DS09
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Rules and Directives Branch,
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Westinghouse Comments on Draft SRP Chapter 3.9.8 & on Draft Regulatory Guide DG-1063, both for Risk-Informed Inservice Inspection of Piping

Ref: Federal Register Notice of October 15, 1997, Volume 62, Number 199, Page 53663-53667, Draft Regulatory Guide and Standard Review Plan Section; Issuance, Availability, and Notice of Workshop

Attached for your information and use are the Westinghouse comments from a review of the draft risk-informed inservice inspection regulation documents which were issued by the NRC for public comment via the referenced Federal Register notice. Comments have been provided in attachment 1 concerning the subject documents as requested.

Also, as requested in the Federal Register notice, the comments have been sent electronically in WORD format.

Note that Westinghouse participated in the preparation of comments submitted by the Westinghouse Owners Group and we fully support and endorse those comments.

Westinghouse appreciates the opportunity to comment on issues of importance to the nuclear energy industry. We would be pleased to discuss our comments further with the NRC staff.

Very truly yours,

H. A. Sepp, Manager
Regulatory and Licensing Engineering

Attachment

cc: J. Guttmann, NRC, Office of Nuclear Regulatory Research

ID+R-5-1
Facility License

X - I+P-11 Guidelines manual

2808C-JTC:011398

bcc: N. J. Liparulo/WECe 4-15, 1L, 1A
R. Bastien/W Brussels, 1L, 1A
J. M. Moore/EXPO 335, 1L, 1A
Rockville Office, 1L, 1A
N. B. Closky/WECe 4-22, 1L, 1A
K. R. Balkey/WEC 4-22e, 1L, 1A
J. T. Crane/WECe 4-7A, 1L, 1A
N. J. Liparulo/WECe 4-15, 1L, 1A

Attachment 1
Westinghouse Comments on

Draft DG-1063,
"An Approach for Plant-Specific, Risk-Informed Decision Making: Inservice Inspection of Piping"
and
Draft Standard Review Plan Chapter 3.9.8,
dated October 1997

The following responses to the questions contained in the Federal Register Notice and comments on DG-1063 and SRP Section 3.9.8 for risk-informed inservice inspection are provided below.

Answer to Questions contained in Federal Register Notice

(A) Is the level of detail in the guidance contained in the proposed regulatory guide and SRP clear and sufficient, or is more detailed guidance necessary? What level of detail is needed?

The level of detail in the general guidance in the proposed RG and SRP is clear and sufficient except for:

- The (plant) expert panel (integrated) review to categorize pipe segments as high or low safety significance is greatly underplayed. In the two plants where the quantitative methods have been applied, the expert panels added between 50-70% more segments. Guidance should be provided on how this process should be done to obtain consistent results from plant to plant.
- There is confusion in terms between ISI expert team, experts for eliciting probabilities and the plant expert panel review for safety significance determination
- Need to better define how augmented programs and leak detection is taken into account in the general guidance
- Secondary criteria may need to be conceived in the change in risk calculation. You can show overall risk reduction while letting risk increase in key front line defense systems.
- Sections 5 and 6 have more material than necessary when compared to Section 4 - engineering analysis
- Submittal requirements ask for more information than necessary. Much of the information can be maintained in documentation (calc notes) on site.

The level of detail in some appendices may be a bit overwhelming and some confusion exists as to how the evaluation is carried out because of redundancy throughout some appendices. Appendix 3 should be eliminated and just cited as a reference. Given developments of SRRA Codes, it is doubtful that any licensee would embark on the process in Appendix 3 to develop their RI-ISI program.

(B) Is it acceptable to use qualitative information (e.g., not quantifying the change in risk--DCDF and DLERF) to propose changes in ISI programs? If so, does DG-1063 provide adequate guidance in this regard? Can qualitative assessments be used to identify and categorize piping segments as high, medium and low safety significant? How? What are the limitations of such an approach?

Having performed a blended quantitative and qualitative evaluation for two full plant studies, we don't know how a risk-informed ISI program could be developed solely on a qualitative approach.

(C) Under the risk-informed approach, what is the appropriate size of the sample of welds or piping segment areas that should be inspected? What should the criteria be for selecting the sample size?

Having done extensive calculations with the Perdue model, the sample size is either 100% for susceptible locations or none for reliable piping. One exam is recommended in each high safety significant segment. No in-between sample sizes were determined out of 125 pipe segments that were conducted at Surry-1.

(D) How should welds or piping segment areas in the inspection sample be selected for inspection: randomly, those most likely to experience degradation, or some combination of random and possible degradation? What would be the basis for the recommended selection process?

For areas in piping susceptible to known degradation, they should not be chosen at random; 100% of the area should be addressed. For reliable pipe segments, the exam that is chosen in each HHSS segment for defense-in-depth purposes can be randomly selected. However, we recommend that the location should be selected using engineering insights.

(E) Once selected, should the same welds or piping segment areas be inspected at each inspection interval or should different welds or piping segment areas be included in the sample? What would be the basis?

Once selected, the same weld or area should always be inspected (unless flaw indications are found). Selecting the same location will provide the licensee with information on changes that may be occurring from exam-to-exam.

(F) DG-1063 proposes a method for meeting the criteria for acceptable safety and quality, as addressed in 10 CFR 50.55a(a)(3)(I). That method applies leak frequency target goals to maintain piping performance levels at or improved over the existing performance observed when implementing ASME Section XI requirements. Are there other acceptable risk-informed means by which to meet the criteria in 10 CFR 50.55a(a)(3)(I)?

We know of no other method for meeting the criteria for safety and quality applying leak frequency target goals to maintain piping performance levels at or better than existing performance observed using ASME XI requirements.

(G) Should the scope of DG-1063 permit licensees to propose ISI changes to selected systems, in lieu of assessing the entire piping in the plant? For example, would it be acceptable for a licensee to limit its analysis to Class 1 piping (reactor coolant system piping) and not consider other piping in the plant? Such an analysis would not provide information required for categorizing piping in the plant and thereby grading the inspection based on plant risk. It would also discourage the use of risk-insights (e.g., PRA) to identify risk-significant piping within the plant. How can the concept of assessing risk in an integrated fashion be maintained if the scope were limited to one or a limited number of systems, such as Class 1 piping. What is gained by analyzing all the systems versus only selected systems? What is lost by minimizing the scope?

