



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D. C. 20555

ENCLOSURE 1

SAFETY EVALUATION REPORT

SOUTHERN CALIFORNIA EDISON COMPANY

SAN ONOFRE NUCLEAR GENERATING STATION UNIT NO. 1

DOCKET NO. 50-206

CONFORMANCE TO REGULATORY GUIDE 1.97

1.0 INTRODUCTION

Southern California Edison Company was requested by Generic Letter 82-33 to provide a report to NRC describing how the post-accident monitoring instrumentation meets the guidelines of Regulatory Guide (R.G.) 1.97 as applied to emergency response facilities. The licensee responded to Item 6.2 of the generic letter on December 16, 1985. Additional information was provided by letters dated May 29, 1987, December 29, 1988, February 17, 1989, June 3, 1989, January 9, 1990, and May 2, 1990.

A detailed review and technical evaluation of the licensee's submittals was performed by EG&G Idaho, Inc., under a contract to the NRC, with general supervision by the NRC staff. This work was reported by EG&G in Technical Evaluation Report (TER), "Conformance to Regulatory Guide 1.97: San Onofre-1," dated June 1990 (attached). We have reviewed this report and concur with the conclusion that the licensee either conforms to, or has adequately justified deviations from, the guidance of R.G. 1.97 for each post-accident monitoring variable except for the variables neutron flux, reactor coolant system (RCS) cold leg water temperature, RCS pressure, wide range steam generator level, condensate storage tank level, pressurizer level, recirculation flow, quench tank temperature, quench tank pressure, containment atmosphere temperature, containment sump water temperature, emergency ventilation damper position, and steam generator pressure.

2.0 EVALUATION CRITERIA

Subsequent to the issuance of the generic letter, the NRC held regional meetings in February and March 1983 to answer licensee and applicant questions and concerns regarding the NRC policy on R.G. 1.97. At these meetings, it was established that the NRC review would only address exceptions taken to the guidance of R.G. 1.97. Further, where licensees or applicants explicitly state that instrument systems conform to provisions of the regulatory guide, no further staff review would be necessary for those items. Therefore, the review performed and reported by EG&G only addresses exceptions to the guidance of R.G. 1.97. This safety evaluation addresses the licensee's submittals based on the review policy described in the NRC regional meetings and the conclusions of the review as reported by EG&G.

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3.0 EVALUATION

We have reviewed the evaluation performed by EG&G contained in the attached TER and concur with its bases and findings. The licensee either conforms to, or has provided an acceptable justification for deviations from the guidance of R.G. 1.97 for each post-accident monitoring variable except for the variables a) neutron flux, b) RCS cold leg water temperature, c) RCS pressure, d) wide range steam generator level, e) condensate storage tank level, f) pressurizer level, g) recirculation flow, h) quench tank temperature, i) quench tank pressure, j) containment atmosphere temperature, k) containment sump water temperature, l) emergency ventilation damper position, and m) steam generator pressure.

- a-g) R.G. 1.97 recommends the use of Category 1 neutron flux, RCS cold leg water temperature, RCS pressure, wide range steam generator level, condensate storage tank level, pressurizer level, and Category 2 recirculation (high pressure safety injection) flow instrumentation. The licensee has designated the recirculation flow as a Type A variable. R.G. 1.97 requires that Type A variables meet the Category 1 criteria. The instrumentation provided by the licensee meets the Category 1 criteria with the exception of separation and independence.

The licensee has stated that the separation and independence issues for these variables will be addressed in the resolution of SEP topic VI-7.C.2, "Failure Mode Analysis." The purpose of this study is to provide a comprehensive resolution to single failure and separation of power supplies and cabling issues of the plant components required for safe shutdown of the plant after a postulated design basis accident. The licensee should ensure that documentation of the resolution of the separation and independence for these variables is available for NRC audit during the R.G. 1.97 inspection.

- h) R.G. 1.97 recommends Category 3 quench tank temperature instrumentation with a range of 50°F to 750°F to monitor the operation of the primary cooling system. The instrumentation provided by the licensee monitors a range of 100°F to 250°F. The licensee did not provide a justification for this deviation.

The staff finds this deviation unacceptable. The licensee should expand the range of the existing instrumentation to cover a minimum of 50°F to a saturated steam temperature that corresponds to the tank rupture disk relief pressure. Since the tank rupture disk is set at 100 psig, the range should be extended to cover at least 327°F.

- i) R.G. 1.97 recommends Category 3 quench tank pressure instrumentation with a range of zero to design pressure to monitor the operation of the primary cooling system. The instrumentation provided by the licensee monitors a range of zero to 50 psig. The licensee did not provide a justification for this deviation.

The staff finds this deviation unacceptable. The licensee should expand the range of the existing instrumentation to cover the tank rupture disk relief pressure. Since the tank rupture disk is set at 100 psig, the range should be extended to cover at least 100 psig.

- j) R.G. 1.97 recommends Category 2 containment atmosphere temperature instrumentation to monitor the accomplishment of cooling by the containment cooling system. The licensee has not provided this instrumentation. The justification provided by the licensee is that containment pressure is a diverse alternate to containment temperature.

