NUCLEAR ENERGY INSTITUTE

April 20, 1994

Mr. Gary G. Zech, Chief
Performance and Quality Evaluation Branch
Office of Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Questions and Answers From NUMARC Workshops

Dear Mr. Zech:

During the two industry workshops sponsored by NUMARC in 1993 on implementation of the maintenance rule, one in Atlanta and the other in St. Louis, over 700 questions were submitted to NUMARC. Each question was reviewed and the number of questions reduced to about 500 as a result of duplication. We then convened the members of the Verification and Validation Ad Hoc Advisory Committee (AHAC) to aid us in preparing answers to each question. On February 17 & 18, 1994, we met in a public meeting with the NRC and discussed the draft responses to each question. As a result of that meeting and several subsequent reviews by the AHAC and members of the NEI staff, a complete set of the questions and answers (Q&As) have been finalized (Enclosure).

The purpose of this letter is to request NRC review and concurrence with the developed responses. We would appreciate having your response, if possible, by May 27, 1994. It is anticipated that utilities will be able to utilize the Q&As in preparing their site specific implementation plan for the maintenance rule. We feel that a set of industry and NRC approved Q&As will provide invaluable input for both the industry and the NRC when discussing the implementation issues.

As you review the Q&As there may be questions regarding the answers provided. We are available to meet with you at your convenience to answer any questions or concerns that you may have.

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Should you have any questions regarding the enclosure or wish to establish a meeting date, please call Dan Rains or me.

Sincerely,

Warren J. Hall

Warren J. Hall
Manager
Operations, Management
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WJH
Enclosure

SCOPE 1. **In reading NUMARC-93-01, Section 8.2.1, it would seem that a potentially resource-intensive effort is necessary to determine what is in scope and what is not. What are the resource risks associated with defaulting to Section 8.2.1.5 and setting high level plant performance goals (i.e. number of trips) vs. documenting why it is OK to put it in Section 8.2.1.6?**

When scoping at the system level, the level of effort to complete is not great based on the verification & validation (V&V) exercise. The V&V participants completed the scoping work in less than three months. Approximately 60% of all plant SSCs are in scope to the Maintenance Rule as explained in Section 8 of NUMARC 93-02. This would mean that if all SSCs were included then 40% of the plant would be under the Maintenance Rule unnecessarily. The intent of the Maintenance Rule is to monitor maintenance and ensure it is effective. If the utility includes SSCs which have little effect on plant safety then resources will be diverted unnecessarily to less important SSCs.

SCOPE 2. (a) **Does the NRC expect that a utility will definitively identify the SSCs at a given site that are in the Maintenance Rule scope?**

(b) **Is it acceptable to identify only those SSCs which are risk significant and include all other SSCs in the scope of the rule?**

(a) Yes

(b) The Maintenance Rule criteria identifies the minimum set of SSCs that a utility could designate within the scope of the Maintenance Rule. The licensee always has the option to exceed the regulatory requirements and include all plant SSCs within the scope of the Maintenance Rule. The NRC would then regulate (enforce) the utility to those regulatory commitments. Unnecessary commitments from utilities have been identified by both the NRC and industry as a cause for the frequency of regulatory action and that approach is not recommended.

SCOPE 3. **Under Section 8.2.1.5 if a system is known to have the potential to cause a plant trip, but because the reason it has not is because of an effective maintenance program; can you conclude that the system may be excluded from the scope of the Maintenance Rule until a MPFF is experienced?**

No. An SSC that the licensee knows can cause a plant trip is in scope to the Maintenance Rule. Consideration of applicable industry experience, existing analyses on trip initiation, plant trip history and any related corrective action should be given when making this determination.

SCOPE 4. **How long will/should it take to complete the scoping effort?**

One V&V participant used an integrated data system, and completed the effort in 9 days at a cost of $3,000. Another V&V participant used one and a half people to do the initial paperwork and then had another team review it. Yet another V&V participant expects to spend approximately 1500 man-hours per unit in a two phase approach and identify supported functions at that time. Other results are given in NUMARC 93-02.

SCOPE 5. **How do SSCs get removed from the scope of the rule?**

If an SSC is determined to be within the scope, it cannot be removed unless the plant is modified or an EOP procedure change alters the original reason for inclusion. It is very important to go through all 5 questions included in Section 8 of NUMARC 93-01 and document results. SSCs are excluded from the scope of the Maintenance Rule when they do not meet any of the five scoping criteria explained in NUMARC 93-01.

SCOPE 6. **If there has not been a scram or a safety system actuation in the last two fuel cycles, can all non-safety-related equipment be eliminated from Maintenance Rule monitoring?**

No. Non-safety-related SSCs are included within the scope of the Maintenance Rule if they meet the criteria of NUMARC 93-01, Sections 8.2.1.2 through 8.2.1.5. Good performance (i.e., no trips) does not justify excluding SSCs from the scope of the Maintenance Rule.

SCOPE 7. **Regarding instrumentation, reactor protection (RPS) or engineered safety features (ESF), typically a train is not affected until multiple channel failures occur and conversely single channel failures may degrade multiple trains, but until there are multiple failures, overall train (and system) availability is unaffected. It would almost seem then that most of the instrumentation in RPS or ESF actuation would be outside the scope of the rule (i.e., neither cause nor prevent protective action).**

Control instrumentation would generally be included in the scope on the basis of being safety-related or the fact that some non-safety-related control instrumentation have caused scrams. Instrumentation redundancy was purposely designed to prevent single failure events but there are five criteria in NUMARC 93-01, Section 8 that cause SSCs to be included in the Maintenance Rule. An SSC is included within the scope of the Maintenance Rule if it meets any of the five scoping criteria.

SCOPE 8. **If a component is classified safety-related, can it be excluded from the rule for any justification? Is it necessary to reclassify a safety-related component to exclude it from the Maintenance Rule scope?**

No, safety-related SSCs can only be excluded by reclassifying as non-safety-related and not meeting the additional Maintenance Rule requirements in paragraph (b)(2) (See Question 5). Safety-related SSCs cannot be excluded on the basis of performance (i.e., no failures) because the Maintenance Rule specifies their inclusion. An SSC can only be excluded from the scope of the rule if it does not meet all of the criteria in Section 8.0 of NUMARC 93-01.

SCOPE 9. **The Emergency Feedwater (EFW) system valves need to close on main steam isolation -- loss of this function would not affect EFW. How should the SSC be scoped under this condition?**

It should be included within the scope. The safety function of main steam isolation would be affected and performance monitoring should be set up to identify this loss of safety function.

SCOPE 10. **How important is identifying specific safety-related functions during scoping of non-safety-related functions, i.e., specific EOP scope?**

It is extremely important to identify and document the function for both safety and non-safety SSCs that causes the SSC to be within the scope of the Maintenance Rule. There are two basic areas where this information is needed. First, the function the SSC provides is needed so failures can be evaluated against those functional aspects. The maintenance preventable functional failures (MPFF) review would be considered too broad (i.e., require looking at all failures) if the functional criteria was not applied. Not all failures that cause loss of function are MPFFs. Secondly, when removing SSCs from service it is important to be aware of what function is being lost so compensatory actions can be taken if necessary and assessment of the impact of removing multiple components from service can be determined.

SCOPE 11. **Where a system has redundant components, does the definition of system function include having the primary and redundant component available to perform their primary and backup function? Please address both ECCS types with a general design criteria to be single failure proof and other systems, such as condensate, where a backup pump auto actuation could prevent a trip but is not required by nuclear design requirements.**

Yes. The primary and backup (redundant) SSCs are all in scope because they contribute to meeting the system function.

Systems with redundant components (operating pumps and standby or backup pumps) must be monitored for performance. The system function for the condensate system with redundant components is handled by including all components under the scope of the Maintenance Rule. The condensate pumps (i.e., 2 pumps with 100% capacity) are needed to meet system design criteria. The redundant (i.e., standby or backup) pumps are also in scope to the Maintenance Rule.

The ECCS system is a redundant design with two independent trains (power, piping, etc.) available to meet the design function. Both trains would be scoped within the Maintenance Rule. In general, ECCS systems are functionally independent at a level higher than components.

SCOPE 12. **For "scoping" systems/trains, is there any benefit or efficiency in grouping them by functions as outlined in the BWROG EPG (i.e., RPV level control - core cooling, RPV power control - reactor S/D, etc.)?**

Yes. But the functions need to be compared to the five scoping criteria to determine if the function is in-scope to the Maintenance Rule.

SCOPE 13. **The use of the term safety function is used somewhat synonymously with safety-related in NUMARC 93-01. Is this the case?**

No. It should be understood that criteria (b) of the rule states the functions both safety and non-safety, are considered in scope to the Maintenance Rule. In addition, non-safety related SSCs may also provide a safety function (e.g. BWR condensate for RPV injection).

SCOPE 14. **Many components are classified as safety-related for the purposes of circuit integrity (for electrical relays, etc.) or pressure boundary integrity (instruments, etc.). These components have no real safety function.**

(a) **Should they be included within the scope of the Maintenance Rule?**

(b) **If they are included and experience repetitive failures without affecting train, system, or plant level safety function, should goal setting be applied? This statement should be clarified to consider failure modes and effects analysis prior to classifying an SSC to (a)(1).**

(a) Yes. The components identified (instrumentation, relays, etc.) are classified as safety-related, and are included within the scope of the Maintenance Rule. Paragraph (b) of the Maintenance Rule defines the criteria for inclusion within the Maintenance Rule. If instrumentation provides a safety control function then the instrumentation is important to plant safety. In addition, the safety function could be lost if pressure boundary integrity or electrical isolation is lost.

(b) If the repetitive failure caused a loss of function of a SSC within the scope of the rule, goals should be considered. This is an example of why it is important to document the function of the SSC within the scope of the rule.

Failure modes and effects analysis should be considered during the assessment of the function that is lost, the cause that initiated the loss and the appropriate corrective action.

SCOPE 15. **Can emergency power systems listed in Table 9-1 in Workshop session 5 be combined into one EPS? Why monitor mechanical, electrical, and civil structures independently (e.g., EDGs, 4160VAC, HVAC, etc.)?**

Yes. Systems can be combined to form "super" systems or components can be combined to form "pseudo" systems. For example, all the systems used to support diesel generator operation could be combined under one system for monitoring purposes. The cooling water, fuel, oil, ventilation, electric power, control and other systems may be aggregated into a "super" system. For example, this combining would focus more on the functional aspects of the diesel generator rather than the individual SSC's contribution to the systems function.

SCOPE 16. **For a non-safety-related system which causes a reactor scram or could cause a reactor scram, what is correct definition -- cause or could cause?**

If the loss of a non-safety-related SSC function is known to have caused or could cause a scram, trip, or prevent a safety-related SSC from fulfilling its safety-related function, the non-safety-related SSC is within scope. If it is not known by the utility's own existing analysis, experience or industry experience, it may be considered out of scope until subsequent experience requires its inclusion within the scope of the Maintenance Rule. No new analyses are required to determine if the SSC could cause a scram. The guideline document will be revised to reflect a two cycle review period for failure evaluation.

SCOPE 17. **PRAs, engineering analyses, etc., deal with hypothetical failures. Would they only be used to show what failures of SSCs would constitute functional failures, not which SSCs must be included (since they may not have actually occurred)?**

If the PRA or other analyses indicates that a loss of a safety function has a reasonable probability of occurring, the loss of function has been analytically determined even though it has not occurred and therefore is within the scope of the rule. The guideline was written to exclude the necessity to perform additional analysis (the rule is a performance based rule) and uses the word hypothetical to indicate that additional analysis is not required.

SCOPE 18. **On page 13 of NUMARC 93-01, does the second bullet on Seismic II SSCs installed in proximity to Seismic I SSCs mean that spatial interaction effects are not sufficient to include an item or a support as an SSC under the rule?**

Yes. Seismic II/I equipment is not within the Maintenance Rule scope unless it satisfies one of the 5 scoping criteria in NUMARC 93-01, Section 8.

SCOPE 19. **Is it necessary to consider other operating conditions (e.g., shutdown risk) or modes when scoping SSCs under the Maintenance Rule?**

Yes. All operating conditions should be considered.

SCOPE 20. **The rule also applies to refueling cycles and other scenarios. I haven't seen many examples of these conditions. Are there different documents/functions that occur/need to be looked at for these? Any special difficulties/considerations?**

Some refueling cycle events are modeled in the PRA. In addition, NUMARC 91-06 addresses shutdown risk. The Maintenance Rule covers all modes of operation. Examples of outage/refueling functions include fuel pool cooling and residual heat removal (RHR).

SCOPE 21. **During the scoping phase of Maintenance Rule implementation for non-safety-related SSCs that cause a reactor trip or actuation of a safety-related system, do you assume that: (1) the failure of the SSC by itself causes a scram without operator action; or (2) that the SSC could cause a scram, if no operator action; or (3) that the SSC will cause a scram if no operator action?**

The non-safety-related SSC is in scope for those SSCs that could cause a reactor trip or actuation of a safety-related system with or without operator action.

SCOPE 22. **Should all five criteria in NUMARC 93-01 for selecting SSCs be reviewed for applicability, or if one yes, are you finished?**

If you get one yes, you are finished. However, it is recommended that all criteria be considered so that if plant changes occur, the utility will not inadvertently remove an SSC from scope. All questions should be answered during scoping, but it is not required.

SCOPE 23. **For scoping purposes at what point or condition is an accident considered terminated? What is the transition point between accident mitigation and accident recovery? I propose SI termination and release terminated.**

This is a utility-specific decision based on a case-by-case evaluation and is not addressed in NUMARC 93-01.

SCOPE 24. **Why isn't prevention of accidents or transients also of interest?**

It is of interest. The rule indicates [See NUMARC 93-01, Appendix A2, paragraph (b)(1)] that safety-related SSCs are in scope that have the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the 10 CFR Part 100 guidelines.

SCOPE 25. **Why are those SSCs that could cause a scram in the rule?**

Scrams are included in the Maintenance Rule, because they represent unnecessary challenges of the safety systems even though the plant was designed for scram initiation.

SCOPE 26. **Are severe accident management strategies in scope?**

No. Severe accident management strategies are not included as one of the scoping criteria unless they are referenced in station EOPs and meet the significant value criteria.

SCOPE 27. **For non-safety-related equipment that mitigates accidents and transients: How do these SSCs differ from safety-related equipment and equipment used in EOPs?**

All safety-related SSCs are within the scope of the Maintenance Rule. Non-safety-related equipment that does not meet the criteria of (b)(2) of the rule is not within the scope of the rule. If a utility relies on non-safety equipment in its EOPs to provide a significant fraction of the accident mitigation function, the non-safety-related SSC is within the scope of the rule and must be addressed. A significant fraction is not defined by the guideline and utility specific technical judgment is expected based on different design and accident management strategies. Section 8.2.1.3 of NUMARC 93-01 discusses significant fraction and provides an example.

SCOPE 28. **What type of data information system was used to support the scoping effort? Did it exist or did it have to be developed?**

Most V&V participants used their work order data base, Q-list or FSAR to determine SSCs that defined the plant. Scoping effort is explained in Section 5.2.1 of NUMARC 93-02. Some information systems were existing or needed substantial upgrade.

SCOPE 29. **Why is a review of procedures referenced in EOPs necessary?**

The procedures referenced in EOPs may identify SSCs that are in scope to the Maintenance Rule. If these referenced procedures are an extension of the EOPs, those SSCs in the procedures could be in the scope of the rule if it meets the rule criteria. Refer to Section 5.2.1.4 of the V&V Report (NUMARC 93-02) for additional information on SSC scoping process dealing with EOPs.

SCOPE 30. **How is significant contribution in the EOP determined?**

No specific value has been established. PRA data and expert panel reviews could be considered in the determination of significant contribution. See Section 8.2.1.3 of NUMARC 93-01 for an example.

SCOPE 31. **How are SSCs used in EOPs eliminated since they are not very descriptive?**

Generally, technical judgment is needed. One V&V participant indicated that if the SSC is not a significant contributor to function, it should not be included within the scope of the rule and the utility should document the basis. An important consideration is to identify the function that the EOP provides and then determine significance. Some SSCs are included in EOPs for economic consideration (e.g. turbine lube oil) and do not contribute to mitigating core damage or radioactive release. These do not need to be included within the scope of the rule.

SCOPE 32. **What basis is used for determining the significance for SSCs used in EOPs?**

The development of appropriate criteria for use by an expert panel is suggested. Criteria that could be considered includes:

- Operator is afforded additional time to restore principle SSCs designed to mitigate the event; or

- Operator could mitigate the event through use of the system alone or in conjunction with other SSCs.

SCOPE 33. **What determines how to eliminate some EOP systems from scope?**

Significant SSC contributors to overall core damage or safety significance to the plant should be considered and subsequently reviewed by senior operations personnel (SRO). It was recognized during the V&V process that some systems are in the EOPs for economic reasons and to restore the plant after an accident has been mitigated.

SCOPE 34. **Are non-safety-related SSCs in EOPs? The Westinghouse Owners Group has multilevel procedures to deal with plant transients. EOP = Emergency Operating Procedures; ST = Status Trees; FR = Functional Restoration Guidelines; CA = Contingency Actions; and AO = Abnormal Operations. Do the STs, FRs, CAs, and AOs need to be included in the scope of the Maintenance Rule?**

Yes, non-safety-related SSCs are used in EOPs.

In most cases, it is unlikely that SSCs utilized in secondary procedures would need to be included within the scope of the rule.

Initially, only the top level procedures need be considered (i.e., EOPs). If the EOPs reference secondary procedures and those SSCs in the secondary procedures provide a significant (utility defined) mitigation function in an accident they must be considered for inclusion within the scope of the rule.

SCOPE 35. **Is non-safety-related equipment utilized for assessment functions in EOPs within the scope of the Maintenance Rule? For example, the Emergency Response Facility Computer and PASS systems are indirectly involved in EOP implementation. Please state the industry standard for such systems providing an assessment function.**

No. The referenced SSCs in general do not meet the scoping requirements for inclusion within the scope of the Maintenance Rule. Other regulatory criteria may apply and should be satisfactorily implemented.

SCOPE 36. **Two of the non-safety-related criteria were listed under the same item in the rule. These were the SSCs required to mitigate accidents/transients and those listed in EOPs. Was their inclusion in the same rule item intended to represent a correlation and can those SSCs required to mitigate accidents/transients be determined from a review of the EOPs? Did the V&V participants determine that the majority of the SSCs required to mitigate accidents/transients were formed by review of those SSCs in the EOPs?**

The Maintenance Rule states in paragraph (b)(2)(i) ". . that are relied upon to mitigate accidents or transients or are used in plant emergency operating procedures (EOPs); or . . ." and was interpreted as two independent criteria. There is no intended connection or relationship between non-safety-related SSCs relied upon to mitigate accidents or transients and non-safety-related SSCs used in plant emergency operating procedures. The guideline covers four criteria for non-safety-related SSCs to determine if they are to be included in the scoping effort. NUMARC 93-01, Sections 8.2.1.2 and 8.2.1.3 cover the intent of paragraph (b)(2)(i) of the Maintenance Rule.

SCOPE 37. **If the PRA takes credit for non EOP procedures that utilize non-safety systems, would these non-safety systems be within the scope of the Maintenance Rule? Examples: An abnormal procedure exists to establish backup cooling to the centrifugal charging pumps (using firewater) in the event component cooling water cooling is lost. This prevents a RCP seal LOCA from occurring. A non EOP procedure also exists that discusses the availability of a portable pump to deliver diesel fuel oil to the day tanks in the event both fuel oil transfer pumps fail. Would firewater and the portable pump be within the scope of the Maintenance Rule?**

No. This assumes that the non EOP procedure is not referenced in the EOP itself.

Additionally, if the firewater and portable pump are a significant contributor to those systems ability to mitigate an accident or transients, they would be within the scope.

SCOPE 38. **Given that a non-safety system in the EOPs is used to mitigate an accident, what level of effort was expended to identify support systems to the non-safety EOP system (i.e., AC/DC power, HVAC)?**

Non-safety support system (i.e., room coolers) were generally identified for safety-related SSCs and not those in EOPs.

SCOPE 39. **Are there any "unplanned" safety system actuations that are not reported as LERs? If so, please give examples.**

None are known at this time.

SCOPE 40. **Please discuss approaches used and lessons learned concerning use of industry operating experience in scoping. Is INPO going to expand SEE-IN to support utilities identifying Maintenance Rule findings/lessons to other utilities?**

Industry operating experience that occurs during the two operating cycles prior to rule implementation on July 10, 1996, should be considered for applicability to each nuclear plant to determine the plant's vulnerability to this mechanism. If an industry event is determined to be applicable to a utility that has not experienced the event, the affected SSCs are considered to be within the scope of the Maintenance Rule.

If a utility does not consider the events that occur at another utility as applicable to its nuclear plants and the event subsequently occurs, it is an initial failure that requires root cause and corrective action to preclude recurrence. If the event is considered by the utility as applicable to its nuclear plant, the SSCs associated with the event are now within scope and corrective action to preclude recurrence should be initiated. Only a second failure at the same utility is considered a repetitive failure.

The use of operating experience is important and weaknesses should be identified and corrected when noted. However, it is not practical for a utility to review every non-safety failure that occurs at its nuclear power plant against every event that has previously occurred in the industry. If this were undertaken, it would detract from the day-to-day safe operation of the plant. Utilities should review a failure that occurs within its nuclear plant for events that occurred during the two previous operating cycles and review industry operating experience as it is identified without a search for previous events that could be similar. See NUREG-0737 and NUREG-0660, Procedures for Feedback of Operating Experience to Plant Staff, Section I.C.5, which defines a method for establishing an Operating Review Program.

Industry operating experience was used to determine which systems and components would be included in NPRDS and has also been used to determine subsequent changes in NPRDS scope. However, in order to maintain NPRDS reporting as consistent and uniform as possible, and therefore make NPRDS easier to use and more reliable, NPRDS scope does not immediately respond to every perturbation in industry operating experience. NPRDS scope changes are made only after detailed and comprehensive reviews demonstrate a long-term need for the revised data. INPO will continue to monitor industry operating experience and needs associated with the Maintenance Rule and may adjust the scope of NPRDS based on experience and industry needs.

Further expansion in the INPO SEE-IN program is not currently planned. In this program, the operating experiences of United States and participating non-U.S. nuclear plants are reviewed, and information regarding significant occurrences is disseminated to the industry. Each of the U.S. nuclear utilities has an operating experience review program that uses the results of SEE-IN and other industry sources. The purpose of these individual program is to ensure that plant personnel are made aware of pertinent industry and in-house operating experience. In addition, with over 30 separate NUCLEAR NETWORK® topic areas, there are sufficient categories to accommodate industry exchange of the wide range of information and experience relevant to the Maintenance Rule. NUCLEAR NETWORK should be used for utility sharing. NUMARC can be accessed through NUCLEAR NETWORK using the new Regulatory Processes and Interactions (NU) channel.

SCOPE 41. **A utility feels that its root cause program for SSCs is adequate and effective. Is it still necessary to include within the scope SSCs identified through in-house and industry operating experience?**

Yes. SSCs that meet paragraph (b) criteria of the rule are in scope. Adequate and effective cause determination of failure and appropriate corrective action are not criteria for determining if an SSC is within scope of the rule. Adequate and effective are criteria for monitoring and goal setting.

SCOPE 42. **Given the following scenario: 1) Initial SSC selection is completed and a non-safety-related SSC is not included in the scope because it is not in EOPs; 2) A review of plant SSC history and industry experience does not identify the SSC as a trip initiator, causing safety system actuation, or causing failure of a safety system to perform its intended function; 3) Subsequent to initial scoping an industry experience report is received indicating that the SSC has failed resulting in a trip of the reactor at another facility of the same design and configuration; 4) The reason that the SSC failure has not been experienced at this facility is because of an effective PM program. Must you now consider this SSC in the scope of the rule at your facility?**

The SSC would have been incorrectly excluded from being within the scope of the rule if it were excluded because the maintenance program is currently effective at the time of disposition.

Yes. If an SSC is known to be capable of causing the loss of a function described under paragraph (b) of the rule, it is within the scope of the rule. Good performance (now or always) does not exclude an SSC from the scope of the rule. However, if an SSC that has been determined (during initial scoping) to be appropriately dispositioned as not in scope, a later event either at the utility or that utility learns of an event at another unit that is applicable to that utility, the event will require the SSC to be addressed under the Maintenance Rule.

SCOPE 43. **To what extent do industry events need to be considered?**

To the extent that the industry events are applicable to your plant. The main focus should be on similar SSC and design function.

SCOPE 44. **During SSC scoping, the guideline does not specify the look backwards for two operating cycles to determine SSCs within the scope of the rule. How far back should industry operating experience be considered?**

The guideline will be modified to include consideration of failures during the previous two operating cycles. The "two operating cycles" time frame can be applied to Section 8, SSC selection.

SCOPE 45. **If only a part of a system is safety-related or is used in support of a safety-related function, can only that part of the system be included in the Maintenance Rule? For example, the main steam system from the steam generator to the main steam isolation valve.**

Yes, you can split systems at safety-related boundaries. Document retention providing the basis for the split is important.

SCOPE 46. (a) **If a system is within the scope of the rule (as an SSC), is it acceptable to have some components in that system excluded from the scope?**

(b) **For risk significant systems within the scope of the rule, is it acceptable to monitor only the most risk significant components in the system (e.g., the pumps) as an indicator of system performance?**

(a) Yes. If there are components in a system that is within the scope of the rule that perform no safety function and whose failure will not prevent the SSC from performing its safety function than they can be excluded. Monitoring at the component level should include those components whose failure will prevent the SSC from performing its intended function.

(b) Yes. The monitoring of risk significant SSCs within the scope of the rule can be performed at the component level. If the function of a fluid system is to provide a certain capacity of water, the pump is not the only component whose failure would result in loss of function. There would be many valves whose failure could also result in a system functional failure.

SCOPE 47. **Can an SSC be risk significant but not come under the scope of the rule?**

No. The V&V participants did not identify any risk significant SSCs which were not under the scope of the Maintenance Rule.

