U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos. 50-275/91-04 and 50-323/91-04

Docket Nos. 50-275 and 50-323

License Nos. DPR-80 and DPR-82

Licensee: Pacific Gas and Electric Company
77 Beale Street
San Francisco, California 94106

Facility Name: Diablo Canyon Units 1 and 2

Inspection Conducted: February 11-14, 1991

Inspector: L. Miller, Chief, Operations Section — Date Signed 3-4-91

Approved by: D. F. Kirsch, Chief, Reactor Safety Branch — Date Signed 3-4-91

Summary:

Inspection on February 11-14, 1991 (Report Nos. 50-275/91-04 and 50-523/91-04)

Areas Inspected:

This was an announced, special inspection to follow-up on the inspection documented in Inspection Report Nos. 50-275/90-29 and 50-323/90-29 concerning mechanical maintenance measuring and test equipment (MM M&TE) issues at Diablo Canyon. Inspection procedures 30703 and 92700 were used.

Results:

The inspection made the following general conclusions:

1. The licensee's management at the site and corporate offices had not ensured that the Quality Assurance (QA) and Quality Control (QC) Departments' significant audit findings relating to the M&TE program were substantively followed up and corrected by the Maintenance Department.

2. The QC Department, and to a lesser degree, the QA Department, were not aggressive in seeking corrective action for the findings of their audits of MM M&TE.

3. The methods and equipment used by the Mechanical Maintenance Department to control M&TE were still inadequate, despite the previous licensee audits and NRC inspection, (50-275/90-29), based on a limited sample of activities.

These findings appear to represent a significant safety matter because they indicate a chronic programmatic weakness in the control of MM M&TE, which may have, or at least had the potential to adversely impact installed safety related equipment. Further, although these deficiencies in the control of MM M&TE were identified by the QA and QC organizations, these oversight groups, Mechanical Maintenance and PG&E management were ineffective in achieving the necessary corrective action.

One apparent violation (50-275/91-04-02) was identified: failure to identify a breakdown in the program for control of measuring and test equipment as a nonconformance, and failure to promptly correct this breakdown.

Unresolved item 50-275/90-29-01 was resolved by this inspection into violation 50-275/91-04-02, and is therefore closed.

Three open items were identified.

DETAILS

1. Persons Contacted

*J. Townsend, Vice President, NPG, Plant Manager
*W. Barkhuff, Quality Control Manager
T. Bennett, Mechanical Maintenance Department Manager
C. Seward, Senior Power Production Engineer
M. O'Connell, Regulatory Compliance Engineer
D. Taggart, Director, Site Quality Assurance
J. Strahl, Mechanical Maintenance Foreman
*B. Giffin, Asst. Plant Manager, Maintenance Services
A. Young, Sr. QA Supervisor
*T. Grebel, Regulatory Compliance Supervisor

*Attended exit meeting.

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

2. Background

This inspection was a followup inspection to Inspection Nos. 50-275/90-29 and 50-323/90-29. The purposes of the latest inspection were threefold: to review further the existing program for control of measuring and test equipment (M&TE), to review the corrective actions which had been taken for deficiencies identified in earlier versions of that program by the licensee's audits and the previous NRC inspection, and to determine whether enforcement action was appropriate for the unresolved item identified by that inspection. This unresolved item concerned what appeared to be ineffective corrective action for the M&TE program weaknesses previously identified by the licensee's audits and surveillances.

3. Review of Existing Program for Control of M&TE

The inspector conducted surveillances of work by personnel in the Mechanical Maintenance (MM) and Instrumentation and Controls (I&C) calibration and tool issuing facilities. Selected tool issue logs, calibration records, M&TE modules from the Plant Information Management System (PIMS), and personnel qualification records were reviewed. In addition, tool issuance, return, and calibration were observed.

a. The inspector observed that calibrated tools were issued and calibrated by the I&C department in a careful and methodical manner. Licensee representatives stated at the beginning of the inspection that all work performed in the radiologically controlled area (RCA) during the refueling outage in progress would be done using only M&TE issued by the I&C department. This policy was announced in a memorandum dated November 21, 1990, and became effective January 14, 1991, shortly after the end of the previous NRC inspection.

