ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

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Licensee:	TU Electric
Facility:	Comanche Peak Steam Electric Station, Units 1 and 2
Location:	FM-56 Glen Rose, Texas
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ATTACHMENT: Supplemental Information

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EXECUTIVE SUMMARY

Comanche Peak Steam Electric Station, Units 1 and 2
NRC Inspection Report 50-445;-446/97-12

Operations

- The safety review committees were effective in analyzing, assessing, and resolving issues (Section O1.1).

- The inspectors identified one occurrence in which an operations, notification, and evaluation form was not written for the failure of a safety injection system relief valve as required by their administrative procedures. This was identified as the first example of a violation of Criterion XVI (Section O1.2).

- The licensee failed to provide required information in Licensee Event Report 96-02 related to past occurrences of slow closure of Feedwater Isolation Valve 1-HV-2135. Although the licensee disagreed with this violation, the inspectors verified with the program office that the failure to report this information was a violation of 10 CFR 50.73 (Section O3.1).

Maintenance

- The licensee was maintaining good control over the backlog of maintenance items (Section M2.2).

- During a walkdown, equipment material control and housekeeping were observed to be excellent (Section 2.3).

- The licensee failed to initiate a operations, notification, and evaluation form to document the failure of the diaphragm on the reactor Makeup Water Pump Discharge Valve 2DD-0019, as required by their administrative procedures. This was identified as the second example of a violation Criterion XVI (Section M7.1).

- The licensee failed to take adequate corrective action for a series of diaphragm valve failures related to improperly installed valve internals, in that, the location of all the improperly installed diaphragm valves had not been identified and the licensee had not inspected or evaluated the adequacy of these potential deficiencies. This was identified as the third example of a violation of Criterion XVI (Section M7.1).

Engineering

- The licensee failed to take adequate corrective actions within Plant Incident Report 96-055 to determine and correct the administrative and technical problems that resulted in numerous missed opportunities to earlier identify and correct a slow stroking problem with Feedwater Isolation Valve 1-HV-2135. This was identified as the fourth example of a violation of Criterion XVI (Section E2.3).

- The licensee failed to initiate a operations, notification, and evaluation form in response to an industry notification addressing previously unaccounted errors in a motor-operated valve diagnostic system, as required by their administrative procedures. This was identified as the fifth example of a violation of Criterion XVI (Section E2.3).

- An inconsistency existed in the basis for the licensee's establishment of shelf life for nitrile elastomer diaphragms (Section E2.3).

- The licensee failed to evaluate the safety implications of four design change notices, each of which involved changes to drawings depicted in the Final Safety Analysis Report, in a manner consistent with the requirements established by 10 CFR 50.59. This discrepancy resulted partially from a licensee guidance document that allowed "trivial changes" to the facility without performing a safety evaluation. This was identified as a violation of 10 CFR 50.59. Although the licensee believed that previous NRC inspections had accepted this practice, the inspectors concluded that this was not the case as discussed in the report (Section 2.4).

- The licensee failed to provide adequate instructions for the installation of temporary lead shielding on safety and nonsafety-related piping systems, in that it did not discuss the materials to be used as attachment devices or the methods to secure the temporary shielding. This was identified as a violation of 10 CFR Part 50, Appendix B, Criterion V (Section 2.5).

- The backlog of open engineering issues was well-managed with a declining 2-year trend (Section E2.6).

- System health reports and dedicated teams for each system were identified as strengths in the area of system engineering (Section E7.1).

Report Details

Summary of Plant Status

Both units were operated at 100 percent power for the duration of the inspection.

I. Operations

O1 Conduct of Operations

General Comments 40500

The objective of this inspection was to evaluate the effectiveness of the Comanche Peak Steam Electric Station programmatic controls to identify, resolve and prevent problems that degrade plant safety. This review focused on the following areas:

- Safety review committee activities
- Root-cause analysis
- Corrective action
- Self assessment
- Operating experience feedback

The inspection consisted of an exten. review of plant documents, attendance at various plant meetings, employee interviews, and meetings with licensee personnel to discuss technical or administrative questions.

The inspectors conducted reviews of ongoing plant operations as it related to the corrective action process. In general, the plant operations involvement in the corrective action process was satisfactory.

O1.1 Day-to-Day Resolution of Problems by Operations

a. Inspection Scope (40500)

The inspectors evaluated the operations staff's efforts to resolve identified problems by reviewing operations, notification, and evaluation forms, observing the activities of the operations notification and evaluation committee in developing corrective actions, and observing the activities of the station operations review committees. The inspectors held discussions with operational staff personnel to determine how day-to-day resolution of problems were handled. The inspectors interviewed selected operations staff personnel to determine their knowledge of the corrective action process and procedures at Comanche Peak. The inspectors interviewed nine operational staff personnel, which included operations shift manager, unit supervisors, reactor operators, and auxiliary equipment operators.

b. Observations and Findings

The operational staff interviewed by the inspectors were knowledgeable of the corrective action process. They indicated that the day-to-day resolution of problems (e.g., equipment deficiencies) were handled through the operations, notification, and evaluation form process or by use of the control of maintenance and work activities process (Procedure STA-606, "Control of Maintenance and Work Activities," Revision 24). The control of maintenance and work activities process was used for regular maintenance and minor maintenance activities only. Operations, notification, and evaluation forms were initiated for more significant issues, which also included human performance and procedural compliance issues.

Upon receipt of a operations, notification, and evaluation form, the shift manager reviews the operations, notification, and evaluation form for immediate reportability and operability. All hard copy operations, notification, and evaluation forms were brought to the shift manager for review and signature. The inspectors observed a shift manager process Operations, Notification, and Evaluation Form 97-412 that required the shift manager to request the joint engineering team to perform a quick technical evaluation to determine if equipment operability was affected. The quick technical evaluation was performed within the procedurally recommended 24-hour period.

The inspectors attended several operations, notification, and evaluation form meetings between April 22 and 29, 1997, a station operations review committee meeting on April 25, 1997, and an industry operating experience report review meeting on April 29, 1997. These groups performed the following functions:

- The operations, notification, and evaluation form meeting reviews and assigns proposed corrective action for each operations, notification, and evaluation form. The inspectors observed the operations, notification, and evaluation form board review, discuss, and assign work control review processes for each form reviewed.

- The operations, notification, and evaluation form meeting reviews each condition report for significance, determines priority level, and screens each for potential hazards to nuclear safety.

- The station operations review committee reviews all operations, notification, and evaluation forms that are considered to be a potential hazard to nuclear safety.

- The industry operating experience report review meeting reviews industry events, NRC information notices, and numerous industry-generated reports and notifications to ensure lessons learned from industry operating experience are utilized to improve plant safety.

The inspectors observed good communications between the various work groups, a questioning attitude, constructive discussions, comprehensive consideration of safety significance and root causes, acceptable prioritization of issues, and appropriate management attendance in every meeting. In general, the meetings were effective and well conducted.

c. Conclusions

The inspectors concluded that the day-to-day resolution of problems was handled in an effective manner through the operations, notification, and evaluation form process. Overall, the inspectors concluded that the operations staff handled the day-to-day resolution of problems in an effective manner. In general, the inspectors concluded that the safety review committees were effective in analyzing, assessing, and resolving issues. The committees were also effective in determining safety significance, prioritization, and appropriate root-cause determination.

O1.2 Review of Operator Logs and Records

a. Inspection Scope (40500)

The inspectors held discussions with operations personnel and reviewed operations shift managers logs and operations shift orders to determine if logged items met the threshold for writing a operations, notification, and evaluation form.

b. Observations and Findings

The inspectors reviewed station operations shift orders for the period between April 1-29, 1997. The shift orders provide operational information for each unit, status of equipment, operational guidance, and general information pertaining to operations department personnel.

The inspectors reviewed the Unit 2 shift managers logs for the period April 20 through May 20, 1996. The inspectors reviewed 11 adverse condition log entries. These log entries detailed equipment malfunctions and unexpected control room alarms. Of the 11 log entries, the inspectors verified that 9 log entries had operations, notification, and evaluation forms written and one did not meet the procedural requirement of an adverse condition. One log entry dated May 14, 1996, described isolating the Unit 2, Train A, Safety Injection Cross-Tie Valve 2-8821A to see if leaking Relief Valve 2-8853A was the cause for a level decrease in the safety injection accumulators. This log entry requested engineering to perform a quick technical evaluation to determine operability of the Train A safety injection system with the relief valve leaking by.

