U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No.:	50-275/92-27 and 50-232/92-27
Docket No.:	50-275 and 50-323
License Nos.:	DPR-80 and DPR-82
Licensee:	Pacific Gas and Electric Company Nuclear Power Generation, B14A 77 Beale Street, Room 1451 P. O. Box 770000 San Francisco, California 94177
Facility Name:	Diablo Canyon Units 1 and 2
Inspected at:	Diablo Canyon Site, San Luis Obispo County, California
Inspection Conducted:	September 14 through October 8, 1992
Inspectors:	C. Clark, Reactor Inspector C. Myers, Reactor Inspector

Approved by: _____ 10/30/92
M. Royack, Acting Chief, Engineering Section — Date Signed

Summary:

Inspection from September 14 through October 8, 1992 (Report Nos. 50-275/92-27 and 50-323/92-27)

Areas Inspected: A routine regional inspection of activities relating to Unit 1 Inservice Inspection (ISI), Inservice Testing (IST) and the Erosion/Corrosion Monitoring Program. Inspection procedures Nos. 49001, 73753, 73755, and 73756 were used as guidance for this inspection.

General Conclusions and Specific Findings

Erosion/Corrosion:

The licensee is developing an Erosion/Corrosion Monitoring Program consistent with their commitments to the recommendations of Generic Letter 89-08. Program strengths were found in the areas of continuity and engineering involvement, experience and management support. Program weaknesses were identified in the areas of inspection personnel qualification, post-mortem component inspection, grid area scanning inspection technique and Quality Assurance involvement.

Inservice Inspection:

Except for two hydro tests the observed Unit 1 Inservice Inspection activities met program requirements.

Inservice Testing:

The Inservice Testing (IST) procedures which were reviewed appeared to provide minimum guidance and instructions to personnel performing IST Surveillances. The licensee appeared to depend on the "skill of the craft" of personnel performing tests and evaluating IST data to ensure that all program commitments were met.

Significant Safety Matters:

None.

Summary of Violations:

One violation was cited for a failure to maintain the required annual vision test certification for an ISI examiner (Section 3.3). A second violation was cited for a failure to measure IST vibration data at the location required by ASME Code and to issue an Action Request when the nonconformance was identified (Section 4.2).

Open Item Summary:

During this inspection, there were no new open items identified.

DETAILS

1.0 Persons Contacted

Pacific Gas and Electric Company

*S. Banton, Director, Plant Engineering
*M. Burgess, Director, System Engineering
*L. Cossette, Plant Engineering, Senior Engineer
*M. Coward, System Engineering
*W. Crockett, Manager, Support Services
*D. Gonzalez, Director, System Engineering
*L. Goyette, Nuclear Engineering and Construction Services (NECS), Onsite Plant Engineering Group (OPEG)
*T. Grebel, Regulatory Compliance Supervisor
*C. Hartz, Quality Assurance Engineer
*D. Moon, Regulatory Compliance Engineer
*C. Pendleton, System Engineering Senior Engineer
*J. Shoulder, NECS/OPEG
*R. Taylor, Quality Assurance
*R. Thierry, Regulatory Compliance Senior Engineer
*J. Townsend, Vice President and Plant Manager, Diablo Canyon Operations
*A. Young, Quality Assurance, Senior Supervisor

The inspectors also held discussions with other licensee and contractor personnel during the course of the inspection.

*Denotes those individuals attending the exit meetings of September 18, 1992, October 2, 1992, and/or participating in the telephone exit on October 13, 1992.

2.0 Inspection of Erosion/Corrosion Monitoring Programs (49001)

2.1 Introduction

The purpose of this inspection was to evaluate the licensee's long term erosion/corrosion (E/C) monitoring program to determine (1) if the program was being conducted in accordance with NRC guidelines established in Generic Letter (GL) 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning," (2) if the program was being conducted in accordance with licensee commitments and procedures, (3) if management control problems or generic weaknesses existed, and (4) if Quality Assurance (QA) or independent reviews of the program have been conducted.

Erosion/Corrosion monitoring is generally conducted on non-safety related carbon steel piping. No specific regulatory requirements apply to the content of the licensee's program.

