August 4, 2003

Dr. Mario V. Bonaca, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: IMPROVEMENT OF THE QUALITY OF RISK INFORMATION FOR REGULATORY DECISION MAKING

Dear Dr. Bonaca:

Thank you for your letter dated May 16, 2003, which provides the Advisory Committee on Reactor Safeguard's (the Committee) views on "Improvement of the Quality of Risk Information for Regulatory Decision Making." As noted in your letter, the recommendations are in support of the Commission's direction to the staff in two Staff Requirements Memorandums (SRM). In a March 31, 2003, SRM on risk-informed changes to 10 CFR 50.46, the Commission stated that "the PRA should be a level 2 internal- and external-initiating event all mode PRA, which has been subjected to a peer review process and submitted to and endorsed by the NRC." Similarly, in an SRM dated March 28, 2003, the Commission directed the staff to "ask for specific comment in the Statements of Consideration on whether NRC should amend 50.69(c)(1)(i) to require a comprehensive high quality PRA. For example, this PRA should be a level 2 internal- and external-initiating event all mode PRA, which has been subjected to a peer review process and submitted to and endorsed by the NRC."

The Committee's recommendations focus on key issues that need to be addressed to achieve such "comprehensive high-quality PRAs." Further, the Committee's letter of April 21, 2003, (which provided the Committee's recommendations on proposed resolution of public comments on Draft Regulatory Guide DG-1122, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities"), also touched on these same issues. The Committee's April 21 letter was responded to in my letter dated June 4, 2003.

The staff's response to the recommendations in your May 16, 2003, letter (and related points from your April 21, 2003, letter) are provided below:

(1) ACRS May 16, 2003 Letter Recommendation: Completeness of risk information requires that probabilistic risk assessments (PRAs) address low-power and shutdown (LPSD) modes and "external" events, such as fires and earthquakes, in addition to power operations.

ACRS April 21, 2003, Letter Recommendation: The staff should provide guidance on acceptable qualitative characterization of risk contributions not calculated in limited-scope PRAs.

Staff Response: The staff agrees that when making risk-informed decisions, all contributors to risk should be considered, and that the best way to achieve this is with a full-scope PRA that addresses LPSD modes and "external" events, such as fires and earthquakes, in addition to power operations. However, the staff recognizes that the majority of licensees do not have such broad scope PRAs, and therefore, the staff will continue to make decisions by addressing the missing scope items in the manner discussed in Regulatory Guide (RG) 1.174 ("An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"). The staff concurs with the Committee that it is important to ensure, when methods other than PRAs (e.g., qualitative arguments or bounding analyses) are used to compensate for missing scope items, that they not result in decisions that are non-conservative.

In DG-1122, a full-scope PRA is defined as a PRA that addresses LPSD modes and "external" events, such as fires and earthquakes, in addition to power operations. For each of the technical elements of a full-scope PRA, the necessary attributes and characteristics are provided in DG-1122. However, it is recognized in DG-1122 that "methods other than PRA (such as bounding analyses) can be used to address risk issues." The staff expects that these approaches will limit the benefit licensees might obtain from risk-informed applications. DG-1122 does not, however, provide guidance on such other methods since its focus is on PRA standards. The staff has agreed to provide additional guidance in DG-1122, or in a separate regulatory guide, regarding acceptable characterization of other methods, such as bounding analyses, to ensure that they are reasonable approaches and that the appropriate level of realism and conservatism is addressed.

(2) ACRS May 16, 2003 Letter Recommendation: Guidance should be developed on how licensees and peer review teams should consider operating experience in order to improve PRA completeness.

ACRS April 21, 2003, Letter Recommendation: The staff needs to clarify how the capability categories are consistent with the provision in the regulatory guide that the event probabilities reflect the actual operating history and experience of the plant as well as applicable generic experience.

