



Technical Meeting on the Verification and Validation of Severe Accident Management Guidelines

**IAEA Headquarters
Vienna, Austria**

12–14 December 2016

Ref. No.: J4-TM-50582

Information Sheet

A. Introduction

Accident management procedures, including emergency operating procedures (EOPs) and severe accident management guidelines (SAMGs), have been developed to help operators to prevent or mitigate the impacts of accidents at nuclear power plants (NPPs). Emergency operating procedures have been in use since the beginning of the use of nuclear power and they have been designed to enable operators to prevent incidents at NPPs from developing into severe core damage accidents. To supplement and enhance EOPs, severe accident management was first introduced in the 1990s with the creation of SAMGs following recognition that post-Three Mile Island EOPs did not adequately address severe core damage conditions.

The accident at the Fukushima Daiichi NPP in March 2011 highlighted the importance of ensuring that systems for the prevention and mitigation of accidents are separate and independent to the extent practicable for assuring an effective defence in depth. Establishing and maintaining multiple layers of defence against any internal/external hazards is an important measure to reduce radiological risks to the public and environment. Moreover, the global nuclear community also needs more reliable severe accident management guidelines to deal with extreme internal/external hazards at NPPs. In order to establish realistic and enhanced SAMGs, it is fundamental to promote sharing of the best current practices and to confirm the effectiveness of the guidelines. When SAMGs are in development, the technical accuracy and adequacy of the instructions and the ability of personnel to follow and implement the guidelines should be verified and validated. Even when SAMGs are already in place, a periodical review is required to validate and verify the efficiency of guidelines so as to identify any potential gaps during their implementation, for example, with regard to: interfaces with EOPs and emergency plans; responsibilities for implementing the guidelines; or any information needed to diagnosis the status of the plant during the accident. If changes are made to SAMGs, they should be revalidated in order to maintain their adequacy.

The processes of verification and validation of SAMGs play a crucial role in making sure that the accident management provisions in place will achieve the desired results. This meeting will provide an opportunity for technical discussions focusing on the current status of the methodology of verification and validation for SAMGs in Member States, and will also enable participants to share best practices and extensive knowledge accumulated following the Fukushima Daiichi accident.

Following the meeting, all the information shared and discussed will be used in developing a technical document on issues related to the verification and validation of SAMG effectiveness. This proposed new publication will provide guidance for Member States on the conduct of SAMG verification and validation activities.

B. Objectives

The purpose of the meeting is to support Member States in developing and implementing approaches for the verification and validation of SAMGs by sharing information on current best practices. In particular, the meeting aims to:

- Share the diverse current practices used to confirm the effectiveness of SAMGs, with a particular focus on the verification and validation of SAMG actions under severe accident conditions;
- Consider various issues related to the verification and validation of SAMGs; and
- Discuss effective approaches for implementing the verification and validation of SAMGs.

C. Topics and Format

The meeting will cover the following topics:

- Overview of international requirements, national regulatory and industry requirements, and issues related to the verification and validation of SAMGs;
- Strategy, tools and methodology for the verification and validation of SAMG effectiveness, including;
 - Using deterministic and probabilistic safety analyses;
 - Role of simulator exercises;
 - Role of exercises, drills and plant walkdowns;
 - Feedback from plant personnel involved in SAMG preparation and implementation and training programmes;
 - Issues related to crediting equipment recovery and use of non-permanent equipment (portable/mobile) in SAMG actions;
 - Issues related to reliance on human performance;
 - Integrated assessment for verification and validation of SAMG effectiveness;
 - Issues pertinent to the interface of the accident management programme with the emergency arrangements of the plant.
- Examples of recent experiences and issues related to SAMG verification and validation, such as, in particular, lessons learned from the Fukushima Daiichi accident (both from the regulatory body perspective and that of the nuclear industry); and
- Verification and validation of interfaces between onsite accident management activities and off-site emergency preparedness and response activities.

An opening plenary session will be held and invited speakers will give presentations related to recent experiences with the validation and verification of SAMGs in Member States.

