

November 9, 1984

Docket No. 50-206
LS05-84-11-008

Mr. Kenneth P. Baskin, Vice President
Nuclear Engineering
Licensing and Safety Department
Southern California Edison Company
2244 Walnut Grove Avenue
Post Office Box 800
Rosemead, California 91770

Dear Mr. Baskin:

SUBJECT: ENVIRONMENTAL QUALIFICATION OF ELECTRICAL EQUIPMENT

Re: San Onofre Nuclear Generating Station, Unit No. 1

On October 2 through 4, 1984, members of the NRC staff and consultants from the Idaho National Engineering Laboratory conducted an audit of the electrical qualification files for San Onofre Unit No. 1. The results of the NRC staff audit are enclosed.

Subsequent to the above cited audit, a meeting was held between your representatives and members of the NRC staff to discuss your revised justification for continued operation (JCO) for electrical equipment that has not been demonstrated to be qualified as of this time. The results of this October 26, 1984 meeting indicate that these revised JCO's will be acceptable. Revised JCO's for all equipment were submitted by letter dated November 3, 1984.

The NRC staff encourages you to continue with your current equipment qualification effort. We are tentatively planning a re-audit of San Onofre Unit No. 1 prior to March 31, 1985. Your NRC project manager will contact you regarding appropriate dates for such an audit.

Sincerely,

Original signed by

John A. Zwolinski, Chief
Operating Reactors Branch #5
Division of Licensing

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Mr. Kenneth P. Baskin

- 2 -

November 9, 1984

cc

Charles R. Kocher, Assistant
General Counsel
James Beoletto, Esquire
Southern California Edison Company
Post Office Box 800
Rosemead, California 91770

David R. Pigott
Orrick, Herrington & Sutcliffe
600 Montgomery Street
San Francisco, California 94111

Dr. Lou Bernath
San Diego Gas & Electric Company
P. O. Box 1831
San Diego, California 92112

Resident Inspector/San Onofre NPS
c/o U.S. NRC
P. O. Box 4329
San Clemente, California 92672

Mayor
City of San Clemente
San Clemente, California 92672

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County of San Diego
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Energy Facilities Siting Division
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John B. Martin, Regional Administrator
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1450 Maria Lane
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Office of Nuclear Reactor Regulation
Results of Electrical Equipment Environmental
Qualification Audit of
Southern California Edison Company
San Onofre Nuclear Generating Station Unit 1
Docket Number 50-206

On October 2 through 4, 1984, members of the NRC staff and consultants from the Idaho National Engineering Laboratory (INEL) conducted an audit of the electrical equipment qualification files for San Onofre Nuclear Generating Station Unit 1. A list of participants and attendees of the initial and exit meetings is given in Appendix A. The purpose of the audit was to verify that the documentation contained in the files was adequate to demonstrate qualification of the electrical equipment within the scope of 10 CFR 50.49.

The audit consisted of a detailed review of 13 qualification files representing approximately 30% of the equipment items in the San Onofre Nuclear Generating Station Unit 1 equipment qualification program. The file documents were reviewed to determine conformance with the "DOR Guidelines", NUREG-0588, or 10 CFR 50.49 as appropriate. The items audited were:

1. Limitorque valve actuator SMB-00/Peerless motor
2. Limitorque valve actuator SMB-00/Reliance motor
3. ASCO solenoid valve NP 8320A184E
4. Paul Monroe rotary valve operator PD 89425
5. Foxboro level transmitter E 13 DH
6. Foxboro pressure transmitter E 11GH
7. Viking penetrations
8. Amphenol penetrations
9. Westinghouse chempump GPS-60L-46H-3T
10. GE Cable Vulkene and FP-EPR Neoprene
11. Teledyne Positioner 02112-0002-5210, 0003-5210
12. Target Rock solenoid valve 81A-004
13. "Various" Cable

Specific audit findings on these qualification files are supplied as Appendix B.

10 CFR 50.49(i) requires that replacement equipment must be qualified in accordance with the provisions of the rule, essentially the criteria specified in Category I of NUREG-0588, unless there are sound reasons to the contrary.

