IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Concept of Operations for a Nuclear or Radiological Emergency in EPC I - V

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

19 - 23 June 2023, Daejeon, Republic of Korea

Review: Summary of EP Categories

EP Category	Criteria	Facility/activity example
I	Severe deterministic health effects off-site	Power Reactors
II	Warranting urgent protective actions off-site, deterministic health effects on-site	Research Reactors
III	No urgent protective actions off-site are warranted, severe deterministic health effects on-site	Large radioactive sources
IV	Activities and acts with the potential to trigger a radiation emergency that could warrant protective actions and other response actions in an unforeseen location	Transportation of sources
V	Areas within emergency planning zones and distances for a facility in category I or II not located in the State where the facility is located	EPC I or II

Emergency Classification System

- Triggers fast and coordinated on- and off-site response based on emergency action levels (EAL) i.e. pre-determined observable thresholds

Class	Plant conditions	Protective actions off site
General emergency	May not be safe off site • Projected or actual severe damage to fuel • Loss of control	Immediate urgent protective action
Site area emergency	If additional failures → severe damage to fuel	• Alert officials and public to prepare • Off-site monitoring
Facility emergency	On site risk only	None
Alert	Degraded or uncertain conditions; For reactor, no known danger to fuel	None

EPC I and II

- For EPC I and II the primary radiological risk comes from **atmospheric releases** and the possibility of severe health effects off-site

Image courtesy IAEA

Emergency Action Levels (EALs)

- Trigger for classification of the emergency
- Predetermined threshold observable during emergency conditions

Plant conditions (e.g. SF loss)

Radiological monitoring

Other hazards/ threats

Images courtesy IAEA

Public Risk

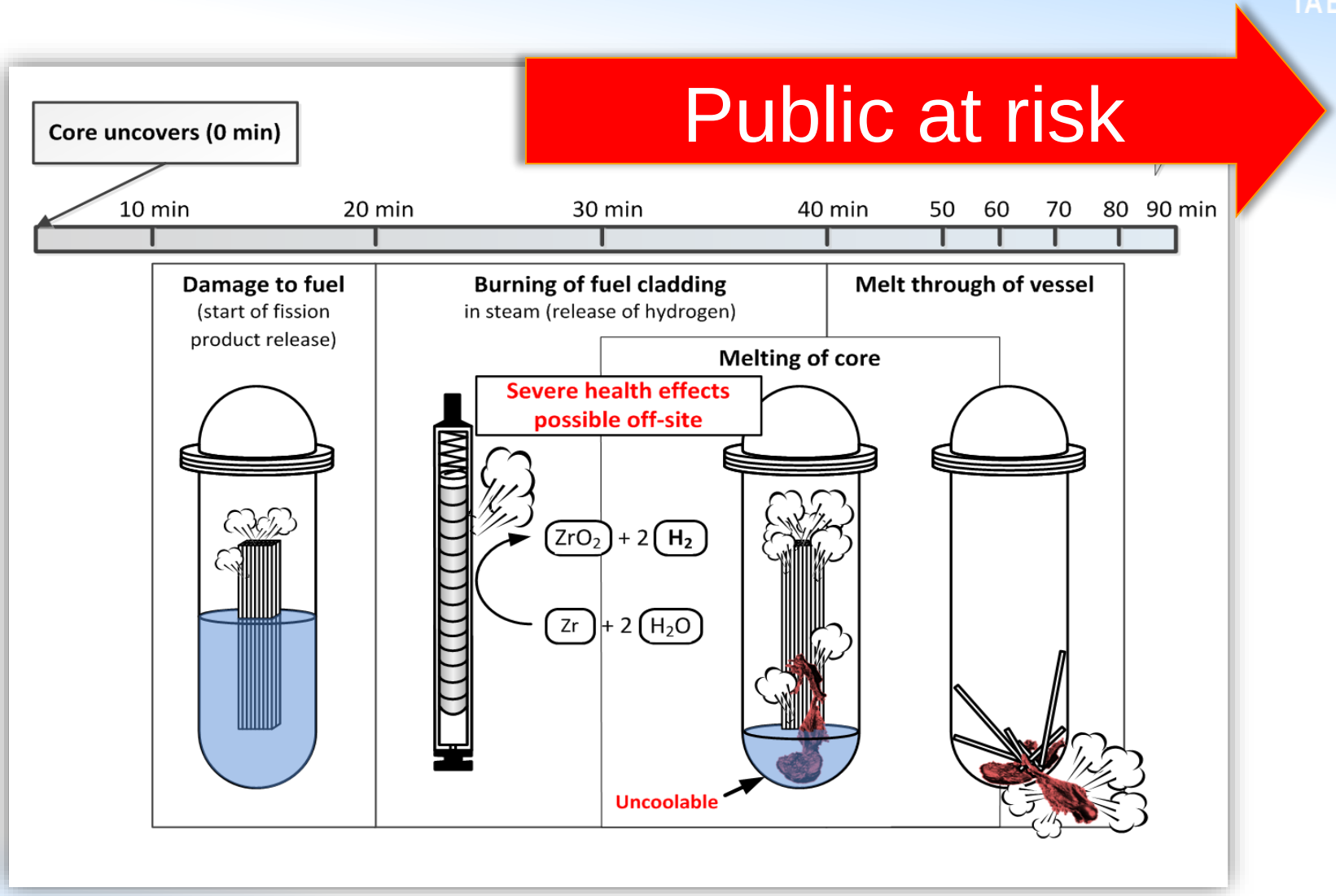
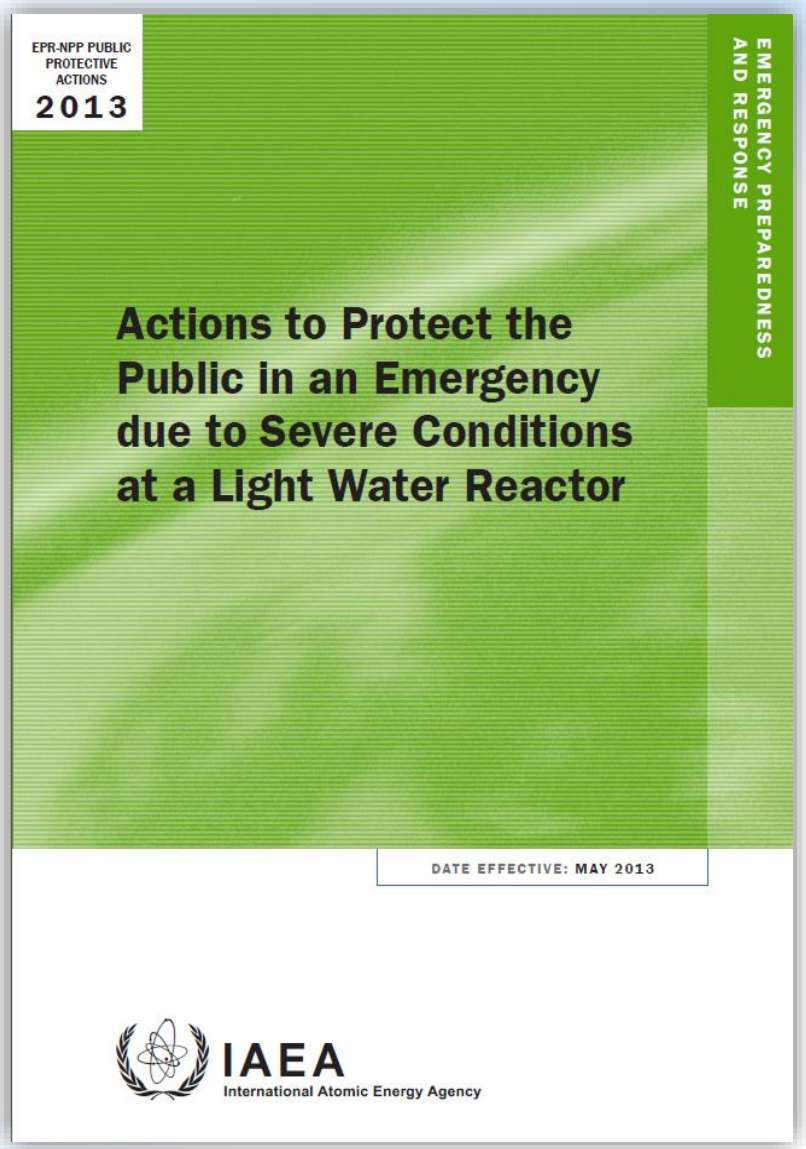


Image courtesy IAEA

Rule of thumb: Core heats up at 1 K/s after shutdown if not covered with water

EPR-NPP-Public Protective Actions 2013

- Presents a sample (generic) concept of operations for a LWR or its spent fuel pool (i.e. EPC I)
- Not intended to replace a site specific concept of operations
  - Needs to be adapted to fit the local conditions



