



60 Years

IAEA

Atoms for Peace and Development

Demonstration of the SAMG-D Toolkit

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Joint IAEA-ICTP Essential Knowledge Workshop on Nuclear Power Design Safety – Updated IAEA Safety Standards

9-20 October 2017

Trieste, Italy

01 Key objectives

- Implementing IAEA Action Plan on Nuclear Safety
- Strengthening global nuclear safety framework
- Sustaining and improving safe, reliable and efficient operation
- Strengthening preventive and mitigative domains
- Enhancing severe accident management measures

02 IAEA SAMG-D toolkit

Development of organizational structure

Development of emergency and accident response strategies

SAMG-D

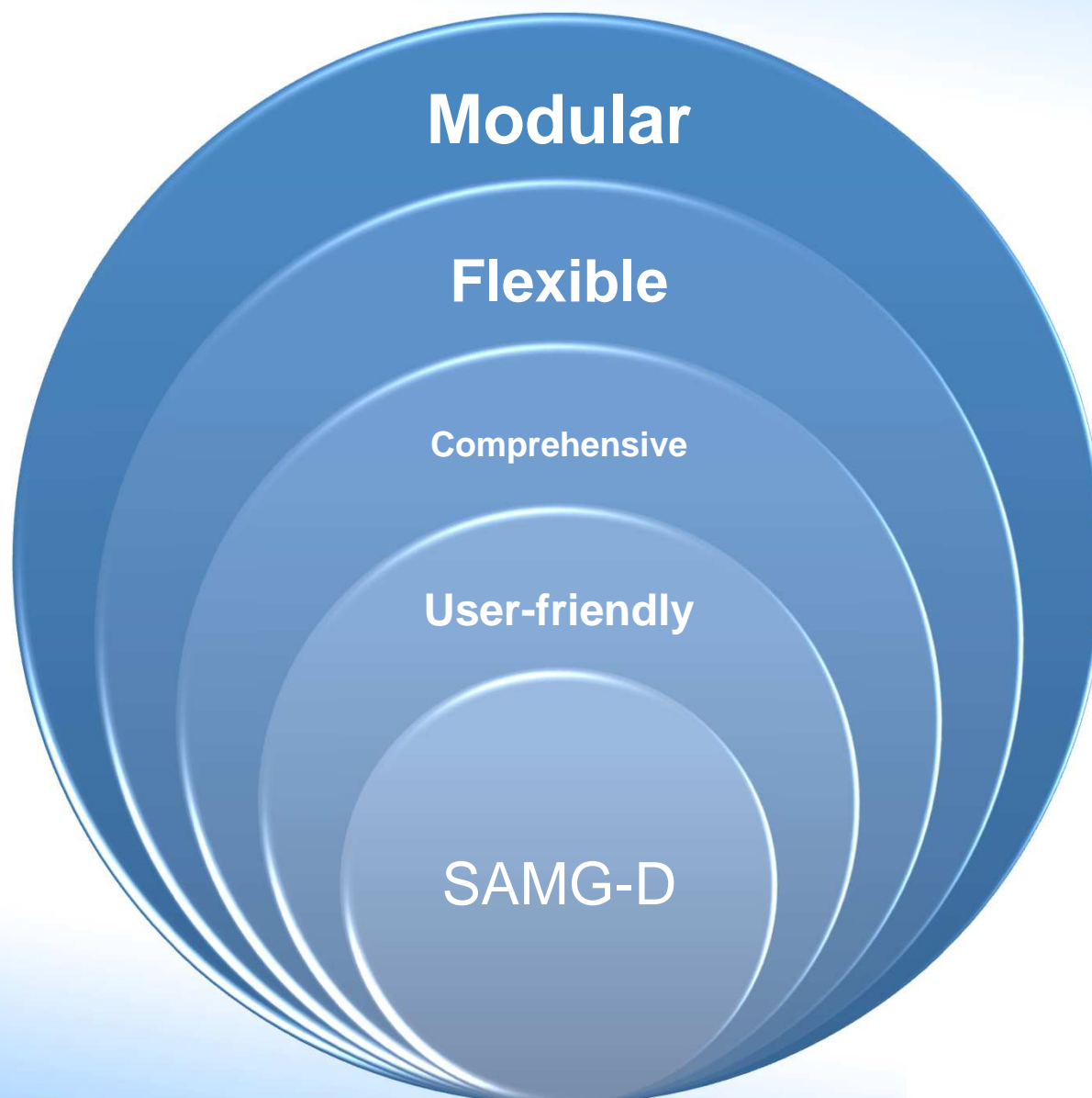
Severe Accident Management Guideline Development toolkit