At the present time, many valuable insights were gained from the application of a blended quantitative and qualitative process to all appropriate piping systems to two plants. While some common insights are emerging, there are many differences because of plant-to-plant variation in design and operation. At some time in the future after more plants apply the process, it may emerge that only some systems need to be evaluated to gain valuable safety and economic benefits.

(H) The decision metrics described in Attachment 2 to DG-1063 identify a 2-by-2 matrix for identifying a graded approach to inspection based on risk and failure potential. Piping segments categorized as high-safety-significant and high-failure-potential receive more inspections than segments categorized as high-safety-significant and low-failure-potential. The number of inspections for the high-safety-significant and low-failure-potential segments is based on meeting target leak frequency goals and incorporates uncertainties in the probability of detection. What other methods are available to provide a comparable level of quality and safety? What are the technical bases for those other methods?

We are not aware of another method that can provide a comparable level of quality and safety using the 2-by-2 matrix for a graded approach in combination with application of a statistical process.

(I) How should the time dependence of degradation mechanisms be accounted for in selecting inspection intervals and categorizing the safety significance of pipe segments?

SRRA models provide an appropriate approach that can directly evaluate the time dependence of degradation mechanisms through the end-of-license, and they should be used in the categorization of pipe segment safety significance. The 10-year inspection interval is still appropriate except for very aggressive mechanisms like IGSCC.

(J) On what basis could the requirement for ISI be eliminated? For example, if a detailed engineering analysis identifies a Class 1 or 2 piping segment as low-safety-significant and low-failure-potential, is it acceptable to eliminate the requirement for ISI or should a Class 1 or a 2 pipe segment be considered part of the defense-in-depth consideration and be required to have some level of inspection regardless of its categorization as low-safety-significant and low-failure potential? If yes, why? If not, why not?

The NDE requirements for ISI can be eliminated; however, other ISI methods such as pressure testing with visual examination are still performed and leak detection systems are available to identify any leakage before catastrophic failure. The Perdue model was applied to low safety significant pipe segments where ASME XI NDE exams could be eliminated. The model was exercised such that the target leak rate could be achieved with no examination (pre-ISI only).

(K) Are data bases available on degradation mechanisms and consequences of piping failures? Is data available to identify the secondary effects that can result from a pipe break, such as high-energy pipe whip damaging other piping and components in the vicinity of the break? What are the industry's plans for developing and maintaining an up-to-date data base on plant piping performance? Should a commitment to develop and maintain such a data base be required for a RI-ISI program? How could it be ensured that the data base is maintained?

Further work is required on degradation mechanism failures, consequence data bases to support RI-ISI. Limitations in the target leak rates were found in applying the Perdue model for Surry-1 piping segments. To obtain target leak frequencies, information is needed on pipe diameter, thickness, geometry, material, degradation mechanism and loading condition. When developed, it is hoped that such databases will be publicly available and maintained to support RI-ISI programs.

(L) Does the application of the Perdue-Abramson model (DG-1063, Attachment 4), with the use of the decision metrics and leak frequency goals (DG-1063, Attachment 2) provide an alternative acceptable level of quality and safety as required by 10 CFR 50.55a(a)(3)(I)? Alternatively, should there be a leak

frequency goal independent of core damage frequency goal, as a measure of defense in depth?

The Perdue-Abramson model provides an alternative acceptable level of quality and safety as required.

(M) Is the guidance proposed by the staff for finding a fracture mechanics computer model acceptable for use in RI-ISI programs clear and adequate? If not, what is missing?

Fracture mechanics computer model guidance is clear.

(N) Is the guidance on risk categorization clear and sufficient, or is additional guidance needed? What additional guidance is needed?

Guidance on risk categorization is clear, except plant expert panel review in underplayed and some appendices should be streamlined.

(O) Table A5.1, in DG-1063, identifies a proposed checklist that could assist in identifying potential locations for various degradation mechanisms in a pipe. Is this checklist complete? What additional information could enhance the usefulness of such a check list?

Table A5.1 is sufficient.

(P) Could pre-existing flaws in piping lead to more severe consequences than previously addressed? More specifically, if the piping in a mitigating system can't survive post-core damage conditions due to a pre-existing flaw, would there be a change in the risk categorization of that piping? Would failure of a mitigating system due to a mechanism that is not part of normal design basis event change the risk categorization of the piping?

The WOG process for estimating the consequences in a mitigating system assumes that the pipe fails with a probability of 1.0. Therefore, a pre-existing flaw does not change the consequences and thus the risk categorization. For estimating the failure probabilities, the conditions expected for the piping (not just under design basis but also under normal and abnormal operating conditions) are considered. The risk categorization should not change based on the process used to define the consequences and to estimate the failure probabilities.

Comments on Draft DG-1063

General Comments

The NRC Staff has done an extremely thorough, detailed effort in developing regulatory guidance and review plans for the application of a risk-informed approach for inservice inspection of piping (RI-ISI).

1. The WOG and Surry application of the acceptance guidelines that are contained in DG-1061 and applied in DG-1063 were not applied in that the total plant CDF and LERF and the change in those measures are not determined but the total piping CDF and LERF are determined along with the change in piping CDF and LERF. Therefore, these criteria are not used.

2. It is stated that the licensee will include in its submittal a proposed process for determining when formal NRC review and approval are or are not necessary. Shouldn't some guidance into this process be supplied by the NRC so that misinterpretations are not made that would preclude approval of submittals? For example, is a normal update to the PRA model to incorporate plant design changes, which results in components being reclassified as LSS when they had previously been HSS, a "change to the plant probabilistic model assumptions." Does this require prior NRC approval?

3. The amount of documentation required to be submitted to the NRC is excessive. The information should be available but retained on site for NRC inspection and audit but not formally submitted. The review of the amount of documentation requested by the NRC would require excessive manhours of effort by the NRC reviewers.

4. The regulatory guide and SRP should make a clear distinction between ISI and NDE. The proposed WOG and Surry submittals specifically state that the changes are being made only to scope of the NDE portion of ISI and that pressure tests and other ASME requirements will still be performed.

5. The regulatory guide and SRP should make a clear distinction between the PRA and the probabilistic analysis performed for the risk-informed piping ISI. For example, on page 11, ensuring that piping degradation is not beyond the assumptions of the PRA. The PRA does not contain the piping failure probabilities but the risk-informed ISI analysis does contain the piping failure probabilities.

