

SACRAMENTO MUNICIPAL UTILITY DISTRICT P. O. Box 15830, Sacramento CA 95852-1830, (916) 452-3211 AN ELECTRIC SYSTEM SERVING THE HEART OF CALIFORNIA

MAR 3 1 1988 GCA 88-106

U. S. Nuclear Regulatory Commission Attn: Frank J. Miraglia, Jr. Associate Director for Projects 11555 Rockville Pike Rockville, MD 20852

Docket No. 50-312 Rancho Seco Nuclear Generating Station License No. DPR-54 REGULATORY GUIDE 1.97 POSITION. REVISION 6

Dear Mr. Miraglia:

In response to Generic Letter 82-33, the District submitted by letters dated July 13 and September 14, 1984; October 31, 1985; and March 30 and December 23, 1987, its response to Regulatory Guide 1.97. As part of the District's Expanded Augmented System Review and Test Program (EASRTP), a review of the District's Regulatory Guide 1.97 position revealed several areas requiring clarification with regard to the display of Category 1 variables on the SPDS. Additional detail and changes to the report are provided as Attachment I to clarify the District's position.

Clarification for the physical separation for Category 1 variables was deemed necessary based on our review of the NRC's Safety Evaluation Report on Rancho Seco Restart NUREG-1286, the District's submittal of Engineering Report ERPT-E0220 "Report on Conformance of Nuclear Service Electrical Building (NSEB) and DG Building Electrical Installation to Regulatory Guide 1.75" that is referenced in NUREG-1286, and the Rancho Seco Appendix R Fire Protection Program (see Attachment I).

Recent changes to the Post Accident Sampling System (PASS) which were submitted to the NRC on May 4, 1987, have affected the range of some of the PASS analyses. These changes deviate from the ranges recommended in Regulatory Guide 1.97, Revision 3, but were found to be acceptable by the NRC for meeting the requirements of Item II.B.3 of NUREG-0737. These changes are incorporated in this Regulatory Guide 1.97 Position revision based on the NRC staff acceptance documented in NUREG-1286.

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Frank J. Miraglia, Jr.

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In addition to the items discussed above, some miscellaneous changes have been incorporated to correct instrument tag numbers and to delete the implementation schedule which is provided by seperate correspondence.

Attachment I describes the changes that have been made by Revision 6 to the Rancho Seco Generating Station Unit No. 1, Regulatory Guide 1.97 Position.

Attachment II contains replacement pages for incorporating Revision 6 into the Rancho Seco Generating Station Unit No. 1, Regulatory Guide 1.97 Position.

Please contact me if you have any questions. Members of your staff with questions requiring additional information or clarification may contact Mr. Jerry Delezenski at (209) 333-2935 extension 4914.

Sincerely,

Paul and open

G. Carl Andognini Chief Executive Officer, Nuclear

Attachments

cc: G. Kalman, NRC, Rockville A. D'Angelo, NRC, Rancho Seco J. B. Martin, NRC, Walnut Creek

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## REGULATORY GUIDE 1.97 POSITION CUMMARY OF REVISION 6 CHANGES

## Page 10, Paragraph III.A.8.

Old:

7. K.

The Category 1 variables will be displayed in the SPDS in the Control Room and will be uniquely identified.

Changed to:

The SPDS CRTs provide the primary display of Category 1 variables for use under accident conditions.

Reason for change:

Reg. Guide 1.97 requires instruments designated as Category 1 to be specifically identified so that the operator can easily tell that they are intended for use under accident conditions. This identification has been accomplished at Rancho Seco by displaying these variables on the SPDS CRTs which are intended for use under accident conditions. No additional identification of Category 1 variables has been provided within the SPDS displays.

Page 18, Section IV. Variable No. 19, under SMUD Tag Nos.