Capacity building in newcomer Member States. Training

Development and implementation of guidelines

02 IAEA SAMG-D toolkit



03 SAMG-D released 2015



OVERVIEW OF THE SAMG-D TOOL



The Tool to enhance Severe Accident Management

The SAMG-D describes the elements necessary to develop a full package of Severe Accident Management Guidelines (SAMG), which serve to achieve the main goals of severe accident management at a Nuclear Power Plant (NPP). Severe accident management is a subset of accident management as follows:

Accident management is the taking of a set of actions during the evolution of a beyond design basis accident:

- (a) To prevent the escalation of the event into a severe accident;
- (b) To mitigate the consequences of a severe accident;
- (c) To achieve a long term safe stable state.

The second aspect of accident management (to mitigate the consequences of a severe accident) is also termed **severe accident management**. It includes measures to: [Read more →](#)

- (1) terminate the progress of core damage once it has started,
- (2) maintain the integrity of the containment as long as possible and
- (3) minimize releases of radioactive material.

See *Accident Management, Anticipated Operational Occurrence, Beyond Design Basis Accident, Design Basis Accident, Operational states, Severe Accident, and Severe Accident Management*.

Guidelines that have been developed for the operating staff for managing severe accidents are called Severe Accident Management Guidelines (SAMG).

The SAMG-D is also an education and training tool to help plant staff understand the context of severe accidents and the associated procedures and guidelines. The SAMG-D describes the elements that a full package of SAMG should encompass to achieve the goals of severe accident management. It is set up to help utilities to select proper SAMG products from the various vendors and implement those at their plants. The SAMG-D is designed for use with LWRs and PHWRs. **The SAMG-D is not designed to independently construct a full SAMG package.**

The IAEA Nuclear Power Technology Development Section (NPTDS) developed the SAMG-D also as a contribution to the [IAEA Action Plan on Nuclear Safety](#).

Please, before starting the use of SAMG-D have a look at the [DISCLAIMER](#) and the information provided in [About](#).

03 SAMG-D released 2015

SAMG-D

Severe Accident Management Guideline Development toolkit

Module 1

Fundamentals on reactor safety

Module 2

Severe accident management and mitigation strategies

Module 3

Severe accident management guidelines

Module 4

Implementation, requirements and infrastructure



The Tool to enhance Severe Accident Management

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- The second aspect of accident management (to mitigate the consequences of a severe accident) is also termed **severe accident management**. It includes measures to:
- (1) terminate the progress of core damage when it has stopped;
 - (2) maintain the integrity of the containment as long as possible and
 - (3) minimize release of radioactive material.

See Accident Management, Accident/Operational Occurrences, Beyond Design Basis Accident, Design Basis Accident, Operational Status, Severe Accident, and Severe Accident Management.

