

October 1, 2000

To: Committee on Nuclear Risk Management  
Project Team on PRA Standard

Ladies and Gentlemen:

Enclosed is a copy of the notes of a meeting of the ASME Task Group on [the] Proposed PRA Standard. As noted, this Task Group was formed as a result of discussions at a senior management level involving NRC Staff, Nuclear Industry and ASME in an effort to resolve issues raised concerning the acceptability and usefulness of the Draft 12 of the ASME PRA standard. The Task Group met on September 19-20, 2000 and developed the conclusions and recommendations contained in the notes. These were presented in summary form to the senior management group on September 21, 2000, and received favorable endorsement. NRC and Industry representatives agreed that a six-month schedule for completion of the Standard (assume completion to be CNRM approval) would satisfy their needs. They also indicated that they would continue to support the standard and provide resources to assist in its completion in this time period.

The ASME Committee on Nuclear Risk Management is requested to consider these recommendations when developing a strategy for completion of the Standard. It is expected that the assigned Project Team will continue to have primary responsibility for completion of the Standard. As noted in the minutes, the Task Group will be preparing some additional input to assist in implementing its recommendations. This is scheduled to be completed by October 30, 2000.

On behalf of ASME Nuclear Codes and Standards I would like to extend our appreciation to those who participated in this effort and we hope it will serve as a major step toward successful completion of the standard.

Sincerely,

John H. Ferguson  
Vice President  
Nuclear Codes and Standards

Cc: Board on Nuclear Codes and Standards  
Senior Management Group: Ashok Thadani, NRC, David Helwig, NEI  
Members: ASME TG on Proposed PRA Standard

# NOTES

## **ASME TASK GROUP ON PROPOSED ASME PRA STANDARD**

Meeting: September 19-20, 2000  
ASME Washington Center  
1828L St. NW Suite 906  
Washington, DC 20036

**00-01 BACKGROUND**

On September 9, 2000 an ASME Task Group on [the] Proposed ASME PRA Standard was appointed pursuant to a letter from GM Eisenberg, Director, Nuclear Codes and Standards. (Annex 1). The purpose of the TG was to evaluate the proposed Rev 12 of ASME PRA Standard against a set of key objectives agreed to jointly by a senior management group of executives from ASME, USNRC and the Nuclear Industry. Members of the TG were identified respectively by USNRC and Industry as knowledgeable technical experts who could represent their respective interests. All parties agreed that S.A. Bernsen, Chair of the Committee on Nuclear Risk Management would serve as facilitator. Results of the TG were reported to the senior management group at a public meeting on September 21 at 14:00 EDT at NEI offices. In accordance with ASME Codes and Standards policy meetings of the Task Group were open and the results are publicly available.

**00-02 TG MEMBERS**

The TG consisted of the following individuals:

- For USNRC:
  - Mike Cheok           NRC/NRR
  - Mary Drouin        NRC/RES
  - Gareth Parry       NRC/NRR
  - Nathan Siu         NRC/RES
  
- For Industry:
  - Bob Budnitz        Future Resources Associates, Inc.
  - Dave Bucheit       Dominion Generation
  - Jim Chapman        SCIEN TECH
  - Greg Krueger       PECO Energy
  - Doug True          ERIN
  
- Facilitator
  - Sid Bernsen         Consultant, ASME

**00-03 TASK GROUP CHARGE**

The Task Group was requested to evaluate a set of key objectives (Principles/Objectives for the ASME Standard, Annex 2) and provide the following conclusions and recommendations on the following:

- (1) Is it possible and/or appropriate for the standard to meet each objective?
- (2) To what extent does Draft 12 of the standard meet each objective?
- (3) Identify the critical technical issues associated with as many technical elements as possible.
- (4) Propose resolutions for the issues identified in (3) and provide examples of changes that could be made affecting structure and organization of the technical elements

#### 00-04 AGENDA

The TG adopted a preliminary agenda proposed by S.A. Bernsen as a basis for the discussions. It was recognized that this was flexible and would serve as a point of departure, since all participants were encouraged to identify issues and propose resolutions for all parts of the standard.

#### 00-05 CONCLUSIONS

##### (a) General Conclusions

All participants agreed the following general conclusions:

- The stated principles/objectives for the standard are appropriate and it is possible to meet them.
- While the content of Draft 12 addresses many of these objectives, problems exist in several areas. These are more specifically identified in the detailed comments.
- Draft 12 should and can be modified to be acceptable to the stakeholders represented by the TG.