01d:

See Table 5.2-2 in USAR

Changed to:

See Tech Spec Table 3.6-1

Added footnote to SMUD Cat. and Computer Display:

\*\* See Note 19

Reason for Change:

EASRTP review of the District's Reg. Guide 1.97 Position revealed the necessity for clarifying the position with regard to Variable No. 19. The reference to USAR Table 5.2-2 is not an accurate reference to the list of containment isolation valves displayed on the SPDS. The list of Category 1 variables on the SPDS was contained in the

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District's November 20, 1986, response to NRC request for information. The containment isolation valves in this list are based on Technical Specification Table 3.6-1 which lists the containment isolation valves that must be operable to assure containment integrity during startup and operation. Only the automatically (SFAS) actuated valves in Table 3.6-1 were determined to fall within the definition of Type B variables in Reg. Guide 1.97.

The manually initiated containment isolation valves listed in Technical Specification Table 3.6-1 fall within the definition of Type D variables and are displayed in the Control Room via Class 1 back-lit push-buttons or other Class 1 displays.

Steam generator isolation valves are not included since the steam generators and secondary system piping are extensions of the containment liner. Integrated containment leakage testing verifies the integrary of the secondary side of the steam generators. Steam generator isolation valves do not receive SFAS closure signals and therefore, fall within the definition of Type D or E variables. Valve position is indicated in the Control Room via Class 2 back-lit pushbuttons.

#### Page 32, Note 19

#### Added:

Valve positions for automatically (SFAS) actuated containment isolation valves listed in Technical Specification Table 3.6-1 are displayed on the Class 1 SPDS in the Control Room. The SPDS displays also contain an alert for failure of safety features containment isolation valves to respond to the SFAS command.

Reason for Change:

See Variable No. 19 above.

Additional information is provided with regard to the alert feature in SPDS for the SFAS actuated containment isolation valves.

#### Pages 6 & 6a,

Added heading before sub-paragraph III.A.2.a.1.i.:

a) Rancho Seco Appendix R Program Safe Shutdown Circuits meet the following separation criteria except where specific exemptions have been granted by the NRC in letters dated May 19, 1986 and November 6, 1987.

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# Added sub-Paragraph III.A.2.a.1.b):

- b) Non-Appendix R Circuits
  - i. For the Category 1 circuits in the NSEB that are not required for Appendix R safe shutdown capability, separation of cables and equipment comply with the criteria contained in Engineering Report ERPT-E0220 "Report on Conformance of NSEB and DG Building Electrical Installation to Regulatory Guide 1.75." This report was reviewed and accepted in NUREG-1286, the NRC Staff Safety Evaluation Report relating to restart of Rancho Seco, issued October 1987.
  - ii. For the Category 1 circuits in the Auxiliary Building that are not required for Appendix R safe shutdown capability, the separation of cables and equipment comply with the original plant criteria contained in USAR Section 8.2.2.11.

Deleted from the end of paragraph III.A.2.a.2:

"--- or one of the criteria identified above:"

Deleted sub-paragraphs i and ii under paragraph III.A.2.a.2.

Replaced with sub-paragraph III.A.2.a.2.a):

a) Rancho Seco Appendix R Program Safe Shutdown Circuits inside the Containment meet the separation criteria as stated in the exemptions granted by the NRC in a letter dated November 6, 1987.

Added sub-Paragraph III.A.2.a.2.b):

- b) Non-Appendix R Circuits
  - i. For the Category 1 circuits in the Containment that are not required for Appendix R safe shutdown capability, the separation of cables and equipment comply with the original plant criteria contained in USAR Section 8.2.2.11.

Reason for Change:

The separation criteria originally provided for the NSEB, Auxiliary Building, and Containment are separation requirements for the Rancho Seco Appendix R program. This criteria applies to the safe shutdown circuits required for Appendix R that are also used to provide Reg. Guide 1.97 Category 1 information. At the time that the Reg. Guide 1.97 position was developed, all the Category 1 variables were thought to fall into the Appendix R safe shutdown list. Evolution of both programs has resulted in a list of

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variable that is different for each program. Not all of the Category 1 variables are also Appendix R circuits; therefore, non-Appendix R circuits were not evaluated to the Rancho Seco Appendix R separation criteria.

