

Actions to Mitigate the Consequences of Radiological or Nuclear Emergencies

IAEA-KINS Workshop on the Emergency Preparedness and Response to Nuclear and Radiological Emergencies

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Introduction

- Requirement 8: *“The government shall ensure that arrangements are in place for taking mitigatory actions in a nuclear or radiological emergency”*

Definition. Mitigating Action

- Action to **reduce** the severity or seriousness of an event, generally before the implementation of urgent or early public protective actions



Image courtesy IAEA

Discussion

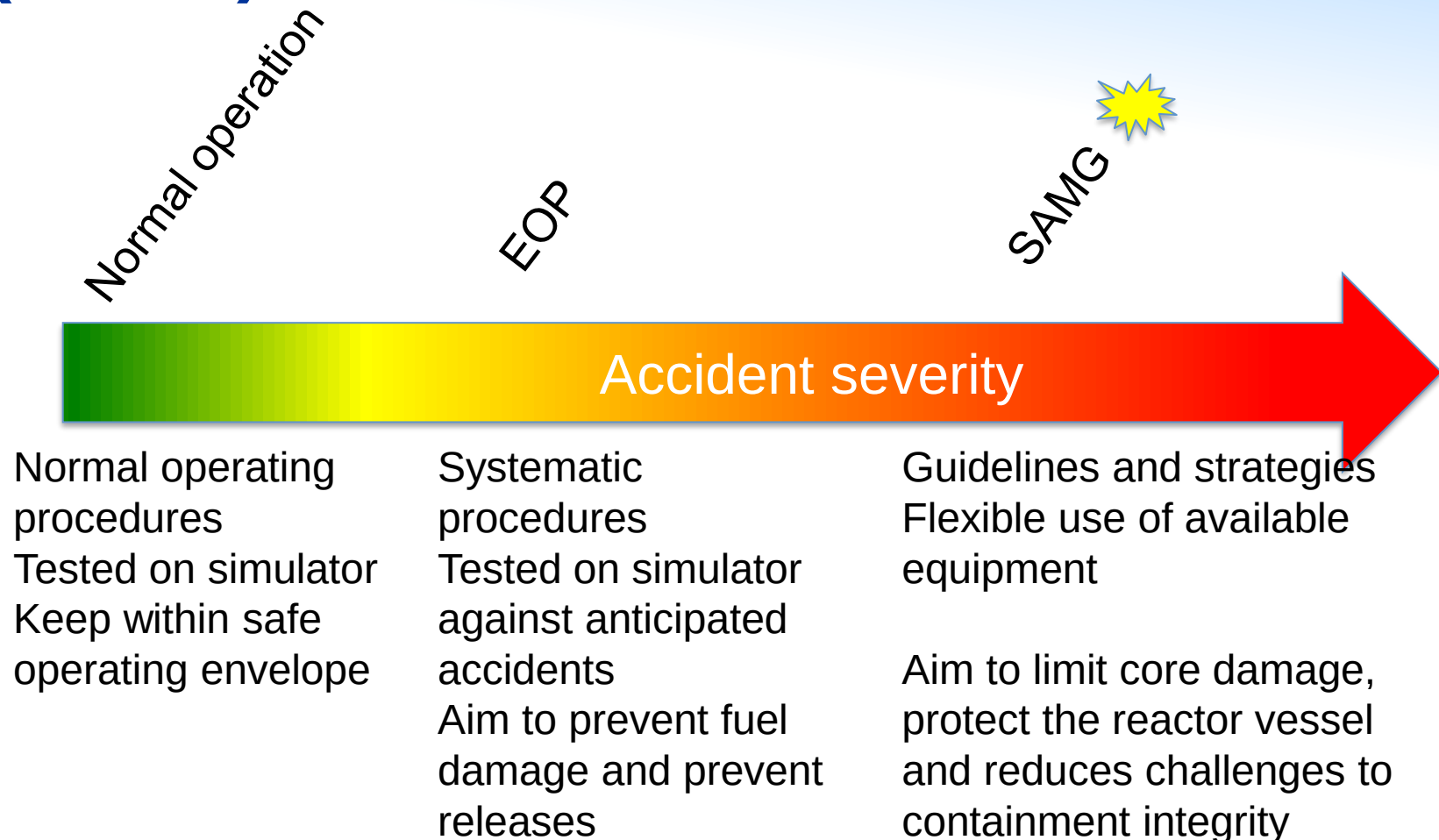
- Can you give examples of actions that could mitigate the impact of a nuclear or radiological emergency?
- What advantages and disadvantages you see in these actions?



