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EXECUTIVE SUMMARY

This inspection involved a review of Millstone Unit 3's implementation of 10 CFR 50.65, the maintenance rule. It also included a review of Millstone Units 1 and 2 scoping and risk-ranking activities. The report covers a one- week onsite inspection by regional, and Nuclear Reactor Regulation (NRR) inspectors during the week of March 17-21, 1997. The team included a contractor for support in the area of probabilistic risk assessment (PRA) and risk-ranking for Units 1 and 2.

<u>Maintenance</u>

The team concluded that Units 2 & 3 had not correctly identified all of the structures, systems and components (SSCs) and associated functions that were required to be within the scope of the rule. This was a violation of the rule.

The team noted that Northeast Nuclear Energy Company (NNECo) had reviewed their scoping of SSCs for Unit 3 since the November 1996 NRC inspection and were including many new SSCs and functions in their maintenance rule program. The team found no new examples of SSCs that should have been in scope, but were not for Unit 3 during this inspection.

The team found that system engineers were knowledgeable of their systems and the maintenance rule. The team found that the involvement of system engineers and the maintenance rule system basis documents used by the system engineers represented a program strength.

All three units' PRAs level of detail, truncation limits and quality were acceptable to perform the risk categorization for the maintenance rule. The NNECo PRA Group has provided rigorous analysis to support the maintenance rule implementation. The team noted that the drywell (Unit 1), chilled water system (Unit 2), and nuclear fuel and reactor pressure vessel (both units), were classified as low safety significant without sufficient basis. NNECo agreed to re-evaluate these SSCs.

The Unit 3 expert panel process was strong and had risk-ranked systems by expert judgement in a logical, effective process.

The team reviewed the goals for the (a)(1) SSCs and found the goals to be good. In addition, appropriate corrective actions were taken when an SSC failed to meet its goal or performance criteria or experienced an maintenance preventable functional failure (MPFF).

The team had concerns with the containment isolation valve performance criteria and unavailability monitoring during some surveillance testing.

Station procedures provided sufficient controls for safe on-line and shutdown maintenance activities. All departments were familiar with the work/risk determination processes and understood the need to evaluate risk prior to releasing work activities.

The PRA group was actively involved in the risk determination process for on-line work activities. Risk was qualitatively measured for work during both shutdown and for on-line work activities through the use of the shutdown risk and equipment out-of-service (EOOS) programs. Shutdown risk management for the current plant configuration was well controlled and monitored. Operator knowledge of the rule was at a level that allowed them to carry out their responsibilities. The team found on-line and shutdown risk management to be a program strength.

The approach to balancing reliability and unavailability may not accomplish the objective of preventing failures of SSCs while minimizing unavailability as required by the rule. *This is an inspector followup item.*

The procedure for performing periodic evaluations except for balancing reliability and unavailability provided good guidance for satisfying (a)(3) requirements.

The training provided to system engineers and licensed operators on the maintenance rule appeared to be well developed.

Report Details

M1 Conduct of Maintenance (62706)

The primary focus of the inspection was to complete the maintenance rule baseline inspection on Unit 3 and support NRC Special Project Office's effort by verifying that Units 1 and 2 had appropriately performed scoping and risk-ranking to meet the requirements of 10 CFR 50.65, the maintenance rule. The team used inspection procedure (IP) 62706, "Maintenance Rule," NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," and Regulatory Guide (RG) 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," as references during the inspection.

M1.1 SSCs Included Within the Scope of the Rule (62706) (Units 1, 2 and 3)

a. Inspection Scope

The team reviewed the facility's scoping process and documentation to determine if the appropriate structures, systems and components (SSCs) were included within their maintenance rule program in accordance with 10 CFR 50.65(b).

b. Observations and Findings

The facility had performed maintenance rule scoping in two phases as described in Station Procedure OA 10, "Millstone Station Maintenance Rule Program," Rev 1. The SSCs within the scope of the maintenance rule were listed in an attachment to the procedure titled, "Program Instructions" PI1.1; "Phase 1 Scoping", Rev 2; and "Program Instruction" PI1.2; and "Scoping Phase 2", Rev 1. Phase 1 identified the SSCs to be considered for inclusion into the maintenance rule scope. The Phase 2 scoping identified functions of in-scope Phase 1 SSCs.

In addition to the scoping effort, the facility used part of the maintenance rule results to prioritize future SSCs to be worked during the facility's design basis verification program. This enabled the facility to establish the bases for the 10 CFR 50.54 considerations, which were grouped into the following categories:

- Group 1: In-scope systems which are both high safety significant and safety-related.
- Group 2: In-scope systems which are either high safety significant or safety-related.
- Group 3: In-scope systems which are neither high safety significant nor safety-related.
- Group 4: Systems not in scope to the rule.

Between November 1996 and March 1997 the facility performed a review of their Phase 1 scoping effort. The review was prompted because of problems identified with Unit 3 scoping during an NRC inspection conducted in November 1996 (combined inspection report Nos. 50-245, 336 and 423/96-09) and discussed below. The facility issued two adverse conditions reports (ACRs) (M3-96-1211 and M3-96-1212) to address the generic problems. In implementing the corrective actions of the ACRs, the facility identified additional SSCs which were required to be within the scope of the rule, but were not. Various SSCs were subsequently added to the Unit 3 Phase 1 and 2 scope. In addition, the facility performed a review of Unit 1 and Unit 2 scoping and identified similar problems as those described for Unit 3. However, at the beginning of the inspection, the corrective actions had not been fully incorporated into the maintenance rule program for the units (i.e., Phase 2 scoping, risk-ranking, historical review, goal setting, and/or performance monitoring had not been performed or established).

During the scoping review, the team noted that the maintenance rule system basis documents provided clear guidance and valuable information to the system engineers and were considered a program strength.

Unit 3 (Closed URI 50-423/96-09-12, 50-423/96-09-13 and IFI 50-423/96-09-14)

As part of this inspection, the team continued its review of the initial phase of the Unit 3 inspection. The team reviewed the Phase 1 and 2 scoping effort. The facility used the Millstone Unit 3 drawing list, nuclear plant reliability data system (NPRDS), probabilistic risk assessment (PRA) system listing, operations department system listing, engineering department system listing, and the Production Maintenance Management System (PMMS), a computerized data base of all plant systems, to identify the SSCs to be considered for placement under the maintenance rule. Numerous SSCs were scoped within the maintenance rule, and several SSCs were identified as high safety significant. Of the SSCs not scoped in the maintenance rule as separate SSCs, approximately one-tenth were included with other SSCs functions already within the scope of the maintenance rule.

The team did not identify any additional SSCs that should have been within scope, beyond those identified in November 1996.

The team reviewed documentation associated with a sample of SSCs to determine whether the facility properly justified its scoping conclusions. In November 1996 the team had determined that the facility had not correctly identified several SSCs that were required to be scoped within the maintenance rule. Since November, the facility had appropriately addressed this issue and had added numerous SSCs to scope prior to the March 1997 inspection. The facility's review resulted in an additional 21 safety-related, 26 non-safety related, and 78 Category 1 SSCs being added to the facilities Phase 1 and 2 scoping efforts. In some cases, the documentation detailing the technical basis of scoping justifications was not adequate, but the team found this concern was also being corrected during the March 1997 inspection.

