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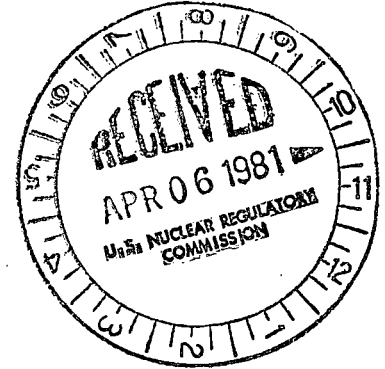
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April 2, 1981

Director of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. F. J. Miraglia, Chief
Licensing Branch 3
Division of Licensing



Gentlemen:

COMPLIANCE WITH REGULATORY GUIDE 1.97
NO. 2 UNIT
SALEM NUCLEAR GENERATING STATION
DOCKET NO. 50-311

Public Service Electric and Gas hereby submits, in the enclosure to this letter, its initial evaluation of Salem 2 to determine the degree of compliance with Regulatory Guide 1.97, along with a schedule for bringing the unit into compliance.

Should you have any questions, do not hesitate to contact us.

Very truly yours,

Enclosure

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SALEM NUCLEAR GENERATING STATION
UNIT #2
COMPLIANCE WITH USNRC REGULATORY GUIDE 1.97

"INSTRUMENTATION FOR LIGHT WATER-COOLED NUCLEAR POWER PLANTS TO ASSESS PLANT AND ENVIRONS CONDITIONS DURING AND FOLLOWING AN ACCIDENT"

INTRODUCTION

PSE&G has completed an initial evaluation of the Salem Unit #2 instrumentation systems to determine its degree of compliance with Reg. Guide 1.97. Since the Salem design bases for instrument systems were developed and approved by the NRC significantly prior to the issuance of this guide, the evaluation was based on compliance with the overall intent of the guide.

Demonstration of compliance with the intent of the Reg. Guide required that any specific differences between the Salem design bases and those of the Reg. Guide be identified. The identification of these differences are specified in Section I.

The key elements of the overall evaluation can be summarized as follows:

- o Compliance of existing systems and instrumentation is based upon meeting the intent of the Reg. Guide.
- o Compliance of new equipment is based upon application of the Reg. Guide to the extent that existing design can accommodate the change without compromising the existing system.
- o Previous commitments to modify existing equipment or to add new equipment were considered (e.g. NUREG-0588 and NUREG-0737) in the context of those commitments which pre-date Reg. Guide 1.97.

The results of this evaluation have been classified into five basic types of "compliance levels". These compliance levels have been selected to illustrate the resolution actions planned for the equipment to demonstrate the overall plant compliance with Reg. Guide 1.97. This information is included in Sections II and III.

I. Identification of Design Basis Differences From Reg. Guide 1.97.

To establish a baseline set of criteria for this evaluation, the Reg. Guide 1.97 recommendations have been reviewed for similarity to the Salem plant design bases. In those instances where the Salem bases agree with the Reg. Guide 1.97, no differences are listed below. For those cases which involve differences, a comparison is provided below to demonstrate that the intent of the guide is adequately achieved.

1. The Salem plant design bases were effectively established prior to issuance of the Regulatory Guides referenced in Reg. Guide 1.97. Although the Salem plant conforms to the intent of the Regulatory Guides, as stated in the Salem FSAR, strict compliance has not been required. In many cases, the Guides have been revised to incorporate subsequent revisions of referenced standards; and in some cases, the Guides are not applicable to the previously approved design (e.g., Reg. Guide 1.75).

For the purpose of compliance with Reg. Guide 1.97, the Salem design will conform with the intent of the referenced Guides and Standards to the same extent as specified in previous responses to the NRC on the subject documents.

2. Reg. Guide 1.89 - "Qualification of Class IE Equipment for Nuclear Power Plant". The Salem plant review basis is NUREG-0588, Category II for existing instrumentation and NUREG-0588, Category I (i.e., IEEE 323-74) for new equipment. Evaluations for equipment in harsh environments have been completed. Evaluations for noncontrolled benign environments will be completed per NRC established schedules.

Recorders, indicators, and other instrumentation located in controlled benign environments such as the control room, have been considered as meeting

the intent of Reg. Guide 1.97, pending the completion of the NUREG 0588 benign environment review.