6. The regulatory guide and SRP should make a distinction between "the expert panel integrated review" and the "ISI team" of engineering experts.

Comments on Main Text of Draft DG-1063

1. P. 3, section 1.1, References 6 and 7 appear to be inappropriate for the context of the discussion. It would be more prudent to reference the recently-approved ASME Code Cases.

2. P. 4, section 1.3, first sentence, the terminology "inspection of pipes" is used. It is suggested that the terminology "inspection of piping" be used here and other places in the document since it is common understanding among piping engineers that the term "piping" refers to the pipes, fittings, etc.

3. P. 4, Section 1.3, last sentence states "When….degradation mechanisms along a pipe vary, the pipe is subdivided into segments…" Although the WOG methodology may do this, it is possible to have varying degradation mechanisms in a segment of pipe, and the limiting one is picked. Variation of pipe degradation is vague, not a necessary criterion, and should not be a requirement for subdividing segments. WCAP-14572, Revision 1 states segments are defined where "the break probability is expected to be markedly different due to material properties." This is different than varying degradation mechanisms, and is the wording used in DG Section A2.3.

2. P. 5, second paragraph refers to segments categorized as HSS, but does not define what is meant by HSS or provide a reference for a definition.

3. P. 5, states that the licensee should examine the inspection strategies for all welds in the final proposed ISI program. What criteria should be used to examine the inspection strategies? What is specifically wanted here?

4. P. 7, section 1.5, Do references 11 and 12 really apply to the discussion in this section?

5. Page 7, The definition of "Expert Elicitation" alludes to using outside experts, experts not part of the plant staff, as the acceptable standard when applying expert elicitation to estimate failure probabilities and associated uncertainties of material in question for specified degradation mechanisms. We find that this recommendation to use outside experts as the acceptable standard is unnecessary as part of the definition. It should be up to a Licensee to determine the best qualified individuals to perform this function.

6. Page 7 , The definition of "Expert Panel" should be expanded and revised to include specific reference to the personnel that actually are used. It is not made up of primarily inservice inspection (ISI) personnel that are experienced in inservice inspection program development. The ISI personnel are just one part of the panel makeup, a supplement to the panel, and its primary members are those personnel that provide insights from Operations, Maintenance, Engineering, and PRA.

7. Page 8 - RRW "Risk Reduction Worth" needs to be added, defined, and recognized as an importance measure.

8. P. 9, item 2 - the section reference for defense-in-depth should be 4.1.2. Item 3 - the section reference for sufficient safety margins should be 4.1.3. Item 4 - the section reference for proposed increases in risk should be 4.2.6 (note, there is no section 4.4).

9. P. 11, Element 3, the third sentence refers to piping degradation not beyond the assumptions of the PRA. The meaning is not clear. Is this referring to the initiating event frequencies assumed for LOCAs and secondary side breaks? Typically IPEs do not model pipe breaks other than for these several initiating events.

10. P.14, the fourth bullet includes plant probabilistic model assumptions as requiring NRC approval for changes in a RI-ISI program. This terminology is vague and could be interpreted in different ways. If a plant change requires a change to the plant PRA model, and the utility verifies that the model changes are correct, why does the NRC require prior approval? It should be sufficient that the utility maintain documentation which the NRC can audit if it chooses.

11. P. 15, the first paragraph refers to Section 4.4 which does not exist.

12. P. 16, section 4.1.1, should also include a list of generic letters and other NRC correspondence on the subject. Currently, the 4th bullet is incomplete.

13. P. 18, Section 4.1.5 refers to a detailed FMEA. Unless defined, the interpretation for this can vary. "Detailed FMEA" strongly suggests a formal documented program which is not necessary. If the main elements of an FMEA are included, this should be acceptable without additional NRC review and approval.

14. Page 19, figure 4.1, seventh bullet, the structural elements selected for 100 percent inspection should be those with the highest relative contribution not only to CDF but also to LERF AND those elements should also have the highest failure potential.

15. Page 19, figure 4.1, eighth bullet, the structural elements subject to a reduced level of inspection should be those with the relatively contribution not only to CDF but also to LERF AND those elements should also have the lowest failure potential.

16. Page 22, table 4.2, the terminology "less safety significant" and "non-risk-significant" should be replaced with "low safety significant" for consistency.

17. P.22, Section 4.2.2, second paragraph - see comment on page 4, section 1.3 (note: the third paragraph on DG p. 22 adequately addresses the issue)

18. P.23, Section 4.2.4. the third sentence states "The failure probability…used in the PRA…" implying that segment pipe failures are added to the PRA model. Suggest changing to "…used with the PRA…"

19. On page 24 of 4.2.4, page A1-19 of A1.3.16 and A2-12 of A2.5.1, a large number of sensitivity and or uncertainty analyses are requested. However, the probabilistic SRRA analyses already include the effect of most of these uncertainties and the effect of the uncertainties on the best-estimate uncertainties has already been shown to be large. Therefore, what is the purpose of the requested information?

20. Page 24 of 4.2.4 and elsewhere it states that the SRRA models, assumptions and inputs must all be independently reviewed, approved and documented by the ISI expert panel or other independent reviewers. Since all the needed plant experts should be involved in providing their input to the SRRA calculations, where are knowledgeable and independent reviewers to be obtained?

21. P.24 of 4.2.4, the first paragraph implies a requirement to perform formal sensitivity/uncertainty studies on the inputs to the SRRA code (if that is being used to determine the piping failure probabilities). While this may be done to determine appropriate input parameters for specific segments, the paragraph appears to be requiring a general sensitivity study. The SRRA code is used to provide a consistent basis for determining failure probabilities, and the code will receive a SER from the NRC. Given that, it is difficult to understand what this paragraph is requiring.

22. P. 25, Section 4.2.6, the first sentence refers to Section 4.4 which does not exist.

23. P. 25, Section 4.2.6, the last bullet on the page should be revised from "an assessment and accounting of…" to "an assessment of…" The term "accounting" implies formal quantitative sensitivity <u>and</u> uncertainty studies. Performing both may not be necessary.

24. P. 26, Figure 4.2, first bullet states that the associated weld population be identified. The WOG approach does not require this information upfront (but only during application of the Perdue Model) and it is not always easy to determine the weld population for a given segment.