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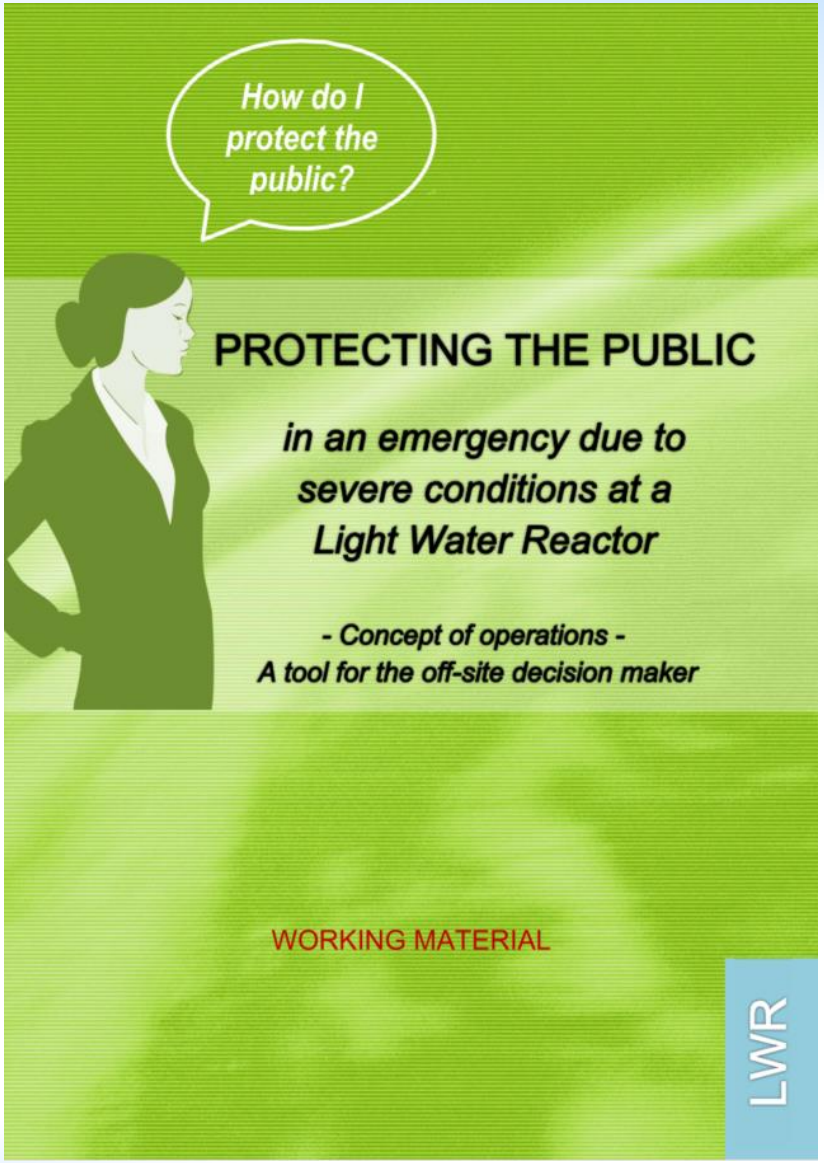
Concept of Operations in EPC I or II

Open your copy



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Structure

- Checklist
- Concept of operations
- Steps 1 to 7

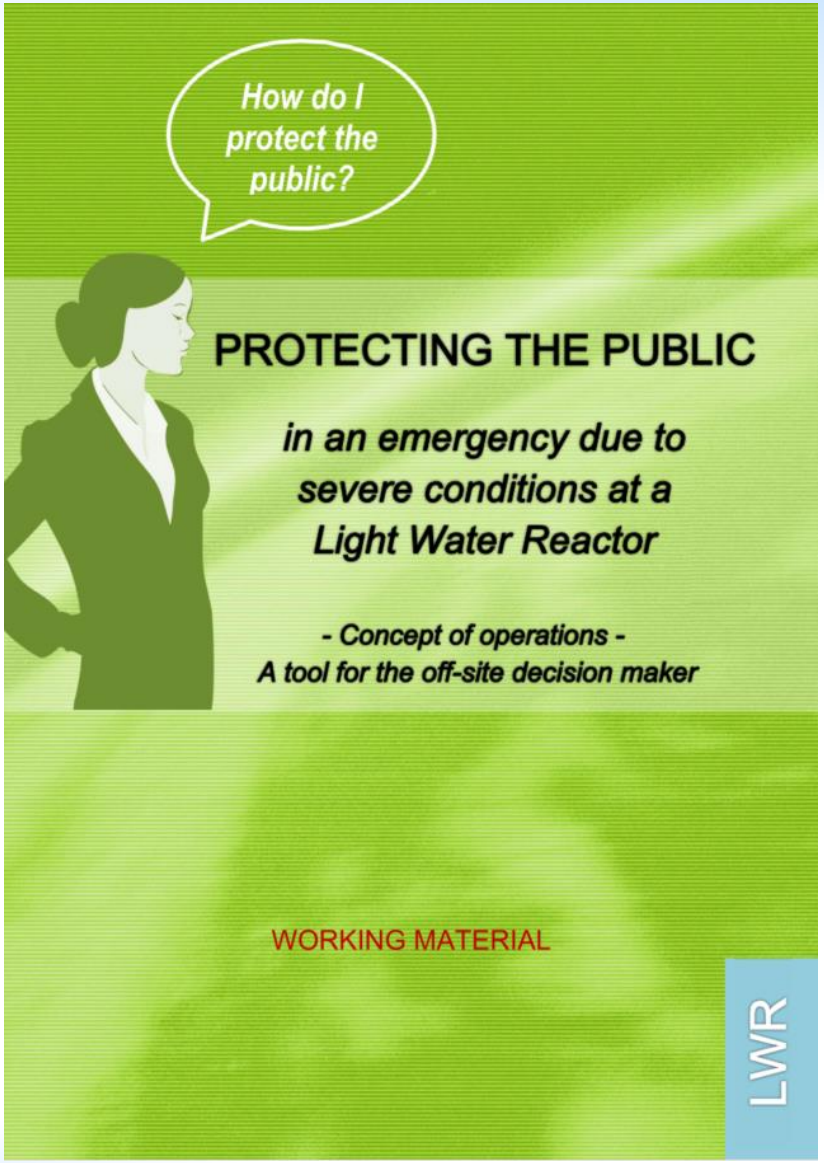

Image courtesy IAEA

Checklist

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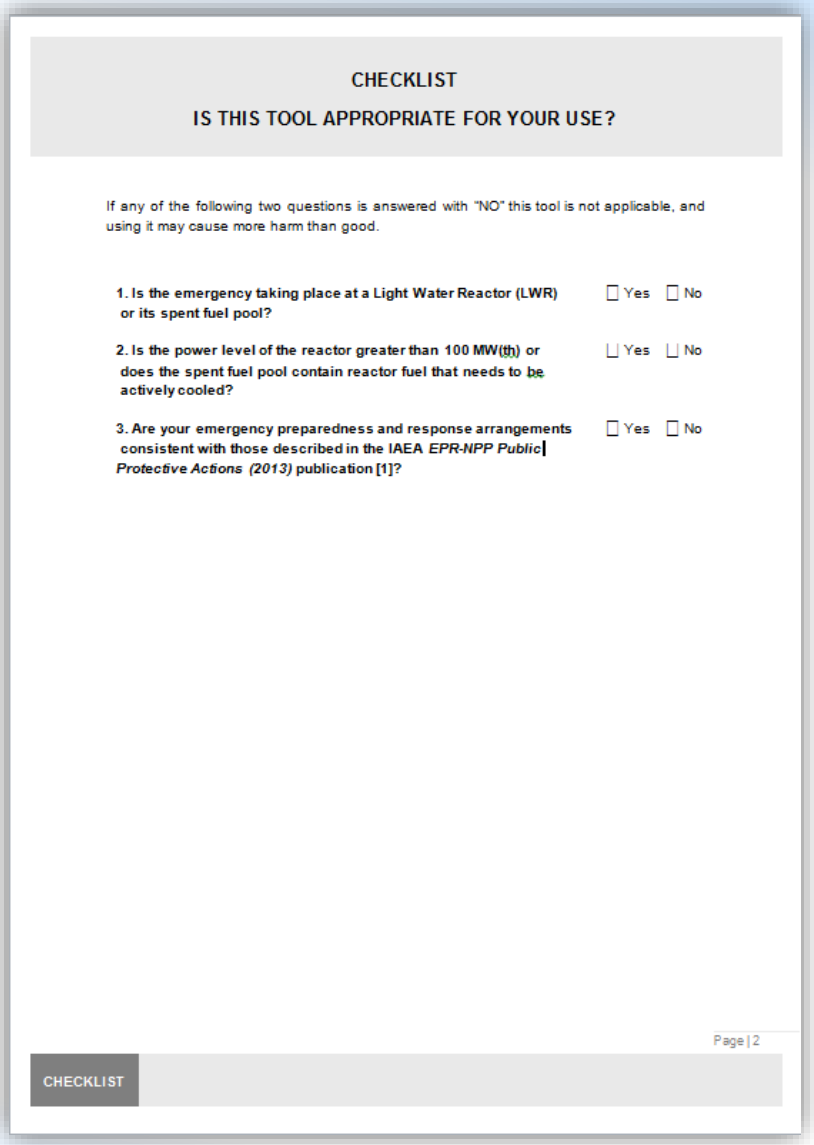
- Intended to make sure you don't use the tool if it isn't applicable
- If any of the two first questions is answered with "NO", this tool is not applicable
  - Using it may cause more harm than good



CHECKLIST

IS THIS TOOL APPROPRIATE FOR YOUR USE?