The licensee performed Technical Evaluation 96-515 on May 15, 1996, that described the relief valve being replaced. The licensee also performed Technical Evaluation 96-524, dated May 16, 1996, to address safety injection system past operability while relief Valve 2-8853A was leaking by. These technical evaluations were performed outside of the normal operations, notification, and evaluation form process. If a operations, notification, and evaluation form had been written, a quick technical evaluation would have been performed as originally requested by the shift manager.

The first Technical Evaluation 96-515 was performed within the procedurally recommended time frame for a quick technical evaluation; however, the second Technical Evaluation TE96-524 was performed a day later. The licensee missed an opportunity to take full advantage of the operations, notification, and evaluation form process to address issues of plant incident resolution, deficiency resolution, or engineering resolution. These issues were ultimately performed 1 month later on June 24, 1996, when Operations, Notification, and Evaluation Form 96-726 was written to address over-pressurization of the safety injection pump discharge header. The licensee became aware of this adverse condition due to recommendations to monitor system pressure, that were detailed in Technical Evaluation 96-510, dated May 15, 1996.

The inspectors questioned the licensee if a operations, notification, and evaluation form should have been written to document this problem. The licensee stated that a operations, notification, and evaluation form was required in this case, but had not been written.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

Procedure STA-421, "Operations, Notification and Evaluation (ONE) Form," Revision 5, provides a mechanism for plant personnel to report conditions which potentially threaten the safe operation of the plant. Attachment 8.A of this procedure includes examples of conditions that should be reported on an operations, notification, and evaluation form. The above example is consistent with these examples and, therefore, should have been documented on an operations, notification, and evaluation form.

The failure to initiate a operations, notification, and evaluation form is the first example of a violation of Criterion XVI (50-445;-446/9712-01).

c. Conclusions

The inspectors concluded that the licensee's threshold to write operations, notification, and evaluation forms was adequate. However, one example of the failure to write a operations, notification, and evaluation form resulted in a violation of Criterion XVI.

O2 Operational Status of Facilities and Equipment

O2.1 Operator Work-Arounds

a. Inspection Scope (40500)

The inspectors held discussions with operations personnel and reviewed station procedures regarding operator work-arounds, defined as items that require operators to take compensatory measures beyond the intended design of the plant and that could distract the operator from required actions during transient conditions.

b. Observations and Findings

The inspectors reviewed Operations Guideline 36, which described the process for controlling work-arounds and contained the duties and responsibilities of operations personnel with regard to work-arounds. The number of work-arounds had generally declined over the past year. Currently, both units had seven work-arounds identified. The inspectors verified that each operator work-around was tracked and scheduled for elimination by an maintenance action item.

The licensee also tracked items termed as operations priority work items, defined as equipment deficiencies that cannot or have not been corrected through normal corrective programs and that the operations department feels the need to identify and track under this program. The number of operations priority work items had remained relatively constant over the past year.

c. Conclusions

The inspectors concluded that operator work-arounds were receiving appropriate management attention and that resolution and closure of work-arounds was being performed in a timely manner consistent with licensee priorities.

O2.2 Operability and Reportability Determinations

a. Inspection Scope (40500)

The inspectors reviewed 22 operations, notification, and evaluation forms handled by operations to determine the adequacy of the operability and reportability determinations.

b. Observations and Findings

The operations shift manager reviews all operations, notification, and evaluation forms and documents whether an immediate impact on operability or reportability exists. If the shift manager has any question on the initial determination of operability, Procedure STA-422, "Processing of Operations Notification and Evaluation (ONE) Forms," Revision 12, requires the initiation of a quick technical evaluation. Quick technical evaluations by procedure are performed within 24 hours. The inspectors considered the immediate reportability determinations made by operations to be satisfactory.

The inspectors reviewed the operations, notification, and evaluation form operability assessments and their bases. Overall, the inspectors found the operability assessments and bases to be technically adequate. However, there were some instances where the operability determination was not well documented and the inspectors had to discuss the evaluation with licensee personnel to understand the basis for concluding that a degraded condition was operable.

c. Conclusions

The licensee was adequately handling operability and reportability determinations, however, some determinations had a less than desirable level of detail to fully describe the thought process used in the evaluation.

O3 Operations Procedures and Documentation

O3.1 Licensee Event Report 96-02

a. Inspection Scope (40500)

The inspectors reviewed Licensee Event Report 96-02 as part of a review of a feedwater isolation valve slow closure event discussed in Section E2.3.

b. Observations and Findings

The inspectors questioned the adequacy of Licensee Event Report 96-02, in that it did not reference previous similar events. In the event, Feedwater Isolation Valve 1-HV-2135 had stroked closed in greater than the 5-second limit imposed by the Technical Specifications. At the time that Licensee Event Report 96-02 was issued, the licensee was aware of numerous previous occurrences where the same valve had failed to stroke as required. Several of these previous events are discussed in Section E2.3 of the inspection report. However, the licensee provided the following statement in Licensee Event Report 96-02:

> "There have also been previous similar events related to slow closure of MFIVs on Unit 2. However, corrective actions taken to resolve the causes of the previous events would not have prevented this event."

Although the reference to Unit 2 valves was of uncertain origin, when questioned, the licensee was able to find a single instance in 1995 when Valve 2-HV-2137 had stroked closed in 5.91 seconds in lieu of the 5.0 second requirement. The previous events of slow closure of Valve 1-HV-2135 were not discussed in any other sections of Licensee Event Report 96-02.

Section III.B of Licensee Event Report 96-02 states, that a metal fragment in a hydraulic solenoid valve was the probable root cause of the failure and concluded that since the valve was installed in 1993 and that the fragment could not have entered the valve during service, that "MFIV 2 (1-HV-2135) is conservatively considered to have been inoperable from November 1993 until the solenoid valves were replaced on January 24, 1996." The use of the word "conservatively" suggested a lack of additional objective evidence related to the operability of this valve. This statement, coupled with the lack of mention of previous slow closures of the same valve, would leave an impression that the slow closure of Valve 1-HV-2135 on January 22, 1996, was the only known occurrence of this event.

10 CFR 50.73(b)(5) states, "The Licensee Event Report shall contain: Reference to any previous similar events at the same plant that are known to the licensee."

During the inspection, the licensee expressed disagreement with the inspectors' position that a discussion of the previous failures of Valve 1-HV-2135 was required within Licensee Event Report 96-02. This was based on the licensee's interpretation that the required discussion of previous occurrences was restricted solely to reported events within previous licensee event reports.

NUREG 1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," Revision 1, Second Draft, Section 5.2.1.(5), page 116, states:

> . . . previous occurrences should include previous events or conditions that involved the same underlying concern or reason as this event, such as the same root cause, failure, or sequence of events. For infrequent events such as fires, a rather broad interpretation should be used (e.g., all fires and, certainly all fires in the same building should be considered previous occurrences. For more frequent events such as ESF actuations, a narrower definition may be used (e.g., only those scrams with the same root cause). The intent of the rule is to identify generic or recurring problems.

NUREG 1022, "Licensee Event Reporting System," Supplement No. 1, Question and Answer 12.9, page 20, provides essentially the same guidance. Therefore, whether defining the feedwater isolation valve problem as a frequent or infrequent event, the guidance of NUREG 1022 clearly indicates that the same valve failing because of the same cause is within the scope of the 10 CFR 50.73 definition of similar events.

The failure to report previous occurrences of failure of Valve 1-HV-2135 in Licensee Event Report 96-02 is a violation of 10 CFR 50.73 (50-445/9712-02).

c. Conclusions

The inspectors concluded that the licensee had failed to provide required information concerning previous failures of Valve 1-HV-2135 in Licensee Event Report 96-02. This was identified as a violation of 10 CFR 50.73.

O4 Operator Knowledge and Performance

O4.1 Operator Involvement in the Corrective Action Process

a. Inspection Scope (40500)

The inspectors interviewed operations personnel to determine their knowledge and involvement in the corrective action process.

b. Observations and Findings

Operations staff management personnel were present and actively participated in the operations notification and evaluation committee, station operations review committee, and operations review committee meetings. All operations, notification, and evaluation forms were reviewed and approved by the control room shift manager.

Operational staff personnel were encouraged by management to write operations, notification, and evaluation forms. Operators interviewed by the inspectors stated that they were not reluctant to write operations, notification, and evaluation forms, and felt that if there was a doubt about an equipment issue, they could write a operations, notification, and evaluation form to ensure that the matter would be corrected.

c. Conclusions

The inspectors concluded that operations involvement in the corrective action process was satisfactory.

