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**Subject:** documents for today's meeting  
**Date:** Tuesday, July 24, 2012 12:06:44 PM  
**Attachments:** [NRC Concepts on IA - Industry Thoughts and Comments - NumericalFormat.doc](#)  
[IntegratedAssessmentGuidanceOutline\\_2012\\_07\\_24.docx](#)

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Ed,

Here are the documents for today's meeting. Please also add them to the scheduler.

**Thanks,**  
**Shelby**

## Industry Thoughts and Questions on Integrated Assessment Concept

### 1. Scope

1.1 The scope of the integrated assessment ISG should also include guidance on acceptable interim actions that might be needed at the time the flood reevaluations are completed if the evaluation results exceed the CLB.

### 2. Assumptions: We should develop a set of assumptions as a starting point for the IA. These will help focus our thinking. The assumptions that the industry listed in our draft IA guidance that we sent in a month or so ago listed the following:

2.1 The results of the flooding reevaluations for existing plants that use methodologies applicable to new plants are “beyond design basis”; the evaluations do not define a new licensing basis for the existing plant (50.54(f) letter, pg. 2, 4). Therefore the following applies:

2.1.1 Evaluation results do not create immediate operability concerns for affected SSCs.

2.1.2 The strategies used by licensees to address the results do not need to adhere to 10CFR50 Appendix B standards for safety related changes to plant design or procedures.

2.1.3 Note however, the NRC may decide to order a licensee to change its licensing or design basis subsequent to submittal of the reevaluation results or Integrated Assessment Report.

2.2 Credit can be taken for all available resources, both on-site and off-site (50.54(f) letter, pg. 2), including the use of systems, equipment, and personnel in non-traditional ways. For example, replenishing the spent fuel pool from the potable water or fire protection systems can be assumed as long as these systems would not be rendered non-function by the flood at the time they are needed.

2.3 The integrated assessment analysis can use a combination of mitigation and protection to address the flooding results (50.54(f) letter, pg. 2).

2.4 Temporary mitigation and protection measures can be credited (50.54(f) letter, pg. 2).

2.5 FLEX equipment can be used to mitigate the flood if FLEX is in place and available.

2.6 Combined events do not need to be assumed unless they can reasonably be expected to occur at the same time. For example, high winds and lightening should be assumed to occur at the same time as a flood due to local intense precipitation, but a seismic event need not be assumed (unless the seismic event caused the flood). ANSI/ANS 2.8-1992 “Determining Design Basis Flooding at Power Reactor Sites” provides additional guidance on combined events that should be considered.

2.7 Credit can be taken for non-safety related SSCs as long as the SSCs can be shown to be functional during the flood.

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2.8 Risk informed concepts can be used to estimate the feasibility of the flood hazard.

2.9 Flood timing effects can be used to determine how much time is available before the flood affects the site and how long flooding conditions persist.

### 3. Methodology

#### 3.1 Use of risk insights in the approach

3.1.1 Description of Risk Insights - Risk Insights is the term we should be using instead of PRA. We understand that this is not intended to be a PRA evaluation using RG 1.200 standards. Risk insights can be used to characterize the risk where we need to keep the concept of very unlikely extreme hazard in perspective. We should not be required to provide the same response to a 1,000,000 year flood as a 100 year flood.

3.1.2 The concept is a combination of deterministic and probabilistic approaches. It isn't clear how these will be integrated. In other venues (like standards meetings or committees) the NRC participants have encouraged standardization around accepted approaches and the avoidance of "one off" approaches.

3.1.3 What standard or process has been (or will be) developed that would yield consistent "risk-informed evaluations." In the absence of a defined process and standard, it is very likely that we would end up with multiple and overlapping conservative assumptions.

3.1.4 The IA approach may become problematic when it transitions from qualitatively developing risk insights to determining acceptable or unacceptable situations because of difficulty in developing the basis for acceptance criteria. For assessments that may involve quantification (which in this approach would seem to be associated with more demanding conditions) the accepted quantitative criteria (CDF, LERF) should be based on both the initiating event and the plant response risks. Will the IA approach not include initiating event risk?

3.1.5 In the past, any event that had a frequency of less than  $1 \text{ E}^{-06}$  was considered not credible. In the new environment of extreme and unlikely hazards is there a new threshold or thresholds? Would there be a line where physical modifications are required and another line where a FLEX type response would be considered acceptable?