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03 SAMG-D released 2015

SAMG-D toolkit

<https://www.iaea.org/NuclearPower/SAMG-D/index.html>



The screenshot shows the IAEA website's 'Nuclear Power (NENP)' section. The main heading is 'The IAEA Severe Accident Management Guideline Development SAMG-D Toolkit'. Below the heading, there is a paragraph describing the purpose of SAMG-D: 'Nuclear power plants (NPPs) have been designed to withstand a large number of incidents and accidents, so that possible radiological consequences will be low and within predefined limits. NPPs have been equipped with a number of safety systems to control such incidents and accidents, together with a set of emergency operating procedures (EOPs) which help the operators to achieve a final stable and safe end state. In the unlikely case when the event cannot be controlled, fuel damage must be expected and that will possibly be followed by containment damage and a large radioactive release. For such accidents, called 'severe accidents', mitigatory actions are still possible, using available and - in some cases - dedicated plant equipment. Severe accident management guidelines (SAMGs) have been developed to provide operators with systematic guidance on the mitigatory actions to be taken during such accidents. The main objective of SAMGs is to utilize any available equipment at the NPP to terminate core damage, maintain containment integrity, and minimize off-site radionuclide releases. The development of SAMGs in different countries has led to different formats depending on the type of reactor, the industry that developed the guidance, and the various regulatory requirements.'

In connection with the implementation of the IAEA Action Plan on Nuclear Safety, the International Atomic Energy Agency (IAEA) has developed a training resource called the SAMG-D ("Severe Accident Management Guideline Development") toolkit.

Download SAMG-D Toolkit

Click to download

The screenshot also shows a sidebar with a navigation menu. The 'Severe Accident Management Guideline Development' item is highlighted. Below the main text, there is a thumbnail for the SAMG-D toolkit, which includes a title 'The Tool to enhance Severe Accident Management' and a list of objectives: (1) To improve the operation of the core into a severe accident, (2) To minimize the release of radionuclides, and (3) To achieve a long term safe stable state.

03 SAMG-D released 2015

SAMG



The screenshot shows a web browser window displaying the SAMG-D website. The browser's address bar shows the file path: \\nsni-home\NSNI-Home\HIRANUMAN\Desktop\SAMG-D\default.html. The website header features the IAEA logo and the title "IAEA SAMG-D Severe Accident Management Guideline Development Tool". A navigation menu includes links for Module 1, Module 2, Module 3, Module 4, Publications, Glossary, and About. The main content area is titled "OVERVIEW OF THE SAMG-D TOOL" and contains a large image of workers in white protective suits at a nuclear facility. To the right of the image is the heading "The Tool to enhance Severe Accident Management" followed by a detailed description of the SAMG-D tool and its objectives. Below this, there are two columns for "MODULE 1" and "MODULE 2", each with a heading and a "Go to Module" link. The "Fundamentals on Reactor Safety" module includes a diagram of a reactor core. The "Severe Accident Challenges and Mitigation Strategies" module includes a photograph of a nuclear power plant. A small window on the right side of the browser shows a file size list with entries for 7 KB, 16 KB, and 1 KB.

IAEA.org

IAEA SAMG-D Severe Accident Management Guideline Development Tool

Module 1 | Module 2 | Module 3 | Module 4 | Publications | Glossary | About

OVERVIEW OF THE SAMG-D TOOL

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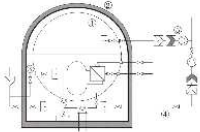
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MODULE 1

Fundamentals on Reactor Safety

[Go to Module 1 »](#)

Module 1 consists of two parts: 1a and 1b. **Part 1a** presents the **basic concepts of nuclear safety**. This includes concepts such as the fundamental safety principles, defence-in-depth, design basis accidents and design extension conditions. Part 1a can be skipped by people who are familiar with these basic elements of nuclear safety.



Part 1b presents the nature and role of procedures and guidelines to mitigate the consequences