For all replacement equipment installed subsequent to February 22, 1983, the licensee must review the environmental qualification documentation to assure the equipment has been properly qualified.

During the audit the following observations were made concerning the San Onofre Nuclear Generating Station Unit 1 equipment qualification program.

It is evident that the equipment qualification program is incomplete. This is due to the age of the plant, which makes qualification efforts more difficult, as well as the inactivity which occurred from late 1982 to early 1984. As a result, no equipment files are considered complete.

Southern California Edison Company (SCE) anticipates completion of 10 equipment files before Unit 1 returns to service. The remaining equipment files (approximately 30) will require justification for continued operation (JCO) prior to plant return to service.

The existing JCOs, in general, do not adequately comply with the provisions of 10 CFR 50.49(i). Revised JCOs which address these provisions must be submitted with sufficient time allowed for staff review before Unit 1 return to service.

SCE has requested an extension to November 30, 1985 for 3 qualification files, which affect a total of 15 equipment items. Additionally, SCE expects to request extensions for 8 additional qualification files which will affect approximately 40 equipment items.

A plant inspection revealed that several safety related solenoid valves were not maintained properly. One solenoid coil cover was not installed correctly, and the other solenoid valve was loosely mounted on its associated valve operator. Proper maintenance of safety related equipment is necessary to insure qualification. It is recommended that maintenance of safety related equipment be strengthened, and that a positive physical identification method be employed to highlight safety related equipment.

The review of the qualification files revealed two major equipment specific concerns. The Viking penetrations are not qualifiable and are scheduled for replacement. The JCO for these 27 penetration assemblies is inadequate. This JCO must be strengthened to reflect the criteria found in 10 CFR 50.49(i). The qualification file that addresses the various cable, some of which is unidentified and used inside and outside containment, states that the cables are not qualified. The JCO furnished is inadequate and must be revised.

SCE furnished examples of complete equipment files as developed for Units 2 and 3, and stated that the Unit 1 files would be done in a similar manner. These examples were adequate.

Based on the results of the audit, the staff concludes that the licensee has not demonstrated compliance with 10 CFR 50.49. The staff recommends that the licensee initiate immediate efforts to revise the applicable JCOs to meet the criteria of 10 CFR 50.49(i), continue the effort to develop complete qualification files, and upgrade the maintenance of safety related equipment. Further, the staff recommends a reaudit prior to March 31, 1985, to insure that the concerns mentioned have been addressed.

Appendix A
San Onofre Nuclear Generating Station, Unit 1 Audit Participants
October 2, 3, 4 1984

<u>Name</u>	<u>Affiliation</u>
R. Vollmer	NRC/NRR/DE
V. Noonan	NRC/NRR/DE
W. Paulson	NRC/NRR/DL
U. Potapovs	NRC/I&E/HEADQUARTERS
P. Shemanski	NRC/NRR/DE
J. Burdoin	NRC/Region V
R. Borgen	INEL
M. Yost	INEL
B. Carlisle	SCE
J. Rainsberry	SCE
F. Badwan	SCE
A. Llorens	SCE
R. Krieger	SCE
M. Short	SCE
M. Speer	SCE
V. Salvatore	SCE
D. Cox	SCE
D. Pilmer	SCE
A. Brough	SCE
R. Erickson	SCE
J. Haar	IMPELL
L. Eytel	IMPELL
V. Franceschi	IMPELL

APPENDIX B

Specific Audit Findings

San Onofre Nuclear Generating Station Unit 1

1. Limitorque motor actuators model SMB-00-Peerless motor

Plant ID Number MOV 866A, MOV 866B

These valve motor actuators, used on the recirculation pump discharge valves, are located in containment. They are opened by operator action upon initiation of the recirculation phase following a LOCA.

SCE has indicated that these valve actuators will be replaced with fully qualified operators by November 30, 1985. They have supplied a JCO which utilizes partial test data from two test reports. This JCO is adequate and meets the criteria stated in 10 CFR 50.49(i).

2. Limitorque motor actuators model SMB-00 Reliance motor

Plant ID Numbers 356, 357, 358

These valve actuators, used on the recirculation line isolation valves, are located inside containment. They are opened upon operator action to allow flow of recirculation water to the reactor coolant system.