25. P. 27, Section 4.2.6.1, what does the term "ISI issue" mean?

26. P. 27, Section 4.2.6.4, in the last sentence where/what are Attachments 4 and 5 ?

27. P. 28, section 4.3, does integrated decision making include the use of a plant expert panel as called out in draft DG-1061? If yes, then guidance should be provided on the plant expert panel in this section.

28. P. 28, section 4.3, the acceptance guidelines stated in this section are not appropriate for risk-informed ISI. The total mean CDF is not used as a measure but the total piping CDF is used as the measure for risk-informed ISI.

29. P. 33, performance monitoring should include elements that lead to the feedback and corrective action. This could include for example, the flaw size measurement as compared to the ASME acceptance criteria.

30. P. 35, section 5.2, on examination results, only unacceptable flaws or indications of leakage should be evaluated as part of an RI-ISI program update.

31. P. 39, What are the NDE acceptance criteria for Class 3 and non Code class piping, which currently are not available in ASME Section XI? There appears to be a need to refer to the recently-approved ASME Code Cases which address this item.

32. P. 46, Section 6.2.2 and its subsections appear to require the plant to submit the entire PRA for NRC approval. Given the PRA review during the IPE and Maintenance Rule efforts, this should not be required. The NRC requirements in this section are excessive especially compared to the level of detail provided in plant FSARs describing safety analysis modeling and results.

33. P. 47, Section 6.2.2.1, Pipe Segments, the NRC information requirements are vague regarding the acceptable level of detail in the information being requested. In particular, for the WOG process, given that a sub-panel examines the failure mechanisms while determining the failure probabilities for the segments, what does the NRC expect to have submitted so that a NRC reviewer can determine whether degradation mechanisms are properly considered?

34. In a number of places (e.g. page 49 of 6.2.2.2 and pages A2-12 and 18 of A2.5), it states that the segment failure probability is the summation of all the element probabilities. Since the probabilities are not independent but controlled by the location most likely to fail first (i.e. with the highest probability at a given time or a common mode failure), this is not correct and would require additional SRRA calculations and documentation with no additional benefit.

35. On page 49 of 6.2.2.2, the documentation requirements appear to be excessive if they are applied to each calculation, as is implied, instead of to the SRRA methodology that is consistently applied to all calculations. Only the exceptions to the general SRRA methodology should need to be documented and justified.

36. The requirements to incorporate the results from expert elicitation for failure probabilities for non-standard materials, modes and mechanisms into the SRRA computer codes after an industry panel (ASME codes and standards preferred) review and approval (e.g. pages 49, A2-21 and A2-22), are not feasible with normal

vendor QA practices for validation and verification each time a safety related computer code is changed. For example, how do you verify an estimated failure probability calculation when the reason an expert elicitation was used is exactly because there is no applicable model or data readily available.

37. P. 49, The first paragraph states that the NRC recommends expert elicitation be performed by an industry group or a professional society. Although this is stated as a recommendation, the NRC should find a plant group of experts satisfactory if only a limited amount of piping is being assessed (i.e., one system or a portion of a system).

This page appears to require a large amount of documentation for the submittal related to the segment failure probability assessment and CDF and LERF contributions. It is recommended that general information on the process be provided with a couple of specific examples. This should provide the NRC adequate information and assurance that the appropriate considerations were incorporated into the RI-ISI program. The rest of the documentation will be available at the utility for NRC review, if necessary. Some specific comments on the information requested: 6th and 7th bullet - the WOG methodology uses point estimates and not means. 8th bullet - the WOG methodology does not calculate or use system failure probabilities; the WOG methodology does not calculate failure probabilities for each element in a segment, but rather for the weakest point(s) in a segment. 9th bullet - because failure probabilities are calculated individually for each segment, a discussion of the major contributors for a system is not relevant for the WOG methodology.

38. P. 50, Human actions, the WOG methodology does not specifically consider quantification of the human actions, the model is quantified with and without operator action.

39. P. 50, Section 6.2.2.3, In the first paragraph, if the change in CDF and LERF (due to pipe breaks) from the current Section XI program to RI-ISI program can be shown to be risk neutral or a risk decrease, then examining total plant CDF and LERF values should not be necessary.

40. P. 51, Section 6.3, It is not clear what is meant by "each issue considered in the integrated decision-making process..." Does this refer to all of the issues listed in Section 4.3, a subset of those listed in Section 4.3, or something else?

41. P. 51, Section 6.4 appears to require a large amount of documentation for the submittal related to degradation mechanisms and postulated failure modes for the piping segments. It is recommended that general information on the process and guidelines for assessing piping failure probabilities be provided with a couple of specific examples. This should provide the NRC adequate information and assurance that the appropriate considerations were incorporated into the RI-ISI program. The rest of the documentation will be available at the utility for NRC review, if necessary.

42. P. 51, Section 6.4, the last three paragraphs are written such that it is not clear if the documentation referred to is to be part of the submittal or simply maintained at the utility.

43. P. 54, Table 6.1,
- Changes in CDF and LERF, the WOG methodology does not evaluate the total CDF and LERF, but the piping CDF and LERF.
- ISI systems - a schematic diagram does not always portray the information accurately. A table may also be sufficient to meet this requirement.
- Categorization - this is an excessive requirement in that additional piping elements that will undergo ISI but are outside the scope of this document should not be requested if no changes are made to those elements.
- Location of Inspections - System/piping drawing overlays should not be required. Similar information can be provided in comparison tables.
- Expert Elicitation - the requirements are excessive if expert elicitation was only used for a system or a portion of a system. In some cases, expert elicitation results may not be appropriate for incorporation into a data base (no failure occurrences) or a computer code (special pipe, e.g., fiberglass).

44. P. 56, Reference 7 should be updated to the current version of WCAP-14572 (Revision 1).

Comments on Appendices

Appendix 1

1. Page A1-2, 7th bullet, this statement should include experts and/or plant engineering personnel applying the code.

2. Page A1-5, a "proof test" should be better defined.

3. Page A1-14, 5th bullet, this statement should call out that the consensus process should be performed by the plant engineering personnel and/or experts running the code.