The inspector determined that because of this change in policy, approximately 75% of the calibrated torque wrenches were under the control of the I&C department, a higher percentage than was found during the previous inspection.

The only potential discrepancy observed in the I&C department control program was that calibration personnel stated that they did not have an effective method to ensure that issued tools were promptly returned when the job to which the tools had been assigned had been completed.

b. The inspector observed that calibrated tools were issued and calibrated by the MM department in a manner which was generally consistent with the less detailed procedural guidance required by the licensee for this department. However, the following significant discrepancies were identified:

(1) On February 12, 1991, the inspector observed that Tension Dynamometer #157 had been issued for Work Order C0078894-01 on January 23, 1991, a work order which was completed on January 29, 1991. This was not a safety related job, but was associated with safely moving a cask used for transportation of radioactive material. At the inspector's request, the tool was located. The personnel using it stated that it had been in use to check chainfalls for some days, a different job than the one for which it had been issued. The licensee personnel were not aware of this earlier job.

The inspector noted that this was a current example of a finding identified in QC Surveillance Report QCS 90-0030, dated April 12, 1990, and a similar one re-identified in Quality Assurance Audit 90812T, dated September 6, 1990. The surveillance report had stated that 28% of the M&TE usage sampled was not recorded as required by Quality Assurance Procedure (QAP) 12.A, Control and Calibration of Measuring and Test Equipment, Sections 4.25 and 4.26, Revision 19. The QA audit stated that 35% of work orders reviewed did not contain adequate M&TE descriptions, as required by AP C-40S3, Revision 12, Attachment 6.3, Instructions for Completing and handling W/O's with PIMS on Line.

Finally, MM M&TE personnel stated that personnel frequently did not return M&TE once the job for which it had been issued was completed, and that testing personnel did not have an effective method to ensure that the equipment was returned. Based on this limited sample of one job which was checked, and the comments from both MM M&TE and I&C M&TE personnel, the inspector concluded that the licensee's controls to ensure that M&TE was traceable to the jobs where it was used were still ineffective. This is an open item (50-275/91-04).

(2) On February 12 and 14, 1991, the inspector requested that eight torque wrenches available for issue in the MM calibrated tool issue room be checked at one point of their useable range for calibration. Licensee personnel performed a check on each of these wrenches. Two of the eight (25%),# 393 and #381, were found out of calibration. Torque wrench #393 indicated 240 in-lbs at an actual value of 218 in-lbs, while torque wrench #381 indicated 125 in-lbs at an actual value of 145 in-lbs. Both wrenches were indicated by their calibration records to be in calibration. The tolerance for torque wrenches to be considered in calibration was four percent of their setpoint per Step 7.2.7 of Procedure MP M-53.1.

Licensee personnel could not explain this finding. They indicated that typically one out of 100 times they would find a similar discrepancy. The discrepant torque wrenches were removed from service for calibration.

The inspector noted that Maintenance Procedure M-53.1, Revision 5, Section 7.4 required that torque wrenches be verified before and after their use at the setting, or over the range, at which they were to be used. The inspector noted that it was possible that a torque wrench could be in calibration at some points and out of calibration at others. In this case, a simple one point calibration check such as that performed at the inspector's request would not necessarily indicate a previous verification error had been made. However, this relatively high percentage of discrepancies suggested a significant percentage of verification errors.

The inspector concluded that the verification program for MM torque wrenches was potentially failing to ensure that only calibrated tools were in use. This is an open item (50-275/91-04-03).

(3) The inspector observed the MM M&TE personnel perform several verification checks of audible indicating (snap-type) type torque wrenches, also known as "click type" torque wrenches. These verifications were performed on different models of the Williams Torque Wrench Tester. Steps 7.2.2 and 7.3.1 of procedure MP M-53.1, referenced in the previous paragraph, required the calibration of torque wrenches in accordance with the applicable Technical Bulletin. These personnel were not aware of the prominent Note in Technical Bulletin No. TB-129, the applicable Technical Bulletin for this activity, which described the proper use of this equipment:

> "Extreme care must be exercised when checking audible indicating (snap-type) wrenches so the operator does not pull beyond the "break away torque."

