

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-206/85-26

Docket No. 50-206

License No. DPR-13

Licensee: Southern California Edison Company
2244 Walnut Grove Avenue
Rosemead, California 91770

Facility Name: San Onofre Unit 1.

Inspection at: San Onofre/San Clemente, California

Inspection Conducted: July 22-26 on site and August 1-16, 1985 off site

Inspectors:

Clifford A. Clark
C. Clark, Reactor Inspector

8/27/85
Date Signed

Talbert Young Jr. for
R. Compton, Consultant

8-28-85
Date Signed

Approved by:

Talbert Young Jr.
T. Young, Jr., Chief, Engineering Section

8-28-85
Date Signed

Summary:

Inspection during July 22-26 onsite and August 1-16, 1985 off site (Report No. 50-206/85-26)

Areas Inspected: This routine, announced inspection consisted of a review of the program plan, procedures and records pertaining to the San Onofre 1 inservice testing program for pumps and valves. Inspection Procedure 61700 was covered. The inspection involved a total of 83 hours onsite by one NRC inspector and one NRC consultant.

Results: In the areas inspected, one violation of NRC requirements was identified (failure to follow code/licensee requirements - paragraph 4) and one unresolved item was identified (adequacy and accessibility of IST relief valve records - paragraph 4).

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DETAILS

1. Persons Contacted

- *H. E. Morgan, Station Manager
- *P. A. Croy, Acting Deputy Station Manager
- *J. T. Reilly, Station Technical Manager
- *C. A. Kergis, Lead Compliance Engineer
- *M. E. Freedman, Compliance Engineer
- *T. A. Mackey, Jr., Compliance Supervisor
- *D. S. Scholl, Engineer Supervisor
- *J. L. Anderson, Surveillance Coordinator
- *W. R. Savage, Maintenance Supervisor
- *W. M. Lazear, Quality Assurance Supervisor
- *H. Q. Merton, Maintenance Manager Unit 1
- *V. A. Gow, Lead Quality Assurance Engineer
- *R. W. Krieger, Operations Manager
- W. G. Zintl, IST Coordinator
- M. Baker, Nuclear Operations Assistant
- J. Valdivia, System Engineer
- D. Fulbright, System Engineer
- M. Mitchell, System Engineer
- M. Schwaebe, System Engineer

*Denotes those attending the exit meeting July 26, 1985.

2. Inservice Testing (IST) Program Plan

Inservice testing is required to be performed in nuclear power plants in accordance with the ASME Boiler and Pressure Vessel Code by 10 CFR 50.55.a(g). The ASME Code, Section XI, subsection IWP and IWV, outlines rules for inservice testing of pumps and valves. The licensee made the initial submittal of the IST Program Plan to the NRC Office of Nuclear Reactor Regulation (NRR) in September 1977. Based on preliminary reviews, NRR gave interim approval to the IST program in a Safety Evaluation Report (SER) in December 1977. Meetings with NRR were held on site in February 1983 to discuss various aspects of the IST program. As a result, a revised program was submitted for approval in January 1984. Additional changes were forwarded to NRR in June and September of 1984 and in April 1985. Final NRR approval of the revised program has not yet been granted. The applicable edition of the code as committed to in the revised program is 1977 through the Winter 1979 Addenda. Formal initiation of the first 120 month IST program interval was January 1, 1978. This program applies to 26 pumps and approximately 425 valves.

The IST Program Plan submitted in 1984 and subsequent clarifications, changes and relief requests were reviewed for compliance with the applicable edition of the Code, the relief requests detailed in the plan and responses to NRR questions from the February 1983 meetings. The submitted plan consists of two engineering procedures and relief requests. The two engineering procedures describe the complete IST program, separately for pumps and valves. Code requirements related to

test bases, methods, analysis, corrective action, records, instrumentation, reference values, and repairs and maintenance are all well delineated. Pumps and valves are listed with type of test applicable and basic parameters/acceptance criteria are detailed.

The inspectors note that obtaining copies of all pertinent submittals and correspondence for both the current and original program was time consuming. Engineering files were not complete or compiled and documents had to be retrieved from the central document files. A consolidated and complete record of current and historical program plans is considered a necessary part of the information needed for the engineering staff to properly administer this program.

Several instances were noted where tests are not performed or information is not accurate as specified in the Program Plan. These instances are discussed in paragraph 3 of this report.

There were no violations of NRC requirements identified.