Mitigatory Actions for Nuclear Facilities

- Emergency operating procedures (**EOP**)
 - To control transients such as Loss of Coolant Accidents, reactivity excursions, system failures, etc.
- Severe Accident Management Guidelines (**SAMG**)
 - To prevent releases when EOPs don't work anymore
- Firefighting
- Damage control

Severe Accident Management Guidelines (SAMG)



 When SAMGs are triggered, the situation is serious

Challenges in Mitigation

- The facility organization is stressed to the limit
- A technical support centre is required
- External resources are required and need to integrate with the facility organization seamlessly
- Special deployable equipment is required
- Communications is even more complex than usual



Image courtesy IAEA

Storage and Research Facilities.Examples

- Fire
 - Firefighting
 - Onsite team
 - Offsite support
- Spill
 - Containment
 - Ventilation isolation
 - Drain isolation



Image courtesy IAEA

Challenges

- Facility capabilities are usually limited
- External firefighters required
 - They need to be trained
 - They need to be supported
 - They need protection and dosimetry
 - Emergency workers designation?
 - Facility support required
- What is the **procedure** outside working hours?

Mitigation for Transport Accidents

- Main mitigation actions are:
 - Firefighting
 - Containment of spills
 - Isolation of radioactive sources
 - Isolation of potentially contaminated bystanders



Image courtesy IAEA

Identification of Challenges

- Transporter is first to take action... if not incapacitated
- Witnesses and bystanders are first at the scene, but their mitigating capabilities are limited
 - They may worsen the situation and create (more) contamination
- First responders are first qualified responders at the scene
 - But can they identify the presence of radioactivity?
 - Do they know how to respond?
 - Will they respond if they know the scene is radioactive?

Challenges.What is Needed?

- Adequate **arrangements** for the transporter and the consignor to take prompt response actions at the scene
- Familiarization **program** and adequate **equipment** for all first responders
 - To recognize the presence of radiation
 - To take appropriate actions to contain the hazard

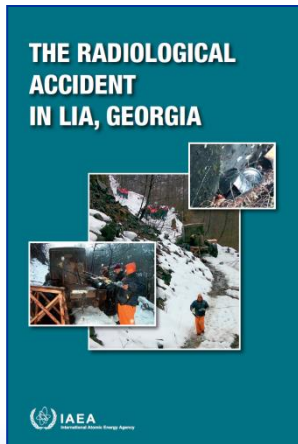
Other Emergencies Include

- Lost or stolen sources
- Found sources or contamination
- Security events involving radioactive material

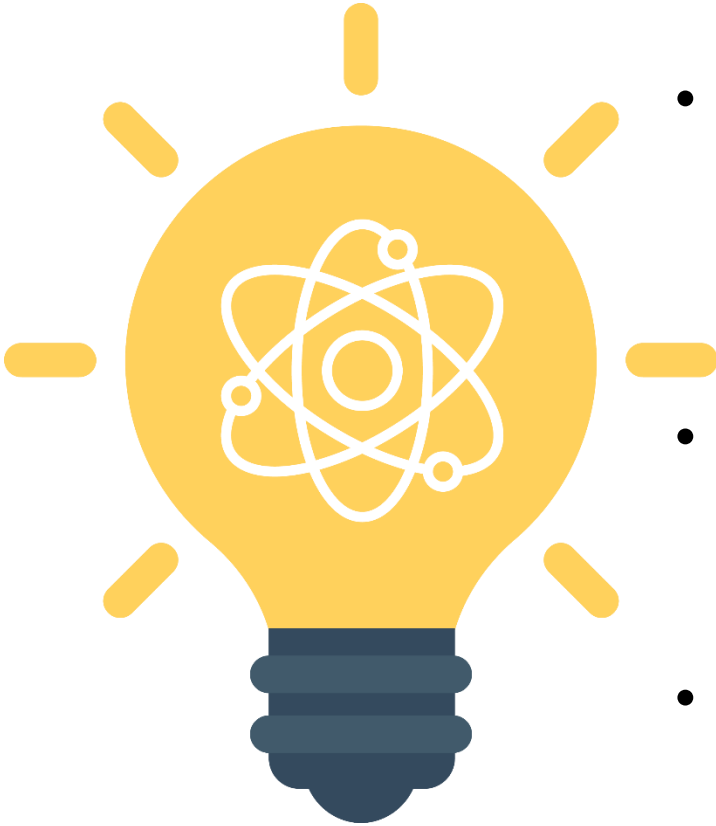


Mitigation Includes:

- Prompt **plans** to find the source
 - Integrated and coordinated response
 - Public information strategy
- **Shielding** and **isolation** when the source is found



Key Points



- For nuclear facilities, mitigatory actions include EOP, SAMGs and firefighting
- For all facilities, arrangements with external resources must be in place
- For transport and other EPC IV events, external organizations must all have a basic knowledge of what to do when radioactivity is encountered

Where to Get More Information

- IAEA GSR Part 7 (2015)
- IAEA GS-G-2.1 (2007)
- IAEA EPR-Method (2003)
- IAEA NS-G-2.15 (2009)
- IAEA WS-G-6.1 (2006)

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Thank you!

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