If any of the following two questions is answered with "NO" this tool is not applicable, and using it may cause more harm than good.

1. Is the emergency taking place at a Light Water Reactor (LWR) or its spent fuel pool? ☐ Yes ☐ No
2. Is the power level of the reactor greater than 100 MW(th) or does the spent fuel pool contain reactor fuel that needs to be actively cooled? ☐ Yes ☐ No
3. Are your emergency preparedness and response arrangements consistent with those described in the IAEA *EPR-NPP Public Protective Actions (2013)* publication [1]? ☐ Yes ☐ No

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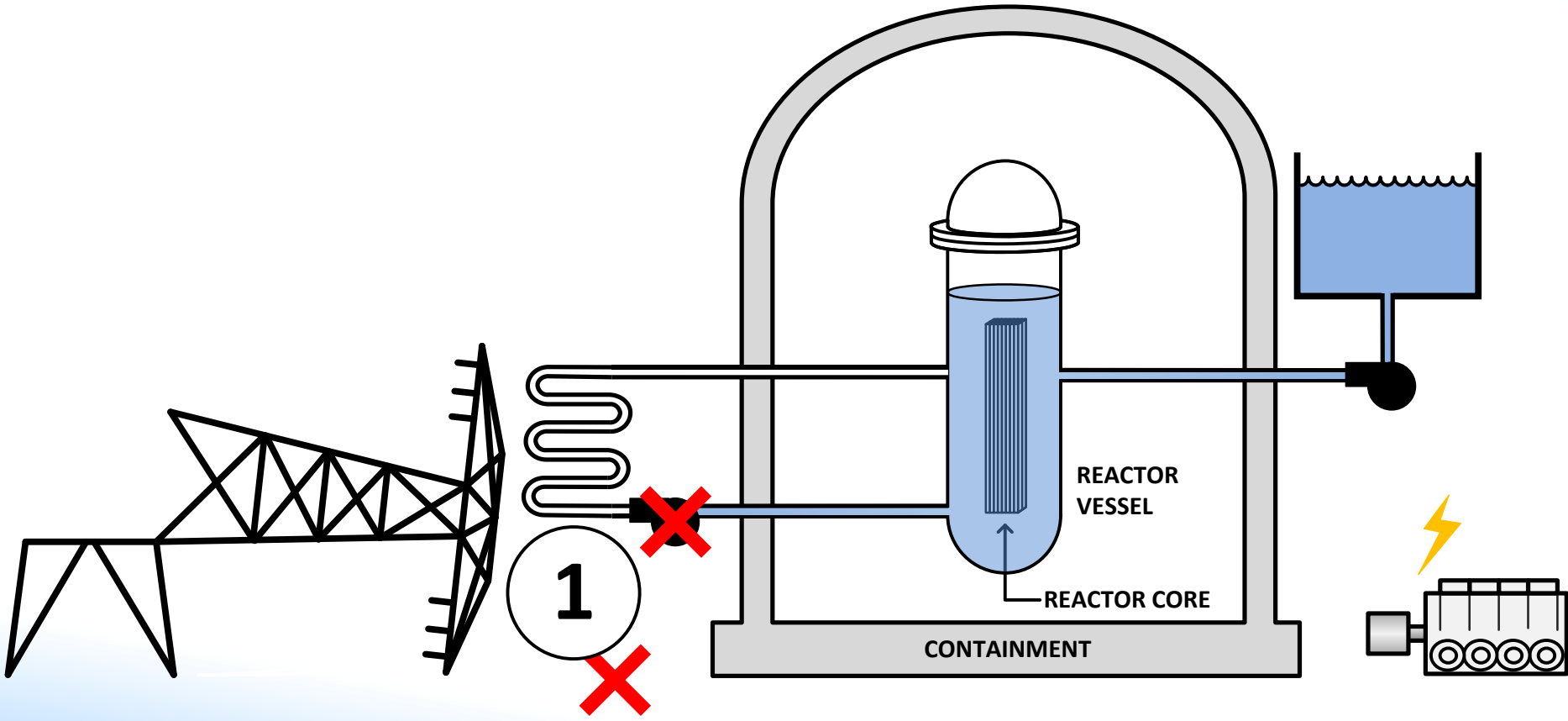
CHECKLIST

Image courtesy IAEA

Example Event that May Lead to a Severe Release



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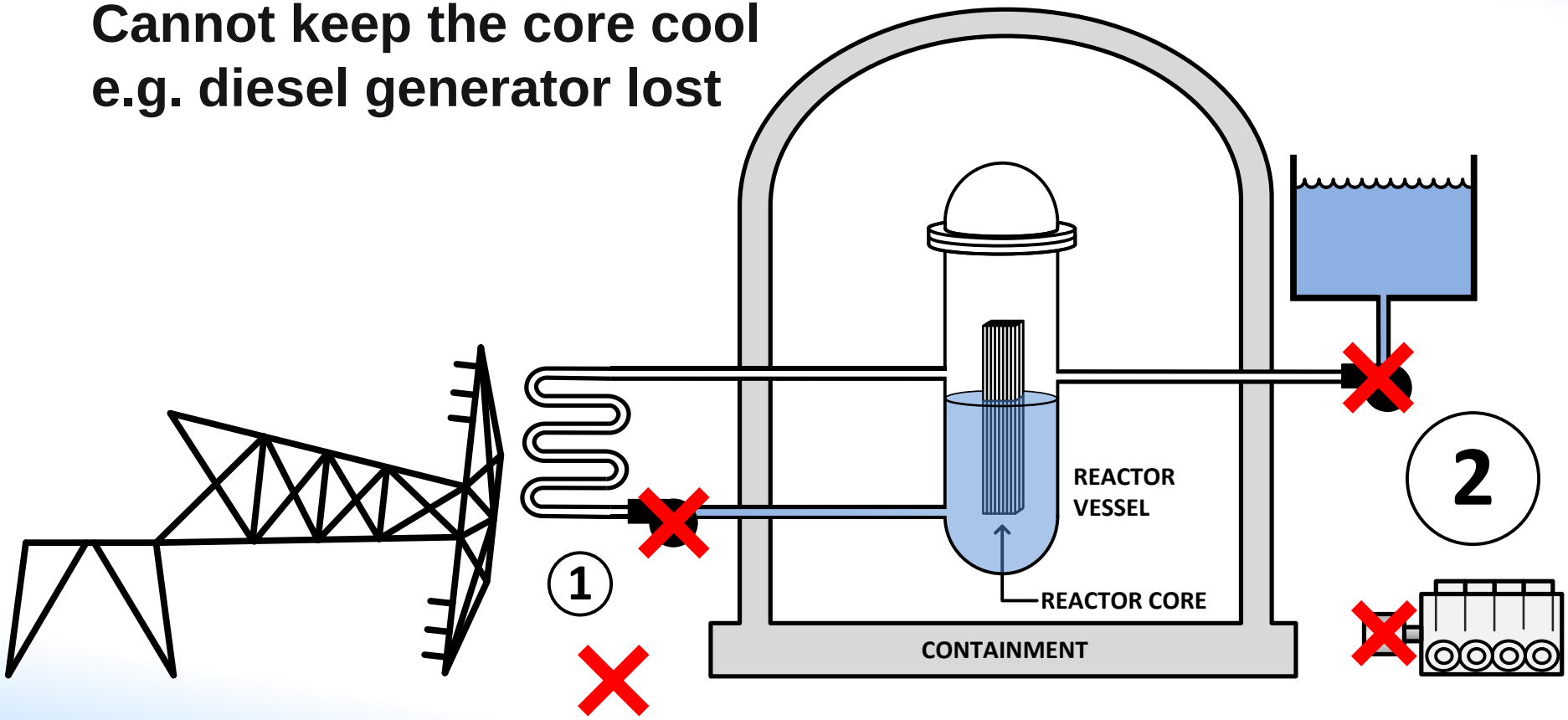
Example Event that May Lead to a Severe Release (cont.)