Based on the above, the team determined that the NRC-identified within scope SSCs represented examples of a violation, and that the additional examples of within scope SSCs identified by NNECo represented non-cited examples of the same violation.

The team had found in November 1996 that some SSCs were not appropriately included in scope. For example, the following safety-related SSCs had been omitted and were identified by the team: fuel assemblies, fuel handling system, alternate shutdown panel, radiation monitoring panel, emergency lighting battery pack support, and the tunnel under the service building. These SSCs were specified as being safety-related in the Millstone 3 Updated Final Safety Analysis Report (FSAR). Also, the following non-safety related SSCs had been omitted: fire protection system, post accident sampling system (PASS), and communication and emergency lighting systems. These non-safety related SSCs had met one of the following standards: (1) mitigated accidents or transients; (2) were used in emergency operating procedures (EOPs); (3) whose failure could prevent a safety-related SSC from functioning; or (4) whose failure could cause a scram or safety system actuation. The team also had determined that the facility did not include the following SSCs that contained Category 1 components: auxiliary boiler-auxiliary condensate, communication-sound powered, compressed gas-hydrogen, compressed gas-nitrogen, electrical-AC lighting-normal, primary water, rad waste-liquid, solid and AER drains, reactor coolant-reactor coolant pump vibration monitor, and waste treatment-waste water. The failure to include these Unit 3 safety-related, non-safety related, and Category 1 SSCs in the scope of the maintenance rule represents a violation of 10 CFR 50.65(b). "Failure to scope SSCs within the maintenance rule." **(VIO 50-423/97-80-01)**

As part of this scoping review, the team assessed the causes, corrective actions, and proposed schedule to complete the actions associated with the two ACRs. The team determined that the facility had appropriately processed and scheduled the actions needed to resolve the noted issues.

Also, during the November 1996 scoping review, the team had determined that the facility would, on occasion, move SSC components' function(s) from one SSC category to another. Based on the initial look, the team noted that a number of systems listed in the printout contained Category 1 components, but were outside the scope of the rule. Additional inspection was performed during the March 1997 inspection to ensure that the facility had properly captured safety-related components within the scope of the rule. The team selected the following systems to verify that each safety-related component was captured: fuel building ventilation system, control rod drive mechanism ventilation and cooling system, and the main steam valve building ventilation system. The team verified that each of the above mentioned system's safety-related components were appropriately scoped.

Unit 2:

The team reviewed the Unit 2 Phase 1 and 2 scoping effort. This included the corrective actions associated with the ACRs, noted in the above Unit 3 section. While implementing the corrective actions of the ACRs, the facility identified 12 SSCs and related functions which had not been initially scoped into the maintenance rule as required. In addition to the facility's identified examples, the team identified the following SSCs which are part of the Unit 2 EOPs and should have been included within the scope of the rule: control rod element drive cooling system, containment auxiliary circulating system, and the condenser air removal exhaust system. For the control rod element drive cooling system, the Unit 2 FSAR indicated and the facility confirmed that the fans were powered from an emergency power source, indicating possible mitigative functions for the system.

In addition, the following systems were not included within scope even though industry operating experience has shown that the system failure could lead to a scram and/or loss of safety-related equipment functions: exciter air cooler system and the intake structure ventilation system. These SSCs had either caused a scram at a similar plant or were identified as having the potential to cause a common mode failure of the service water (SW) system as reported in a recent Unit 2 licensee event report (LER).

Failure to include the above Unit 2 SSCs and associated functions within the scope of the maintenance rule represents a violation of 10 CFR 50.65(b) "Failure to Scope SSCs Within the Maintenance Rule." **(VIO 50-336/97-80-01)**

In addition to the violation, the team noted that a number of systems were not clearly documented as being in scope. For example, the anticipated transient without scram (ATWS) system was not described in the Phase 2 scoping as a function of an in-scope SSC. Through interviews, the team ascertained that the system was scoped under the control element drive system function 1.04, "provide the withdraw, insert, and trip capability for the control element assembly." The facility acknowledged that the ATWS system and system functions were not clearly documented in their program and provided the team-proposed changes that addressed the issue for ATWS and other SSCs. These changes were already in-process, and were not prompted by the team.

Also, for the Phase 2 scoping review, the team noted a number of functions that were not listed within the maintenance rule scope. For the functions not properly classified, the team was provided documentation which demonstrated that the functions were in the process of being included in the scope. The revision was based on a review by the facility of the Phase 2 scoping. Again, these changes were already in-process, and were not prompted by the team. The team did note that the facility's Phase 1 review had correctly identified the SSCs within the scope. Examples included: reactor pressurizer function 1.02, (low temperature over-pressure protection (LTOP) was listed as only being required in MODES 1-4), station air system did not include EOP functions, and non-vital electrical buses were not listed in scope for scrams. Because of the on-going changes to the Phase 2 scoping on both Units 1 and 2, the team will review Phase 2 scoping in a future inspection. This is an inspector follow-up item: Phase 2 Scoping Review. (IFI 50-245, 336/97-90-02)

Unit 1:

The team reviewed the Unit 1 Phase 1 and 2 scoping effort. This included the corrective actions associated with the ACRs noted in the above Unit 3 section. The facility had recently identified the following SSCs to be added to the maintenance rule program, but had not completed the Phase 2 scoping effort prior to this inspection: 120 VAC electrical distribution system, communications system, discharge structure, emergency lighting system, make-up water system, nuclear fuel, process computer, plant heating & condensate recovery system, rad waste building, refuel platform, turbine building, component cooling water system, and transformer deluge system. The team determined that these NNECo-identified within scope SSCs represented examples of the above scoping violation that would not be cited.

In addition, the team found that documentation supporting the Unit 1 Phase 2 scoping effort did not identify SSCs that performed maintenance rule system functions. Three examples included: (1) heater drain system, function 1.02, "provide process control signals and functions (permissive, interlocks, start, throttle, etc.)"; (2) the turbine generator system, functions 1.01, "convert thermal energy in the main steam system into mechanical energy to rotate the electric generator to provide 24 kv power"; and (3) function 1.03, "provide interlocks, permissives and automatic actions". Another possible example was numerous non-safety related alarm and indicator functions for safety-related systems which may provide accident mitigating functions.

Based on the examples noted above and the facility's on-going changes to the Phase 2 scoping effort, which identifies subsystems and components that perform maintenance rule system functions, the team will carry review of Phase 2 scoping as an inspector follow-up item: Phase 2 Scoping Review. (IFI 50-245,336/97-80-02)

The team reviewed CEN 104I, "Condition Monitoring of Structures," Rev. 1, dated February 26, 1997, to verify appropriate structures had been included under the scope of the rule for Unit 1. The team found the facility's list of structures under the scope of the maintenance rule to be acceptable.

c. Conclusions

The team concluded that Units 2 & 3 had not correctly identified all of the SSCs and associated functions that were required to be within the scope of the rule and this was a violation of the rule.