Following the plenary session, four technical sessions will be held for discussions on the topics listed above. The meeting will close with a discussion during which the technical session chairs will summarize the conclusions and recommendations of their respective groups.

D. Participation

The meeting is targeted at international experts, in particular from Member States with experience in the operation of NPPs.

Participants should complete the attached Participation Form (Form A) as soon as possible and send it to the competent official authority (Ministry of Foreign Affairs or National Atomic Energy Authority) for transmission to the IAEA Secretariat (see Section M), to arrive no later than **30 September 2016**. The nomination of a participant will be accepted only if forwarded by the Government of an IAEA Member State or by an organization invited to participate.

The meeting is, in principle, open to all officially nominated persons. The IAEA, however, reserves the right to limit participation in case this becomes necessary due to limitations imposed by the available seating capacity. It is, therefore, recommended that interested persons take the necessary steps for obtaining their official nomination as early as possible.

E. Visas

Designated participants who require a visa to enter Austria should submit the necessary application to the nearest diplomatic or consular representative of the Austrian government at least four weeks before they travel to Vienna, Austria.

F. Expenditure

The IAEA is generally not in a position to bear the travel and other costs of participants in the meeting. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Such assistance can be offered upon specific request to normally one participant per country provided that, in the IAEA's view, the participant on whose behalf assistance is requested will make an important contribution to the meeting. The application for financial support should be made at the time of nominating the participant and should reach the IAEA Secretariat no later than **30 September 2016**.

G. Presentations

Participants are expected to give presentations in line with the scope of Section C above. Approximately 20 minutes will be allotted for each presentation, including floor discussion.

A completed Participation Form (Form A), indicating whether or not the participant intends to give a presentation, must be sent to the IAEA through the competent official authority not later than **30 September 2016**, together with an electronic version of the abstract (Form B) and responses to the attached Questionnaire.

H. Working Language

The working language of the meeting will be English. No interpretation will be provided.

I. Outputs

The results of the meeting will be reflected in a report which will summarize the results of the meeting.

J. Local Arrangements

The meeting will be held in Vienna, Austria, and will start on Monday, 12 December 2016, at 9.30 and end on Wednesday, 14 December 2016, at 16.00.

All the material for the meeting, including the agenda and information on the exact venue as well as local arrangements, will be sent to nominated participants once the completed Participation Forms have been received.

K. Meeting Secretariat

Scientific Secretaries:

Mr Anthony Ulses

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Administrative Coordinators:

Ms Mónica García Montes and Ms Jolanta Roch-Bräuer

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Subsequent correspondence on scientific matters should be sent to either of the Scientific Secretaries and correspondence on other matters related to the meeting to both of the Administrative Coordinators.

Participation Form

Technical Meeting on the Verification and Validation of Severe Accident Management Guidelines

IAEA Headquarters, Vienna, Austria

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To be completed by the participant and sent to the competent official authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA, or National Atomic Energy Authority) of his/her country for subsequent transmission to the International Atomic Energy Agency (IAEA), Vienna International Centre, PO Box 100, 1400 Vienna, Austria, either electronically by email to: Official.Mail@iaea.org or by fax to: +43 1 26007 (no hard copies needed).

Participants who are members of an invited organization can submit this form to their organization for subsequent transmission to the IAEA.

Deadline for receipt by IAEA through official channels: 30 September 2016

Family name:		Given name(s):		Mr/Ms
Institution:				
Full address:				
For urgent communications please indicate:		Tel.: Fax: Email:		
Nationality:		Designating Government or organization:		
Mailing address (if different from address indicated above):				
Do you intend to submit a paper? Yes <input type="checkbox"/> No <input type="checkbox"/> Title of presentation/paper:				

Instructions for the Preparation of Abstracts

Length

The extended synopsis must not exceed 800 words.

Copyright

Authors are responsible for ensuring that nothing in their papers infringes any existing copyright. If previously copyrighted material is included, authors must provide evidence that the copyright holder has given permission for its use.

