noted in Section 3.3

3.3 Exceptions to Regulatory Guide 1.97

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

3.3.1 Information Provided in Reference 5

Listed below are instruments from Table 7.5-4 of the applicant's submittal (Reference 4), where the applicant stated that the indicator range and design category would be provided later. Additional information was provided by Reference 5. This information is evaluated below.

1. Steamline radiation--the applicant deleted this as a Type A variable, Reference 5 lists it as a Type E variable that meets the recommendations of Regulatory Guide 1.97.
2. Neutron flux--in Reference 5, the applicant states that this instrumentation is Category 1 and meets the range recommendations of Regulatory Guide 1.97.
3. Coolant level in reactor--in Reference 5, the applicant states that this instrumentation is Category 1 and meets the range recommendation of Regulatory Guide 1.97.
4. Radioactivity concentration or radiation level in circulating primary coolant--In FSAR Table 7.5-4, note 4, the applicant states that gross failed fuel detectors are located in the

letdown line. This is used to provide indication of fuel failure during normal operations, however, the letdown line is isolated for serious accidents requiring containment isolation. For post-accident monitoring, the applicant uses the post-accident sampling system, which is being reviewed by the NRC as part of their review of NUREG-0737, Item II.8-3, to monitor this variable.

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

5. Pressurizer heater status--In Reference 5, the applicant states that the range of the instrumentation is 0-220 amperes. This is acceptable; however, the category of the instrumentation is not provided. The applicant should provide Category 2 instrumentation for this variable.
6. Quench tank temperature--In FSAR Table 7.5-4, note 8, as provided in Reference 5, the applicant states that the range of this instrument is 50 to 400°F. Regulatory Guide 1.97 recommends a range of 50 to 750°F for this variable. The licensee states that the design temperature of the tank is 340°F and the design pressure is 100 psig.

The range covers the anticipated requirements for normal operation, anticipated operational occurrences and accident conditions. The pressure relief limits the temperature of the tank contents to saturated conditions under 400°F. Thus, we find this deviation acceptable.

7. Emergency ventilation damper position--all information concerning this variable remains to be provided.

8. Status of standby power and other energy sources important to safety--Reference 5 states that this variable conforms to the guidance of Regulatory Guide 1.97.
9. Vent from steam generator safety relief valves or atmospheric dump valves--Reference 5 states that this variable conforms to the guidance of Regulatory Guide 1.97.
10. Radiation exposure meters--Regulatory Guide 1.97, Revision 3, deletes this variable. Since the applicant is addressing Revision 3 of the regulatory guide this variable is not applicable.
11. Airborne radiohalogens and particulates--Reference 5 states that this variable conforms to the guidance of Regulatory Guide 1.97.
12. Plant and environs radiation--Reference 5 states that this variable conforms to the guidance of Regulatory Guide 1.97.
13. Plant and environs radioactivity--Reference 5 states that this variable conforms to the guidance of Regulatory Guide 1.97.

The applicant provided the necessary information in Reference 5 for all of these variables except pressurizer heater status and emergency ventilation damper position. The applicant should provide the recommended instrumentation and the information for these two variables.

3.3.2 Radiation Monitoring Instrumentation

The applicant, in Reference 4, took exception to the design category (Category 2) recommended by Regulatory Guide 1.97 for two Type C and four Type E radiation monitoring instruments. In Reference 4, the applicant identified instrumentation that, except for environmental qualification, meets this recommendation. They are:

1. Radiation exposure rate (Type C)--this variable is excluded as a Type C in Regulatory Guide 1.97, Revision 3. Since the applicant is addressing Revision 3, this variable is not applicable.
2. Effluent radioactivity-noble gases (Type C)--Reference 5 states that this variable is monitored by the common plant vent instrumentation at this station. Therefore, it is acceptable.
3. Radiation exposure rate (Type E)--Regulatory Guide 1.97, Revision 3, recommends Category 3 instrumentation for this variable. The applicant has complied.
4. Condenser air removal system exhaust (Type E)--conformance for this variable remains to be provided.
5. Common plant vent (Type E)--Reference 5 states that the effluent gaseous monitor provided by the applicant for this variable conforms to the guidance of Regulatory Guide 1.97.
6. All other identified release points (Type E)--conformance for this variable remains to be provided..