SCOPE 48. **Given that the IPE should be a comprehensive integrated study, would it capture the bulk of the SSCs under the Maintenance Rule? This does not mean that the IPE alone be used for scoping, but rather as a means for using existing studies to accomplish a portion of work.**

No. The V&V effort indicated in NUMARC 93-02, Section 8.4, that less than 50% of the SSCs scoped in the Maintenance Rule are included in the PRA/IPE, and only 27% of the total plant SSCs are modeled in the PRA. The PRAs can be used for risk significant determinations but the criteria outlined in the Maintenance Rule and NUMARC 93-01 should be used as the basis for scoping.

A PRA can be used to assist an expert panel in determining the importance of the contribution of some SSCs used in EOPs. The PRA can be a valuable source of information regarding the loss of some functions and their effects, and in conjunction with an expert panel is used to determine the risk significant SSCs.

SCOPE 49. **What if the IPEEE has been completed? Will this study be counted against your scoping effort when inspected or inspected on a preliminary basis? More importantly, the "structures" part of SSC.**

The IPEEE, when completed, should be considered in the Maintenance Rule scoping effort since it will provide additional data on vulnerabilities to risk. This should not be any different than other studies (i.e., EQ, Appendix R, etc.) that provide additional insight to plant safety and risk vulnerabilities. The safety function of structures is addressed by the Maintenance Rule criteria.

SCOPE 50. **If a system is within the scope of the rule, are all of the components in that system within the scope of the rule?**

Not necessarily. If there are components within the system whose failure will not cause the loss of the function(s) that caused the system to be within the scope of the rule, then those components do not need to be considered within the scope of the rule.

SCOPE 51. **Would it be acceptable for one of the "systems" that should be considered in SSC determination to be the "containment isolation system" to avoid the need to document why certain systems that penetrate containment are subdivided into safety and non-safety parts? Does it save any time or reduce documentation whichever way is chosen?**

Yes. A review of the V&V Report (NUMARC 93-02, Section 7) indicates that the scoping and monitoring effort can be greatly simplified if the containment system is treated as a whole. The documentation that would be applicable would be based on existing information already being collected.

SCOPE 52. **With regard to the containment/drywell, should scoping be done at the component level instead of system level?**

Scoping at the component level is a determination that must be made by each individual utility.

A V&V participant formed a new "pseudo" system that included containment isolation/containment integrity and scoped at the component level for this system only. See NUMARC 93-02, Section 7 for additional details.

SCOPE 53. **If an "artificial system" is established, such as containment isolation; (a) should it include all containment isolation valves (CIVs) or only those in otherwise non-safety-related systems? (b) if it includes all CIVs, is there a problem in treating a component as part of two different systems?**

(a) The utility has flexibility to combine all CIV including both safety and non-safety SSCs into an "artificial system."

(b) No problem is foreseen. Current containment and other surveillance tests results provide adequate means for ongoing monitoring.

SCOPE 54. **When applying screening criteria to the scoping and screening process, specifically Sections 8.2.1.4 and 8.2.1.5, the Workshop presenters stated that an adequate review of plant and industry experience for non-safety-related SSCs that either prevented a safety-related SSC from performing its safety function or whose failure caused a reactor trip or safety system actuation would be for two cycles prior to rule implementation. Is it July 1996 when the rule is effective? Is it when the scoping criteria is applied? Or is it when the maintenance programs are put in effect a year prior to the rule's effective date?**

On July 10, 1996, the effective date of the rule, a two cycle review should have been completed. That means a utility could start on July 10, 1993, and complete two cycles (assuming an 18-month refueling interval) when the rule is effective. The advantage of looking forward (i.e., start data review on July 10, 1993) is the quality of data should be more accurate and easier to collect.

SCOPE 55. **For in-house events, is it required to review all of your maintenance history or just the last two operating cycles?**

It is not necessary to review all maintenance history, only the two cycles prior to July 10, 1996.

SCOPE 56. **Does a system that could, but has not, caused a trip within the last 24 months need to be included in the scope of the Maintenance Rule?**

Yes. Any SSC that is known to be capable of causing a trip when the system fails is in scope to the Maintenance Rule regardless of whether or not it has ever caused a trip.

SCOPE 57. **Some Owners Groups have tracked causes of reactor trips over a number of years, e.g., the WOG used a Trip Reduction Assessment Program (TRAP) to identify and evaluate all Westinghouse reactor plant trips. For Westinghouse-designed plants, is every past system/component failure that caused a scram as identified in TRAP required to be included in the Maintenance Rule per Section 8.2.1.5, or do we apply a criteria where we only look at the past two years worth of TRAP data?**

The TRAP data review should include two fuel cycles as presented in NUMARC 93-01. The TRAP data base is a comprehensive data set that could be prudently used with minimal effort to identify NSSS specific industry experience. As with any data base, the utility should decide the applicability and appropriateness for its use.

SCOPE 58. **How much detail is required to document what is not in scope?**

Most cases would require only brief documentation. Reference NUMARC 93-02 (V&V Report), Table 5-10. The documentation should be that which the utility requires as a basis for its decisions.

SCOPE 59. **What type of documentation could be provided for the SSC determination other than the SSC matrix described earlier?**

If a matrix is used, including text fields may be the only additional documentation needed. The PRA results, expert panel conclusions could provide supporting documentation for the matrix. Marked up P&IDs could also be a means of documenting SSCs in scope. The utility implementation plan could provide the NRC with the utilities strategy to implement the Maintenance Rule.

The NRC has stated that the documentation needed is no more than that which provides a utility the data it needs to implement the rule. Data is not submitted to the NRC. It should be available for inspection.

SCOPE 60. **There is certain information in the rule (i.e., SSC functions) that must carry forward from scoping to performance criteria/monitoring. The scoping matrixes do not seem to have this level of detail. Did any of the V&V participants do both? What information needs to be retained in scoping for performance criteria/monitoring so time can be saved and it will not be necessary to iterate back and forth between the two?**

One V&V participant identified the function that the SSCs referenced in the covered EOPs. The function was identified for the expert panel determination of risk significance. The matrix spreadsheet has been expanded to include a column which captures SSC function. Explicitly noting on the matrix or in the documentation what function caused the SSC to be included in the Maintenance Rule (e.g., removal of decay heat), may help during determination of SSC scope performance criteria and monitoring.

SCOPE 61. **For some systems, is it acceptable to mark up P&IDs to show Maintenance Rule system boundaries and then update the component data base to redefine systems to facilitate some data collection (non plant level monitoring type systems)?**

Yes. It is acceptable, but not required, to mark P&ID to identify system boundaries. The utility has many options for documenting system boundaries during Maintenance Rule scoping. However, if monitoring is performed based on function, the system boundary effort would not be needed. Methods include annotating a P&ID or using a listing of SSCs that may be an integral part of the plant information system. It is not necessary to update the component data base unless monitoring will be at the component level. One V&V participant noted that they did not find the P&ID markup method very useful.

SCOPE 62. **Did the V&V BWRs compare the systems and components within scope amongst plants? Was this considered to be beneficial? If so, should all BWRs or sister plants compare lists? (Ref. #125S)**

Not all V&V participants agreed that comparing differences was of benefit. Comparing differences among common peer groups is expected to identify areas that are logically different or when the function is the same assure classification and scoping is appropriate.

SCOPE 63. **One V&V participant had different data bases available; however, the utility decided on one data base. Were the other data bases eliminated?**

Yes. A utility is responsible for defining the SSC's within the scope of the Maintenance Rule and should establish the appropriate data sources to achieve that objective.

SCOPE 64. **Provide some examples of structures that might be within scope.**

Examples include containment, certain tanks, control building, diesel generator building and possibly the intake structure. Performance criteria for structures could include settling, cracking, spalling, etc.

SCOPE 65. **How does the screening criteria specifically apply to structures? If a structure contains an in scope system, does this make the structure in scope?**

Structures are in scope if they meet one of the five criteria contained in Section 8 of NUMARC 93-01. The structure is considered on its own merits and not the equipment it protects.

SCOPE 66. **Will the NRC accept technical judgment vs. technical evaluation for a consideration of an item to be included or excluded in the Maintenance Rule program?**

Yes, assuming that there is an appropriately documented technical basis for the decision in either case.

SCOPE 67. **When determining the impact of non-safety-related system failures on safety-related systems or on causing a scram, is it necessary to consider both passive or active on all the failures? Passive failures such as pipe breaks - example: in case of the flooding analysis a fire pipe could fail which could result in a scram. Is it necessary to consider such failures (fire pipes are generally not charged but if a clapper valve trips and is left tripped, the break could flood a room)?**

Yes. If you have determined through existing analysis, or other means, that passive or active failures of non-safety-related systems can cause a scram or failure of a safety-related system, it must be included within the scope of the rule. It is not required that you do additional analysis or consider hypothetical events.

SCOPE 68. **Must all sources of radioactivity be counted when judging equipment within the scope of the Maintenance Rule or just fuel within the vessel? This has implications for fuel handling equipment, waste systems, and fuel building leak tightness? All examples given so far have been for fuel activity.**

The Maintenance Rule applies to all SSCs which are bounded by the utilities operating license and meet the criteria defined in paragraph (b) of the rule and Section 8 of NUMARC 93-01. For example, if SSCs for fuel in the spent fuel pool or in dry storage are identified as safety-related then they would be included under the scope of the Maintenance Rule.

SCOPE 69. **Is scoping required to be done on a real time basis as plant procedures or systems are changed or can it wait until the periodic evaluation?**

Plant modifications and procedure changes should be reviewed for Maintenance Rule applicability prior to implementation. Don't forget that a plant modification or procedure change may determine that an SSC can also be removed from the scope of the rule. If the utility waited until the periodic review there could be a delay of one year or more before the SSC was included or removed from the scope.

SCOPE 70. **Were training personnel used to assist in the scoping effort (i.e., those responsible for SRO training/use of simulator)?**

No. However they would be an excellent source of experience and knowledge.

SCOPE 71. **In the V&V report, two BWRs reached different decisions on the importance of annunciators to EOPs. Was this a plant difference or just a difference of judgment between plants regarding the importance of what really were similar systems performing similar roles?**

The difference was one of application of the annunciator system in the EOPs. It was a difference in judgment between the two plants that have similar systems and apply them differently. Yes. That difference in judgment is acceptable but the basis for the decision should be documented.

SCOPE 72. **10CFR50.65 specifically discusses design basis events. Is equipment which is only used to mitigate beyond design basis events such as ATWS and SBO included within the rule? Examples of such equipment are the diverse ATWS trip system installed under the ATWS rule and a security diesel generator credited in the SBO response. Comment: If the answer is no, then SBO does not have to be considered and all references to these events should be deleted in the examples (e.g., CST in Section 8.2.1.4). However, if the answer is yes, then Section 8.2.1.6 should be clarified to show that the security DG may be included if used during SBO.**

Yes. If the specific utility design does not credit the equipment as safety-related, it must meet the Maintenance Rule paragraph (b)(2) criteria for non-safety equipment to be within the scope of the Maintenance Rule. However, ATWS and SBO events are transients which are addressed in EOPs; thus SSCs used to mitigate them are within the scope of the Maintenance Rule.

SCOPE 73. **Did systems used for boron precipitation fall under 8.2.1.4?**

No. They were generally in scope under the criteria basis of being safety-related.

SCOPE 74. **In the example discussed during the scoping breakout session, Westinghouse extraction steam was said to be within the rule because a steam leak might cause a reactor trip. Shouldn't extraction steam be scoped within the rule because its failure might cause MSR high level and that would be turbine trip? Should failure of things like piping, walls, etc., be considered as potential trip initiators when their probability for failure is very small and certainly within plant design bases?**

The focus of the Maintenance Rule is on actual events (trips, etc.) that have occurred and not hypothetical scenarios. The extraction steam is in the scope of the Maintenance Rule because it has caused a reactor trip. The root cause is important because it will identify corrective action the utility should take to prevent the same or similar event from occurring again at their utility. Potential trip initiators do not need to be considered unless they have been identified in previous analysis or actually caused a trip.

SCOPE 75. **Should fire protection be considered during scoping/risk significance work?**

Yes. Fire protection was identified by most of the V&V plants as being included within the scope of the Maintenance Rule. Several said it was safety-related for their facility and the others considered it non-safety but important.

SCOPE 76. **Is there an underlying criteria behind the examples in the Table in Section 8.2.1.6? How does a utility determine if it has other similar situations if the only requirement is that they not meet 8.2.1.2 - 8.2.1.5?**

There is no underlying criteria and no effort to list all examples. The intent of NUMARC 93-01 was to provide examples of SSCs which would not meet the criteria of Sections 8.2.1.2 - 8.2.1.5. There are no hidden criteria if you have an SSC that does not meet the criteria to be included within the scope of the rule -- then it should not be there.

SCOPE 77. **Would non-safety-related equipment be required to be in scope based upon a procedural requirement to scram upon loss of that equipment?**

Yes. If the manual scram in response to a loss of non-safety-related equipment is procedurally required to anticipate or preclude an automatic trip.

SCOPE 78. **Where do systems like the Post Accident Sampling System (PASS) fall in the scoping effort.**

The determination of whether or not systems like PASS are in or out of scope is dependent on the use of the system and if it meets any of the criteria required for inclusion in the Maintenance Rule. The PASS could be included in EOPs but is not involved in the mitigation phase of an accident and therefore would not be part of the Maintenance Rule scope. However, utility's current licensing basis requires the licensee to assure functionality of PASS and for this reason maintenance would be required for other regulatory reasons.

SCOPE 79. **How were system engineering resources used to develop SSC scope? What was the impact on system engineering during scoping?**

System engineering personnel could provide scoping input but would probably be more familiar with system performance.

SCOPE 80. **In the V&V process, was there any comparison between the Maintenance Rule scoped components and the NPRDS reportable components? If so, how did the population differ? What are plans to capture more rule-scoped components within NPRDS?**

Comparison of the scope of SSCs and NPRDS in the V&V process was limited to a detailed review of only a few systems. The result of the V&V comparison are in Section 8 of the V&V report, NUMARC 93-02. The V&V process concluded that there will be some systems included in the scope of the Maintenance Rule that are not in the scope of NPRDS due to differences in selection criteria. However, it is expected that there will be a good correlation between the risk-significant systems in the scope of the rule and the systems included in the scope of NPRDS.

Comparison of the number of components scoped in the Maintenance Rule and NPRDS is not appropriate. NPRDS is a component level database, and the components included in the scope are selected based on specific function and application criteria. The Maintenance Rule scoping criteria allows selection of entire systems or trains based on system function. Therefore, component level comparisons are not meaningful.

There are no plans to expand the scope of NPRDS to include rule-scoped components. However, NPRDS is being modified to add a "wild card" system that utilities can use on a voluntary basis to report engineering data and failure reports on components in systems that are outside of the NPRDS scope.

The V&V participants evaluated the application of the NPRDS data base to facilitate Maintenance Rule implementation. They concluded that no changes to the NPRDS scope are required based on the following:

- Review of NPRDS component data for selected systems indicates that the data confirmed existing plant data but typically did not provide additional insights that were useful for rule implementation.

- Many SSCs within the scope of the Maintenance Rule are not included in the NPRDS database. An expansion of NPRDS to include all SSCs may be impractical due to dilution of technical resources and the high cost of implementation with minimal perceived benefit.

- The use of NPRDS component data is useful in comparing plant performance against industry norms; however, system/train configuration and bounding differences between nuclear units and the design of NPRDS as a component level database causes comparison of system/train performance using NPRDS data to be very complex and resource intensive. The evaluation of system/train functional performance may be better assessed through other methods such as plant incident/problem reports and LERs.

- The review of NPRDS and industry operating experience to minimize recurrence of unacceptable performance is a good practice; however, there is little value in establishing plant-specific goals based on this information by any plant other than the plant actually incurring the unacceptable performance. The activities that result in performance at a specific plant, as indicated by failures, are within the control of the plant staff that experienced the failure. Goals should be established by a utility to focus on areas that need additional attention. Goals also provide a utility's management indication of its utility-specific unacceptable performance. NPRDS and other industry operating experience can be useful to benchmark and confirm the validity of plant-specific goals established on the basis of individual plant performance.

SCOPE 81. **Is there any basis to conclude that a system that was within the Maintenance Rule scope is no longer within the scope? For example: the system has not caused a scram or SSA in three cycles; plant modification. The basis of the question comes from the move to rely on the Maintenance Rule for satisfying the license renewal rule.**

Once an SSC has been determined to be within the scope of the rule, it can only be removed by not meeting any of the criteria for inclusion with the rule.

No SSC within the scope of the rule can be removed from the scope based on performance.

PRA 82. **In NUMARC 93-01, Section 9, what is the basis for using risk significant methods 1A or 1B, 2 and 3? Can/should you mix and match to get best answer, or should you use all three?**

NUMARC 93-01 recommends that all three methods be used because they give different results. This is because the three methods provide different measures of risk and will result in a more robust list of SSCs which are risk significant. These results should be provided to an expert panel for final analysis.

PRA 83. **Use of PRA "availability" numbers for any given system appears to be short-sighted due to unintentional effect. For NUMARC: PRA input to Maintenance Rule implementation should be emphasized as a TOOL. It is very important to keep focused when dealing with theoretical processes such as PRA results.**

The guideline and results documented in the V&V Report (NUMARC 93-02) indicate PRA use to be effective as an input to an expert panel and the potential limitations of the PRA are noted. This should not diminish the value of using this method of quantification.

PRA 84. **When performance criteria are selected based on the PRA, it would appear that for the required surveillance test time required by the technical specifications and preventive and corrective maintenance time should be allowed for. The number of hours chosen for the performance criteria for this SSC should then be reviewed by the PRA experts for acceptability. Is this correct?**

Yes.

PRA 85. **Please expand on extent V&V identified changes needed to baseline PSA regarding maintenance basic event quantification?**

A V&V participant learned that one system assumed out-of-service time was insufficient to perform preventive maintenance. They then identified a reasonable PM out-of-service time, recalculated the CDF affect, and determined the estimated PM time to have minimal affect on CDF.

PRA 86. **PRA boundaries may be different than Maintenance Rule system boundaries. Can the boundaries be changed to match?**

Yes. This was identified during the V&V program. The utility has the flexibility to define the system boundaries in a way that facilitates implementation. The expert panel should consider the system boundary differences when determining risk significances.

PRA 87. **Have any bounding or sensitivity studies in regard to performing maintenance been done? How about bounding risk numbers?**

Analyses have been performed to assess the effect of risk significant SSC maintenance unavailability, either from planned outages or equipment failures on CDF. A plant level risk measure such as CDF provides an indication of the impact the unavailability due to preventive maintenance could have in relation to the aggregate reliability of SSCs. Unavailability data can be partitioned into planned and forced and an assessment made to measure the impact of each from a baseline CDF that assumes total availability of the modeled systems. The ratio of the calculated change in CDF due to planned maintenance to that due to forced maintenance provides an indication of the amount of optimization achieved at a plant level utilizing measurable system information.

Planned maintenance unavailability may not have a significant impact on CDF for a particular system but from a system perspective the unavailability may be unjustified when compared to the reduction in failure rate. Therefore, optimization of availability and reliability should be balanced against a plant level risk goal and more importantly a system contribution goal.

PRA 88. **What effect on overall CDF can maintenance contribute?**

The contribution is plant specific. However, for some PRAs maintenance unavailability has an effect if all SSCs were never removed from service for maintenance activities. One utility results indicated the CDF went down by approximately a factor of 2 in some cases.

PRA 89. **In workshop session 7 on page 20 of the slides (bullet 2), it was indicated that "initiating events not under the control of the plant are also in this category" where they could be judged to be unrelated to maintenance. For initiating events that are unrelated to maintenance, should the PRA requantify the CDF without consideration for this initiator and then use this "revised" PRA for Method 2?**

Method 1B requires the removal of SSCs and individual initiating events whose failure or unavailability or occurrence can not be influenced by maintenance actions. Method 1B uses Risk Reduction Worth which is a property of each SSC (initiating event), not of each cut set. Consequently, specific SSCs or initiating events are simply removed from the list of important items; nothing is requantified as a result. This step serves only to prevent plant personnel from pursuing potential problems that actions under the rule can not remedy.

PRA 90. **How do PRA analysis consider common mode failures in regards to risk?**

Common mode failures where multiple trains or system functions are lost due to failure of a common support SSC, are addressed in PRA system models.

If an SSC appears as risk significant as a result of common mode failure it should be included as risk significant. Judgment should be exercised when considering CDF events that only occur using the RAW importance measure.

PRA 91. **In examples of events that are eliminated, are the events that contain no equipment failures the ones eliminated?**

Almost. Remove events whose occurrence can not be prevented by changes in the plant maintenance program. The rule is focused on maintenance actions. Consequently there is no benefit in retaining events whose sources lie in other areas.

PRA 92. **How do you handle cut sets with very small values ($10^{-8}/10^{-9}$ range) that are part of the 90 percent CDF?**

Eliminate them by increasing the truncation value, or allow the expert panel to do the same thing by inspection and documentation.

If the small cutsets are accompanied by more "normal", i.e., larger, contributors and the CDF is not unduly small, it should be adequate to lower the cut-off, e.g., to 80%. If a significant majority of the cutsets are small, the expert panel should consider giving more weight to the other methods, or not using the cutset method.

PRA 93. **If you use the adaptation of sum of items contributing 90% of CDF, is it possible that some cutsets have factors other than reliability/availability that cause them to be in the 90%? If the above is true, would use of RRI and/or RAW result in a different equipment risk significance?**

It is expected that the three methods will result in slightly different lists. All three lists should be provided to the expert panel for evaluation in determining the final composite risk significant listing. More information is provided in Section 5.2.4 of the V&V Report (NUMARC 93-02).

PRA 94. **If the "industry generic data" may not be accurate in perspective to improved maintenance programs, does this effect make a difference in the PRA model system CDF or the risk significance?**

The most risk significant systems will have been investigated by the PRA team when the PRA was quantified, and they are most likely to have been requantified using plant specific data simply because they were found to be risk significant. The use of generic data for the rest of the PRA SSCs has no effect on the CDF because they are by definition not risk significant. If you need to provide a performance criterion for one of the risk significant SSCs it would not usually be advisable to base it on generic data.

PRA 95. **What percent of the PRA data was plant specific vs. generic industry data?**

The percent of specific vs. generic data varies based on the individual plant. The range of PRA generic data used (20-90%) is very broad.

PRA 96. **Why the concern (relative to performance criteria) over the source (plant/generic) of data? If the SSC is risk significant at a given unavailability, why wouldn't that unavailability be an acceptable performance criteria?**

The PRA value may be larger or smaller than recent plant-specific history. There may be good reasons for this difference and you may not want to set performance criteria that is driven by generic or PRA data.

PRA 97. **What labor would be expended to do the PRA methods outlined in the guideline?**

1 man month/plant - Peach Bottom
3 man weeks/plant - Grand Gulf

PRA 98. **Two questions were asked about use of PRA to help decide on importance of systems listed in the EOPs. One indicated a system in the EOPs (fire protection, fifth level of decay heat removal) which per PRA is not important; can it be excluded? Answer was no, can't use PRA. Later discussions indicated that engineering judgment should be used (must be used). A panel member indicated that SSCs should add "significant value" to be included. Second question on service water to charging pumps it was determined by PRA to be important, but doesn't meet any criteria for inclusion in the rule. NRC representatives indicated that it should be included in the scope of the rule even though it didn't meet the five criteria of the rule. These answers appear inconsistent. Clarification is requested.**

NUMARC 93-01, Section 8.2.1.3 states that an "evaluation" can be performed to assess the importance of the SSC. A PRA can be used as an input in evaluating the importance of some non-safety-related SSC's used in EOPs to determine if the SSC provides a significant mitigating contribution. In this way, if a non-safety-related SSC does not meet the rule criteria, it can be excluded. Adequate documentation of the basis for exclusion is recommended.

Response to second question. If a PRA indicates that the function of providing service water to a charging pump is risk significant, in that it could increase the potential for CDF or cause a release as defined by 10 CFR Part 100, the presumption that it does not meet any of the 5 criteria is probably faulted. If an SSC does not meet the rule criteria, it is out of scope to the rule until such time that experience or an analysis indicates the SSC does meet the rule criteria.

PRA 99. **Would it be appropriate to assume that the EOPs were included in the PRA?**

No. The group that performed the PRA should be consulted to establish the extent and limitations.

PRA 100. **How does the PRA reflect a situation in which a component such as the AFW pump reliably performed its most important safety function to pump adequate water to the SG but did not reliably perform its less important function of retaining system fluid; i. e., suppose the pump seal leaked repeatedly after maintenance at 25-50 GPM but this leakage did not affect the main function? The AFW pump may, in the opinion of some experienced a MPFF that must be prevented, but in the opinion of others there was not a MPFF of the really important function. Is the PRA able to distinguish between important and unimportant MPFFs?**

Leakage that does not cause the loss of function of a system or component within scope to the Maintenance Rule is not a MPFF or failure in PRA terms. The impact on system unavailability needs to be assessed for monitoring system performance. There is no such thing as an unimportant MPFF. If it is a MPFF, it is a failure that needs to be addressed as a maintenance related event under the maintenance rule.

PRA 101. **What is the significance of the differences between PRA classification of "component" and maintenance classification if the assessment at the functional level gives a similar answer?**

None.

PRA 102. **If you classify a system to be not risk significant, can the components which it supports that are risk significant be reclassified as non-risk-significant?**

No.

PRA 103. **Can only one or two methods of determining risk significance be used? Can we use other methods? In defining system unavailability goals, can we use conditional probability goals? These questions are related to PRA methods based on linear event trees.**

The guideline allows for any appropriate methodology that a utility can demonstrate as satisfying the intent of the rule. The guideline recommends risk significant method determination including sensitivity evaluations in combination as an input to an expert panel. The V&V results indicate that the use of all of the risk significant methods in combination with an expert panel provides an appropriate list of significant systems.