O7 Quality Assurance in Operations

O7.1 Operations Department Self Assessment

a. Inspection Scope (40500)

The inspectors reviewed two operations self assessments and four nuclear overview department evaluation reports. The review covered a wide variety of operations concerns (i.e., conduct of operations, plant status, procedures, facilities and equipment, and operator knowledge and performance.)

b. Observations and Findings

The inspectors reviewed the last two operations self assessments for completeness of reviews and trends. The inspectors interviewed the operations department head and questioned him on concerns mentioned in the last operations self assessment. The operations manager was aware of the status of most issues. However, when questioned on an issue that was a carryover item in the last two operations self assessments (i.e., the timely access to the hot tool room for auxiliary operators), the manager was not sure of the status of the issue. Upon further review with his staff, the manager was able to detail the corrective actions taken to correct the issue.

The inspectors reviewed four nuclear overview department evaluation reports. Report NOE-EVAL-96-000134, dated July 15, 1996, documented an unresolved item which referenced a 1995 Nuclear Overview Department evaluation that identified an improvement area regarding documentation of operability determinations associated with operations, notification, and evaluation forms and quick technical evaluations. Report NOE-EVAL-000200, dated February 20, 1997, addressed this unresolved item and described corrective actions taken by the operations shift manager to correct this issue. However, the unresolved item remained open pending further response from the shift operations manager following his assessment of the documentation of operability determinations on quick technical evaluations.

In light of this licensee-identified problem area, the inspectors reviewed 20 operations, notification, and evaluation form operability assessments and determined, in general, that operability determinations were adequately performed. One operations, notification, and evaluation form requested an operability determination; however, a quick technical evaluation had not been performed. It was not clear until the inspectors held discussions with plant staff that the operability issue had been adequately addressed. In a second instance, the shift managers log requested that a quick technical evaluation be performed to determine whether operability had been effected on a safety-related system due to a leaking relief valve. A operations, notification, and evaluation form was not written; however, a technical evaluation was performed the next day, which determined that the system had remained operable. This failure to write a operations, notification, and evaluation form is described in detail in Section O1.2 of this report.

c. Conclusions

Operations assessments were effective in identifying strengths and areas of concern. In general, actions were taken to correct recurring deficiencies. However, additional management attention is required in the area of assessment of the documentation of operability determinations and quick technical evaluations. Operations management was generally aware of strengths and concerns mentioned in operations self assessments.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Corrective Maintenance Orders

a. Inspection Scope (40500)

The inspectors reviewed 27 corrective maintenance orders to determine if repetitive problems existed and to determine if they were being used to improperly modify the plant design. In addition, the inspectors reviewed corrective maintenance work orders to determine if identified problems were being properly documented on operations, notification, and evaluation forms. The inspectors discussed several of the maintenance work orders with applicable licensee personnel.

b. Observations and Findings

The inspectors found that the corrective maintenance work orders were used appropriately for repair and replacement of plant equipment. The inspectors found no examples where the maintenance orders were improperly used to modify the plant design. In addition, no examples of repetitive maintenance were identified. The inspectors determined that the licensee had performed appropriate corrective actions for the corrective maintenance orders reviewed.

For the 27 corrective maintenance work orders reviewed, the licensee used operations, notification, and evaluation forms where required to document discrepant conditions.

c. Conclusions

The inspectors concluded that corrective maintenance work orders were appropriately used for repair and replacement of plant equipment.

M2.2 Maintenance Backlog

a. Inspection Scope (40500)

The inspectors reviewed the maintenance backlog of corrective maintenance work orders to determine the backlog size, the trend (i.e., increasing, decreasing or steady), how the backlog was tracked and managed, and how priorities were determined. The inspectors also discussed the backlog with applicable maintenance personnel.

b. Observations and Findings

The licensee's corrective maintenance safety-related work order backlog from April 1995 to April 1997 indicated a generally decreasing trend. In April 1995, the corrective maintenance backlog consisted of 278 open work orders. By April 1997, the backlog had decreased to 44 open items.

c. Conclusions

The inspectors concluded that the licensee's corrective maintenance backlog of work orders had decreased significantly over a 2-year period and was being effectively managed.

M2.3 Plant Walkdown

a. Inspection Scope (40500)

The inspectors conducted walkdowns of various plant areas to determine equipment operability and material condition. In addition, the inspectors conducted walkdowns to determine general plant housekeeping and plant material condition.

b. Observations and Findings

During the plant walkdowns, the inspectors noted that excellent plant housekeeping was being maintained as evidenced by an absence of leaks, debris, material storage problems, and indications of corrosion on equipment. The team found a few minor inconsistencies which were reported to the licensee. Specifically, the team found two safety chains on a platform which were too short to be connected in the Unit 2 turbine driven auxiliary feedwater room. In addition, two more safety chains that were too short to be connected in the turbine building. Also, the inspectors found some trash between the pump and the shielding over the pump in the Unit 2 Train A residual heat removal pump room. The licensee responded promptly to correct these deficiencies.

c. Conclusions

Overall, the inspectors concluded that both equipment material condition and plant housekeeping were excellent.

M7 Quality Assurance in Maintenance Activities

M7.1 Quality Assurance in Maintenance Activities

a. Inspection Scope (40500)

The inspectors reviewed "1996 Maintenance Functional Self Assessment," which was performed during the period of July 8-12, 1996. The inspectors discussed the findings with licensee personnel to determine if the corrective actions and recommendations that resulted from the self assessment were adequate and had been completed in a timely manner.

b. Observations and Findings

The inspectors found that the licensee's self assessment was thorough and critical of maintenance department processes. Some of the areas covered by the self assessment included the material condition of the plant, work control, preventive maintenance, and maintenance procedures and documentation. The inspectors sampled some of the recommendations from the self assessment and determined that the licensee had resolved the items adequately.

The self-assessment team reviewed operations, notification, and evaluation forms for a 2-year period to determine if actions taken as a result of the occurrences were effective at identifying the causes and preventing recurrence. One problematic issue identified by the self-assessment team was eight separate occurrences of ITT Grinnell diaphragm valve failures over the 2-year period. Seven of the valves had failed because of incorrectly installed finger plates (i.e., finger plate installed upside down), which resulted in tearing of the diaphragm when the valve was opened. The eighth failure resulted from misalignment of the compressor prior to reassembly.

The inspectors reviewed the six operations, notification, and evaluation forms and one work order that were generated to correct problems with the incorrectly installed finger plates. Operations, Notification, and Evaluation Form 94-902, dated July 6, 1994, identified that a finger plate had been installed upside down. However, since the licensee determined that no previous work had been performed on the valve by maintenance, the licensee determined this was an isolated manufacturer-related problem and that no further action was required. As the failures continued to occur, the licensee determined that the valve procedure associated with the failed valves lacked clear guidance as to the proper orientation of the finger plate during installation. Based on the self assessment's recommendation that all procedures relative to diaphragm valve assembly be revised to include appropriate instructions to preclude additional diaphragm valve failures, the licensee revised all of the diaphragm valve procedures.

The inspectors reviewed Work Order 3-95-322110-01, dated March 1996, which stated that the finger plate on Diaphragm Valve 2DD-0019 (Reactor Makeup Water Pump 2-01 discharge valve) had been installed upside down causing the diaphragm to tear. The inspectors determined that the licensee had not written a operations, notification, and evaluation form for this adverse condition.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

Procedure STA-421, "Operations, Notification and Evaluation (ONE) Form," Revision 5, provides a mechanism for plant personnel to report conditions which potentially threaten the safe operation of the plant. Attachment 8.A of this procedure includes examples of conditions that should be reported on a operations, notification, and evaluation form. The above example is consistent with these examples and, therefore, should have been documented on an operations, notification, and evaluation form.

The failure to identify this condition adverse to quality in accordance with Administrative Procedure STA-421 was considered to be the second example of a violation of Criterion XVI (50-445;-446/9712-01).

The inspectors also discussed with the licensee the six operations, notification, and evaluation forms and one work order that were initiated for incorrect finger plate installations and the resultant torn diaphragms. The inspectors asked the licensee what actions had been taken to ensure that other similar valves, both safety and nonsafety, installed in the plant were not affected by improper installation of the finger plates. The licensee stated that they had not completely reviewed the generic implications associated with incorrect installation of the finger plates.