3. IST Program Procedures

The San Onofre IST Program Plan is implemented through various site procedures. The following procedures were reviewed for compliance with the ASME Code, the IST Program Plan and 10 CFR 50 Appendix B requirements:

Engineering Procedure S01-V-2.14, Rev. 5, "In-Service Testing of Pumps Program"

Engineering Procedure S01-V-2.15, Rev. 5, "In-Service Testing of Valves Program"

Engineering Procedure S0123-V-5.15, Rev. 0, "In-Service Testing (IST) Coordinator Duties and Responsibilities"

General Procedure S01-XV-1.0, Rev. 0, TCN-2; "Post Maintenance Retest Program"

Operating Instruction S01-12.4-2, Rev. 5, "Operations In-Service Valve Testing"

Various other valve surveillance procedures, maintenance procedures for relief valve testing and station pump test procedures.

As stated previously, the basic engineering procedures for pumps and valves were thorough and detailed. The retest requirements of the ASME Code for components undergoing maintenance or repairs were addressed by site procedures. The Inservice Pump Test Record forms used have useful, required reference information and good layout for test parameters. However, the following discrepancies or weaknesses related to procedures were noted:

- a. There were several discrepancies between details provided in the program plan and actual site conditions. Pump relief request 7

states that Sea Water Pumps are submersible type pumps and thus vibration and bearing temperature measurements would not be made. However, Sea Water Cooling Pump ("C") is not a submersible pump. Vibration and bearing temperatures have been measured. In addition, for this pump, no differential pressure measurements have ever been taken as the required instrumentation was not installed. No relief request was written for this pump. The required instrumentation has recently been installed and the procedure is being revised to obtain the required information. Pump relief request 5 states that total flow from the combined Feedwater Pump test will be apportioned to each pump based on motor input amperage. In fact, the test procedure states that flow is assumed to be equal.

- b. Test procedures did not specify any tolerance for pre-set test parameters. Paragraph 6.3.1.8.5 of Procedure S01-V-2.14 states that "Operations will adjust system to the reference value within a specified tolerance." Discussions with system cognizant engineers indicate that values are set "as close as we can". Examples of tests where preset values varied from reference test values without explanation or justification include the August 14, 1981 Charging Pump "A" test where flow was set at 38 gpm versus a reference of 32 gpm. On November 19, 1984 on this same pump flow was set at 80 gpm versus a reference flow of 82 gpm. The flow for the Salt Water Pumps have varied at times from 50 to 400 gpm different than reference values. For this pump engineers are doing a pump curve evaluation so that a preset reference is apparently not required, however, this parameter is still listed as preset and some value and tolerance should be formally specified. The values for preset test parameters directly affect test results and evaluations and thus the required accuracy must be determined and achieved to provide valid test data.
- c. Reference values and test acceptance criteria must be entered on the Test Record form by the cognizant system engineer for each test performed. This approach, as opposed to a pre-printed listing of these values in the procedures or test form, may have contributed to the number of errors noted in this area. This concern is discussed more fully in paragraph 4 of this report.
- d. Procedure S01-1-6.64 for testing of relief valves (excepting Pressurizer and Main Steam reliefs) did not specify the increased testing required to be taken by the code when one valve tests unsatisfactorily. Discussions with responsible maintenance and engineering personnel indicated some confusion as to responsibilities and requirements in this area.
- e. The inspectors noted that for a great number of pumps, the evaluation of operability was based on comparison of pump test performance to the manufacturers pump test performance curves. Pump curve analysis is being used at San Onofre for Salt Water, Diesel Oil Transfer, RHR and Auxiliary Feed Pumps.

The need to use Pump curve analysis usually indicates problems with system design or instrumentation needed to support the required

tests or inadequate test procedures. The inspectors consider that the need for and use of vendor pump curve analysis should be reevaluated at San Onofre 1.

The licensee agreed to review the concerns identified with the IST procedures and take remedial action as required. Pending completion of this review, the assessment of the IST procedures will be identified as a followup item (50-206/85-26-01).

There were no violations of NRC requirements identified.

4. IST Records

Various types of IST records for pumps and valves were examined for conformance to Code and site procedural requirements. A number of discrepancies were noted that indicate the documentation aspects of the San Onofre 1 IST program require improvement.

The review of pump test documentation revealed weaknesses or discrepancies in the following areas:

- a. Pump record files in engineering were very informal (kept by each system cognizant engineer) and of varying detail. The information requested to be retained in these working files is not delineated in site procedures or guides. Summary records of corrective action, check-off sheet 5.2 of procedure S01-V-2.14, were not complete for all pumps. For example, there was no summary for major Component Cooling Water Pump repairs in November 1981 or for Feedwater Pump B after bearing repairs in May 1985. These summaries are required to be kept for each pump by Code Subsection IWP-6250. This failure to implement code requirements on site is an apparent violation of paragraph 4.7 of technical specifications for the San Onofre Nuclear Generating Station, Unit 1 (50-206/85-26-02).
- b. Reference values and acceptance criteria were sometimes recorded or recorded erroneously on Pump Test Record forms. For example:
 - (1) Charging Pump "A" had acceptance criteria for differential pressure listed at 2240-2431 psi (94 to 102%) from the time of the reference test (August 23, 1981) until April 19, 1985 and later when it was changed to 2216 to 2331 psi (93 to 98%). The specified range should have been 2216 to 2431 psi (93 to 102%).
 - (2) On Charging Pump "A" no reference values were listed for tests run on November 11, 1984 and February 21, 1985.
 - (3) The reference value for RHR Pump "B" differential pressure on the May 5, 1985 test was 84.4 psi, but the actual value was 85.4 psi.
 - (4) The acceptance criteria for differential pressure on Feedwater Pump "A" on February 9, 1982 was calculated as 92 to 102%.