3. Reg. Guide 1.100 - "Seismic Qualification of Electric Equipment for Nuclear Power Plants". The Salem plant review basis is IEEE 344-71, for existing equipment and IEEE 344-74, for new equipment.
4. Reg. Guide 1.75- "Physical Independence of Electric Systems". The Salem plant electric systems do not conform to the recommendations in Reg. Guide 1.75, since this was not an original design criterion. New equipment will be integrated into our existing separation provisions. The Salem separation criteria has been approved by the NRC staff as described in Safety Evaluation Report, Supplement No. 4, Section 8.4.5.
5. Reg. Guide 1.32- "Criteria for Safety-Related Electric Power Systems for Nuclear Power Plants. The Salem plant review basis is IEEE 308-71, "Class IE Electric Systems for Nuclear Power Generating Stations".
6. Quality Assurance: Regulatory Guides
 - a. Reg. Guide 1.28, "Quality Assurance Program Requirements (Design and Construction)" Revision 2, dated February, 1979. The Salem plant review basis is Safety Guide 28, which endorses ANSI 45.2.1 of 1971.
 - b. Reg. Guide 1.38, Revision 2, dated May, 1977, "Quality Assurance Requirements for Packaging, Shipping, Receiving, Storage, and Handling of Items for Water-Cooled Nuclear Power Plants". The Salem plant review basis is Reg. Guide 1.38, Revision 1, dated October, 1976.
 - c. Reg. Guide 1.64, dated June, 1976, "Quality Assurance Requirements for the Design of Nuclear Power Plants". The Salem plant review basis is Reg. Guide 1.64, Revision 0, dated October, 1973.

- d. Reg. Guide 1.123, dated July 7, 1977, "Quality Assurance Requirements for Control of Procurement of Items and Services for Nuclear Power Plants". The Salem plant review basis is ANSI 45.2.13, of 1976.
 - e. Reg. Guide 1.144, Revision 1, dated September, 1980 "Auditing of Quality Assurance Programs for Nuclear Power Plants". The Salem plant review basis is ANSI 45.2.12, Draft 4, Revision 2.
 - f. Reg. Guide 1.146, dated August 1980, "Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants". The Salem plant review basis does not include a commitment to Reg. Guide 1.146.
7. Unique Identification: The instruments are not specifically identified on the control panels as those intended for use under accident conditions. The instrumentation on the control panels in the Salem Control Room is presently grouped on a functional basis. Additional markings could add confusion to a control panel layout that was favorably reviewed during the NRC "Human Factors Review of the Salem No. 2 Unit Control Room" in March of 1980.
8. Reg. Guide 1.118- "Periodic Testing of Electric Power and Protection Systems". The Regulatory Guide invokes the requirements of IEEE 338-1975, which is applicable to protection systems. The display information provided for Reg. Guide 1.97, is not considered to be part of the protection system and does not require all of the testing specified in IEEE-338. The plant equipment being used for compliance with Reg. Guide 1.97 has been designed to incorporate testing capabilities as discussed in the Salem FSAR, Chapter 7.2. Testing frequencies will be in accordance with the applicable Technical Specifications.

9. TYPE "A" VARIABLES (PLANT SPECIFIC)

The definition of Type "A" Variables given by Reg. Guide 1.97, Paragraph 1.1 is:

"Those variables to be monitored that provide the primary information required to permit the control room operators to take the specified manually controlled actions for which no automatic control is provided and that are required for safety systems to accomplish their safety functions for design basis events."

The Salem Emergency Operating Procedures were reviewed to determine which Reg. Guide 1.97, Type "A" parameters are required using the following baseline interpretation of Reg. Guide 1.97, Paragraph 1.1 .

The operating procedures specify certain operator verification of automatic actions, and if the automatic actions have not been performed (presumably due to system failure), the operator is required to manually perform those actions. The parameter selection does not include either the verification step or the manual backup action. The parameter selection includes those required for operator actions needed for system functioning where no automatic signal/system exists.

Where important, the manual Type "A" operator actions must be monitored to assure that the action has been performed. This monitoring of Type "A" operation is performed by "Type B" Variables as defined by Reg. Guide 1.97.

In reviewing the Emergency Operating Procedures, the event "end point" for parameter selection is a stable hot condition for all events except LOCA's (large or small) that cannot be isolated. The end point for LOCA's that cannot be isolated is a cold depressurized condition.

See Table I.1 for an index of Class "A" Variables.

II. REG. GUIDE 1.97 COMPLIANCE LEVELS

The evaluation revealed varying degrees of compliance with Reg. Guide 1.97 which were classified into five "compliance levels". These classifications evolved from consideration of the design bases, existing NRC commitments and specific new changes, where possible, to meet the Reg. Guide. The overall results of this effort are summarized in Table II.1.

The description of each "compliance level" is provided below:

1. Items in Compliance

The items categorized under this heading meet the PSE&G bases as outlined in Section I.

2. Items Where Design Precludes Compliance

The items categorized under this heading are presently installed, but by nature of the present design, may not meet the recommendations in the Guide such as environmental and seismic qualifications. These items are generic to Westinghouse plants.