R.G. 1.97 states that, "monitoring instrumentation inputs should be from sensors that directly measure the desired variables." The licensee's instrumentation does not directly monitor containment atmosphere temperature. Therefore, the licensee's deviation is unacceptable. The licensee should provide Category 2 containment atmosphere temperature instrumentation as recommended by R.G. 1.97.

- k) R.G. 1.97 recommends Category 2 containment sump water temperature instrumentation to monitor the operation of the containment cooling system. The licensee has not provided containment sump water temperature instrumentation. The licensee's justification for not providing this instrumentation is that containment cooling operation is monitored by containment pressure and system status (i.e., flow, valve position and pump status) of the containment spray and recirculation system. The instrumentation described by the licensee does not provide sufficient information for the operator to determine the quantity of heat being removed from the containment. Therefore the licensee's justification is unacceptable. The licensee should provide Category 2 instrumentation that will monitor the heat removed from the containment.

- l) R.G. 1.97 recommends Category 2 emergency ventilation damper position instrumentation to indicate the damper position of the ventilation system. The licensee has not provided information concerning this instrumentation. The licensee should provide Category 2 emergency ventilation damper position instrumentation as recommended by R.G. 1.97.

- m) R.G. 1.97 recommends Category 2 steam generator pressure instrumentation with a range of atmospheric pressure to 120 percent of design pressure to monitor the operation of the steam generators. The instrumentation provided by the licensee has a range of zero to 1000 psia. The lowest safety valve setpoint is 985 psia. Thus, the corresponding range recommended by the regulatory guide is zero to 1182 psia.

The justification provided by the licensee is that 1000 psia is the limit of the peak secondary pressure. The licensee also states that an increased range would increase uncertainty and would adversely affect the RCS mismatch trip and the feedwater control system.

The licensee has not indicated if all safety valves, including any setpoint tolerances, are open before the steam pressure exceeds the instrument range. Therefore, the licensee's inference that the peak pressure seen by this instrumentation is 1000 psia is without basis. It is conceivable that the steam pressure can be higher than the upper limit of the licensee's range.

Therefore, the licensee's justification is unacceptable. The licensee should expand the range of the steam generator pressure instrumentation, while maintaining accuracy for trip setpoints, to cover any expected pressure that the steam lines may experience.

4.0 CONCLUSION

Based on the staff's review of the enclosed TER and the licensee's submittals, we find that the San Onofre Nuclear Generating Station Unit No. 1 design, is acceptable with respect to conformance to R.G. 1.97, Revision 2, except for various attributes of the instrumentation associated with the variables a) neutron flux, b) RCS cold leg water temperature, c) RCS pressure, d) wide range steam generator level, e) condensate storage tank level, f) pressurizer level, g) recirculation flow, h) quench tank temperature, i) quench tank pressure, j) containment atmosphere temperature, k) containment sump water temperature, l) emergency ventilation damper position, and m) steam generator pressure.

- a-g) It is the staff's position that information provided by neutron flux, RCS cold leg water temperature, RCS pressure, wide range steam generator level, condensate storage tank level, pressurizer level, and recirculation flow instrumentation is needed by the operator to monitor the operation of the plant safety systems. It is also the staff's position that the licensee should resolve the separation and independence issues for these variables. The licensee should ensure that documentation of this resolution should be available for NRC audit during the R.G. 1.97 inspection.
- h) It is the staff's position that information provided by quench tank temperature instrumentation is needed by the operator to monitor the operation of the primary cooling system. It is also the staff's position that the licensee should expand the range of the existing instrumentation to cover a minimum of 50°F to 327°F.
- i) It is the staff's position that information provided by quench tank pressure instrumentation is needed by the operator to monitor the operation of the primary cooling system. It is also the staff's position that the licensee should expand the range of the existing instrumentation to cover the tank rupture disk pressure of 100 psig.

- j) It is the staff's position that information provided by containment atmosphere temperature instrumentation is needed by the operator to monitor the accomplishment of cooling by the containment cooling system. It is also the staff's position that the licensee should provide Category 2 containment atmosphere temperature instrumentation as recommended by R.G. 1.97.
- k) It is the staff's position that information provided by containment sump water temperature instrumentation is needed by the operator to monitor the operation of the containment cooling system. It is also the staff's position that the licensee should provide Category 2 instrumentation that will provide a quantitative measure of the heat removed from the containment.
- l) It is the staff's position that information provided by emergency ventilation damper position instrumentation is needed by the operator to monitor the position of the emergency ventilation damper. It is also the staff's position that the licensee should provide Category 2 emergency ventilation damper position instrumentation as recommended by R.G. 1.97.
- m) It is the staff's position that information provided by steam generator pressure instrumentation is needed by the operator to monitor the operation of the steam generators. It is also the staff's position that the licensee should expand the range of the steam generator pressure instrumentation, while maintaining accuracy for trip setpoints, to cover any expected pressure that the steam lines may experience.