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
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ATTACHMENT: Supplemental Information

EXECUTIVE SUMMARY

Comanche Peak Steam Electric Station, Units 1 and 2
NRC Inspection Report 50-445/98-10; 50-446/98-10

With some exceptions noted, Comanche Peak Steam Electric Station personnel developed and implemented an overall strong program in accordance with 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," that was attributed to very good management focus and attention.

Operations

- Operators had a good understanding of the Maintenance Rule and their responsibilities for implementing the Maintenance Rule program; however, two shift managers displayed a lack of awareness of probabilistic risk insights (Section O4.1).

Maintenance

- The licensee's program scoping, in general, was adequate and met the intent of the Maintenance Rule. However, examples of failure to include in the program scope 13 applicable structures and the reactor rod control and indication function were identified as a violation of 10 CFR 50.65(b) (Section M1.1).

- Pursuant to Section VII.B.1 of the NRC Enforcement Policy, a noncited violation of 10 CFR 50.65(b) was identified for failure to include 23 functions associated with 18 systems in the program scope (Section M1.1).

- With one exception, the Maintenance Rule review panel had properly categorized the safety significance of structures, systems, or components. The team found that, from a defense-in-depth perspective, the review panel had inappropriately categorized the containment structure as nonrisk significant (Section M1.2).

- The Maintenance Rule review panel made determinations of structure, system, or component function safety significance with a probabilistic risk analysis that had not been updated since 1992. As a result, recent plant modifications that potentially impacted risk that were not modeled in the probabilistic risk assessment included new high temperature reactor coolant pump seals, a common instrument air compressor, and a swing inverter (Section M1.2).

- A violation of 10 CFR 50.65(a)(2) involved the licensee's inappropriate reliability performance criteria for certain functions (i.e., less than one functional failure) without establishing condition monitoring performance criteria for those functions (Section M1.2).

- A program weakness was identified relative to the licensee's use of plant level performance criteria for some functions to monitor equipment performance in lower operating modes. Plant level performance monitoring criteria would not be triggered by functional failures in these lower operating modes (Section M1.2).

- The Maintenance Rule review panel was appropriately comprised of individuals with backgrounds in operations, maintenance, engineering, oversight, and probabilistic risk assessments. The review panel qualifications and experience ensured that a proper integration of deterministic and probabilistic insights were achieved (Section M1.2).

- The licensee's second periodic assessment regarding Maintenance Rule effectiveness had not been issued in a timely manner. Specifically, the report had not been approved and issued since completion of the assessment 5-1/2 months ago. Despite the lack of timeliness, the licensee had initiated appropriate corrective actions in response to identified issues (Section M1.3).

- The licensee's process for balancing reliability and availability was adequate and the licensee appropriately adjusted preventive maintenance activities as required (Section M1.4).

- The licensee's program for assessing safety for removing equipment from service for maintenance was very good. The process ensured that combinations of equipment removed from service were either pre-analyzed or received a safety evaluation from a risk expert prior to the start of the maintenance activity. The licensee had a strong program to monitor risk during planned outages, and had comprehensive procedures to ensure equipment needed to mitigate events were available (Section M1.5).

- Pursuant to Section VII.B.1 of the NRC Enforcement Policy, a noncited violation of 10 CFR 50.65(a)(2) was identified regarding the failure to monitor unavailability hours from July 10, 1996, to the third quarter 1997 for Feedwater System Functions 02 and 07; to the fourth quarter 1997 for Auxiliary Feedwater System Function 16 and Instrument Air System Function 06; and to the second quarter 1998 for the Solid State Protection System Functions 06 and 07 (Section M1.6).

- The team concluded that, with the exception of the noncited violation, the licensee had: (1) properly established goals and performance criteria, (2) performed appropriate monitoring and trending, (3) took appropriate corrective actions when required, and (4) appropriately determined from review of equipment history that systems were properly categorized and maintenance preventable functional failures were appropriately determined (Section M1.6).

- The licensee established conservative action level criteria for reliability and unavailability to allow corrective actions to be implemented prior to exceeding the established performance criteria. The team considered this approach, although not required by the Maintenance Rule, to be indicative of an aggressive overall program to identify and correct plant problems at a very low threshold even for nonrisk significant systems (Section M1.6).

- Licensee actions, in two instances, were untimely regarding historical assessment performance, which resulted in delayed placement of systems into Category (a)(1). After revising Component Cooling Water Function 01 on July 10, 1997, and establishing Containment Isolation Function 04 on July 16, 1997, the licensee performed a historical assessment and identified that the performance criteria had been exceeded. ONE forms were initiated on December 15, 1997, and February 16, 1998, respectively, and the containment isolation and component cooling water systems were placed in Category (a)(1) on March 19 and March 20, 1998, respectively (Section M1.6).

- The team generally found that the visible material condition of the structures, electrical equipment, and mechanical systems reviewed was very good (Section M1.7).

- The team concluded that the licensee's Maintenance Rule self-assessment process was comprehensive in nature and that it was effective in identifying areas for improvement. The team also determined that issues identified during this process were effectively prioritized and tracked to resolution (Section M7.1).

Engineering

- All groups of engineering personnel with Maintenance Rule program responsibilities demonstrated a thorough understanding of the Maintenance Rule and were sufficiently trained and experienced to carry out those responsibilities (Section E4.1).

Report Details

Summary of Plant Status

During the inspection week, both units operated at or near full power.

I. Operations

O4 Operator Knowledge and Performance

04.1 Operator Knowledge of the Maintenance Rule

a. Inspection Scope (62706)

During the inspection, the team interviewed two shift managers, two control room supervisors, and two reactor operators to determine if they were familiar with the general requirements of the Maintenance Rule, aware of probabilistic risk assessment (PRA) insights, and understood their particular duties and responsibilities for Maintenance Rule program implementation.

b. Observations and Findings

The operator tasks associated with the Maintenance Rule included the documentation of structures, systems, and components (SSCs) that were out-of-service, evaluating priorities for restoration of SSCs, and evaluating plant configurations to determine if work authorization created unacceptable risk levels.

The operators interviewed understood the philosophy of the Maintenance Rule and their responsibilities associated with the Maintenance Rule program. The operators were adequately trained and understood the requirements of the applicable procedures. All operators understood the need to expeditiously restore equipment to operating condition and to minimize SSC unavailabilities.

Some operators were not aware of some key PRA insights. For example, one shift manager was not aware of risk-significant operator actions and system risk significance.

According to Work Control Instruction Manual 203, "Weekly Surveillances/Work Scheduling," shift managers were responsible for assessing the safety significance of maintenance activities during back shifts and on weekends. Work Control Instruction Manual 203 directed that the safety assessment be performed either by a risk engineer or by using the guidance in the procedure. The interviewed shift managers were not proficient in the use of Work Control Instruction Manual 203. However, the team noted that the shift managers routinely obtained safety assessments from the licensee's risk engineers as needed in lieu of using the guidance in Work Control Instruction Manual 203.

c. Conclusions

Operators had a good understanding of the Maintenance Rule and their responsibilities for implementing the Maintenance Rule program; however, two shift managers displayed a lack of awareness of probabilistic risk insights. The interviewed shift managers were not proficient in the use of Work Control Instruction Manual 203; however, operators routinely obtained safety assessments from the licensee's risk engineers prior to removing equipment from service.