The specified environmental parameters are: temperature; 291°F; pressure, 64.1 PSIA; 100% relative humidity; chemical spray; and radiation, 2×10^7 RADS TID. Testing and analysis presented in Limitorque test reports B0058 and 600456 show that information exists to qualify these valves.

During the plant walkdown, it was noted that a T drain pipe plug specified by test report B0058 was not installed. SCE presented descriptions of the qualification process at SONGS 2 and 3 that resulted in installation of the drains.

SCE expects to have this qualification file complete prior to Unit 1 return to service. Based on the information presented, and the examples of similar valve's qualification files complete at SONGS 2 and 3, the staff agrees that these Limitorque motor actuators will be qualified upon completion of the qualification documentation.

3. ASCO solenoid valve model NP 8320 A184E

Plant ID Numbers SV533A and SV536A

These solenoid valves, which actuate the control valves for pressurizer relief tank and reactor drain tank containment isolation, are located in the containment. They are closed automatically on receipt of a containment isolation signal or a safety injection signal

The specified environmental parameters are: temperature, 291°F; pressure, 64.1 PSIA; 100% relative humidity; chemical spray; and radiation, 2×10^7 RADs TID.

Testing as detailed in Isomedix test report AQS 21678/TR Revision A shows testing to values that envelop the specified parameters. The preliminary information developed shows a 40 year qualified life with elastomer replacement at 4 year intervals.

SCE expects to complete all qualification documentation prior to Unit 1 return to service. It is the staff's opinion that, when this is completed, the ASCO solenoid valves will be qualified for the service conditions specified.

4. Paul Monroe rotary valve operator model PD 89425, PD 89426

Plant ID Number CV 525, CV 526

These valve operators, which act as isolation valves for the reactor coolant system letdown line and the reactor coolant pump seal water return line, are located in containment. They are operator actuated in the event of an accident.

The environmental conditions that these valves could be exposed to are: temperature, 291°F; pressure, 64.1 PSIA; 100% relative humidity; chemical spray; and radiation, 2×10^7 RADs TID.

Test reports furnished for audit review included Paul Monroe number PA 89572 and Wyle 58388-1. The review showed that sufficient data was available to show qualification when the complete file is assembled. This agrees with the applicant's conclusion, who expects the file to be completed prior to Unit 1 return to service.

5. Foxboro level transmitters - model E 13DH-MCA/RRW
Plant ID Numbers LT-430, 431, and 432

These level transmitters, used to determine pressurizer levels, are located in containment. The specified environmental parameters are: temperature, 291°F, pressure, 64.1 PSIA; 100% relative humidity; chemical spray; and radiation, 2×10^7 RADs TID.

Wyle test report 45592-4 presents data to show that the specified conditions are enveloped by testing on a similar model transmitter. The review of the test report and analysis show that the Foxboro level transmitters will be qualified when the documentation file is completed. SCE expects this to be done prior to Unit 1 return to service.

6. Foxboro pressure transmitter model E 11 GH Type B
Plant ID Number PT 425

This pressure transmitter provides pressurizer pressure input to the subcooling recorder to monitor the reactor coolant system cooling adequacy following an accident. It is located in the containment.

SCE is in the process of determining the similarity to the Foxboro NE10 transmitters. If similarity can be established, then the transmitter would be qualified via Wyle test report 45592-4. If similarity can not be established, then the transmitter will be replaced with a qualified model prior to November 30, 1985.

A JCO was furnished if the latter option is followed, and a review of that JCO indicates that it meets the criteria found in 10 CFR 50.49(i) and is adequate.

7. Viking Penetrations

These penetrations provide a continuous circuit for safety related cable entering the containment. The inboard side of these penetrations are exposed to the incontainment environment.

The licensee has been unable to secure test reports which qualify these penetrations. Replacement of 27 of these penetrations with qualified Conax penetrations is scheduled prior to November 30, 1985.

The licensee has submitted a JCO based on material analysis presented in Wyle report Number 26330-05. The staff considers this JCO to be inadequate. It should be revised with the criteria presented in 10 CFR 50.49(i) addressed. This revised JCO must be submitted to the staff with sufficient time to allow review prior to Unit 1 return to service.