In the NSEB, the non-Appendix R, Category 1 variables meet the separation requirements stated in ERPT-E0220, "Report on Conformance of NSEB and DG Building Electrical Installation to Regulatory Guide 1.75." submitted June 26, 1987 and revised December 8, 1987 and February 22, 1988. The initial report was evaluated and accepted in the NRC Safety Evaluation Report relating to restart of Rancho Seco (NUREG-1286 issued October 1987).

In the Auxiliary Building (excluding the Computer/Control Room) and the Containment, all Class 1 circuits conform to the original plant separation criteria stated in USAR Section 8.2.2.11. Credit was taken for existing Class 1 instrumentation since Generic Letter 82-33 (Supplement 1 to NUREG-0737) allows the use of installed instrumentation to satisfy Reg. Guide 1.97 requirements. Therefore, non-Appendix R Category 1 circuits in these buildings were not reviewed against Appendix R separation criteria but do meet the original plant separation criteria stated in USAR Section 8.2.2.11.

In addition, various exemptions from Appendix R requirements have been granted since the development of the District's Reg. Guide 1.97 position. These exemptions are documented in letters from the NRC dated May 19, 1986 and November 6, 1987. Some of these exemptions modify the separation criteria for Appendix R safe shutdown circuits in specific areas of the Auxiliary Building and Containment. A general reference to the granted exemptions for these buildings has been incorporated for clarity.

## Page 30, Variable 84 under SMUD Range

Old:

Comply See Note 84

Changed to:

See Note 84

Reason for Change:

The ranges of the PASS analyses deviate from the recommended ranges but have been accepted by the NRC in NUREG-1286. See note 84 below for additional discussion.

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### Fage 42, Note 84

Old:

While total dissolved gas content is measurable by the Post Accident Sampling System (PASS) no specific measurement of oxygen content is available on site. The reactor coolant PASS was designed per NUREG 0737, Section II.B.3 which does not require measurement of oxygen (accepted by the NRC in the letter dated 2/15/83, Stolz to Mattimoe). All other ranges meet or exceed those listed in Reg. Guide 1.97.

Add just before the last sentence:

The boron concentration upper limit is 3800 ppm by in-line analysis. Since the boron concentration under accident conditions is not expected to exceed 2000 ppm, the upper limit of 3800 ppm was accepted by the NRC (reference NUREG-1286 issued October 1987).

Reason for Change:

Update the District's Reg. Guide 1.97 position with respect to the PASS that is accepted by the NRC for compliance with Item II.B.3 of NUREG-0737.

Page 15, Variable 5 under SMUD Tag Nos.

Old:

PT-20544 A,B

Change to:

PT-20546 A.B

Page 23, Variable 50 under SMUD Tag Nos.

01d:

PT-20544 A,B

Change to:

PT-20546 A,B

Reason for Change:

Correct the instrument tag numbers for Steam Generator Pressure.

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# Pages 1, 43, and 44,

Change:

Deleted Section VI, "Detailed Implementation Schedule."

Reason for Change:

Update of the Reg. Guide 1.97 Implementation Status was provided by separate correspondence dated March 30, 1987. Future updates of the implementation of the remaining Reg. Guide 1.97 items will be submitted separately. Attachment II to GCA 88-106

Regulatory Guide 1.97 position Revision 6 Corrected pages only SACRAMENTO MUNICIPAL UTILITY DISTRICT RANCHO SECO GENERATING STATION UNIT NO. 1 REGULATORY GUIDE 1.97 POSITION REVISION 6 (CORRECTED PAGES ONLY) MARCH 1988

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#### 2. Redundancy

### a. Separation

Physical separation is provided as described below. Figure 1 is a block diagram illustrating the major physical components and circuits of the SPDS which the District proposes for Category 1 variable display. The system is considered to consist of three separate portions for evaluation of separation:

NSEB and Auxiliary Building (excluding the Computer/Control Room)
The Containment