The team noted that NNECo had reviewed their scoping of SSCs for Unit 3 since the November 1996 NRC inspection and had included many additional SSCs and functions in their maintenance rule program. The team found no examples of SSCs that should have been in scope, but were not for Unit 3 during this inspection.

The team determined that a review of the Phase 2 scoping effort following completion of the on-going revisions to the program for Units 1 and 2 was necessary.

The team concluded that the maintenance rule system basis documents used by the system engineers was a program strength.

M1.2 Safety (Risk) Determination, Risk-Ranking, and Expert Panel (Units 1, 2 and 3) (62706)

a. Inspection Scope

Paragraph (a)(1) of the maintenance rule requires that goals be commensurate with safety. Additionally, implementation of the rule using the guidance contained in NUMARC 93-01 required that safety be taken into account when setting performance criteria and monitoring under (a)(2) of the rule. This safety consideration would then be used to determine if the SSC functions should be monitored at the system, train, or plant level. The team reviewed the methods and calculations that NNECo had established for making these safety determinations for Units 1, 2 and 3. The team also reviewed the safety determinations that were made for the specific SSCs reviewed during this inspection.

NUMARC 93-01 recommends the use of an expert panel to establish safety (risk) significance of SSCs by combining PRA insights with operations and maintenance experience, and to compensate for the limitations of PRA modeling and importance measures. The team reviewed the risk-ranking determinations made by the expert panel.

b. Observations and Findings on Safety (Risk) Determinations, Risk-Ranking, and Expert Panel

Expert Panel (Unit 3)

NNECo used an expert panel to establish safety significance and other maintenance rule- related functions. The team reviewed the procedures for controlling the expert panel activities and recent expert panel meeting notes. The team also reviewed other expert panel documentation and discussed their decisions with them.

The expert panel performed the risk-ranking that was based on expert opinion and included PRA results. NNECo determined that the expert panel would use the Delphi process to solicit and weigh this opinion. The team found that the results of the expert panel process were generally more inclusive than risk-ranking performed by numeric PRA methods only.

Safety Determinations and Rankings (Units 1, 2, and 3)

Units 1 and 2

Unit-specific PRAs were used to rank SSCs with regard to safety significance. The unit-specific Level 1 PRA models were updated, linked-fault-tree models which were used for importance calculations to determine SSC safety significance. The CAFTA software was used to quantify these linked-fault-tree PRA models. The Unit 1 Individual Plant Examination for Severe Accident Vulnerabilities (IPE), submitted on March 31, 1992, was based on the 1989 updated probabilistic safety study (PSS) and provided information on core damage frequency (CDF) and Level 2 analysis of containment failure for both internal and external events. The Unit 2 IPE, submitted on December 30, 1993, was based on the Level 1 PSS and contained information on Level 2 analysis (containment performance analysis) results.

The safety significance ranking of Units 1 and 2 SSCs was based on a combination of results from importance analyses using the unit-specific PRAs and expert panel judgement. In general, NNECo used quantitative measures of risk achievement worth (RAW), risk reduction worth (RRW), and cutsets contributing to 90 percent of calculated CDF. There were no calculations of quantitative measures for containment systems performance. Therefore, the importance measures did not reflect information on containment performance and large early release frequency (LERF) sequences. However, the team found that some containment systems were considered as high safety significant by the expert panel process. The high safety significance determination of Unit 1 SSCs was based on the SSC meeting at least one of the quantitative criteria and expert panel voting. In the case of Unit 2 SSCs, the high safety significance determination was based on the SSC meeting at least one of the quantitative criteria, evaluation results by Delphi process, and finalized expert panel deliberations.

The team reviewed the truncation limits used during the risk-ranking process and found the limits to be reasonable. (Truncation limits are imposed on PRA models to limit the size and complexity of PRA results to a manageable level). NNECo used a truncation level of 1E-9 when quantifying the plant-specific PRA models for both Units 1 and 2. These four orders of magnitude were more inclusive than the overall CDF estimate of 1.1E-5 per reactor year for Unit 1, and the CDF estimate of 3.4E-5 per reactor year for Unit 2. NNECo indicated that a truncation level of 1E-10 was used in some risk sensitivity calculations when a larger number of minimal cutsets was needed. The team considered that the truncation limit of 1E-9 used for the risk-ranking process was reasonable.

The team noted that initiating event frequencies were updated in the unit-specific PRA models to reflect plant operating experience. In general, generic failure data for the component failures and unavailabilities were used in the PRA calculations. Unit-specific data was used when statistically sufficient data was available. A Bayesian updating process was used to aggregate generic and unit-specific data in some cases. However, NNECo has not initiated a program to update the PRA models with actual unit equipment failure data. NNECo indicated that changes in the updated PRA models would be considered in the continuous evaluation of risk-ranking SSCs in the scoping of SSCs for the maintenance rule.

The team reviewed a sample of SSCs covered by the rule that the expert panel had categorized as low safety significant to assess if the expert panel had appropriately established the safety significance of those SSCs. In the case of Unit 1 SSCs, the sample included the nuclear fuel, reactor pressure vessel (RPV), drywell, circulating water, instrument air, scram pilot air, reactor building ventilation, turbine building ventilation, and turbine building closed cooling water systems. Most of these systems were not explicitly modeled in the Unit 1 Level 1 PRA. The team agreed with the NNECo assessment for most of the SSCs. However, the team disagreed with the assessment for the nuclear fuel, RPV, and drywell. The expert panel had considered that high reliability of these passive components as the basis of the low safety significant determination. High reliability is not a necessary and sufficient criterion for classifying a SSC as low safety significant. An increase in the risk of radiological consequences would be experienced if system performance of the fission product barrier SSCs were to degrade. NNECo agreed to re-evaluate the safety significance of the nuclear fuel, RPV, and drywell before the full scope maintenance rule baseline inspection at Unit 1. At the time of the inspection, the expert panel had declared 32 SSCs to be high safety significance out of the 61 SSCs within the scope of the rule at Unit 1. Systems were classified as high safety significant if the system included a component that was necessary to support a high safety significant function. With the exception of those SSCs noted that will be re-evaluated, the team did not identify any other SSCs that had been inappropriately ranked.

In the case of Unit 2 SSCs, the sample of low safety significant SSCs reviewed by the team included the nuclear fuel, RPV, chilled water, containment and enclosure building ventilation, turbine building ventilation, instrument air, nuclear steam supply control panels, 6.9 kv AC, condensate and circulating water systems. Most of these systems were not explicitly modeled in the Unit 2 Level 1 PRA. The team agreed with the NNECo assessment for most of these SSCs. However, the team disagreed with the assessment for nuclear fuel, RPV, and chilled water system. The chilled water system is an important support system to the DC switchgear room ventilation system, which is considered as high safety significant. NNECo agreed to re-evaluate the risk significance of these SSCs before the full scope maintenance rule inspection at Unit 2. At the time of the inspection, the expert panel had declared 33 SSCs to be high safety significant out of 95 SSCs within the scope of the rule at Unit 2. With the exception of those SSCs noted that will re-evaluated, the team did not identify any other SSCs that had been inappropriately ranked.