8. Amphenol Penetrations

These penetrations provide a continuous circuit for safety related circuits entering the containment. The inboard side of the penetrations are exposed to the following conditions: temperature; 291°F, pressure, 64.1 PSIA; 100% relative humidity; chemical spray; and radiation, 2×10^7 RADs TID.

Testing of these penetrations is detailed in Amphenol test reports 123-1247 and 123-1260 with analysis presented in Wyle report 262330-27. These reports indicate that the penetrations can be shown to be qualified for 12 years from their installation in 1977. SCE is in the process of extending that qualified life via material analysis, and will have this qualification file complete by March 30, 1985. The staff concludes that the JCO furnished reflecting the above information is adequate.

9. Westinghouse chempump model GPS-60L-46H-3T Plant ID Numbers G-45A, G-45BK
These chempumps, located under submergence level in containment, remove water from the sump and deliver it to the recirculation and containment spray systems during the long term recirculation phase following a DBE.

The licensee has been unable to locate qualification documentation for these motors. A material analysis shown in Wyle report number 26330-11 has been performed on the pump motors. This is submitted as justification for continued operation. The staff concludes that this JCO is inadequate, and must be revised and strengthened to address the criteria found in 10 CFR 50.49(i).

10. General Electric Power Cable FR-EPR Neoprene, FR Vulkene Insulation
These cables, FR Vulkene used inside containment and FR-EPR Neoprene used outside containment, are used for safety related functions in their specific areas.

Franklin Institute Research Laboratories test reports F-C3913-2A and F-C4497-2 is used to show qualification of these cables to their respective environments.

The staff review of these documents show that, when SCE completes the qualification file, these cables will be qualified to their respective environments. The licensee has indicated that this detailed evaluation in accordance with SCE procedure will be complete prior to Unit 1 return to service.

11. Teledyne Solenoid Valves Models 02112-002-5210, 01221-003-5210

Plane ID Numbers: HV853A, HV858B

HV852A, HV851B

HV854A, HV854B

HV852A, HV852B

These solenoid valves on the hydraulic safety injection valves are located in the turbine building. Upon initiation of safety injection, HV854 and HV852 close and HV853 and HV851 open to allow borated water to be pumped to the safety injection lines. A main steam line break would expose one train of these valves to the following conditions: temperature, 325°F; pressure, 15.2 PSIA; 100% relative humidity.

SCE has been unable to locate test reports that qualify the solenoid valves to these conditions. A FMEA is being performed to determine if failure would affect the valve assemblies safety function. If the FMEA is successful, the solenoid valves will be removed from the list. If not, they will be replaced with a qualified substitute. The JCO furnished meets the criteria of 10 CFR 50.49(i) and is acceptable.

12. Target rock solenoid valves model 81A-004

Plant ID Numbers CV 117, 118 and 119

These solenoid valves are located outside of containment below the mezzanine against the north wall. The valves are containment isolation valves for the steam generator steam sample and close automatically on a containment isolation or a safety injection signal. The conditions that these valves must be qualified for are: temperature, 352°F; pressure, 47.2 PSIA; 100% relative humidity; and radiation, 3.5×10^5 RADs TID.

Target Rock test reports 3514 and 2375 show environmental testing to values that envelop the conditions specified. SCE indicated that a complete documentation package would be completed prior to Unit 1 return to service. The staff concludes that these solenoid valves will be qualified at that time.

13. Various Cable

Many types of cables were utilized for safety related circuits inside and outside of containment. This qualification file presents a material analysis, Wyle report 26352-03, which addresses out of containment cable. Some of these cables remain unidentified. The audit review indicated the following conclusions.

1. No material presented is sufficient to qualify any of these cables.
2. Insufficient data was found in the file to support a JCO for incontainment cable utilizing the criteria found in 10 CFR 50.49(i)(2).
3. Some JCOs for incontainment cable utilized the acceptable criteria found in 10 CFR 50.49(i)(1), (4), (5). As far as these JCOs, which approach justification on an equipment specific basis, reflect all the incontainment cable used for safety related purposes, they are adequate.