MODULE 2

Severe Accident Challenges and Mitigation Strategies

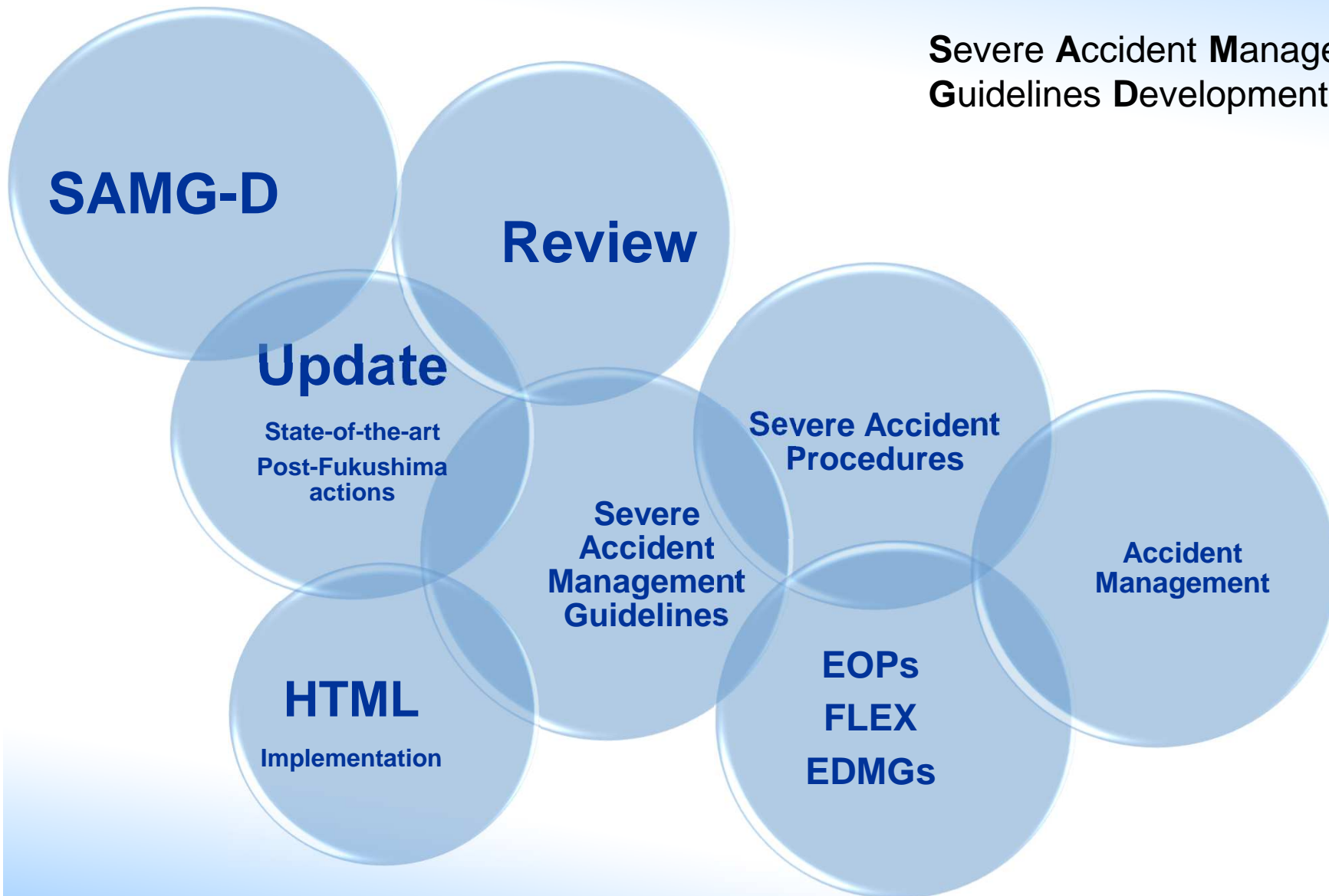
[Go to Module 2 »](#)

Module 2 describes the **complex physicochemical and radiological phenomena** associated with severe accidents. It identifies the processes that challenge fission product boundaries and the potential releases if these fail. It indicates possible strategies to protect the fission product boundaries and, where the protection fails, to mitigate releases.



04 SAMG-D review and update

**Severe Accident Management
Guidelines Development toolkit**



04 SAMG-D review and update

SAMG-D

Severe Accident Management Guideline Development toolkit

Intro

Fundamentals on reactor safety

Module 1

Accident management

Module 2

Severe accident management and mitigation strategies

Module 3

Severe accident management guidelines

Module 4

Implementation, requirements and infrastructure





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Atoms for Peace and Development

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Thank you!