2.2 Program Description

The licensee had initiated a program for long term monitoring for pipe wall thinning due to erosion/corrosion in 1987 during the first Unit 2

refueling outage (2R1). To analytically predict locations most susceptible to pipe wall thinning, the licensee used the CHEC/CHECMATE computer codes developed by the Electric Power Research Institute. The licensee has repeatedly inspected areas identified by their analysis as being susceptible to E/C to obtain actual wear rates. According to the licensee, E/C wear measurements had been obtained during four outages in each Unit. From the examination data, the licensee had established actual wear rates for replacement projections and for feedback into their analytical program.

The licensee identified that their program was documented and implemented through the following procedures.

- Nuclear Plant Administrative Procedure NPAP-D-300, "Monitoring of Erosion/Corrosion Induced Pipe Wall Thinning," Revision 0, dated March 2, 1990.

- Mechanical and Nuclear Engineering Department Instruction I-66, "Pipe Wall Thickness Measurements for the Erosion/Corrosion Program," Revision 6, dated August 26, 1991.

- Mechanical and Nuclear Engineering Department Instruction I-67, "Acceptance Criteria for Piping Erosion/Corrosion," Revision 1, dated December 1, 1991.

- Nondestructive Examination Manual Procedure N-UT-11, "UT Thickness Measurement Using A Digital Thickness Gage," Revision 1, dated March 15, 1991.

The licensee also identified that new procedures were being developed to formalize and consolidate the E/C program requirements. The licensee had scheduled the new procedures to be implemented by March 1, 1993. The inspector reviewed the following draft procedures for information.

- Inter-Departmental Administrative Procedure IDAP-XXX, "Erosion/Corrosion Program Interfaces and Responsibilities"

- Department Level Administrative Procedure DLAP-XXX, "Erosion/Corrosion Program Technical Requirements"

The inspector reviewed the licensee's program documents and implementing procedures and found them to conform with the licensee's commitments submitted in their July 19, 1989, response to GL 89-08, "Erosion/Corrosion-Induced Pipe Wall Thinning."

2.3 Program Implementation

The inspector reviewed the method which the licensee was employing to determine E/C wear rates, the pipe and components to be inspected, the documentation and calculations that supported the analysis, inspection

data feedback to the analysis group and actions taken for degraded conditions.

Items noted by the inspector during this inspection are detailed below.

2.3.1 Analysis Program

The inspector determined that the licensee used the CHEC and CHECMATE computer codes developed by the Electric Power Research Institute (EPRI) to identify and prioritize susceptible locations for erosion/corrosion wear. The CHEC code was applied for analysis of single phase fluid systems, and the CHECMATE code was used for two phase fluid systems. The licensee used these programs along with other industry information and experience to identify and rank suspect locations in piping systems for inspection.

The inspector determined that only the initial CHEC/CHECMATE predictions without inspection data feedback were used by the licensee in their program. The licensee referred to this initial calculation as the Pass 1 CHECMATE calculation. The licensee used the Pass 1 results to identify and rank the susceptible wear areas for inspection. Subsequent inspection data was input to the program by the licensee in their Pass 2 CHECMATE calculation, but these results have not been used to date.

Instead of using the Pass 2 CHECMATE calculation the licensee used an in-house calculation to quantitatively predict remaining pipe wall thickness and acceptable remaining time in service. The inspector found that all acceptance criteria identified in licensee procedure I-67 were based on the use of data from this in-house calculation. Although the computer codes also predicted E/C wear rates, the licensee had developed their in-house calculation due to the poor correlation of the computer code predictions with inspection results. According to the licensee, their analysis technique represented an improvement in accuracy over the CHECMATE code.

The inspector considered the licensee technique to be adequate but emphasized the need to incorporate conservative margins in their acceptance criteria commensurate with the degree of uncertainty in their analysis at the time. The licensee acknowledged the inspector's concern.

The inspector determined that the licensee's program incorporated measures for self improvement of the correlation with the computer codes. For example, metallurgical evaluation of pipe material composition for areas found with unexpectedly low wear was being conducted during the outage inspections in an attempt to identify if slight amounts of chromium were present which would affect their modeling input data.

The inspector determined that the licensee was actively involved in the CHEC/CHECMATE user's group (CHUG) and had been a lead user for qualification of the computer codes. The inspector determined that current industry experience was clearly reflected in the licensee's activities in developing their program. For example, recent international experience indicating E/C passivation due to copper deposition in the porous oxide layer (magnetite) formed on the pipe surface was being investigated by the licensee by analyzing the oxide layer of unexpectedly low wear areas.