Unit 3

Risk-ranking of systems and trains was reviewed during the November 1996 NRC inspection (Reference Report 50-423/96-09). During that inspection, the NRC team noted that the PRA level of detail, data, and quality were adequate to perform risk-ranking. Although the NNECo process for risk-ranking was acceptable, the team observed that the PRA used generic equipment failure data, and that the PRA truncation level was relatively high, allowing the possibility that high safety significant equipment was not identified. Additionally, the team noted that the safeguards equipment room ventilation and coolers had been excluded from being high safety significant without completing room heat load calculations, and that NNECo did not use containment equipment or external event analysis in quantifying risk-ranking of systems.

During the current inspection, NNECo discussed the results of additional analysis performed at a lower cutset truncation level. NNECo requantified the model at 1.0E-10 truncation level, and this resulted in numerical recognition of the residual heat removal, containment quench spray and reactor plant component cooling water systems as high safety significant. These three systems had previously been included as high safety significant by the expert panel. The panel had performed risk-ranking by expert opinion using the Delphi process.

NNECo has undertaken work to calculate the effect of loss of ventilation cooling within rooms containing safeguards equipment. The PRA model conservatively assumes that equipment failure will directly result from failure of room cooling and ventilation. The team discussed the work in progress to calculate the room temperature profile that will be applied to predict resultant equipment failure. This issue remains open until the room temperature effects on equipment failure have been reviewed by the NRC. **(IFI 50-423/96-09-15)**

NNECo was reviewing the insights from external events analysis and was developing a policy on update of basic event data.

c. Conclusions on Safety (Risk) Determinations, Safety (Risk) Ranking, and Expert Panel

The team concluded that the all three unit's PRA level of detail, truncation limits and quality were acceptable to perform the risk categorization for the maintenance rule. The team also concluded that the NNECo PRA group has provided rigorous analysis to support the maintenance rule implementation. Additionally, the team noted that the drywell (Unit 1) chilled water system (Unit 2), and nuclear fuel and reactor pressure vessel (both units) were classified as low safety significant without sufficient basis. NNECo agreed to re-evaluate these SSCs.

The team concluded that the Unit 3 expert panel process was strong and that it had risk ranked systems by expert judgement in a logical process.

M1.3 Goal Setting and Monitoring (a)(1) and Preventive Maintenance (a)(2) (Unit 3)

a. Inspection Scope

The team reviewed program documents in order to evaluate the process established to set goals and monitor under (a)(1) and to verify that preventive maintenance was effective under (a)(2) of the rule. The team also discussed the program with appropriate plant personnel. The team reviewed in detail the following Unit 3 SSCs:

(a)(1) SSCs
- containment isolation
- chemical and volume control
- main steam
- vital 480 volt motor control centers (MCCs)
- reactor coolant
- service water

(a)(2) SSCs
- structures
- reactor protection
- auxiliary feedwater

b. Observations and Findings

NUMARC 93-01, Paragraph 9.3.2, "Performance Criteria for Evaluating SSCs," states that "Performance criteria for risk significant SSCs should be established to assure reliability and availability assumptions used in the plant-specific PRA, IPE, IPEEE, or other risk-determining analysis are maintained or adjusted when determined necessary by the utility." NNECo system engineers had generally established system and train level performance criteria in terms of unavailability and maintenance preventable functional failures (MPFFs) for a two-year rolling period.

The team reviewed the performance criteria for Unit 3 to confirm that the facility had set performance criteria under (a)(2) of the maintenance rule, and that they were consistent with the assumptions used to establish the 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 PRA are maintained.

The team reviewed the NNECo approach to establishing performance criteria, as outlined in the Program Instruction 3 of the Millstone Integrated Maintenance Program Manual (pg. PI 3-1 to PI 3-19), and found the approach to be reasonable. The approach included the use of the PRA process in developing the reliability and unavailability performance criteria, and met the requirements of the maintenance rule.

The team reviewed reliability performance criteria for risk significant SSCs and found the criteria to be acceptable. For reliability performance criteria, NNECo used functional failures (FFs) rather than MPFFs, a more conservative approach. A performance criterion of one FF less than the number of redundant trains per 24 months was selected for the reliability of all high safety significant SSCs. In the case of low safety significant SSCs, the reliability performance criterion was set at a number of allowed FFs equal to the number of trains or components of interest. The reliability performance criteria varied from 0 to 5 FFs per two-year period depending on the PRA unreliability values (if the SSC was modeled in the PRA), the estimated number of demands during the two-year period, and other industry reliability data information. In general, the reliability performance criteria were correlated and, in some cases, more stringent than the PRA-assumed failure rates. NNECo's approach for establishing the reliability performance criteria was based on using the appropriate statistical distributions (e.g., binomial distribution for standby SSCs and Poisson distribution for operating SSCs) to calculate SSC train failure probabilities. Therefore, the selection of these reliability performance criteria appeared to be in consonance with PRA assumptions because the actual number of failures on a specific SSC over the two-year period was mostly zero, with occasionally one failure occurring. The team agreed that the proposed reliability performance criteria for risk significant SSCs were acceptable.

The team found the unavailability criteria for risk significant SSCs to be acceptable. In general, the unavailability criteria of risk significant SSCs were also correlated and, in some cases, more stringent than the unavailability assumptions used in the PRA. NNECo had evaluated the change in CDF due to the unavailability criterion for each of the high safety significant SSCs such that CDF increase did not exceed 2 percent. NNECo had also performed sensitivity analyses to evaluate the cumulative risk impact of setting the unavailability criteria for all high safety significant SSCs into the Unit 3 PRA model. The sensitivity calculations showed that the CDF increase was 14 percent when the maintenance unavailabilities for all high safety significant SSCs, excluding 3 highly available SSCs (i.e., refueling water storage tank, vital AC and DC power supplies) were set equal to the proposed unavailability criteria. NNECo's approach in the sensitivity analyses accounted for system interdependencies, and the evaluation results showed that the unavailability performance criteria as a group were commensurate with safety. The team concluded that the NNECo approach to applying the PRA process for establishing the bases of reliability and unavailability performance criteria was reasonable.

The performance criteria for reliability and unavailability of high safety significant SSCs were correlated and, in some cases, more stringent than the unreliability and unavailability assumptions used in the PRA. The team concluded that the approach of evaluating the change in CDF for establishing the unavailability performance criteria was acceptable, because the cumulative risk impact of all system interdependencies would be fully evaluated.

The team found that unavailability monitoring at Unit 3 was not consistent with the NUMARC 93-01 guidance for unavailability. Procedure PMG-1.1, "Unavailability Monitoring," specifies that activities such as preventive maintenance, human error, surveillance, and testing may result in loss of system/train functions thus requiring unavailability monitoring. However, based on discussions with Unit 3 system engineers, the team found that unavailability was not being monitored during some surveillance testing for the service water and auxiliary feedwater systems. Discussions with the maintenance rule coordinator revealed that the current unavailability data collection methods used INPO reporting methods, which do not include surveillance unavailability if provision to return the system to normal are provided in the procedure.