Based on this concern, the licensee initiated Operations, Notification, and Evaluation Form 97-435, during the inspection on May 2, 1997. The form reviewed the generic implications of the finger plates and also attached a listing of approximately 500 diaphragm valves, in both safety-related and nonsafety-related systems, where the potential existed for incorrect installation of the finger plates. The licensee performed an operability review and determined that the valves were operable based on the fact that there had not been a failure of a diaphragm valve for over a year and that some of the valves had been opened and had not failed. The inspectors considered the operability review to be justified pending the additional actions the licensee intended to take to fully assess the situation.

The licensee's failure to take adequate corrective action to review the generic implications of the diaphragm failures was the third example of a violation of Criterion XVI (50-445;-446/9712-03)

c. Conclusions

The inspectors concluded that the 1996 Maintenance Functional Self Assessment was thorough, critical, and effective. In addition, the inspectors concluded that the licensee had initiated appropriate responses to the recommendations in the report. However, the inspectors identified two violations that had not been identified by the self assessment. Specifically, the licensee had failed to initiate a operations, notification, and evaluation form for the incorrect installation of the finger plate on Diaphragm Valve 2DD-0019 (Reactor Makeup Water Pump 2-01 discharge valve). In addition, the licensee failed to evaluate the generic aspects of the diaphragm failures until prompted by the NRC inspectors. These examples were identified as violations of 10 CFR Part 50, Appendix B, Criterion XVI.

III. Engineering

E2 Engineering Support of Facilities and Equipment

E2.1 Engineering Support of Operating Experience

a. Inspection Scope (40500)

The inspectors reviewed the licensee's response to the information notices and 10 CFR Part 21 reports identified in the attachment to this inspection report.

b. Observations and Findings

The inspectors observed that the licensee appropriately addressed each technical issue discussed in the listed reports. The licensee implemented corrective actions as necessary to disposition the resulting technical findings.

c. Conclusions

The inspectors concluded that the licensee had satisfactorily addressed the technical issues discussed in the listed reports.

E2.2 Engineering Support in Operability Determinations

a. Scope (40500)

The inspectors reviewed six quick turnaround evaluations performed by engineering, as listed in the attachment to this inspection report. The quick turnaround evaluation process provides a 24-hour operability evaluation for conditions that cannot be independently assessed by operations personnel.

b. Observations and Findings

The inspectors did not identify any concerns related to the analyses performed by engineering to determine the operability of degraded equipment as described in the quick turnaround evaluations reports.

c. Conclusions

The inspectors concluded that engineering performed an acceptable assessment of operability within each quick turnaround evaluation reviewed.

E2.3 Engineering Support of operations, notification, and evaluation Forms

a. Inspection Scope (40500)

The inspectors selected a sample of operations, notification, and evaluation forms that were assigned to engineering for resolution. These are included in a list of operations, notification, and evaluation forms in the attachment to this inspection report. The inspectors reviewed the reports and arranged meetings with licensee engineers to discuss questions that arose during the reviews.

b. Observations and Findings

b.1 General Assessment

The inspectors reviewed 47 operations, notification, and evaluation forms that were principally dispositioned by engineering. These reports were of high quality, including complete descriptions of the problem, well-conceived root-cause evaluations, and appropriate application of corrective actions. Of particular note was the consistent consideration of the generic consequences of the identified problem. The operations, notification, and evaluation form prompted the reviewer to document an evaluation of the potential for the identified problem to be present in other applications. The inspectors identified this as a strength.

The inspectors identified issues specific to several of the reviewed operations, notification, and evaluation forms, as discussed below.

b.2 Feedwater Isolation Valve Slow Closure - The inspectors reviewed Plant Incident Report 96-055, which described the licensee's investigation into the events following a Unit 1 trip on January 22, 1996. A plant incident report functions similarly to a operations, notification, and evaluation form, but is reserved for more significant events. During the event, a loss of power to Panel 1EC1 resulted in a close signal being sent to all four feedwater isolation valves. However, one of these valves (1-HV-2135) was noted by the operators to be in a mid position. This valve closed in 38 seconds, but is required by Technical Specification 4.7.1.6 to close within 5 seconds.

Upon investigation, the licensee discovered a small metal fragment between the fluid filter screens and valve internals of the Train A Hydraulic Solenoid Valve 1-HV-2135-SV1. The licensee concluded that the fragment, in restricting the free flow of hydraulic fluid, was the root cause of the valve's failure to close in the required time.

This event was reviewed by a task team during the post-recovery period as documented in NRC Inspection Reports 50-445;-446/96-02 and 50-445;-446/96-06. During this time, the licensee determined that the post-maintenance test methods used on Valve 1-HV-2135 following various troubleshooting efforts were inadequate. Specifically, the test procedure energized both the Trains A and B solenoids in order to verify closure of the valve within the required time. Since one train was capable of closing the valve within its required time limit, the proper functioning of one train could mask any deficiencies in the train on which maintenance was performed. The licensee identified that the correct post-maintenance test for operability should have been the train specific response time test in accordance with Surveillance Procedure PPT-S1-9404B, "Feedwater Isolation Valve Response Time Test, Train B," Revision 1. The failure to specify the correct post-maintenance test was identified as a noncited violation in NRC Inspection Report 50-445;-446/96-06.

During this inspection, the inspectors noted that Plant Incident Report 96-055 discussed several past events where Valve 1-HV-2135 had stroked closed in greater than the Technical Specification time limit. However, the plant incident report did not evaluate why the corrective action process had failed to identify the root cause and correct the inoperable condition. The following is a timeline of several of the events leading up to the January 22, 1996, event.

- On March 4, 1995, Valve 1-HV-2135 stoked closed in greater than 25 seconds during the performance of Surveillance Test OPT-511A. Operations, Notification, and Evaluation Form 95-181 was written to investigate. However, the form was written in such a way that the root cause of the test failure was presumed to be a limit switch problem. After checking the limit switches, the valve tested satisfactorily. The licensee missed an opportunity to correct the problem at this time because of a presumptive approach to the troubleshooting effort combined with a lack of sensitivity to the potential for an intermittent failure mechanism.

- On November 19, 1995, Valve 1-HV-2135 stoked closed in approximately 88 to 112 seconds following a Unit 1 trip. The licensee informed the inspectors that the operators noted the slow closure. The valve was retested satisfactorily and returned to service. An operations, notification, and evaluation form was not written to investigate the failure. Later, in the process of investigating the January 22 event on January 30, 1996, Operations, Notification, and Evaluation Form 96-0080 was written following a review of plant computer data that confirmed the slow closure.

On January 17, 1996, the operators again noted that Valve 1-HV-2135 was in a mid-position following a Unit 1 trip. Again, an operations, notification, and evaluation form was not processed and less than adequate action was taken to troubleshoot the valve failure. As a result, the inoperable condition of Valve 1-HV-2135 was not identified, and the unit was restarted. Had the event of January 22, 1996, not occurred, the inoperable condition of Valve 1-HV-2135 would most likely not have been discovered for an extended period of time.

The inspectors observed that Plant Incident Report 96-055 reported, but did not evaluate the consequences of the above events and several others that occurred during the approximate 3-year period during which Valve 1-HV-2135 was intermittently inoperable. As a result, corrective actions were not taken addressing the deficiencies that permitted this safety significant condition to go uncorrected for an extended period of time.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

The licensee's failure, on numerous previous occasions, to properly assess the root cause of the failure of Feedwater Isolation Valve 1-HV-2135 to stroke closed within design parameters resulted in this valve being inoperable for an extended period of time. Because the timely closure of this valve is assumed within the safety analysis of the plant to prevent overcooling of the reactor or to isolate a faulted steam generator, the failure to earlier identify and correct this condition represented a significant condition adverse to quality. Although Plant Incident Report 96-055 identified this significant condition adverse to quality, it failed to determine the cause of the condition or to take corrective action to preclude repetition.

This issue was identified as the fourth example of a violation of 10 CFR Part 50, Appendix B, Criterion XVI (50-445;-446/9712-03).

b.3 Ellis and Watts Cooling Coil Fan Motors during Tornado - NRC Inspection Report 99901308/96-01 documented a vendor audit of Ellis and Watts, Division of Dynamics Corporation of America. This inspection report documented a concern regarding the cooling coil fan motors purchased by Comanche Peak, in that, the fans had not undergone a proper commercial-grade dedication by the vendor. Specifically, the dedication plans did not address verification of a critical characteristic of the fan motors involving their capability to operate during tornado conditions at a reduced pressure of 11.7 psia.