The inspector observed that MM M&TE personnel were unaware of this precaution, and routinely did not use extreme care, Consequently, for smaller torque wrenches, measuring in in-lbs, these personnel routinely pulled the wrench significantly beyond the break away torque. For example, for a wrench set to break away at 100 in-lbs, the Williams Tester typically indicated a peak torque value of 130-140 in-lbs had been attained during the test. For larger torque wrenches, the same effect was not noted. For example, for a wrench set to break away at 100 ft-lbs, a peak torque value of 102 ft-lbs was typically attained. The person performing the test attempted to estimate the value of the release torque, but the process was inherently imprecise given the relative rapidity with which the wrench passed through the break away torque value.

The inspector noted that field personnel could reasonably be expected to be even less meticulous than the testing personnel who routinely exceeded the setpoint torque values unintentionally. The inspector concluded that this testing had demonstrated that use of snap-type torque wrenches in the in-lb ranges could result in significant overtorquing of fasteners in those ranges. A related, but broader conclusion was independently reached by the licensee's Technical and Ecological Services (TES) Division Report 420DC9176, (January 14, 1991) issued in response to Action Request A0183483 (March 17, 1990). That report made one observation which was relevant to this discussion:

> "Click" type wrenches may have a second [torque] peak that can significantly over torque a bolt."

The inspector determined that the I&C M&TE program had recently greatly reduced the number of snap-type torque wrenches available for use, whereas the MM M&TE program had not addressed the concern. To the contrary, on February 14, 1991, the inspector was advised by licensee testing personnel that workman were requesting snap-type torque wrenches for use inside the RCA from the MM M&TE calibrated tool issue room, despite the licensee's decision discussed in Section 3.A above to use only I&C calibrated tools in the RCA beginning January 14, 1991.

The inspector concluded that, for small torque wrenches, the licensee's program to control torquing of fasteners had not been nearly as precise as required by MP M-53.1. The inspector noted that the effect of the unknown errors produced should be considered by the licensee for systematic evaluation. (Open Item 50-275/91-04-01)

4. Review of Previous Quality Assurance Audits and Quality Control Surveillances Related to MM M&TE Program Weaknesses (Unresolved Item 50-275/90-29-01)

The inspector reviewed the status of corrective action for the surveillances, audits and the inspection which preceded this inspection and which were related to MM M&TE. Inspection Report Nos. 50-275/90-29 and 50-323/90-29 previously detailed much of this chronology. It is summarized here, combined with additional information determined during this inspection.

Four licensee reports from December 5, 1989 through September 6, 1990 identified repeatedly that the MM M&TE program had significant weaknesses. These reports were:

a. Quality Control Surveillance 89-175 dated December 5, 1989

This report concluded that "a significant problem exists with [MM] M&TE traceability to specific work activities." An expanded surveillance was recommended, but no definitive corrective action which addressed correcting this problem was indicated by the surveillance.

b. Quality Control Surveillance 90-030 dated April 12, 1990

This surveillance identified a variety of programmatic problems. These included:

"chronic omission of data, data errors, missing signatures, . . . logs not maintained;

incomplete and no history searches/evaluation for out-of-tolerance M&TE, history searches ARs exceeding procedural time limits;

equipment usage not being consistently recorded, jeopardizing the accuracy of the calibration data baseline;

"as found" data not recorded and in some instances photocopied and uses (sic) for multiple tools."

inadequate training and qualification of calibrators;

extrapolation of calibration data which is not permitted;

use of standards with less than the [procedurally] required accuracy;"

This expanded surveillance of MM M&TE concluded that:

> "Unsatisfactory performance of tool calibration and issue activities was primarily due to unclear or incomplete procedures and poor practices by maintenance personnel. Many of the program administrator's corrective actions during the last year only corrected the symptoms of the problems and not their causes thus allowing problems to recur.. . . The overall effectiveness of the Mechanical Maintenance calibration program is unsatisfactory."