- The Computer/Control Room
- 1. NSEB/Auxiliary Building

For the circuits in the Nuclear Service Electrical Building (NSEB) or Auxiliary Building (excluding the Computer/Control Room), separation shall comply with one of the following criteria:

- a) Rancho Seco Appendix R Program Safe Shutdown Circuits meet the following separation criteria except where specific exemptions have been granted by the NRC in letters dated May 19, 1986 and November 6, 1987.
  - Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 2-hour rating.
  - ii. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet; or
  - iii. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating.
- b) Non-Appendix R Circuits
  - i. For the Category 1 circuits in the NSEB that are not required for Appendix R safe shutdown capability, separation of cables and equipment comply with the criteria contained in Engineering Report ERPT-E0220 "Report on conformance of NSEB and DG Building Electrical Installation to Regulatory Guide 1.75." This report was reviewed and accepted in NUREG-1286, the NRC Staff Safety Evaluation Report relating to restart of Rancho Seco, issued October 1987.
  - ii. For the Category 1 circuits in the Auxiliary Building that are not required for Appendix R safe shutdown capability, the separation of cables and equipment comply with the original plant criteria contained in USAR Section 8.2.2.11.

2. Containment

Inside the containment, reparation will comply with one of the following criteria:

- a) Rancho Seco Appendix R Program Safe Shutdown Circuits inside the containment meet the separation criteria as stated in the exemptions granted by the NRC in a letter dated November 7, 1987.
- b) Non-Appendix R Circuits
  - i. For the Category 1 circuits in the Containment that are not required for Appendix R safe shutdown capability, the separation of cables and equipment comply with the original plant criteria contained in USAR Section 8.2.2.11.
- 3. Computer/Control Room

Reg. Guide 1.75 "Physical Independence of Electrical Systems" and IEEE standard 384-1974 "Separation of Class IE Equipment and Circuits" identify the criteria for review of Class IE circuits for "exposure to potential hazards such as high pressure piping, missiles, flammable material, flooding, and wiring that is not flame retardant".

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7. Range

Where two or more instruments are needed to cover a particular range, overlapping of instrument span is provided. Where the required range of monitoring instrumentation results in a significant loss of sensitivity in the normal operating range, separate instruments are used.

8. Equipment Identification

The SPDS CRT's provide the primary display of Category 1 variables for use under accident conditions.

9. Interfaces

Qualified instrument channels are electrically isolated from non-qualified portions of the instrument loop up to and including the isolation device.

10. Servicing, Testing, and Calibration

Category 1 instrumentation is part of the planned maintenance program. Testing is performed on instrument strings on a regular basis. The testpoints for the instrument strings are under administrative control (technical specification, maintenance procedure, administrative procedure, or surveillance procedure) to prevent unannounced testing. The isolators for the instrument strings are accessible during and following a design basis event. Normal calibration of instrumentation located inside containment is on a refueling cycle basis.

11. Human Factors

The Control Room Design Review process will include a Human Factors Evaluation of Category 1 variables. Human factors analysis recommendations will be part of the CRDR submittal.

12. Direct Measurement

Except where noted, monitoring instrumentation inputs are from sensors that directly measure the desired variables.

Var. No.	Variable Per R.G. 1.97 Rev. 3	SMUD Tag Nos.	SMUD Cat.	Computer Display	NRC Range	SMUD Range	Comments
	TYPE A VARIABLES						
1	Hot Leg Water Temperature (Category 1)	TE-21030 TE-21033	1	SPDS IDADS	Plant Specific	120-920 <sup>0</sup> F	Living Schedule
2	RCS Pressure (Category 1)	PT-21050 PT-21051	1	SPDS IDADS	Plant Specific	0-3000 psig	
3	Containment Sump Water Level (Category 1)	LE-20509 A,B LE-20510 A,B	1	SPDS IDADS	Plant Specific	0 to 10'	
4	Steam Generator Level (Category 1)	LT-20507 A,B LT-20508 A,B	1	SPDS IDADS	Plant Specific	6-619"	Living Schedule
5	Steam Generator Pressure (Category 1)	PT-20546 A,B PT-20545 A,B	1	SPDS IDADS	Plant Specific	0-1200 psig	Living Schedule