##### (b) Detailed Observations/Comments

- (1) The current Objective Statements for the technical elements do not provide a clear description of the overall objective for each element and they are not always consistent with the High Level Requirement (HLR) Statements
- (2) The HLRs should be logically related to the Objective Statements
- (3) The SRs should fully implement the HLRs. (E.g., The SRs should be used to identify what is necessary to implement the HLR for each element and category)
- (4) In general, the level of detail in the supporting requirements (SRs) is sufficient to capture most of the technical issues required to meet the HLRs. Exceptions to this conclusion are:
  - Data Section is incomplete
  - Quantification section is too detailed.

- (5) The SRs should address certain technical topics which are important to risk and where a consensus methodology does not currently exist
  - A few missing issues need to be identified (e.g., BWR ATWS, Consequential SGTR, dual unit initiators, etc.)
- (6) The clarity of some SRs needs to be improved.
- (7) The current definitions for the categories are not clear and are not adequate to help formulate SRs.
  - Specific applications may span categories; therefore categories can not be defined by applications
- (8) Consistency in and between categories and technical elements needs to be improved
- (9) Section 6 - Peer Review
  - Needs enhancement with respect to methodology and documentation.
  - Should clarify that Peer Review is a process applied to evaluate the PRA and not to review specific applications of the PRA
- (10) Section 3 – The Application Process generally describes how the standard could be used in decision making processes involving the application of a PRA
  - More detail would be necessary to make this process work, but it is not appropriate to include this level of detail in the standard at this time
- (11) Additional references would be useful
- (12) Section 2, Definitions, needs improvement

## 00-06 RECOMMENDATIONS

- (1) Provide a clear description of the overall objective for each element.
- (2) Define HLRs that are logically related to the Objective Statements
- (3) Specify the minimum set of SRs that fully implement the HLRs for each category, paying particular attention to level of detail in the Data and Quantification sections (see item 4 above under Observation/Comments)
- (4) See recommendation 3 above
- (5) Technical topics which are important to risk and where a consensus methodology does not currently exist should be addressed (i.e., For each topic, the applicable SR should require documentation of approach, assumptions and significance)
- (6) The clarity of some SRs needs to be improved; for example:
  - (a) Many SRs include statements like “to the extent necessary to support category X applications” These should be replaced with statements tied to the category attributes for the technical element

(b) Use of the term “may” should be avoided and it is recommended that “may” should not be used as a lead statement but only to identify acceptable approaches subsidiary to a requirement. Also avoid use of unbounded permissives. Examples:

- if a “may” is used in Category I to allow an action required by a higher category, then doing the action should elevate that SR to the higher category, so “may” is not appropriate. Example IE-D3 CI&II, HR-B3 CI
- In IE-C2 CI rephrase to eliminate “may” For example “**DO NOT** truncate or subsume unless...”
- Others include: HR-E8 CI (although this requirement needs review for consistency among all categories); HR-F2 CI and HR-F4 (all categories are unclear), QU-B6 CI.

(c) The term “consider” should be defined and usage should be limited. If the recommendation to define lower limit of capability for SRs is followed, many uses of consider could be avoided.. (The ANS PRA standard on seismic events has a draft definition that might be a suitable basis for a definition in the ASME standard). Examples of usage of consider that should be revised include SC-C2 CI (shouldn't consider be dropped?) and AS-A12 CI (what else could one use?)

(7) Provide clear definition for the categories.

The TG developed the following proposed criteria for defining categories

Criteria	Category I	Category II	Category III
Degree of resolution/specificity of each PRA element	Sufficient to identify system and associated human action contributors (and their bases) to the results	Sufficient detail to identify contribution of SSCs and associated human actions (and their bases) to the results	Model SSCs and human actions that are implicitly credited in Category II
Degree to which plant-specific information is incorporated into the PRA element	Accounts for unique design and operational features of the plant	Reflects the as-built as-operated plant	Models the as-built as-operated plant
Degree to which realism is factored into the models and PRA results for each element	Applicable information used as input to technical analysis will have moderate (conservative) impact on the conclusions and risk insights as supported by good practices	Departures from realism in the technical analyses will have small impact on the conclusions and risk insights as supported by good practices	Departures from realism in the technical analyses will have negligible impact on the conclusions and risk insights as supported by good practices

(8) Improve consistency in and between categories and technical elements. The TG recommends that the SRs should define the lower limit of acceptability for each

category. Therefore, recommendations for enhancements in a Category I or II SR to match a higher category should be avoided.

