

LICENSEE EVENT REPORT (LER)

Facility Name (1) SAN ONDRE NUCLEAR GENERATING STATION (SONGS) UNITS 2 and 3	Docket Number (2) 0 5 0 0 0 3 6 1	Page (3) 1 of 0 3
---	--	----------------------

Title (4)
Containment High Range Radiation Monitors Not Environmentally Qualified

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
Month	Day	Year	Year	/// Sequential /// /// Number	/// Revision /// /// Number	Month	Day	Year	Facility Names		Docket Number(s)
0 6	1 1	9 6	9 6	---	0 1	0 2	0 7	9 7	SONGS 3		0 5 0 0 0 3 6 2

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)																				
POWER LEVEL (10) 0 9 9	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 20.405(a)(1)(iii)	<input checked="" type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 20.405(c)	<input type="checkbox"/> 50.36(c)(1)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(iv)	<input type="checkbox"/> 50.73(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input checked="" type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 73.71(b)	<input type="checkbox"/> 73.71(c)	<input checked="" type="checkbox"/> other (Specify in Abstract below and in text)
	- TS Special Report - 10CFR21																				

LICENSEE CONTACT FOR THIS LER (12)

Name R. W. Krieger, Vice President, Nuclear Generation	TELEPHONE NUMBER AREA CODE 7 1 4	3 6 8 - 6 2 5 5
---	--	-------------------------------

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
B	I P	C B L 1	B 3 8 9	N	B	I P	C O N	A 3 8 0	N
B	I P	C B L 1	R 3 5 2	N	B	I P	P E N	W 1 2 0	N

SUPPLEMENTAL REPORT EXPECTED (14)	Expected Submission Date (15)	Month	Day	Year
<input type="checkbox"/> Yes (if yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO			

ABSTRACT

On 6/11/96, Edison completed an environmental qualification (EQ) reassessment of coaxial cables and connectors for inside containment high range radiation monitors (HRRM), and concluded that during an accident, moisture could permeate the cable jacket and cause a loss of HRRM signal. Because the HRRM have always been susceptible to this condition, and are required by Technical Specification (TS) 3.3.3.1 to be operable in Modes 1 through 4, Edison is reporting this occurrence in accordance with 10CFR50.73(a)(2)(i). When the HRRMs were declared inoperable, both units were at about 99 percent power.

With the HRRMs inoperable, the existing TS 3.3.3.1 required Edison to repair the monitors within 48 hours or shutdown the affected unit(s) within the next 12 hours. However, separate from this event, Edison and the NRC have been working to issue new TS for the HRRMs as part of the TS Improvement Project (TSIP). Under TSIP, with HRRMs inoperable, Edison would be required to restore the monitor(s) to operable status within 7 days or implement a preplanned alternate method of monitoring and prepare a special report to the NRC. On 6/12/96, Edison received NRC approval for early implementation of the TSIP TS for the HRRMs.

On 6/15/96, Edison initiated the proceduralized preplanned equivalent alternate method of monitoring required by the new TS. This alternate method uses a combination of permanently installed and hand-held radiation monitors to ensure equivalent information is available to the operators. Unit 2 repairs were completed during its cycle 9 refueling outage. Unit 3 repairs are anticipated for its cycle 9 refueling outage.

LICENSEE EVENT REPORT (LER) TEST CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	96-005-01	2 of 3

Plant: San Onofre Nuclear Generating Station, Units 2 & 3
 Reactor Vendor: Combustion Engineering
 Mode: Mode 1, both Units
 Power: 99%, both Units
 Event Date: June 11, 1996
 Time: 0845

BACKGROUND

San Onofre Units 2 and 3 each has two high range radiation monitors (HRRMs)[IP,RI] installed inside containment. In the event of an accident, the HRRMs are intended to provide information to assist plant operators in diagnosing and responding to events. The HRRMs are Sorrento Electronics RD-23 ion chamber detectors [IP,DET] with an output of 1E-11 amperes.

The signal cable is Rockbestos RSS-6-104/LE coax [IP,CBL] terminated at each end with Amphenol (HN) style connectors [IP,CON]. Prior to Cycle 8, Edison replaced the original Brand Rex CS 75146 coaxial with Rockbestos brand due to limited Brand Rex service life expectancies.

The associated containment penetration [IP,PEN] assemblies were manufactured by Westinghouse (Model WX-32916) and have Amphenol (N) style connectors on each end of the penetration pigtailed [IP,CBL]. The pigtailed themselves use a cable similar to the HRRM signal cables. All inside containment connectors are protected with Raychem brand environmentally qualified (EQ) shrink-fit tubing.