Var. No.	Variable Per R.G. 1.97 Rev. 3	SMUD Tag Nos.	SMUD Cat.	Computer Display	NRC Range	SMUD Range	Comments
	TYPE & VARIABLES con	t'd					
16	RCS Pressure (Category 1)	PT-21050 PT-21051	1	SPDS IDADS	0-3000 psig	Comply	Same as Variable 2
17	Containment Sump Water Level (Category 2) Now (Category 1) Wide	LE-26112C,D LE-20509A,B LE-20510A,B	2 1	SPDS IDADS	Top to Bottom Plant Specific	Comply See Note 17	See Variable 3
18	Containment Pressure (Category 1)	PT-53621 PT-53622	1	SPDS IDADS	O-design Pressure (59 psig)	Comply	
19	Cont. Iso. Valve Pos (excl. Check Valves) (Category 1)	See Tech Spec Table 3.6-1	1 **	SPDS IDADS **	Closed/ Not Closed	Open/ Closed See Note 19	
20	Containment Pressure (Category 1)	PT-53621 PT-53622	1	SPDS IDADS	-5 psig to design pressure (59 psig)	Comply	Same as Variable 18

\*\* See Note 19

Var. No.	Variable Per R.G. 1.97 Rev. 3	SMUD Tag Nos.	SMUD Cat.	Computer Display	NRC Range	SMUD Range	Comments		
	TYPE D VARIABLES Cont'd.								
45	Pressurizer Heater Status (Category 2)	MCC S2A2 MCC S2B2	2	IDADS	Electric Current	Comply	Living Scheduele		
46	Quench Tank Level (Category 3)	LT-21905	3		Top to Bottom (0-23'5")	0-10 ft. Upper Half See Note 46			
47	Quench Tank Temperature (Category 3)	TE-21801	3		50° to 750°F	50°F to 600°F See Note 47	Living Schedule		
48	Quench Tank Pressure (Category 3)	PT-21920	3		0 to design pressure (235 psig)	0-200 psig See Note 48			
49	Steam Generator Level (Category 1)	LT-20507 A,B LT-20508 A,B	1	SPDS IDADS	From tube Sheet to Separaters	6-619 <sup>°</sup> See Note 49	Living Schedule Same as Variable 4		
50	Steam Generator Pressure (Category 2)	PT-20546 A,B PT-20545 A,B	1	SPDS IDADS	From ATM pressure to 20% above lowest safety valve settin	0-1200 psig See Note 50 ng	Living Schedule Same as Variable 5		
51	Safety Relief Valve Position (Category 2)	XE-20533 XE-20534 XE-20544 tc 20559 XE-20571 A.B.C XE-20562 A.B.S	N/A See Note 51	IDADS	Closed/ Not Closed	Open/Not Open See Note 51			

Var. No.	Variable Per R.G. 1.97 Rev. 3	SMUD Tag Nos.	SMUD Cat.	Computer Display	NRC Range	SMUD Range	Comments
	TYPE E VARIABLES Coa	t'd.					
84	Primary Coolant and Sump (Grab Sample) (Category 3)	PASS	3		10 <sup>-6</sup> -10Ci/m Isotopic Analysis B:0-6000 ppr C1:0-20 ppm H <sub>2</sub> :0-2000cc 0 <sub>2</sub> :0-20ppm; pH:1-13 pH	; See Note 84	See Variable 23
85	Containment Air (Grab Sample) (Category 3)	PASS	3		H <sub>2</sub> :0-10% 0 <sub>2</sub> :0-30% Isotropic Analysis	Comply See Note 85	See Variable 23

## Variable Explanation

15 The Rancho Secc Reactor Coolant System subcooling margin monitor was designed and installed per NUREG 0578, 2.1.3.b (accepted by the NRC in the letter dated 5/1/80, Reid to Mattimoe). The control room indication is a digital readout which has a range of 0 to 200°F of subcooling. Indication of superheat is not provided on the digital display because of potentia? confusion of superheat versus subcooled degrees by the operator. The emergency procedures which rely upon this variable only require indication of whether or not adequate subcooling margin is apparent.