Based on review of the licensee's analysis and inspection results, the inspector concluded that the licensee's program adequately identified E/C wear areas and initiated actions to preclude excessive thinning of those area. The inspector observed that the program was established to define and expand inspection locations for future outages and schedule repairs or replacement.

2.3.2 Selection Criteria

The inspector reviewed the licensee's system selection criteria for determining which systems would be included in their E/C program. The inspector observed that the licensee had established a line selection criteria which followed the guidelines contained in NRC Bulletin 87-01, "Thinning of Pipe Walls in Nuclear Power Plants," and GL 89-08. The inspector reviewed system parameters for four included systems and four excluded systems and concluded that the selection criteria had been properly applied.

2.3.3 Data Input

The licensee recently had all computer code modeling and data input performed by a contractor including independent review. According to the licensee, a scheduled review of the contractor report for accuracy and errors had not yet been performed. The licensee planned to perform their own CHECMATE analysis beginning with the Unit 1 Fifth Refueling outage (1R5) data.

The inspector reviewed the licensee's in-house calculation No. 92120-C-01, Revision 0. The inspector determined the data was accurate and independently reviewed.

The inspector reviewed the heat balance inputs and modeling of selected systems to verify that the correct data had been input for the ranking of the lines. The inspector concluded that the licensee had utilized appropriate sources of input data and had accurately input the data for analysis.

2.3.4 Inspections

The licensee identified suspect wear areas for inspection during outages based on the priorities determined by the E/C program prior to the outage. An outage report documenting the inspection results

and recommendations for future repairs or replacements was prepared after each outage.

The inspector reviewed the outage inspection plan for Refueling Outage 1R5 which was currently in progress. The scope of the licensee's inspection effort included 167 locations which has expanded from the initial 60 locations at the beginning of their program. The inspector observed that the number of licensee's inspections to exceed the average number of inspection locations of other facilities.

The inspector observed that the licensee had completed all analyses of all high energy large bore piping systems with the exception of the Gland Steam System which was to be completed by December 31, 1992.

The inspector observed ultrasonic (UT) inspection in progress. The inspector noted that the licensee utilized a china marker to lay out the grid pattern and identify inspection points. The inspector was concerned that the marks did not appear to be permanent to ensure repeatable measurement points for future inspections. According to the licensee, they had experienced acceptable longevity using the china markers after changing from using high temperature paint dots.

The inspector observed that the licensee utilized an inspection grid pattern which differed from the Nuclear Utility Management and Resource Council (NUMARC) recommendations contained in Appendix A to NUREG-1344. The licensee used a grid with uniformly spaced inspection points. The licensee considered their grid technique to result in equivalent inspection coverage. Problems with this licensee's inspection technique is further discussed in Section 2.3.6.5.

The inspector concluded that the scope of the licensee's inspections was adequate.

2.3.5 Inspector Qualifications

The inspector reviewed licensee procedure N-UT-11 and had discussions with two inspectors performing UT inspections to determine their understanding of the E/C program, the proper use of the UT instruments and the importance of accurate grid locations for future inspections. The inspector found that the latest revision of the procedure was in use and that the personnel had been certified.

The inspector observed that the licensee utilized Nuclear Engineering and Construction Services (NECS) personnel to layout the grid patterns and to perform the UT inspection. The certification of these personnel was limited to the use of a digital thickness gage. The inspector reviewed the certification standard for qualifying personnel conducting nondestructive examinations (NDE), American Society for Nondestructive Testing (ASNT), Recommended

Practice No. SNT-TC-1A, "Personnel Qualification and Certification in Nondestructive Testing," and concluded that a limited certification was provided for within the standard. The inspector noted that the limited certification required only abbreviated inspection training consisting of 1 hour instruction and a demonstration of mastery of the proper UT inspection skill. The licensee justified their certification of inspection personnel under ASNT-SNT-TC-1A on the basis that only minimal inspector skill was required to accurately obtain the SNT-TC-1A data with the digital thickness gage.

The inspector considered the inspection personnel certification and training to be a weakness in the licensee's program, based on the observations of work discussed in the following section.

2.3.6 Observation of Work in Progress

The inspector observed several deficiencies in the performance of UT inspectors while observing work in progress.

2.3.6.1 Grid Point Measurements

The inspection data was not being obtained at the proper grid point locations. According to the licensee's procedure, the data was to be obtained at a location immediately adjacent and downstream of the marked grid intersection. The inspector observed that all couplant gel marks were upstream of the grid marks. The inspector identified his observations to the supervisor who also observed the error and immediately corrected the personnel. All measurements were subsequently repeated for the component using the correct grid point locations. The inspector observed other component inspections and found the data points to be appropriately located.