PRA 104. **Is it appropriate to consider only credible failures and accident sequences described in UFSARs during PRA and expert panel analysis? Some utilities are including extremely low probability events, such as RPV failures or Steam Generator topple accidents, in their review which appears inappropriate.**

PRAs may consider accidents and failures which are not contained within the FSAR. When using the PRA to find risk significant SSCs, use the PRA as it stands.

If the expert panel is not using a quantified approach to risk significance, it should seek information on SSCs that support critical safety functions from previous engineering evaluations, e.g., FSAR, but postulated accidents that are extremely low probability events need not be considered.

PRA 105. **How is PRA being applied to passive components (e.g., pressure boundary, anchor bolts, and check valves). If PRA is not used to determine risk significance of passive components, what other tool is available?**

In general, PRAs consider passive components as inherently reliable. The expert panel should be aware of the assumptions and limitations of the PRA in making risk significant determination for any SSC.

PRA 106. **In most cases, risk significance deals with power situations. If utilities are implementing NUMARC 91-06, can this be considered as adequate to determine risk significance in place of the 3 methods listed in NUMARC 93-01?**

No. Risk significance must be considered in all plant modes. NUMARC 91-06 is an appropriate method for dealing with shutdown risk. However, it does not identify the SSCs which are risk significant within the context of the Maintenance Rule. This is an appropriate determination for the expert panel to make.

PRA 107. **How does the PRA help or what does the performance criteria do when the plant is in different modes?**

It is important to determine all modes that require the use of Maintenance Rule SSCs. For modes outside the scope of the PRA, SSC performance criteria should be based on engineering or expert panel judgment.

PRA 108. **There can be SSCs in PRA that don't fall under the Maintenance Rule criteria. Did the V&V participants find any of those and, if so, what did they do?**

None were identified by the V&V participants.

PRA 109. **What precautions should be taken when using PRA unavailability as performance criteria?**

The following should be considered:

- Plant data may not have been used in the PRA for that SSC.
- Plant data was used but does not dominate generic data.

- The PRA time basis may go back too far to represent current performance.

- Out-of-service assumptions (i.e., time logging) may not match actual out-of-service time.

- PRA use of work orders for failure rate estimation is subject to great uncertainty in finding what really failed, particularly a long time ago.

- The median unavailability number from the PRA (50 percent fractile) is not necessarily a good performance target.

- The mean unavailability probably represents a high fractile and also may not be a good choice.

- If change in CDF is used to assess safety significance of a proposed performance criterion, do not forget that the CDF is uncertain and can be unknown within a factor of 5 to 10 (up to 1000 percent).

PRA 110. **There may be significant differences between the SSC performance criteria for unavailability and the SSC unavailability used in the IPE/PRA. Specifically, criteria hours and actual hours may exceed the assumed unavailable hours in the PRA. How can the Maintenance Rule personnel defend the less conservative performance criteria?**

A generic answer is not possible. The circumstances need to be appropriately examined and documented. The unavailability assumed in the IPE/PRA may be based on generic data that, when analyzed, may be of less value than current unit performance. However, if the example given occurs, the utility should determine the current level of SSC performance changes to the CDF as calculated by the PRA. The utility should determine if this is acceptable. If it is acceptable, the PRA could be revised, if not, SSC performance does not meet the performance criteria and disposition to (a)(1) could be required.

PRA 111. **How difficult was it to extract performance criteria from the PRA?**

It is not expected that performance criteria will be extracted directly from the PRA. Rather, PRAs can be used to determine performance criteria through sensitivity analysis. These analyses are not difficult but could be time consuming.

PRA 112. **If performance criteria are established from PRA sensitivity analysis on the basis of individual SSC performance, what ensures the adequacy of these criteria in providing for plant safety if multiple SSCs are functioning at minimal levels?**

NUMARC 93-01 allows for establishing performance criteria for SSCs based on PRA analysis. This implies looking at SSCs individually to establish minimum acceptable performance. The concern for aggregate minimal performance could be addressed in one of two ways: 1) establish a high level plant criteria that would adequately address the aggregate of all SSCs, or; 2) establish conservative criteria for individual SSCs which will ensure the aggregate is always acceptable.

Page 12 of the text on Sections 9.3.1.1, 9.3.1.2, and 9.3.1.3, Section 7 in the Workshop notes addresses this case (the safety effect of multiple SSCs being close to their performance criteria). Add up all the Fussel-Vesely importance measures over all components that contribute to the CDF. Take the reciprocal of this number (let's say the sum is 2.7 and 1/2.7 is 0.37). This result is the fractional amount by which all the SSC unavailabilities could increase simultaneously with a consequent approximate doubling (increase by 100%) of the CDF. In this example you would then know that if all SSCs increased by 37% the CDF would double.

There is a small error in this process that leads the CDF to increase by a factor of 2.25 instead of just 2 when the individual SSCs worsen by as much as 50%. However, the rule-of-thumb is so convenient that this is acceptable for Maintenance Rule purposes.

If you want to consider the same calculation but allow the CDF to increase by 50% rather than 100% just divide the above fractional unavailability increase by two, i.e., 37%/2 = 18.5%, and so on. You can check the answer by putting in the increases for all the SSCs in the largest cutsets and requantifying the CDF.

PRA 113. **Is the expectation to use all 3 PRA methods to determine risk significance plus use an expert panel?**

Yes. It is recommended that all three PRA methods and the expert panel be used.

PRA 114. **Does the list of risk significant SSCs differ depending on the method used?**

Yes. The cutoffs are not "equal", the methods are different measures of risk and, although different, many risk significant SSCs will show up on all three lists.

PRA 115. **NUMARC 93-01, Section 9.3.1.1, .2 and .3, states to eliminate PRA factors not specifically unrelated to maintenance. Does this mean that there would be separate lists of risk significant systems when considering plant operations outside of maintenance (e.g., prioritizing design changes)?**

Yes. You could have different lists. The reason for eliminating non-maintenance affect is to allow the process to address the Maintenance Rule scope.

PRA 116. **PRA importance rankings of basic events are useful for calculating or determining the risk significance of system "trains." These train importances do not represent "system" unavailability importances, but appear to be used to rank "systems." This change in meaning of the word "system" should be clarified.**

NUMARC 93-01 does not imply system and train unavailabilities are the same. For importance ranking and establishing performance criteria, it is expected that the train level will be used by most utilities.

PRA 117. **Is it expected that over time the risk significant list of SSCs would change and a PRA update would be in order? Focus on the "worst" SSCs could conceivably result in their evolving to the "best" SSCs.**

Improved performance should minimally affect risk significance. This is because the "Risk Achievement Worth" (RAW) method determines the significance of SSCs without regard to their performance. It is not likely that the list of risk significant SSCs would change significantly over time. However, change in the plant design, operation, or in procedures (EOPs) could change the risk significance of an SSC. While some utilities may elect to update their PRA, it should be emphasized that there is no requirement to update the PRA based on existing regulatory requirements of the Maintenance Rule.

PRA 118. **Since the plant's PRA will be used extensively in the implementation of the Maintenance Rule, is it necessary to update the PRA on the same schedule as is required for the periodic review of the maintenance program. In other words, is a newly updated PRA a pre-requisite to completing the maintenance program periodic review?**

No. There is no regulatory requirement to update the PRA. If the PRA is used continuously for decision making, each utility must decide on a case-by-case basis when to update their PRA. However, if PRA is used as the basis for determining risk significance, you should know where there are significant differences between maintenance performance and the PRA assumption, and to be able to explain the acceptability of the differences.

PRA 119. **Is it expected that the PRA will be updated to "match" the expert panel input?**

No. A PRA update is not required by regulation. The expert panel considers events the PRA is not capable of quantifying and addresses its limitations. Even though not required, some utilities have decided to periodically update their PRAs.

PRA 120. **Are PRAs updated continuously?**

No. Neither the Maintenance Rule nor NUMARC 93-01 require a periodic update of the utility's PRA but it does not preclude a utility from future updates. As previously indicated, many utilities plan to update their PRA conclusions regardless of the Maintenance Rule implementation approach.

PRA 121. **How does PRA typically collect data for out-of-service times?**

The methods of data collection are plant specific and the utility has flexibility to choose. However, the method selected should be consistent with existing data collection for other existing utility systems to avoid confusion. This is one of the limitations of PRAs that the expert panel should consider.

An example would be "Number of hours unavailable are the actual hours inoperable as defined by Plant Operations. Start with the LCO log and use system engineer to reject hours where the function was not actually lost. Base total hours required to be operable on technical specification requirements for operability, or on other plant requirements for SSCs for which technical specifications do not apply."

PRA 122. **Does NUMARC 93-01 RRW > 1.005 and RAW > 2 include adjustments to initiating event frequencies or just mitigating system? (Reference NUMARC 93-01, Section 9.3.1.1.) Example: instrument air importance could be calculated by adjusting to 1 and 0 system failure probability and requantifying; however, event initiating frequency (usually based on 5 years history) data may also be effected. Was this considered or presumed in the NUMARC RRW > 1.005 and RAW > 2 criteria?**

If a system is modeled as an initiating event as well as a support system, then the importance measures for each should be examined. A risk reduction measure for the initiating event can be found by putting the frequency to equal zero. It is your choice as to whether to do this in the same calculation as putting the support availability to zero.

PRA 123. **Expand on "shadowing effects" and how CDF is affected by varying sensitivity of a limited "large" cut set, and its risk significance change, i.e., how other SSCs become more dominant when the "shadowing" is removed.**

If risk for a plant is dominated by failure of a minimum number of SSCs, then the list of risk significant SSCs for the Maintenance Rule could be limited to this small number. This could mask a much larger population of SSCs which would become risk significant if and when the problems with the dominant SSCs were corrected. If a minimal number of SSCs dominate the CDF, then it is recommended that a more detailed evaluation be conducted of the cutsets which are below the utility's cut off value.

PRA 124. **What training level of detail should the PRA person need to give the expert panel? What other information/training do they need?**

The expert panel should understand the terminology, approach, limitations and major assumptions upon which the risk analysis is based (e.g., unavailability due to planned maintenance). Additional training in Risk Achievement Worth (RAW), Risk Reduction Worth (RRW), and containment release assumptions is of benefit.

PRA 125. **Why is the NUMARC RAW criteria more conservative than the NRC regulatory review group criteria (i.e., > 2 rather than > 10)?**

The numerical criteria for risk significance provided in NUMARC 93-01 represent suggested measures. The purpose of the risk significant criteria was to categorize a number of systems to a status such that increased emphasis could be allocated to those systems. The numerical criteria is secondary to the concept of applying maintenance resources to those SSCs that affect plant safety. The RAW > 2 was selected to provide a reasonable number of systems.

PRA 126. **Reference NUMARC 93-01, Method 2, 90 percent cut-off. Can Methods 1A or 1B be used to further eliminate systems in addition to non maintenance components?**

In principle you can change any of the methods in reasonable ways. It would probably be better to modify the 90 percent cutoff value, and use the expert panel rather than mix the methods. Eliminating SSCs is not the objective of the risk significant determination.

PRA .127. **Risk Achievement Worth requires that we assure failure of components to see the impact on CDF. What components are we required to assume the unavailability of one, e.g., do we only look at components in the dominant cutsets or do we postulate failures of the reactor vessel, containment, auxiliary building, etc., some of which may be IPEEE initiators?**

You find the risk achievement worth for each component that contributes to the final CDF. Calculation of RAW, CDF, and RRI should be accomplished for events contained within the current unit specific PRA. Then those unrelated to maintenance should be deleted prior to providing this information to the expert panel for consideration. The panel is then expected to consider the scope of the PRA in making it's final Risk Significance Determination.

It is important to note that the Maintenance Rule requires consideration of SSC risk significance for external events and for non-power modes, which may not be included in the utilities, current IPE models. The expert panel should be used to make this determination.

PRA 128. **The Risk Achievement and Reduction Worths are typically determined on a component and/or failure mode (pump, valve, failure to open, failure to close, etc.), yet under the scope sessions it was strongly emphasized that SSC selection should be on the system, train, or function basis. Are the various importances to be agglomerated by system (after eliminating non maintenance events) in order to determine the various importance measures? For example, a system may have many basic events with a risk reduction worth of < 1.005 and should not appear as important as a system with one component RRW = 1.1; however, if all the components in the first system are combined, it may be more important.**

No. The cutoffs and methodologies proposed for risk significance determination were developed such that a component meeting the criteria was an "indicator" that the system or train was risk significant. This information is to be provided to the expert panel which would ultimately determine if a system/train is risk significant.

PRA 129. **Is it expected to find additional SSCs using Risk Reduction Worth or Risk Achievement Worth over and above those that you would find by looking at the cutsets making up 90% of the CDF?**

Yes. There are sound technical reasons why using Risk Reduction and Risk Achievement Worth will likely find additional contributors for some PRAs. For example, a component or train performance is nearly perfect, yet if it were to fail, an unacceptable consequence could result. The components performance would not result in a failure rate that when calculated would contribute unacceptably to core damage frequency; however, the failure could not be tolerated. The reactor vessel is an example. See NUMARC 93-02, Tables 9-1 through 9-7.

PRA 130. **When removing contributors unrelated to maintenance in Method 1A and 1B, what exactly is being removed?**

You would be deleting basic events whose failure/probabilities are not related to maintenance activities. For example, operator errors.

PRA 131. **How can you find the Risk Achievement Worth for each component that contributes to the final CDF?**

Calculation of RAW, CDF, and RRI should be accomplished for events contained within the current PRA. Then those unrelated to maintenance should be deleted prior to providing this information to the expert panel for consideration. The panel is then expected to consider the scope of the PRA in making its final risk significance determination.

It is important to note that NUMARC 93-01 requires consideration of SSC risk significance for external events and for non-power modes, which may not be included in the utility's current IPE models. The expert panel should be used to make this determination.

PRA 132. **Given the fairly large uncertainties inherent in a PRA, please provide the basis for the 0.5% risk reduction importance criteria in determining risk significance.**

The 0.5% is a relatively arbitrary cutoff and was chosen to give generally consistent results between the 3 PRA method(s). V&V plant determinations, using a 1.0% cutoff, showed the RRI to produce a very small set of SSCs.

PRA 133. **Explain the difference between the Level I and Level II PRAs. Why do we need to consider the Level II PRA?**

Level 1 PRA's consider the potential for SSC unavailability to affect the frequency of core damage events. A Level II PRA considers the potential for SSC unavailability to affect containment integrity and inter-system LOCA leakage. The SSCs related to the containment function can significantly influence the risk of a nuclear power plant.

PRA 134. **Did the V&V utilities estimate any scoping impact from the IPEEEs?**

No. Since most IPEEEs were not complete at the time of the V&V activity, no estimate of scoping impact was performed. IPEEE as well as any other future regulatory requirements should be evaluated for its effect on the maintenance program.

PRA 135. **Most considerations are given to level one PRAs in the guideline. When level twos are performed, will it be necessary to rescope? Will it change the list of risk significant systems?**

The guideline clearly states that SSCs should be considered risk significant if they prevent containment failure or bypass. This should be part of the initial risk significant determination. The IPE submitted in response to GL 88-20 provides an assessment of containment integrity even when a formal Level 2 PRA is not performed. The result of this IPE containment analysis should be provided to the expert panel.

PRA 136. **Is risk significance a one-time analysis or should it be done on a repetitive basis? If so, how often?**

Evaluation of risk significance is a "one-time" activity. Risk significance determination should only change as a direct result of major changes in plant configuration or procedures (EOPs).

PRA 137. **Why was the turbine building cooling water system that was indicated as risk significant by all 3 risk determination methods not identified as risk significant?**

The system was ranked very low on all 3 methods; therefore, the expert panel decided it was not required to be risk significant. Cases such as this are unusual and should be well documented.

PRA 138. **PRA values for SSCs can vary from plant to plant. How will NRC view these differences?**

The results of PRA are valid on their own merits and are likely to be different. The NRC does not plan to compare PRA results.

In its draft inspection procedure, the NRC emphasized that the inspector should not put too much emphasis on comparing one plant to another when evaluating maintenance activities under the Maintenance Rule.

PRA 139. **Are the differences in PRA assumptions and data important factors when comparing plant to plant variation in scope? Is NRC's review going to focus on the process or the results for similar plants?**

The results of PRA are valid on their own merits and are likely to be different. The NRC does not plan to compare PRA results. However, plant specific PRA assumptions and data usage are important factors when considering how to use PRA data for Maintenance Rule response. These assumptions and data used should be well documented for future reference.

PRA 140. **PRAs are in part a measure of design robustness, not just component/system availability/unavailability. Regarding comparison of CDF between "similar" plants, what is acceptable risk? If a PRA (plant specific) CDF is unity, and other peer plants have two times that CDF, should performance criteria be backed off to an acceptable risk (CDF)? For illustration, if an industry goal for availability is 97.5 percent and a PRA can tolerate availability down to 85 percent without significant increase in CDF should 85 percent then be used?**

There should not be a comparison of CDF between "similar" plants when implementing the Maintenance Rule. The plant is assessed on its own merits, and experience and design. The effect on the CDF of operating at the performance criteria should be one of the factors considered when setting the performance criterion for each SSC for that plant. A utility with a CDF close to 1E-4, may feel more constrained on the factor by which the CDF could be increased, than a utility with a CDF close to 1E-6. But that is the plant specific determination.

RS 141. **Does relative risk significant ranking change significantly depending on method used?**

The change is not great and generally occurs in the bottom two-thirds of the list. Refer to NUMARC 93-02 for a listing of the three PRA methods and how SSCs were ranked for each method. Ranking within a set of selected risk significant SSCs is less important than the set of SSCs. NUMARC 93-01 does not require ranking of risk significant SSCs.

RS 142. **Assessing risk significance: "Identification of risk significant SSCs can be a qualitative process or quantitative process." Is it acceptable to perform a qualitative process only? Do you validate the qualitative process with the quantitative process? Is one method best to use for a PWR, for a BWR? Which one?**

Yes. It is acceptable to perform only a qualitative process. However, during the V&V process, both a qualitative and quantitative process were found to give the best results. The V&V effort did not identify any method (PRA, expert panel) that was preferred for a BWR or PWR.

RS 143. **Are the numerical criteria for risk significance stated in the guideline to be integrated at the component failure mode level or the system level?**

The guideline does not specify a numerical criteria for risk significance because of the difference in design and modeling of PRAs. The guideline outlines a process which includes performing the three methods of PRA and having an expert panel review those results and make a decision on the unit's risk significant SSCs.

RS 144. **Are the specific numerical values provided in the guidance firm or can different values and ranking methods be used to determine risk significance?**

Different methods and values may be used as long as it is appropriate and the logic for the values and ranking methods used are documented.

RS 145. **Does risk significance address only those failures directly associated with maintenance preventable functional failures?**

No. Plant design is the primary element in determining SSC risk significance. Loss of function caused by operator action or other non-maintenance related activities should not be considered when determining risk significance. After risk significance is determined, maintenance efforts are then directed at prevention of loss of function of those SSC's.

RS 146. **Why is CDF chosen as the damage indicator rather than early release frequency which is more closely related to public safety? The contributions are not the same.**

Both CDF and containment release probability are considered for risk significant determination. NUMARC 93-01 considers both factors for inclusion in the Maintenance Rule scope and determination of risk significance.

RS 147. **How is risk significance determined for balance of plant?**

Many balance of plant (BOP) systems are modeled in the PRA or BOP events are captured in the PRA event initiators. Some BOP systems could show up on the list from application of PRA methods. If BOP systems within the scope of the Maintenance Rule do not show up in the PRA results, it is expected that the expert panel would evaluate the effect of these BOP systems unavailability.

RS 148. **It was stated that for PRA purposes if a component is risk significant, then the entire system is risk significant. How are components, such as heat exchangers, handled where two systems converge, one of which may be risk significant and the other system is not risk significant?**

This is a plant specific issue which needs to be resolved through the consideration of the expert panel. However, as discussed in NUMARC 93-01, the utility has the option to place just the risk significant component within the scope of the Maintenance Rule rather than the entire system if the entire system does not meet the criteria to be within the scope.

RS 149. **If a component is risk significant because it has a high failure rate, and the rest of the components in the system have low failure rates, should the whole system be designated risk significant?**

That is a decision that must be made by the individual utility. The determination of risk significance is based primarily on the loss of system safety function (e.g., needed to mitigate an accident). For example, the reactor pressure vessel has an extremely low failure rate but is risk significant because of its system safety function. If the system or train will be monitored at the system or train level it would be better to designate the entire system as risk significant. Conversely, if the system will be monitored at the component level then appropriate component(s) may be identified as risk significant.

EXPNL 150. **What should be considered in forming the expert panel?**

Based on the results of the V&V program, the following factors should be considered when establishing an expert panel:

- Number on panel should be approximately three to five to allow broad experience.
- A diverse experience base is preferred with panel members coming from various station perspective (operations, maintenance, engineering, PRA, safety analysis, etc.)
- A process should be established such as those described in NUREG/CR-5424, "Eliciting and Analyzing Expert Judgment," and NUREG/CR-4962, PLG-0533, "Methods for the Elicitation and Use of Expert Opinion in Risk Assessment."
- Documentation of method and participant inputs.

EXPNL 151. **Are maintenance personnel suggested for inclusion on the expert panel?**

Yes.

EXPNL 152. **What guidance or criteria should an expert panel use in choosing risk significant balance of plant (BOP) systems? Our risk significance established by PRA (90% CDF method) includes only 1 BOP system. This emphasis on safety systems seems inappropriate considering: BOP is a major contributor to reactor trips; BOP has the least redundancy of equipment and most single point failures; and BOP has relatively unstructured maintenance program requirements such that equipment reliability can be influenced by maintenance to a greater extent.**

If the PRA is utilized, then a combination of the three methods of importance calculations should be employed. The expert panel should review the assumptions and modeling within the PRA to determine if they are appropriate. If not, then they may use the experience of similarly configured plants and their own expert experience of events at their plant to add additional SSCs to the final risk significant list. They may also use these techniques to add SSCs which may be risk significant in modes of operation besides 100% power operation.

EXPNL 153. **How was the Connecticut Yankee (CY) expert panel able to review the PRA in one man-week?**

The 40 hours represented actual time for a first cut to accomplish the V&V objectives and not calendar time which took several months. Connecticut Yankee expects that a complete system review by the expert panel will take about 80 hours. The time needed to complete the expert panel portion to determine risk significance will depend on many factors such as:

- Availability of panel members to meet.
- Knowledge and understanding of NUMARC 93-01 and PRA methodology.
- Understanding of plant operation and accident sequences.
- Understanding of expert panel facilitator with requirements of NUREG/CR-5424 and NUREG/CR-4962.

Some of the following tasks are planned to be performed by the Connecticut Yankee expert panel:

- Screen contributors that can be influenced by maintenance.
- See if the numbers are small because CDF was dominated by 1 or 2 failure combinations.
- Examine PRA system and component boundary definitions to determine their relation to Maintenance Rule SSCs.
- Shutdown analysis and use in PRA.
- Passive performance analysis, etc.
- Documentation of expert panel qualifications and decisions, with basis.

EXPNL 154. **The "expert panel" methodology used by Connecticut Yankee and in NUREG/CR-5695 includes 2 categories:**

- **Accident response functions**
- **Normal operations functions**

Nuclear heat removal appears in both functions, as it should. However, the support function of "electric power" only appears in "normal operations". It would seem these extremely important support functions, like electric power, should appear in both.

Both should be included. Connecticut Yankee's final effort will include "support auxiliaries" in both main function categories.

EXPNL 155. **Can the "expert panel" provide sufficient justification to use PRA for relative ranking but not use "availability" numbers?**

Yes. The expert panel should consider the PRA assumptions including the availability numbers for systems. The PRA availability numbers are a starting point. An element to be considered is that they are often generic industry numbers and may not necessarily be specific to your utility.

EXPNL 156. (a) **What is the relationship between PRA importances and the expert panel discussion concerning "accident response functions" and "normal plant functions"?**

(b) **What is the role of the expert panel when PRA importance information is complete?**

(c) **Exactly what are component/system importances used for in the Maintenance Rule?**

(a) The expert panel considers the PRA importance for a specific system and compares that to the "accident response functions" and "normal plant functions" of that same system. For all of the PRA systems identified as important (i.e., risk significant) the expert panel then comes up with a final listing of those risk significant SSCs.

(b) The expert panel makes the final decision on the units risk significant SSCs.

(c) The risk significant SSCs which the expert panel identified have a specific performance criteria established. Actual risk significant SSC performance is compared against the performance criteria and goals may or may not be established. The purpose of identifying risk significant SSCs is to provide the ability to focus resources and attention on those SSCs most important to public health and safety.

EXPNL 157. **When using the expert panel for determining risk significance, it is suggested that the panel include membership from the plant PRA group, operator group, and maintenance group. When setting up the panel, what is the recommended knowledge level of PRA that the operator and maintenance members should posses? What did the V&V plants do to compensate for this low PRA knowledge level for these members?**

An understanding of the terms and limitations of PRA is needed to understand the applicability and methodology. Intensive knowledge for quantitative review is not needed. The information provided to the panel should include the data (PRA output) and the services of one PRA member to interpret if required. The intent is not to make the panel PRA experts. The PRA results provide one imput into the process.

EXPNL 158. **What is the required or expected documentation for the expert panel evaluation?**

The following areas are examples of documentation that should be considered:

- Result of risk achievement and risk reduction sensitivity evaluations;
- Original weightings selected by expert panel and adjustments to all plant systems; and
- The basis for selecting or screening out systems,
- The final risk significant system listing.

PERFCRIT 159. **If system level performance criteria are exceeded, (a) can recategorizing the system to (a)(1) be avoided by taking corrective action? (b) is it always recategorized as (a)(1)? (c) If so, how soon must corrective action be taken? (d) What justifications are acceptable for not having to recategorize from (a)(2) to (a)(1)?**

(a) Yes. If based on cause determination results. See NUMARC 93-01, Section 9.3.3.

(b) No. See NUMARC 93-01, Section 9.3.3.