Appendix 2

1. For someone unfamiliar with the RI ISI process, Appendix 2 contains a lot of detailed information which is difficult to relate to an overall process. While Figures A2.1, A2.2, and A2.4 display portions of the process discussed in Appendix 2, it is recommended that a general flow chart be included at the beginning of Appendix 2 to guide the reader through the main sections of the Appendix.

2. A2-1, third paragraph, the 1st bullet implies that the PRA model must incorporate piping segments. The WOG methodology uses the PRA model with surrogate components to appropriately model the effects of piping failures. Recommend changing "to include in the plant PRA model" to "to assess with the plant PRA model."

3. A2-3, Section A2.1, the last sentence states acceptable approaches are summarized in this section, but Section A2.1 ends. Recommend replacing "this section" with "this appendix" or listing the specific sections which address modeling the piping failures.

4. A2-3, The WOG methodology does not generate affect cutsets directly but only from the conditional calculations. Also, the WOG methodology does not use total CDF/LERF but piping CDF/LERF.

5. A2-3, section A2.1, states the PRA will need to be modified. The WOG methodology does not modify the PRA but uses surrogate components. This should be an acceptable method.

6. A2-4, the first paragraph refers to a FMEA - see comment on the main text. This comment also applies to the second paragraph on p. A2-5.

7. A2-5, the WOG method uses the PRA and does not require incorporation into the PRA model as stated in the footnote to the page.

8. A2-6, second paragraph, rotating machinery and pressure boundary missiles are not effects from pipe breaks and should, therefore, be deleted. Recommend describing the buildings to examine in general terms rather than specific building names which may not be applicable from plant to plant.

9. A2-12, Section A2.5.1, the 4th bullet discusses expert elicitation for piping failure probabilities. Refer to comment 21 on the main text. The 6th bullet refers to calculating system failure probabilities and combined failure probabilities - the WOG methodology does not calculate or use system or combined failure probabilities. The failure probability for each segment is used directly with the consequence for each segment to determine the CDF or LERF for each segment.

10. A2-14, Section A2.5.2, Effects of ISI, the "LERF" in the parentheses should be "DLERF."

11. A2-14, section A2.5.2, aging effects, states that statistical analyses have not identified increasing failure rate... . This is not clear and data should be provided to support this conclusion.

12. A2-17, the last paragraph, the WOG approach uses the highest failure probability in the segment as the failure probability for the segment and does not use any weighting.

13. A2-17, the second to last paragraph, the requirement for detailed structural mechanics evaluations for each location is excessive and does not provide useful data. If all locations equal, then there is the likelihood of a common mode failure of all piping segments.

14. A2-18, the first paragraph is requesting system level failure probabilities because it can be "more readily benchmarked with limited data regarding pipe failures..." This is not part of the current WOG methodology and would require additional effort to calculate and review and does not provide data useful for evaluating individual locations.

15. The need for a standardized and completely repeatable process for SRRA calculation of failure probabilities, as defined in the example requirements on page A2-20 of A2.5.3, could overly restrict the "what-if" discussions needed for a quality risk-informed method per the fifth item of Table 4.1 on page 19. For example, since most piping failures have occurred for loading events outside the design basis (e.g. leaking valves, water hammers, vibration, stuck snubbers, etc.), strict reliance on design basis stresses could be misleading. Furthermore, changing the calculated results to match a failure database or expert judgment could be erroneous since the effects of postulated events, such as a large earthquake or LOCA, have not been

considered in the database and potential plant-specific effects may not have been included in the expert judgment in general or that for another plant.

16. A2-21, the first paragraph should make an allowance for using plant expert judgment for a small number of failure probabilities (e.g., a system or a portion of a system), rather than using ASME or an industry group.

17. A2-22, the third bullet on the page states that the results from expert judgment should be reported to the NRC. This could be interpreted to mean that any SRRA input value estimated by a group of plant experts needs to be included in the submittal. This level of documentation is unnecessary. A general statement of the use of expert judgment and perhaps a few examples should be sufficient for the NRC to evaluate the process of determining the failure probabilities. More detailed documentation will be maintained at the utility.

18. A2-23, section A2.5.5, this section is poorly worded; screening is not performed in the WOG process; all segments have their failure probabilities calculated and consequences estimated and all segments are reviewed by the plant expert panel. The objective is not to eliminate segments but to classify them as low safety significant for which appropriate inspection would be defined. The sensitivity studies described in this section may not be appropriate because of the changes made in the WOG methodology. We do not account for small leaks and system disabling leaks; we now credit augmented programs. Also, if a pipe segment is low without ISI, it will be even lower with crediting ISI; this sensitivity does not make sense.

19. A2-24, 3rd main bullet on page, the recommended sensitivity study using all leak probabilities is not appropriate if the indirect consequences have been mapped to specific types of failures, for example, a consequence due to pipe whip resulting from a full break. Assigning the leak failure probability to this consequence, for most cases, will result in a conservative estimate of CDF or LERF which could misrepresent the appropriate contribution from the segment.

20. A2-24, the last bullet on the page suggests a sensitivity study in which all operator actions are increased by a factor of 10 to account for possible additional stress. It is not clear what is meant by all operator actions, this could significantly increase the number of PRA runs required (or at least additional cutset manipulations) because each case would require essentially two CDF and LERF values.

21. A2-26, Figure A2.6, the reference in the title should be Reference 2, not 7,2.

22. A2-27, EQN A2-1, the definition for $FR_{IE,seg-1}$ is difficult to understand as written. For risk ranking, the failure probability without ISI should be used.

23. A2-29, the inclusion of OT in the equation does not appear to be appropriate for the equation. If the plant was in an AOT, the piping segment would be isolated and

this would have different consequences given an event rather than the pipe failing and causing a total loss of the system.

24. A2-30, for continuously operating systems the time quantity is defined as T_m + OT. See above comment.

25. A2-33, it is not clear why the discussion of failure potential is included in Section A2.7.1 which covers selecting segments for inspection. The paragraph is unnecessary.

26. A2-34, the list of basic elements to be considered should include more explanation. These may not be appropriate for risk-informed ISI.

27. A2-35, the last paragraph cites a team of ISI experts determining the final segment categorization. It is strongly recommended that an expert panel, as described in WCAP-14572, Section 3.6.3, be used for the final categorization of the segments and not just an ISI team. An expert panel, as described in the WCAP, will result in a more integrated decision making process.