. Loss of safety function – Cannot keep the core cool e.g. diesel generator lost



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Start of the Concept of Operations

Operator detects an event that may result in severe fuel damage

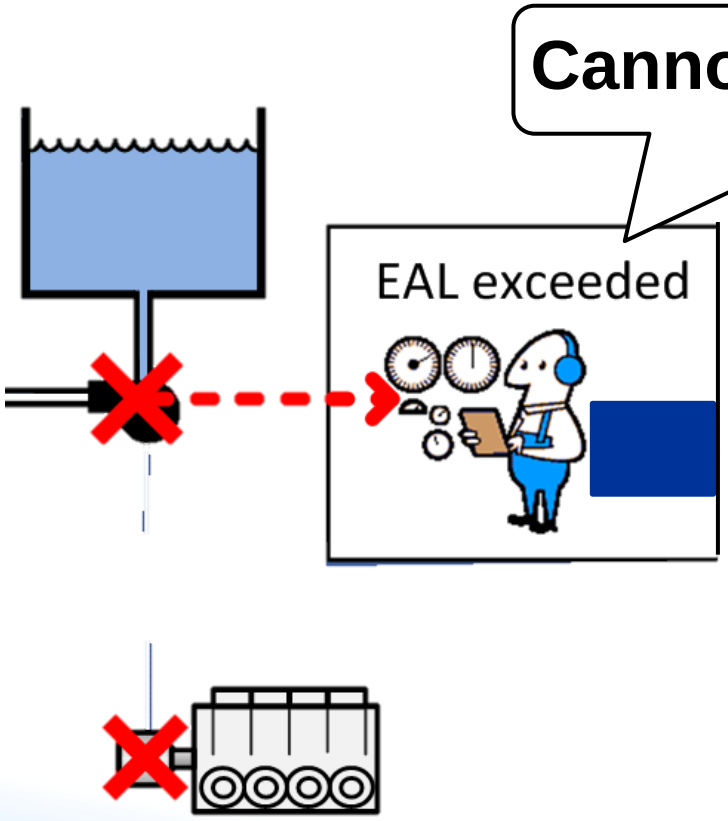

Image courtesy IAEA

00:00

Time zero of the concept of operations is the moment when the operator of the nuclear power plant or facility storing the spent fuel pool detects an event that may result in severe fuel damage

Concept of Operations

- Summary of the concept of operations
- Brief description of the response to an emergency
- It ensures that all those involved in the development of a response capability share a common vision

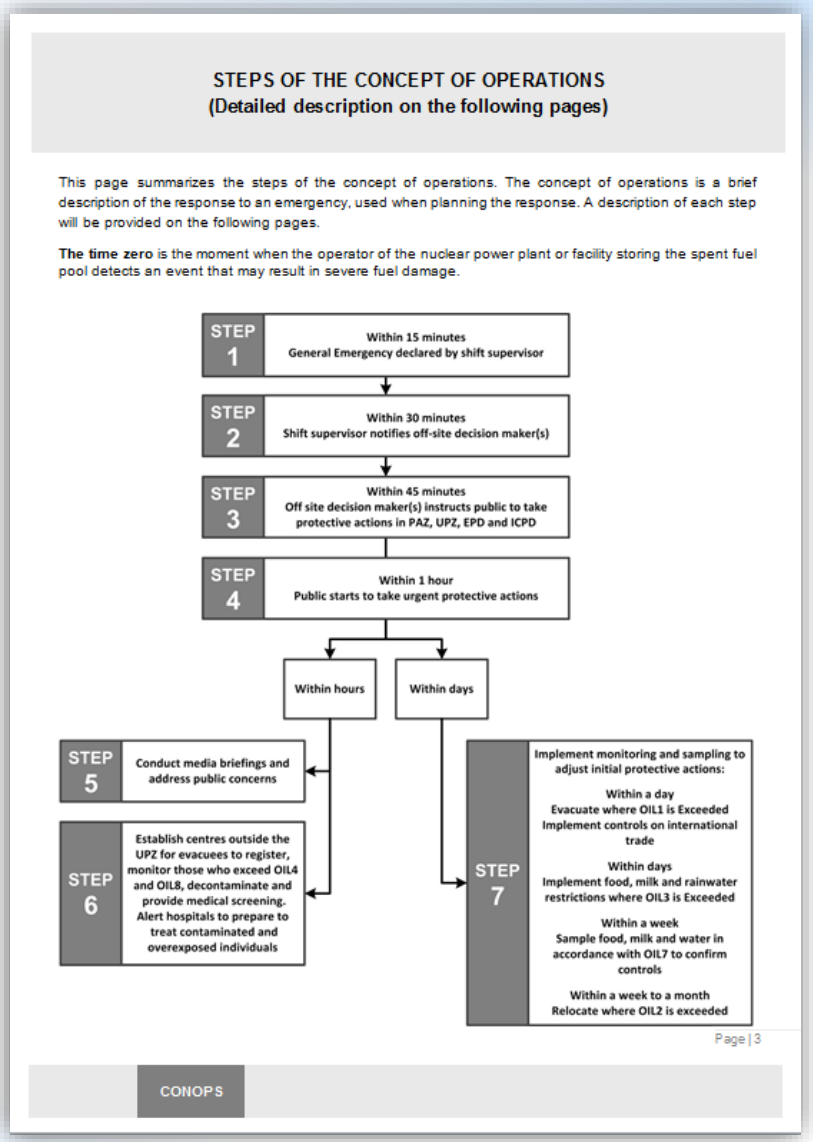

Image courtesy IAEA

Goal 15 min

STEP 1

Page 4

- The shift supervisor declares a General Emergency based on a pre-established Emergency Classification System.
- EALs provided in IAEA General Safety Guide No. GSG-2

STEP 1 — **A General Emergency is declared by the shift supervisor** — **GOAL 15 min***

The shift supervisor of the nuclear power plant declares a General Emergency when the conditions at the plant warrant the urgent implementation of actions to protect the public off the site.

Some examples[1] of conditions requiring the declaration of a General Emergency are:

- Loss of safety functions needed to protect the fuel in the reactor core or spent fuel, such as:
  - Shut the reactor down (establish reactor criticality control);
  - Keep the core covered (cool the fuel);
  - Remove decay heat from the reactor and the containment;
  - Maintain vital auxiliaries (e.g. AC/DC power and instrumentation).
- Detection of actual or imminent severe damage to the fuel in the reactor core or spent fuel pool, such as:
  - high radiation levels throughout the plant
  - temperature of the core above 600 ºC
  - vessel water level below the top of active fuel
- Inability to control safety functions needed to protect the reactor core or spent fuel pool.
- Detection of radiation levels off the site above 100 µSv/h.

* After the operator detects an event that may result in severe fuel damage.

[1] For a comprehensive list of conditions warranting the declaration of a General Emergency at a Light Water Reactor see *IAEA General Safety Guide No. GSG-2* [2] and *IAEA-TECDOC-955* [3]. The list provided here is an example, and is not intended to replace site specific arrangements.

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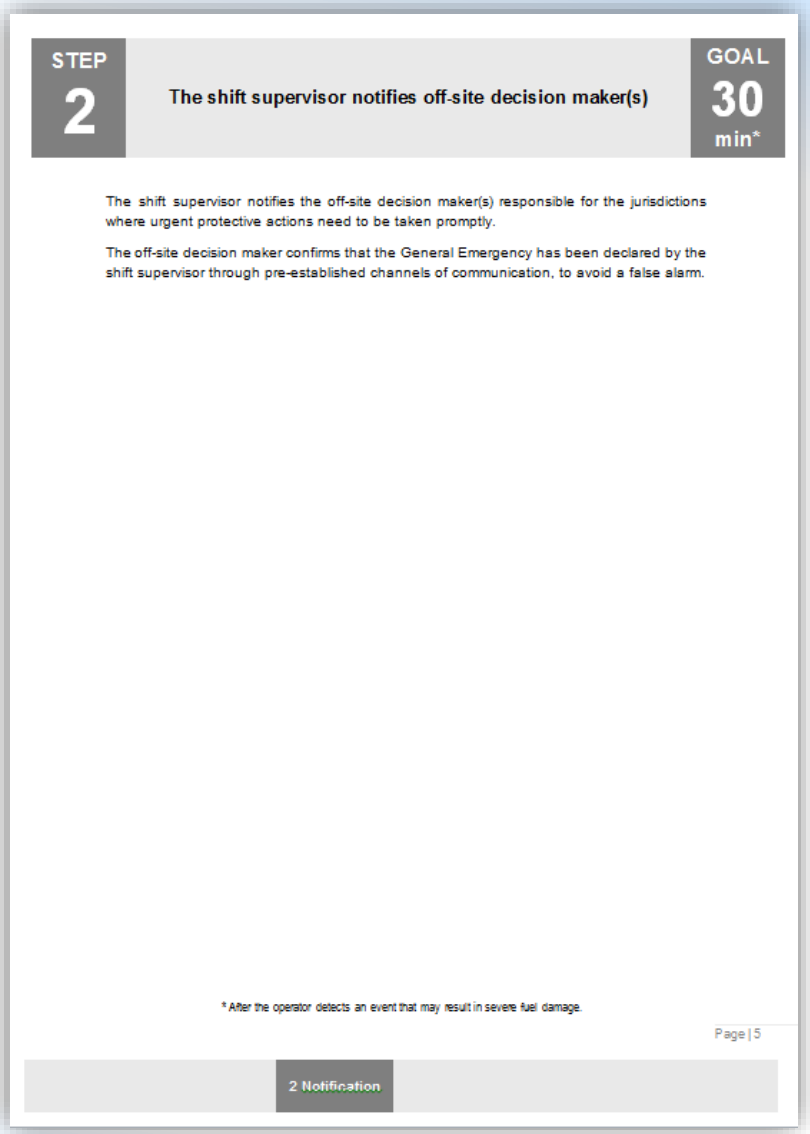
1. Declaration