(c) If SSCs are recategorized then corrective action should be taken at the conclusion of cause determination on a schedule consistent with safety significance. See NUMARC 93-01, Section 9.4.3.

(d) If the corrective action taken is effective. (see NUMARC 93-01, Section 9.4.3)

PERFCRIT 160. **If an auxiliary feedwater (AFW) performance criteria is 100 hours train unavailability per year and ends with 95 hours unavailable due to testing, and 10 hours due to a MPFF, is (a)(1) goal setting necessary? Would a goal to reduce the hours subject to testing be included?**

Under the conditions described, it may be necessary to establish a goal based on the cause determination. Establishing a performance criteria that allows a 5% margin (95 hours actual and 100 hours performance criteria) may be too conservative. Part of the cause determination for exceeding a performance criteria would include looking at all reasons. This would include testing hours which could be required by technical specifications or optional testing. The technical specification requirements can only be changed by following applicable regulatory procedures; however, you might consider reducing the optional testing time.

PERFCRIT 161. **Please define "plant level" performance criteria.**

An explanation of "plant level" performance criteria is provided in NUMARC 93-01, Section 9.3.2. An excerpt is provided below. A more detailed discussion is included in the above referenced section and should be consulted.

Overall plant level performance criteria are broad based and are supported by many SSCs that could be either safety or non-safety-related. Since equipment performance is a major contributor to meeting plant level performance criteria, it can be useful in determining maintenance program effectiveness.

Plant level performance criteria should include the following:

- *Unplanned automatic reactor scrams per 7000 hours critical;*
- *Unplanned capability loss factor; and*

- *Unplanned safety system actuations.*

Other performance criteria may include indicators similar to those recognized by the NRC, industry organizations, or established by the utility to monitor SSCs that cannot be practically monitored by plant-level performance criteria.

Each utility should evaluate its own situation when determining the quantitative value for its individual plant level performance criteria. The determination of the quantitative value will be influenced by different factors, including such things as design, operating history, age of the plant, and previous plant performance.

PERFCRIT 162. **What was the basis for the plant level performance criteria presentation in NUMARC 93-01, Section 9.3.2? Was it based on INPO standards or developed by V&V participants?**

The concept was taken from INPO and the NRC's approach on monitoring trips and safety system actuations, which are challenges to safety. The plant-level performance criteria are broad indicators of SSC performance and, by implication, maintenance performance. The numerical values should be determined by the utility based on previous performance and management philosophy. The Maintenance Rule is intended to assure acceptable SSC performance through effective maintenance. The V&V participants verified that the industry's overall performance indicators (trips, SSAs, etc.) could form the basis and were applicable to the Maintenance Rule.

PERFCRIT 163. **Non-risk-significant operating systems do/do not require system-specific performance criteria if performance at the plant level is acceptable?**

Non-risk-significant operating systems do not require system-specific performance criteria if performance at the plant level is acceptable.

PERFCRIT 164. **For n: safety, non-risk-significant SSCs where performance criteria is for the whole plant (e.g., plant trip) must an SSC failure cause a functional failure (i.e., plant trip) to be counted towards a repetitive failure determination? If yes, this means individual equipment histories need not be tracked unless the failures result is a plant trip. Or is this incorrect because industrywide equipment histories can also be counted toward repetitive failures?**

Yes. Individual component failures may need to be monitored if they result in a functional failure of the SSC which impacted a plant level performance criteria (i.e. caused a plant trip). A second identical failure of the component resulting in a loss of SSC function then becomes a repetitive MPFF.

Industry operating experience of failures provides a utility with an opportunity to identify potential failure mechanisms which could result in functional losses at their plant. Failure to recognize and act on such industry experience which results in a functional failure is a MPFF but is not considered repetitive until the second event at the specific plant occurs.

PERFCRIT 165. **In NUMARC 93-01, page vii, Figure 1 is in error. In the block for 9.3.2, it implies that all SSCs that are not risk significant should have a plant level performance criteria. On page 21, it states that non-risk-significant standby SSCs should have a specific (i.e., not plant level) criteria.**

Figure 1 will be corrected.

PERFCRIT 166. **What justification has been used to allow the use of a plant-level criteria based upon experience, which includes non maintenance factors, for the Maintenance Rule performance goal (i.e., plant trips are often human error, the maintenance contribution to 1/2000 hours is smaller)?**

The Plant Level Performance Criteria selected represent these non-risk significant operating systems (e.g., BOP) that could challenge (e.g., scram) the power plant, its equipment, and its operations but which do not require performance criteria to be established at the SSC level. The intent of using such indicators in conjunction with the concept of Maintenance Preventable Functional Failures (MPFF) is to provide a method to identify opportunities for improved maintenance activities to reduce challenges to plant, equipment, or operators. Events caused by actions other than maintenance need not be considered. See NUMARC 93-01, Section 9.3.4.

It is recognized that the maintenance contribution to total plant-level criteria is small but it can still be used as a basis for monitoring performance.

PERFCRIT 167. **Please give examples of system-specific performance criteria like INPO SPPI. Can criteria be changed? Example: A goal is set at upper quartile of industry average. If the goal is not met, it is changed to second quartile. What is recommended for system availability (i.e., INPO first quartile of performance, 95%) goals?**

Examples of system specific performance criteria use availability and reliability, of that system.. Specific performance criteria as stated in NUMARC 93-02, Section 5.2.3.3, should be used based on the importance of SSCs at each individual plant. INPO quartile measures are used to provide a utility an indication of performance relative to overall industry performance

Quartile values are not appropriate here. Rather, there should be a balance between availability and unavailability in a plant specific basis to perform maintenance and testing to ensure a high reliability. The availability of a specific system should be determined by the individual utility and can for example be derived from the IPE.

PERFCRIT 168. **Can total time averaged core damage frequency be used as a plant level performance criteria?**

Yes. However it has limitations and is complex.

PERFCRIT 169. **How can SSCs be handled that would normally fall under plant-level performance criteria but whose failure will not effect the plant-level criteria (i.e., fuel pool cooling or chilled water system)?**

If the SSC performance cannot be monitored by a plant-level criteria (e.g., standby system), other performance criteria should be established for monitoring the systems function.

PERFCRIT 170. **For the non-risk-significant and non standby systems in the scope of the Maintenance Rule, is it suggested that plant level criteria can and should be used? In the next three years, should system/train performances criteria be established and measured in the event that goal setting is necessary at a later date?**

Yes. Non-risk significant operating systems in the scope of the Maintenance Rule should use plant level performance criteria. No. To monitor all non-risk-significant and non standby systems against specific goals at this time may not be cost effective since it is expected that most SSCs will not need goal setting. However, if the utility is aware of SSCs that need improvements, it would be helpful to monitor their performance now for two reasons. First it could promote improved performance before 1996 so goal setting may not be needed. Secondly, if goal setting is required, a technical basis could be established for what that goal should be.

PERFCRIT 171. **Have any V&V plants set system performance criteria at the system level for redundant train systems? If so, what process was used to demonstrate compliance with the total system level criteria?**

Yes. Systems with redundant trains were considered at the train level. The reason for establishing performance criteria at the train level is to monitor individual train performance which can be very different, and also to have meaningful measurable parameters to trend. The latter is not usually possible at the system level for systems with redundant trains where the overall system rarely loses its function. When such a system level event finally occurs it would be of such importance that you would still need to research and compile train or even component level data to understand what underlying trends may be present.

PERFCRIT 172. **It has been stated in the workshop and in Regulatory Guide 1.160 that setting performance criteria to the system/train level is all that is anticipated at this time. The NRC in the workshop plenary session stated that a recurring failure of any SSC is basis to set an (a)(1) goal for the SSC. It is possible that a component has a recurrent failure, but the system/train still meets or exceeds its performance criteria.**

(a) **If a component has recurrent failures, but the affected system/train is still within its performance criteria, is it necessary to place the component into (a)(1) of the rule?**

(b) **Does the system/train performance criteria preclude this?**

(c) **Does a cross train failure of like components count as a repetitive failure for both trains?**

(a) No. A repetitive component failure that does not affect the train or system function does not require goal setting. It would not be a maintenance preventable functional failure. Cause determination and appropriate corrective action should be addressed.

(b) The system/train criteria does not preclude a utility choice to establish component performance criteria or goals; however it is not recommended.

(c) No. A component that has a failure and there are similar components in multiple systems/trains does not automatically count as a repetitive failure. Two components that experience identical failures in redundant trains is considered a repetitive failure.

PERFCRIT 173. **How or what is recommended for performance criteria for systems vs. trains, and how could PRA analysis assumptions/cases be used in support of the decision?**

PRA assumptions regarding the out-of-service time of a function can be selected at any level (SSC or train) depending on the methods elected by the analyst. Generally, reliability and unavailability are appropriate. Condition monitoring criteria is also effective. The PRA analyst, expert panel, and system engineer have appropriate expertise to support these determinations. An important consideration is that the train or division performance can be monitored and that the basis for monitoring be documented.

PERFCRIT 174. **The term "train" now appears in the MPFF definition. Does this require train-specific performance criteria to be established?**

NUMARC 93-01, Section 9.0, recommends that performance criteria and monitoring be established at the train level when determined appropriate by the utility, especially for risk significant equipment. However, a utility may choose to establish performance criteria at the system as component (not recommended) level.

PERFCRIT 175. **What, if any, reason would there be for establishing specific performance criteria at the component level (rather than system or train)?**

Functional groupings of components, such as Appendix J valves and penetrations administrative leakage limits, provide a measurable performance criteria that a utility could use as an effective method to monitor system ISLOCA (inter-system loss of coolant accident) integrity. Also, if there is a component or group of components that are risk significant, but the entire system is not risk significant, specific performance criteria may be established for the component or group of component.

PERFCRIT 176. **During the St. Louis workshop breakout session, it was brought up that each utility may define "unavailability" as it sees fit. This conflicts with the information communicated in Atlanta when the question came up as to whether credit could be taken for operations' manual manipulation of an MOV for example. Or human clearances on a diesel could be used to allow short duration work or measurements to be performed. In case of need, the operator would direct the workers to back out and manually start the diesel. These practices are now permitted under the INPO definition of unavailability in calculating SSPI goals/results. According to one participant in Atlanta, no human intervention would be allowed in any form in the handling of unavailability. Although each utility should be able to define unavailability according to their own work practices and procedures, this point needs to be clarified.**

Utilities should have a clear and consistent understanding of how they establish, monitor, and document unavailability time (e.g., consistent with PRA assumptions used when analyzed). Unavailability times should not be counted or accumulated if operator action is credited and controlled by a procedure (i.e., the operator is available to open a valve or close a breaker and the action is controlled by procedure when required to be performed). This assumes that there is no conflict with the PRA.

PERFCRIT 177. **If performance criteria is unavailability, can you exclude out-of-service (OOS) hours that are caused by non maintenance connected events?**

If truly not connected with maintenance (e.g., design deficiency), the answer is yes. However, the utility should be aware that the decision to track all OOS time or only maintenance OOS related time will be dependent on the application of the data.

The utility may set a performance criteria for either all contributors and evaluate for the maintenance contribution or establish performance criteria for maintenance contribution only.

PERFCRIT 178. **When talking about the gray areas of redundancy and back up in systems or trains, can performance criteria be established which take redundancy, etc., into account such that the functional aspects of the system are unaffected?**

A system functional loss, by virtue of design redundancy, diversity, and administrative controls occurs less frequently than train or multiple component functional loss. If a system (condensate) has three redundant pumps with only two being required, it is still necessary to monitor the performance of all three pumps not any two of the three.

PERFCRIT 179. **If a SSC does not meet its performance criteria, and it is not due to a MPFF, is it still necessary to set goals?**

No. The decision for setting a goal is based on the results of a cause determination. See first paragraph on page 31 of NUMARC 93-01 and page 30, Section 9.4.4. Goal setting would not be required under the Maintenance Rule; however, 10 CFR Part 50, Appendix B may be applicable to assure timely and effective correction of significant safety concerns. The key thought is that the results of the cause determination will address the necessary corrective action which may or may not include goal setting.

PERFCRIT 180. **What are the advantages and disadvantages of adopting a performance criteria of 0 repetitive MPFFs (Either as an (a)(1) or an (a)(2) criteria)?**

A performance criteria of zero means that the SSC is very important and possibly risk significant and failures cannot be tolerated. The disadvantage would be the setting of goals earlier than may be necessary. The advantage would be that goals could be set prior to a serious loss of function. The goals would require that corrective action is taken and the SSC is monitored at a higher level.

PERFCRIT 181. **For non-risk-significant standby systems why is it needed to set performance criteria since even at 100% unavailability it has low impact on risk? Is an availability of 0% acceptable performance criteria for non-risk-significant standby systems?**

The intent of establishing performance criteria is to be able to determine if the SSC is receiving the appropriate level of maintenance attention commensurate with its importance to safety. While a non-risk-significant standby system could have a small impact on risk, it still has a function to perform (e.g., it is included in the EOPs). If you set a performance criteria of 0% availability, that would mean the SSC is not required and, for example, could be deleted from the plant. The performance criteria should be set at a reasonable value based on functionality and redundancy. (Example - surveillance test results can monitor reliability and/or performance.)

PERFCRIT 182. **Why do non-risk-significant standby systems require individual performance criteria? Doesn't "non-risk significant" equate to "unimportant" relative to core protection? Thus, this inclusion seems to be contrary to the notion that the Maintenance Rule only applies to SSCs that are important for core protection or release prevention.**

The determination of performance criteria of non-risk-significant standby systems that have been included within the scope of the Maintenance Rule is needed to focus utility monitoring to assure the SSC performance does not change unacceptably. A change in performance could result in the SSC meeting a utility's criteria for risk significance. Specific criteria is recommended in the guideline because "standby" equipment can not be aggregated to plant-level criteria. If you can identify an effective criteria above system level, you are free to use it. Non-risk-significant does not mean unimportant. Non-risk-significant means safety equipment subject to 10CFR50 criteria that by virtue of its reliability and function does not have a high potential to contribute to core damage or radiological release. The term non-risk significant should not be assumed to mean no risk but only that the impact on safety is less than that for the risk significant SSCs determined by the PRA and expert panel.

PERFCRIT 183. **It appears that the primary performance criteria for SSCs is availability. A good portion of availability input is derived from PRA, which deals almost exclusively with plant operation. What are opinions/practices for V&V plants regarding establishing shutdown performance criteria for SSCs? Specifically, if availability is used, how can differences be reconciled in refueling cycle durations vs. impact on shutdown availability? Are two sets of performance criteria used (shutdown vs. modes 1, 2, 3)? Should two sets of risk significant SSCs be established based on performance importance relative to modes? Would it be practical to drop some systems during modes 4 and 5?**

Refer to the definition of "availability" in NUMARC 93-01, Appendix B. Reliability and condition can be used as performance criteria in addition to availability. There are some instances where two sets of performance criteria may be needed (one for modes 1, 2, and 3 and another for modes 4 and 5). By using a function based approach, it may not be necessary to maintain separate risk significant lists for various modes of operation. For example, the residual heat removal (RHR) system is in standby during modes 1, 2, and 3 but is in operation during modes 4 and 5. Availability cannot be measured for standby or non-required systems (i.e., reactor coolant, feedwater, etc.) during refueling activities. A utility could establish the criteria of "available when required to perform." The PRA assumptions and method of measuring performance should be appropriate and consistent.

The effort to maintain two sets of books for availability may not be worth the effort. There may be exceptions such as the RHR or fuel pool cooling system.

PERFCRIT 184. **If there is a system that provides more than one function under the Maintenance Rule, is it necessary to establish more than one performance criteria?**

Yes. If a single performance criteria cannot provide a means to monitor the performance of both functions.

PERFCRIT 185. **The workshop example of instrument air indicates the performance criteria is availability. Does this sufficiently establish performance or is it necessary to look at other parameters such as moisture content, volume, pressure, etc.?**

Performance criteria typically falls into 3 general categories - availability, reliability, and condition monitoring. Specific performance criteria is expected to consist of some combination of these. For example, history has shown that moisture content can affect the function of the instruments. The utility may decide to select this condition monitoring parameter to determine performance. (NUMARC 93-02, Section 5.2.3.3, pages 5-27.) Generally, availability and reliability is sufficient to monitor system performance and it is not necessary to go to condition monitoring.

PERFCRIT 186. **What types of condition-based performance criteria have been established? Do they work to predict/preclude loss of function?**

Vibration, delta pressure, moisture content, oil analysis and temperature are examples of condition parameters that indicate condition-based performance that are predicting indicators. In general, condition parameters do tend to preclude loss of function or provide an alerting function to anticipate the effects of failure.

PERFCRIT 187. **Has any V&V plant established performance criteria in support of functional requirements for supporting EOP system requirements? Was it component specific, i.e., IEN 86-06, valves and Regulatory Guide 1.97, instruments?**

No. Because in all V&V cases the SSC was in scope due to the applicability of other scoping criteria. The V&V effort was limited to establishing performance criteria and evaluating the performance of 2 to 4 systems per plant. The number of systems selected was limited because of the time constraints to test the validity of NUMARC 93-01.

PERFCRIT 188. **Should the reliability performance criteria be set at 0 or 1? What factors might determine whether 0 or 1 failure is appropriate? What are the ramifications of choosing 0 vs 1 for failures to start on demand?**

The determination to establish 0 or 1 as the performance criteria for failures to start on demand will be based on specific station performance redundancy/diversity and consequence. If the system is risk significant, you may establish 0 failure as the performance criteria. If the system can tolerate more failures, then a higher criteria may be established. The ramifications of setting 0, 1, or a higher number will be an increase in the number of hours spent performing cause determinations based on exceeding a performance criteria that is set unrealistically low.

PERFCRIT 189. **What are several examples of performance criteria that would be established for structures? Would building settlement and visual inspection be acceptable? What seismic criteria would be applicable? What would be the periodicity for monitoring?**

If structures meet the criteria specified in NUMARC 93-01, Section 8 and a utility establishes performance criteria for the structures, then the performance criteria could include inspection of settlement, cracking, spalling, corrosion (metal), and others. For example, containment ILRT would be one means to monitor performance. The actual periodicity would be dependent on several factors including accessibility (i.e., radiation exposure) and present performance (large crack in concrete should be monitored more frequently). (**Note:** Seismic criteria is part of the design features of a structure and would not necessarily be a reliable performance criteria.)

PERFCRIT 190. **What type of performance criteria is suggested for inherently reliable equipment?**

Inherently reliable SSCs do not require performance criteria. (**Note:** See NUMARC 93-01, Section 9.3.3, pg. 24)

PERFCRIT 191. **What kind of comparisons should be made between the performance criteria used on identical systems at different plants? If one plant chooses 5 percent unavailability based on its review and another chooses 8 percent unavailability, will the 8 percent plant be under some additional scrutiny because of its higher value? Will this 8 percent value be thought of as not "optimizing the availability and reliability" since another plant is doing a "better job"? Could plants be pushed to the highest plant's standard for each criteria?**

The NRC in its draft inspection procedure emphasized that inspectors should not put too much emphasis on comparing one plant to another when evaluating maintenance activities under the rule. Industry operating experience of other plants should be considered when establishing the performance criteria but there can be valid reasons for differences. Performance history, maintenance programs, plant configuration and PRA assumptions are different from plant to plant and will result in different performance criteria. Each units performance criteria stands on its own merits and comparison for the purpose of commonalty is inappropriate.

PEREVAL 192. **In NUMARC 93-01, page 24, the choices provided in the third paragraph seem to be to either establish the effectiveness of your PM program by 36 months (or 2 cycles) worth of data OR to show that the SSC does not have acceptable performance and create a goal. If the full required time period of documentation is not available on July 10, 1996, but the performance data which is available shows acceptable performance, is it acceptable to simply create a "goal" equivalent to the performance criteria established for that SSC and continue to collect data until the "3 year/2 cycle" information has been collected and then declare the SSC in (a)(2)? This should not require any root cause analysis or establishment of goals at a lower (e.g., component) level.**

From the question, it is assumed that the acceptable performance data that is available is less than two cycles (or 36 months). If that is the case, it would be acceptable to establish goal(s) and monitor performance until the utility has assurance that it has an effective maintenance program. The V&V participants reviewed three cycles of performance without any advanced knowledge of what would be required and were able to reconstruct performance history. It is recognized that the task to determine acceptable performance for the V&V participants was more difficult than future efforts may be.

PEREVAL 193. **Please confirm that most V&V utilities do not plan to do a full two-cycle performance history review prior to early implementation of the Maintenance Rule program. For example, if a utility plans to implement the Maintenance Rule program in early 1995, they could base their review on one cycle history and following the end of the second cycle in mid 1996, they could then adjust their performance evaluation accordingly.**

The industry guideline NUMARC 93-01, Section 9.3.3 states that a two-cycle review of performance history is needed prior to rule implementation in July 1996 for placement of SSCs in (a)(2).

PEREVAL 194. **How are risk significant SSCs with unsatisfactory performance histories handled?**

Risk significant SSCs with unsatisfactory performance require goal setting and monitoring in accordance with paragraph (a)(1) of the rule. See NUMARC 93-01, Section 9.3.3, for detailed discussion.

PEREVAL 195. **What difficulty was found for retrieval of data to evaluate for 2 cycles or 36 months, whichever is less?**

One V&V participant had very little difficulty based on their data retrieval system. Another utility had difficulty in retrieving the data. Data retrieval will vary from utility to utility depending on their work order system and other data bases.

PEREVAL 196. **How much effort was required to quantify Comanche Peak instrument air unavailability?**

The actual time was approximately 30 labor hours. Additional time was required for preparation of workshop material and writing up the summary.

GOALS 197. **For SSCs that have been determined to be addressed under paragraph (a)(1) of the rule and goal setting is required, can the specific root cause or corrective action be the focus of the goal?**

Goal setting should be performance based. While reference to the root cause or corrective action may be part of the goal, the emphasis should be on restoring performance.

SSC performance monitoring is also required. If you only monitored the corrective action, and it was ineffective, you could be unaware of the continued unacceptable performance.

GOALS 198. **An example provided from NUMARC 93-01 considered pipe wall thickness as a performance criteria for an SSC. How can this example be reconciled with the idea of only a few system-specific goals, with the rest being plant wide? Pipe wall thickness pushes the performance criteria down to the component level (and for a lot of components).**

There may be instances when a goal should be set for components especially if there have been repetitive failures. Pipe wall thickness could be set as the performance criteria or goal. The guideline did not intend that there be a goal assigned to a program but is focused on SSC performance.

GOALS 199. **If a MPFF occurs that requires goals to be set, can the goal be directed at the component that failed?**

Yes. But you should continue to monitor the overall system performance.

GOALS 200. **If a repeat MPFF causes a "goal" to be set, is it practical to make the goal "the performance criteria" plus no repeat failures of this component over the next x # of hours?**

Yes. It is assumed that the cause determination for the repeat MPFF indicated the proper corrective action to preclude recurrence.

GOALS 201. **If there are two automatic reactor trips in one cycle, would it be necessary to establish goals and corrective action?**

First you should determine whether the automatic trips were the same maintenance related cause. Goals would not be required if the performance criteria for plant trips was three trips due to maintenance. If the actual number of trips exceeds the performance criteria, then perform a cause determination. The results of the cause determination will provide the basis for taking corrective action which may or may not include setting goals.

GOALS 202. **Why not leave things in (a)(1) for a long time?**

A utility has the flexibility to determine an appropriate time period for monitoring the performance of SSCs to established goals; however, the more systems that reside unnecessarily in (a)(1), the harder it becomes to focus attention and resources on those SSCs needing additional performance monitoring.

GOALS 203. **How often should goals be checked and revised?**

At least on a refueling cycle basis not to exceed 24 months during the periodic maintenance assessment or whenever a goal is not met.

GOALS 204. **Are there provisions made for resetting goals once set?**

Yes. Goals can be reset during the monitoring phase or during the periodic assessment. A documented basis should be established that indicates the rationale for any changes.

GOALS 205. **Is there any guidance or limits on the time an SSC may be left in category (a)(1)? Is there any negative regulatory impact from being in (a)(1) for time frames of 1 or 2 cycles?**

Yes there is guidance. The time frames provided in NUMARC 93-01, Section 9.4.3, are minimum time frames. No, there is no negative regulatory impact for leaving an SSC in (a)(1) longer than this. The appropriate implication of SSCs assigned to (a)(1) is that management believes performance improvement is needed because of previous unacceptable performance. In some cases, it would be prudent to monitor performance over several cycles to determine acceptable performance. Another example of where it would be beneficial to monitor performance over several cycles would be if a plant modification has been made (because of an MPFF) and several monitoring intervals are necessary to determine performance.

GOALS 206. **If an unavailability goal of 46.4 hours is established and the SSC is removed from service to do work and exceeds 46.4 hours because of a non MPFF, how is it resolved?**

It is assumed that the unavailability goal of 46.4 hours is for maintenance related activities (taking the system off line to repack a valve, replace a pump seal, etc.). Therefore, the non MPFF failure that causes the unavailability does not count against the performance criteria established.

If the goal is a composite of unavailability for all reasons, evaluate the maintenance contribution and risk effect to determine why you are not meeting that goal and determine if a revision or additional goals are necessary.

GOALS 207. **Will the NRC staff take different action if you violate a goal vs. violating a performance criteria?**

No. Performance criteria are established to allow a utility to initiate corrective action before a goal is needed. A goal is established to provide focus on unacceptably performing SSCs. The cause determination undertaken by the utility when a goal is exceeded and the results achieved will determine what future action the NRC will take. Timely and effective corrective action is the objective.

GOALS 208. **In one of the workshop sessions, the panel stated that there is no negative stigma from having SSCs in category (a)(1). However, SSCs have been placed in category (a)(1) because maintenance has been ineffective. What assurance do the utilities have that the NRC or INPO will not use the number of systems in category (a)(1) as one element of their maintenance assessment. Additionally, it will be very easy for intervenors, press, and general public to misconstrue the significance of placing SSCs in category (a)(1) because of ineffective maintenance. Was this considered during the development of NUMARC 93-01 and Regulatory Guide 1.160?**

As discussed on page 25 of NUMARC 93-01, goals are established to bring about necessary improvements in performance.