2.3.6.2 Couplant Gel Application

The couplant gel was not being applied properly. According to the supervisor, the personnel had been trained to apply the couplant gel to the component at the inspection location and work the gel into the surface by hand prior to positioning the UT probe at the area. The inspector observed the personnel dip the UT probe into a supply of gel and position the UT probe and gel on the component surface. The supervisor corrected the individuals on the proper technique for applying the couplant gel.

The inspector reviewed licensee Nondestructive Examination Report 420DC-89.380, "Diablo Canyon Power Plant the Effect of Scale and Ultrasonic Thickness Measurements," issued May 16, 1989. This report identified that couplant application technique can have a substantial effect on the accuracy of the measured thickness.

2.3.6.3 Calibration Block Control

The calibration block used for field calibration of the UT thickness gage did not contain a unique identification nor was it under the control of the licensee's measuring and test equipment (M&TE) program to assure appropriate accuracy and traceability.

2.3.6.4. Measuring Instrument Control

The UT thickness gage was not under the control of the licensee's M&TE program. The field calibration which was performed consisted of only a single point calibration using the calibration block.

2.3.6.5 Inspection Technique

The inspection technique measured data at only discrete points and did not incorporate any scan of the area between points to assure that localized minimum wall areas were detected. NUMARC inspection guidance recommends several scanning methods for various grid types. The inspector found this to be a weakness in the licensee's inspection program.

During the inspection, this weakness became self-evident when the licensee found a section of removed piping from the MSR high pressure drain line which had extensive localized wall thinning in areas between the inspection points. While the pipe wall was expected to have a remaining thickness in excess of the minimum allowable thickness of .154 inches, the actual minimum wall thickness was found to be .024 inches in localized areas which were not identified by UT inspection.

The licensee acknowledged the inspector's concern and identified that selective scanning was occasionally performed in areas of particular interest. The licensee indicated that the adequacy of their routine inspection technique would be reviewed as part of their investigation of the unexpected wear results for the replaced pipe.

2.3.6.6 Work Order Control

The inspection activity was not specifically conducted under the authority of a work order. The inspector found that an outstanding work order only directed the preparation and restoration of the component for the inspection. The work order did not specifically identify performance of the inspection activity through the implementing procedure I-66. The inspector found this to be a weakness in the implementation of the E/C program using established plant procedures.

2.3.6.7 Conclusion

The inspector concluded that the control of inspection instruments, inspector qualification and the poor correlation of measured wear with analytic predictions were weaknesses in the licensee's program. The licensee acknowledged the inspector's concerns and indicated that they are continuing to follow industry initiatives to improve the accuracy of the UT technique for the measurements of E/C wear.

2.3.7 Material Repairs and Replacements

The inspector reviewed several corrective actions initiated by the licensee as a result of identified E/C wear. The inspector concluded that the licensee had replaced large portions of the extraction steam lines with more resistant material. The inspector concluded that the corrective actions were performed in accordance with established plant procedure.

The inspector observed that UT inspection of degraded components was not routinely performed prior to their scheduled replacement. Furthermore after removal of the degraded component, no confirmatory inspection was routinely performed . According to the licensee, a removed component would be saved for inspection only if it was of particular interest. The inspector pointed out the opportunity provided by post-mortem examination of degraded components to confirm the accuracy of the UT inspection technique, as well as to validate the licensee's analytic predictions of E/C wear rates.

The inspector considered this lack of feedback of post-mortem inspection data to be a weakness in the licensee's program. The licensee acknowledged the inspector's concern and indicated that they are following the industry actions underway to address measurement accuracy and would incorporate improvements which were identified.

The licensee identified the following areas as high wear areas based on their E/C program predictions and actual plant inspections:

1. feedwater heater (FWHTR) drain lines
2. extraction steam lines
3. main steam reheater (MSR) drain tank pump discharge line
4. feedwater regulating valve bypass line
5. MSR low pressure scavenging steam line

Additional areas of concern which have lower actual wear rates included:

1. steam generator (SG) blowdown line
2. main feedwater lines
3. main condensate lines

The inspector concluded that the licensee's program incorporated adequate corrective actions for components with identified E/C pipe wall thinning.