II. Maintenance

M1 Conduct of Maintenance

M1.1 Scope of the System, Structure, and Component Functions Included Within the Maintenance Rule

a. Inspection Scope (62706)

The team reviewed the licensee's procedure for initial scoping, the Updated Safety Analysis Report, and emergency operating procedures. The team developed an independent list of SSCs that they determined should have been included in the scope of the licensee's Maintenance Rule program in accordance with the scoping criteria in 10 CFR 50.65(b). During the onsite review, the inspectors used this list to determine if the licensee staff had adequately identified the SSC functions to be included in the Maintenance Rule program.

b. Observations and Findings

The licensee's program required identification of detailed functions performed by SSCs and subsequent placement of applicable functions in the program scope. Procedure STA-744, "Maintenance Effectiveness Monitoring Program," Revision 1, provided instructions and guidance pertaining to identification of SSC functions. System engineering was responsible for identifying functions based on their review of design bases documents and the final safety analysis report. After function identification and scope determination by system engineering, the Maintenance Rule review panel was responsible for reviewing and approving the functions to be monitored by the program.

b.1 Systems and Components

The team determined that the reactor rod control and indication system was nonrisk significant, and was being monitored in Category (a)(2), using plant level performance criteria and reliability performance criteria. The system had four functions, two of which were not included in the Maintenance Rule program (02 and 03). Function 02 provided a digital rod position indication and alarms associated with control and shutdown rod position during operation in Modes 1-5. The team questioned licensee personnel as to

why this function was not included within the scope of the Maintenance Rule program, since the first action taken by operators during the use of emergency operating procedures is to verify rod position. Licensee personnel responded by stating that rod position indication was not significant in mitigating a transient or reactor trip; therefore, it was not included within the scope of the Maintenance Rule program. The team did not agree with the licensee's position. The failure to include the digital rod position indication function in the scope of the Maintenance Rule program was a concern because a primary operator action taken during use of emergency operating procedures is to determine whether control rods are fully inserted and an adequate shutdown margin has been achieved. As such, it is necessary to assure the ability of the rod position indicating system to perform this function through the performance of appropriate preventive maintenance

The team considered the failure to include the digital rod position indication function in the scope of the Maintenance Rule program a violation of the requirements of 10 CFR 50.65(b) (50-445; -446/9810-01).

Subsequent to the team's identification of this concern, the licensee initiated ONE Form 98-0768 on May 14, 1998, to address the issue, including a recommendation that the Maintenance Rule review panel reevaluate this function for scoping applicability.

Additionally, the team identified that 23 functions, associated with 18 systems, had been added to the Maintenance Rule program scope since the licensee's implementation of the Rule on July 10, 1996. These included:

Auxiliary Feedwater System Function 01
Condensate System Function 06
Chemical and Volume Control System Functions 16, 17, and 19
Containment Spray System Function 09
Condenser Vacuum and Water Box Priming System Function 04
Circulating Water System Function 09
Electric Power Low Voltage System Function 01
Fuel Handling System Functions 01 and 02
Fire Protection System Function 01
Leak Rate Test System Function 02
Plant Computer System Function 03
Process Plant Sampling System Functions 02 and 06
Reactor Coolant System Function 13
Service Water System Functions 03 and 08
Switchyard Equipment System Function 05
Tornado Venting System Function 01
Liquid Waste Processing System Function 07
Analog Control System Function 03

The failure to include the above functions within the scope of the Maintenance Rule program at the time of its implementation was a violation of 10 CFR 50.65(b)

(50-445;446/9810-02). At the time it was identified that each of the above functions was not within the scope of the Maintenance Rule program, the licensee acted in a timely manner to evaluate and correct the condition. Therefore, this licensee-identified and corrected violation is being treated as a noncited violation, consistent with Section VII.B.1 of the NRC Enforcement Policy.

b.2 Structures

The licensee performed baseline inspections on structures from June 1997 to April 1998, and was reviewing the baseline inspection findings as of this inspection. The structures, which were being monitored in Category (a)(2), had a performance criterion of zero functional failures within 2 years. The licensee had established a program for condition monitoring of structures in desktop guide, "Structural Monitoring Inspections," Revision 0. The desktop guide provided the identities of all structures within the scope of the Maintenance Rule program. The team's review of the desktop guide identified that the following structures (either safety-related, or nonsafety-related whose failure could prevent safety-related systems or components from fulfilling their safety-related functions) were not included in the scope of the Maintenance Rule.

- Service water discharge structure
- Circulating water discharge structure
- Main transformer pads (two for each unit)
- Auxiliary transformer pads (two for each unit)
- Startup transformer pad
- 345 kV and 138 kV switchyard relay houses

When informed by the team, the licensee acknowledged this condition and initiated ONE Form 98-0756 on May 12, 1998, to address this issue, including performing the necessary baseline inspections. The team identified this failure to include certain structures within the scope of the Maintenance Rule program as an additional example of Violation 50-445; -446/9810-01.

During the baseline inspections, the licensee identified two deficient conditions; however, they were evaluated by the licensee as "acceptable with deficiencies" with no further actions required. The team reviewed the baseline report, observed the two conditions, and concurred with the licensee's evaluation. The team considered the baseline inspections, overall, to have been a good effort directed by proper instructions on how and what to inspect.

c. Conclusions

The licensee's program scoping, in general, was adequate and met the intent of the Maintenance Rule. Two examples of failure to include in the program scope applicable structures and the reactor rod control and indication function were identified as a violation of 10 CFR 50.65(b). Pursuant to Section VII.B.1 of the NRC Enforcement

Policy, a noncited violation of 10 CFR 50.65(b) was identified for failure to include 23 functions associated with 18 systems in the program scope (50-445; -446/9810-02).

M1.2 Safety or Risk Determination

a. Inspection Scope (62706)

The team reviewed the methods and calculations that the licensee had established for making the required safety determinations for those systems that were reviewed. Additionally, the team reviewed the safety determinations for the functions that were reviewed in detail during this inspection. The team also verified the adequacy of the determination of performance criteria. As part of the inspection team's review, Maintenance Rule review panel members were interviewed and minutes of several panel meetings were reviewed. Finally, the team reviewed a sample of low safety-significant (LSS) SSCs to determine if the licensee had adequately established safety significance.

b. Observations and Findings

b.1 Safety or Risk Determination Methodology and Results

In addition to determining which SSCs were within the scope of the Maintenance Rule program, the licensee's Maintenance Rule review panel initially established the risk significance ranking of SSCs, established performance criteria for SSCs, determined which SSCs were Category (a)(1) or (a)(2), and established goals for the Category (a)(1) SSCs.

The final risk significance ranking was based on a combination of results from a PRA and Maintenance Rule review panel judgment based on deterministic considerations. The licensee used quantitative measures of risk achievement worth (RAW), risk reduction worth (RRW), and core damage frequency contribution (CDF) that were consistent with the guidance provided in NUMARC 93-01. The Maintenance Rule review panel considered risk insights from the licensee's review of external events such as fires, floods and high winds. The Maintenance Rule review panel considered all functions that met the NUMARC 93-01 criteria to be risk significant. Additionally, the Maintenance Rule review panel added several SSCs to the risk significant list. For example, the containment spray, electrical control panels, and switchyard equipment systems were added to the risk significant category.