The licensee issued Operations, Notification, and Evaluation Form 96-1541 to address this issue and performed Calculation ME-CA-0000-4098, Revision 0, to perform the tornado analysis. Using a computer model, the calculation assumed that the pressure would decrease rapidly from 14.7 to 11.7 psia, hold at 11.7 psia for approximately 10 seconds, and then rapidly recover. The maximum pressure drop across the coolers during the transient was calculated to be 0.0209 psi, which is approximately 60 percent of the pressure drop at which the unit filters are recommended for replacement. Based on these facts, the licensee concluded that the fan cooler units would continue to operate during and after a tornado.

The inspectors reviewed Calculation ME-CA-0000-4098 and considered that the analysis adequately addressed the procurement discrepancy discussed in NRC Inspection Report 99901308/96-01.

b.4 MOVATS MUTN 96-02 - The licensee initiated Operations, Notification, and Evaluation Form 96-1487 to address a maintenance update (MUTN 96-02) received from MOVATS addressing previously unaccounted errors in the MOVATS 3500 strain module. The inspectors inquired as to the licensee's response to Supplement 1 of MUTN 96-02. The licensee stated that, because of administrative changes the supplement was misrouted and was not processed as a operations, notification, and evaluation form. However, a faxed copy of the supplement was received by the licensee's motor-operated valve group. The licensee had investigated some of the technical details of the notice, but a operations, notification, and evaluation form had not been initiated.

In response to the inspectors' questioning of this issue, the licensee initiated Operations, Notification, and Evaluation Form 97-405, to address the immediate operability and reportability questions related to the supplement. The inspectors considered the form to have satisfactorily addressed the immediate operability consequences.

10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, "Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected."

Procedure STA-421, "Operations, Notification and Evaluation (ONE) Form," Revision 5, provides a mechanism for plant personnel to report conditions which potentially threaten the safe operation of the plant. Attachment 8.A of this procedure includes examples of conditions that should be reported on a operations, notification, and evaluation form. The above example is consistent with these examples and, therefore, should have been documented on an operations, notification, and evaluation form.

The failure to identify a condition adverse to quality in response to receipt of the adverse vendor information is considered the fifth example of a violation of Criterion XVI (50-445;-446/9712-01).

b.5 Shelf Life of Diaphragms - The inspectors reviewed Operations, Notification, and Evaluation Forms 97-409 and 97-420, dated April 25 and 29, 1997, respectively, which concerned various actuator diaphragms stored in the warehouse that had developed cracks. The majority of the diaphragms had been purchased from Fisher Controls and Copes Vulcan. The inspectors also reviewed Procedure ECE 6.08, "Determination of Shelf Life," Revision 0, which identified that nitrile elastomer diaphragms had a shelf life of 14 years based on an Electric Power Research Institute guideline. However, the inspectors noted that the manufacturer had recommended a shelf life of 2 years for the diaphragms, which could be extended to 6 years if certain conditions were met. The licensee was currently reviewing the issue to determine whether a revision to the shelf life of the diaphragms was needed. This issue was identified as an inspection followup item (50-445;-446/9712-04).

c. Conclusions

Generally, the licensee's performance in the dispositioning of operations, notification, and evaluation forms was good. In particular, the treatment of generic concerns was comprehensive. Some exceptions were noted, including a violation for failure to take adequate corrective actions and for failing to initiate a necessary operations, notification, and evaluation form.

E2.4 Maintenance Alterations

a. Inspection Scope (40500)

The inspectors selected a sample of maintenance alterations that were assigned to engineering for resolution, as listed in the attachment to this inspection report. The inspectors reviewed the maintenance alterations and arranged meetings with licensee personnel to discuss questions that arose during the reviews.

b. Observations and Findings

The inspectors reviewed Procedure ECE 5.01-07, "Maintenance Alteration Evaluations," Revision 2, which provided the method and criteria for determining if the change was a maintenance alteration or a modification to the plant. According to the licensee, the maintenance alteration process met at least the minimum requirements of 10 CFR Part 50, Appendix B, Criterion III, "Design Control." However, the level of detail from an administrative and budgetary perspective was less than that used in the design modification process.

The inspectors noted that a maintenance alteration allowed some configuration changes to systems, structures, and components. The procedure defined a maintenance alteration as a configuration change that did not change the existing licensing or design basis. The inspectors determined that the criteria defining which changes met the definition of a maintenance alteration were vague, leaving much of the decision-making to the responsible engineer. However, one definite stipulation was that any change requiring a 10 CFR 50.59 safety evaluation could not be processed as a maintenance alteration.

The inspectors reviewed Administrative Procedure STA-707, "10 CFR 50.59 Reviews," Revision 13, which established and maintained the licensee's safety evaluation program. The inspectors found that this procedure referenced another procedure titled "10 CFR 50.59 Review Guide," Revision 4, for guidance for performing safety evaluations. The inspectors noted that the review guide defined "trivial changes" as being modifications that did not constitute changes to the facility as described in the Safety Analysis Report. The review guide stated that trivial changes did not require a 10 CFR 50.59 safety evaluation and instructed licensee personnel to answer "NO" to the relevant 10 CFR 50.59 screening questions. Within the review guide, the licensee defined seven categories of "trivial changes" as follows.

- Editorial changes
- Clarifications
- Relocation of information to a more appropriate section
- Revisions to make supporting sections of the licensing basis document consistent
- Organizational changes
- Deletion of existing information which was believed to be below the level of detail required to be included in the Final Safety Analysis Report
- Minor changes, which had no potential safety impact

The inspectors consulted with the Office of Nuclear Reactor Regulation and concluded that the last two categories of the licensee's definition allowed changes were potentially beyond the scope of trivial changes as discussed in NRC guidance documents. The NRC definition of "trivial changes" [discussed, in part, in Inspection and Enforcement Manual Chapter, Part 9800, "CFR Discussions, Changes to Facilities, Procedures and Tests (or Experiments)," Section D.7.d, dated January 1, 1984] included editorial, organizational, and typographical changes, but did not extend to changes involving physical changes to the plant configuration that resulted in a revision to plant drawings included in the Final Safety Analysis Report.

The inspectors reviewed a sample of maintenance alterations and identified four examples where the licensee had made a trivial change without performing a safety evaluation as required by 10 CFR 50.59. These are listed below.

- Maintenance Alteration Design Change Notice 10490, Revision 0, involved changing the valve lineup to bypass a flow transmitter by opening a bypass line for the reactor coolant post accident sampling system sample cooler. This change was not trivial because it involved a revision to Drawing M1-0228-01, which was included in the Final Safety Analysis Report.

- Maintenance Alteration Design Change Notice 10714, Revision 0, involved deleting two feedwater drain valves. This change was not trivial because it involved a revision to Drawing M2-0203-01A, which was included in the Final Safety Analysis Report.

- Maintenance Alteration Design Change Notice 10445, Revision 0, involved removing the internals of a instrument air check valve on the discharge side of an instrument air compressor. This change was not trivial because it involved a revision to Drawing M1-0216, which was included in the Final Safety Analysis Report.

- Maintenance Alteration Design Change Notice 9013, Revision 1, involved a generic replacement of globe and hermetically sealed valves in nonprocess applications with ball valves. This change was applicable for both safety and nonsafety applications. The activity screening stated that specific applications would be indicated on the flow diagrams by means of an optional valve symbol as reflected on the flow diagram Legend M1-200. These changes were not trivial because Drawings M1-0242, M1-0269, M1-0311, M2-0210, M2-0215, M1-0200, M1-0210, M1-0215, and M1-0241 included within the Final Safety Analysis Report were revised.

The licensee considered each of the four examples to meet the definition of a "trivial change" (i.e., minor changes which had no potential safety impact). In each case, the 10 CFR 50.59 screening question asking whether the change resulted in a change to the facility, as described in the Final Safety Analysis Report, was marked "NO." However, the inspectors concluded that the four examples did not represent trivial plant configuration changes because they involved revisions to the drawings in the Final Safety Analysis Report. Because the licensee had, in fact, changed the facility as described in the Final Safety Analysis Report, a safety evaluation was required by 10 CFR 50.59 to determine whether an unreviewed safety question existed.

10 CFR 50.59(a)(1) states, " . . . the holder of a license authorizing operation of a production utilization facility may (i) make changes in the facility as described in the safety analysis report . . . unless the proposed change . . . involves . . . an unreviewed safety question."

10 CFR 50.59(b)(1) states that, " . . . the licensee shall maintain records of changes in the facility . . . to the extent that these changes constitute changes in the facility as described in the safety analysis report . . . These records must include a written safety evaluation which provides the basis for the determination that the change . . . does not involve an unreviewed safety question."