2.3.8 Program Management/Quality Assurance Overview

The inspector reviewed the management of the licensee's program and had the following observations.

2.3.8.1 Program Responsibility

The inspector observed that the responsibilities for administering the licensee's program were identified in licensee procedure D-300. The inspector reviewed the licensee procedure and concluded that the program responsibilities were adequately defined.

2.3.8.2 Quality Assurance

The inspector observed that the Quality Assurance department had not been significantly involved in the development of the licensee's program. There had been no audits of the program nor specific surveillances of the inspection activities to assess the adequacy of the program or the quality of its implementation. The inspector considered this to be a weakness in the licensee's program.

The licensee acknowledged the inspector's concern and identified that an audit of the E/C program was planned for the 1R5 outage as part of the Quality Assurance department outage management inspection. The inspector reviewed the audit plan for the inspection and found it comprehensive. The inspector concluded that the lack of QA involvement had been a weakness in the program which the licensee appears to be addressing during the current outage.

2.3.8.3 Long Term Strategy

The inspector observed that the licensee's program did not currently include a long term strategy for reducing general E/C wear rates as recommended by the EPRI guidelines. The licensee's program was designed for long term monitoring for E/C wear and component repair/replacement with more resistant material as required.

The licensee considered that the relatively high rates of E/C wear which they have experienced in several systems was the direct consequence of plant operation at relatively low Ph (8.7-9.0) with an ammonia based secondary chemistry. The licensee indicated that a change in secondary chemistry to increase the Ph was being considered by an engineering task force as a possible plant betterment for long term corrective action.

The inspector concluded that the licensee was still developing their long term strategy for reducing E/C wear.

2.4 Summary of E/C Program Strengths and Weaknesses

The inspector identified specific strengths and weaknesses in the implementation of the licensee's E/C program.

2.4.1 Strengths

2.4.1.1 Continuity and Engineering Involvement

The NECS engineering personnel developing and supervising the program were involved in the program since its inception. The personnel have a good working knowledge of the program and its limitations and have developed the program with a defense-in-depth philosophy. The personnel have a keen awareness of the cause and effects of E/C, particularly in the areas of localized effects which are not modeled by the computer codes, such as throttling cavitation.

2.4.1.2 Experience

Actual plant problems and experience with E/C have been incorporated into the E/C program and are a cornerstone in the licensee's program.

2.4.2.3 Management Support

Management attention and support of the E/C program and its development have been evident in the high level awareness of the program and involvement in industry initiatives.

2.4.2 Weaknesses

2.4.2.1 Inspection Personnel Qualification

Plant inspection personnel were not utilized to obtain inspection data. Abbreviated inspection training for NECS personnel established minimal qualification and experience.

2.4.2.2 Post-mortem Component Inspection

Components were not routinely inspected after repair or replacement to verify measurement accuracy or predicted wear rates.

2.4.2.3 Grid Area Scanning Inspection Technique

UT inspection technique did not incorporate routine scanning of the grid area between discrete intersection points to assure minimum wall thickness location were identified.

2.4.2.4. Quality Assurance Involvement

Quality Assurance involvement in the development and implementation of the E/C program had been peripheral.

2.4.2.5 Calibration Block Control

The calibration block used for field calibration of the UT thickness gauge did not contain a unique identification with traceability to its material or verification of its dimensional configuration. While there is no specific regulatory requirements applicable to E/C calibration blocks, industry practice is to normally have traceability of calibration blocks to associated documents/records.

2.4.2.6 UT Instrument Calibration Control

The UT thickness gauge was not under the control of the licensee's M&TE program and did not appear to receive any periodical calibration/linearity checks. While there is no specific regulatory requirement applicable to UT instruments used for E/C work, industry practice is to have measurement equipment calibration/linearity periodically checked.

2.4.2.7. Work Control

The work orders issued for E/C inspections only directed the preparation and restoration of the components for the inspections. The work orders did not specifically identify performance of the inspection activities. While there is no specific regulatory requirement applicable to the procedural control of E/C inspection activities, the industry normally standardizes the processes at a facility for continuity of inspection/work activities.

2.5 Conclusion

The inspector concluded that the licensee was developing a comprehensive program for long term monitoring of E/C in accordance with their commitments to GL 89-08. The program applied generally to non-safety related carbon steel piping. Limitations in the accuracy of the predictive state of the art were recognized. Weaknesses in the implementation of the program through established plant procedures indicated a lack of lateral integration of the E/C program into the plant as it transitions from an engineering project to an established long term plant program.