Image courtesy IAEA

Goal 30 min

STEP 2

- The shift supervisor notifies off-site decision maker(s)
- Confirm the information and keep the contact with the operator to a minimum (operator will be busy with mitigatory actions).



STEP 2

The shift supervisor notifies off-site decision maker(s)

GOAL 30 min*

The shift supervisor notifies the off-site decision maker(s) responsible for the jurisdictions where urgent protective actions need to be taken promptly.

The off-site decision maker confirms that the General Emergency has been declared by the shift supervisor through pre-established channels of communication, to avoid a false alarm.

* After the operator detects an event that may result in severe fuel damage.

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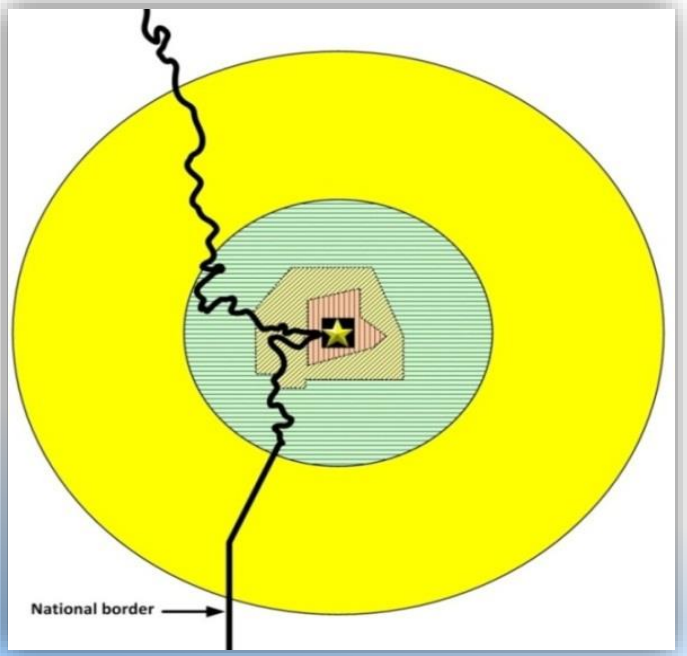
2 Notification

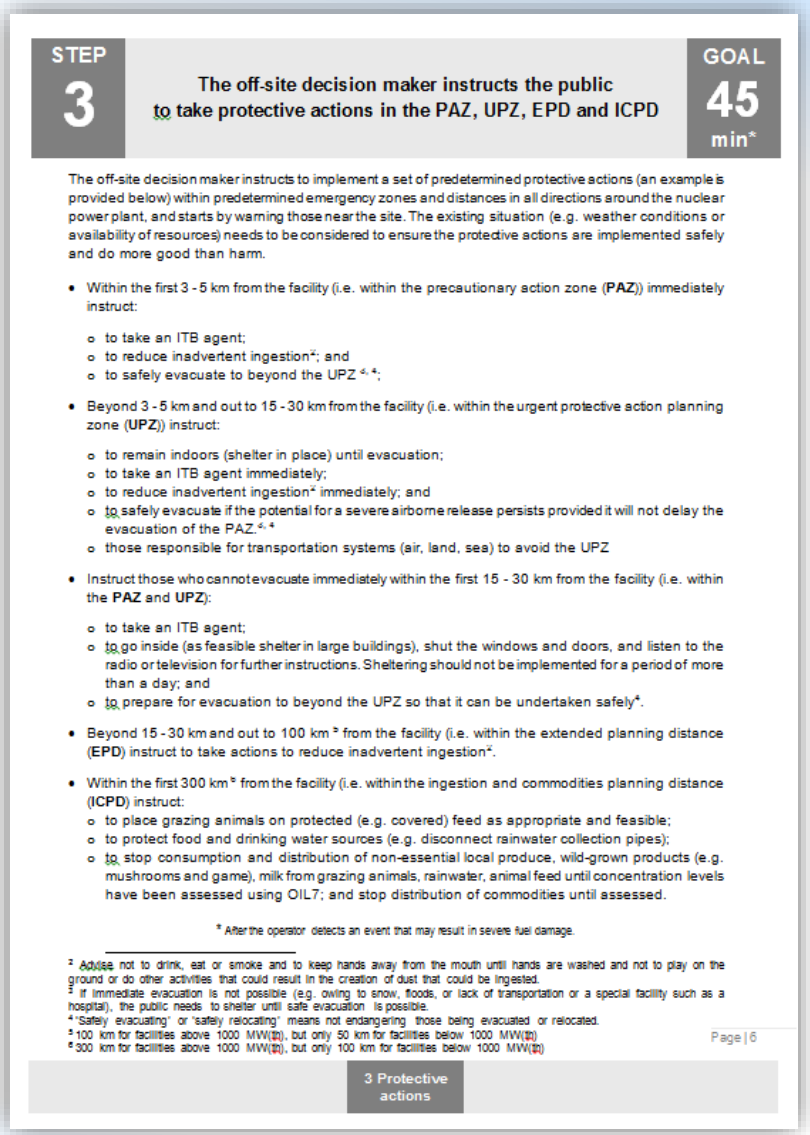
Image courtesy IAEA

Goal 45 min

STEP 3

- The off-site decision maker instructs to public to take the protective actions foreseen for a General Emergency within predetermined emergency zones and distances.





STEP 3

The off-site decision maker instructs the public to take protective actions in the PAZ, UPZ, EPD and ICPD

GOAL 45 min*

The off-site decision maker instructs to implement a set of predetermined protective actions (an example is provided below) within predetermined emergency zones and distances in all directions around the nuclear power plant, and starts by warning those near the site. The existing situation (e.g. weather conditions or availability of resources) needs to be considered to ensure the protective actions are implemented safely and do more good than harm.

- Within the first 3 - 5 km from the facility (i.e. within the precautionary action zone (**PAZ**)) immediately instruct:
  - to take an ITB agent;
  - to reduce inadvertent ingestion[2]; and
  - to safely evacuate to beyond the UPZ [3, 4];
- Beyond 3 - 5 km and out to 15 - 30 km from the facility (i.e. within the urgent protective action planning zone (**UPZ**)) instruct:
  - to remain indoors (shelter in place) until evacuation;
  - to take an ITB agent immediately;
  - to reduce inadvertent ingestion[2] immediately; and
  - to safely evacuate if the potential for a severe airborne release persists provided it will not delay the evacuation of the PAZ.[3, 4]
  - those responsible for transportation systems (air, land, sea) to avoid the UPZ
- Instruct those who cannot evacuate immediately within the first 15 - 30 km from the facility (i.e. within the **PAZ** and **UPZ**):
  - to take an ITB agent;
  - to go inside (as feasible shelter in large buildings), shut the windows and doors, and listen to the radio or television for further instructions. Sheltering should not be implemented for a period of more than a day; and
  - to prepare for evacuation to beyond the UPZ so that it can be undertaken safely[4].
- Beyond 15 - 30 km and out to 100 km [5] from the facility (i.e. within the extended planning distance (**EPD**) instruct to take actions to reduce inadvertent ingestion[2].
- Within the first 300 km [6] from the facility (i.e. within the ingestion and commodities planning distance (**ICPD**) instruct:
  - to place grazing animals on protected (e.g. covered) feed as appropriate and feasible;
  - to protect food and drinking water sources (e.g. disconnect rainwater collection pipes);
  - to stop consumption and distribution of non-essential local produce, wild-grown products (e.g. mushrooms and game), milk from grazing animals, rainwater, animal feed until concentration levels have been assessed using OIL7; and stop distribution of commodities until assessed.