Equipment performance cannot be assessed accurately unless the time for surveillance testing unavailability is included. The team informed the maintenance rule coordinator of this concern. A condition report was generated to document and disposition this finding. The issue of unavailability monitoring will be carried as an unresolved item pending NRC evaluation of the extent and acceptability of this monitoring approach. **(URI 50-423/97-80-04)**

The maintenance rule, as implemented by NUMARC 93-01, states that industry wide operating experience should be taken into consideration, where practical, when establishing goals or performance criteria. Based on reviews of documentation and discussions with facility personnel, the team determined that Unit 3 had established programs for reviewing and evaluating industry operating experience. The system engineers reviewed industry experience to determine the effect on their systems and to develop and implement appropriate corrective actions. The team found that system engineers were able to identify system improvements that had been implemented based on information obtained from industry operating experience. The team also discussed the industry operating experience program with the nuclear safety engineering (NSE) representative assigned to Unit 3 and reviewed the NSE Instruction 3.01, "Operating Experience Evaluations," Revision 2 and a new draft of the procedure. The NSE representative was knowledgeable of the requirements of procedure 3.01. The NSE representative noted that, as of March 21, 1997, 108 messages concerning industry operating experience had been sent to the Unit 3 personnel.

<u>Detailed Review of (a)(1) and (a)(2) SSCs</u>

The team reviewed the implementation of the maintenance rule for individual (a)(1) and (a)(2) systems for Unit 3. The team reviewed each of the six (a)(1) and three (a)(2) systems to verify that goals or performance criteria were established in accordance with safety, that industry wide operating experience was taken into consideration and appropriate monitoring and trending were being performed. The team reviewed the goals for the (a)(1) SSCs and found them to be acceptable. In addition, the team determined that corrective actions were taken when an SSC failed to meet its goal or performance criteria or experienced an MPFF.

The team determined that there was no clearly defined process for placing degraded structures into the (a)(1) category. The performance criteria of a functional failure of the structure before placing the structure into the (a)(1) category appeared to be an unacceptably high threshold. NNECo took action to revise the procedure to more clearly define the criteria to be exceeded prior to placing a structure in the a(1) category. The team was satisfied with the NNECo action.

The team noted that components of the containment isolation system were not clearly identified in the system basis documents. These components consisted, in part, of containment penetrations, doorways, and hatches that perform the function of providing containment isolation. NNECo agreed to clarify the basis documents to more clearly identify all components of the system.

The team reviewed the performance criteria of these and other systems and found that, in most cases, it was acceptable. However, the performance criteria for the containment isolation valves were set at the allowable leakage from primary containment rather than specifying performance criteria for individual valves. This practice could mask poor performance of individual valves. The team recognized that individual valve leakage criteria exist as part of the Appendix J program. NNECo stated this issue would be reviewed for inclusion under the maintenance rule. The performance criteria established for containment isolation valves is an inspector follow item. **(IFI 50-423/97-80-03)**

System managers were found to knowledgeable of their systems and made effective use of the system basis documents.

The unavailability monitoring concern during some surveillance testing of the auxiliary feedwater and service water systems was discussed earlier.

c. Conclusions for Goal Setting and Performance Criteria

The team found the goals for the (a)(1) SSCs to be appropriate. In addition, appropriate corrective actions were taken when an SSC failed to meet its goal or performance criteria or experienced an MPFF.

The team expressed concern with the containment isolation valve performance criteria and the unavailability monitoring during surveillance testing of some systems.

The team concluded that performance criteria had been established that met the maintenance rule requirements.

M1.4 Plant Safety Assessments before taking Equipment Out of Service (Unit 3)

a. Inspection Scope

Paragraph (a)(3) of the rule states that an assessment of the total impact on plant safety should be taken into account before taking equipment out of service for monitoring or preventive maintenance. The team reviewed the applicable procedures and discussed the process and procedures with appropriate Unit 3 personnel, including licensed operators, probabilistic risk assessment (PRA) and work planning department personnel. Licensed reactor operator knowledge of the general requirement of the maintenance rule and their particular duties and responsibilities under the rule were assessed.

b. Observations and Findings

Station procedure OA 10, "Millstone Station Maintenance Rule Program," Section 1.7, specifies that schedules be developed to implement maintenance, surveillance, and plant modification activities; and that the schedules be reviewed by the PRA group to perform a risk assessment for SSCs taken out-of-service. Risk considerations are performed for work activities with the plant on-line or in a shutdown condition.

Work activities at Unit 3 are planned on a 12-week rolling schedule in accordance with Procedure U3-WC14, "On-line Scheduling." The 12-week schedule establishes predetermined system work windows for on-line maintenance activities, while maintaining availability of the key plant safety functions. All recurring work activities including surveillances were broken down into discrete functional equipment groups and received a risk analysis, based on probabilistic safety assessment insights and operating judgement, to eliminate peaks in the relative risk caused by the combinations of the planned activities.

During a specific work week schedule development, the work scope is frozen 3 weeks prior to its implementation. The schedule is forwarded to PRA and the operations shift manager for review to ensure risk is minimized and verify compliance with technical specifications. The relative risk of planned work activities is determined through the use of the equipment out-of-service (EOOS) program, which modeled the functional equipment groups into the PRA. The EOOS program used data from the planned maintenance management system to determine what work is scheduled. The program is conservative in that it assumes all work scheduled for a particular day is performed simultaneously, vice sequenced when determining the overall plant risk.

During plant shutdown conditions, Procedure OP 3260A, "Conduct of Outages," provides the controls for maintenance activities. For planning purposes, the EOOS program is used to determine the availability of equipment necessary to fulfill the key safety functions rather than individual systems to ensure the core is protected, and assigns a color code to depict the defense in depth. The key safety functions include: reactor coolant and spent fuel cooling decay heat removal, inventory control, power availability, reactivity control, and reactor containment integrity. Depending on the status of each key safety function, one of four color codes (green, yellow, orange, and red) is assigned. Green indicates there is significant defense in depth, and red denotes an unacceptable level of defense in depth. Licensed reactor operators determine the actual defense in depth prior to releasing any work activity.

The team reviewed the process for releasing emergent work and for evaluating the risk due to schedular changes after the work week is finalized. For work activities in any plant mode, all changes to the work plan require either PRA review and/or management review and approval prior to its implementation.

The team reviewed the work planning and analysis for the week that the team was on-site and reviewed a representative sample of the system work weeks that were completed. All were found to be performed as directed by station procedures. Discussions with Unit 3 licensed reactor operators, PRA, and work planning department personnel revealed that all personnel understood their responsibility associated with on-line maintenance and the maintenance rule.

c. Conclusions

The team concluded that station procedures provided sufficient controls for safe on-line and shutdown maintenance conditions. All departments were familiar with the work/risk determination processes and understood the need to evaluate risk prior to releasing work activities.

The PRA group was actively involved in the risk determination process for on-line work activities. Risk was qualitatively measured for work during both shutdown and for on-line work activities through the use of the shutdown risk and EOOS programs. The PRA model is conservative in that it assumes all work scheduled for a particular day is performed simultaneously.

