

U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 50-312/85-23

Docket No. 50-312

License No. DPR-54

Licensee: Sacramento Municipal Utility District  
P. O. Box 15830  
Sacramento, California 95813

Facility Name: Rancho Seco Unit 1

Inspection at: Herald, California (Rancho Seco Site)

Inspection conducted: May 16-18 and 20-23, 1985

Inspectors:

*Talbert Young Jr. for*  
C. A. Clark, Reactor Inspector

*7-26-85*  
Date Signed

*Talbert Young Jr. for*  
R. Compton, Consultant

*7-26-85*  
Date Signed

Approved By:

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

*7-26-85*  
Date Signed

Summary:

Inspection during the period of May 16-18, 20-23, 1985 (Report No. 50-312/85-23)

Areas Inspected: This announced inspection consisted of a review of the program plan, procedures and records pertaining to the Rancho Seco inservice testing program for pumps and valves. The inspection involved a total of 66 hours onsite by one NRC consultant.

Results: In the areas inspected, two violations of NRC requirements were identified (failure to follow procedures for calibration of gauges - paragraph 3, and failure to follow procedures for testing of relief/safety valves - paragraph 4), and one unresolved item was identified (adequacy of procedures to implement SER and Code Requirements - paragraph 2).

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## Details

### 1. Persons Contacted

- \*G. Coward, Plant Superintendent
- \*P. Oubre', Manager, Nuclear Operations Department
- \*W. Spencer, Nuclear Operations Superintendent
- \*J. Field, Engineering and QC Superintendent
- \*R. Lawrence, Mechanical Maintenance Superintendent
- \*N. Brock, Electrical/I&C Maintenance Superintendent
- \*R. Columbo, Regulatory Compliance Supervisor
- \*R. Wichert, Senior Mechanical Engineer
- \*H. Heckert, QA Specialist
- \*J. Uhl, Plant Mechanical Engineer
- B. Stiver, Plant Mechanical Engineer
- J. Price, Surveillance Scheduler
- \*G. Perez, NRC Resident Inspector

\*Denotes those attending the exit meeting on May 23, 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 50.55A(g). The ASME Code, Section XI, Subsection IWP and IWV outlines the rules for inservice testing of pumps and valves. The IST program at Rancho Seco is outlined in a document entitled "ASME Code Section XI Inservice Inspection and Testing Program," dated July 18, 1979. This document along with letters providing revisions and additional requests for relief (December 10 and 24, 1979; April 17 and May 30, 1980; March 3 and October 6, 1983 and January 25, 1984) were submitted to the NRC Office of Nuclear Reactor Regulation (NRR) for review and approval. NRR issued a Safety Evaluation Report (SER) on September 25, 1984 setting forth their approval of the Rancho Seco plan with certain additions and conditions. As approved in the SER, the applicable ASME Code edition for this program is the 1974 Edition and Addenda through Summer 1975. This program applies to 16 pumps and approximately 440 valves.

The IST Program plan document was reviewed for compliance with the ASME Code, the requests for relief detailed in the plan and the comments and conditions of the SER. The types and frequencies of tests appear to be in compliance with Code requirements. This document however does not have any signatures for preparation, review or approval. This plan provides extensive detail regarding the scope of the IST program and the type/frequency of tests on safety related plant equipment and 10 CFR 50.55 requires periodic updating and revisions per 10 CFR 50. Therefore, the inspector considers that the program plan documents and changes should be formally processed and controlled as are other plant procedures.

SMUD commitments and NRC comments and conditions in the SER have not yet been implemented through site procedures. Several examples noted by the inspector are as follows:

- (a) Section 2.2.9 of the SER requires full stroke testing of RCS-001 and RCS-002 as committed by SMUD in a letter on October 6, 1984, with additional conditions regarding frequency. Present site procedures and the program plan still only address partial stroke testing of these valves.
- (b) Section 2.2.12 of the SER requires various Containment Building spray system valves to be partial stroke tested at cold shutdown. The program plan still identifies these valves to be tested at refuelings and plant records do not reflect any cold shutdown testing.
- (c) Section 2.2.21 of the SER stipulates that fixed temperature measurement locations be specified at the pump locations. However, site personnel stated that installed pumps did not have any targets or benchmarks to assure that temperature and vibration measurements were taken at the same location.