28. A2-36, the last paragraph requires that the HSS segments contribute 95% of the piping CDF and LERF. This is an unnecessary requirement if the percentage of CDF and LERF addressed for the RI ISI program is shown to be greater than that for the current Section XI program. The NRC has stated that RI ISI is not a requirement for plants to implement. Therefore, the current Section XI programs are adequate and demonstrated improvement to the Section XI program should be acceptable. The 95% criterion has the potential to require many LSS segments to be included in the RI ISI NDE program simply to meet 95% of CDF and LERF, thus defeating the purpose of ranking the segments.

29. A2-37, Early Detection of Degradation Mechanisms, the second paragraph identifies "each piping system identified as contributing to risk." This is a vague term and should be replaced with "each HSS segment."

30. A2-37, Leak Versus Break Probabilities, leak probabilities may be helpful in selecting the elements within a segment for NDE, however, the appropriate failure probability should be used for selecting the segments to inspect with NDE. This section, A2.7.1 addresses the segments to inspect not the elements, which are addressed in Section A2.7.2. Refer to comment 11 on Appendix 2.

31. A2-38, Section A2.7.2, refer to comment regarding plant ISI engineering team versus plant expert panel.

32. A2-40, the criteria for high failure potential differ from that on p. 164 of WCAP-14572. DG-1063 does not define what is meant by leak, i.e. disabling, large, small? In addition, the values stated are only for fatigue failures and may not be appropriate for other failure mechanisms.

33. A2-41, Region 3, this paragraph requires examinations in accordance with an owner defined program. This should be changed to a consideration for examination in an owner defined program. These segments have been designated as LSS in accordance with the DG, and should not be subject to requirements in a risk-informed program. Losses due to unplanned outages and repair costs should not be subject to NRC safety requirements.

34. A2-41, information is unnecessarily repeated in the region descriptions and the section "Guidelines for Selection of Locations in Regions 1 and 2."

35. A2-41, sentence after Region 4 discussion, the sentence should be changed to read "System pressure tests and visual examination are performed for ASME Code Class 1, 2, and 3 piping in Regions 1, 2, and 3 as well."

36. A2-43, the proposed inspection strategy description at the top of the page is not discussed in ASME Code Case N577, Case A.

37. A2-43, Section A2.7.3.1, the first paragraph begins with a discussion of segments in Region 2, then discusses segments with high failure potential. Region 2 is for segments with low failure potential. The paragraph should be clarified to distinguish between discussions about Region 1 segments and Region 2 segments.

38. A2-43, Section A2.7.3.2, this section seems to be a mixture of sequential sampling if unacceptable degradation is found and element selection. It is recommended that the paragraph be focused on sequential sampling.

39. A2-44, the first sentence below Table A2.7 discusses segments classified as having low failure potential. Section A2.7.3.2 should apply to any HSS segment in the RI ISI NDE program.

40. A2-46, the paragraph in the middle of the page states that utilities must monitor leak target goals. It does not describe an acceptable monitoring program. Should this be a formal part of the RI ISI program? If the industry shows a continuing trend of lower leak rates, will this monitoring effort be required to adopt lower leak rates to be used for the RI ISI program?

41. A2-47, Section A2.7.3.4, there is too much emphasis on the low failure potential elements and no mention of sequential sampling as a result of identification of unacceptable degradation. Also, in the first sentence of the middle paragraph "log" should be changed to "lot."

42. A2-50, Reference 2 should be updated to the current version of WCAP-14572 (Revision 1).

Appendix 4

1. A4-6, Section A4.4 (and Section A4.5), requires that a 95% confidence be demonstrated for a system, not on a segment-by-segment basis. The NRC method of using the product of the segment confidences really gives the probability that none of the segments in the system will exceed its individual target leak rate.

2. A4-6, Section A4.4, "Two segments, RC-41 and RC-42,43,..." should be revised to "Three segments, RC-41, RC-42, and RC-43,.."

3. A4-8, table numbering should be consistent. Recommend changing Table A4-2 to A4.2 and Table A4.2 to A4.3.

4. A4-8, the last paragraph mentions the required plant-wide confidence. What is it, how is it determined, is such a measure required and what is the justification for such a requirement?

5. A4-9, Section A4.5, the second to last full sentence on the page is confusing. How can a leak frequency be a probability?

6. Section A4.5, it is not clear how the acceptable system leak frequency r_0 is determined for a system which has different pipe with different target leak frequencies as given in Appendix 2 Table A2.9

7. Page A4-1. The first paragraph notes that: "This method is extracted from a paper by Perdue (Ref. 1)." A more recent and substantially enhanced version of this reference entitled "A Spreadsheet Model for the Evaluation of Statistical Confidence in Nuclear Inservice Inspection Plans, (Rev June 24, 1997)" is available.

8. Page A4-5. The second paragraph below Figure A4.1 should be rewritten to read something like the following: "Referring to Figure A4.1, the probability of accepting a lot, given that one flaw exists in the lot, is the sum of all the path probabilities that lead to an 'Accept Lot' outcome. In this example, there are two possible paths for accepting the lot; the first involves not catching the lot flaw in the sample and the probability of that happening is calculated from the hypergeometric distribution as HYPGEOMDIST(0,2,1,8), which signifies the probability of getting zero flaws in a sample of 2 given one flaw exists in a lot of eight. The second path involves catching the lot flaw in the sample but not detecting it and the probability of this event is HYPGEOMDIST(1,2,1,8)*(1 - 0.65), where the second term is (1- probability of detection =) the probability that the flaw will *not* be the detection technique." The probability of accepting the lot is then the sum of these two paths,

HYPGEOMDIST(0,2,1,8) + HYPGEOMDIST(1,2,1,8)*(1 - 0.65)

9. <u>Page A4-6 & beyond</u>: It is suggested that Sections A4.4 and the sub-section (page A4-8) entitled "Assuring an Acceptable System Confidence" do not reflect the most recent thinking on the subject and should be replaced by something like the following (adapted from the aforementioned June 24 paper by Perdue) which would also provide a better transition into the Global Analysis section:

A4.4 Measuring Confidence for a System of Segments

Define a system to be a functional collection of segments. Thus, for example, the segments in Table A4-2 are a portion of the Reactor Coolant System. Ultimately, it is the reliability of the system (or, for that matter, the unit or plant) that is of interest. Conceptually, the problem of measuring system confidence can be solved as follows:

- Combine the optimum plan posterior distributions for each lot or segment to obtain the corresponding system posterior distribution.
- Use the resulting system cumulative posterior distribution to evaluate the probability that the system leak rate will be less than the system target rate.
- If the system confidence is sufficient, (i.e., 95% or better) then stop. Otherwise, revisit the worst lots and increase their inspection requirements until sufficient system confidence is achieved.