Staff Response: The staff agrees that operating experience needs to be addressed in any risk-informed application, and therefore, the PRA needs to reflect the operating history and experience of the plant as well as applicable generic experience. To address this issue, explicit guidance was added to the American Society of Mechanical Engineers (ASME) PRA standard ("Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications," ASME RA-S-2002). The staff believes that, for both the licensee and the peer reviewer, the explicit requirements in the ASME standard provide sufficient guidance for the plant operating experience to be reflected in the PRA. The standard also has requirements addressing the consideration of experience from similar plants, specifically in the initiating events, data analysis, and common cause analysis, to address the issue of completeness. In addition, the staff has agreed to add further discussion in DG-1122 to clarify how the ASME capability categories are considered to be consistent with reflecting the operating history and experience of the plant.

(3) ACRS May 16, 2003 Letter Recommendation: The assessment of uncertainties should address model uncertainties. Guidance for the quantitative evaluation of model uncertainties should be developed. In the letter, the Committee further notes that "more guidance regarding sensitivity and uncertainty analyses would contribute greatly to confidence in risk-informed regulatory decision making. Such guidance should include a clear discussion of the roles of sensitivity and uncertainty analyses, as well as practical procedures for performing these analyses. It should address not only how uncertainties should be treated in the PRA, but, also, how they impact decision making with examples to show the pitfalls if uncertainties are inadequately addressed."

ACRS April 21, 2003, Letter Recommendation: The final regulatory guide should include guidance on how to perform sensitivity and uncertainty analyses.

Staff Response: The staff agrees with the Committee. The ASME Standard provides requirements for the performance of sensitivity and uncertainty analyses addressing both parameter and model uncertainties. These requirements, however, are only in the context of identification of the uncertainties, the treatment of uncertainties, and the characterization of their impact on the results. The staff believes that the requirements in the standard, combined with the staff positions in DG-1122, provide sufficient guidance regarding the identification and understanding of the key uncertainties (both parameter and model). However, there is no guidance in the standard regarding the role of sensitivities and uncertainty analyses, i.e., the impact of uncertainties on decision making. While this issue is discussed in RG 1.174, the staff agrees that more guidance in this area would be beneficial. The staff is considering the feasibility of preparing additional guidance on risk-informed decision making with an emphasis on the treatment of uncertainties. This guidance would be used in every risk-informed activity in a support role similar to that of DG-1122.

In revising DG-1122 to address the above items, it should be noted that DG-1122 does not provide guidance on how PRA results are used in the application-specific decision making processes; that guidance is provided in such documents as:

- RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis"
- RG 1.175, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Inservice Testing"
- RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications"
- DG-1121, "Guidance for Categorizing Structures, Systems, and Components in Nuclear Power Plants According to Their Safety Significance"

DG-1122 is a supporting document to other NRC regulatory guides that address risk-informed activities. As guidance is needed on an application-specific basis, it will be incorporated into the appropriate application-specific guidance document. The attached figure shows the relationship of DG-1122 and risk-informed activities, application-specific guidance, consensus PRA standards, and industry programs.

In addition, as DG-1122 is revised, it will be revised to account for other findings, such as insights from the recent peer review of the San Onofre Nuclear Generating Station (SONGS) PRA. NRC staff observed an industry peer review of the SONGS PRA and noted the following:

- The ASME standard needs additional guidance in interpreting and applying some of the supporting level requirements. The peer review team intends to provide this feedback to ASME. The staff also intends to add this guidance, where appropriate, in DG-1122.

- The industry members believed that the standard had "raised the bar" with respect to PRA quality. While they did not necessarily believe that this was inappropriate, they believed that the consequences are that each licensee will have to modify its PRA to some degree, some more than others, to meet what the standard represents as "current good practices." (A set of principles and objectives were established by ASME (see DG-1122). One principle states that "The standard should be based on current good practices.")

The staff plans to meet with the Committee as the above guidance is developed.