The information used for risk ranking SSCs was based on the PRA model developed to support the 1992 individual plant examination and 1996 individual plant examination for external events studies submitted to the NRC. Generic data was used in the PRA calculations. The licensee had not performed an update of the PRA despite changes in plant design, operating practices, and equipment performance. Some recent plant modifications that potentially impacted risk that were not modeled in the PRA included new high temperature reactor coolant pump seals, a common instrument air compressor, and a swing inverter. Therefore, the use of a PRA that had not been updated since 1992

by the Maintenance Rule review panel was a weakness. The licensee representative stated that they expected to complete an update to the PRA by the end of 1999.

A truncation level of 1E-9 was used to quantify the PRA results used for risk ranking. This truncation limit was greater than four orders of magnitude less than the overall CDF estimate of 5.7E-5 per reactor-year. This limit was considered to be reasonable to ensure that risk significant SSCs were not omitted from risk ranking considerations.

The team reviewed of a sample of SSCs within the scope of the Maintenance Rule program that were categorized as LSS. The SSCs reviewed included control room heating ventilation and air conditioning (HVAC) system, emergency diesel generator HVAC, and battery room HVAC. The team found that the level of detail, the engineering assumptions and quality of the PRA modeling were adequate to support the LSS determination.

With one exception, the team concluded that the Maintenance Rule review panel had properly categorized the safety significance of SSCs and documented the basis for their conclusions. The Maintenance Rule review panel classified the containment structure as low risk significant. This was based on a very low failure probability. However, from a defense-in-depth perspective, the team concluded that the containment structure should have been considered risk significant. The team noted that there was no consequence of not considering the containment structure as risk significant since the licensee had treated the structure as risk significant when establishing performance criteria.

b.2 Performance Criteria

The team reviewed the licensee's performance criteria to determine if the licensee had set adequate performance criteria under Section (a)(2) of the Maintenance Rule consistent with the assumptions used to establish safety significance. Section 9.3.2 of NUMARC 93-01 recommends that risk-significant SSC performance criteria be set to assure that the availability and reliability assumptions used in the risk determining analysis (i.e., PRA) are maintained.

The team reviewed the unavailability and reliability performance criteria for all SSC functions. The licensee established reliability performance criteria using the guidance provided in Electric Power Institute Research Institute (EPRI) Technical Bulletins 96-11-01, and 97-3-01 "Monitoring Reliability for the Maintenance Rule." The licensee applied the EPRI methodology at the system/train level, taking into account specific system/train reliability (from the PRA), estimated system/train demands and operating hours as appropriate to establish system/train performance reliability performance criteria.

The licensee established unavailability performance criteria using an iterative process. The licensee initially doubled the unavailability assumptions in the PRA for most SSC functions. For SSC functions that the licensee knew were sensitive to changes in unavailability, the licensee used values less than twice the PRA assumptions. The

licensee then performed sensitivity calculations and adjusted the unavailability performance criteria to minimize the postulated change to core damage frequency.

To assess the potential impact on CDF for all the reliability and unavailability performance criteria, the licensee performed a sensitivity analysis substituting the performance criteria for the reliability and unavailability assumptions in the PRA. The team reviewed the analysis and found that the resultant change in CDF was within the industry guidelines (EPRI Technical Report-105396, "PSA Applications Guide") for permanent plant changes.

The team concluded that the licensee had demonstrated a reasonable and appropriate bases for the established reliability and unavailability performance criteria. The number of allowed failures reflected in reliability performance criteria had been demonstrated to be consistent with probabilistic risk assessment assumptions and commensurate with safety. In addition, the number of allowed unavailability hours established for availability performance criteria had also been demonstrated to be consistent with probabilistic risk assessment assumptions and commensurate with safety.

While the licensee demonstrated that the assumptions in their PRA were preserved when establishing their performance criteria, the team found that some performance criteria for certain functions were inappropriately established. For some SSC functions, the licensee established a reliability performance criteria of less than one functional failure. As described in Section C.1.4 of Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," these criteria were too small (i.e., of such a low threshold) to be effectively monitored and trended as required by the Maintenance Rule. The licensee had not established, within the Maintenance Rule program, condition monitoring performance criteria for these functions. Examples included:

Electric Panels System Function 03
Switchyard Equipment Function 03
Containment Hydrogen Purge Function 03
Containment HVAC System Function 09
Miscellaneous Plant HVAC Function 01
Liquid Waste Processing Function 08
Westinghouse Process Instruments Function 04
Reactor Coolant System Function 03
Miscellaneous Equipment Function 07
Main Steam System Function 02
480 V Switchgear System Function 01
Reactor Control Rod and Indication Function 04
Chemical and Volume Control Functions 04 and 11
6.9 kV Switchgear System Functions 02 and 06
345 kV and 138 kV System Function 02

The failure to establish condition monitoring performance criteria within the Maintenance Rule program was a violation of 10 CFR 50.65(a)(2) (50-445; -446/9810-03).

b.3 Maintenance Rule Review Panel

The licensee's Maintenance Rule review panel determined which SSC functions were within the scope of the Maintenance Rule program, evaluated the risk significance ranking of SSC functions and established the performance criteria of SSC functions. Members of the Maintenance Rule review panel included representatives and designated alternates from maintenance support, results engineering, engineering analysis (PRA), operations support, nuclear overview, plant modification team, and system engineering. Two members and one alternate held senior reactor operator licenses. Alternates for permanent members and rules for a quorum were established in the Maintenance Rule review panel's charter. The expert panel possessed over 175-person years of nuclear power experience.

All Maintenance Rule panel members had received PRA training. Interviewed panel members were aware of the key risk insights and were familiar with PRA terminology.

The team reviewed the licensee's process and procedures for establishment of a Maintenance Rule review panel. It was determined that the licensee had established the Maintenance Rule review panel in accordance with the guidance provided in NUMARC 93-01. The "Maintenance Rule Review Panel Guidance Document" contained the guidance regarding Maintenance Rule review panel activities and responsibilities.

The team determined that Maintenance Rule review panel meetings were convened as needed, and participation of the PRA personnel provided strong input into the decision making on risk ranking and performance criteria for SSC functions. The team interviewed panel members on previous decisions and aspects of panel responsibilities. The Maintenance Rule review panel members interviewed had a satisfactory working knowledge of their responsibilities with respect to the Maintenance Rule implementation.

c. Conclusions

The team found that the licensee had appropriately risk-ranked SSCs within the scope of the Maintenance Rule with one exception. The team found that from a defense-in-depth perspective that the review panel had inappropriately categorized the containment structure as nonrisk significant.

The PRA used by the Maintenance Rule review panel to determine SSC function safety significance had not been updated since 1992. Some recent plant modifications that potentially impacted risk that were not modeled in the probabilistic risk assessment included new high temperature reactor coolant pump seals, a common instrument air compressor, and a swing inverter.

The licensee demonstrated through rigorous statistical analysis and by sensitivity studies that the assumptions in the PRA were preserved when establishing their performance criteria. However, some performance criteria for certain functions were inappropriately established. For some SSCs functions with a reliability performance criteria of less than one functional failure, the licensee had not established condition monitoring performance criteria for these functions. This was identified as a violation 10 CFR 50.65(a)(2).