A number of simplifying assumptions about system logic would have to be made, and Monte Carlo (simulation) methods would be required to combine the segment distributions. The modeling effort could be non-trivial for systems with large numbers of segments and, consequently, some approximation or heuristic approach is desirable. One such approximation would be to add across segment mean leak rates and associated variances to approximate system mean leak rate and variance and (appealing to the Central Limit Theorem) then use the Normal cumulative probability distribution to evaluate the likelihood that system leak rate would be below a specified system target leak rate for the segment inspection strategies chosen.

Alternatively, eschew the idea of actually calculating system confidence in favor of assuring that the **probability that every segment will achieve its target is Òadequately high.Ó** For example, the probability that every segment under ÒPlan AÓ in Table A4-2 will achieve its target is given by the **product** of the separate segment confidences,

System Prob(all segments > target) = Õ (Segment Confidence Probabilities)
(Equation A4-1)

and is equal to 98.34 % (bottom row of Table A4-2)). The counterpart for ÒPlan BÓ in Table A4-2, where every lot must have at least one element inspected, approaches 100 percent. The Plan B "defense-in-depth" strategy can itself be viewed as a heuristic for helping to insure that both the level of system confidence *and* the probability that every segment will achieve its target is adequately high. Using this conservative alternative to the calculation of actual system confidence, the following protocol can be followed:

- Select a sampling plan for each segment that achieves at least 95 percent confidence (no more than 5 percent risk of exceeding target leak frequency), *subject to the constraint that at least one element will be inspected in each high-safety significant segment.*

- Calculate the probability of all segments exceeding their target leak rates as the product of the segment confidences associated with the sampling plans initially chosen. If this system probability is not adequately high, then rank-order the segments and proceed to augment inspection plans in the worst segments until the requisite system confidence that no lot will exceed its target leak frequency is achieved.

Finally, follow the "Global Analysis" described below (A4.5) to assure that the sum of the mean leak rates for the inspection strategies chosen on a segment - by - segment basis add to a value that is less than the target leak rate for the relevant system.

These steps assure: (a) that all segments within a system will be below their respective target leak rate with a suitable level of confidence, and (b) that the expected system leak rate associated with the locally - optimal segment choices will be below the system target leak rate.

<u>Appendix 5</u>

1. Page A5-5, element 3 states that a risk-informed ISI program should justify inspection reliability using performance demonstration program results. This data is not currently available in a form to be able to support this process.

Comments on Draft SRP Chapter 3.9.8, Standard Review Plan for the Review of Risk-Informed Inservice Inspection of Piping

General Comments

Overall, this a very well crafted SRP chapter, the most organized of the risk-informed SRPs. Like the Technical Specifications SRP chapter, it closely follows the format and guidance of SRP Chapter 19. It uses a format of consistently repeating the elements of the risk-informed regulatory process through the area of review, acceptance criteria, and review procedures, a style that should be considered for the other application-specific SRP chapters.

Specific Comments

1. Chapter 3.9.8, Section I. (page 3.9.8-1) - The five principles of risk-informed regulation are listed here. This probably helps set the tone for the rest of the SRP chapter. It will be necessary to revise the wording of these principles as revisions occur to SRP chapter 19 and DG-1061. It may be preferable to reference one of these related documents.

2. Section I. (page 3.9.8-2) - Note that the second paragraph states that the "PRA-based assessment of the proposed change should explicitly consider the affected piping segments and develop the impact on the CDF and LERF due to the potential piping failures." This appears to preclude the use of some industry bounding analysis versus a plant-specific assessment; the latter is the approach we support.

3. Section I.1 (page 3.9.8-2) - Footnote 1 uses the definition for the current licensing basis found in SRP Chapter 16.1, but not in SRP Chapter 3.9.7; specifically, it adopts the part 54 license renewal definition. This makes sense and will allow this SRP chapter to remain applicable for those plants that renew their licenses. (The SRP chapter 19 should consider using this approach.)

4. Section I.1 (page 3.9.8-3) - Note that the first line states "that the PRA used in support of the RI-ISI program submittal reflects the actual plant." This appears to preclude the use of some industry bounding analysis versus a plant-specific assessment; the latter is the approach we support.

5. On page 3.9.8-4, second paragraph: What do we find in the plant's FSAR to review regarding safety analysis acceptance criteria?

6. Section I.2.2.1 (page 3.9.8-4) - In the last paragraph, it is probably a typographical error, in the second line "risk-insight regulations" versus risk-informed or some similar term. Also, in the fourth line, component should be plural.

7. Section I.2 2.1 (page 3.9.8-5) - The top paragraph implies that the expert panel should be involved with selecting (or at least approving) the scope of systems within

the RI-ISI submittal, not just approving the selection of piping segments or welds from a previously selected set of systems. We support this use of the combined knowledge and experience of the plant personnel in this fundamental aspect of the RI-ISI process.

8. Section I.2.2.5 (page 3.9.8-7) - Using the term "failure modes and effects analysis" can imply a particular format to the structured assessment of possible failure causes and their consequences. This may not be intended.

9. Section I.2.3.1 (pages 3.9.8-7 and 3.9.8-8) - The categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063. Also, on the last line of the second-to-last paragraph and the second line of the last paragraph, change "is" to "are."

10. On page 3.9.8-8, third paragraph, last sentence: Does the justification for the exemption of structural elements (welds?) from inspection pose an unnecessary burden? We select 6 welds out of 25, do we have to justify why we didn't select each of the other 19 welds?

11. Section I.3 (page 3.9.8-8) - In the third paragraph, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

12. Section II.1 (page 3.9.8-10) - The last sentence is redundant to what is stated in the second sentence.

13. Section II.2.2 (page 3.9.8-11) - It may be appropriate to reference section 4.2 of DG-1063 for specific guidance on use of the PRA in analyzing changes to the ISI program. A statement could be added to sections II.2.2.1 through II.2.2.3 that is similar to that at the end of section II.2.2.4.