No violations or deviations from regulatory requirements were identified.

3.0 Inservice Inspection - Observation of Work and Work Activities (73753)

3.1 The inspector reviewed samples of Unit 1 Inservice Inspection (ISI) work activities in progress to ascertain that repair and replacement of components were being performed in accordance with applicable

requirements. Examination personnel observed during this review appeared to be knowledgeable and performed the examinations in an acceptable manner. The licensee was conducting the Unit 1 fifth refueling outage (1R5).

3.1.1. Ultrasonic examinations of the transition pipes at each feedwater nozzle of the Unit 1 steam generators identified that the short piece of pipe should be replaced. The licensee issued Design Change Package (DCP) No. P-47662 to accomplish this work for all four steam generators. The transition pipes (approximately 2 inches long) were sections of the original 16 inch outside diameter piping left attached to the feedwater nozzles after nozzle weld repair in 1977. Unit 2 steam generators did not have these two inch pieces of transition pipes installed. Additional NRC followup of this problem is documented in Inspection Report No. 50-275/92-31.

3.1.2 Ultrasonic examinations of the nozzles on the four Unit 1 emergency core cooling system accumulator tanks identified nozzle cracking in accumulator tank 1-4, nozzles C-B, C-1B, and the skirt coupling off nozzle G, which were all replaced in accordance with instructions issued in DCP No. N-47241. The licensee issued instructions to perform eddy current examination of all nozzles in the four tanks (from inside the tanks). Licensee acceptance criteria required the replacement of any 2 inch and smaller accumulator nozzle or skirt couplings that showed indications of Inter-Granular Stress Corrosion Cracking (IGSCC). As of October 20, 1992, no additional nozzles or skirt couplings were replaced in Unit 1 tanks. The Unit 2 accumulator nozzles and skirt couplings were inspected, repaired and/or replaced during the last refueling outage (2R4).

3.2 The inspector reviewed the current ISI plan and schedule to determine if changes to the ISI plan had been properly documented and approved. No concerns were identified.

3.3 The inspector reviewed the qualifications and certifications of the inspection personnel involved in work activities in progress. No concerns were identified. The inspector also reviewed the qualifications and certifications of a sample of contractor and maintenance examination personnel who had performed ISI activities during this outage. The inspector identified the following failure to maintain required personnel qualifications.

- On September 4, 1992, a licensee Level II visual examiner from the maintenance department observed two System 14, Code Class III, hydrostatic pressure tests and completed two data sheets (Attachments B, Report of Section XI System Pressure Test - IST VT 2-1). However, as of October 1, 1992, this examiner did not have a current Vision Test Certification in the licensee's qualifications and certification files.

On October 5, 1992, the licensee provided information to the NRC that identified that as of October 1, 1992, the subject examiner Vision Test Certification had expired January 4, 1992. The licensee issued Action Request (AR) number A-279236 to identify this non conformance and to identify that the subject examiner had successfully renewed his Vision Test Certification on October 2, 1992.

Licensee Procedure No. 2.1, "Qualification and Certification of Personnel," Revision No. 6, states in part that:

- Section 1.1, "This procedure establishes criteria for qualification and certification of PG&E personnel whose jobs require appropriate knowledge of the technical principles applicable to the nondestructive examinations they perform. This procedure meets the requirements of the following Codes: 1.1.1 American Society for Nondestructive Tested Recommended Practice SNT-TC-1A, 1980, Edition...ASME Boiler and Pressure Vessel Code, Section XI, 1977 Edition through Summer 1978 addenda..."

- Section 7.1.1, "The visual activity and color vision (physical) examination shall be performed annually..."

Under paragraph 8.1.1 Physical, Paragraph 8.1.1(4) of Recommended Practice No. SNT-TC-1A states in part that "The examination should be administered on an annual basis.

Subartice IWA-2300(e) of the subject edition and addenda of the ASME Code states in part that "Nondestructive examination personnel for all methods shall be examined...personnel vision examinations shall be conducted annually."

The failure of the Level II visual examiner, who performed the September 4, 1992, System 14 hydrostatic pressure tests, to have a current annual vision examination is considered an apparent violation (50-275/92-27-01). A similar violation (50-323/83-04-01) was issued nine years earlier in Inspection Reports 50-275/83-05 and 50-323/83-04.