- (9) Section 6 - Peer review needs enhancement
  - Definition of intent of term "methodology" needs to be clarified.
  - Methodology requirements should be enhanced
  - Emphasize that review is not an audit – it is an assessment
  - Value judgement is required
  - Documentation of facts and observations is essential
- (10) Section 3 – Application Process
  - Should be modified to clarify that it is an overall process for application of a PRA in conjunction with the requirements of the standard
- (11) Provide additional references to help clarify and explain the SRs. Primarily these should be references that are sources of information that can be used for explanation, not references that identify one of a number of acceptable methods because those referenced tend to become the only approach
- (12) Provide clear and accurate definitions

## 00-07 FOLLOW-ON WORK

### (a) Future TG Actions

TG members have agreed to provide the following additional input. It is expected that these actions will be completed by 10/30

- (1) With regard to Detailed Comment 5 concerning important technical topics and how to address them, the NRC members of the TG presented a draft list of Technical issues/assumptions that could have the ability to effect PRA results. It was understood that this was developed independent of a review of the SRs in Draft 12 to provide an independent check. Many of the items are already covered in Draft 12. This list will be refined and presented to the TG and CNRM Project Team to assist in implementing resolution of comment 9. For those topics not adequately addressed, it is recommended that they be noted in an SR for the appropriate element and documentation requirements include identification of the approach and assumptions used to treat the topic and the significance of the results (Recommendation #5).
- (2) Identify suggested additional references; however, it is recommended that the Project Team reconsider the reasons for elimination of some of the references contained in Draft 10 (Recommendation #11).

- (3) Submit proposed definitions for the categories appropriate to each technical element (Recommendation #7)
- (4) Propose revised statement of the objectives and HLRs for each element based on the recommendations contained herein (Recommendations #1&2)
- (5) Provide suggested changes to Section 3 (As support for Recommendation #10)
- (6) Identify existing comments and if necessary provide additional comments to help complete the Data element
- (7) Recommended changes to Section 6

(b) **Recommended future actions**

Many of the observations and recommendations developed by the TG are also reflected in comments received on Draft 12. Since it has been concluded that the scope, format and basic technical content of Draft 12 should, and can be modified to be acceptable, project team actions to complete the standard should continue. With the exception of Section 4, the TG believes that it would be appropriate for the project team to initiate review and resolution of comments on Sections 2,3,5, and 6 as soon as possible.

Following the submittal of TG input on Section 4, it is recommended that a "small" group of project team/TG members be assembled for a focused 1-2 week effort to organize and edit the content of Section 4 according to the revised principles. Following this, resolution of the comments (public comments on Rev 12) on Section 4 should be initiated.

**00-08 ADJOURNMENT**

The meeting was adjourned at 5:00 PM, September 20, 2000

Respectfully submitted,

SA Bernsen, Chair  
Committee on Nuclear Risk Management

**Annex 1**

**Date:** September 9, 2000

**To:** Sidney Bernsen (Chairman) Mary Drouin; Nathan Siu; Gareth Parry; Michael Cheok; Greg Kreuger; Doug True; Jim Chapman; Dave Bucheit; Robert Budnitz

**Subject:** Appointment of ASME Task Group on Proposed ASME PRA Standard

**Members:**

Some issues have been raised about the scope and purpose of the proposed ASME standard, and whether the approach meets the needs perceived by our main stakeholders. As a result of a meeting of senior management group of executives from ASME, USNRC and the industry, it was decided to assemble a group of experts representing these stakeholders who will evaluate these issues against predetermined key objectives and recommend possible paths to resolution. The results of these actions will be provided to the ASME CNRM for inclusion into the standard development process. Dr. Bernsen will be the Chairman and facilitator. The key objectives developed by the senior management group are shown in Annex 2.

**Task Group Charge**

The Task Group is requested to evaluate the key objectives provided in Annex 1 and make recommendations to the senior management group by:

- (1) stating whether or not it is possible and/or appropriate for the standard to meet each objective;
- (2) stating to what extent Draft 12 of the standard meets each objective
- (3) identifying the critical technical issues associated with as many technical elements as possible
- (4) proposing a resolution for the issues in (3), including (describe these conceptually and provide detailed examples of changes that could be made affecting structure and organization of technical elements)
- (5) Prepare report for the Senior Management Meeting 0900 on September 21 providing the results of 1,2, 3 and 4.