The positive perception should be that management recognizes the importance of the equipment or need for improvement and has established goals to improve performance. Performance criteria should be established at a level such that adverse trends in performance can be detected on a timely basis. The NRC recognizes unacceptable performance through other regulatory programs.

OE 209. **What constitutes industry operating experience and when must it be used?**

Each utility's procedures currently identify the elements to be considered and the actions necessary for operating experience review and implementation.

OE 210. **Why is it necessary to consider industry operating experience? The "safety net" feature of the criteria seems to make industry experience a moot point.**

While the "safety net" aspect is important, the use of industry operating experience is also important to identify problems that are applicable to a utility that should be avoided. The sharing of information and lessons learned was a key lesson learned from the TMI accident.

OE 211. **What is the appropriate level or threshold when evaluating industry operating experience to determine whether a component or system should be included within the site-specific Maintenance Rule scope (i.e., NRC notices, INPO Reports, Nuclear Network, Owners Groups, site-specific trip reports)?**

Each utility currently identifies the elements to be included in their plant specific operating experience program. The appropriate level or threshold is a utility specific determination based on how the individual program is structures. The expected sources of information could be those listed and others as determined by the utility.

OE 212. **Is the two-year review of operating experience a rolling period and how does that relate to overall use of industry experience in determining scope?**

The guideline requires a review of two refueling cycles of in-house and industrywide history prior to implementation of the Maintenance Rule on July 10, 1996. The purpose of this review is to determine if non-safety-related SSCs should be considered within the scope of the Maintenance Rule in accordance with NUMARC 93-01, Section 8.

Additionally, the review of operating experience is a continuous process with industry events or failures reviewed for utility applicability. Part of the continuing operating experience review may involve adding SSCs to the original Maintenance Rule scope for those non-safety-related SSCs that meet the Maintenance Rule criteria.

The refueling cycle review of industry operating experience should consider overall performance relative to goals that are established for SSCs.

OE 213. **Why can't organizations that provide industrywide operating experience (NRC, INPO, etc.) indicate on document (SER, SOER, LER, etc.) that this event is Maintenance Rule related, even including if: (1) the results are attributable to maintenance; and (2) the function was lost. Alternatively, NPRDS reporting could be altered to be responsive to industry's needs for implementation of the Maintenance Rule. A quarterly report summarizing industry operating experience which could impact implementation (scope) of the Maintenance Rule from INPO can be a big help.**

INPO has actively solicited comments on potential changes to NPRDS that would be beneficial to the industry as they implement new initiatives, such as the Maintenance Rule. There has not been strong wide-based industry support for significant changes to NPRDS. While some potential improvements have been identified, the general opinion has typically been that the changes are not necessary and do not warrant the costs. INPO will continue to monitor industry actions associated with the Maintenance Rule and, as the industry gains more experience in its implementation, INPO is willing to make changes to NPRDS based on experience and industry needs. It should be noted that LERs are already cause coded and most SER and SOER reports contain adequate information to make a cause determination or provide a source to obtain additional data if needed. Utilities, when reporting on failures, should identify if the failure was a MPFF.

OE 214. **For the main feedwater (MFW) system, if it is in scope and monitored at the system level, is it necessary to review industry data to determine which MFW components are trip indicators?**

No. A review to determine which components are trip initiators is not required by the Maintenance Rule. For the purpose of the Maintenance Rule, a review of the actual loss of train and system function by the reviewing utility is needed to establish if maintenance is effective or if goal setting is needed.

OE 215. **What is the expected reaction time to respond to Industry Operating Experience (IOE)?**

The timeliness for responding to IOE information should be consistent with its safety significance

OE 216. **What is the expected frequency of review of IOE?**

The operating experience (OE) review frequency should continue as presently defined by each utility's program. The rule currently requires a review at least on a refueling basis but no greater than 24 months. An ongoing review would meet the intent of the periodic review.

OE 217. **What is the extent of the inclusion of my operating experience program in the compliance program for 10CFR50.65? Does this mean that my operating experience program is now in "regulatory space"? If the answer is yes, then how is the variability of the depth and extent of operating experience programs going to be accounted for? Is it necessary to go back and assess the status and ability of the operating experience program to respond to the requirements of the Maintenance Rule?**

The Maintenance Rule 10CFR50.65 does not incorporate the operating experience program in regulatory space. Utilities presently review and disposition NRC information (e.g., LER, IEB, IEN, etc.). Additional industry information (INPO, EPRI, NSSS, vendors, etc.) is distributed to utilities for review and action as appropriate. Utilities are required to be in compliance with their own procedures that assure safe operation of the facility. Utilities currently monitor the implementation of the IOE programs on an on-going basis. If performance of SSCs within the scope of the Maintenance Rule is not in accordance with the criteria of the rule, the cause and its correction is necessary. An additional review of the operating experience program is not required by the rule.

OE 218. **What do you believe the NRC's response will be for a plant that gets a trip due to a cause previously experienced in the industry, that you had excluded from the Maintenance Rule based on a plant-specific evaluation?**

The question is what was the initial basis for exclusion. If a utility was aware of some industry experience that is applicable to its plant, that information should be considered in the plant specific scoping consideration. The importance of proper documentation will be valuable to the utility in fact finding and explaining the initial decision bases. However, this SSC should now be considered for in-scope determination for that utility.

MONITOR 219. **If the main feedwater system (a non-risk-significant, normally operating system) is being monitored under the plant-level criteria of three trips per refueling cycle, would the main feedwater system or the control valves be moved to (a)(1) if you experienced two MPFFs on the control valves over one cycle?**

Yes, but only if the MPFFs were repetitive failures to the control valves. If goal setting and monitoring is required by (a)(1), the utility could choose to monitor the system in total or only monitor the control valves at the component level.

MONITOR 220. **How are component level risk significant factors related to train level?**

If a system/train function is determined to be risk significant, components within the system or train can be either risk significant or non-risk significant. If a component failure of a system or train causes the system/train safety function to be lost, then that component is considered to be risk significant.

MONITOR 221. **When can it be assured that corrective actions designed to prevent future failures are effective, and how does this affect movement from (a)(2) to (a)(1)?**

The most direct answer is historical performance since the corrective action was taken, and the use of technical judgment. NUMARC 93-01, Section 9.4.3, suggests a monitoring periodicity based upon test frequency for determining when a goal is met. Movement from (a)(2) to (a)(1) is based on unacceptable performance as indicated in Section 9.4.4.

MONITOR 222. (a) **Is monitoring technical specification LCO time for system availability adequate to implement the Maintenance Rule (e.g., this could mask problems, including MPFFs)?**

(b) **During a PM task performed during a refueling cycle outage (no LCO) a component could be discovered to be failed. Will plants count this "failure" against their system reliability/availability criteria?**

(a) Monitoring technical specification LCO time alone is not adequate to meet the Maintenance Rule criteria. It ignores reliability (failure rate).

(b) Function availability time is counted when the function is required. If a system or train function loss is identified during an outage, the time since the function was last known to be required and available until the last time the function was required is the availability time to be considered.

MONITOR 223. **It was mentioned that doing the necessary research to determine the performance (availability) of a system such as Instrument Air was a difficult task. Does anyone have a good or automatic method of tracking "system availability" for non-safety-related systems? Who would be a good point of contact?**

See NUMARC 93-02, Section 6.4. Contact Tom Thurmon @ GGNS.

MONITOR 224. **Is temperature acceptable for monitoring Spent Fuel Pool (SFP) cooling?**

Yes. Since temperature is the parameter to be controlled and indicates the condition of the system, it is appropriate to use it as a monitoring method.

MONITOR 225. (a) **How often should evaluations be conducted if performance criteria or goals have been met?**
(b) **What time period is allowed to do an evaluation of possibly changing the goal?**

(a) The time frames are discussed in NUMARC 93-01, Section 9.4.3.

(b) A goal could be changed at any time providing the basis is technically sound. The basis for changing the goal should be documented.

MONITOR 226. **Much of the workshop discussion has dealt with important functions, whereas the rule emphasis is on SSCs. With the emphasis in the discussions on functions, is it not then necessary to define the functions which are essential and then to go on to define how much those important functions can be allowed to degrade before a functional failure has occurred? For example, one important function would be to provide x gpm auxiliary feedwater at y psi. The system could do so whether or not the pump seals were leaking at 25 or 50 gpm. And yet the pump seal itself may have been judged to have experienced a maintenance preventable functional failure.**

Yes. It is very important to define the functions which are essential for those SSCs within the scope of the Maintenance Rule. Not only should the SSCs be identified, but the functions that those SSCs support should be identified. There are three reasons for identifying the function. The first is to ensure that monitoring efforts are directed at the functional level, second that when SSCs are removed from service, there is a clear understanding of what function is being affected and third, in determining if it is a MPFF it is known which functions of the SSC are being affected.

MONITOR 227. **Standby system "hidden" failure unavailability time assignments are 1/2 the surveillance period per INPO reporting guidelines. Does this somewhat arbitrary assignment conflict with likely Maintenance Rule performance criteria, particularly when failure finding is an accepted element of an effective PM program?**

No. Utilities can use the INPO definition of standby system estimated (hidden) failure unavailability as one-half the surveillance period or they can use the date of discovery method utilized by the NRC as the starting time for unavailability. Whatever method is used, it should be consistently applied by the utility for comparison and trending (e.g., it should be consistent with PRA methodologies that are used for risk determination).

MONITOR 228. **When a component fails and it is a maintenance preventable failure, is it necessary to establish performance monitoring for the component in that system only or all of the same components in all the systems under the Maintenance Rule or all systems in the plant?**

Goal setting for other systems that have the same component but have not experienced failures would not be required. Cause determination and corrective action should include all similar components in the plant.

Performance monitoring and goal setting would be necessary for specific SSCs if the failure was determined to be a MPFF.

MONITOR 229. **What mechanism is suggested to obtain plant-specific demand failure data (i.e., failure to start)? NPRDS does not provide this data. Of particular interest is how does one obtain the best estimate for the number of demand failures for a given component (i.e., the denominator problem)?**

The best approach would be a review of surveillance program records or work order history. A review of shift operating logs may also be needed for components that are in operation during normal operation (e.g. cooling water pumps that are shifted to equalize run times, etc.). It is understood that the review would be time consuming but it would be the most accurate.

MONITOR 230. **How do utilities plan to determine maintenance failure?**

Failures at utilities should be determined on the basis of loss of function. The level of failure (system/component) which is being monitored will dictate what information source (plant trip report, work request, etc.) to query for determination.

MONITOR 231. **If a system has unacceptable performance and goals have been established but there is no surveillance program, what is the shortest interval that the system performance can be reviewed to get three successive surveillance intervals? The guidance suggests quarterly.**

A utility must decision the appropriate interval based on the history of the system. There are many factors that should be considered. For example, SSC risk significance, type of failure, corrective action implemented, standby or operating, and others. In general a longer time should be allowed to monitor performance if the SSC is risk significant, corrective action is extensive, and it is a standby system. The main focus should be the utility's confidence that the unacceptable performance problems have been corrected. See NUMARC 93-01, Section 9.4.2 for guidance in this area.

MONITOR 232. **Containment isolation valves that are not in other systems designated SSCs and only serve an isolation function: NPRDS has these valves listed as the containment penetration system. I would like to maintain this designation and use the integrated leak rate test as the PM. Is this acceptable?**

Yes. It is up to each individual utility to designate the SSCs that are within the scope of the rule (e.g., developing a "pseudo system" for containment isolation). Also, it is up to each utility to define the appropriate PM or monitoring activity (the Local Leak Rate Test may be the appropriate PM).

MONITOR 233. **For a risk significant system in the following example, how is redundancy addressed? Three 50% feedwater trains provide water to the vessel. One of the feed pumps begins to fail (high vibration, mechanical seal failure). Does swapping once to the standby pump constitute a loss of the SSC function even though the function has been preserved by the standby train?**

No. The system function was not lost, therefore a failure has not occurred. If the risk significant system/train function is lost, it constitutes a decrease in reliability and availability that should be monitored. If the system/train function was not lost, the pump that failed should still be evaluated for cause and corrective action.

MONITOR 234. **Why is it necessary to perform extensive availability monitoring, but little reliability scoping and performance monitoring? Reliability may be important since we apparently are not monitoring availability IAW INPO PPI definitions (i.e., no T1/2 penalty for failures) which penalize availability when failures occur. Recommend both availability and reliability be monitored, especially for standby systems and trains.**

The V&V plants did scope and monitor failures to determine dispositioning in (a)(1) or (a)(2). Many performance criteria had both unavailability (i.e., < 2.5%) and reliability (i.e., zero MPFFs) as performance criteria. The monitoring aspect was retroactive since there was a limited time to look forward. The industry agrees that reliability should be monitored and the guideline explains that performance can include reliability, condition, and availability.

MONITOR 235. **What is the basis for choosing unplanned safety system actuations as a significant plant level indicator? With the exception of transient initiators already captured in scram indicator, is there any technical evidence that unnecessary safety system actuations are safety significant?**

No. There is not a technical basis. However, the use of safety system actuations (SSA) has been used as an indicator of challenges to system design. While the plant was designed to handle those challenges, if the challenge is unnecessary it may be cost and safety effective to preclude recurrence.

MONITOR 236. **The scope of the diesel generator performance monitoring includes diesel fuel transfer. Any failure of diesel fuel transfer does not affect "start" or "availability" but does affect "successful run" based on a 24-hour run need. How was this captured in scoping and in performance monitoring or was this fact ignored for start and availability?**

Both scoping and monitoring consider support systems (functions) in determining performance. HVAC and power (electrical) needs are factored in to the PRA. A system that relies on support systems (power, cooling, fuel, etc.) should be monitored on the basis of availability of the support functions.

MONITOR 237. **How was risk significant "indicating" instruments determination selection made and monitored since these components do not directly affect system performance?**

Instrumentation can be included in the scope of the Maintenance Rule on the basis of safety-related or non-safety-related and whether or not it meets the conditions in paragraph (b)(2) of the rule. Indicating only instrumentation (i.e., pressure gauges, etc.) which do not have a significant mitigating function within the EOP or do not perform a control function would not be monitored (excluding any internal utility monitoring effort) under the Maintenance Rule. Control instrumentation would be monitored since unacceptable performance could affect system function.

MONITOR 238. **If monitoring at the system level, what failure causes the system to be considered under paragraph (a)(1) of the rule?**

If a system-level performance criteria is exceeded and the cause is determined to be a MPFF or a repetitive identical MPFF occurs, then a goal should be established (See NUMARC 93-01, Section 9.4.4).

MONITOR 239. **Run to failure has been previously determined as acceptable in some cases. If the failure is a loss of function, are there any examples of a system functional failure which could be considered acceptable? Note: There may be component failures (in the scope of the rule) which do not result in functional failure, and may be considered acceptable to run to failure.**

No. It is not acceptable for any SSC to run to failure if the result will be a loss of system\train function.

SSCs that provide little or no contribution to system safety function could be allowed to run to failure (i.e., perform corrective maintenance rather than preventive maintenance). However, the decision to run to failure and the basis for that decision must have been developed prior to the failure.

MONITOR 240. **For the two following cases what would be the guideline actions with regard to monitoring requirements? Case 1: Scoping is by system. Over a period of time, three different components fail causing the system to be unable to perform a function having risk significance. Case 2: Scoping is by components. The same three components fail over the same time interval (failure not concurrent in either case). In both cases, corrective action is sufficient to prevent future failures for the same cause. Would there be a difference in setting up performance monitoring?**

No. The final result would be the same for both cases because the function as defined in paragraph (b) of the rule at the train or system level is the object of monitoring and goal setting. Components that cause the train or system function to be lost could be monitored relative to the train or system function.

MONITOR 241. **In what cases should a functional failure be considered on a per train basis and in what cases should it be considered on a per "system" basis? For example, should instrument air availability be monitored on the basis of having adequate air pressure in the plant, or should it be monitored on individual air compressors being out-of-service?**

Risk significant SSCs should be tracked at a train level. For non-risk-significant systems, it is suggested that the higher level monitoring be done first. This would mean that system performance should be the start, and if system performance becomes unacceptable, then monitoring at the individual compressor level may be appropriate.

MONITOR 242. **If a risk significant SSC has an unsatisfactory performance history that gets resolved by corrective action, how long should it be monitored before changing it to the routine monitoring category?**

See NUMARC 93-01, Section 9.4.3, for dispositioning SSCs from (a)(1) to (a)(2) based on performance.

MONITOR 243. **How is availability monitored for a complex multiple component system - mostly by train out-of-service for all causes through the maintenance work order system, or through LCO/clearance control?**

Any of the following methods could be utilized to monitor system availability for a complex multiple component system.

Train availability for all causes with additional review of maintenance-related causes. This would be the broadest approach and may be the easiest method to monitor system performance.

Maintenance work order identification of functional failures for components which affect the system function. This would be the most time consuming approach but could be somewhat offset by a good database. The components that affect system/train function would need to be identified during the scoping effort.

LCO clearance could be used in support of either of the two methods described above. However, this indicator only points you in the direction for further review.

MONITOR 244. **For purposes of implementing the Maintenance Rule, are scrams and forced outages related to maintenance and the performance criteria to be utilized?**

Yes.

MONITOR 245. **By monitoring unavailability hours or availability, you have effectively moved to a failure monitoring mode (or removed from service) instead of a precursor to failure monitoring. This seems counter to the notion of improved maintenance. . Does NRC really accept system level unavailability as a goal in (a)(1) of the rule?**

Yes. Availability monitoring and predictive maintenance are not mutually exclusive. Monitoring availability tells you how you did, and predictive maintenance tells you what to anticipate and correct prior to failure. Utilities should continue those maintenance program aspects of monitoring SSC performance. Availability is looking from the aspect of being capable of performing its intended function. The NRC has accepted NUMARC 93-01 as one method to implement the Maintenance Rule as stated in Regulatory Guide 1.160.

MONITOR 246. **If a system (e.g., RCIC) fails its surveillance criteria, is it acceptable to make an engineering evaluation to determine the significance and not count it as unavailable?**

Yes. An engineering evaluation can be used because the surveillance failure does not automatically mean a functional loss has occurred.

MONITOR 247. **For the purpose of monitoring unavailability, did Grand Gulf use the maintenance contribution only or all contributions?**

Grand Gulf used the time keeping method already in use at the plant which documented taking the system/train out-of-service for all contributions.

MONITOR 248. **Is there any expectation that system unavailability modeling (such as is done for INPO safety system program) will be done for determining system unavailability for the Maintenance Rule?**

The guideline makes no predetermination as to what methods will be utilized by a utility. The INPO approach is a method that could be selected. Other approaches are equally sound.

MONITOR 249. **Unplanned capability loss factor (UCLF) is as much an indicator of good work control/scheduling practices as it is a measure of equipment performance. A large input into UCLF is a plant's ability to negotiate with the load dispatcher to get non curtailing deratings to perform maintenance activities such as condenser waterbox cleaning at the plant's convenience as opposed to scheduling four weeks in advance. While UCLF has large commercial value, have any of the V&V plants successfully used it as an indicator of the effectiveness of maintenance? What is the safety significance?**

UCLF was not explored during the V&V program because only a certain set of systems were monitored. However, if the performance criterion of UCLF is selected by a utility but is not met, a cause determination should be performed. In those cases where UCLF is for economic reasons (load dispatcher), then goal setting is not required. Derates for maintenance failures could be an indicator of maintenance effectiveness.

MONITOR 250. **For non-risk-significant systems where a plant-level capability factor is used for performance monitoring, how is it determined which system requires goal setting when the capability factor exceeds acceptable performance? (Loss of unit capability can be a cumulative effect from many system outages.)**

Cause determination of appropriate depth and technical judgment should be used to determine the system or systems that caused a criteria to not be met.

MONITOR 251. **Would a refueling cycle extension or a post-refueling power ascension delay caused by a MPFF count against the Unplanned Capability Loss plant-level criteria?**

Yes. If unplanned capability loss factor is used to indicate plant-level performance and a MPFF occurs that affects that indicator, a cause determination and corrective action should result in a decision regarding the need for goal setting.

MONITOR 252. **Have any V&V plants set up a precursor to identify an early warning prior to exceeding a goal or performance criteria?**

Yes. Existing performance monitoring programs such as ASME Section IX criteria have alert levels. In addition, most plants predictive maintenance programs have alert or observation levels established for such areas as vibration and oil analysis.

MONITOR 253. **In developing the goal for normally operating equipment time out-of-service, should time out-of-service for non threatening repairs (i.e., material condition items) be excluded when trying to establish a performance goal? Historical records probably don't account for discretionary maintenance previously performed.**

The total time out-of-service for all reasons should be captured. This is particularly important for risk significant systems. It is the intent of the rule and the guideline that availability (unavailability) should be balanced against reliability. Therefore, it is important to capture all out-of-service time, whether caused by equipment failure or any elective maintenance. The causes of out-of-service time may have been previously addressed by a utility's PRA methodology and should be considered.

MONITOR 254. **How have the V&V plants dealt with electronic circuit card failures? Most Westinghouse PWRs have several hundred to several thousand similar cards. How are failures dealt with that some may consider repetitive but are actually statistically expected considering the population of devices and Mean Time Between Failure (MTBF)?**

Because of electronic circuit card redundancy, it is not expected that a single failure or statistically expected failures will affect the train function. Circuit card failures would continue to be evaluated and corrective actions taken, but the system design is intended to minimize random failures from affecting system performance. However, monitoring of circuit card failures is important to identify those instances where train function may be lost or failures exceed statistically expected values.

MONITOR 255. **If ASME Section XI parameters are used as performance criteria in the monitoring process, would the "Alert Levels" or the operability levels be chosen as performance criteria? Would monitoring at the system level suffice?**

Appropriate technical judgment should be used. Monitoring should consider the level (alert, operability, etc.) that is presently used if performance or run to failure is acceptable. Alert levels are used to preclude loss of function or unacceptable economic maintenance cost. Loss of operability can mean loss of function if no other alternative exists. The monitoring levels should be reasonable and provide sufficient time to take corrective action. Monitoring at the system level could suffice.

MONITOR 256. **How does one measure availability of standby safety systems when verification typically makes the system "inoperable" if only from a technical specification view?**

The intent of the Maintenance Rule is to provide a balance between availability and reliability. In other words, the intent is to optimize the maintenance strategy to have the important systems (trains) available as much as practical. Availability for standby safety systems is measured for all hours the system is capable of starting and performing its function versus the hours required. Therefore, all hours that the system function is defeated, either due to failures or elective maintenance or testing, would be counted as unavailable hours. The intent is to achieve the highest reliability with the minimum out-of-service time, however, some test-related out-of-service time is expected.

MONITOR 257. **Existing requirements to demonstrate technical specification compliance already go a long way toward showing that maintenance is effective and that important functions will be performed as needed. Is the intent of the Maintenance Rule to supplement those requirements or to pull those requirements under the umbrella of the Maintenance Rule? For example, on AFW the existing technical specifications require performance-related tests on flow, head, etc. They do not directly impose requirement on availability and reliability which it now appears the Maintenance Rule will do. Is this a correct interpretation?**

The Maintenance Rule is not intended to supersede technical specification requirements, but to enhance or supplement those requirements where performance improvements are needed. The technical specifications and other monitoring programs (i.e., ASME, IWV/IST/ISI, etc.) can be used to demonstrate that the system, train or component is meetings its performance criteria. No new programs may be necessary.

MONITOR 258. **In development of the reliability centered maintenance program, failure modes and effects analysis (FMEA) were created. Assuming that the monitoring and trending processes required by the Maintenance Rule are effective, what is the value of maintaining and updating the FMEAs?**

The question is outside the scope of the Maintenance Rule implementation guideline. The maintenance rule does not require the maintaining and updating of the FMEA. Appropriate utility personnel should address this issue.

MONITOR 259. **NRC Regulatory Guide 1.160 discusses EDG reliability. Specifically, "If any performance criterion is not met or a second emergency diesel generator maintenance preventable failure occurs, it is expected that the licensee would establish goals and monitor subsequent EDG performance under 10CFR50.65(a)(1) consistent with ... ." NUMARC 93-01, Page B-2 defines "repetitive" MPFF fundamentally as a second MPFF of the same cause. The NRC Regulatory Guide use of "second" MPFF instead of "repetitive" appears to be more inclusive criteria for establishing goals in accordance with (a)(1). Did the NRC intend to use the word "second" in the same sense as NUMARC used the word "repetitive"?**

Yes. The NRC's use of the word second was meant to be the same as repetitive. The diesel generators were already covered under The Station Blackout Rule and NUMARC guidance had been provided.

MONITOR 260. **INPO requires the calculation of "estimated unavailable hours" for the calculation of EDG unavailability. Will this approach be required vis-à-vis the Maintenance Rule? Will it cause confusion if there is a conflict between the goal for INPO and the performance criteria for the Maintenance Rule?**

The utility should calculate estimated unavailable hours due to a failure for surveillance test of standby systems. For those SSCs which are being reported to INPO the present system can continue and could be used by utilities for compliance with the Maintenance Rule. The intent is to utilize those programs already established without restricting those methods of monitoring performance which are more effective. The utility's methods for monitoring performance should be consistently applied.

MONITOR 261. **Can the following scenario exist: Case 1: Diesel A = performance criteria 95 percent. Performance = 17 successful starts, 3 unsuccessful starts. The 3 unsuccessful starts are independent MPFFs. Conclusion = no goal setting is necessary. Case 2: Everything the same, i.e., performance but now the 3 unsuccessful starts are repetitive MPFFs. Conclusion = goal setting is required. Therefore, performance is identical yet Case 2 requires goal setting and Case 1 does not. Is this correct?**

Yes. Repetitive failures cause the two cases to be different. In both cases, the diesels met the availability performance criteria but not the reliability criteria of repetitive failures.