In addition, the program plan has not been updated to reflect the current SMUD commitments and SER requirements.

The non-current program plan and the delay in implementing SER requirements and SMUD commitments will be identified as an unresolved item (50-312/85-23-01). These questions will be addressed in future inspections.

### 3. IST Program Procedures

The Rancho Seco IST program plan is implemented through various site procedures. The following procedures were reviewed for compliance with the requirements of the ASME Code, IST program plan, SER and 10 CFR 50 Appendix B.

Administrative Procedure (AP) AP-19, Rev. 3 "Plant Performance Monitoring, Testing and Inspection"

AP.303, Rev. 10, "Surveillance Program"

AP.3, Rev. 29, "Work Request"

Surveillance Procedure (SP) SP 213.01, Rev. 6, "Inservice Tests and Inspection of Pumps"

SP 214.01, Rev. 4, "Inservice Testing and Inspection of Valves"

Surveillance procedures for testing of various pumps and valves.

In general, the above listed procedures provided the information and guidance necessary to adequately manage and control IST activities. The summary detail provided in SP 213.01 and SP 214.01 were especially useful

as a complete cross-reference/tabulation of components, applicable procedures, test types and acceptance criteria. However, several discrepancies and procedural weaknesses were noted.

- a. SP 203.06, which includes testing of valves DHS 015 and 016 states that the operator is to "record proper flow path and design flow provided through valves on Enclosure 6.2". However, Enclosure 6.2 only reflects a sign off for those valves to verify that the valves are locked open.
- b. Per SP 214.02 the acceptable stroke times for TV-1 through 5 varies from 3.3 to 5.6 seconds. Revision 1 to the actual test procedure, SP 213.03C, specifies the valve to close in less than 3 seconds. Prior to Revision 1, issued March 3, 1985, the acceptance criteria was a maximum of 10 seconds. In addition, SP 213.03C does not require recording of actual stroke time, only a verification of less than maximum limit operation.

The SER requires valves to operate at no more than 2 seconds slower than a new or recently reconditioned valve. Although it is noted that these are very fast acting valves, the actual stroke times should be measured and recorded for trending purposes. Additionally, the acceptance criteria of the actual test procedure should have been corrected/updated in a more timely manner.

- c. Program plan relief request PV-3 states that valves SIM-19 through 22 would be full stroke exercised at each cold shutdown. SP203.03 only states that valves are to be "inspected", it does not address verification of full stroke operability. This procedure needs to be revised to meet program requirements and/or to reflect actual verifications being performed.
- d. SP 213.01 which summarizes pump test parameter acceptance values, does not show any acceptance criteria for suction pressure for pumps P-261, P-272, P-291, P-318, P-319, P-472, and P-482. There were no alert or action ranges shown for suction pressure on any of the above pumps. SP 213.01 also does not specify acceptable bearing temperatures for pumps P-291, P-318, P-319, P-472 and P-482.
- e. Various test instruments were selected at random from SP's and their calibration records were checked for proper frequency and compliance with accuracy requirements of Section XI. Six temporary test gauges checked had current calibration records. However, stopwatches used for determining operability of pumps and valves are not in the site calibration program. Also, of nine plant gauges checked, two were not in the site calibration program, PI-26103 and PI-26143 for the Low Pressure Injection pumps. These gauges had been calibrated at various times by Work Requests and were last calibrated in October 1983. In addition, no calibration records exist for gauges PI-23804 and PI-23848, which are in the formal program. For 0-300 psi gauge PI 70501 the most recent calibration record (5/17/84) shows a calibration test for a 0-200 psi gauge.

SMUD QA audit 0-534, conducted in February 1983, identified identical problems - a lack of calibration records and gauges used in Surveillance Procedures that were not in the calibration program. As corrective action all SP's were to be reviewed to identify any instruments not yet in the program. These audit findings were closed out as corrected by QA audit 0-613, performed in March 1984.

Quality Assurance Procedure (QAP) 14, "Calibration of Measurement and Test Equipment," and QAP 26, "Test Control," require tests of Class I equipment to be made with instruments calibrated in a controlled, periodic calibration program. The inadequate calibration and lack of proper calibration records and the improper closure of audit findings is an apparent violation of paragraph 6.8.1 of Rancho Seco Unit 1 Technical Specifications (50-312/85-23-02). The licensee has committed to perform a review of all SP's and AP-303 and make changes as required to specify logging of instrument I.D. numbers and calibration dates (except for control room instruments).