3. Items Which Are Being Replaced/Added

The items categorized under this heading deviate from one or more recommendations in the Guide. These items will be replaced with devices modified to meet the appropriate recommendations. Replacement/Installation/Modification for each item will be made to:

- a. Meet requirements imposed by other documents such as NUREG-0588 and NUREG-0737.
- b. Meet the recommendations of Regulatory Guide 1.97.

4. Items Which Are Not Being Replaced

The items categorized under this heading are presently installed, but deviate from one or more recommendations of the Guide.

This is based on:

- a. Devices located in non-harsh environment, that require qualification review in accordance with NUREG-0588 for benign environments which will be completed by June 30, 1982.
- b. Devices located in a harsh environment that are not utilized in accident emergency instructions for operators to maintain plant safety.
- c. Devices currently meeting Tech. Spec. requirements but the specified ranges do not meet the recommendations in Reg. Guide 1.97.

5. Items Not Part of Salem Design

The items categorized under this heading are not part of the Salem design and are not being installed. Alternate capabilities are available which meet or will meet our requirements and provide adequate information for maintenance of plant safety.

III. PLANNED ACTIONS

Compliance Level 1

No action planned. The instrumentation in this compliance level meets the intent of Reg. Guide 1.97 in accordance with the criteria specified in Section I.

Compliance Level 2

No equipment replacement planned at this time pending resolution of generic problems.

Compliance Level 3a

Instruments are being replaced or upgraded as a result of prior commitments related to NUREG-0588 and NUREG 0737. These devices will comply with Reg. Guide 1.97 in accordance with the criteria specified in Section I by the dates specified in previous correspondence to the NRC staff.

Compliance Level 3b

Instruments will be upgraded to meet Reg. Guide 1.97 in accordance with the criteria specified in Section I by 6/1/83.

Compliance Level 4a

The equipment will be evaluated in accordance with the requirements of the NUREG-0588 benign environment review, and appropriate actions will be taken where required.

Compliance Level 4b

No action planned. The importance of the device is deemed to be relatively low or insignificant.

Compliance Level 4c

The existing devices comply with Tech. Spec. requirements and should not be modified.

Compliance Level 5

No action planned. Other provisions exist which negate the need for the instrumentation.

All items currently planned to remain unchanged have been evaluated for potential effects on plant safety. This evaluation concludes that plant safety is not affected by the lack of compliance to Reg. Guide 1.97.

TABLE I.1

INDEX TYPE "A" VARIABLES

<u>Variable Description</u>	<u>Variable Reference No.</u>
Reactor Coolant System Hot Leg Water Temperature	5
Reactor Coolant Pressure	6
Degrees of Subcooling	9
Containment Pressure	11
Effluent Radioactivity Noble Gas Effluent from Condenser Air Removal System Exhaust	16
Refueling Water Storage Tank Level	27
Pressurizer Level	30
Steam Generator Pressure	36
Auxiliary Feedwater Flow	39
Auxiliary Feedwater Storage Tank Level (Condensate Storage Tank)	40
Steam Generator Radiation	73

Table II.1

Summary of Instrumentation Compliance with
Reg. Guide 1.97.

<u>Variable Ref. No.</u>	<u>Variable Description</u>	<u>Compliance Level</u>
1	Neutron Flux (Source Range, Intermediate range, Power range) - Monitors	2
2	Control Rod Position	1
3	RCS Soluble Boron Concentration	1
4	RCS Cold Leg Water Temperature - RTD's - Indication	3a 3b
5	RCS Hot Leg Water Temperature - RTD's - Indication	3a 3b
6	RCS Pressure - Transmitters	3a
7	Core Exit Temperature - Thermocouples	2
8	Coolant Level in Reactor	1
9	Degrees of Subcooling - Display (inputs - See variable Ref. No. 6&7)	1
10	Containment Sump Water Level - Transmitters	3a
11	Containment Pressure (narrow and wide range) - Transmitters	3a
12	Containment Isolation Valve Position (excluding check valves) - Limit Switches	3a
13	Radioactivity Concentration or Radiation Level in Circulating Primary Coolant	5

Table II.1 (Cont'd)