Subcooling or superheat is also available graphically on the Safety Parameter Display System (SPDS) CRT based control room display.

17 The Narrow Range Reactor Building sump water level is monitored by a magnetic float with reed-switches and indicating lights in the control room for 1, 2, 3, 4, and 5 feet. These lights provide positive indication of rising water level in the sump, thus alerting the operator to an unusual condition.

The wide range RB sump water level uses a magnetic float with reed switches every 1/8 inch. These wide range indicators are Class 1 and were installed for NUREG 0737, Clarification II.F.1, Attachment 5 and are displayed on the SPDS and IDADS (accepted by the NRC in the letter dated 1/28/82, Stolz to Mattimoe).

19 The Rancho Seco Reactor Building (RB) Isolation System is presented in the USAR, Section 5.2.4. A listing of the valves involved in the RB isolation system is shown in Table 5.2-2 of the USAR. A schematic representation of the valve arrangements are shown in Figure 5.2-21 of the USAR.

The Rancho Seco RB isolation system described in the USAR, addresses 10CFR50 Appendix A, Criterion 54, 55, 56, and 57. Additionally, Reg. Guide 1.141, "Containment Isolation Provisions for Fluid Systems" and ANSI Standard N271-1976 provide guidance on various combinations and numbers of automated and manual valves. Reg. Guide 1.141, C-2, requires no indication on sealed closed manual and remote valves.

Valve positions for automatically (SFAS) actuated containment isolation valves listed in Technical Specification Table 3.6-1 are displayed on the Class 1 SPDS in the Control Room. The SPDS displays also contain an alert for failure of safety features containment isolation valves to respond to the SFAS command.

Reg. Guide 1.97 suggests a range of closed/not closed. Except for the sealed closed manual and remote valves, Rancho Seco has indication of valve position in the form of open/mid travel/closed, open/closed, open/not open, or closed/not closed. The indication in any presentation format satisfies the District's understanding of the Reg. Guide 1.97 position.

#### Variable Explanation

- 83 Atmospheric stability at Rancho Seco is derived from the differential temperature indicated between 33 and 200 feet. The -10 to +10°F temperature range covers the seven Pasquill stability classes versus Delta-T as derived from Proposed Revision 1 to Reg. Guide 1.23, Table 1. Expansion of the existing range would provide no additional useful information. In addition to temperature differential, atmospheric stability can also be calculated for all seven classes using wind direction sigma. Therefore, the differential temperature range is adequate.
- 84
- While total dissolved gas content is measurable by the Post Accident Sampling System (PASS) no specific measurement of oxygen content is available on site. The reactor coolant PASS was designed per NUREG 0737, Section II.B.3 which does not require measurement of oxygen (accepted by the NRC in the letter dated 2/15/83, Stolz to Mattimoe). The boron concentration upper limit is 3800 ppm by in-line analysis. Since the boron concentration under accident conditions is not expected to exceed 2000 ppm, the upper limit of 3800 ppm was accepted by the NRC (reference NUREG-1286 dated October 1987). All other ranges meet or exceed those listed in Reg. Guide 1.97.
- 85 The containment air Post Accident Sampling System (PASS) has full capability to measure hydrogen from 0 to 10 volume % and to do an isotopic analysis utilizing gamma spectroscopy. No on-site measurement of oxygen content in the containment atmosphere is provided. Oxygen analysis is not required because no action would be taken as a consequence of this measurement. All other ranges meet or exceed those listed in Reg. Guide 1.97. The reactor coolant PASS was designed per NUREG 0737, Section II.B.3 which does not require measurement of oxygen (accepted by the NRC in the letter dated 2/15/83, Stoltz to Mattimoe).

VI Detailed Implementation Schedule

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