The cable runs for the four HRRMs (2 in each unit) vary from 175 to 250 feet inside containment. Of this length, a maximum of 90 feet is exposed in cable trays, with the remaining cable routed through unsealed conduit. The HRRMs are installed at a 45 foot higher elevation than the containment penetrations.

In late 1995, while investigating HRRM output fluctuations, Edison noted that the monitor output appeared to be affected by environmental factors (temperature, air flow, electronic noise, etc.). Accordingly, Edison initiated new EQ testing to re-assess the environmental qualifications of the HRRMs and signal cables.

DESCRIPTION OF EVENT

During the EQ re-assessment effort, Edison conducted steam chamber tests for the specific cable/connector combination used for the HRRMs. On 6/11/96, Edison concluded that moisture could permeate the HRRM coaxial cable jacket during an accident and short circuit the monitor signal by two phenomena: (1) after permeating the cable jacket, moisture could form a "water column" inside the cable jacket and be forced into the containment penetration connector by the 45 foot pressure head developed by the cable elevation change, or (2) moisture could similarly permeate the penetration pigtail jacket and short circuit the containment pigtail connector. Due to the extremely small signal current output from the HRRMs (nominally pico-amperes), the partial shorting of the cable connectors that could occur would be sufficient to cause the HRRMs to be inoperable. When the HRRMs were declared inoperable, both units were at about 99 percent power.

Because the HRRM cable/connector combination has always been susceptible to this condition, and the HRRMs are required by Technical Specification (TS) 3.3.3.1 to be operable in Modes 1 through 4, Edison is reporting this occurrence in accordance with 10CFR50.73(a)(2)(i).

LICENSEE EVENT REPORT (LER) TEST CONTINUATION

SAN ONOFRE NUCLEAR GENERATION STATION	DOCKET NUMBER	LER NUMBER	PAGE
UNIT 2	05000361	96-005-01	3 of 3

CAUSE OF THE EVENT

During initial plant licensing, EQ testing for the HRRMs, signal cables, and terminating connectors was performed on the discrete components. While each discrete component satisfied its specific EQ acceptance criteria (insulation integrity), the detector/cable/connector/penetration combination was not tested as a whole to ensure the combination would continue to function when used in pico-ampere service.

CORRECTIVE ACTIONS

With the HRRMs inoperable, the existing TS 3.3.3.1 required Edison to repair the monitors within 48 hours or shutdown the affected unit(s) within the next 12 hours. However, separate from this event, Edison and the NRC have been working to issue new TS for the HRRMs as part of the TS Improvement Project (TSIP). Under TSIP, with HRRMs inoperable, Edison would be required to restore the monitor(s) to operable status within 7 days or implement a preplanned alternate method of monitoring and prepare a special report to the NRC. On 6/12/96, Edison received NRC approval for early implementation of the TSIP TS for the HRRMs. This LER satisfies the special report requirement of the new TS.

On 6/12/96, Edison initiated the proceduralized preplanned equivalent alternate method of monitoring required by the new TS. This alternate method uses a combination of permanently installed and hand-held radiation monitors to ensure equivalent information is available to the operators.

Based on the results of repair option testing, the inside containment organically insulated field cable and penetration pigtailed at Unit 2 were replaced with stainless steel jacketed mineral insulated cable and solid conductor containment electrical penetrations. Testing of the new equipment configuration confirmed EQ requirements for this application are satisfied. Similar repair for Unit 3 will be completed during its cycle 9 refueling outage.

Because the potential short circuiting phenomena discussed above is limited to coaxial cables only, Edison confirmed that other instrumentation inside containment using coaxial cable (three applications) would perform their intended functions.

SAFETY SIGNIFICANCE

Because the HRRMs provide indication only and other monitoring is available, there is no safety significance to this occurrence.

ADDITIONAL INFORMATION

No similar EQ conditions have been reported in the past three years.

Edison's EQ re-assessment is documented in:

Environmental Qualification (EQ) Report M85114, Rev. 0, "Loss of Coolant (LOCA) Test of 'Moisture Dam' Modified Rockbestos RS-6-104/LE Coaxial Cable, ABB/CE Mineral Insulated Triaxial Cable, and CONAX Coaxial Penetration Feedthroughs for the Regulatory Guide 1.97 High Range Radiation Monitoring (HRRM) System," November 15, 1996.

ENCLOSURE 2