A follow-up surveillance was recommended by QC to determine whether the corrective actions identified and scheduled by the MM department were effective.

In discussions with the inspector, the QC Manager stated that he had recommended to the Mechanical Maintenance Department Manager that a nonconformance report (NCR) be issued, but that manager considered that an NCR was inappropriate because the surveillance findings were not significant enough, and because that manager thought that some of the surveillance findings were invalid.

At the time of the previous inspection, which began on November 27, 1990, some of the Action Requests initiated by QC for specific findings of this surveillance had still not been addressed by the Mechanical Maintenance department (e.g. AR A0184108, dealing with rusted standards, and AR A0183542, dealing with widespread recordkeeping errors). Where the findings had been addressed, they were addressed in piecemeal fashion by lower level personnel, using comment fields on Action Requests, rather than in a coordinated way which clearly demonstrated management oversight and approval of the response. Most significantly, licensee personnel could not provide any documentation which addressed the five overall conclusions and seven recommendations of this surveillance. During this inspection, this documentation was still not available. The inspector concluded that these conclusions and recommendations had not been formally addressed.

c. <u>Quality Performance and Assessment Branch Surveillance 90-126, dated May 30, 1990</u>

The Site Quality Assurance Manager stated that this surveillance was initiated by Quality Assurance because of concerns regarding the validity of QC Surveillance 90-30. This surveillance was a review of previous surveillances, audits, corrective action requests (ARs), and Quality Evaluations (QEs) related to the program for MM M&TE. This surveillance clearly identified that some of the findings identified by QC were repetitive, and recommended a QA audit of the area.

This surveillance mentioned that MM M&TE deficiencies had been identified as early as 1985. The inspector confirmed that Quality Assurance Audit 85230P, dated October 17, 1985, had identified failures to properly document M&TE usage. These problems were documented to have been corrected by procedural revision and personnel training.

The inspector observed that surveillance 90-126 did not recommend an NCR for the recurrence of M&TE program weaknesses.

d. Quality Assurance Audit 90812T, dated September 6, 1990

This audit independently reassessed the M&TE programs, including MM M&TE, five months after the MM program deficiencies were identified by QC. No comment was made regarding the existence of programs with different procedural requirements for use of M&TE. The audit did reconfirm several of the deficiencies identified in the QC Surveillance 90-30. Generally, it was less clearly written, and made no general conclusions or recommendations regarding the MM M&TE program.

The audit also identified recurrent deficiencies related to those identified in 1987 by NCR DCO-87-QA-N001. That 1987 NCR referred to the discovery that the calibration accuracy ratios between calibration standards and M&TE had not, in all cases, been determined and documented. This 1990 audit found recurrent failures to control this ratio, as had QC Surveillance 90-30.

Most of the problems identified by Audit 90812T were limited to technical issues. The most significant findings of this audit appear to have been:

Usage information for M&TE was not recorded as required on 35% of 20 work orders reviewed. This was a repeat finding from QC Surveillance 90-30.

The procedurally required accuracy ratios between calibration standard and M&TE of 4:1 were not attained for several different types of equipment. This was a repeat finding from QC Surveillance 90-30.

MM did not maintain vendor manuals for most of the equipment they were responsible for calibrating; therefore, tool room personnel could not describe or refer to recognized practices and methods of calibration. This particular discrepancy, as noted in paragraph 3.b.3 above, was still evident during this inspection in that tool room personnel were not familiar with the precaution in the vendor manual for the use of click type torque wrenches.

This audit did not state clearly any conclusions regarding the adequacy of the MM M&TE program, nor did it make any clear recommendations to management, unlike QC surveillance 90-30.

However, unlike the QC surveillance, which only documented the specific findings as Action Requests to the MM department, this audit did issue several Audit Finding Reports (AFRs), which required the MM department to respond with a root cause determination for the problems.

Action Requests were the licensee's working level request for information by the requestor of the affected party, in this case, the MM department. At the request of the MM department, the due date for these detailed corrective actions was extended. At the time of the previous NRC inspection, no action had been taken on these findings.