Shutdown risk management for the current plant configuration was well controlled and monitored. Operator knowledge of the rule was at a level that allowed them to carry out their responsibilities. The team judged on-line and shutdown risk management to be a strength.

M1.5 (a)(3) Periodic Evaluations and Balancing Reliability and Availability (Unit 3)

a. Inspection Scope

Paragraph (a)(3) of the rule requires that performance and condition monitoring activities and 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. Paragraph (a)(3) of the rule also 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 the procedural guidelines for these evaluations, since no periodic evaluation required by the rule had been performed.

b. Observations and Findings

NNECo procedure, PMG-1.5, "Periodic Assessment," Rev. 2, provided acceptable guidelines for the topics to be evaluated in the periodic assessment. The methods for balancing unavailability and reliability are provided in an attachment to PMG-1.5. The facility's approach was to compare actual performance to the SSC performance criteria. NNECo's assumption was that if both availability and reliability performance criteria were met, then they were balanced. If one of the performance criterion was exceeded, then this assumption was called into question. When both performance criteria were exceeded, the performance is evaluated. It was not clear to the team that the method for balancing allows one to optimize reliability and availability. The issue of balancing will be carried as an inspector followup item until the periodic assessment is performed. **(IFI 50-423/97-80-05)**

c. Conclusions

The team concluded that the approach to balancing reliability and availability may not accomplish the objective of preventing failures of SSCs while minimizing unavailability as required by the rule. This is an inspector followup item.

The procedure for performing the periodic evaluation except for balancing reliability and availability provided good guidance for satisfying (a)(3) requirements.

M2 Engineering Support of Facilities and Equipment

M2.1 Review of Updated Final Safety Analysis Report Commitments

A recent discovery of a licensee operating their facility in a manner contrary to the FSAR description highlighted the need for a special focussed review that compares plant practices, procedures, and parameters to the FSAR descriptions. While performing the inspections discussed in this report, the team reviewed portions of the FSAR for Units 1, 2, and 3. The team noted that the FSAR wording was, on occasion, inconsistent with the observed plant practices, procedures and parameters. For example, the team noted inconsistencies in the Unit 3 FSAR during the review of Table 3.7.B.2, "Methods of Analysis used in Seismic Category 1 Structures." The listed seismic category structures were not the same as indicated in other sections of the FSAR. There were also minor discrepancies noted during the Unit 2 FSAR review.

M3 Staff Knowledge and Performance (Unit 3)

M3.1 Knowledge of the Maintenance Rule

a. Inspection Scope

The team interviewed engineers and managers to assess their understanding of the maintenance rule and associated responsibilities. Also, the team interviewed licensed reactor operators and senior reactor operators to determine if they understood the general requirements of the rule and their particular duties and responsibilities for its implementation. The team also reviewed the training provided on the maintenance rule.

b. Observations and Findings

System engineers were knowledgeable of their systems and were familiar with related industry operating experience. They were also familiar with the maintenance rule requirements. In addition, the engineers demonstrated a very good knowledge of the system during in-plant system walk downs. The team also noted that the system engineers were cognizant of their system's performance through the tracking and trending programs.

Licensed reactor operators and senior reactor operators were found to be knowledgeable of the maintenance rule.

The team reviewed training lesson plans and instructions used to provide maintenance rule training to the system engineers and licensed operators. Licensed operator training provided a good overview of maintenance rule program requirements and the responsibilities of the various personnel involved. The training placed particular emphasis on the on-shift personnel responsibilities. The system engineer's portion of the training provided a detailed breakdown of various sections of the maintenance rule, including establishing and monitoring of performance criteria. The training also provided several good examples of functional failures and maintenance preventable functional failures.

c. Conclusions

The team found that system engineers were knowledgeable of their systems and the maintenance rule. Licensed operators were also knowledgeable of the maintenance rule.

The team determined that appropriate and effective training had been provided to both system engineering personnel and licensed operators.

M7 Quality Assurance (QA) in Maintenance Activities

M7.1 Self-Assessments of the Maintenance Rule Program (Unit 3)

a. Inspection Scope

The team reviewed four assessments of the maintenance rule. These assessments were:

- Assessment of Maintenance Rule Implementation at Millstone Station, October 16-20, 1995
- Maintenance Rule Periodic Assessment at MP3, April 22-26, 1996
- NS&O Assessment Overview of Maintenance Rule Implementation, April-June 1996
- Maintenance Rule Self Assessment Report, December 9-13, 1996, dated January 29, 1997

b. Observations and Findings

The team found the assessments were generally in-depth and provided good feedback for maintenance rule program improvements. The issues that were identified in the assessment reports appeared to have been acted upon by the facility. However, the team noted that several issues were repeatedly identified or were otherwise noteworthy. These issues included:

- Need for a structures monitoring program as part of implementation of the rule.
- Need for a clear definition and understanding of MPFFs.
- Updating PRA models and assessing potential impacts on the maintenance rule program.
- SSCs within the scope of the rule but without clearly defined boundaries or assigned responsibilities.
- Appendix J valves not included in the scope of the maintenance rule for leakage.
- MPFF evaluations instrumentation and controls (I&C) tests and calibrations under generic work orders.

c. Conclusions

The team concluded that NNECo had conducted several maintenance rule program assessments and had generally addressed issues identified in the assessments.

V. Management Meetings

XI. Exit Meeting Summary

The team discussed the progress of the inspection with NNECo representatives on a daily basis and presented the inspection results to members of management at the conclusion of the inspection on March 21, 1997.

The team asked whether any materials examined during the inspection should be considered proprietary. NNECo indicated that no information provided to the team was considered proprietary.

After the exit meeting, NNECo requested a copy of the questions used by the team as guidance for interviewing NNECo personnel. A copy of these questions were provided and are attached to this inspection report.

PARTIAL LIST OF PERSONS CONTACTED

Northeast Nuclear Energy Company

J. Armstrong, Director Engineering, Unit 1
M. Bain, Technical Support Manager, Unit 2
M. Brothers, Unit Director, MP 3
R. Duncan, Director, Operations Engineering, Unit 3
J. Evola, Senior Engineer
J. Gionet, Unit 3 NRC Coordinator
K. Hastings, Project Manager, CBM Dept.
D. Hicks, Director, Unit 3
M. Hill, Director, Audits and Evaluation
J. McElwain, Unit 1 Officer
G. McNatt, Maintenance Rule Coordinator, Unit 2
H. Miller, Assistant Unit Director, Unit 2
T. Nichols, Manager, CBM Dept.
C. Papanic, Licensing
J. Paschel, Licensing Manager
D. Perkins, Unit 2 NRC Coordinator
J. Quinn, Engineering Supervisor, Unit 1
T. Ryan, Maintenance Rule Coordinator, Unit 3
R. Spooner, Maintenance Rule Coordinator, Unit 1
G. Swider, Technical Support Manager, Unit 3
J. Stanford, NSSS Supervisor
S. Weeraklwdy, Supervisor PRA Group
S. Willard, Program Engineer, Conn Yankee
J. Wilson, Maintenance Rule Coordinator, Unit 3

LIST OF INSPECTION PROCEDURES USED

IP 62706 Maintenance Rule

LIST OF ITEMS OPENED, DISCUSSED AND CLOSED

OPENED

VIO 50-423/97-80-01, Failure to Scope SSCs within the Maintenance Rule.