MONITOR 262. **Why was it decided to monitor EDG reliability differently than NUMARC 87-00? NUMARC 87-00 addresses data reach back versus data certainty and the ability to reflect reliability indicators that reflect current maintenance practices. Doesn't the 5-year data reach back of NUMARC 87-00 seem excessive?**

The emergency diesels were treated differently by one V&V utility because an extensive performance history was available. An extensive history for the EDG has been developed by all utilities and may be of benefit in its current form. The data needed to determine acceptable performance for the Maintenance Rule is two refueling cycles or three years.

MONITOR 263. **Consistent with the objective of having only one maintenance program (not one to meet the rule and another to maintain the plant), is it not desirable to do all important monitoring of risk significant SSCs under the umbrella of the Maintenance Rule?**

Yes. However a utility has the flexibility to accomplish monitoring consistent with its organizational plan. Many station programs (OE, PRA, OPS, etc.) support the Maintenance Rule and everyone involved should understand how station integration is achieved.

MONITOR 264. **When we refer SSCs for senior management attention of (a)(1) systems, what level does the NRC consider senior management?**

Authority and responsibility vary based on utility organization. The NRC considers senior management as those personnel with the responsibility and authority to cause corrective action to be taken to address performance that is unacceptable.

MONITOR 265. **Who performs or will perform the performance monitoring and MPFF reviews at the V&V plants? And how will they flag MPFFs for review?**

There are a variety of ways that performance can be monitored. The assignment of responsibility will depend on organization structure and present monitoring methods. Some V&V plants used system engineers while others used plant performance personnel. Failure identification on work orders could be done by modifying (i.e., adding data fields) the work order document or the station deviation (problem) report. It is more important that the monitoring is effective, not who performs the monitoring.

MONITOR 266. **Will the application of the INPO Plant Performance Indicators (PPI) procedures to Maintenance Rule SSCs satisfy the Maintenance Rule monitoring requirements (e.g., EDG, ECCS, AFW availability)? Also, please confirm that we consider systems such as charging/HHSI and CCW to be "in operation" despite the fact that one or more trains in the system are in standby during normal system operation.**

Yes. INPO PPI procedures can be used to satisfy the Maintenance Rule requirements for those systems (i.e., diesel, auxiliary feedwater, safety injection) which are being reported to INPO.

Systems which contain one or more redundant trains that are in a standby mode during normal operation of the system are considered to be "in operation." The V&V plants identified the performance criteria that they would use. That criteria is provided in the V&V report. (NUMARC 93-02, Section 5.2.3 and Section 6.)

DISP 267. **In order to determine if a component is categorized as (a)(2) or (a)(1), should repetitive component or system/train failures be used as the basis?**

A utility has the flexibility of setting goals at any level (e.g., plant, system, train or component level).

The basis for goal setting (i.e. dispositioning to (a)(1)) is based on the SSC not meeting the performance criteria established. This could be caused by the SSC not meeting the performance criteria or repetitive MPFF's.

If the Maintenance Rule is implemented at the component level, then repetitive MPFF of a component should be used as a basis to categorize a component as (a)(1) or (a)(2). The use of system or train failures should not be used to categorize a component into (a)(1) or (a)(2) because the failure of a system or train could be due to different components within the system or train. If there is repetitive MPFF of a system or train, that should be considered.

DISP 268. **When a performance criteria isn't met, is it necessary to move the SSC from (a)(2) to (a)(1) or can an evaluation be performed?**

No. It is not always necessary to move the SSC from (a)(2) to (a)(1) if a performance criteria is not met. However, in all cases of unacceptable performance the utility should perform a cause determination, at the appropriate depth, and the results will indicate what corrective action should be taken. Corrective action will not automatically lead to goal setting.

DISP 269. **If a modification is implemented on an SSC that is in (a)(1) and it corrects the problem, what method or how can it be moved from (a)(1) to (a)(2)?**

Dispositioning of SSCs from (a)(1) to (a)(2) is described in NUMARC 93-01, Section 9.4.3.

It is assumed that the modification was the result of an MPFF and not a design deficiency. By monitoring the SSCs performance or making an engineering evaluation that the corrective action (i.e., modification) has corrected the problem and goals (i.e. (a)(1) categorization) are no longer required.

DISP 270. **How are SSCs moved from (a)(1) to (a)(2) when surveillance interval is greater than two fuel cycles?**

The utility should determine the basis for establishing acceptable performance and could include monitoring SSC performance during operation if the surveillance interval is greater than two fuel cycles. The surveillance of SSCs is only one method of monitoring performance and others could be identified for SSCs with long surveillance intervals. In addition, there is nothing negative about monitoring performance of SSCs over long intervals to determine acceptable performance.

DISP 271. **There appears to be an inconsistency between the Maintenance Rule and bullet 2 on sheet 1 of session 9, "Dispositioning of SSCs from (a)(1) to (a)(2)." The Maintenance Rule says performance and condition shall be evaluated at least annually (every refueling cycle). The bullet talks about surveillance periodicity being two refuel cycles. Shouldn't the periodicity be no greater than one refueling cycle?**

The Maintenance Rule was changed to indicate a periodic evaluation every refueling cycle or 24 months.

DISP 272. **Is moving a system from (a)(2) to (a)(1) considered a negative reflection on plant performance? Will it be monitored by the NRC?**

No. It indicates that the utility has identified SSC(s) that have unacceptable performance and need to improve performance by establishing a goal and adding emphasis to take positive action to improve performance.

Yes. The NRC will review goals and evaluate utility efforts to improve performance.

CAUSE 273. **Would a generalized root cause statement like "poor control of maintenance" be sufficient to state that two failures of different sub-components on a system constitute a "repetitive failure"?**

No. The utility should investigate the failure to identify, if possible, the specific cause of failure. Where possible, specific cause determinations should be made because they result in effective corrective action.

CAUSE 274. **NUMARC 93-01, Section 9.4.4 requires a cause determination for a failure of a risk significant SSC. If scoping and risk significant determination have only been to the system level, does this preclude the need to do cause determinations for component failures that do not result in functional failures?**

Yes. However, a component failure that does not result in a loss of function should be evaluated on its own merits.

CAUSE 275. **What do you do if you cannot determine the cause of a failure? How do you determine if the failure was maintenance preventable?**

Document that cause determination could not be determined. If it is suspected that it was maintenance, design or operation that caused the failure, document the suspected cause and why. Each failure requires a case-by-case technical evaluation based on the failure mode and affects. It is likely in most cases that a specific cause of failure can be determined.

In the unlikely event that the specific cause cannot be identified, the cause evaluation should be very detailed in what was done and why the cause could not be identified. If a repetitive MPFF or additional failures whose cause cannot be identified occur, it could identify that there is a problem with the cause determination and corrective action program.

CAUSE 276. **For components that are in scope of the rule due to EOP requirements, the loss of function may not be obvious. If there is a component failure, what is considered "timely" to analyze this factor. NOTE: The Maintenance Rule only requires periodic assessment at a refueling frequency (< 24 months).**

The Maintenance Rule guideline requires more than periodic assessment. If a functional failure occurs, appropriate cause determination and corrective action is needed.

No fixed time has been established as "timely." It is event and condition dependent. The 24 months refers to the minimum frequency for a review of the effectiveness of maintenance and not for the time to complete a cause determination and corrective action. Timely in the context described is the response expected under Appendix B requirements for timely corrective action and is established on a case-by-case basis.

CAUSE 277. **Is it acceptable to use our existing Appendix B program in lieu of that described in NUMARC 93-01, Section 9.4.4, or does 10CFR50.65 impose additional requirements in this area?**

Yes. It is acceptable to use Appendix B as long as it will cover the four conditions described in Section 9.4.4. Utilities are encouraged to use existing programs as discussed in NUMARC 93-01, Section 7.0. A problem may be encountered if the existing Appendix B program did not include all SSCs within the scope of Maintenance Rule which includes balance of plant equipment.

MPFF 278. **The NRC does not address or define a MPFF; why does NUMARC?**

The NRC in paragraphs (b)(1) and (b)(2) defines the plant functions that are within the scope of the rule. It is recognized that not all failures are due to maintenance (e.g., design, misuse of equipment, etc.). Also, the function that caused the system, train or component to be within the scope of the Maintenance Rule is important. The system may be designed to perform functions that are outside the scope of the Maintenance Rule. Therefore, the term "Maintenance Preventable Functional Failure" was derived. Without it, any failure of any function for any reason could be interpreted as being within the scope of the Maintenance Rule. It is important to note that as long as train and system functions, as defined by the Maintenance Rule, are reliably sustained by the maintenance program, the intent of the rule is achieved.

There are two actions necessary when considering failures. The first action to consider is whether a function within the scope of the rule is lost. The second action is to determine if the loss of function is maintenance preventable.

MPFF provides emphasis on the loss of a safety function to discriminate maintenance deficiencies that do not affect the safety function of the train or system (e.g., degradation without loss of functions is not a MPFF). The guideline is also performance based but the focus is on maintenance effectiveness including those activities that directly support the performance of maintenance. Maintenance activities on SSCs within the scope of the rule performed by other organizations (outside the maintenance organization) should be considered during MPFF evaluation.

MPFF 279. **Provide a firm understanding of a MPFF. Within a Maintenance Rule scoped system, the failure of a component causes (assume failure is maintenance related): (a) loss of a train function, but not the system function, is it a MPFF? (b) No loss of a train or system function, is it a MPFF?**

(a) Yes. This assumes that the utility is monitoring at the train level.

(b) No.

MPFF 280. **To be a repetitive MPFF the definition in NUMARC 93-01 implies it must be the same component. What is the intent in this area?**

MPFF and repetitive MPFF are defined in Appendix B of NUMARC 93-01 as follows:

"A MPFF is the failure of an SSC (structure, system, train, or component) within the scope of the Maintenance Rule to perform its intended function (i.e , the function performed by the SSC that required its inclusion within the scope of the rule), where the cause of the failure of the SSC is attributable to a maintenance-related activity. The maintenance-related activity is intended in the broad sense of maintenance as defined above.

The loss of function can be either direct, i.e., the SSC that performs the function fails to perform its intended function or indirect, i.e., the SSC fails to perform its intended function as a result of the failure of another SSC (either safety-related or non-safety-related).

MPFF 283. **Is the MPFF (where the "functional" word is defined) a failure to function as designed or the failure to perform the SSC function?**

It is the failure of the SSC to perform its intended function (i.e. that function which required SSC inclusion in the Maintenance Rule) due to maintenance related activities or lack thereof.

MPFF 284. **Who will be responsible for determining if a MPFF is applicable when a corrective maintenance work order is issued? Will this individual be required to review all work orders issued against a particular system?**

This is a utility specific decision based upon how they establish their implementation program.

MPFF 285. **Please clarify MPFF as it applies to components and systems. It appears that we are attempting to establish "goals" or performance criteria on the component level, when MPFF is repetitive! Effective control of components through appropriate PMs, etc. is not compromised by the majority of component level repetitive MPFFs. For example, through RCM, etc. it may be decided to run certain SSCs to failure. Why should there be a concern when this "run to failure" component fails more than once? Root cause or failure determinations will correct component "failures" not placing the component in (a)(1).**

The intent is to monitor performance at the most appropriate level. If a repetitive MPFF occurs, the cause determination should consider establishing goals at the component level to insure corrective actions are effective. For example, if repetitive MPFFs of a specific MOV have occurred, goal setting to monitor that MOV performance may be appropriate. Components that have been evaluated and are allowed to run to failure are not MPFFs and goal setting is not necessary.

MPFF 286. **With regard to MPFFs, if the initial implementation is at the system level, is it necessary to perform an evaluation of each component as it fails if it is in a risk significant system to determine if it is risk significant?**

To be considered a repetitive MPFF the following criteria must be satisfied:

a. Failures (2 or more) must have occurred within the periodic review period.

b. The failure cause mode must be identical.

c. The failure must occur on the same or identical type component. Generic class(es) of components (i.e. valves) is not cause for a repetitive MPFF determination.

MPFF 281. **Is the following general statement on MPFF definition true: the majority of MPFFs that will be identified are expected to relate to processes performed on SSCs (such as procedures or training) not to the specific SSCs themselves? Therefore, goal setting and monitoring on any specific SSC may not be the appropriate corrective action?**

No. This statement is not true. The maintenance rule addresses the specific performance of SSCs within the scope of the rule. Most MPFFs are expected to relate to plant hardware, specifically to SSCs. But many root causes will be related to the software (i.e., procedures, processes, personnel). Goal setting and monitoring on a specific SSC is intended to measure improved performance. Corrective actions should address the root cause whether it is hardware or software.

MPFF 282. **Is there a distinction between maintenance-related failures and design-related failures when it comes to MPFFs? If there are design problems on charging pumps, for instance, that continue to fail and you continue to live with it because it doesn't effect overall system performance, are these now MPFFs which force you into (a)(1) and eventual additional action?**

Yes. There is a distinction between design and maintenance-related failures as explained in NUMARC 93-01, Section 9.4.5. Design-related failures are not considered MPFFs and would not require any additional action under the maintenance rule.

No. Utilities are expected to continue cause determination of each functional (i.e. system/train) failure regardless of risk or non-risk-significant status. If the component that fails causes the SSC to be unable to perform its intended function, an evaluation should be performed.

MPFF 287. **A cause determination is required for repetitive MPFFs of any SSC within the scope of the Maintenance Rule. Since maintenance work systems operate on a component basis, how do we know if a failure is to a component within the scope of the Maintenance Rule if we only determine scope at the system level?**

The loss of a train or system function is most often discovered by a failure to respond to a signal or command during operation and test or identified during inspection. Utilities may choose to expand or use existing Problem Incident Reports for identifying functional loss or system off normal conditions.

If a utility chooses to use the work order system it may be necessary to modify the data retrieval technique.

During review of the failure, it will be necessary to determine if the system/train function was lost. If a system/train function is lost, then a cause determination is required. Scoping at the system level implies all components within that system are also scoped unless a lower level review (i.e., component level) is performed.

MPFF 288. **If a solenoid operated valve (SOV) fails closed (and by being closed it is performing its function), the workshop panel said this is not a MPFF. What then is the implication for the reactor protection system, whose job is to protect the reactor and which fails safe? It would appear that failure of its inputs (Tavg, etc.) would not be MPFFs.**

If an SSC (SOV in this case) is designed to fail closed and by doing so performs its intended design function and the function of the system in which that SOV is located does not lose its ability to perform its intended function then the failure is not a MPFF. A failure of an SSC that is maintenance preventable and results in actuation of the RPS to shutdown the reactor is a MPFF because it tripped the plant. Conversely a failure of an SSC that prevented RPS from tripping would also be an MPFF on loss of RPS function.

MPFF 289. **Auxiliary feedwater pump seal leakage could cause the loss of pressure boundary integrity and would be a function scoped under the rule. Would seal failure be considered a functional failure?**

If the boundary function (i.e., pressure boundary integrity) is a function to be protected then a seal failure could be considered a functional failure. However, if the system function is to provide 500 gpm of flow and it produces 600 gpm, the seal could leak up to 100 gpm without being a functional failure. In most cases, it would have to be a catastrophic failure to result in a loss of function.

MPFF 290. **If SSC (risk significant) monitoring is established at the system level, and safety-related component fails within that system that does not cause a loss of a system safety function, do you have a MPFF?**

No.

MPFF 291. **When addressing a MPFF, should the "function" be defined at the system, train, or component level?**

That is a utility specific determination based on whether scoping has been established at the system/train level or the component level.

MPFF 292. **The NRC expressed the point of view that a component failure which causes the loss of a train's function is most likely a MPFF. If a component begins to degrade such that the train's function faces imminent loss, but plant personnel intervene and the train's function is not lost, has a MPFF occurred?**

No. Because no failure occurred. The purpose of maintenance is to prevent failures so the case you cited would be expected. Monitoring, testing and PM activities are all designed to intercede prior to failure.

MPFF 293. **What are the practical boundaries of the maintenance definition phrase " ... but extends to all supporting functions for the conduct of these activities."? Example: (a) A pump is tagged out to change the oil (pump is non ASME and non-safety); the pump auto start feature is rendered inoperable due to a tagging restoration personnel error; inoperable status is not known until next weekly surveillance. Is this a MPFF? (b) Is a parts problem a MPFF? If so, at what point or sequence in the process does it enter the MPFF classification?**

If the maintenance program is deficient and results in a functional loss as defined by criteria (b) of the rule, the loss of function is a MPFF.

(a) The tag-out error by operations personnel is not a MPFF.

(b) A parts availability problem is not a MPFF. However an incorrect part or assembly error could be an MPFF.

MPFF 294. **How much discretion does the utility have in describing the functional level for failures to be evaluated as potential MPFFs? For instance, a safety-related flow transmitter for AFW is in scope, if the transmitter fails, must this loss of indication be considered a "functional failure" even given redundant means of indication or alternative means of inferring flow?**

No. Instrumentation failures which do not fail the system or train within the scope of the rule would be considered as isolated component failures.

MPFF 295. **At Grand Gulf, who will determine MPFFs?**

The engineering department.

MPFF 296. **Do requirements of (a)(1) apply if a MPFF of a non-safety function occurs for a risk significant SSC? Example: The safety function of a MOV is to close. A failure to open occurs. The cause was failure of the torque switch. Should (a)(1) requirements be applied?**

In the example referenced above, goal setting is not required. However, if a SSC within the scope of the rule has a MPFF that causes that SSC not to be able to perform its intended function, then goal setting would be required.

MPFF 297. **How are MPFFs identified for standby systems that, during normal operation, the failure of the safety function is not intuitively obvious? How can the "top down" approach to the identification of MPFFs be effective for these systems?**

Standby systems (i.e., those not normally in continuous operation) are tested during surveillance (technical specification, ISI/IST) and during actual demand conditions. For example, the diesel generators (standby SSCs) would be demanded during a station blackout condition. It is during surveillance testing or actual demands that a MPFF will be discovered.

MPFF 298. **Does the Maintenance Rule require the determination of SSC scoping at the component level due to the need for future detection of MPFF and management?**

No. Utilities have been strongly encouraged to not scope at the component level. It is neither necessary nor desirable to identify all the components that, upon failure, cause the function to be lost. When the failure of a SSC within scope of the Maintenance Rule causes a loss of function the cause must be determined and appropriate corrective action taken. To implement the Maintenance Rule at the component level is unnecessary and is a waste of resources.

Regulatory Guide 1.160 states that *"The extent of monitoring may vary from system to system depending on the system's importance to risk. Some monitoring at the component level may be necessary; however, it is envisioned that most of the monitoring could be done at the plant, system, or train level."*

MPFF **299. If the performance criteria is on a train level and there are two MPFFs not related, is it necessary to go to (a)(1)?**

No. If the train or system level criteria is not exceeded. A documented cause determination and corrective action is needed, and evaluation of goal setting consideration may be appropriate.

MPFF **300. Under repetitive MPFF does this mean the same component?**

Either the same component or identical type component (i.e. 4" double disk gate valve).

MPFF means the loss of the function as specified in paragraph (b) of the rule and is generally indicated at the train and system level. Frequently, more than one component can cause the loss of function. A repetitive MPFF means the loss of the same train or system function attributable to the same cause. A component failure mechanism that could occur in different trains or systems should be evaluated for the potential for unacceptable generic impact.

MPFF 301. **If a MPFF or even repetitive MPFFs occurred but did not occur at such a frequency or cause unavailability time in excess of the performance criteria associated with the system, would it still be necessary to take action to prevent the failure? Concern: In some situations, the cost in plant resources and system unavailability associated with trying to prevent a MPFF may exceed the cost of allowing the component to be run to failure.**

Yes. If a MPFF or repetitive MPFFs occurs in a system within the scope of the rule, the guideline requires that appropriate corrective action be taken even if the performance criteria was not exceeded. It is unacceptable to allow a component to run to failure if that failure will cause the system/train to be incapable of performing its intended function. However, SSCs can be allowed to run to failure as long as the determination and documentation have been made prior to the failure.

MPFF 302. **Are common cause failures of multiple, identical, redundant equipment considered as repetitive failures? Otherwise such failures, though more important than two series failures, do not seem to get the extra attention they deserve.**

Yes. If a failure occurs in multiple, identical redundant equipment due to the same failure mechanism (e.g., of the same component) it is a repetitive failure.

Any cause determination should review the common cause failure probability and take the appropriate action.

MPFF 303. **Is there anything in the rule or guideline that makes it necessary to elevate to (a)(1) for common failures of similar equipment (MPFFs) in different trains/systems which in and of themselves do not cause the specific train/system criteria to be exceeded.**

A goal need not be established if cause determination and corrective action are determined to be effective. A utility should establish a goal to improve performance as needed.

MPFF **304. (a) Can a MPFF determination be limited to system level functions only?**

(b) How would safety-related instruments be handled when the failure of the instrument would not fail the system?

(c) Is providing information to operators a system function?

(d) Is the failure of an automatic function considered a Maintenance Rule functional failure if there is a manual or a backup function available?

(a) Yes. If the system cannot be subdivided into trains. If the highest level (system) is only considered, the individual train performance would not be captured.

(b) Instrumentation failures which do not fail the system or train function would be considered as isolated component failures. The individual component failure would need to be investigated under 10 CFR Part 50, Appendix B criteria.

(c) Yes. But the information provided may not meet the five scoping criteria in NUMARC 93-01, Section 8.

It should be noted that Regulatory Guide 1.97 does identify certain safe shutdown system functions for which the operator requires information.

(d) Yes. Unless specific credit has been taken in the accident analysis for the manual back up.

MPFF **305. The panel indicated that it did not expect many MPFFs and less repetitive MPFFs. Did the panel consider industry experience for repetitive MPFFs on the MPFFs that were identified?**

Yes. Industry experience (i.e., LERs) was reviewed; however, it could not be easily determined how many industry MPFFs there were. In the majority of the industry experience reports reviewed the determination of functional failure was not readily apparent.

MPFF 306. **Assuming a system/train incurred a MPFF, if the MPFF was corrected and the system/train unavailability was still within the unavailability performance criteria, would the system/train remain in (a)(2)?**

Yes.

MPFF 307. **Are maintenance personnel errors considered MPFF?**

Yes. Personnel errors associated with maintenance (e.g., component put in backwards, leads left off) could result in MPFF. This should be determined by evaluation for cause.

MPFF 308. **Will a functional failure that, upon root cause determination, is determined to be due to a human performance error within the maintenance program, be considered maintenance preventable? Example: maintenance performed on wrong component, maintenance performed incorrectly (wrong procedure) on correct component.**

Yes. Refer to examples provided in NUMARC 93-01, Section 9.4.5.

MPFF 309. **If an I&C tech using the correct procedure doing an Engineered Safeguard (ES) surveillance gets across the wrong terminals and causes an inadvertent ES actuation which exceeds a performance goal, is this a MPFF? (See workshop manual Section 10, page 2, bullet 3, vs. page 3, bullet 4.)**

The following conditions from the question are assumed:

- Correct procedure is being used.
- Procedure correctly identified terminals.

The I&C technician made a personnel error which would be classified as a MPFF.

Attention should be focused on correcting root cause. Goals and monitoring would be established only if the performance criteria are exceeded and the corrective action proved to be ineffective.

MPFF 310. **Is "personnel error" as the cause of a failure a MPFF?**

(a) **For instance, a mistake in a tag-out that mis-wires a control box and renders a pump inoperable?**

(b) **A security guard bumps a breaker to off and it is not discovered for two days, during which time the system in inoperable. Are these MPFFs?**

(a) Tag-out mistake - operational activities (i.e., tag-outs) are not maintenance related and therefore would not create an MPFF. Electrical mis-wiring by maintenance that result in functional failure would be an MPFF.

(b) Security guard - No.

Review the examples provided in NUMARC 93-01, Section 9.4.5.

MPFF 311. (a) **If a component failure occurs that is maintenance preventable however, it does not affect the train or system functional performance, is that a MPFF?**

(b) **At what level will/should we assess and determine "functional failures"? An example: we have two trains of salt water systems with three pumps. The third pump fails but does not affect system performance (or train) criteria. The normal maintenance process would assess this failure for corrective actions and generic implications. However, under the rule it appears that this will not be a "functional failure" and therefore would not be assessed as a MPFF.**

(a) No. A component failure that does not result in loss of a train or system function is not a MPFF within the context of the rule. If the utility is monitoring performance (i.e., performance criteria established) at the system or train level and a component fails but the system or train function is not lost, then there is no functional failure.

(b) A utility has the flexibility to assess functional failure at any SSC or train level. However, typically, functional failures will be determined at the train level and not the component level for risk significant safety systems. The third pump is considered to be a standby (i.e. redundant) component so demand failures are very important to identify and correct. Since the train function was not lost this is not an MPFF.

MPFF 312. **Is the MPFF classification solely limited to improperly performed maintenance? For example, if a manufacturer recommended a replacement interval for O-rings, and an engineering evaluation was performed which extended the interval and subsequently experienced a functional failure due to the failure of the O-ring (which would not have occurred had the O-ring been replaced within the manufacturer's recommended interval). Should that be classified as a MPFF?**

No. An engineering analysis or evaluation is appropriate when changing manufacturer suggested PM frequencies. If subsequent events (failures) indicates that those evaluations were not correct then the PM frequencies should be re-evaluated. The specific details will need to be evaluated by the utility and resolved.

MPFF 313. **Are failures of replacement equipment that fail considered a repetitive MPFF?**

Yes. If the failure cause of a replaced equipment is determined to be the same as that of the original equipment, then it should be considered a repetitive MPFF.

MPFF 314. **Is failure during a post-maintenance test considered as a possible MPFF?**

No. Any functional failures identified during post maintenance testing are not a MPFF (Reference NUMARC 93-01, page 34, "Examples That Are Not MPFFs") because the system has not been returned to service. However, it would require review and follow-up under the utility's Post Maintenance Test Programs.