The failure to perform and document a safety evaluation for the four design change notices was identified as a violation (50-445;-446/9712-05).

During the inspection and at the exit meeting, the licensee disagreed with the proposed violation because this practice had been accepted in previous NRC inspections. With regard to this discussion, the licensee indicated the following:

(1) There had been previous NRC inspections of the licensee's 10 CFR 50.59 procedures and guidelines, and that all of these inspections had come to positive conclusions with respect to the licensee's implementation of 10 CFR 50.59.

(2) Inspection Report 50-445;-446/93-32, Section 2.2.2, describing the review of Temporary Modification 92-1-05, constituted a review and acceptance of the licensee's definition of a "trivial change."

With regard to example (1), the inspectors noted that NRC acceptance of a position is not conferred by the lack of reference to an issue within a report. As such, licensees should not conclude that every undocumented element of a reviewed program has been accepted by the NRC.

With regard to example (2), the inspectors noted that the discussion in Section 2.2.2 of the inspection report did not review and approve the licensee's design change program with respect to "trivial changes". The inspection documented that a safety evaluation had not been performed for a temporary modification to the reactor vessel level instrumentation, which involved a clear change to the facility as described in the licensing basis documents. The inspectors noted that the change should have been implemented as a "trivial" type change because the change had no potential safety impact. The inspectors were concerned about the need to carefully follow administrative procedures to ensure that changes to the facility were properly evaluated. The inspectors also were concerned that the change had been accomplished as a temporary modification vice a permanent change to the facility; however, they concluded that this error was isolated and of minor safety significance. Nevertheless, these views and concerns cannot be reasonably construed to be NRC approval of the licensee's program for use of "trivial changes". The example represented an isolated instance, which was not reviewed by the Office of Nuclear Reactor Regulation. Therefore, the inspectors concluded that this current violation is appropriate.

c. Conclusions

The inspectors concluded that the procedure used for maintenance alterations was weak, in that, it did not clearly specify the criteria for determining when a maintenance alteration could be performed instead of a modification. In addition, the inspectors concluded that the licensee's 10 CFR 50.59 Review Guide incorrectly defined "trivial changes". As such, the inspectors identified four examples of the failure to perform safety evaluations required by 10 CFR 50.59.

E2.5 Engineering Backlog

a. Inspection Scope (40500)

The inspectors reviewed the licensee's engineering backlog to determine the backlog size, how the backlog was tracked and managed, and how priorities were determined. In addition, the inspectors reviewed the backlog to determine the backlog trend (i.e., increasing, decreasing, or steady).

b. Observations and Findings

The inspectors reviewed the backlog and found that as of April 1997 there were a total of 2586 open action items. Based on a graph that plotted open action items from April 1995 through April 1997, a slight decreasing trend existed over the 2-year period. In April of 1995 there had been a total of approximately 3400 open action items. Out of the current open 2586 action items, 1202 of the items were safety related. These open items included 419 operations, notification, and evaluation forms, 53 maintenance alterations, 283 design change notices, 99 technical evaluations, and other items.

c. Conclusions

The inspectors concluded that the licensee was controlling the backlog at an acceptable level with a declining trend over the past 2 years.

E7 Quality Assurance in Engineering Activities

E7.1 Quality Assurance Audits and Self Assessments

a. Inspection Scope (40500)

To evaluate the effectiveness of the licensee's controls in identifying and resolving plant problems, the inspectors selected and reviewed the licensee's corrective actions for nine observations from the licensee's self-assessment report, "1995 Engineering Self-Assessment Report," dated September 1996.

b. Observations and Findings

The inspectors reviewed the licensee's responses to nine observations generated from the 1996 engineering self assessment and discussed them with the applicable engineering personnel to determine the adequacy of the action item response. The inspectors reviewed the licensee's action plan for the 1995 engineering self assessment and found that each finding from the self assessment had been addressed.

Two of the recommendations concerned developing a restoration plan for each of the active temporary modifications and developing and implementing a priority scheme that complemented the site-wide priority scheme and prioritized work. The licensee stated that they had created a system health report, which was issued quarterly. The inspectors reviewed the fourth quarter 1996 report and found that it was a very good tool for system engineers and management to focus attention and resources on the systems that failed to meet performance goals.

The inspectors noted that each plant system was rated using four assessment colors. To rate the systems, each system engineer met quarterly with dedicated personnel from maintenance, operations, and modification engineering to discuss the system and determine its rating and trend. The inspectors found that each system report contained a justification for the system rating, short-term corrective actions or recommendations for improvement, long-term corrective actions, and temporary modifications installed. The report also contained information on system unavailability, reliability, and listed operational concerns.

The inspectors found that the licensee had adequately dispositioned the action items and had resolved the issues. The inspectors concluded that the system health reports and the dedicated teams assigned to each system were a strength.

c. Conclusions

The inspectors concluded that the licensee had adequately dispositioned nine observations selected from the 1995 engineering self assessment. The inspectors also concluded that the system health reports and the dedicated teams for each system were a strength.

E7.2 Root-Cause Analysis

a. Inspection Scope (40500)

Within the condition reports listed in the attachment, the inspectors reviewed root-cause analyses performed by the licensee.

b. Observations and Findings

In general, the licensee's root cause analyses were comprehensive and broad scoped. The identified root causes appeared to be consistent with the reported facts. One exception was Plant Incident Report 96-055, where the root cause process failed to consider previous failures to identify a safety significant deficiency (see Section E2.3).

c. Conclusions

The licensee had implemented a good root cause analysis process. Only one root cause reviewed during the inspection was observed to be deficient.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) Inspection Followup Item 445/9601-02: Unit 2 Refueling Water Storage Tank Degradation

Background - This item involved a possible leak from the Unit 2 refueling water storage tank. White deposits had been found on the surface of the tank. All questions had been resolved except for two: (1) the potential for an unmonitored release path and (2) the potential for long-term degradation of the tank rebar from boric acid corrosion.

Inspector Followup - The inspectors reviewed Calculation CS-CA-0000-5013, Revision 0, which evaluated the potential degradation of the reinforcing steel in the refueling water storage tank concrete structure. The calculation indicated that a minimum design margin of 29 percent was available for the critical load case, but also concluded that some corrosion of rebar may be occurring based on the presence of iron oxide in the precipitate. The licensee concluded that the extent of existing and future corrosion would not threaten the available margin. Upon observations of the exterior of the tank, the inspectors did not detect any indications of active leaks. The pressure grouting applied by the licensee was evident in the lower sections of the tank and appeared to be holding well.

The inspectors concluded that the issue was adequately resolved for the current time. Ongoing examinations of the tank conducted during routine plant walkdowns should be sufficient to detect future leaks. If necessary, the issue could be reopened at that time.

E8.2 (Closed) Inspection Followup Item 50-445;-446/9310-07: Use of Run Efficiency

Background - This item identified the practice by the licensee of using run efficiency in the equation for predicting the unseating capability of some of its motor-operated valves. The actuator vendor, Limitorque, had not endorsed the use of run efficiency for the opening direction, instead recommending use of a lower pullout efficiency for this application.

Inspector Followup - During this inspection, the inspectors discussed this issue with a licensee motor-operated valve expert. For certain applications, Comanche Peak was still using run efficiency for the open analysis. However, the following two factors, not typically considered, were also included in the calculation of pullout capability: (1) a factor accounting for torque losses due to a stem-thrust effect of approximate magnitude to account for the difference between run and pullout efficiency, and (2) the use of a 0.9 application factor in lieu of the 1.0 application factor endorsed by Limitorque for instances where the limiting voltage is less than 90 percent rated. In recognition of these facts and the extensive testing the licensee performed to justify their methodology, the inspectors considered the issue to be resolved at Comanche Peak. However, this does not confer a generic NRC endorsement to use run efficiency for motor-operated valve open capability analyses.

E8.3 (Closed) Inspection Followup Item 445,446/9505-01: Thermo-Lag Issues

Background - This item involved issues related to the use of Thermo-Lag fire barriers at Comanche Peak. One of these concerns involved the use of TU Electric Test Scheme 15-2, in which a localized heat affected zone was observed on a single cable. The other issue involved a number of Thermo-Lag discrepancies in Unit 2 that were documented in TU Engineering Report ER-ME-100, "Evaluation of Unit 2 Thermo-Lag Fire Barrier Discrepancies," Revision 0, dated February 15, 1995. During a previous inspection, this report had been in draft.