For some functions, the licensee elected to use plant level performance criteria to monitor equipment performance in lower operating modes. Plant level performance monitoring criteria would not be triggered by functional failures in these lower operating modes. This was considered a program weakness.

The expert panel was appropriately composed of individuals with backgrounds in operations, maintenance, engineering, oversight, and PRA. The expert panel qualifications and experience ensured that a proper integration of deterministic and probabilistic insights were achieved.

M1.3 Periodic Evaluations

a. Inspection Scope (62706)

The team reviewed the licensee's guidance for performing a periodic program evaluation to meet the requirements of 10 CFR 50.65(a)(3).

Paragraph (a)(3) of the Maintenance Rule requires that performance and condition monitoring activities, associated goals, and preventive maintenance activities be evaluated, taking into account, where practical, industry-wide operating experience. This evaluation is required to be performed at least one time during each refueling cycle, not to exceed 24 months between evaluations. The licensee's administrative controls, related to the 10 CFR 50.65(a)(3) periodic evaluation process, were described in Procedure STA-744.

b. Observations and Findings

In order to evaluate the adequacy of the licensee's periodic evaluation process, the team reviewed Engineering Report ER-SYS-008, "Maintenance Rule Periodic Effectiveness Assessment," Revision 0, which documented the licensee's initial paragraph (a)(3) periodic evaluation. Specifically, this assessment addressed the implementation of the Maintenance Rule program for Units 1 and 2 for the period of June 1, 1995, through June 30, 1996. As determined by the team, the assessment appropriately summarized the status of the three systems for which goals had been established under Category (a)(1). The team also concluded that with the exception of the failure of a reactor coolant pump motor in June 1996, which was not appropriately identified as a functional failure, the licensee properly characterized the performance of SSCs monitored under Category (a)(2). Based on the team's review of this assessment, it was determined that the licensee had adequately addressed the requirements of Procedure

STA-744 and paragraph (a)(3) of the Maintenance Rule for the specified period and that the associated corrective actions were appropriate.

The team also examined the preliminary results of the licensee's second periodic evaluation, which covered the period from July 1, 1996, through December 31, 1997. Although this assessment coincided with the 18-month refueling cycle, the team noted that approximately 5½ months after the completion of this assessment it had still not been approved for issuance by the Maintenance Rule review panel. As noted by the licensee, the combination of competing priorities and their understanding that the assessment was not due until the end of the 24-month period, described in the Maintenance Rule, resulted in the scheduled completion date of June 1998. However, the team informed the licensee that the paragraph (a)(3) provisions of the Maintenance Rule required an evaluation at least every refueling cycle provided the interval between evaluations does not exceed 24 months. Thus, the paragraph (a)(3) periodicity provisions of the Maintenance Rule were intended to provide flexibility to licensees in order to appropriately capture operational data based on a refueling cycle, and to make this information available to utility management in a timely manner, such that the effectiveness of maintenance activities can be determined.

Notwithstanding, the lack of timeliness in issuing the subject document, the team determined that the assessment provided meaningful information related to the implementation of the Maintenance Rule program, and that, overall, the licensee had established a conservative process for developing goals for SSCs under Category (a)(1) of the Maintenance Rule. The team also ascertained that, in general, appropriate corrective actions had been effective in improving the performance of systems identified for goal setting during the assessment period. Relative to the establishment of performance measures for SSCs covered under Category (a)(2), the licensee used action level criteria, which were set below the performance measure in order to identify declining trends before they became significant.

c. Conclusions

Based on review of the licensee's initial periodic evaluation contained in Engineering Report ER-SYS-008, Revision 0, the team concluded that the licensee had established appropriate provisions to satisfy the requirements of Procedure STA-744 and paragraph (a)(3) of the Maintenance Rule, and that the associated corrective actions were appropriate. With respect to the second periodic evaluation, the team identified an observation relative to the lack of timeliness in issuing this document. Specifically, the team noted that 5½ months after the completion of the evaluation, the results had not been approved by the Maintenance Rule review panel. Despite the lack of timeliness in issuing this periodic evaluation, the licensee had initiated appropriate corrective actions in response to the identified issues. The team determined that the content of the assessment provided meaningful insights into the implementation of the licensee's Maintenance Rule process.

M1.4 Balancing Reliability and Unavailability

a. Inspection Scope (62706)

10 CFR 50.65(a)(3) requires that adjustments be made where necessary to assure that the objective of preventing failures through the performance of preventive maintenance is appropriately balanced against the objective of minimizing unavailability due to monitoring or preventive maintenance. The team reviewed plans and procedures and then met with the Maintenance Rule coordinator, system engineers, reliability engineers, and representatives of the Maintenance Rule review panel to discuss the licensee's methodology for balancing reliability and unavailability.

b. Observations and Findings

The team reviewed the licensee's approach to balancing system reliability and unavailability for high safety significant SSC functions to achieve an optimum conditions. The requirements for balancing reliability and unavailability were discussed in Procedure STA-744. System engineers were responsible for collecting the data and implementing the balancing process for high safety significant SSCs during periodic system evaluations. The system engineers were also responsible for generating the data by periodically monitoring and trending system performance.

The licensee's procedure indicated the method for balancing was to monitor against the individual system unavailability and reliability performance criteria. Those values were based on the PRA assumptions that took into account optimum values relative to core damage. If these performance criteria were exceeded, the system engineer would assess the appropriateness of planned maintenance activities or the root cause of the failure(s) and the impact on reliability. Since the individual system performance criteria were judged to be appropriate, the team determined the balancing method met the requirements of the Maintenance Rule.

The team noted that the licensee adjusted preventive maintenance activities as needed. These adjustments were made as part of the licensee's system health program, as well as, for the Maintenance Rule.

c. Conclusions

The licensee's process for balancing reliability and availability was adequate. The licensee appropriately adjusted preventive maintenance activities as required.

M1.5 Plant Safety Assessments Before Taking Equipment Out-of-Service

a. Inspection Scope (62706)

Paragraph (a)(3) of the Maintenance Rule states that the total impact on plant safety should be taken into account before taking equipment out-of-service for monitoring or plant maintenance. The team reviewed the licensee's procedures and discussed the

process with plant operators, schedulers, and risk engineers. The team also reviewed safety assessments that the licensee had made for several past plant configurations.

b. Observations and Findings

The team reviewed the licensee's processes for removing equipment from service. Procedure STA-604, "Work Scheduling," was an upper tier procedure that contained general guidance for scheduling tests and maintenance activities during power and shutdown operations. Work Control Instruction Manual 203 provided detailed procedural guidance on the methodology and responsibilities for the development of the weekly surveillances, work schedules, and the performance of online maintenance safety assessments. Procedure STA-627, "Control of Planned Outages," described the licensee's process to assess safety when a plant was shutdown.

The team found that the licensee generally used risk insights to assess the safety of proposed plant maintenance configurations. Work Control Instruction Manual 203 required that safety assessments be performed prior to performing online test and maintenance activities. Work Control Instruction Manual 203 required that these safety assessments be made either by a risk engineer or by a maintenance scheduler using the safety assessment screening guidelines. Shift managers were responsible for performing safety assessments for emergent maintenance activities if maintenance schedulers were not on the site.