VIO 50-336/97-80-01, Failure to Scope SSCs within the Maintenance Rule.

IFI 50-245, 336/97-90-02, Phase 2 Scoping Review.

IFI 50-423/97-80-03, Performance criteria for containment isolation valves.

URI 50-423/97-80-04, Monitoring unavailability when performing surveillance testing.

IFI 50-423/97-80-05, Balancing reliability and unavailability.

CLOSED

URI 50-423/96-09-12, Failure to include safety-related and non-safety related SSCs within scope.

URI 50-423/96-09-13, Systems with safety-related components (Cat 1) and without documented justification for scoping decisions.

IFI 50-423/96-09-14, Review a sample of SSCs that had either their functions moved to another SSC or were eliminated from the scope.

DISCUSSED

IFI 50-423/96-09-15, Equipment performance in ECCS rooms with heat loads considered.

LIST OF ACRONYMS USED

ACR	Adverse Condition Report
ATWS	Anticipated Transient Without a Scram
CFR	Code of Federal Regulations
CR	Condition Report
DRCH	Division of Reactor Controls and Human Factors
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
EN	Event Number
EOOS	Equipment out of service
EOP	Emergency Operating Procedure
FSAR	Final Safety Analysis Report
HQMB	Quality Assurance and Maintenance Branch
HVAC	Heating Ventilation and Air Condition
IFI	Inspection Follow-up Item
IP	Inspection Procedure
LER	Licensee Event Report
LTOP	Low Temperature Over-Pressure Protection
MES	Maintenance Engineering Services
NNECo	Northeast Nuclear Energy Company
NPRDS	Nuclear Plant Reliability Data System
NRC	United States Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
NUMARC	Nuclear Management and Resources Council
PASS	Post Accident Sampling System
PMMS	Production Maintenance Management System

PRA	Probabilistic Risk Assessment
RI	NRC Region 1
RG	NRC Regulatory Guide
SSCs	Structures, Systems, and Components
URI	Unresolved Item
VIO	Notice of Violation

ENCLOSURE 2

List of Questions for Interviews and Inspection

Maintenance Rule Coordinator Questions

Expert Panel Questions

(a)(3) Periodic Evaluation and Balancing Questions

Plant Operators Questions

(a)(1) Goal Setting and Monitoring Questions for System Engineers

(a)(2) Preventive Maintenance Questions for System Engineers

Probabilistic Risk Analysis Coordinator Questions

Equipment Out of Service Questions

Maintenance Rule Coordinator Questions

___ 1. How have you educated the appropriate plant staff regarding the requirements of the maintenance rule?
___ 2. Does your management adequately support the implementation of the rule?
___ 3. How are repeat failures identified?
___ 4. How are repeat MPFFs identified?
___ 5. What actions are taken after they are identified?
___ 6. How are generic implications taken into consideration?
___ 7. Are the persons responsible for implementing the rule clearly defined?
___ 8. Was NUMARC 93-01 followed when implementing the rule?
___ 9. Are there any exceptions?
___ 10. What SSCs are under the scope of the rule?
___ 11. How are systems and trains defined?
___ 12. How did you determine which systems were high safety significant?
___ 13. How did you determine which structures were high safety significant?
___ 14. Which are being monitored at the plant, system, train, or component level?
___ 15. Which are being monitored under (a)(1) of the rule?
___ 16. How did you determine which SSCs should be monitored using goals under (a)(1) of the rule?
___ 17. How is unavailability data recorded?
___ 18. Is trending performed for all systems?
___ 19. Who is responsible for trending?
___ 20. Has your Plant identified SSCs that have been determined to be allowed to run to failure or that are inherently reliable?
___ 21. How are these determinations documented?
___ 22. What is your process for establishing performance criteria for SSCs within the scope of the rule?

___ 23. How is industry-wide operating experience used to support the rule in the areas of Implementation and day-to-day operation?
___ 24. How were performance criteria developed?
___ 25. Which SSCs are being monitored using plant level performance criteria?
___ 26. How was the decision made to use plant level performance criteria?
___ 27. What action is taken when a plant level performance criterion is exceeded?
___ 28. Who has responsibility for evaluating failures and establishing corrective actions?
___ 29. Was past performance taken into consideration when establishing performance criteria?
___ 30. Where you able to obtain reliability and unavailability and failure data for the previous two cycles?
___ 31. What process is used ensure that the scoping list is maintained up-to-date (EOP changes, design changes, SCRAMS, etc.)?
___ 32. Has specific training been given to those on the expert panel and those responsible for performance monitoring and trending, making (a)(1)(a)(2) determinations, and other rule activities?

<u>Expert Panel Questions</u>

___ 1. Has an expert panel been established?
___ 2. List the names, titles, and discuss qualifications of expert panel members.
___ 3. Was a PRA expert included as a member of the expert panel?
___ 4. Is there an expert panel charter or procedure that describes their duties and responsibilities? How often does panel meet? What are the quorum rules? Are there meeting minutes? May we review the minutes for the last six meetings?
___ 5. If the expert panel is permanent, are there provisions for assuring that the required level of expertise is maintained when replacing members? Is this panel the same members as existed originally?
___ 6. If the expert panel is not permanent, how will future plant modifications be handled?
___ 7. What activities besides risk-ranking (scoping, performance evaluation, etc.) are the expert panel members involved in?
___ 8. Were you trained on the use of PRA information and its limitations?
___ 9. What are some of the limitations of the use of PRA?
___ 10. Were Risk Reduction Worth, Core Damage Frequency Contribution, Risk Achievement orth methods used for determining risk when establishing goals under (a)(1) or performance criteria under (a)(2) of the rule?
___ 11. Were risk considerations other than PRA used?
___ 12. How were systems not modeled by PRA determined to be risk significant?
___ 13. Were there differences between what was considered PRA high safety significant and Expert Panel high safety significant?

- ___ 14. Is the reliability and availability data obtained through the maintenance rule monitoring activities being used to update or evaluated against the assumptions used in the PRA?
- ___ 15. Were any additional insights used by the expert panel to determine high safety significance of SSCs?
- ___ 16. Does the selection of high safety significant SSCs seem reasonable?
- ___ 17. Has the list of SSCs within the scope been revised or changed?
- ___ 18. What defines the system and trains?
- ___ 19. Are there any "run to failure" or "inherently reliable" classification?
- ___ 20. How are fission product barrier SSCs classified for safety significance?
- ___ 21. Has the FSAR, design bases documents, EOPs, and PRA system notebooks been reviewed for possible impact on the scoping list?
- ___ 22. Who identifies maintenance preventable functional failures?
- ___ 23. What is the (a)(1) list? Has it changed? Why and when?
- ___ 24. What is the (a)(2) list? Has it changed? Why and when?

