Southern California Edison Company

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J. T. HEAD, JR.
VICE PRESIDENT

TELEPHONE
213-572-1472

April 19, 1979

U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region V
Suite 202, Walnut Creek Plaza
1990 North California Boulevard
Walnut Creek, California 94596

Attention: Mr. R. H. Engelken, Director

Docket No. 50-206
San Onofre Unit 1

Dear Sir:

Reference: LER 78-012, Rev. 0, and letter dated November 21, 1978 from SCE (J. T. Head, Jr.) to NRC Region V (R. H. Engelken). Subject: Chemical and Volume Control System Piping Leakage

This letter and the attached Revision 1 to LER 78-012 constitute a follow-up report concerning the failure of two chemical and volume control system lines reported in accordance with Section 6.9.2.b(4) of Appendix A to the San Onofre Unit 1 Provisional Operating License in the letter referenced above.

During the September-October, 1978 refueling outage, leakage was observed from the reactor coolant pumps seal water return (line #2014) and the charging pump discharge (line #2002) while performing inservice inspection system pressure tests. The leaking areas of both pipes were located in a sand filled pipe trench covered with removable concrete plugs (the leaks were initially located when water was observed seeping from the trench into an adjacent piping tunnel).

The sand fill was removed and the affected portions of the lines identified by visual, liquid penetrant and ultrasonic testing. The seal water return originally consisted of a three inch line of A312 type 304, schedule 10 stainless steel. The affected portion of this pipe was replaced with A312

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type 316, three inch schedule 40 stainless steel. The affected portion of the charging line was replaced with the original A312 type 316, two inch schedule 160 stainless steel material. The lines were returned to service after these portions had been replaced and pressure tested.

Metallurgical analysis of pipe sections taken from affected portions of both lines indicate the failure mechanism was transgranular stress corrosion cracking from the outside pipe surface induced by high concentrations of chloride ions in the sand fill surrounding these lines. Analyses of the sand removed from the trench indicated a chloride concentration which ranged from 70 to 1000 ppm.

The two other safety-related stainless steel lines located in the trench were examined for surface indications with liquid penetrant. Examination of the CVCS letdown line (#3006) revealed no defects. Examination of the CVCS charging pump discharge line (#2005) revealed several areas with localized indications. These indications were removed by light surface grinding and verified clear by liquid penetrant examination. Weld repair was not required since the remaining wall thickness was significantly greater than the minimum requirements of the original design standard. The external environmental conditions in the pipe trench which resulted in the stress corrosion will not recur. The sand fill has been removed and it has been verified that no other bare safety-related stainless steel piping is buried in dirt or sand filled trenches at San Onofre Unit 1.

The limiting conditions for plant operation as described in Appendix A to the Provisional Operating License were not exceeded as a result of the conditions observed in lines 2005 and 3006. In addition, there were no radioactive releases resulting from these conditions or the repair activity. It is concluded that safe operation of the plant was not subsequently affected as a result of the observed conditions and that continued safe operation has been assured by the corrective actions taken.

Should you require additional information concerning the above, please contact me.

Sincerely,

J. H. Head Jr.

Attachment: Licensee Event Report No. 78-012 Revision 1

cc: Director, Office of Inspection and Enforcement (30)
Director, Office of Management Information & Program Control (3)

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Dear Sir:

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This letter and the attached Revision 1 to LER 78-012 constitute a follow-up report concerning the failure of two chemical and volume control system lines reported in accordance with Section 6.9.2.b(4) of Appendix A to the San Onofre Unit 1 Provisional Operating License in the letter referenced above.

During the September-October, 1978 refueling outage, leakage was observed from the reactor coolant pumps seal water return (line #2014) and the charging pump discharge (line #2002) while performing inservice inspection system pressure tests. The leaking areas of both pipes were located in a sand filled pipe trench covered with removable concrete plugs (the leaks were initially located when water was observed seeping from the trench into an adjacent piping tunnel).

The sand fill was removed and the affected portions of the lines identified by visual, liquid penetrant and ultrasonic testing. The seal water return originally consisted of a three inch line of A312 type 304, schedule 10 stainless steel. The affected portion of this pipe was replaced with A312

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type 316, three inch schedule 40 stainless steel. The affected portion of the charging line was replaced with the original A312 type 316, two inch schedule 160 stainless steel material. The lines were returned to service after these portions had been replaced and pressure tested.

Metallurgical analysis of pipe sections taken from affected portions of both lines indicate the failure mechanism was transgranular stress corrosion cracking from the outside pipe surface induced by high concentrations of chloride ions in the sand fill surrounding these lines. Analyses of the sand removed from the trench indicated a chloride concentration which ranged from 70 to 1000 ppm.

The two other safety-related stainless steel lines located in the trench were examined for surface indications with liquid penetrant. Examination of the CVCS letdown line (#3006) revealed no defects. Examination of the CVCS charging pump discharge line (#2005) revealed several areas with localized indications. These indications were removed by light surface grinding and verified clear by liquid penetrant examination. Weld repair was not required since the remaining wall thickness was significantly greater than the minimum requirements of the original design standard. The external environmental conditions in the pipe trench which resulted in the stress corrosion will not recur. The sand fill has been removed and it has been verified that no other bare safety-related stainless steel piping is buried in dirt or sand filled trenches at San Onofre Unit 1.

The limiting conditions for plant operation as described in Appendix A to the Provisional Operating License were not exceeded as a result of the conditions observed in lines 2005 and 3006. In addition, there were no radioactive releases resulting from these conditions or the repair activity. It is concluded that safe operation of the plant was not subsequently affected as a result of the observed conditions and that continued safe operation has been assured by the corrective actions taken.

Should you require additional information concerning the above, please contact me.

Sincerely,

J. H. Reader Jr.

Attachment: Licensee Event Report No. 78-012 Revision 1

cc: Director, Office of Inspection and Enforcement (30)
Director, Office of Management Information & Program Control (3)