Licensee risk engineers developed the screening guidelines in Work Control Instruction Manual 203. These guidelines consisted of pre-analyzed plant configurations. The risks associated with these configurations grouped by the configurations' impact on CDF. The team found the risk grouping to be adequate. The screening guidelines also contained adequate provisions to direct a scheduler or shift manager to obtain a safety evaluation from a risk engineer when assessing a proposed unanalyzed configuration or assessing an emergent failure. In addition, Work Control Instruction Manual 203 provided guidance restricting the scheduling of test and maintenance activities that could potentially lead to an initiating event.

The maintenance schedulers, who were interviewed, all demonstrated a good understanding of how to use the above tools to determine the risk associated with a particular plant configuration. However, as described above, the shift managers were not proficient in the use of Work Control Instruction Manual 203. The team found the licensee's PRA group was routinely contacted by both schedulers and shift managers when questions arose or when a new plant configuration required a safety evaluation.

The team reviewed operator logs, limiting conditions for operations logs, and clearance logs for the months of January and February 1998 for Unit 1 and March and April 1998 for Unit 2. The team did not identify any instances where the licensee either failed to perform a safety assessment or performed an inadequate safety assessment. The team also noted that the licensee routinely only removed one Maintenance Rule high safety significant SSC for maintenance or testing at a time.

The licensee implemented an effective shutdown safety assessment process for planned outages. This process was described in Procedure STA-637, "Shutdown Risk Program," Revision 2. The licensee's shutdown safety assessment process took into account the need to maintain certain critical safety functions during shutdown operations. These functions included reactivity control, electrical power, inventory control, containment integrity, and decay heat removal. The licensee developed comprehensive "Outage Safety Function Guides" that described the equipment and controls necessary to support these safety functions. There were separate guides for different plant conditions during an outage. For example, there was a guide for use during midloop operation. The licensee incorporated these guidelines into EPRI outage risk assessment monitor (ORAM) software for evaluating defense-in-depth requirements to maintain the respective shutdown safety functions. Insights from the outage risk assessments were evaluated by outage management and by the licensee's PRA group. Work Control Instruction Manual 627 also required that proposed changes to the outage schedule be reviewed for the changes' impact on shutdown safety.

The team noted that the licensee intended to implement a risk monitor that will be capable of performing safety assessments in all modes of operation. This should significantly enhance the licensee's safety assessment programs.

c. Conclusions

The licensee's program for assessing safety for removing equipment from service for maintenance was very good. The licensee's process ensured that combinations of equipment removed from service were pre-analyzed or received a safety evaluation from a risk expert prior to the start of the maintenance activity. The licensee had a strong program to monitor risk during planned outages. The licensee had comprehensive procedures to ensure equipment needed to mitigate events were available.

M1.6 Goal Setting and Monitoring and Preventive Maintenance

a. Inspection Scope (62706)

The team reviewed program documents and records in order to evaluate the process that was in place to establish performance criteria, set goals, and monitor under Category (a)(1) to meet goals, or to verify that preventive maintenance was effective under Category (a)(2). The team also discussed the program with the Maintenance Rule coordinator, Maintenance Rule review panel members, system engineers, plant operators, and schedulers.

The team reviewed in detail the Unit 1 and 2 systems described below to verify that goals or performance criteria were established with safety taken into consideration; that industry-wide operating experience was considered, where practical; that appropriate monitoring and trending were being performed; and that corrective action was taken when an SSC function failed to meet its goal or performance criteria, or when an SSC function experienced a maintenance procedure functional failure.

Auxiliary Feedwater System
Instrument Air System (Units 1 and 2)
Feedwater System (Units 1 and 2)
Heater Drains System
Generator and Exciter System
480 Vac Switchgear System (non-Class 1E)
Nuclear Instrumentation System
Solid State Protection System
Anticipated Transient Without Scram Mitigation System Actuation Circuitry (AMSAC) (Unit 1)
Containment Isolation (Units 1 and 2)
Component Cooling Water (Unit 1)
Safety Chilled Water (Unit 2)
Structures
Reactor Coolant System
Reactor Rod Control and Indication
Turbine Electrohydraulic Control System
Residual Heat Removal System
(Bold systems indicate Category (a)(1) monitoring and applicable unit)

The team also reviewed the licensee performance monitoring activities for the selected systems identified above, from July 10, 1996, to the present inspection period. The monitoring for Maintenance Rule unavailability hours for various systems functions was discussed with the cognizant system engineers.

b. Observations and Findings

With the exception of some SSCs discussed below, the team noted that the performance of the above systems was such that the SSCs were currently being monitored in accordance with 10 CFR 50.65(a)(1) or (a)(2), as appropriate. Performance criteria were appropriate in all cases. The team found that appropriate corrective actions had been taken to address the causes of any unacceptable performance. The team did not identify any current inadequate goal setting or performance monitoring for the subject systems.

Specific comments on other SSCs are given below.

b.1 Auxiliary Feedwater System

The auxiliary feedwater system is a risk significant system with standby functions, and was being monitored under Category (a)(2) in both units. The Comanche Peak Integrated Screening Process Matrix identified that Auxiliary Feedwater System Function 16 provided redundant supplies of steam to the auxiliary feed pump turbine, while in standby during Modes 1-3. The team noted that official monitoring of Maintenance Rule unavailability hours for Function 16 did not start until the fourth quarter of 1997. The licensee representative informed the team that an internal review, performed during the third quarter of 1997, identified that Maintenance Rule unavailability

hours for Function 16 should be monitored. As a result of that review, system engineering implemented the following actions to perform unavailability monitoring of Function 16 in both units:

- An unavailability performance criterion of less than 14.2 hours per month over a 24-month running average was established for each unit.

- A review of unavailability hours documented for Function 16 since July 31, 1994, was performed for both units. The review identified that the 24-month running average for unavailability hours for each unit was less than 14.2 hours. This was documented in the Comanche Peak Fourth Quarter FY97 System Status Report for both units.

The team verified that the Maintenance Rule unavailability hours for Function 16, for both units from July 31, 1994, to April 30, 1998, would not have moved the auxiliary feedwater system from Category (a)(2) to Category (a)(1). The Comanche Peak First Quarter FY98 System Status Report identified the 24 month running average unavailability hours for function 16 as 1.94 hours for Unit 1 and 5.32 hours for Unit 2.

The team determined, however, that the failure to monitor unavailability hours for Function 16 from July 10, 1996, to the fourth quarter of 1997, was considered a violation of 10 CFR 50.65(a)(2) (50-445; -446/9810-04). This licensee-identified, and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy.

b.2 Instrument Air System

The instrument air system is a risk significant system with standby functions, in both units. The Comanche Peak Integrated Screening Process Matrix identified that Instrument Air System Function 01 addressed providing clean plant air at the required pressure and desired humidity during operation while in Modes 1-6. The team noted that official monitoring of Maintenance Rule unavailability hours for Function 01 did not start until the fourth quarter of 1997. The licensee representative informed the team that an internal review, performed during the fourth quarter of 1997, identified that Maintenance Rule unavailability hours for Function 01 should be monitored. As a result of the review, system engineering implemented the following actions to perform unavailability monitoring of Function 01 in both units:

- An unavailability performance criterion of less than 29 hours per month per instrument air compressor package over a 24-month running average was established for each unit, and documented in the Comanche Peak Fourth Quarter FY97 System Status Report for both units.