(a)(3) Periodic Evaluation and Balancing Questions

- ___ 1. What is your schedule for performing these evaluations?
- ___ 2. Does the periodic evaluation (or do the plans for the periodic evaluation) include an assessment of performance and condition monitoring activities and associated goals and preventive maintenance activities?
- ___ 3. Does the periodic evaluation (or do the plans for the periodic evaluation) take into account, where practical, industry-wide operating experience?
- ___ 4. What process have you established for making adjustments where necessary to ensure that the objective of preventing failures of SSCs through maintenance is appropriately balanced against the objective of minimizing unavailability of SSCs because of monitoring or preventive maintenance activities?
- ___ 5. Are there any examples where this activity resulted in changes to the preventive maintenance activities for specific SSCs?
- ___ 6. Who will be performing the evaluation?
- ___ 7. Who in plant management will review the evaluation?

Plant Operator Questions

- ___ 1. Can you describe the key requirements of the Maintenance Rule.
- ___ 2. What maintenance rule activities are you responsible for?
- ___ 3. When do you declare a SSC out of service and who is responsible for making that determination?
- ___ 4. How is unavailability data for maintenance rule systems recorded?
- ___ 5. Which systems is this data recorded for?
- ___ 6. What purposes is this information used for under the maintenance rule?
- ___ 7. What is a PRA is and how it is used for implementing the maintenance rule?

___ 8. How is risk assessed prior to performing monitoring or preventive maintenance at your plant?
___ 9. Are you involved in this process?
___ 10. How can you determine which SSCs are out of service at any given time.
___ 11. How can you determine which SSCs are within the scope of the rule?
___ 12. How can you determine which SSCs are risk significant?

(a)(1) Goal Setting and Monitoring Questions for System Engineers

___ 1. What goals were set and what monitoring was being performed? Was this monitoring activity part of an existing program?
___ 2. If the system is high safety significant, are both reliability and availability being monitored?
___ 3. What was the basis for determining it to be (a)(1)?
___ 4. Was plant management involved in the decision?
___ 5. How will you know when it can be reclassified as (a)(2)?
___ 6. How was safety (or risk) taken into consideration when establishing goals and monitoring against those goals?
___ 7. Did you have any input into the risk determination process?
___ 8. Why is the SSC being monitored at the (plant, system, train, component) level?
___ 9. Is monitoring predictive in nature and is trending being performed?
___ 10. Was industry-wide operating experience taken into account when establishing these goals?
___ 11. How did this goal address the cause of the repetitive failure or the reason for exceeding its (a)(2) performance criteria?
___ 12. Did this SSCs experience any maintenance preventable functional failures or exceed an established goal?
___ 13. What was the root cause?
___ 14. What corrective action was taken?
___ 15. Was the effectiveness of corrective action verified either by post maintenance testing or modification of goals or monitoring activities?
___ 16. What are your (the system engineers) background and qualifications?
___ 17. Describe your understanding of the maintenance rule.
___ 18. What is the difference between a performance criterion and a goal?
___ 19. What is the purpose of establishing a goal?
___ 20. Do you feel that your management would hold it against you for placing your system into (a)(1)?
___ 21. How do you view (a)(1) classifications?
___ 22. How do you determine when to place an SSC into (a)(1)?
___ 23. What role did you play in establishing the goals for your system(s)?
___ 24. Do you understand the basis for the goals for your system?
___ 25. Do you agree with the goals that were established?

___ 26. What maintenance rule activities are you responsible for?
___ 27. Describe your system.
___ 28. How many other systems are you responsible for?
___ 29. Are the number of assigned systems changed frequently?

(a)(2) Preventive Maintenance Questions for System Engineers

___ 1. Was safety or risk taken into consideration when establishing performance *criteria? Yes___No___. Explain:*
___ 2. Did you have any input into the risk determination process?
___ 3. Did you make a determination that preventive maintenance was not required bocause the SSCs was inherently reliable?
___ 4. Did you make a determination that preventive maintenance was not required for *this SSC because of its low safety significance and therefore could be allowed to* run to failure?
___ 5. Has this SSC experienced a maintenance preventable functional failure, or failed to meet the performance criteria?
___ 6. What was the root cause?
___ 7. What corrective action was taken?
___ 8. Did the licensee reconsider the performance criteria or disposition this SSC to (a)(1) where it would be subject to goal setting and monitoring?
___ 9. What type of trending is being performed?
___ 10. What are your (the system engineers) background and qualifications?
___ 11. Can you describe the key requirements of thu maintenance rule.
___ 12. What maintenance rule activities are you responsible for?
___ 13. What is the difference between a performance criterion and a goal?
___ 14. What is the purpose of establishing a goal?
___ 15. Do you feel that placing your system into (a)(1) could have a negative impact on your personal performance appraisal?
___ 16. How do you view (a)(1) classifications?
___ 17. How do you determine when to place an SSC into (a)(1)?
___ 18. What role did you play in establishing criteria for your system(s)?
___ 19. Do you understand the basis for the performance criteria for your system?
___ 20. Do you agree with the performance criteria that were established?
___ 21. Are the performance criteria appropriate?
___ 22. For systems utilizing plant level criteria, can the systems affect the criteria?
___ 23. Describe your system.
___ 24. How many other systems are you responsible for?
___ 25. Are the number of assigned systems changed frequently?

Probabilistic Risk Analysis Coordinator Questions

___ 1. How many people are in the probabilistic risk analysis group?

___ 2. What hardware and software does it have?
___ 3. Since the issue of the IPE, has the PRA been revised? When? Why? How?
___ 4. What systems are modelled in the PRA?
___ 5. Was generic or plant specific data used?
___ 6. How and who establish risk significance?
___ 7. Any calculations support the risk-ranking?
___ 8. May we see a current risk-ranking list?
___ 9. Are there previous revisions? When and why?
___ 10. How is Level 2 data factored into the risk significance?
___ 11. How is common mode or generic failures factored into the risk significance?
___ 12. What factors (at least 3) are used for risk significance? (Risk Achievement Worth, Fussell-Vesely {or RRW}, Core Damage Frequency, Birnbaum, etc.)
___ 13. What truncation (at least 4 orders from CDF) is used? Why?
___ 14. Sensitivity studies?
___ 15. How is PRA data used in performance criteria?
___ 16. How is PRA data used in goals?
___ 17. How are PRA assumptions corrected when performance criteria or goals are different?
___ 18. What mode limits apply to the risk significance?
___ 19. Who does trending? How is PRA changed based on trending data?
___ 20. How is unavailability data reported/recorded?
___ 21. How has unavailability and reliability been balanced?

<u>Equipment Out of Service Coordinator Questions</u>

___ 1. Is a matrix or on-line risk meter used?
___ 2. What procedure addresses the use of the matrix or risk meter?
___ 3. How is matrix developed and maintained?
___ 4. What procedure addresses how the matrix is developed?
___ 5. Can we see the current matrix?
___ 6. Has this matrix been revised? When and why?
___ 7. What limits and operating modes apply to the matrix?
___ 8. What is done in other than modes 1 and 2?
___ 9. Did the expert panel approve the matrix?
___ 10. Any calculations support the matrix?
___ 11. Is Level 2 data in the matrix?
___ 12. May we review control room logs?