* After the operator detects an event that may result in severe fuel damage.

[2] Advise not to drink, eat or smoke and to keep hands away from the mouth until hands are washed and not to play on the ground or do other activities that could result in the creation of dust that could be ingested.
[3] If immediate evacuation is not possible (e.g. owing to snow, floods, or lack of transportation or a special facility such as a hospital), the public needs to shelter until safe evacuation is possible.
[4] 'Safely evacuating' or 'safely relocating' means not endangering those being evacuated or relocated.
[5] 100 km for facilities above 1000 MW(th), but only 50 km for facilities below 1000 MW(th)
[6] 300 km for facilities above 1000 MW(th), but only 100 km for facilities below 1000 MW(th)

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3 Protective actions

Image courtesy IAEA

Goal 60 min

STEP 4

- The public starts to take urgent protective actions
- It is assumed that the public is knowledgeable with these actions and has been instructed in advance as part of the preparedness programme

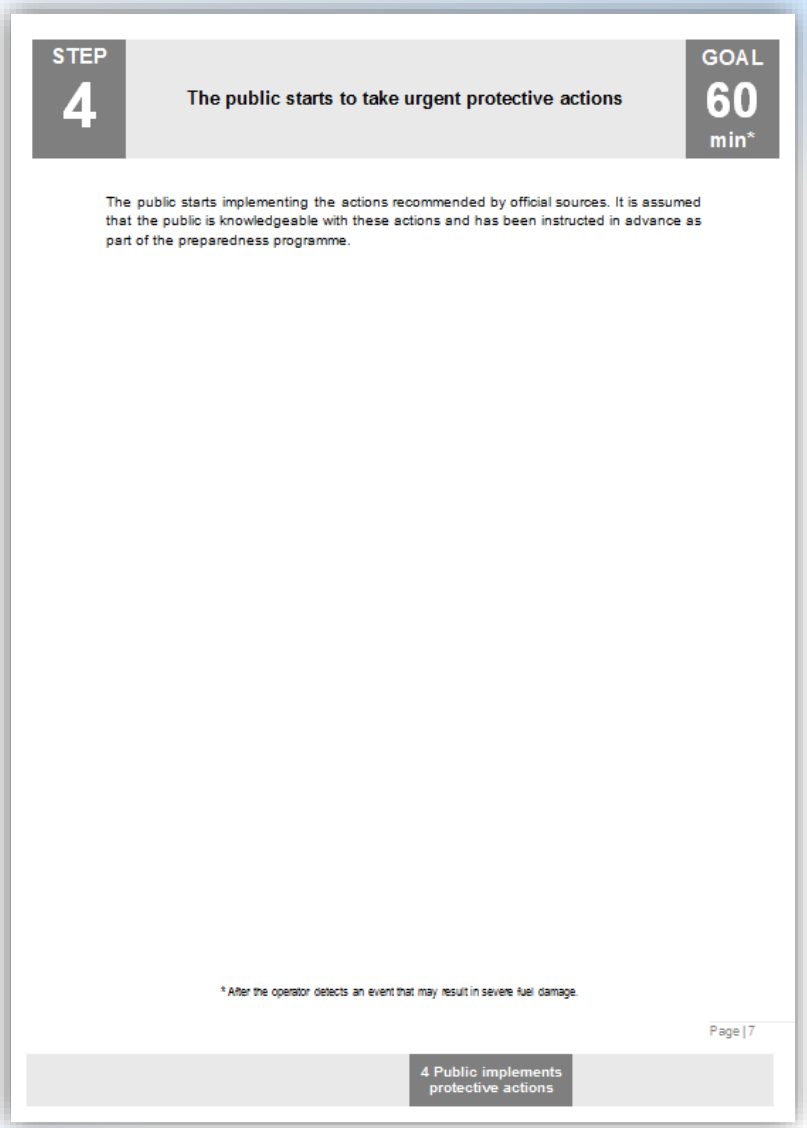
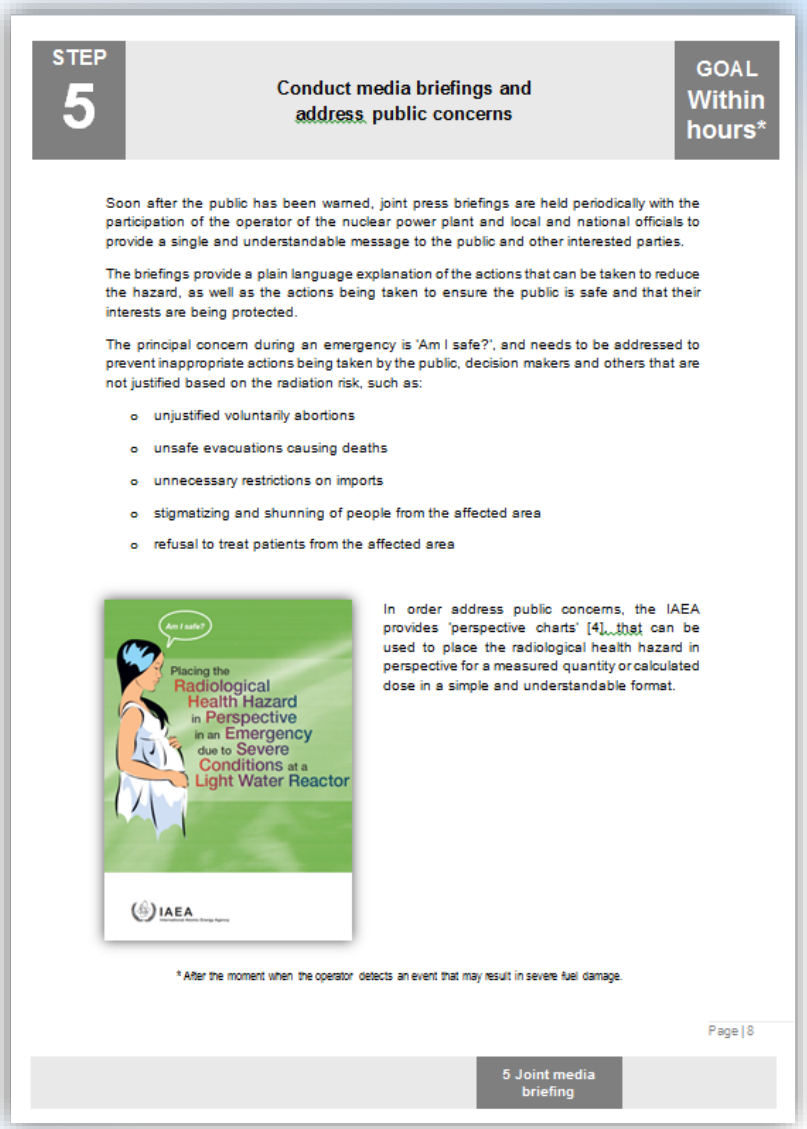


Image courtesy IAEA

Goal within hours

STEP 5

- All response organizations conduct joint media briefings and address public concerns



STEP 5

Conduct media briefings and address public concerns

GOAL Within hours*

Soon after the public has been warned, joint press briefings are held periodically with the participation of the operator of the nuclear power plant and local and national officials to provide a single and understandable message to the public and other interested parties.

The briefings provide a plain language explanation of the actions that can be taken to reduce the hazard, as well as the actions being taken to ensure the public is safe and that their interests are being protected.

The principal concern during an emergency is 'Am I safe?', and needs to be addressed to prevent inappropriate actions being taken by the public, decision makers and others that are not justified based on the radiation risk, such as:

- unjustified voluntarily abortions
- unsafe evacuations causing deaths
- unnecessary restrictions on imports
- stigmatizing and shunning of people from the affected area
- refusal to treat patients from the affected area

In order address public concerns, the IAEA provides 'perspective charts' [4], that can be used to place the radiological health hazard in perspective for a measured quantity or calculated dose in a simple and understandable format.

* After the moment when the operator detects an event that may result in severe fuel damage.