- A review was performed on work orders (dated from July 1994 to October 1997) issued for work performed on the instrument air system in both units. This review indicated that the instrument air system in both units failed to meet the new

unavailability performance criteria established for Function 01. The team noted that licensee personnel initiated ONE Form 97-1138 on October 21, 1997, to document the failure and that there were no system operability concerns for either unit. Each unit's instrument air system was placed in Category (a)(1) for monitoring.

The failure to monitor unavailability hours for Function 01 from July 10, 1996, to the fourth quarter of 1997, was an additional example of a violation of 10 CFR 50.65(a)(2) (50-445; -446/9810-04). This licensee-identified, and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy.

b.3 Feedwater System

The feedwater system is a risk significant system with standby functions that was being monitored under Category (a)(1) in both units due to a failure to meet plant reliability goals. The Comanche Peak Integrated Screening Process Matrix identified Feedwater System Functions 02 (isolate main feedwater lines on demand, in standby in Modes 1-3) and 07 (provide backup feedwater isolation, in standby in Modes 1-3). The team noted that official monitoring of Maintenance Rule unavailability hours for Functions 02 and 07 did not start until the third quarter of 1997. The licensee representative informed the team that an internal review identified that Maintenance Rule unavailability hours for Functions 02 and 07 should be monitored. As a result of the review, system engineering implemented the following actions to perform unavailability monitoring of Functions 02 and 07 in both units:

- An unavailability performance criterion of less than 15.68 hours per 2 years per unit (over a 24-month running sum) was established for Function 02, and less than 5.33 hours per month per unit (over a 24-month running average) was established for Function 07.

- A review of documented unavailability hours for Functions 02 and 07, since July 1, 1994, was performed for both units. The review identified that Maintenance Rule unavailability hours for Functions 02 and 07 for each unit was less than the newly established performance criteria.

The failure to monitor unavailability hours for Functions 02 and 07 from July 10, 1996, to the third quarter of 1997, is another example of a violation of 10 CFR 50.65(a)(2) (50-445; -446/9810-04). This licensee-identified, and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy.

b.4 Solid State Protection System

The licensee staff had identified the solid state protection system as a risk significant system and had established performance criteria for monitoring reliability and unavailability at the train level. The team noted that sensor failures and unavailability

were monitored and tracked by including their corresponding data against the associated channel within the solid state protection system. The team observed that most of the solid state protection system was in Category (a)(2) with only the Unit 1 anticipated transients without scram mitigation system actuation circuitry (AMSAC) being placed in Category (a)(1).

The licensee had established performance criteria associated with functional reliability as less than two functional failures per train in 1.5 years and unavailability of less than 1.65 hours per month per train. Additional reliability and unavailability criteria were established at a channel level for the 7300 processor and other sensor inputs to the solid state protection system. The licensee also established conservative action level criteria for reliability and unavailability to allow corrective actions to be implemented prior to exceeding the established performance criteria. The team considered this approach, although not required by the Maintenance Rule, to be indicative of an aggressive overall program to identify and correct plant problems at a very low threshold even for nonrisk significant systems.

The licensee had classified Solid State Protection System Function 06 (sequential loading of the 6.9 kVac emergency busses) as a risk significant standby function, while Solid State Protection System Function 07 (AMSAC) was classified as a nonrisk significant standby function. The team discovered that AMSAC was not modeled in the plant's probabilistic risk assessment, but the system was classified as important to safety since it provided a backup to the solid state protection system. The team found that no credit was taken for the backup system in the plant safety analysis. The team observed that the AMSAC system was monitored as Category (a)(1) due to repetitive self-test failures. The licensee had attributed the past failures to design flaws on the self health boards and the test maintenance processor boards. The team noted that ONE Form 97-1383 documented a contingency troubleshooting plan should any additional failures occur during the monitoring period for the established goal of no self-test failures. The team found that an appropriate goal, commensurate with safety, had been established regarding the self-test lockup condition.

As documented in the meeting minutes of April 30, 1998, the Maintenance Rule review panel decided to conservatively maintain the Unit 1 AMSAC function in Category (a)(1) for another 6-month monitoring period to provide reasonable assurance for reliable operation of the system. Additionally, licensee personnel identified the need to include unavailability criteria for the sequential loading of the emergency busses, and the AMSAC function to backup the reactor trip and actuation of feedwater flow in the event of an anticipated transient without scram. The team noted that prior to April 30, 1998, no performance criteria for unavailability of the sequential loading of the emergency busses and the AMSAC function were established. The Maintenance Rule review panel established an unavailability criterion of 17.6 hours per sequencer every 2 years based upon normal maintenance and testing estimates.

The team noted that Procedure ALM-0092A "Alarm Procedures Manual," Revision 6, required that a ONE form be initiated if the alarming condition for the AMSAC trouble

annunciator is not corrected within 48 hours from the initial condition. Since the out-of-service time for AMSAC is not monitored by the limiting condition for operation tracking system, licensee personnel established the unavailability criteria for the AMSAC system as less than three ONE forms written per 2 years for exceeding the 48 hours out-of-service time. The team found that the newly established unavailability performance criterion for the AMSAC function was exceeded by Unit 1 on May 11, 1998, as documented in ONE Form 98-752. Additional corrective actions as part of the troubleshooting plan have included the replacement of the system's analog logic processors. These licensee-identified criteria for unavailability for the sequencer and the AMSAC functions were added to the Maintenance Rule program on April 30, 1998.

The failure to monitor unavailability hours for the Solid State Protection System Functions 06 and 07 from July 10, 1996, to the second quarter of 1998, is another example of a violation of 10 CFR 50.65(a)(2) (50-445; -446/9810-04). This nonrepetitive, licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy.

b.5 Containment Isolation

Containment isolation had four functions identified within the scope of the Maintenance Rule program. One function (to isolate containment) was not risk significant, but was a standby function. The remaining functions were neither risk significant nor standby functions. This system (for both units) was in Category (a)(1) because of valve stroke-time failures during inservice testing (identified in ONE Form 98-196). The reliability performance criteria established for this system was less than seven functional failures per unit per 2 years, and less than two functional failures per component per 2 years. The team determined that the performance criteria appropriately enabled the assessment of the effectiveness of maintenance.

The team observed that the licensee established and placed Containment Isolation Function 04 (this function was added for administrative purposes to centralize valve stroke-time monitoring) within the scope of the Maintenance Rule on July 16, 1997. The subsequent historical review determined that Function 04 had exceeded the performance criteria and the licensee issued ONE Form 98-0196 on February 16, 1998. The review panel approved the placement of Function 04 in Category (a)(1) on March 19, 1998. It appeared that the licensee's staff did not act in a timely manner with respect to historical review, determination that performance criteria had been exceeded, or subsequent placement of the system into Category (a)(1). However, the team did not identify any violation of regulatory requirements.

b.6 Component Cooling Water System

The component cooling water system had 14 functions, 10 of which were in the scope of the Maintenance Rule program. The function to provide cooling was risk significant, but not a standby function. The functions to provide pressure boundary and indication of system parameters were not risk significant nor standby functions. This system was in

Category (a)(1) because excessive functional failures had occurred in Train B of Unit 1. The current reliability performance criterion for this system was less than two functional failures per train per 2 years. The unavailability performance criterion for this system was less than 10.0 hours per train per month. The team found that the performance criteria appropriately measured the effectiveness of maintenance.