<u>Variable Ref. No.</u>	<u>Variable Description</u>	<u>Compliance Level</u>
14	Analysis of Primary Coolant (Gamma Spectrum)	5
15	Containment Area Radiation - Monitors	3a
16	Effluent Radioactivity - Noble Gas Effluent from Condenser Air Removal System Exhaust - Monitors	3a
17	Containment Hydrogen Concentration - Analyzers	3a
18	Containment Effluent Radioactivity Nobles Gases from Identified Release Points - Monitors	3b
19	Radiation Exposure Rate (Electrical Penetration Area) - Monitor	3b
19A	Radiation Exposure Rate (Fuel Handling Building & Penetration Area) - Monitors	4a
20	RHR System Flow - Transmitters	3a
21	RHR Heat Exchanger Outlet Temperature - Thermocouples	4b
22	Accumulator Tank Level and Pressure - - Transmitters - Transmitter Range	3b 4c
23	Accumulator Isolation Valve Position	1
24	Boric Acid Charging Flow - Transmitters	3a
25	Flow in HPI System - Transmitters	3a
26	Flow in LPI System - Transmitters	3a

Table II.1 (Cont'd)

<u>Variable Ref. No.</u>	<u>Variable Description</u>	<u>Compliance Level</u>
27	Refueling Water Storage Tank Level and Low Level Alarm - Transmitters - Transmitter Range	3a 4c
28	Reactor Coolant Pump Status	1
29	Primary System Safety Relief Valve Positions (including PORV and code valves) or Flow through or Pressure in Relief Valve Lines	1
30	Pressurizer Level - Transmitters - Transmitter Range	3a 4c
31	Pressurizer Heater Status (Current) - Heaters	2
32	Quench Tank Level (Pressurizer Relief Tank) - Transmitter Range	4c
33	Quench Tank Temperature (Pressurizer Relief Tank) - Transmitter Range	3b
34	Quench Tank Pressure (Pressurizer Relief Tank) -	1
35	Steam Generator Level - Transmitters	3a
36	Steam Generator Pressure - Transmitters	3a
37	Safety/Relief Valve Positions or Main Steam Flow - Transmitters	3a
38	Main Feedwater Flow	1
39	Auxiliary Feedwater Flow - Transmitters	3a

Table II.1 (Cont'd)

<u>Variable Ref. No.</u>	<u>Variable Description</u>	<u>Compliance Level</u>
40	Condensate Storage Tank Water Level (Auxiliary Feedwater Storage Tank) - Transmitters	3a
41	Containment Spray Flow	5
41A	Containment Spray Flow Additive Rate - Transmitters	3a
42	Heat Removal by the Containment Fan Heat Removal System - Transmitters	3a
43	Containment Atmosphere Temperature	4b
44	Containment Sump Water Temperature	5
45	CVCS Makeup Flow-in - Transmitters	3a
46	Letdown Flow - Transmitters	3b
47	Volume Control Tank Level - Transmitters	4a
48	Component Cooling Water Temperature to ESF System - Transmitters	4a
49	Component Cooling Water Flow to ESF System - Transmitters	4a
50	High-Level Radioactive Liquid Tank Level - Indication	3b
51	Radioactive Gas Holdup Tank Pressure- Indication	3b
52	Emergency Ventilation Damper Position - Control Room Damper Limit Switches	4a
52A	Emergency Ventilation Damper Position - Auxiliary Bldg. Damper Limit Switches	4a

Table II.1 (Cont'd)

<u>Variable Ref. No.</u>	<u>Variable Description</u>	<u>Compliance Level</u>
52B	Emergency Ventilation Damper Position - Fuel Handling Bldg.	4a
53	Status of Standby Power	1
53A	Status of Control Air	5
54	Containment OR Purge Effluent	N/A
55	Reactor Shield Building Annulus Effluent	N/A
56	Auxiliary Building Effluent	N/A
57	Condenser Air Removal System Exhaust	N/A
58	Common Plant Vent or Multi-Purpose Vent Discharging any of above releases - Monitor	3a
59	Vent from Steam Generator Safety Relief Valves or Atmospheric Dump Valves - Monitors	3a
60A	All other identified Release Points (Decontamination Bldg.) - Monitor	3b
60B	All other identified Release Points (Auxiliary Feed Pump Turbine Exhaust) - Monitor	3a
61	All Identified Plant Release Points - Monitor (Particulates and Halogens	3a
62	Radiation Exposure Meters	5
63	Airborne radiohalogens and particulates (portable sampling with onsite analysis capability) -	1

Table II.1 (Cont'd)

<u>Variable Ref. No.</u>	<u>Variable Description</u>	<u>Compliance Level</u>
64	Plant and Environs Raidation - Instrument Range	4c
65	Plant and Environs Radioactivity	1
66	Wind Direction	1
67	Wind Speed	1
68	Estimation of Atmospheric Stability	1
69	Primary Coolant (Grab sample)	1
70	Containment Air (Grab sample)	1
71	Containment Sump (Grab sample)	1
72	Effluent Radioactivity - Noble Gases - Monitor	3a
73	Steam Generator Blow-down Radiation - Monitor	3a