14. Section II.2.2.1 (page 3.9.8-11) - In the second paragraph, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

15. On page 3.9.8-12, first full paragraph, defining segments as portions of piping for which potential degradation mechanism is the same was not applied for the WOG methodology. This should be revised.

16. On page 3.9.8-12, section II.2.2.3: The second and third paragraphs are posed as alternative approaches, but the WOG approach uses these.

17. On the top of page 3.9.8-13, is this a correct definition of common cause initiators?

18. Section II.2.2.5 (page 3.9.8-14) - The consideration of the impact of loss of coolant accidents in addition to leaks, disabling leaks, and breaks should be included.

19. Section II.2.2.6 (page 3.9.8-14) - Ensure that the definition of principle four changes with DG-1061 and SRP chapter 19.

20. Section II.2.2.6 (page 3.9.8-14) -In the third paragraph, a sentence should be added referring to the guidance provided in DG-1063 and its appendices on evaluating uncertainties in piping failure probabilities. Also, in the fourth paragraph, second line, make "increases" singular.

21. Section II.2.3.1 (page 3.9.8-15) - In the first three paragraphs, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

22. What does the last sentence of the first paragraph on page 3.9.8-16 mean? Can the minimum numb[illegible] zero, for say a class 3 system? Does a truly LSS segment have to be labeled [illegible]S to meet this requirement or can we just say that some LSS segments are included for defense in depth or other considerations?

23. Section II.3 (page 3.9.8-17) - In the first paragraph, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

24. Section III (page 3.9.8-18) - In the fourth bullet, "plant probabilistic mode assumptions" is not standard terminology. Does this statement imply that at each update of the plant's PRA, an NRC review is required?

25. Section III.2.2 (page 3.9.8-19) - Change the second to last line from "in this regulatory guide" to "in DG-1063."

26. Section III.2.2.6 (page 3.9.8-21) - On the fifth line, replace "post" with "RI." Also, in the second line, replace "is" with "are," and "does" with "do." Again, note the need to stay current with language changes to DG-1061 principle four.

27. Section III.2.3.1 (page 3.9.8-21) - The categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

28. Section III.3 (page 3.9.8-22) - In the top paragraph, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

29. Section V (page 3.9.8-23) - In the third and fourth paragraphs, ensure that the text remains current with language changes to DG-1061 principle four.

30. Section V (page 3.9.8-23) - In the fifth paragraph, consider adding a reference to guidance in DG-1063.

31. Section V (page 3.9.8-23) - In the sixth paragraph, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

32. Section V (page 3.9.8-24) - In the third paragraph, the impact on fire protection systems is mentioned for the first time in this SRP chapter. If it is appropriate, it should also be include in section II.2.2.5. DG-1063 more specifically addresses consequential initiation of fire protection systems.

33. Section V (page 3.9.8-24) - In the last paragraph, the categories of "more safety significant" and "less safety significant" should probably be replaced with "high safety significant" and "low safety significant" to be consistent with DG-1063.

34. Section VII (page 3.9.8-25) - It is hoped that reference 6 will be updated to Revision 1 to incorporate valuable insights and lessons learned from the Surry pilot RI-ISI program.

35. P. 3.9.8-2, for consistency and completeness, the word definition for PRA should be stated before the acronym is used in the 2nd paragraph.

36. P. 3.9.8-2, Section I.1, this section states that the submittal is reviewed to confirm that the plant meets its current licensing basis. Without further explanation regarding the level of detail for this review, this statement is subject to a wide interpretation and could result in a detailed review which is not appropriate for approval of a RI ISI program. (Note that some clarification on the PRA review is provided in Section I.2.2.)

37. P. 3.9.8-13, Section II.2.2.4, third paragraph, in the first sentence recommend changing "the experts" to "plant experts." "The experts" are not defined.

38. P. 3.9.8-14, Section II.2.2.6, 3rd paragraph, the W/WOG approach regarding the uncertainty analysis as described in WCAP-14572, Revision 1, (p.123) should provide sufficient generic justification, along with plant-specific sensitivity analyses, for not performing plant-specific uncertainty analyses for each submittal.

39. P. 3.9.8-15, Section II.2.3.1, the first paragraph should reference DG-1063, Appendix 2, Section A2.7.1 for more information concerning risk measures for risk ranking. In addition, there is some inconsistency in that the SRP discusses RRW and RAW, while DG-1063 Appendix 2 discusses FV and RAW.

40. P. 3.9.8-16, second paragraph, recommend revising the second sentence to "In high safety-significant segments, the potential for pipe failure…" It should be clear in the SRP that segments selected for NDE are those in the high safety-significant category.

41. P. 3.9.8-17, the fourth paragraph states that the inspection intervals should be short so that degradation too small to be detected does not grow to an unacceptable size before the next inspection. Does this require additional work to demonstrate? Does this need to be in the SRP?

42. P. 3.9.8-17, the 5th paragraph should include significant changes to the PRA model for review in the RI ISI program update.

43. P.3.9.8-18, the fourth bullet includes plant probabilistic model assumptions as requiring NRC approval for changes in a RI-ISI program. This terminology is vague and could be interpreted in different ways. If a plant change requires a change to the plant PRA model, and the utility verifies that the model changes are correct, why does the NRC require prior approval? It should be sufficient that the utility maintain documentation which the NRC can audit if it chooses. The four bullets on this page are repeated on DG-1063 p. 14. Is this repetition necessary?

44. P. 3.9.8-18, Section III.1, What is the NRC asking for by requesting "detailed description of the industry and plant specific information applicable to the piping degradation mechanisms" ?

45. P. 3.9.8-19, Section III.2.2, what is completeness uncertainty? To what lengths should the utility have to address uncertainty?

46. P. 3.9.8-20, Section III.2.2.3, second paragraph, review of all of the surrogate components used in the PRA runs is implied by the wording. The process and some examples should be included in a submittal, however, review of all of the surrogate components is unnecessary. That level of detailed information will be available at the utility for NRC onsite review if deemed necessary by the NRC. The wording should be consistent with Section III.2.2.4 which states the procedures used are reviewed.

47. P. 3.9.8-21, what does the last sentence of the top paragraph mean?

48. P. 3.9.8-22, Section V, many of the above comments apply to the wording in this section.