MPFF 315. **Why do two MPFFs require going to (a)(1) if the performance criteria is still met?**

NUMARC 93-01, Section 9.4.4 states (on page 30 in part) "A cause determination of appropriate depth will be required for ... a repetitive MPFF of any SSC within the scope of the Maintenance Rule, even if the goal or performance criteria is met." A MPFF that has been determined as not significant to risk may be acceptable without goal setting (See NUMARC 93-01, Section 9.4.4, page 31). A repetitive MPFF must be evaluated to determine if it is risk significant, if continued loss of function is acceptable and to assure that corrective action implementation has been adequately resolved. A second or repetitive loss of function does not automatically require goal setting. The purpose of goal setting is to focus attention on the correction of unacceptable performance.

MPFF 316. **During the scoping process what are the data base limits to find repetitive failures?**

If a failure occurs, then the utility should review the data base for two previous cycles. It is recognized that at present most maintenance work histories may not have identified functional failure nor if the failure was a MPFF.

MPFF 317. **In the situation where there is a repetitive MPFF associated with different components but the same human error-related failure mechanism, how would you establish goals and monitoring associated with the failure mechanism and not a specific SSC?**

Corrective actions taken to prevent recurrence should address the root cause. In the example of the human performance related errors, corrective actions would be established to prevent recurrence and the existing monitoring processes would continue to be used.

MPFF 318. **Since NUMARC 93-01 requires that all repetitive failures be identified, a cause determination seems necessary each time a component failure causes loss of SSC function. If this is not done, an identical failure (i.e., same cause) that occurs later may not be tied to the previous cause. This bottom up approach seems to contradict the top down approach taken by some utilities. This is especially critical when failures occur in different systems that are common mode and therefore repetitive.**

The top down approach is to look at plant level or system loss of function and then do cause determination of the component. The bottom up approach looks at all component, failures to determine loss of plant level or system function. Which method or approach a utility selects is dependent on database structure and organizational approach. A strong monitoring program at the highest level would make the top down method easier to implement.

MPFF 319. (a) **If there is a repetitive failure of a component in a system that is not within the scope of the Maintenance Rule, what actions must be taken, if any?**

(b) **If the same component failure occurs in a system that is within the scope of the Maintenance Rule and one outside the scope of the Maintenance Rule, what actions are required?**

(a) No action is required under the Maintenance Rule. However, the failure should be evaluated and corrected under the existing utility maintenance program.

(b) If the component failure in the system within the scope of rule is determined to be a MPFF, appropriate action as described in NUMARC 93-01 should be taken.

The component failure in the system not within the scope of the rule does not require any action under the Maintenance Rule. However, appropriate cause determination and corrective action under the utilities existing maintenance program should be taken. If the failures on the in-scope and out-of-scope system are of the same component, it might be prudent for the utility to investigate that component throughout its facility for potential common mode failure.

MPFF 320. **An SSC has been placed in (a)(1) because of a repetitive MPFF (performance goals were never exceeded). Corrective action and goals are established. After two years the corrective actions have not been implemented, but system performance is acceptable. Can the system be recategorized as (a)(2)?**

Yes. Under the following conditions:

(1) Performance has been monitored for two or three surveillance intervals successfully.

(2) Evaluation performed on why corrective action is no longer required. In addition, the utility may question why the corrective action was never implemented.

(3) There have been no additional MPFFs.

MPFF 321. **If an identical sub-component, i.e., a specific vendor solenoid, is used in different applications on different type components on SSCs determined to be within the scope of the rule, has a functional failure, is the failure considered to be a repetitive MPFF?**

If the sub-component (solenoid) has a failure, then the cause determination should consider the generic applicability for other sub-components.

In this case, a second loss of function would be considered a repetitive failure if the failure was due to the same maintenance related cause on the same or identical type component.

MPFF 322. **In NUMARC 93-01, Section 9.3.4, the wording of the last condition (third bullet) is ambiguous: "A MPFF continues to be repetitive...," and can be interpreted as three failures. First failure plus second failure equals repetitive failure, A repetitive failure plus one more = MPFF continues to be repetitive.**

The first MPFF is a initial and the second MPFF (same cause) is a repetitive. The guideline will be revised to delete the word continues.

MPFF 323. **If there are multiple failures (MPFFs) of similar components across system boundaries resulting in a plant-level performance criteria not being met, how do you address goal setting and monitoring for a pool of components? Examples of this are flow transmitters and motor-operated valves.**

If the same type components (e.g. all flow transmitters) experience multiple functional failure they could have a goal established on a group basis and be monitored independently of the actual system that they are in. For example, motor-operated valves (MOVs) could be in sixty different systems, but a "pseudo" system could be established for MOVs and goals established independently of the sixty systems.

MPFF 324. **Why does a repetitive MPFF require goal setting when the performance criteria have been met?**

NUMARC 93-01, Section 9.4.4, page 30, paragraph 2, requires cause determination for repetitive MPFFs. "The cause determination should identify...whether or not the SSC requires (a)(1) goal setting and monitoring."

Repetitive MPFFs could indicate that the maintenance program and/or the cause determination and corrective action program is ineffective even though the performance criteria has been met.

MPFF 325. **If a failure occurs on pump A and the same failure on pump B, both being initial failures due to design deficiency, does that constitute MPFF?**

Yes. This is assuming that the time interval between the A & B failure was sufficient to correct the problem identified from A to be applied to pump B.

MPFF 326. **Repetitive failure was defined in the workshop as the same cause on similar components. Does this mean that if a system (say HPCI) fails three different times from three different MPFFs that I don't have to count this as a repetitive failure per the Maintenance Rule?**

Yes. This is assuming the three failures were due to different causes.

MPFF 327. **If a failure occurs a second time prior to implementing a design change, does that constitute a MPFF?**

Yes. It is considered a MPFF even though the corrective action is planned a sufficient time has occurred to make changes to prevent recurrences. A goal of increasing the mean time between failure may be appropriate or if the impact of failure is acceptable a goal may not be needed.

MPFF 328. **The loss of a component required in the EOPs may not be discovered for some time. What is considered to be timely to discover and take corrective action?**

The guideline does not address acceptable frequency for detecting failures, but monitoring should be based on the significance of the SSC. Corrective action timeliness should also be based on significance of the SSC.

If you establish the number of acceptable failures over a certain amount of time, the time frame established in the performance criteria would be considered timely.

A surveillance test of an appropriate frequency should be considered.

MPFF 329. **In NUMARC 93-01, Sections 9.3.2, 9.3.3, and 9.3.4, it appears that if the cause is known and corrective action was implemented, a goal is not needed for a MPFF that causes a performance criteria to be exceeded, assuming the MPFF is not repetitive. In that case, the SSC will remain in (a)(2) and continue to be monitored against the performance criteria. Is that correct?**

Yes.

MPFF 330. **If a MPFF occurs on one unit of a multi-unit site and then the other unit experiences a MPFF on the same component type due to the same cause, is this considered a repetitive MPFF?**

No, if the maintenance programs are independently managed at each unit.

Yes, if the following assumptions apply:

1. There is only one maintenance program which covers all units at the site.

2. There has been enough time since the first failure to take appropriate corrective action in the other unit(s).

MPFF 331. **An issue was raised at a conference between utilities and NRC regarding erosion/corrosion programs and MPFFs. The issue indicates that "if an extraction steam pipe fell below the code allowed minimum wall thickness during an operating cycle, but pressure boundary integrity was maintained, at more than one point in the system, a MPFF has occurred. We do not feel that a MPFF occurs in this scenario unless pressure boundary integrity and, hence, system function, is compromised.**

This is correct. A MPFF did not occur in this scenario. Erosion/corrosion that causes SSCs within the scope of the rule to fall below design criteria but do not result in a functional failure is a violation of design criteria and should be evaluated and addressed in accordance with code requirements. If a function within the scope of the Maintenance Rule was lost due to erosion/corrosion, i.e., loss of pressure boundary, the loss of the function is considered a MPFF and would be addressed in accordance with NUMARC 93-01, Section 9.4.4.

MPFF 332. **Knowing that it is not necessary to pose hypothetical failures, why would a pipe rupture in the extraction steam piping for erosion/corrosion reasons be a MPFF?**

If a loss of function of any SSC within the scope of the rule occurs that is maintenance preventable, it is a MPFF when it occurs. If a utility is aware of the vulnerability to lose a function of an SSC within the scope of the rule (assume a PRA analysis, Appendix R analysis, or industry experience previously determined applicable) a functional failure could be determined to be preventable by a maintenance activity.

MPFF 333. **Erosion/corrosion could be considered a MPFF. If there is a repeat failure, would it be repetitive if there was a plan to replace or redesign the defective pipe?**

The failure is repetitive but goal setting may not be required due to the corrective action solution. Planned replacement should consider the consequences of an additional failure. If a failure recurs and a function was lost it should be considered as a repetitive MPFF.

Erosion/corrosion failures are MPFFs for those SSCs within the scope of the rule if the function (i.e., pressure boundary) is lost.

MPFF 334. **If there is a repetitive MPFF due to erosion/corrosion (EC) problems and it is different systems, would this be subject to placing similar systems with EC problems in the (a)(1) category?**

If there are indications that the erosion/corrosion program is ineffective, then the affected SSCs should be placed in (a)(1) and goal setting and monitoring established for them.

MPFF 335. **In NUMARC 93-01, the examples of MPFFs illustrated in the table on page 33, next to last bullet, the following statement is made: *"Failures of the same kind occurring at a utility that have occurred in industry as defined by industrywide operating experience that could have been precluded by an appropriate and timely maintenance activity."* Is this meant to imply that if a design (or other non maintenance) caused failure occurs elsewhere and you do not take proper action to prevent a similar failure at your plant, that failure then becomes a MPFF for your plant?**

No. The industrywide operating experience failure must have also been a MPFF. The implementation of an IOE program is expected to preclude recurrence of similar events.

MPFF 336. **In the workshop presentation on identifying MPFFs, it was stated that "failures of the same kind occurring at another utility that have occurred in the industry as defined by industrywide operating experience ...". The question is, are the major NRC Information Notices, INPO's SOERs, Part 21 notices, etc. sufficient enough as monitored by a utility to identify industrywide MPFFs, or does a utility have to monitor individual NPRDS failures against like SSCs in their plant?**

Existing industry experience reports should be wide ranging enough to determine an industry problem. It is not necessary to monitor NPRDS failures.

MPFF 337. **If an initial MPFF occurs at a plant should it be classified as a repetitive MPFF because a similar event has occurred at another plant?**

No. Industry experience may result in a MPFF at your plant but cannot result in a repetitive MPFF. A repetitive MPFF implies that the utilities corrective actions have been ineffective. The repetitive MPFF should convey to utility management the need to improve corrective action effectiveness and therefore should be reserved for actual repetitive events at individual facilities.

MPFF 338. **If there are two independent MPFFs and corrective action taken on each, but the two failures cause the train or system performance criteria to be exceeded, would you still be required to set a goal and move the train/system to (a)(1)?**

The documented cause determination and evaluation of goal setting would determine if moving the train/system to (a)(1) is necessary. See NUMARC 93-01, Section 9.3.4.

However, repetitive loss of a risk significant function due to MPFFs could call into question the overall effectiveness of the maintenance program and should be addressed.

MPFF 339. **Relating to industry issues and determination of repetitive MPFFs -- this is an opinion, not a question. In the main workshop session on August 24, it was stated that at Plant #1, packing was replaced on the auxiliary feed pump, too many rings were installed, subsequent failure occurred. Investigation revealed that vendor instructions were inadequate, vendor provided guidance, documentation updated, pump repacked satisfactorily, industry notified. Plant #2 same occurrence as Plant #1. Investigation reveals inadequate documentation from vendor. My recommended position is that Plant #1 is not a MPFF, due to document deficiency from vendor. Plant #2 is a MPFF because industry was notified. Plant #2 MPFF is not repetitive failure, but the first from that cause. Hopefully corrective actions would prevent a second MPFF at Plant #2. As stated in the session, Plant #2 failure was repetitive. I would endorse a position that Plants #3 to X would have to consider the two failures, one at Plant #1 and one at Plant #2, as repetitive and put their pumps into the (a)(1) category.**

This is a good example of the decisions a utility will have to consider however the conclusion is wrong. The following summarizes the assumptions:

Plant #1 had failure. Cause was inadequate vendor instructions. Failure was not MPFF because not maintenance preventable.

For all remaining plants at which the failure occurs (for the first time) it would be considered a MPFF, but not repetitive. Industry events (initial or repetitive MPFFs) should not cause a plant which has not experienced the failure to establish goals under (a)(1).

MPFF 340. **Workshop examples of NUMARC 93-01, Section 9.3.4 under Tab 8, page 4, do not meet the definition in the guideline of a MPFF. Why were they cited as examples? Note: Neither example caused loss of the SSC function.**

The examples provided during the workshop in Tab 8, page 4, which covered Section 9.3.4 were not intended to demonstrate MPFFs. They were presented as cases to be evaluated to determine if they were MPFF's.

The following examples were provided during the workshop:

- *A MPFF continued to be repetitive following the corrective action*
  - *It should be made clear that a repetitive failure (for instance at the component level) which does not violate higher-level performance criteria (e.g., loss of safety function at the plant, system, or train level, etc.) does not require goal setting.*
- *Examples*
  - *A service air compressor fails repetitively but does not inhibit the safety-related isolation function. In this case, goal setting is not required.*
  - *Hand wheel to an MOV was mis-assembled twice; safety operation is for the motor to close the valve.*

MPFF 341. **If a piece of maintenance and test equipment goes out of calibration would it be considered a MPFF?**

The fact that a piece of maintenance and test equipment was found to be out of calibration is not in and of itself a MPFF.

However, if a piece of maintenance and test equipment goes out of calibration and is used to repair or calibrate an SSC within the scope of the rule and subsequently the SSC fails as a direct cause of the out of calibration equipment, it would be considered a MPFF.

MPFF 342. **Have any V&V plants considered how motor-operated valve testing will be applied under the Maintenance Rule with respect to MPFFs and performance criteria?**

NUMARC 93-02 (V&V Report), Section 7, reflects the treatment of MOVs under the Maintenance Rule by one V&V participant.

MPFF 343. **When (a)(2) equipment is found to be out of tolerance or inoperable during a refueling cycle due to a MPFF but did not cause the function to fail during operation, is this a MPFF?**

No. It must be maintenance preventable and an actual loss of system function and not just an out of tolerance condition. SSCs that are in operation would be detected if there was a functional failure however standby system functional failures may not be identified except during surveillance testing or an outage.

MPFF 344. **It was indicated that design failures are outside the scope of the Maintenance Rule. Is the establishment of the maintenance program including frequency, methods, testing, PM replacements, lubrications, etc., part of the design or part of the maintenance-related aspect of a MPFF?**

Those activities identified in the question are maintenance activities and not design activities. Therefore any failures (after cause determination) would be a MPFF.

MPFF 345. **Pressure relief valves that fail -- would these failures be considered a MPFF?**

If the pressure relief valve is in a system within the scope of the rule and its failure meets any of the criteria of NUMARC 93-01, Section 8, and the failure was due to maintenance, it would be considered a MPFF. If it was due to maintenance and did not result in loss of function, then a MPFF has not occurred. If the failure was due to design, it is not a MPFF.

MPFF 346. **In NUMARC 93-01, page 34, does the second bullet on "Examples that are not MPFFs" mean that procurement is excluded from "Big M"? Note: The answer that they are excluded seems to make sense from the equivalency evaluation standpoint. If availability is a goal, it may still cause problems if parts cannot be obtained.**

The example referenced is a design inadequacy and not a procurement deficiency.

Parts availability is not a MPFF, but as indicated in the statement it could be established by a cause determination to impact availability. If parts availability affected a performance criteria, corrective action is needed.

The application and use of an incorrect part (not part supplier causes) or incorrect assembly of a part could result in an MPFF.

The activities that are appropriate to assure acceptable procurement of SSCs would require evaluation on a case-by-case basis. Procurement activities do support maintenance and are part of big M.

MPFF 347. **Maintenance programs have, in some instances, been re-engineered and procedures re-written to reflect good (intended) engineering. If failures occur traceable to re-engineering, is this a MPFF?**

Yes. If the re-engineering in some way affected the maintenance of the system, train or component.

MPFF 348. **Has the impact on the traditional "rework" performance indicator been discussed? Assuming that rework is defined as repeat maintenance (within 9 months) to correct a deficiency following a completed maintenance activity, it would appear that certain "rework" could be determined to be a MPFF. Should rework be redefined to not include MPFFs? With the Maintenance Rule, is there a need for rework identification and trending?**

The use of rework as a performance indicator of the effectiveness of the maintenance process is a utility decision. The value of rework identification and trending is a utility specific decision not addressed in the guideline. If rework indicates a repetitive, functional failure within the scope of the Maintenance Rule, goal setting should be considered. No redefinition of rework is needed.

MPFF 349. **Is a failure, such as setpoint drift high of a pressure safety valve (PSV), that does not affect system function considered a MPFF?**

No. There are many instances where setpoint drift can occur and may be perceived as a failure but does not affect system function. Other examples include vibration, pump head curve, flow, and other parameters that monitor performance. It was for this very reason that the concept of functional failure was introduced in the guideline document. There are also other failures (broadest definition) which do not affect function such as the need to correct corrosion, leakage etc.

MPFF 350. **Please provide more details on how you are going to track and identify MPFFs through the work order process?**

This is a decision that must be made by each individual facility based on how they conduct business and their data base capabilities.

Some utilities may add a data field to the work order indicating loss of function and cause (i.e., MPFF). Other utilities could use their problem report tracking system for monitoring purposes.

MPFF 351. **Are SSC failures due to aging considered a MPFF and if not, why not?**

SSC failures, due to aging, can be considered a MPFF. The function would have to be lost because of the failure due to aging before it is a MPFF.

MPFF 352. **Would an alert condition under ASME XI, IWP or IWV, where an advance performance trend has been detected, constitute a functional failure?**

No. An alert level would not constitute a functional failure but a required action level would. For example: A valve is assumed to close in ten seconds in the accident analysis, when the closure time exceeds ten seconds it should be evaluated for a functional failure.

MPFF 353. **Do infant failures of new replacement electronic piece parts have the same MPFF exclusion criteria as infant failures of new original equipment manufacturer (OEM) electronic piece parts?**

Yes.

MPFF 354. **The flow chart for determining if a failure is a MPFF says if an inherently reliable SSC has an "MPFF", you simply reclassify. Does this mean an inherently reliable component can't have a MPFF?**

No. The characterization of an SSC as inherently reliable means that it is considered highly reliable and is not expected to fail even though maintenance is minimal or not performed. Since NDE, inspection and test are performed (and considered maintenance activities in the broad sense) on many SSCs, little equipment and no systems are expected to be inherently reliable.

MPFF 355. **During refueling cycle reviews of MPFFs, is it suggested that a team review those items identified as MPFFs by system engineers to ensure treatment under (a)(1) and goal setting as needed?**

The personnel involved to review MPFF or other aspects of the Maintenance Rule is utility specific. In some cases a team may be appropriate to perform the data reviews.

MPFF 356. **Regulatory Guide 1.160 for the EDG example references a "rolling one-year basis" for a performance monitoring period and the phrase "second" MPFF for consideration to establish goal setting. Respectively, these items are prescriptive and inconsistent when compared to NUMARC 93-01. Was this an intentional application to the diesels? If yes, please provide the rationale.**

Yes. The treatment of the EDG recognizes that licensee programs as indicated by licensing commitments continue in parallel with the Maintenance Rule requirements. Based on V&V experience risk significant SSCs are likely to be monitored from both a reliability and availability standpoint. It is expected that utilities will determine the EDG to be risk significant and under the guideline recommendations, monitor unavailability in accordance with PRA assumptions submitted in response to GL 88-20 and monitor reliability in accordance with docketed commitments in response to the SBO rule. This expectation is consistent with establishing goals and performance monitoring for other risk significant SSCs. See NUMARC 93-01, Section 9.3.2, page 23, next to last paragraph and Section 9.4, pages 25 and 26.

MPFF 357. **What is the advantage to not moving into (a)(1) if you have a MPFF, but the established performance criteria is not exceeded if monitoring and root cause analysis, etc., are performed anyway to prevent repeat failures? Example: Components/parts same in non-safety-related systems components within scope. Don't track then when similar failure occurs in SSCs.**

Advantages of not dispositioning an SSC to (a)(1) include the reduction of the bookkeeping burden and assuring management attention is not unnecessarily diluted. However, if an SSC should receive additional management attention, it is appropriate to disposition the SSC to (a)(1) and establish a goal.

MPFF 358. **Is INPO going to flag experience items that are going to become a repetitive MPFF if it occurs at your facility following notification?**

Any additional effort by INPO or EPRI will be continually evaluated. It is too early in the implementation phase of the Maintenance Rule to identify any action. Lessons learned and problems encountered will be factored in support initiatives which will be undertaken by INPO.

There are no current plans to flag MPFFs in NPRDS. Based upon extensive feedback from a wide range of industry personnel, there is no sufficient industry interest in adding such a flag to NPRDS.

MPFF 359. **Is there any benefit to having unitized maintenance to prevent other systems/trains in other units from being impacted by repetitive MPFFs in one unit?**

Unitized maintenance (multi-unit sites) should be justified on its own merits and not for compliance with the Maintenance Rule. The present organizational structure and program implementation is sufficient to manage the Maintenance Rule.

OOS 360. **In the definition of unavailability it states that a system is unavailable if it requires a response from human action. Often during the performance of surveillance testing, equipment is inoperable but up and running to perform the surveillance test, and all that would be required to make it operable is movement of a switch. This is consistent with the INPO guidance. Therefore, under the Maintenance Rule it should be allowed to assume the system is available.**

The utility should define its basis for calculating unavailability and be consistent with its current practices and assumptions in PRA application. If the PRA assumed no operator action then unavailability times should also be based on the same assumption. If an operator action is allowed, it is expected that the operator action is included in the procedure.

OOS 361. **Do the utilities represented on the workshop panel intend to rely on equipment out-of-service (technical specification action statements, operability calls) as defining when functions are lost and regained?**

In general, the answer is yes. Most utilities rely on the equipment tag out system (i.e., red tag, etc.) or control room logs (i.e., technical specification, out-of-service, etc.) to identify when a system is not available and, therefore, the function is not available.

There are cases when a system is not tagged out but surveillances can be performed without losing the system function. In those cases (sampling for oil analysis, vibration analysis, etc.) the system function would not be lost and the system is assumed to be available. This example could also be extended to those instances when operator action is preplanned to maintain system availability. For example, an operator may be stationed to close a breaker or open a valve to maintain system availability.

OOS 362. **Emphasis on availability may promote not taking things out-of-service to correct material condition. Availability performance criteria need to be set to allow time for this type of maintenance.**

This question identifies two key concepts that utilities should address:

- Availability times used for performance criteria should carefully consider maintenance activities (i.e., PMs) necessary to assure acceptable performance. Eliminations or additions of PM activities without technical justification is inappropriate.

- Adjustments to maintenance where necessary to ensure failure prevention should be appropriately balanced against system availability.

OOS 363. **Where is the line drawn on taking equipment out-of-service during power operation in relation to core damage frequency?**

A utility specific judgment based on a case-by-case evaluation is appropriate.

OOS 364. **How can unavailability be measured when only auto initiation functions are out-of-service (level initiation of HPCS is OOS but pump would manually start and perform desired function)? How can HPCS availability be measured when only the room coolers or switch gear heat removal is OOS?**

This will depend on the utilities definition of operability. While from a technical specification (operability) perspective the system is OOS if the support function (i.e. room coolers, etc.) are not available for the Maintenance Rule, the system would be available. Operability and availability are related but they are not identical.

It is the function of the SSC to perform regardless of what initiates the action or support function. If the automatic actuation or support function is lost, the station must perform compensatory actions including recovery of the auto function/support function. A compensatory action could include having an equipment operator available to open a valve or close a breaker. The OOS time should be documented consistent with utilities data trending practices.

OOS 365. **Is it implied that each and every time equipment is taken out-of-service on a daily basis that each individual change of equipment be documented to demonstrate the assessment was completed?**

Yes. The focus is on the function that is being lost by removal of equipment from service.

The intent is to use those methods and programs currently being utilized (i.e., work order, control room logs, scheduled outage, etc.) to document removal of equipment from service. Engineering evaluations (i.e., PRA) are also acceptable methods to demonstrate that the utility understands and finds acceptable the risk associated with removal of equipment from service. The intent of the maintenance rule is not to reduce the flexibility to manage plant operation but to assure awareness of risk associated with the loss of important functions that result from removing multiple systems or trains from service.

OOS 366. **If there is a predetermined acceptable plant system configuration, is it necessary to document evaluations for taking equipment out-of-service?**

If there is a process (i.e., administrative or operation instructions) to ensure that the predetermined envelope is reviewed prior to each activity involving removal of equipment from service, then additional documentation is not required.

OOS 367. **What kind of documentation of evaluating equipment out-of-service is recommended, can a rolling schedule be analyzed or is it necessary to evaluate each time equipment is taken out-of-service?**

A rolling schedule review should be supplemented with a review of SSCs out-of-service at the time the additional SSC is being removed from service to assure that the plant equipment status is known at the time of removal.

OOS 368. **What considerations have been given to taking a system OOS for technical specification surveillance when required if a risk significance has been identified between 2 systems and the second system is already out-of-service for maintenance (CM)? Is regulatory relief under these circumstances acceptable?**

If regulatory relief is the appropriate action to take (assumes systems out-of-service cannot be rescheduled and justification for continued operation is appropriate), regulatory relief should be sought. However, technical specifications allow some margin for performing surveillances that does not require regulatory relief.

OOS 369. **NUMARC 93-01, Section 11.2.3, recommends evaluation of removing equipment from service for planned maintenance to minimize compromising safety functions. Slide 6 states, "Implied resolution would be that the elective activity would be deferred until plant mode or conditions allow performance without safety function compromise." There is no discussion of the risk associated with deferring a PM task. Example: Oil analysis reveals metal shavings in a turbine driven auxiliary feed pump bearing. A planned activity to inspect the bearing is prepared. In NUMARC 93-01, as published, the activity could be deferred without considering the risk of a failure of the bearing. Can a statement be added to the guideline that addresses the risk of deferring planned maintenance?**

The decision to defer an activity has to take into consideration the consequence of the deferral. If the PM activity is truly "elective", then it can be deferred if the present plant configuration indicates that the elective activity will increase risk. The risk associated with deferring a PM task should be included in your PM program and additional guidance is unnecessary. The final decision is based on many variable that occurs at the time of the decision.