- f. The problems regarding relief valve testing detailed in Section 4 of this report indicate that related procedures need to be thoroughly reviewed for adequacy.

The adequacy of IST implementing procedures is considered as part of Unresolved Item (50-312/85-23-03) and will be evaluated during a future inspection.

#### 4. IST Records

Various types of IST records for pumps and valves were examined for conformance to Code and site procedural requirements. Test frequency requirements were met in almost all cases reviewed. Summary listings of tests for pumps and power operated valves, required by Section XI, were very good records which were easily accessible and convenient for engineering to use for evaluation purposes. In general, the reviewing engineer annotated the summaries to indicate his review and any action taken, thus providing more complete records. However, the summaries should be expanded to include safety/relief valves. Also, reference values and the date/source of these values for pumps and power operated valves should be included on the test summaries to facilitate evaluations and complete the records.

Documentation was generally accessible and auditable. However, the inspector was concerned with the general condition of many test documents including use of white-out, use of pencil to record data, retest results recorded on original test data sheets, crossed-out initials and dates with no explanation and calculation errors.

In several instances the engineering review of valve test data was performed weeks or months after the test. Considering the above items along with the calculation errors and discrepancies in pump test evaluations detailed below, it appears that the engineering review process needs to be improved.

Following are discussions of the specific inspection areas and findings for the review of pump and valve IST records:

a. Pumps

The inspector reviewed test summaries and test data sheets for the last two years for seven pumps; P-318, P-472A/B, P-261A, P-291A and P-705A/B. Test frequencies, 96 hour operability reviews, and vibration test location sketches were acceptable.

The "acceptable range" of parameter values contained in SP 213.01 were established at program initiation in 1980, apparently by averaging the SP test results from 1975-1979 and adding in Section XI suggested tolerances. However, the values in 213.01 do not always coincide with plotted data in the pump files and the actual source of these reference values is not indicated. This has lead to revisions of SP 213.01 values (see Revision 6). SP 213.01 should indicate the specific reference values (not just a range) and the data and method of establishing all reference values needs to be clearly documented in the records.

The inspector noted a calculation error in the December 27, 1984 test for NSRW pump P-472A. However, the corrected differential pressure was still in the acceptable range.

The data for NSRW pump P-472B had numerous discrepancies. The test summary for pump P-472B did not include the calculated differential pressure. As this is the basis for acceptance of the pump, this parameter needs to be reflected in the test summary. Pump P-472B test data had been in the alert range on almost every test since 1982. Test frequencies had properly been increased, but ultimate resolution of the problem was not provided until November 30, 1984, when acceptance criteria (reference values) were changed. The inspector noted a calculation error for inlet pressure on the February 11, 1985 test and whiteout was used on July 28 and November 11, 1984 data sheets. On the April 16, 1983 test, the differential pressure data was in the "Action Required" range, but the report is signed-off as acceptable with a note by the reviewing engineer that he "suspects operator error" on the suction pressure value. This appears to be an inadequate evaluation/corrective action of unacceptable data.

The January 25, 1985 motor vibration test on pump P-291A was in the alert range. A Work Request was written to check alignment and take vibration readings before and after, but no mention is made about increasing the test frequency. No further tests had been performed and the Work Request had not yet been performed at the time of this inspection.

The inspector notes that the acceptance criteria for the Boric Acid pumps P-705A and B are significantly more liberal than specified in Section XI, Table IWP-3100-2 (0.77 Qr to 1.26 Qr versus 0.90 Qr to 1.03 Qr). Although the Code allows establishment of reduced range

limits, the justification should be clearly delineated in the pump record.

b. Valves

Test summaries for approximately 35 power operated valves were reviewed to determine if the stroke time evaluations had been performed in accordance with Section XI Subsection IWV-3417. With only a few exceptions the evaluations/corrective actions were appropriate.