The team observed that the performance criterion for Component Cooling Water System Function 01 (provide cooling for safety-related equipment) had been revised from four functional failures to less than two functional failures on July 10, 1997. The subsequent historical review determined that the performance criteria for Function 01 had been exceeded, and the licensee issued ONE Form 97-1663 on December 15, 1997. The review panel approved placement of Function 01 in Category (a)(1) on March 20, 1998. Thus, it appeared that the licensee staff did not act in a timely manner with respect to making a determination that performance criterion had been exceeded and subsequent placement of the system into Category (a)(1). However, the team did not identify any violation of regulatory requirements.

b.7 Safety Chilled Water System

The safety chilled water system had six functions, five of which were in the scope of the Maintenance Rule program. The function to remove heat was considered risk significant, but was not a standby function. The functions to provide a pressure boundary and to provide instrumentation of system parameters were not risk significant and not standby functions. This system was in Category (a)(1) because of functional failures in Train B of Unit 2. The reliability performance criterion for this system had been established as being less than three functional failures per train per 2 years. The unavailability performance criterion for this system was less than 9.0 hours per train per month. The team found the performance criteria appropriately enabled the assessment of the effectiveness of maintenance.

The team noted an inconsistency with respect to the description of Safety Chilled Water System Function 02, which described the removal of heat from safeguards loads in Modes 1-6. The technical specification requirements for this function were limited to Modes 1-4, and the licensee, accordingly, limited collection of unavailability data to Modes 1-4. The team found three examples of corrective maintenance where unavailability was not collected because the plant was in Mode 6. Three associated work orders were 1-96-105877-00, 3-96-309131-00, and 4-96-105011-00. The team determined that this unaccounted for unavailability would not have exceeded the established limits; however, the system engineer acknowledged the discrepancy and initiated preparations to correct and present the changes to the Maintenance Rule review panel.

c. Conclusions

A failure to monitor unavailability hours from July 10, 1996, to the third quarter 1997 for the Feedwater System Functions 02 and 07; fourth quarter 1997 for the Auxiliary

Feedwater System Function 16 and Instrument Air System Function 01; and second quarter 1998 for the Solid State Protection System Functions 06 and 07; was identified as a violation of 10 CFR 50.65(a)(2). This licensee-identified and corrected violation is being treated as a noncited violation consistent with Section VII.B.1 of the NRC Enforcement Policy.

The team concluded that, with the exception of the noncited violation, the licensee properly established goals and performance criteria, performed appropriate monitoring and trending, took appropriate corrective actions when required, and appropriately determined from review of equipment history that systems were properly categorized, and maintenance preventable functional failures were appropriately determined.

The licensee established conservative action level criteria for reliability and unavailability to allow corrective actions to be implemented prior to exceeding the established performance criteria. The team considered this approach, although not required by the Maintenance Rule, to be indicative of an aggressive overall program to identify and correct plant problems at a very low threshold even for nonrisk significant systems.

After establishing Containment Isolation Function 04 and revising Component Cooling Water Function 01, licensee staff did not act in a timely manner with respect to performing the historical review to determine if performance criteria had been exceeded, and subsequent placement of the systems into Category (a)(1).

M2 Maintenance and Material Condition of Facilities and Equipment

a. Inspection Scope (62706)

In the course of verifying the implementation of the Maintenance Rule, the team performed in-plant walkdowns to examine the material condition of the following structures and systems:

- Generator and Exciter System
- 480 Vac Switchgear System (non-Class 1E)
- Nuclear Instrumentation System
- Solid State Protection System
- Anticipated Transient Without Scram Mitigation System Actuation Circuitry
- Auxiliary Feedwater System
- Instrument Air System
- Feedwater System
- Heater Drains System
- Fuel Handling Building
- Component Cooling Water System
- Safety Chilled Water System
- Unit 1 Residual Heat Removal (RHR) Heat Exchanger 1-02
- Unit 2 Electrohydraulic Control System
- Unit 2 Room 77A (RHR SystemTrain B)

- Unit 1 Containment Spray Pump 1-04
- Unit 2 Room 2-066 (Emergency Core Cooling System Valve)
- Unit 2 Room 1-066 (Emergency Core Cooling System Valve)
- Unit 2 Residual Heat Removal Pump 2-02
- Unit 2 Control Rod Drive Motor Generator-Set 2-02
- Unit 2 Control Rod Drive Motor Generator-Set 2-01
- Unit 2 Rod Control Power Cabinets (5 each)
- Unit 2 Rod Control Logic Cabinet 2-01F

b. Observations and Findings

The team generally found that the electrical systems inspected appeared to be free of corroded or dirty contacts and terminals, with no indications of crimped or frayed wiring, and the associated instrumentation system cabinets to be appropriately locked and controlled. The team observed the various instrumentation cabinets to be well maintained, and in a clean environment free of any oil leaks, water leaks, rusted, or degraded components.

With respect to observations of mechanical systems, the team noted the following:

- A body to bonnet leak was observed by the inspectors on Unit 1 RHR Train A suction valve, and the catch drain was not oriented properly for drainage;

- Insulation had been removed from RHR and containment spray piping in Room 1-063 during the last refueling outage and not replaced;

- Minor oil leaks were observed on Unit 2 RHR Pump 2-02 and the turbine electrohydraulic control system.

With the exception of the minor oil and water leaks identified above, equipment was free of corrosion, rust, and external damage. In addition, supports, insulation, and coatings appeared in very good condition.

c. Conclusions

The team generally found that the visible material condition of the structures, electrical equipment, and mechanical systems reviewed was very good. There were no housekeeping concerns noted in the observed areas.

M7 Quality Assurance in Maintenance Activities

M7.1 Self-Assessments of the Maintenance Rule Program

a. Inspection Scope (62706)

The team reviewed the results of recent Maintenance Rule evaluations, self-assessments and management overview reports in order to determine if the requirements of the Maintenance Rule were being properly implemented.

b. Observations and Findings

As a result of the team's review of the licensee's self-assessment process, it was determined that these efforts were beneficial in confirming the overall adequacy of the licensee's Maintenance Rule program, as well as, identifying areas for improvement. The most recent of these self-assessments, documented in Letter CPSES-9703467, dated June 30, 1997, identified previous findings, recommendations and program enhancements and combined them with current issues in a consolidated Maintenance Rule implementation issues list. The team examined a selected sample of items from this list along with information contained in the companion issues tracking report (Attachment 3 to CPSES-9703467). Based on this review, it was concluded that these tracking mechanisms, in conjunction with the cross reference list (Attachment 4 to CPSES-9703467) effectively reflected the status of specific issues and that the documented resolutions were appropriate.

c. Conclusions

The team concluded that the licensee's Maintenance Rule self-assessment process was comprehensive in nature and that it was effective in identifying areas for improvement. The team also determined that issues identified during this process were effectively prioritized and tracked to resolution.