The inspector observed that apparently there were examiners from at least two different licensee departments, the ISI Department and the Mechanical Maintenance Department, performing ASME Code Examinations. Each department maintained qualification and certification records for their own personnel. The lack of consolidated records or a status list of all examiner records may have contributed to the failure to maintain a current visual certification for the examiner. As part of the licensee corrective actions to address this nonconformance, the licensee identified that they would evaluate consolidating all examiner records at one location and establishing an updated, consolidated status list for all examiners performing Section XI examinations.

3.4 Conclusions

In general, the inspector concluded that the licensee was implementing a comprehensive inservice inspection program and that work was adequately performed except for the hydrostatic pressure testing verified by the examiner with the expired Vision Test Certification.

4.0 Inservice Testing of Pumps and Valves (73756)

The inspector reviewed a pump surveillance activity to determine whether Technical Specification requirements and licensee commitments for inservice testing (IST) were being met. On October 1, 1992, the inspector observed performance of a Unit 2 Technical Specification surveillance performed per test procedure STP P-6B, Revision 24, "Routine Surveillance Test of Steam-Driven Auxiliary Feedwater Pump." Section 1.1 of procedure STP P-6B identified that the pump was required to be tested in accordance with the ASME Code, Section XI and Technical Specifications. The inspector identified the following:

4.1 Procedure Weakness

Step 10.23 of STP P-6B stated in part, "Obtain the Following Vibration Data," and provided a sketch with a single arrow pointing to the top of the test point locations, with a table to record both a horizontal and a vertical vibration measurement for each of the four test points. There were no procedure instructions specifying where to place the vibration pickup probe to ensure continuity between data measurement from surveillance to surveillance. Since different locations may provide different results, continuity between vibration measurement locations is required to ensure acceptable data trending and evaluation. The licensee's IST engineer stated that additional instructions specifying where and how to take vibration data were not required in procedure STP P-6B, since this information was available to surveillance personnel performing the surveillance through "skill of the craft." A weakness observed in the performance of vibration measurement is further discussed in Section 4.2.

4.2 Test Performance Weakness

The inspector noted that turbine test points 1 and 2 had blue dots painted on the top and side of the bearing housings and that pump test points 3 and 4 did not have any painted blue dots identifying their location. Surveillance personnel identified that they used the procedure sketch and skill-of-the-craft to position the pickup probe for pump test points 3 and 4. The inspector also noted that surveillance personnel could not physically position the probe on one blue dot for the horizontal vibration reading at test point 2 and had actually positioned the probe on the pump side of the blue dot.

The surveillance personnel identified that they had received training as part of the operator training program to take vibration data on the blue

dot locations and in accordance with the information provided in the procedure/sketch.

The inspector noted that the actions taken by test personnel to obtain the subject vibration data did not appear to meet either the guidance provided in the procedure or the training. In response the licensee issued two Action Requests (ARs). In AR No. A0279035 the licensee identified that the blue dots for pump vibration test points 3 and 4 had been inadvertently painted over. Action Request No. A0279061 identified that the turbine inboard bearing test point 2 horizontal vibration reading should have been taken at the associated blue dot and not adjacent as the inspector had observed. It appeared, after discussions with the licensee, that several surveillances had been performed prior to the October 1, 1992, with painted blue dots missing from the pump and an interference for installation of the vibration pickup probe on test point 2. However, no AR's had been written identifying the problems.

The licensee was asked to provide a copy of the guidance provided to their surveillance personnel for recording ASME Code vibration data. On October 6, 1992, a copy of an instructor lesson guide, Lesson NLR9121, "Vibration Instrument Training," dated September 12, 1991, was provided to the inspector. Lesson Guide NLR9121 was identified as the only documented guidance issued for taking vibration data. Section 3 of this lesson guide, page 9, states in part that "The blue dots are the ones used by operations for surveillance testing. If blue dots are not present on a machine... an AR should be written to resolve the problem."

The inspector reviewed the available surveillance records, along with revisions 23 and 24 of surveillance procedure STP P-6B and identified the following:

- Subsubarticle IWP-4510 of Division 1 of Section XI of the ASME Code states in part that "At least one displacement vibration amplitude (Peak-to-Peak composite) shall be read during each inservice test. On a pump coupled to the driver, the measurement shall be taken on the bearing housing near the coupling."