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5 Joint media briefing

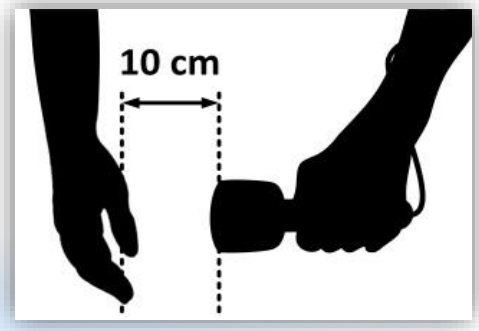
Image courtesy IAEA

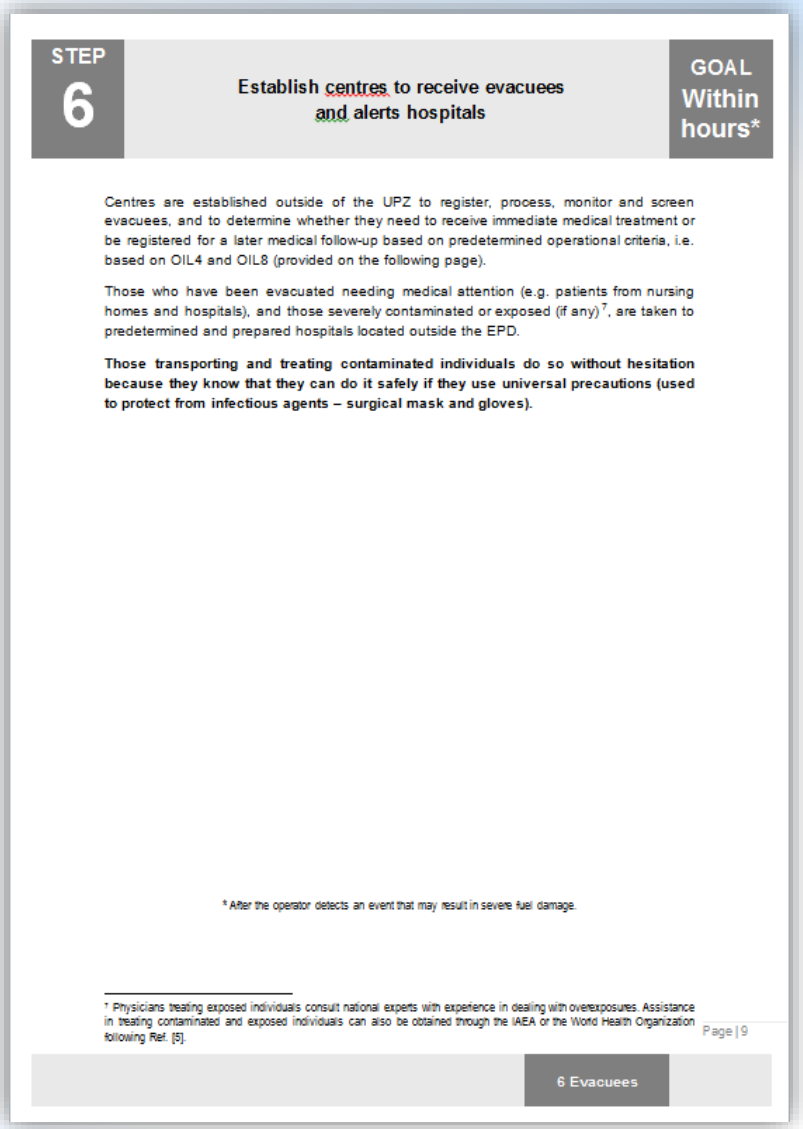
Goal within hours

STEP 6

Page 9 and 10

- The off-site decision maker establishes centres to receive the evacuees and alerts hospitals
- OIL4 and OIL8 for monitoring evacuees





STEP 6

Establish centres to receive evacuees and alerts hospitals

GOAL Within hours*

Centres are established outside of the UPZ to register, process, monitor and screen evacuees, and to determine whether they need to receive immediate medical treatment or be registered for a later medical follow-up based on predetermined operational criteria, i.e. based on OIL4 and OIL8 (provided on the following page).

Those who have been evacuated needing medical attention (e.g. patients from nursing homes and hospitals), and those severely contaminated or exposed (if any)[7], are taken to predetermined and prepared hospitals located outside the EPD.

Those transporting and treating contaminated individuals do so without hesitation because they know that they can do it safely if they use universal precautions (used to protect from infectious agents – surgical mask and gloves).

* After the operator detects an event that may result in severe fuel damage.

[7] Physicians treating exposed individuals consult national experts with experience in dealing with overexposures. Assistance in treating contaminated and exposed individuals can also be obtained through the IAEA or the World Health Organization following Ref. [5].

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6 Evacuees

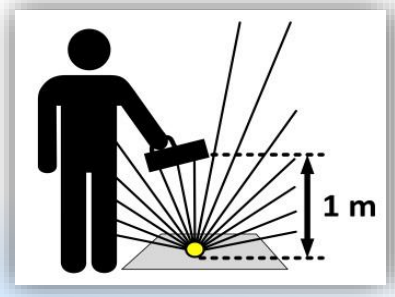
Image courtesy IAEA

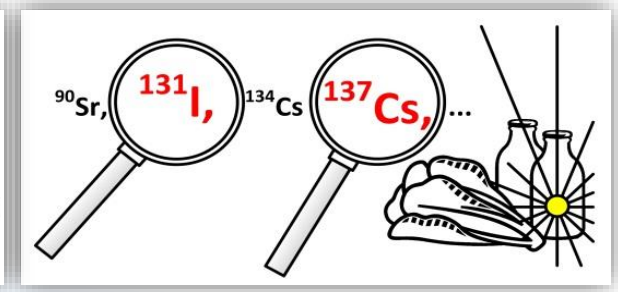
Goal 1 day

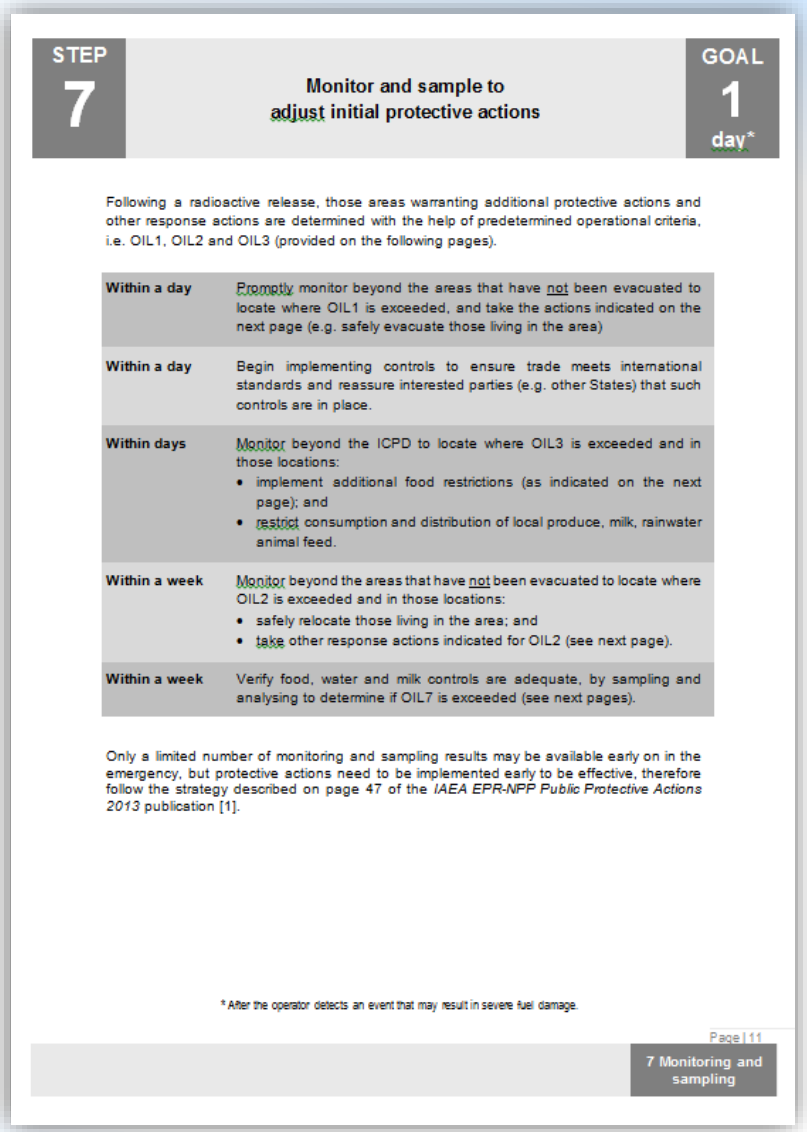
STEP 7

Page 11 to 13

- Following a release implementation of monitoring and sampling to adjust initial protective actions
- OIL1, OIL2 and OIL3 for monitoring the ground, and OIL7 for monitoring food samples







STEP 7

Monitor and sample to adjust initial protective actions

GOAL 1 day*

Following a radioactive release, those areas warranting additional protective actions and other response actions are determined with the help of predetermined operational criteria, i.e. OIL1, OIL2 and OIL3 (provided on the following pages).