M8 Miscellaneous Maintenance Issues

M8.1 (Closed) Inspection Followup Item 50-445;-446/9516-01: A generic concern was expressed on the torque specification for flange bolts. The licensee supplied information that showed that the construction torque requirements, which were different from present requirements, were acknowledged by the NRC as acceptable during construction. The licensee also supplied information that detailed the leak detection programs that are in place to identify and correct leaks as they occur. The inspectors identified no additional problems.

III. Engineering

E4 Engineering Staff Knowledge and Performance

E4.1 Engineers Knowledge of Maintenance Rule

a. Inspection Scope (62706)

The team interviewed system engineering personnel to assess their understanding of the Maintenance Rule program and their associated responsibilities. The team also reviewed procedures to determine responsibilities.

b. Observations and Findings

The team interviewed a representative sample of system engineers. As a result of these discussions, the team determined that all the engineers interviewed demonstrated a strong understanding of the administrative controls contained in Procedure STA-744. Specifically, the system engineers were aware of the required approvals for changes to the Maintenance Rule program, as well as, the interface controls concerning the Maintenance Rule review panel and the Maintenance Rule coordinator. The engineers' knowledge of Maintenance Rule responsibilities was effectively demonstrated with no discrepancies identified.

All system engineers interviewed demonstrated an in-depth and sound knowledge of their respective systems. Although having received minimal training in probabilistic risk analysis, the system engineers understood the relationship, and bases, between it and the safety functions and performance criteria of their respective systems.

The team identified that system engineering personnel had significant responsibility associated with the Maintenance Rule activities. The system engineers developed performance criteria, established goals, performed evaluations, and made functional failure determinations for the functions associated with their respective systems. The system engineers' knowledge and understanding of the Maintenance Rule were sufficient to perform the tasks required of them. In general, the system engineers demonstrated a thorough understanding of the Maintenance Rule program and their associated responsibilities.

The Maintenance Rule coordinator was assigned the majority of the responsibility for implementation of the Maintenance Rule program. The team determined that this person was fully capable of carrying out his assigned Maintenance Rule program responsibilities.

c. Conclusions

All groups of engineering personnel with Maintenance Rule program responsibilities demonstrated a thorough understanding of the Maintenance Rule and were sufficiently trained and experienced to carry out those responsibilities.

V. Management Meetings

X1 Exit Meeting Summary

The team discussed the progress of the inspection on a daily basis and presented the inspection results to members of licensee management at the conclusion of the

inspection on May 15, 1998. Subsequently, inoffice inspection was continued until July 15, 1998, and a telephonic exit was held to discuss the enforcement findings from the inspection. The licensee representatives acknowledged the findings presented.

The team asked the licensee staff and management 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
R. Bird, Jr., Nuclear Planning Manager
M. Blevins, Vice President
T. Clouser, Shift Manager
D. Davis, Nuclear Overview Manager
R. Flores, System Engineering Manager
D. Goodwin, Operations Support Manager
R. Green, Maintenance Rule Coordinator, System Engineering
W. Guldemond, Shift Operations Manager
S. Harvey, Day Shift Manager
T. Hope, Regulatory Compliance Manager
S. Karpyak, Probabilistic Risk Assessment Group, Consulting Engineer
J. Kelley, Vice President, Nuclear Engineering and Support
M. Killgore, Reactor Engineering Manager
F. Madden, Technical Support Manger
D. Moore, Operations Manager
R. Smith, Maintenance Support Manager
M. Sunseri, Nuclear Training Manager
R. Walker, Regulatory Affairs Manger
D. Walling, Plant Modification Manager

WESTINGHOUSE ELECTRIC CORPORATION

S. Fowler, Probabilistic Risk Assessment Engineer
R. O'Rourke, Reliability and Risk Assessment Engineer

NRC

H. Freeman, Resident Inspector
D. Powers, Chief, Maintenance Branch, Division of Reactor Safety

INSPECTION PROCEDURES USED

IP 62706	Maintenance Rule
IP 62002	Inspection of Structures, Passive Components, and Civil Features at Nuclear Power Plants

ITEMS OPENED AND CLOSED

Opened

50-445;-446/9810-01	VIO	Thirteen structures and the reactor rod control and indication function were not included in the Maintenance Rule program scope.
50-445;-446/9810-02	NCV	Failure to include 23 functions associated with 18 systems in the Maintenance Rule program scope.
50-445;-446/9810-03	VIO	The licensee established reliability performance criteria of zero functional failures and failed to establish condition monitoring performance criteria.
50-445;-446/9810-04	NCV	Failure to monitor unavailability hours for Functions AF-16, CI-01, FW-02, FW-07, RP-06, and RP-07.

Closed

50-445;-446/9516-01	IFI	Concern regarding present-day torque requirements as opposed to construction-time torque requirements.
50-445;-446/9810-02	NCV	Failure to include 23 functions associated with 18 systems in the Maintenance Rule program scope.
50-445;-446/9810-04	NCV	Failure to monitor unavailability hours for Functions AF-16, CI-01, FW-02, FW-07, RP-06, and RP-07.

DOCUMENTS REVIEWED

Procedures

STA-744	Maintenance Effectiveness Monitoring Program, Revision 1
STA-421	Operations Notification and Evaluation (ONE) Form, Revision 5
STA-604	Work Scheduling, Revision 1
STA-627	Control of Planned Outages, Revision 5
ALM-0092A	Alarm Procedures Manual, Revision 6
WCI-203	Weekly Surveillance/Work Scheduling, Revision 11

Other Documents

"Comanche Peak Steam Electric Station Final Safety Analysis Report"
DBD-ME-311, "Safety Chilled Water System," Revision 5
DBD-ME-229, "Component Cooling Water System," Revision 10

LERs

94-002 for Unit 1
97-004 for Unit 2

Desktop Guides

Performance Criteria Guideline for Monitoring Maintenance Effectiveness, Revision 4

Maintenance Effectiveness Monitoring Desktop Instruction, Revision 2

Goal Setting and Monitoring Guide, Revision 2

Maintenance Preventable Functional Failure (MPFF) Guide, Revision 3

Desktop Reference Guide for DBUR Entry (CREATION) For Revision of PR-ISM PM, RT, MR, LMS, and NPRDS Data Base Records, Revision 1

Maintenance Rule Review Panel Guidance Document, Revision 2

Operations Notification and Evaluation (ONE) Forms

94-0651	97-0360	97-1663	98-0374
96-0687	97-0385	97-1666	98-0405
96-0732	97-1013	98-0015	98-0687
96-0771	97-1128	98-0029	98-0752
96-1064	97-1383	98-0034	98-0764
96-1343	97-1443	98-0098	98-0756
96-1407	97-1450	98-0176	
96-1490	97-1477	98-0196	
97-0227	97-1590		

Work Orders

1-95-082474-00	3-96-337601-01	4-96-101849-00	4-96-106005-00
1-95-084202-00	4-96-098094-00	4-96-104432-00	4-97-111002-00
1-96-105877-00	4-96-098219-00	4-96-105011-00	4-97-114561-00
3-96-309131-01	4-96-098723-00	4-96-105011-00	