- Revision 23 was issued June 5, 1992. Section 10.23 incorrectly identified that vibration data for test point 3 should be taken on the pump casing instead of on the bearing housing position as required by ASME Code, Section XI, Subsubarticle IWP-4510.

- Revision 24 was issued September 25, 1992. The sketch on page 15 of the procedure was corrected to identify that vibration test point 3 should be on the pump bearing housing.

- Licensee Administrative Procedure NPAP C-12/NPG-7, "Identification and Resolution of Problems and Nonconformances," Revision 21, Section 4.1 states in part that "Any individual who discovers a problem... or a nonconformance exists, is responsible for initiating an Action Request (AR)." As of October 1, 1992, the licensee had

not issued an AR identifying that revision 23 of surveillance procedure STP P-6B incorrectly identified where vibration data was to be measured. Since an AR was not issued, there was no documented evaluation of whether vibration trending and pump operability might be affected.

- A review of surveillance records for Unit 2 pump 2-1 identified that between June 5, 1992, when Revision 23 was issued, and September 25, 1992, when Revision 24 was issued, the licensee performed five surveillances per revision 23. These five surveillances were performed June 10, 17, July 8, August 5 and September 3, 1992.

- Administrative procedure NPAP C-3, "Conduct of Plant and Equipment Tests", Section 4.5.2.2, states in part that "AR's shall be initiated in any of the following circumstances... 2. any deviation from procedures..." The licensee stated that no AR's were issued to identify that the above five surveillance tests were not performed in accordance with erroneous Revision 23 procedure instructions.

The failure to issue an AR when Revision 23 of procedure STP P-6B was recognized to be not in accordance with ASME Section XI, and evaluate the operability effects on the auxiliary pump is an apparent violation (50-232/92-27-02).

Unit 1 pump 1-1 surveillance testing may have also been effected by the incorrect instructions in Revision 23 to procedure STP-P-6B.

The licensee acknowledged the inspector's concerns and identified they were reviewing the applicable pump surveillances and revising current surveillance procedures.

4.3 Conclusions

The inspector identified discrepancies in a surveillance observed during this inspection. The inspector identified additional discrepancies in the records of past performances of the same surveillance. These discrepancies included failure to resolve incorrect instructions in a timely fashion and failure to obtain vibration measurments in accordance with the guidance provided in the ASME Code and licensee training instructions. The inspector concluded that additional management attention was required in this area.

5.0 Observation of Implementation of Foreign Material Exclusion Program

During observation of eddy current activities for inspection of Unit 1 Emergency Core Cooling System Accumulator Tank 1-3 nozzles on September 29, 1992, the inspector identified the following:

- There appeared to be a difference of opinion between personnel logging material into and out of the tank manway, on what items

should be logged into the identified Foreign Material Exclusion (FME) area.

- The bottom 10 inch nozzle was identified as a "High Risk" FME area and had a canvas purge balloon inserted in the nozzle behind a sheet metal cover. A licensee examiner found the top piece of a cellophane wrapper and pull tab from a cigarette package prior to removing the sheet metal cover from the 10 inch nozzle in the bottom of the tank. When this item was passed out of the tank manway, the FME personnel appeared uncertain on how to handle this item. Licensee FME personnel could not identify how the identified foreign material got into the subject tank. Since smoking is not allowed in containment, and general cleanliness controls for work in the subject tank should have prevented entry of this foreign material into the tank, the licensee stated that they would issue an AR and investigate this observation.

The inspector did not observe a loss of FME control for the nozzles during the examinations observed.

In response to the inspector's observation of different opinions between FME personnel on what material should have been logged into and out the tank manway for the FME area, the licensee identified:

- They had implemented the first training classes for their new program in June and July of 1992.
- They were still performing training to implement the program and clarify procedure instructions.
- This concern would be reviewed with FME personnel to clarify any uncertainty.

Conclusions

The inspector concluded that the licensee was implementing a new FME program which included new training for personnel involved in FME. The inspector considered that FME controls for the accumulator 1-3 nozzles were maintained. The licensee stated that they would investigate the inspector's observations.

6.0 Exit Meeting

The inspectors met with the individuals denoted in Section 1 on September 18, 1992 and October 2, 1992. The scope and findings up to that time were discussed. The inspectors identified that additional information had been requested, and this information would be reviewed in the NRC Regional Office in order to complete the inspection. Review of the additional information necessary to complete the inspection was concluded on October 8, 1992, and a telephone exit was held with the licensee on October 13, 1992.