Inspector Followup - During the current inspection, the inspectors verified that in a letter dated May 22, 1996, the NRC accepted Scheme 15-2, except for cables smaller than 750 KcMil [MCM]. In a Letter TXX-97047, dated February 28, 1997, the licensee stated that TU Electric Test Scheme 15-2 is not used to certify configurations that are less than 750 MCM cable.

The inspectors also reviewed the completed report and discussed this issue with the site Thermo-Lag licensing contact. Based on this, the inspectors concluded that the licensee had, in their detailed review of 10 percent of these discrepancies, established a reasonable basis for discontinuing the fire watches initiated in response to these discrepancies. However, the licensee, for other reasons, had retained the fire watches throughout this time period to the present.

Although certain issues related to Thermo-Lag at Comanche Peak remain open, the inspectors concluded that this inspection followup item could be closed. Remaining issues are being resolved under an ongoing dialogue between the licensee and the Office of Nuclear Reactor Regulation.

E8.4 (Closed) Inspection Followup Item 50-445;-446/9710-02: Temporary Shielding

Background - During a routine plant tour, the inspectors observed temporary lead shielding in the plant that was secured with the use of plastic tie wrap. Based on the concern that the temporary shielding could detach and damage surrounding equipment, the inspectors questioned the engineering analysis that had been performed for this method of installation.

Inspector Followup - The licensee stated that eight temporary shielding installations existed in the radiation controlled area of both units, some for greater than 2 years. The inspectors observed temporary shielding installed in several of these areas, and noted that it was within the vicinity of other safety-related piping and components. The temporary shielding was secured with white, plastic tie wraps.

The inspectors reviewed Calculation ECE-PSE-139, dated August 21, 1990, that allowed the installation of temporary shielding within the guidelines described in Procedure RPI-608, "Quality-Related Control of Temporary Shielding," Revision 5, dated May 26, 1994, and found that an analysis of the securing mechanism (i.e., plastic tie wraps) for temporary shielding had not been provided. The calculation did address the additional piping loads generated by the shielding, but did not evaluate the capability of the plastic tie wrap to keep the shielding in place during seismic or other events. The lack of consideration of the tie wrap strength for these installations was considered a weakness in the calculation method employed for this application.

In response to the inspectors' concerns, the licensee issued Operations, Notification, and Evaluation Form 97-429 and attached a technical evaluation of the acceptability of the tie wrap attachments. The evaluation concluded that for three of the eight existing installations, the loads generated by a seismic event would exceed the vendor's recommended loading, but would not exceed the loop tensile strength. For one of the eight existing temporary shielding installations, the calculation stated that the installation was unacceptable; however, the licensee found no seismic Category II/I concerns in the area where this shielding was installed. Therefore, for this installation, falling shielding would not cause an operability concern.

On May 2, 1997, the licensee issued Shift Order 97-05, which stated, "Temporary shielding in the plant which is secured using plastic tie wraps must be inspected if a seismic event or plant transient has occurred." The inspectors considered the technical evaluation in combination with Shift Order 97-05 to have satisfactorily addressed the immediate operability concerns related to this issue.

The inspectors noted that there were both white and blue, plastic tie wraps securing shielding in various locations in the radiation controlled area; however, only blue tie wraps were available in the tool room. However, licensee personnel provided conflicting answers concerning which tie wraps should be used to secure temporary shielding. For example, a radiation protection technician told the inspectors that white, plastic tie wraps were to be used in radiation areas. A joint engineering team

supervisor told the inspectors that blue, plastic tie wraps should be used in radiation areas (and had, in fact, tested blue tie wraps for tensile strength in response to this issue). Personnel in the tool room stated that blue, plastic tie wraps were issued for installing shielding in the radiation controlled area. Finally, the acting radiation protection manager stated that the only distinction between blue and white tie wraps were for foreign material exclusion control in containment where only blue tie wraps were to be used.

Procedure RPI-608, "Quality-Related Control of Temporary Shielding," Revision 5, dated May 26, 1994, allowed for the installation of lead shielding on both safety and nonsafety-related systems. Attachment 2 to Procedure RPI-608, "Shielding Installation Guidelines," stated that plastic tie wraps were acceptable as securing devices. However, the attachment failed to specify the type or size of the tie-wraps to use and failed to provide guidelines on how to correctly secure the temporary shielding, such as the maximum spacing between the attachments. The inspectors concluded that Procedure RPI-608 was inadequate to control the installation of temporary shielding and ensure that the temporary shielding did not adversely affect safety-related components.

10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented procedures and instructions appropriate to the circumstances.

The failure of Procedure RPI-608 to provide adequate installation instructions for the installation of temporary shielding was identified as a violation of 10 CFR 50, Appendix B, Criterion V (50-445;-446/9712-06).

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on May 2, 1997. The licensee acknowledged the findings presented. The licensee disagreed with two of the proposed violations involving the failure (1) to provide information regarding previous failures of a valve discussed in Licensee Event Report 96-02; and (2) to perform a safety evaluation for several plant changes which the licensee classified as "trivial changes". As discussed in Sections O3.1 and E2.4 of the inspection report, we have concluded that (1) the information omitted from the Licensee Event Report was clearly within the scope of the intent of the existing regulations, and (2) our previous inspections did not approve the licensee's method of implementing "trivial changes".

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. Barker, Engineering Overview Manager
O. Bhatty, Senior Regulatory Compliance Specialist
R. Bird, Nuclear Planning Manager
M. Blevins, Plant Manager
D. Buschbaum, Technical Compliance Manager
R. Byrd, Smart Team 2 Manager
R. Calder, Executive Assistant
J. Curtis, Radiation Protection Manager
R. Cutlip, Maintenance Support
D. Deperro, Smart Team 3 System Supervisor
S. Ellis, Smart Team 1 Manager
J. Finneran, Smart Team Design Load
R. Flores, System Engineering Manager
W. Grace, Safety Services Manager
W. Guldemond, Shift Operations Manager
T. Hope, Regulatory Compliance Manager
T. Jenkins, Smart Team 3 Manager
J. Kelly, Vice President, Nuclear Engineering and Support
M. Killgore, Nuclear Engineering Manager
D. Kross, Work Control Manager
B. Lancaster, Plant Support Manager
H. Lancaster, Operations
F. Madden, Technical Support Manager
D. McAfee, Programs Overview Manager
G. Merka, Regulatory Affairs
M. Sunseri, Nuclear Training Manager
C. Terry, Group Vice President, Nuclear Production
R. Walker, Regulatory Affairs Manager
D. Weyardt, Smart Team 2 Support

NRC

V. Ordaz, Resident Inspector
T. Polich, Project Manager

INSPECTION PROCEDURES USED

IP 40500	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 92903	Followup - Engineering

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-445;-446/9712-01	VIO	Failure to Initiate Operations, Notification, and Evaluation Form
50-445/9712-02	VIO	Inadequate Licensee Event Report
50-445;-446/9712-03	VIO	Inadequate Corrective Actions
50-445;-446/9712-04	IFI	Diaphragm Shelf Life
50-445;-446/9712-05	VIO	Inadequate 10 CFR 50.59 Evaluation
50-445;-446/9712-06	VIO	Inadequate Temporary Shielding Installation Procedure

Closed

50-445;-446/9310-07	IFI	Run Efficiency for Motor-Operated Valve Opening Analysis
50-445;-446/9505-01	IFI	Thermo-lag Issues
50-445;-446/9601-02	IFI	Unit 2 Refueling Water Storage Tank Degradation
50-445:-446/9710-02	IFI	Inadequate Temporary Shielding

LIST OF DOCUMENTS REVIEWED

PROCEDURES

STA-421	Operations Notification and Evaluation (ONE) Form, Revision 5
STA-422	Processing of Operations Notification and Evaluation (ONE) Forms, Revision 12
STA-504	Technical Evaluation, Revision 11

ODA-102	Conduct of Operations, Revision 16
NQA-2.30	Industry Operating Experience Report Review Program
ECE 6.08	Determination of Shelf Life
ECE 5.01-07	Maintenance Alteration Evaluations
STA-707	10 CFR 50.59 Reviews
N/A	10 CFR 50.59 Review Guide, Revision 4