3.2 Can you assume that a flood protection feature will perform as designed or do you have to verify its current condition (e.g., do you have to ensure that buried portions of a wall are intact?)

3.3 Identification of vulnerabilities – We need to define what is considered a vulnerability. If you have 6 inches of available margin for an extreme E-7 event, would that be considered a vulnerability? Does the graded approach apply here?

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3.4 Use of FLEX capability must be allowed as a means of mitigation. How FLEX can be applied must be determined.

3.5 Current HRA methods are OK for assessing execution of an action like an operator manual action, however the applications for flooding will be more complex, potentially consisting of a series of actions and precursors. Current HRA methods are not as suitable for these. Guidance developed for other applications involving operator manual actions (NUREG 1852 - Operator Manual Actions for Fire Events) have been around for quite a number of years and there is still debate over how to apply the content.

### **4. Acceptance Criteria**

4.1 Criteria for what are acceptable mitigating actions are necessary. Criteria should be developed for both deterministic (e.g., acceptable backup should be any available equipment considering the existence of the flood) and probabilistic (criteria based on conditional core damage probability) evaluations.

4.1.1 Are there any expectations for preventative maintenance and training?

4.1.2 Success criteria should consider warning times expected for floods and time estimates necessary for making equipment available.

### **5. Assessment of Results**

5.1 Evaluation of available margin – What would be considered adequate margin? It should not be left to judgment. A standard for defining/quantifying adequate margin should be established.

### **6. Other Considerations**

6.1 The staff responsible for traditional PRA applications should be engaged in the intent and development of this concept, which may incorporate elements significantly outside of their normal PRA practice. The review of IA submittals prepared by utilities may be done by NRC staff only familiar with traditional PRA applications who otherwise may not be familiar with the intent and development of this concept.

6.2 Determining (and crediting) equipment reliability data for use in the assessment will depend on the maintenance regime of the equipment. This will bring into question the Maintenance Rule classification of the equipment. Thus this assessment may influence other plant programs.

**Information requested from Integrated Assessment report:**

For the plants where the current design basis floods do not bound the reevaluated hazard for all flood causing mechanisms, provide the following:

- a. Description of the integrated procedure used to evaluate integrity of the plant for the entire duration of flood conditions at the site.
- b. Results of the plant evaluations describing the controlling flood mechanisms and its effects, and how the available or planned measures will provide effective protection and mitigation. Discuss whether there is margin beyond the postulated scenarios.
- c. Description of any additional protection and/or mitigation features that were installed or are planned, including those installed during course of reevaluating the hazard. The description should include the specific features and their functions.
- d. Identify other actions that have been taken or are planned to address plant-specific vulnerabilities.

**ISG Outline**

- Purpose
- Background
- Rationale
- Applicability
- Proposed guidance
- Implementation
- Backfitting discussion
- Final resolution
- Attachments
- References

## Draft outline of Attachment 1: Guidance for Performance of Integrated Assessment

### 1. Introduction

1.1 Recommendation 2.3 flood walkdowns and relationship to Integrated Assessment

1.2 Recommendation 2.1 flood hazard reevaluations and relationship to Integrated Assessment

1.3 Requested actions and information

1.4 Scope of Integrated Assessment

### 2. Terms, definitions, and concepts

### 3. Framework and key assumptions for Integrated Assessment

### 4. Guidance

4.1 Procedure for performing Integrated Assessment a

4.2 Applicable flood mechanisms and associated effects b

4.3 Key plant elevations and protection of equipment b

4.4 Evaluation of the effectiveness of flood protection systems under reevaluated hazard b

4.5 Evaluation of total plant response if the flood protection system is compromised b

4.6 Results b

For example:

- Significance of available margin in terms of the additional severity of the hazard that would be required to eliminate margin
- Effects on capability for shutdown (and maintenance thereof) of exceeding available margins
- Identification of vulnerabilities
- Risk-insights and cliff-edge effects

4.7 Additional protection and/or mitigation features that were installed or are planned including an evaluation of their effectiveness b c

4.8 Any other actions that have been taken or are planned to address plant specific vulnerabilities d

### 5. Report Documentation

Appendix A: Evaluation of flood protection

Appendix B: Evaluation of total plant response

Appendix C: Examples