- (5) On Feedwater Pump "B", the calculated reference value for flow of 4.96×10^6 lbm/hr on July 10, 1981 was erroneously listed on the December 11, 1981 test as 4.5×10^6 lbm/hr and has been listed in error on every test since.
- (6) The acceptance range for differential pressure on the Turbine Driven Auxiliary Feed Pump was erroneously changed from 1257-1379 psi to 1257-1397 psi on the November 6, 1981 test and has been carried through in error on each test since. These errors are considered relatively minor and in some cases result in more conservative criteria. However, considering the importance to the IST effort of accurate reference values and acceptance criteria and the number of discrepancies noted, it appears that much greater attention to detail is necessary.
- c. The column on the Pump Test Record for indicating which parameters are pre-set are not always marked. This was observed for numerous tests including RHR, Charging, Feedwater, Hydrazine Spray and Component Cooling Water pumps.
- d. Reference value test identification numbers and/or dates were listed in error on Pump Test Record forms. Examples include Feedwater Pump "A" tests on February 25, 1985 and May 14, 1985 and Feedwater Pump "B" test on May 8, 1985.
- e. The acceptance criteria for the Diesel Oil Transfer Pumps, outlined in a 1981 memorandum, is to compare the test pump head to the manufacturers curve. However, no acceptance range or limits are specified for the evaluation. In fact, test data points have fallen significantly below the pumps curve and the pumps have continued to be considered acceptable with no additional analysis or corrective action performed. Tests on the "A" pump were as low as 60% on the June 24, 1983 test and has been in the 60-65% range since 1982. Specific acceptance criteria needs to be established and the adequacy of the current test procedure and instrumentation to perform IST on these pumps needs to be determined.
- f. The acceptance criteria for differential pressure for the RHR Pumps is specified on Pump Test Records as greater than 69.5 psi. Based on current reference test values of 81.4 for the "A" pump and 85.4 for the "B" pump this criteria is at 85% and 81% of the reference values. Code and procedure range limits are 93 to 102%. After this inspection was completed the licensee located a memorandum in the site main document control center (not the engineer's pump file) explaining the basis of this criteria. As the inspectors have not reviewed this document, this is considered a Follow-Up Item (50-206/85-03) to be evaluated during a future inspection.
- g. Several miscellaneous and rounding off errors were noted in older Pump Test Reports (1980-1982).

The inspectors reviewed the last three quarterly test results for power operated valves, procedure S01-12.4-2. The record system used by the operations department was thorough and provided for recording of

percentage change in stroke times and referenced repair work and special tests. The data observed and actions taken conformed to Code requirements. The results of Refueling Interval In-Service Valve Test, S01-12.8-8, for July and November 1984 were examined. No discrepancies were noted. The results of the November 1984 Safety Injection Check Valve Tests, S01-12.9-9, were reviewed with no discrepancies noted.

Relief valves in the IST program were checked for inclusion in the computerized San Onofre Maintenance Management System (SOMMS). All valves had been entered into this test control system. The inspectors requested to review test results and associated records on 14 relief valves, but records were not readily accessible. The inspectors requested records be forwarded to the regional office for review, but this also was delayed. Thus no relief valve documentation inspection was performed. Based on the concerns noted in paragraph 3 regarding relief valve additional testing requirements and the problem in obtaining records (the ASME Code requires records "be accessible for audit") this is identified as an Unresolved Item (50-206/85-26-04).

In summary, although no immediate safety concerns were identified, the inspectors consider that the number of discrepancies in documentation, along with evaluations and procedural weaknesses increase the possibility of more significant error. A comprehensive licensee review of IST program activities and existing overall methods and criteria appears necessary. Pending completion of this review, the assessment of the IST program will be identified as a Followup Item (50-206/85-26-05).

There was one apparent violation of NRC requirements identified.

5. Exit Meeting

On July 26, 1985, an exit meeting was conducted with the licensee representatives identified in paragraph 1. The inspectors summarized the scope of the inspection and findings as described in this report. The licensee agreed to review the concerns identified with the IST program and take remedial action as required.