Sincerely,

/RA/

William D. Travers
Executive Director
for Operations

Enclosure: As stated

cc: Chairman Diaz
Commissioner McGaffigan
Commissioner Merrifield
SECY

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Enclosure: As stated

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Commissioner Merrifield
SECY

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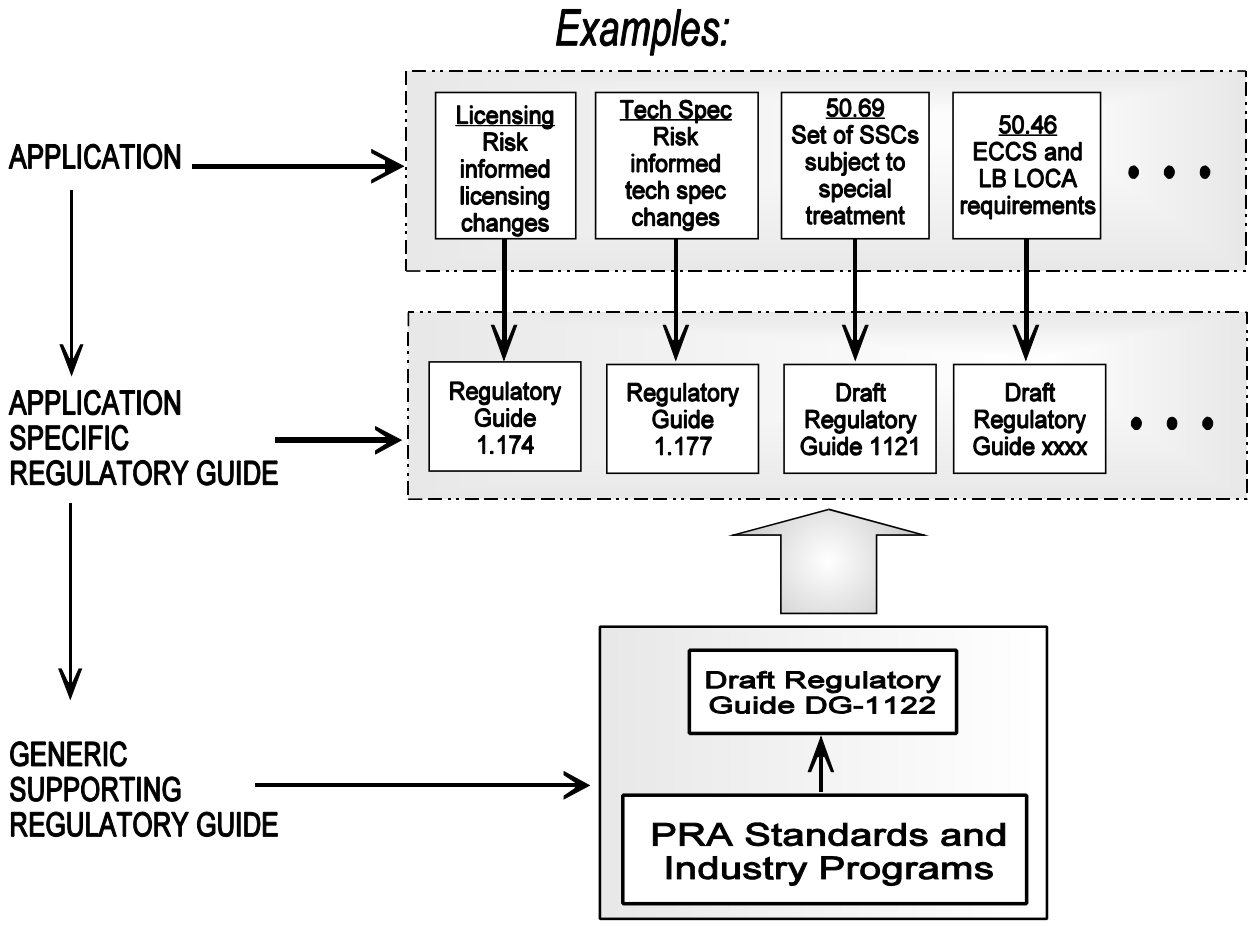
Attachment 1
Relationship of DG-1122 to Other Risk-Informed Guidance



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Concurrence Package

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML031980447.wpd

ORIGINATOR NAME: Mary Drouin

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SUBJECT: IMPROVEMENT OF THE QUALITY OF RISK INFORMATION FOR REGULATORY DECISION MAKING

DATE: 06/13/03

1. Drouin	06/ /03
2. Tech Editor	06/ /03
3. Giitter	06/ /03
4. Cunningham	06/ /03
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