Manuscript

Extended synopses should be written in English and converted to PDF format before submission. The extended synopsis should include a title, details of the authors and their affiliations, the email address of the corresponding author, and keywords. Throughout the extended synopsis, use Times New Roman font with single spacing between lines. The recommended font size is 14 point for the paper title and 11 pt elsewhere. The main text should be justified on both sides. The use of footnotes is discouraged. The length of an extended synopsis should not exceed two A4 pages (word count of approximately 800 words). Other specific guidelines for each section are given below.

Title: Please provide a descriptive title of the paper. The title should be concise, not span more than two lines, use Times New Roman font with a font size of 14 point and be in boldface. You should not capitalize the entire title.

Authors and Affiliations: Include the first name, middle initials and surname of all the authors. The name of the corresponding author should be underlined. The affiliations of all the authors should be included. The email address of the corresponding author should be indicated.

Keywords: Provide up to six keywords, separated by semicolons.

Tables: Tables should be numbered and captioned. As a guideline, the extended synopsis should not contain more than two tables.

Figures: The figures should be numbered and captioned. The figures can be produced in colour and should have a resolution of at least 300 dpi. As a guideline, the extended synopsis should not contain more than two figures.

Equations: The equations should be indented with the numbers displayed on the right side in parenthesis.

$$E = mc^2 \quad (1)$$

Acknowledgements: Any acknowledgements can be included at the end of the main body of the extended synopsis but before the references.

Citations and References: In the text, refer to literature citations in the author-year format, e.g. [Author, 2006] or [Author1 and Author2, 2007] or [Author 1 et al., 2008]. The references should be placed at the end of the extended synopsis in alphabetical order.

Questionnaire

for the

Technical Meeting on the Verification and Validation of Severe Accident Management Guidelines (Vienna, Austria, 12–14 December 2016)

Background and Objective

The purpose of the meeting is to support Member States in developing and implementing approaches for the verification and validation (V&V) of severe accident management guidelines (SAMGs) by sharing information on current best practices, with a particular focus on the V&V of SAMG actions under severe accident conditions.

With a view to collecting information on the V&V of SAMGs prior to the meeting, a set of consolidated survey questions are provided here in order to solicit inputs from the meeting participants. The input will be used for the group discussions during the meeting as well as for the preparation of a draft technical document on the subject of the meeting.

Survey completed by

(Member State, Organization(s))

No.	Survey	Intention of the Survey	Response (or provide write-up on separate pages if necessary)
1	<p>What kinds of SAMGs are, or will be, used in your country?</p> <p>If you are using generic SAMGs, indicate what kinds of SAMGs are being used, (i.e. Westinghouse Owners' Group (WOG) SAMGs, Boiling Water Reactor Owners' Group (BOG) SAMGs, CANDU Owners' Group (COG) SAMGs, etc.).</p> <p>Or</p> <p>if you are using plant specific SAMGs, provide a general description of the review of plant specific SAMGs in the development phase in accordance with the verification process.</p>	<ul style="list-style-type: none"> To summarize what kinds of SAMGs are, or will be, used in Member States. 	

2	<p>Are there any regulatory and industry requirements and guidance specifically for V&V of SAMGs in your country?</p> <p>If yes, what are they?</p>	<ul style="list-style-type: none"> • To summarize the international regulatory and industrial requirements and guidance concerning V&V of SAMGs. 	
3	<p>Provide a summary of the current status or plans to re-evaluate V&V of SAMGs in the light of the Fukushima Daiichi accident.</p>	<ul style="list-style-type: none"> • To provide a summary of the current state of knowledge related to V&V-based assessment of the effectiveness of SAMGs. 	
4	<p>What kind of approaches (a method or combination of methods, tools, data and computational aids, etc.) are, or will be, used in your country or organization for the V&V of SAMGs in general?</p>	<ul style="list-style-type: none"> • To provide a general description of methods and tools that can be used in the V&V of SAMG actions. • To discuss the merits and shortcomings (limitations) of each method and tools for the purpose of assuring the effectiveness of SAMGs. • To provide recommendations for further activities devoted to enhancing confidence in SAMGs. 	
5	<p>Are there any commendable practices regarding exercises, drills and plant walk-downs as a means of V&V of SAMGs?</p> <p>If yes, describe commendable practices</p>		