SP test data and summaries for the following valves were examined for conformance to Code, SER and site procedure requirements:

RCS-001	TV-1 through 4
RCS-0012	HV-26105
DHS-015	HV-26106
DHS-016	SFV-53612
SFV-29015	SFV-53613
SFV-29016	SIM-19 through 22
CBS-021	SFV-24004
CBS-022	SFV-24013
CBS-027	SFV-23616
CBS-028	

Most of these valves involved specific additional conditions included by NRR in the SER. With a few minor exceptions, the data reviewed met the various requirements (see Paragraph 2). The following additional discrepancies were noted. Test data sheet initials and dates were crossed out without explanation on the February 19, 1983 test of DHS-015 and 016 per SP 203.06. Several stroke tests on SFV 29016 (SP 204.03A) exceeded the 150% of previous time criteria of Code paragraph IWV-3417, but no corrective action was taken as required by Code. Subsequent tests were satisfactory, however. The test data for HV26105 and HV26105 indicate chronic problems with operation of these valves dating back to 1976 and consideration should be given to establishing a permanently increased test frequency.

Test data was reviewed for the 12 Main Steam (MS) relief valves (SP 210.02), the 3 Pressurizer Code Safety valves (SP 214.02) and approximately 75 other system relief valves (SP 207.03). The inspector had a number of concerns in the area of relief valve testing.

- (1) The as-found lift test results were missing for many relief valves, including Pressurizer Code Safety valves. This defeats part of the purpose of Section XI testing, verification of operational readiness, and precludes taking corrective action to test similar valves if problems do exist. ANSI-ASME OM-1-1981, "Requirements for Inservice Performance Testing of Nuclear Power Plant Pressure Relief Devices" specifies that as-found pressures be determined prior to maintenance. Site SP's 207.03 and 214.03 also specify testing to determine

as-found set pressures. However, the MS relief procedure, SP 210.02, allows "taking credit for valves tested after maintenance." The inspector notes that MS reliefs are being tested at much greater frequency than required by Code (due to various leakage and unsatisfactory set pressure problems) and the pressurizer safeties are being replaced with a refurbished spare on a periodic basis. However, the as-found condition is still a vital piece of information required for the IST program.

- (2) In July 1983, blowdown ring adjustments were made to Pressurizer Safety Valve No. 9685 with no retest of set pressure. The inspector considers that blowdown ring adjustment could affect set pressures and thus retests are required. Also, there was no test summary for the Pressurizer Safety valves as required by Section XI, Subsection IV-6200 and thus determining a clear picture of the test history was very difficult. The valve maintenance files did not contain the maintenance test data sheets, only Work Requests.
- (3) On tests of the remaining systems' relief valves, four instances were noted where the testing of additional valves in a system after test failures were not performed as required by Section XI, Subsection IWV-3513. Valves PSV-50015 and 50016 failed tests in February 1980, but PSV-50013 and 50014 were not tested until April 1983. On May 25, 1983 PSV-31800 failed a test, but PSV-31900 was not tested until July 13, 1984 (failed). Again, PSV-31800 has not yet been retested (or scheduled) as a result of the PSV-31900 failure. On March 25, 1983 PSV-26030 failed a test but identical valve PSV-26029 was not retested. The engineering review of this test was signed off on August 25, 1983, 5 months after the test.

In summary, the large number of relief valve test failures, the lack of as-found lift test information, the lack of summary data for Pressurizer Safety valves and instances of inadequate retesting and corrective action all indicate extensive review and strengthening of the relief valve test program is necessary.

The failure to perform additional tests after failures and perform retests after repairs, as required by the ASME Code and site surveillance procedures, is an apparent violation of paragraph 4.2.2 of Rancho Seco Unit 1 Technical Specifications (50-312/85-23-04). After this inspection, the licensee reviewed the Work Request history files for the Pressurizer Safety valves and determined that all had been tested during the last five year period and committed to performing as-found tests on all valves in the future. The licensee also stated that both Pressurizer Safety valves would be removed and rebuilt at the next refueling outage.

## 5. QA Activities

The Quality Assurance organization has not done any specific audits of the IST program, but does perform audits of Technical Specification

requirements. The inspector reviewed audits 0-419 (10/81), 9-525 (12/82), 0-592 (11/83) and 0-684 (23/84) which address small portions of IST activities. It does not appear that these SP audits are adequate to fully address many of the aspects of the IST program.

6. Exit Meeting

On May 23, 1985, an exit meeting was conducted with licensee representatives identified in paragraph 1. The inspector summarized the scope of the inspection and findings as described in this report.