PERASS 370. **NUMARC 93-01, page iv, footnote 5, says that the periodic assessment should be done within a three-month period following a refueling cycle. However, the examples given indicate that a variety of cycles can be used, such as a rolling one-year average, assessment by system each three surveillance intervals, etc. For a multi-unit site, it would make sense to evaluate both units together at the same time (i.e., mid-cycle for both units) instead of during a high-load work period, such as during or immediately following a refueling cycle. What is the purpose of NUMARC 93-01, page iv, footnote 5?**

The purpose of the footnote was to provide clarity on what time frame utilities could use to perform the periodic assessment. The three months allowed after a refueling outage was to provide utilities a period of time to collect and analyze data for use the assessment. However, the assessment period by regulation covers one refueling cycle, but not to exceed 24 months.

There is a difference in the periodic assessment time frame which has been established as every refueling cycle not to exceed 24 months and the performance monitoring interval which could be a rolling one year. There is a difference in the time frame for the following activities:

- Periodic assessment (Executive Summary and Section 12) which is every refueling cycle not to exceed 24 months. The periodic assessment of a refueling cycle should be a full cycle of operation and refueling. The rule or guideline does not limit the review to a single cycle. A utility could assess performance from the middle of one refueling cycle to the middle of a following fuel cycle. The assessment must cover at least a full refueling cycle.

- Section 9.4.3, dispositioning SSCs from (a)(1) to (a)(2), which could be acceptable performance for three surveillance cycles for surveillance periodicity is equal to or less than six months or two successive surveillances where periodicity is greater than six months.

- Section 9.4.2, which discusses monitoring SSC performance, indicates that assessments could be done on the established surveillance frequency or on a rolling one year average basis for goals.

The inclusion of a refueling cycle was based on the conduct of many surveillance tests during a refueling cycle. If a complete cycle was not evaluated, it would be possible to show the data and not have a clear picture of performance.

PERASS 371. **Would it be acceptable for non-risk-significant operating systems (i.e., plant-level criteria) to merely look at those SSCs which caused a scram or safety system actuation (SSA) over the periodic review period and not look at any other SSC failures?**

Yes. Assuming the SSCs failure could effect the plant level criteria. Utilities are required to investigate trips and SSAs so the analysis and review is an ongoing process. The utility could review each incident and determine if a trend is developing and prevent reaching the performance criteria or exceeding the goal. For those utilities which have few or no trips or SSA, a look at the periodic assessment is appropriate.

PERASS 372. **For the two-year review, do you have to go deeper than the plant-level performance criteria?**

Evaluations in depth do not need to be performed on non-risk-significant operating systems unless you exceeded the plant-level goal. Performance assessment of other SSCs should be at a depth that is consistent with the performance criteria established (e.g., scrams per 7000 hours of operation, availability, reliability, or condition).

PERASS 373. **Would the periodic assessment for non-risk-significant operating (i.e., plant-level criteria) SSCs be required to include the following: verification that no goals exceeded; review of all MPFFs for repetitive MPFFs; review of all scrams/SSAs?**

Yes. This should be an overview of previous actions and should not require detailed analysis. The data availability rather than the content will be the deciding factor on how long the periodic assessment should take.

PERASS 374. **Does the periodic assessment to be performed every refueling period (not to exceed 24 months) include a 25% allowance as provided for TS surveillances? Is the 24-month criteria based on the given day the activity was last performed or the month in which it was done (i.e., May 1,1993 to May 10, 1994, okay or not)?**

No. The Maintenance Rule does not include a 25% allowance. The refueling cycle (not to exceed 24 months) allows some time for collection of information. For example, refueling cycle completed August 15, 1996 and the following refueling cycle completed October 20, 1997, the utility would have three months from October 20, 1997, to complete the periodic assessment. The assessment period should be based on the month.

PERASS 375. **How set is the guideline for three months allowed after a refueling cycle for the periodic assessment? This would tend to hurt the ability to assess multi-unit plant sites as one maintenance program assessment.**

The issued regulations requires the periodic evaluation be performed each refueling cycles (i.e. 12, 18, 24 months). Multi-unit sites can be assessed at a frequency more frequent than the rule requirement but not less often than a refueling cycle or 24 months. The three months to gather and analyze data is fixed regardless of the refueling cycle length.

PERASS 376. **The example in NUMARC 93-01, Section 12.2.2, implies moving a system from (a)(2) to (a)(1) during the periodic assessment. This should be done during the ongoing evaluation. What is done during the periodic assessment, is it a summary or is it reevaluating performance?**

Many of the SSCs can be moved to (a)(2) or (a)(1) during the ongoing evaluation. However, those surveillances which are done on a refueling cycle basis should be factored into the periodic assessment and could result in goal adjustments during the periodic assessment. Additional guidance on elements in the periodic assessment is provided in NUMARC 93-01, Section 12.0.

PERASS 377. **Will it be acceptable to conduct the periodic review on a rolling schedule over a cycle or 24-month period? All systems under the scope of the rule would be reviewed over the course of 24 months.**

Yes. The Maintenance Rule's intent is to monitor maintenance effectiveness and this could be done in a continuous (i.e. rolling schedule) process as effectively as a one time effort at each refueling. The elements of the periodic assessment should be identified and a process developed to conduct the periodic assessment on a rolling schedule.

PERASS 378. **Can the periodic assessment period run from beginning of refueling to beginning of refueling?**

Yes. The guideline does not specify a start time, only that it be on a periodic basis (assumed refueling) not to exceed 24 months.

PERASS 379. **Will formal assessment of the NPRDS-CFAR report or other "industry reports" be required by the OE or periodic assessment requirements of the guideline?**

No. Each utility should use appropriate information that aids in the development of effective problem resolution and effective performance. The use of specific sources is not required by the rule.

PERASS 380. **At multi-unit sites, do the workshop panel participants plan to conduct combined unit evaluations and if so, do both units need to have a refueling activity included in the evaluation window?**

Combined unit evaluations are not required. Comparison of mirror image units by the utility can provide a larger data base from which to draw conclusions. Each unit's refueling activity should be considered in its own refueling cycle. In addition, it is not required that a refueling cycle be included. This could occur if a unit was shut down for an extended period and the 24 month requirement was applicable.

PERASS 381. **Does the periodic assessment require that risk significance of systems be re-evaluated due to design changes?**

Modifications of the plant design could affect the level of risk significance for SSCs as well as the number of risk significant SSCs or whether or not a SSC must be added to or would be deleted from the scope of the rule. The effect of design changes should be considered as the design is finalized and is not driven by the periodic assessment.

PERASS 382. **Can periodic reports of core melt frequency and challenges to containment integrity be used to demonstrate that the process is adequately fulfilling this aspect of the rule?**

Periodic reports of core melt frequency would be helpful to demonstrate past acceptability of protecting the health and safety of the public but may not meet the intent of the guideline. If periodic reports of core melt frequency means a re-run of the PRA model based on actual plant operating experience, then it may be possible to extract sufficient information from that report to meet the intent of the guideline for specific SSCs modeled in the PRA. Core melt frequency reports could be an excellent overview but may not provide details on goals, repetitive MPFFs, etc.

PERASS 383. **Per the Maintenance Rule, does every preventive maintenance work order need to reference a written basis as to why the PM action optimizes availability and reliability (whether or not the PM takes a system or train inoperable)? Would NUMARC 93-01, Section 12.2.4, require this for risk significant systems? (Note: I believe this question is important due to the regulatory/compliance aspects of the rule. This needs to be agreed upon beforehand by the NRC and utilities. This is a key cost and manpower question. This question prompted a lot of verbal discussion. The NRC said, "Well, wouldn't you want to know?" Of course, that would be prudent. One of the panelists finally said that a written, formalized assessment would not be necessary in many of the cases cited above. Unclear if NRC entirely concurred.**

No. The Maintenance Rule requires that utilities balance the risk of unavailability of SSCs out-of-service with the need to perform preventive maintenance activities. The Maintenance Rule requires that the results of simultaneously removing multiple SSCs from service must be considered.

DOC 384. **Why is it important to document moving systems from (a)(2) to (a)(1)?**

The fact that an SSC is being considered for dispositioning to (a)(1) implies two things. The first is that present performance is unacceptable and second is that a goal should be established. The documentation of those two determinations (unacceptable performance basis, goal establishment) should be made to identify the specific cause and corrective action that is planned to improve specific SSC performance to an acceptable level and revise the corrective action if necessary.

DOC 385. **Did the V&V participants decide/discuss what level of plant documentation the scoping, performance criteria, risk significance, etc. would be?**

The documentation for scoping, performance criteria, risk significance, etc., could be captured in a matrix approach as explained in NUMARC 93-02 (V&V Report), Section 5.2.14.1. Examples are also provided in Tables 2-6 through 2-40 of NUMARC 93-02. The documentation should be sufficient to support decisions made to comply with the Maintenance Rule.

DOC 386. **What level of documentation of the SSC review should be maintained to show compliance with the Maintenance Rule? Is a yes/no table for each SSC sufficient, or is a more detailed documentation process required?**

Tables 2-6 through 2-40 in NUMARC 93-02 indicate that most information can be displayed by a simple yes/no. In addition, references can be made to other databases of records (i.e., PRA report, Q-List, etc.). There will be some areas where text description would be appropriate. The main reason for any documentation is to ensure the utility can reconstruct the basis and decisions made on scoping, risk significant, etc., and not rely on corporate memory.

DOC 387. **What documentation is required for the assessment for removal of SSCs from service?**

The V&V participants did not identify a universal or common method for documenting removal of SSCs from service. Several examples are provided in Appendix B, "Sample Approaches for Controlling the Removal of SSCs from Service," in NUMARC 93-02.

DOC 388. **Is trending of SSCs required at the component level to meet Maintenance Rule documentation requirements?**

No. Monitoring of functional performance consistent with NUMARC 93-01, Section 9.4.2 is expected.

DOC 389. **After an SSC has been moved from (a)(2) to (a)(1), how is this documented? How is this presented to upper management?**

Since the reason for goal setting is to focus attention to correct unacceptable performance, the documentation of the performance goals should occur at the time of the determination. Management notification should be in accordance with utility administrative controls. The format could also be handled in the same way that INPO performance monitoring is presented to station management.

DOC 390. **Is any of the documentation subject to NRC review?**

Yes. The NRC, as part of the inspection effort, may review the utilities documentation on site. The NRC is not expecting report submittals nor do they provide program approvals for the Maintenance Rule.

DOC 391. **Is the refueling interval assessment report to be routed to the NRC as a formal report or as an internal tool only, that is available to NRC upon request?**

No, a formal report does not have to be routed to the NRC. The utility's periodic assessment (refueling) should be available for NRC review on site.

GUIDE 392. **Are there any plans to update NUMARC 93-01 as a result of questions & problems noted in the workshops?**

Yes. The guideline will be updated as long as the need for clarification exists.

DOC 393. **On page 22 of NUMARC 93-01, in the last paragraph , it indicates that in the event of a failure of a "normally operating" non-risk-significant SSC, a cause determination is required to evaluate whether a goal is required. Section 9.4.4 does not mention that requirement. I suggest that the second sentence in the last paragraph on page 22 be reworded to state: "In the event a plant-level performance criteria is not met, a cause determination will be conducted and a decision made ... etc." (i.e., delete "failure to one of these SSCs or") Otherwise, the utility will be forced to do cause determinations every time a normally operating SSC fails.**

The guideline document will be reviewed for wording clarifications.

GUIDE 394. **How will NUMARC attain more consistent definitions between initiatives in the future? NUMARC 91-06 on shutdown safety discusses critical safety functions whereas NUMARC 93-01 now also uses key safety functions. Can we change NUMARC 93-01 to be consistent?**

The intent is the same. No change is planned.

GUIDE 395. **Are examples in the guideline from V&V participants or some other source?**

Examples are from both V&V participants and other utilities that participated in the development of the guideline.

GUIDE 396. **Can participants get some or all of NUMARC 93-01 and other Maintenance Rule documents on electronic media?**

Yes.

NRC 397. **The NRC stated that the "erosion/corrosion" program should be considered to be in the scope of the rule due to a significant event last year at Sequoyah with a rupture of a heater drain line. Does your answer mean that not only are SSCs within the rule scope, but also other programs, like erosion/corrosion?**

Programs are not in scope only SSCs and performance is. The Maintenance Rule addresses functions to be assured that are important to health and safety of the public in accordance with paragraph (b) of the rule. A first failure of a SSC within the scope of the Maintenance Rule due to erosion/corrosion would require an effective cause determination and corrective action. A second failure of the same kind would require goal setting and monitoring and the need to address the effectiveness of the corrective actions.

NRC 398. **Does the NRC agree with going back only two cycles to look for events under NUMARC 93-01, Sections 8.2.1.4 and 8.2.1.5?**

Yes. The guideline will be amplified to reflect a look back.

NRC 399. (a) **Do the performance-based assessments required under the Maintenance Rule satisfy the technical specification administrative requirements for the 24-month audit/verification of maintenance activities, or do we still have to perform a compliance-based verification?**

(b) **If so, does this also satisfy 10 CFR Part 50, Appendix B criteria?**

(c) **Would it make a difference if we involved QA in the Maintenance Rule assessment process?**

(a) The Maintenance Rule periodic assessment may not meet the technical specification administration requirement for maintenance activities but could encompass a portion of those requirement. The utility should compare the technical specification requirements against those activities under the Maintenance Rule and take credit where overlap occurs.

(b) The same assessment of scope between Maintenance Rule requirements and Appendix B criteria should be made to determine any duplication of effort.

(c) Yes. To the extent that QA would provide technical insight. The assessments are more technical than administrative since this is a performance based rule.

NRC 400. **What is the NRC's expectation for the use of operating experience programs within the context of the Maintenance Rule?**

The expectations of the NRC are that licensees will use industrywide operating experience as the Maintenance Rule specified and the guidance document outlined. Industry operating experience can preclude repetitive failures in the industry from occurring.

NRC 401. **Will pilot inspections affect SALP scores?**

No. The purpose of the pilot inspections is to gain insight on the inspection procedure developed for the Maintenance Rule.

NRC 402. **Will the NRC no longer look at PM program basis (i.e., vendor recommendations) as being unsafe if vendor recommendations are not met as long as performance criteria is met?**

Yes. If maintenance performance is acceptable. In those instances where maintenance performance is unacceptable and the root cause is a deviation from the manufacturers recommendation, it would be necessary to determine the utility's basis for that deviation.

NRC 403. **What will be the NRC's guidance to determine there is a "lack of performance" in the area of determining repetitive MPFFs?**

The NRC guidance has been issued in draft form for public comment and future evaluation through a pilot inspection program. It is likely that a case-by-case evaluation will be conducted.

NRC 404. **There still exists the 1989 NRC policy statement on maintenance which was prescriptive in nature. What is the status of this policy statement in relation to the Maintenance Rule and the ensuing inspection procedure?**

The NRC plans to rescind the policy statement.

NRC 405. **Each of the system lists in the V&V Report (Tables 9-5 through 9-7) look significantly different for Westinghouse plants. What is the perspective of the NRC regarding the acceptance of such variation or will there be pressure such as we saw in Regulatory Guide 1.97 to have common lists?**

The NRC recognizes that legitimate differences will exist.

NRC 406. **What follow up actions are being considered by the NRC regarding enhancements to the NPRDS program relative to Maintenance Rule?**

This area is an on-going subject of review between the NRC and INPO. Information will be made available as conclusions are reached.

INPO 407. **Is INPO undertaking any effort to highlight non-safety-related failures which lead utilities to indicate SSCs in the rule?**

Yes. INPO is evaluating performance monitoring requirements for systems important to safety. The scope of systems and data elements presently being collected are being reviewed to determine how the safety system performance indicators can best assist utilities. However, individual component data will continue to be reported to NPRDS, while separate, possibly revised train and system level data will be reported to the plant performance indicator program. The data reported to NPRDS serves a different function and is not redundant to the data reported to the plant performance indicator program. While the components monitored in NPRDS may also be monitored for safety system performance, the data collected in NPRDS does not completely support train and system level unavailability and reliability calculations. The cost of revision NPRDS data to completely support train and system level unavailability and reliability calculations exceeds the cost of keeping both data bases separately and, therefore, extensive revisions to NPRDS data to support such calculations are not planned. In addition, the functions of both databases remain valid and justify their continuance.

INPO 408. **Is INPO looking at the interface (redundancy) in performance monitoring/reporting, i.e., emergency diesel generator, high pressure coolant injection and auxiliary and residual heat removal systems?**

Yes. INPO is evaluating the Plant Performance Indicator Program requirements relative to the upcoming Maintenance Rule implementation.

INPO 409. **Is there any plan being considered by the industry to commonly notify plants of MPFFs (i.e., INPO)?**

No. Based on the results of the V&V activities, there are no plans for additional reporting.

NPRDS 410. **What efforts will be taken on an industry level to provide generic data for components not within the scope of NPRDS?**

INPO is planning to add a wild card system to NPRDS by the end of 1994, which will allow the collection of data for components that are not within the scope of an NPRDS reportable system. Components that are not within the scope of an NPRDS reportable system may be included in NPRDS by assigning them to the wild card system. Reporting will be optional and utilities may add any component they choose to this system, but if they add the component to NPRDS they will be required to maintain failure reporting complete.

INPO will also continue to monitor industry needs associated with the Maintenance Rule and may expand the scope of NPRDS to include systems and components of generic interest if sufficient industry support is expressed.

TECHSPEC 411. **Is NUMARC suggesting that current technical specifications are inadequate to ensure plant nuclear safety? You suggested this in your workshop presentation. The Maintenance Rule does not form this conclusion or make this suggestion.**

No. The Maintenance Rule goes beyond the technical specifications by ensuring the objective of preventing failures of SSCs through maintenance is appropriately balanced against the objective of minimizing unavailability of SSCs due to monitoring or preventive maintenance. It also requires that an assessment be made that considers the combined effect of removing multiple systems from service.

TECHSPEC 412. **Will the NRC be amenable to technical specification changes based upon the unavailability evidence resulting from the Maintenance Rule where systems are shown to be highly reliable but unavailable due to surveillances?**

Yes. The Maintenance Rule, by monitoring maintenance effectiveness, will provide the technical basis and data to support technical specification change requests to surveillance requirements.

TECHSPEC 413. **Will the Maintenance Rule restrict the number of times a technical specification action statement may be entered?**

No. The Maintenance Rule requires that equipment performance be monitored to ensure the functionality of SSCs within the scope of the rule. Voluntary entry into technical specification action statements should be based on plant needs, prudence and license requirements. The performance criteria selected should be aimed at improving equipment availability. The Maintenance Rule, in paragraph (a)(3), requires that during monitoring and preventive maintenance activities, an assessment of the total equipment out-of-service should be made to determine the overall affect on plant safety.

TECHSPEC 414. **Is the NRC doing anything in regards to technical specifications where technical specifications drives unavailability?**

Yes. The NRC would consider technical specification changes based on past performance. Examples of this are changes to testing frequencies as proposed for the Appendix J program and the NRC generic letter that allows for a reduction in the accelerated testing requirements for EDGs based on Maintenance Rule implementation.

LR 415. **NUMARC 93-01 states that an effective maintenance program is one that minimizes component failures and increases or maintains SSC performance. It should be noted that 10CFR54 defines effective program (EP) as a program to manage age-related degradation unique to license renewal that ensures that an SSC important to license renewal will continue to perform its required function or will not prevent the performance of a required function during the period of extended operation. Additionally, the definitions (or scopes) of SSCs in 10CFR50.65 and SSCs important to license renewal in 10CFR54 differ. As we attempt to take as much credit for Maintenance Rule implementation in license renewal specifications, would the workshop panel suggest that different EPs be established, as necessary, for license renewal or would you see the effective maintenance programs being revised at that time? Based on Maintenance Rule implementation and in light of the license renewal rule, are there any suggestions that the V&V plants could make that would assist licensees as they prepare for potential license renewal?**

It is expected that full credit for the Maintenance Rule performance monitoring of selected SSCs will be taken in regards to license renewal.

LR 416. **Why does the Maintenance Rule have one set of criteria for SCCs included and the license renewal rule have another?**

From the discussions in the Workshop general sessions, it can be inferred that an effort is underway to reconcile the requirements of the Maintenance Rule and the License Renewal Rule.

GENERAL Q & A

BIGM 417. **Should there be a NUMARC activity to emphasize "Big M" to all utilities to help change the culture, i.e., support from other plant departments are necessary to support Maintenance Rule implementation?**

No. This is a utility responsibility. The definition of "maintenance" is appropriately defined in NUMARC 93-01, Appendix B. The concept of "Big M" is further explained in the Workshop manual, Tab 12, Page 4, this tab lists the attributes of an effective maintenance program.

DESIGN 418. **How does the Maintenance Rule affect the design change process? Will system availability be a design requirement based on the Maintenance Rule?**

The design change process will now have to consider the Maintenance Rule impact in regard to scoping. In those instances where systems are shown to have unacceptable performance the Maintenance Rule may support the utilities decision to implement design changes.

System availability has always been a design consideration but the Maintenance Rule may monitor the availability of systems better and provide more timely feedback.

EDG 419. **Can utilities implement the Maintenance Rule in lieu of currently planned EDG redundancy additions?**

No. The rule can not be used in the planned EDG redundancy additions relative to the SBO initiatives. The intent of the rule is to focus on equipment performance through monitoring of criteria such as availability and/or reliability, as referenced in NUMARC 93-01, Section 12.2.4.

QA

420. The statement was made during the workshop that QA does not "apply to" the activities of the Maintenance Rule unless the component used (e.g., corrective action program) also happens to fall into the QA purview. At most plants, design, inspection, testing, and maintenance are all considered safety-related. Results of implementing the Maintenance Rule could clearly change the bases for maintenance frequency, methods, etc. Based on level of commitments to ANSI standards, Regulatory Guides, Technical Specifications, FSAR, and QA program, all activities including the trending could potentially be required to be covered by 10 CFR Part 50, Appendix B QA program. The rule does not identify that a QA program applies; however, are there clear cut areas where a QA review does not apply?

NUMARC 93-01, Section 13.1 addresses documentation developed for implementation of the guideline not the programs that are currently covered under the requirements of 10CFR50, Appendix B. It is true that implementing the Maintenance Rule could result in recommended changes to maintenance programs, methods, and frequencies. Changes to requirements covered by 10CFR50, Appendix B QA program would be handled under the existing licensee programs.

TRAIN

421. What is Arizona Public Service doing as far as training/educating your management staff on Maintenance Rule implementation strategy/plan?

Numerous presentations have been scheduled with the management staff, and various departmental personnel during periodic industry events training. These presentations are used to explain the scope of the Maintenance Rule and that the Maintenance Rule effects many organizations, and the implementation strategy for compliance by July 10, 1996.

COMCAUSE

422. Common cause importance. How is it addressed?

Cause determination should address generic and common cause implications. Example: an evaluation of a functional failure of an MOV reveals the cause as a component with manufacturer defect. This determination would require the utility to evaluate the uses of the failed component in other plant MOVs. Corrective action to preclude recurrence would be necessary for all the MOVs of concern. (See NUMARC 93-01, Section 9.4.4, page 31, last paragraph.)

INHREL 423. **A definition of "inherently reliable" should be added to Appendix B. Are passive devices such as piping and tanks inherently reliable?**

No. As used in the guideline, inherently reliable SSCs (defined on page 24 of NUMARC 93-01) are those that have high reliability without preventive maintenance. Piping and tanks are subject to wall thinning due to erosion or corrosion and in some cases are included in condition monitoring programs.

INHREL 424. **Does a single failure of a SSC classified as "inherently reliable" cause a reassessment of others in the same category? Seems that by statement we are trying to eliminate random failures.**

Yes. The failure (functional) of an SSC classified as inherently reliable would mean that it was not highly reliable without preventive maintenance and should be re-evaluated. Similarly, like components should be re-evaluated.

IMPL 425. **It appears that timing concerns could develop on the implementation date of 7/10/96, especially in light of the fact that NRC inspection criteria have not been developed and won't be ready until 1995. Why wasn't NUMARC 93-01 and the NRC inspection criteria drafted in parallel? It appears this could have been accomplished since the NRC worked so closely with industry on the guideline development.**

Utilities should implement their programs based on NUMARC 93-01 as endorsed by Regulatory Guide 1.160. The NRC public workshop on the inspection module will be in early 1994. Pilot inspections will be conducted following the workshop. A lessons learned workshop will follow the pilot inspections.

IMPL 426. **What does implementing by July 10, 1996, mean? If a plant has a refueling cycle ending in June of 1996, will the utility have three months to disposition equipment into (a)(1) and (a)(2)? The disposition must be based on two cycles of data. It appears that many plants will have to back collect data to meet the July 10, 1996, time requirement.**

(See NUMARC 93-01, page iv, footnote #5, also Section 9.3.3, paragraph 3.) The required implementation date is July 10, 1996. Utilities must have their programs in place by that date. Historical data will be for a period of at least 2 fuel cycles. In the case of the June 1996 refueling cycle the 3 month extension would not allow you to delay rule implementation. However, the 3 month period would still be allowable for data collection and analysis.

IMPL 427. **Who will maintain the "Maintenance Rule Basis Concept" document at Arizona Public Service (APS)?**

As currently organized, the "concept document" would be controlled by the System Engineering group at APS.

DB 428. **Is there a utility effort to consolidate maintenance related issues into one data base?**

No.

DB 429. **Since the implementation is in its infancy, are NUMARC/INPO going to develop a database to track/trend and move items to and from (a)(1) or (a)(2)?**

No. The performance criteria for (a)(1) or (a)(2) determination is utility specific. A database as referenced would not be relevant.