ONE FORMS

Operations

95-790	Spurious containment ventilation isolation signal
95-985	Leaking S/G blowdown containment isolation valve
95-1001	Two valves in boric acid flowpath found out of position
96-100	Operator mistakenly started CCP instead of BAMUP
96-410	Auxiliary Operator closed wrong valve removing RHR from service
96-460	Improper fuse installed in fuse block
96-572	Noisy source range channels causes swapover of CP suction to RWST
96-579	MSIV hydraulic oil pump failed to maintain required pressure
96-601	I&C inadequately restored MFP turbine control computers causing turbine trip
96-634	Unit unable to reach full power due to MSR drain line size
96-723	Inadvertent boration while filling & venting BTRS
96-726	Overpressurization of SI discharge piping
96-736	Penetration seal breach without LCOAR tracking
96-830	Rod control power supply failure
96-1102	Reactor vessel level fluctuation during draindown
96-1145	Chiller tripped due to combination of things
96-1182	Breaker failed to open de-energizing bus causing Rx trip
96-1359	Fire door/RCA boundary found open
96-1455	Excessive load increase causing letdown to isolate

Maintenance

96-0166	Erosion of ECCS Throttle Valves
96-0088	Valves Fail Leak Test
95-1144	Valve Would Not Open Manually
95-0864	10 CFR Part 21 Cylinder Liners
96-1064	MOV Testing Deficiency
95-0007	DCN Closed Before Grinding Work was Performed
95-0030	Camshaft Cover Bolts Discrepancies
95-0720	TD-AFW Pump Alignment Out-of-Balance

Engineering

96-0080	FWIV Slow Closure
96-0308	MOV Failed to Open
96-0352	MOV Fails to Fully Close
96-0408	Safety Injection Pump Exceeds Max Head Limits
96-0429	MOV Failed Closed
96-0862	MOV Unseating Problem
96-0781	Starting Air Block Valve
96-0910	EDG Generator Frequency Unstable
96-1487	10 CFR Part 21 MOVATS 3500 Strain Module
95-0018	Failure to Perform Impact Reviews on Minor Modification
95-0022	Circuit Breaker Failed Testing
95-0048	Filtration Unit Airflow out of Specification
96-0951	CCP Lubricating Oil Problem
96-0022	No Design Change Initiated to Remove Components
95-949	Data bases differ on the classification of thermocouples
95-1013	Incorrect torque used on bonnet fasteners
95-1049	Water discovered in left bank air intake manifold of EDG
96-121	Safety injection relief valve lifted and ruptured its bellows
96-299	Relief valve failed set pressure and seat leakage tests
95-816	Safety injection relief valve found relieving to the floor
96-306	Relief valve failed set pressure test
95-1027	Found scaling calculation revised for a modification not implemented
95-1102	Flow diagrams and MEL are inconsistent in the classification of valves
95-1152	Process sample line was found closed and capped but still leaking
95-1013	Torque wrench used to torque fasteners outside of its range
95-756	ONE form disposition was changed from repair to use-as-is
95-1094	On start of TDAFWP handswitch indicator for valve failed
95-846	During EDG test, 3 of 6 bolts on the fuel oil pump were loose
95-930	Poppet was found installed backwards on the EDG fuel oil pump valve
95-880	Valves were found stuck open due to dirty system
95-031	Replacement nozzle for relief valve was wrong size
96-1217	Two pressurizer safety valves failed as-found tests
95-949	Conflict between MEL and PRISM for status of thermocouples
95-1104	Carbon steel valve replaced with stainless valve
95-723	Increased oxygen concentration found in condensate storage tank
95-884	AFW pump shaft found binding
95-738	Guide bushing land was damaged
95-833	Piping to outboard seal was cracked
95-799	CCW surge tank low alarm
95-850	Accumulator check valve leak rates
97-435	Generic implications of diaphragm valve finger plates
94-902	Finger plate found upside down on diaphragm valve
95-839	Finger plate installed improperly in diaphragm valve
96-602	Diaphragm finger plate found installed upside down
96-38	Finger plate was installed upside down
96-406	Finger plate was installed upside down

96-419 Finger plate was found upside down

Corrective Maintenance Work Orders

NUMBER	DESCRIPTION
92-028462	Bolt missing in component shelf
96-104945	Water found inside motor cavity
96-102519	Valve exceeds alert limit stroke time
96-100954	Replace valve
95-086259	Leaking through packing
95-089356	O-ring broken in operator
96-100644	Remove dielectric kits
96-105877	Problem with low oil pressure
95-084650	Isolation valve for pressure indicator is frozen open
96-101667	Diaphragm leaking air
96-104036	Replace lube oil pump low speed shaft
95-091729	Boron crystals buildup on seal leakoff drain
95-094513	Remove and replace 4 cylinder liners for inspection
95-089444	Wires possibly rolled at AC distribution box
95-084212	Replace existing solenoid valves
95-092829	Backleakage through check valve is responsible for accumulator level
96-102268	Minor oil leak at handwheel shaft to casting
96-105889	Troubleshoot problem with flow control valve
96-104040	Rework and replace swing arm/disc assembly as required
96-101080	Valve leaking by seat
96-102617	Valve sprayed from the diaphragm when closed from full open

97-108132	Small diaphragm leak
95-081016	Atmospheric relief valve leaks past seat
95-090815	Spent fuel pool isolation valve has stripped spindle
96-102163	Rebuild relief valve and determine cause for failure
96-102955	Realign station service water pump
96-104477	Stud broken off on primary plant ventilation exhaust filter unit
95-322110	Finger plate on diaphragm valve installed upside down

Maintenance Alterations

DCN NUMBER	DESCRIPTION
10804	Replace 3/4-inch valves with 2-inch valves
10234	Relocate personnel air lock door limit switch
10666	Revise pumps by adding retrofit kit
10701	Machine replacement shaft for valve for proper fit
10702	Used an eccentric bushing in check valve swing arm to correct condition
10787	Permanent addition of thermometer to replace temporary one
10657	Used jack bolts as an alternative configuration to position axial alignment key on feedwater pump
10949	Machine relief groove on the feedwater pump turbine rotor
10863	Install foam deflector shield panels to the top of the clarifier surge tank
9637	Replace 2 inch and smaller Edwards Univalves with commercial globe valves
10738	Provide guidance for maintenance of components which experience service induced material defects
10659	Reduce projection on 4 wall anchor bolts in pressurizer compartment

9813	Replace existing outboard bearing on the SF cooling pump motors with insulated bearings
10147	Substitute one type of fuse for another
10790	Relocate valve and associated flanges due to flow induced vibration
9876	Modify 2 sections of insulation on the reactor vessel
11074	Install 2 tubing runs between containment penetrations to support ILRT testing
10631	Replace valve and section of nearby piping
10485	Determine inoperable motor space heater for containment HVAC fan motor
10720	Remove the check valve and the strainer for the safety chillers and reinstall them as shown
10721	Remove the check valve and the strainer for the safety chillers and reinstall them as shown
10142	Modify RHR pump motor upper and lower cover plates
10922	Modify pump interlock
10797	Install drain valves in radiation waste system
10174	Remove 2 feedwater valves since they are not needed
10445	Remove internals of instrument air check valve
10490	Valve out CCW flow transmitter and open bypass line
9013	Generically replace gate valves with ball valves

Assessments and Audits

NUMBER	DESCRIPTION
1995	Engineering Self-Assessment Report, September 1995
1996	Maintenance Function Self-Assessment

10 CFR Part 21 Reports

MKW Power Systems, "Voltage Adjust Potentiometers," dated May 14, 1996

Cooper Energy Services, "Starting Air Admission Valves (block and vent valves)," dated July 9, 1996

Consolidated Power Supply, "Indeterminate Material Shipped," dated June 20, 1996

Rosemount Nuclear Instruments, "Conduit Seals Exhibit Short Conditions," dated September 20, 1996

MOVATS, "3500 System Strain Module and Aux Contact Module Time Delay Testing," dated September 26, 1996

INFORMATION NOTICES

96-48 MOV Performance Issues

96-61 Failure of a Main Steam Safety Valve to Reseat Caused by an Improperly Installed Release Nut

96-24 Preconditioning of Molded-Case Circuit Breakers Before Surveillance Testing

Operability Reviews

ONE-QTE-96-112 Diesel Generator KVAR and load swings

ONE-QTE-97-272 RWST Suction Isolation Calculation Error

ONE-QTE-96-495 Abnormal discharge pressure of Containment Spray Pump

ONE-QTE-96-226 CCW Discharge Crosstie Valve Leaks 4 PPM

ONE-QTE-97-256 Slight Interference Torque Arm to Packing Gland

ONE-QTE-95-442 As-Left Seat Leak Test not Performed