**Schedule**

A meeting of the task group has been set up as follows:

**Location:**

ASME Washington Center  
1828L St. NW Suite 906  
Washington DC 20036  
Phone: 202-785-3756

**Time/Date:** September 19-20, 2000 7:30A-5P each day

September 9, 2000

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The task group will report its findings to the senior management group in a meeting set up as follows:

**Location:** The meeting will be held on at the NEI offices:

1776 I St., NW Suite 400

Washington, DC 20006

(adjacent to Farragut West metro - Blue Line - exit platform on 18th street side)

**Time/Date:** September 21, 2000 from 2PM until 4PM

It is noted that every attempt to fulfill the above charge should be made during the 2-day period; however, if there is a problem or issue that cannot be resolved, this should also be reported. The management group will need to address this and follow up with additional assignment as required.

**Background/Reference Material**

Enclosed are:

- 1) Drafts 10 and 12 and white paper for Draft 12 of proposed ASME Standard For Probabilistic Risk Assessment For Nuclear Power Plant Applications (enclosed) note: Draft 12 and the white paper are also available on the ASME web site at the following URL (no password needed): <http://www.asme.org/cns/departments/nuclear/public/CNRM/DocumentReview.html>
- 2) Key objectives developed by the senior management group
- 3) NRC comments on Draft 12 Probabilistic Risk Assessment (PRA)
- 4) Peer Review Process Guidance NEI-00-02.

If hard copies of any of the above are needed, please contact me immediately and I will send them to you. We appreciate your willingness to participate in this effort.

Sincerely,

G.M. Eisenberg, Director  
Nuclear Codes and Standards  
(212)591-8510  
[eisenbergg@asme.org](mailto:eisenbergg@asme.org)

Cc: Senior Management Group  
Members: ASME Committee on Nuclear Risk Management  
Members: ASME CNRM Project Team on PRA Standard

**Annex 2****Principles/Objectives for the ASME Standard**

In the risk-informed environment in which NRC and industry are currently operating, PRA results are used as one, but not the only input to a decision-making process. Depending on the specific nature of the application, PRA results can play a more or less significant role. The extent to which the PRA results influence the decision will be impacted by the confidence the decision-makers have in those results. Accordingly, development of a Standard that promotes a consistent determination of the strengths and weaknesses of a PRA will directly impact the ability of decision-makers to efficiently establish a level of confidence in the results. The requirements of such a Standard provide a reference point for determining the strengths and weaknesses and also for evaluating alternative PRA approaches. The Standard should also recognize that in some areas methodology and data enhancements will occur over the next several years.

1. The PRA Standard needs to provide well-defined criteria against which to judge the strengths and weaknesses of the PRA so that decision-makers can determine the degree of reliance that can be placed on the PRA results of interest.
2. The Standard needs to be based on current good practices as reflected in publicly available documents. The need for the documentation to be publicly available follows from the fact that the Standard may be used to support safety decisions.
3. To facilitate the use of the Standard for a wide range of applications, categories can be defined to aid in determining the applicability of the PRA for various types of applications.
4. The Standard needs to be thorough and complete in defining what is technically required and should, where appropriate, identify one or more acceptable methods.
5. The Standard needs to require a peer review process that identifies and assesses where the technical requirements of the Standard are not met. The Standard needs to assure that the peer review process:
  1. determines whether methods identified in the Standard have been used appropriately;
  2. determines that, when acceptable methods are not specified in the Standard, or when alternative methods are used in lieu of those identified in the Standard, the methods used are adequate to meet the requirements of the Standard;
  3. assesses the significance on the results and insights gained from the PRA of not meeting the technical requirements in the Standard;
  4. highlights assumptions that may significantly impact the results and provides an assessment of the reasonableness of the assumptions;
  5. is flexible and accommodates alternate peer review approaches; and
  6. includes a peer review team that is comprised of members who are knowledgeable in the technical elements of a PRA, are familiar with the plant design and operation, and are independent with no conflicts of interest.
6. The Standard needs to address the maintenance and update of the PRA to incorporate changes that can substantially impact the risk profile, so that the PRA adequately represents the current as-built and as-operated plant.
7. The Standard needs to be viewed as a living document. Consequently, it should not impede research but needs to be structured such that when improvements in our state of knowledge occur, the Standard can easily be updated.