The applicant resolved the environmental qualification exception for these variables in Reference 5, with the exception of condenser air removal system exhaust and gland steam exhaust. The applicant states that these two exceptions will be addressed later.

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 pressure instrumentation meets the recommendations of the regulatory guide.

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 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 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 Reference 4 for this variable. In Reference 5 the applicant states that containment heat removal for loss of coolant and main steam line break accidents is by the operation of the containment spray and decay heat removal systems. The applicant refers to Section 6.2.2 of the FSAR, which establishes that adequate heat removal is provided without reliance on the containment fan heat removal system.

The design at Nuclear Project No. 1 does not include the containment fan heat removal system in their accident analysis. Thus, this variable is not applicable at this station.

3.3.6 Makeup Flow-In

Regulatory Guide 1.97 recommends Category 2 instrumentation for this variable. As such, it should be environmentally qualified. The applicant's instrumentation is not environmentally qualified. The applicant justifies this deviation, stating that this variable is not required for the mitigation of an accident, and during design basis events the make-up system is isolated.

As this variable is not utilized in conjunction with a safety system, we find that the instrumentation provided is acceptable.

3.3.7 Letdown Flow-Out

Regulatory Guide 1.97 recommends Category 2 instrumentation for this variable. As such, it should be environmentally qualified. The applicant has provided instrumentation that is not environmentally qualified. The applicant justifies this deviation, in Reference 5, by stating that this variable is not required for the mitigation of an accident, and that during design basis events, the letdown line is isolated.

As this variable is not utilized in conjunction with a safety system, we find that the instrumentation provided is acceptable.

3.3.8 Volume Control Tank Level

Regulatory Guide 1.97 recommends Category 2 instrumentation with a range from the top to the bottom of this tank. As such, it should be environmentally qualified. 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 by the applicant. This range does not cover the hemispherical tank ends where the volume to level ratio is not linear. Where this ratio is linear, it is monitored. 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 in Reference 5, by stating that this variable is not required for the mitigation of an accident, and that during design basis events the tank outlet is isolated.

As this variable is not utilized in conjunction with a safety system we find that the instrumentation provided is acceptable.

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.

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. Portable instrumentation supplements this fixed location instrumentation. The applicant's justification for this deviation is that should the radiation levels reach or exceed the upper limit of the range, personnel would be denied access to those areas except for life saving.

From a radiological standpoint, if the radiation levels reach or exceed the upper limit of the range, personnel would not be permitted into the areas without portable monitoring, except for life saving. Based on the supplemental portable instrumentation used by the applicant for this variable, we find the proposed range for the radiation exposure rate monitors acceptable.

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 should provide the recommended instrumentation for the variables pressurizer heater status, and emergency ventilation damper position (Section 3.3.1).
2. Radiation monitoring instrumentation--environmental qualification should be addressed in accordance with 10 CFR 50.49 for the variables condenser air removal system exhaust and gland steam exhaust (Section 3.3.2).

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, 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. Bouchey to Director of Nuclear Reactor Regulation, NRC, "Nuclear Project No. 1, Response to NUREG-0737, Supplement No. 1," April 15, 1983, G01-83-0149.
5. Washington Public Power Supply System letter, G. C. Sorensen to Director of Nuclear Reactor Regulation, NRC, "Nuclear Project No. 1, Response to Requests for information Regarding Regulatory Guide 1.97," February 6, 1986, G01-86-0035.
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, NRC, Office of Nuclear Regulatory Research, May 1983.

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