This audit did not clearly identify any nonconformance or programmatic breakdown, nor did it refute QC Surveillance 90-30. No corrective action for its findings had been taken prior to the NRC inspection which commenced on November 27, 1990.

5. Conclusions Regarding Licensee Corrective Action for MM M&TE Program Deficiencies Prior to Inspection 50-275/90-29

The previous NRC inspection (50-275/90-29) identified that a nonconformance report had not been initiated to address the recurrent failures to follow the established MM M&TE program. That inspection focused on the statements in Audit 90812T that MM had not fully implemented the corrective actions required by NCR DCO-87-QA-N001. As discussed in paragraph 4d above, that NCR's findings were narrowly focused on calibration ratio discrepancies. The failure to initiate a nonconformance was identified in the previous report as unresolved item 90-275/90-29-01. The previous inspection also identified several examples, in addition to those discussed in this report, of specific quality problems in the MM M&TE program.

After review of the material discussed above, discussion with licensee personnel and managers, and the observations discussed in Paragraph 3, the inspector concluded that the licensee's corrective action in response to the many formal reports of a deficient MM M&TE program had been inadequate.

Quality Control Surveillance 90-30, in particular, clearly reported a significant condition adverse to quality, namely numerous examples of failures to implement the MM M&TE program procedural requirements. The licensee's own surveillance report characterized the MM M&TE program as "unsatisfactory" and "not acceptable."

Senior licensee management was provided with the report of surveillance 90-30, as was Quality Assurance. Yet, at the time of the previous inspection, over seven months later, a nonconformance report had not been issued for these programmatic discrepancies. As a direct result, the cause for the weaknesses had not been determined, and corrective actions to restore program quality were not defined. Rather, an additional audit and an additional surveillance were performed which added additional examples of specific problems, but did not integrate the findings further. These subsequent efforts reduced the clarity of the QC surveillance's conclusions and recommendations, and postponed and diluted effective corrective action to correct the overall problem.

The inspector, therefore, concluded that the scope and breadth of these failures was substantial enough to indicate a breakdown in the Quality Assurance program for the calibration and control of measuring and test equipment. This is an apparent violation of the requirements of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," and Quality Assurance Procedure 15.B, "Nonconformances," Paragraph 2.1.1 and 3.1, in that a nonconformance report for this breakdown was not initiated until after the previous NRC inspection again brought this problem to senior management's attention (Enforcement Item 50-275/91-04-02).

Unresolved Item 50-275/90-29-01, which directly referenced the calibration ratio discrepancies NCR, is correspondingly incorporated as part of this apparent violation, and is closed.

As noted above, related issues of potential overtorquing of small fasteners due to use of click-type torque wrenches (Open Item 50-275/91-04-01), use of uncalibrated torque wrenches (Open Item 50-275/91-04-03), and undocumented use of calibrated tools (Open Item 50-275/91-04-04) were identified. These items are considered integral parts of the MM M&TE program breakdown. They will be followed up during followup on the Enforcement Item.

6. Review of Licensee Corrective Action Since the Previous Inspection

As immediate corrective action for the findings of Inspection 90-29/90-29, the licensee issued nonconformance report NCR DCO-90-MM-N089 on December 21, 1990. The nonconformance was described as:

> "Previous QC and QA audit findings indicated a significant number of program implementation deficiencies. These deficiencies, and the time involved responding to the deficiencies warrant further evaluation."

At the conclusion of the latest inspection, this NCR was still under revision to determine the appropriate corrective actions. Most of the proposed corrective actions from the most recent QA audit, 90812T, had been delayed pending the development of a unified corrective action plan from this NCR.

7. Unresolved Item

An unresolved item is a matter about which more information is required to ascertain whether it is an acceptable item, a deviation, or a violation.

8. Exit Interview

The inspector met with licensee management denoted in Paragraph 1 on February 14, 1991. The scope and detailed findings of the inspection were discussed. Licensee representatives acknowledged the findings of the inspection. Subsequently, on February 25, 1991, licensee representatives were informed that an Enforcement Conference on the results of this inspection would be conducted on March 8, 1991.