Within a day	Promptly monitor beyond the areas that have not been evacuated to locate where OIL1 is exceeded, and take the actions indicated on the next page (e.g. safely evacuate those living in the area)
Within a day	Begin implementing controls to ensure trade meets international standards and reassure interested parties (e.g. other States) that such controls are in place.
Within days	Monitor beyond the ICPD to locate where OIL3 is exceeded and in those locations: • implement additional food restrictions (as indicated on the next page); and • restrict consumption and distribution of local produce, milk, rainwater animal feed.
Within a week	Monitor beyond the areas that have not been evacuated to locate where OIL2 is exceeded and in those locations: • safely relocate those living in the area; and • take other response actions indicated for OIL2 (see next page).
Within a week	Verify food, water and milk controls are adequate, by sampling and analysing to determine if OIL7 is exceeded (see next pages).

Only a limited number of monitoring and sampling results may be available early on in the emergency, but protective actions need to be implemented early to be effective, therefore follow the strategy described on page 47 of the *IAEA EPR-NPP Public Protective Actions 2013* publication [1].

* After the operator detects an event that may result in severe fuel damage.

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7 Monitoring and sampling

Image courtesy IAEA

STEP 7

Displaying monitoring results:

Use OILs for colour-coding

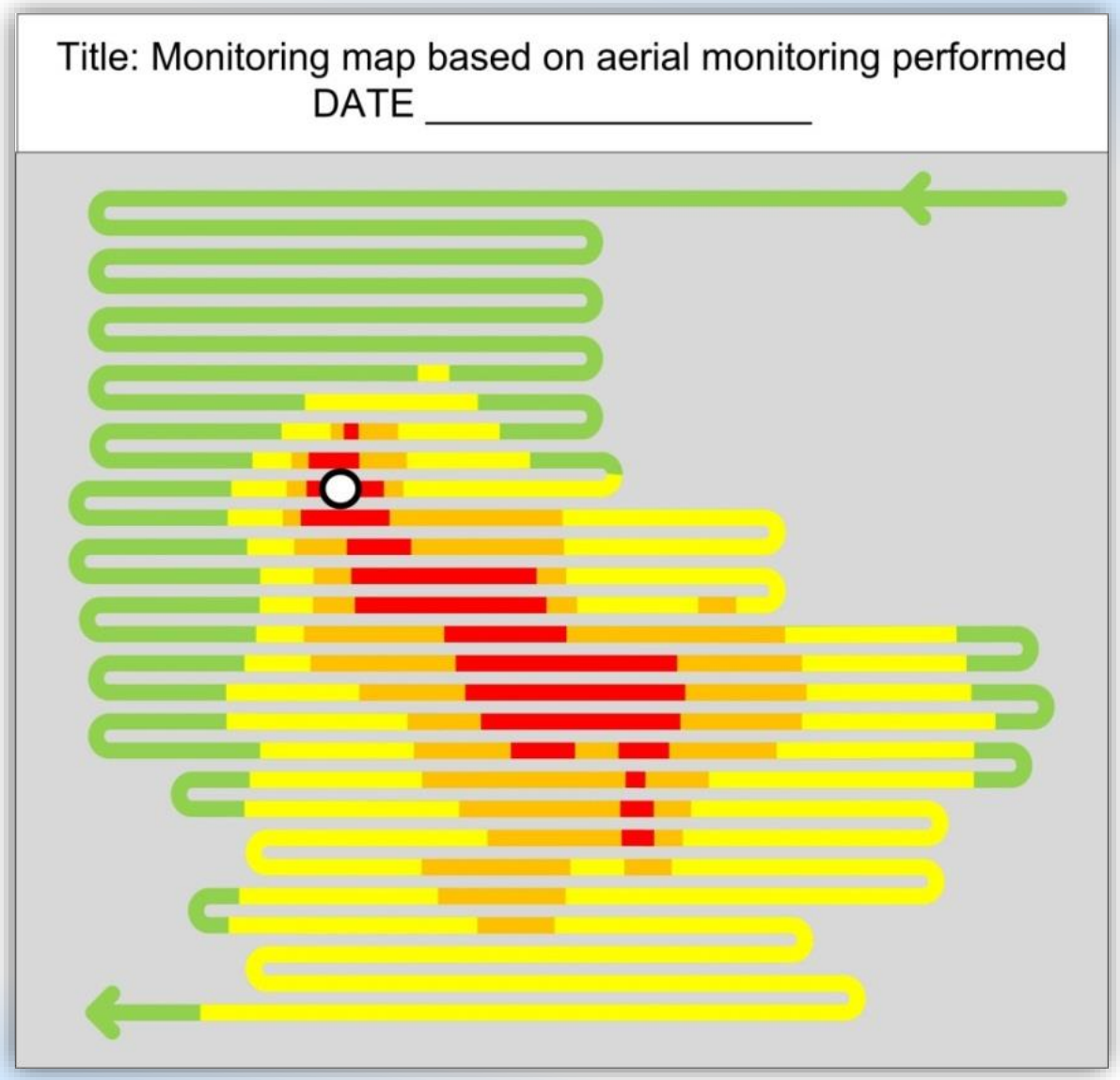
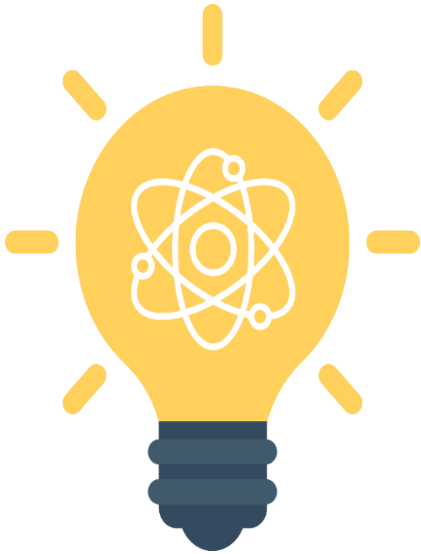


Image courtesy IAEA

Key Points for EPC I and II

- The emergency classification is based on Emergency Action Levels (*EALs*)
- Once a General Emergency is declared by the plant operator the off-site decision maker implements predefined response actions based on a concept of operations
- These response actions are implemented:
  - Quickly
  - In all directions around the NPP
  - In pre-established emergency zones and distances
  - Are refined based on monitoring and sampling



EPC III

- Supports planning for **emergencies involving radioactive sources at fixed locations** (within radiological facilities)
- For EPC III, the primary radiological risk comes from the possibility of severe deterministic effects on-site
- No off-site protective actions anticipated
- Can cause considerable public concern
- Examples:
    - Hospitals
    - Irradiators
    - Labs

Images courtesy IAEA

EPC III Classifications

	Definition	Prompt actions
Alert	Conditions involving uncertain or possible decrease in the level of protection	Assess and mitigate Increase the readiness
Facility emergency	A major decrease in the level of protection for on-site personnel	Mitigate the consequences of the event and protect people on the site

Requires both Operator/On-site and Off-site actions

Alert

- Conditions involving uncertain or possible decrease in the level of protection
- Prompt actions to:
  - Assess and mitigate the abnormal conditions
  - Increase the readiness of on-site and off-site response organizations

Alert.
Immediate Actions

Operator and On-site

- Take life saving actions and give first aid
- Notify off-site officials
- Activate the appropriate part of the response
- Conduct off-site monitoring near facility (if appropriate)
- Implement actions to mitigate the event
- With off-site officials:
  - If the alert receives media or public attention, then
  - Initiate joint media briefings at a PIC

Off-site

- Increase readiness
- Implement the needed components of UCCS, including an Emergency Response Commander
- Inform all governmental agencies
- Provide fire, police or medical support if requested
- Initiate joint media briefings at the PIC if the alert receives media or public attention

Facility Emergency

- Major decrease in the level of protection for **on-site** personnel
  - Hazard to small reactor core
  - Loss of shielding for a large gamma emitter
  - Possible criticality
- Prompt actions
  - Mitigate the consequences of the event and protect people on the site

Facility Emergency.
Immediate Actions

Operator and On-site

- Take life saving actions
- Protect those on-site
- Notify off-site officials and request emergency services if needed
- Conduct monitoring near facility
- Protect on-site and off-site emergency response personnel
- Ensure contaminated people or items do not leave
- Operate under Unified Command and Control System (UCCS) – under the Emergency Response Commander
- Support media briefings at PIC

Off-site

- Activate the partial response under a single emergency response commander under the UCCS
- Ensure that governmental agencies are informed
- Provide fire, police or medical support to the facility if requested
- Conduct monitoring to confirm off-site actions are not needed
- Provide treatment for injured
- With on-site officials, initiate joint media briefings at the PIC

Concept of Operations in EPC III

- Comprehensive **hazard assessment**
  - Identification of:
    - Hazards and potential consequences
    - Warranted (required) protective actions and other response actions

Hazard

Consequence

Response

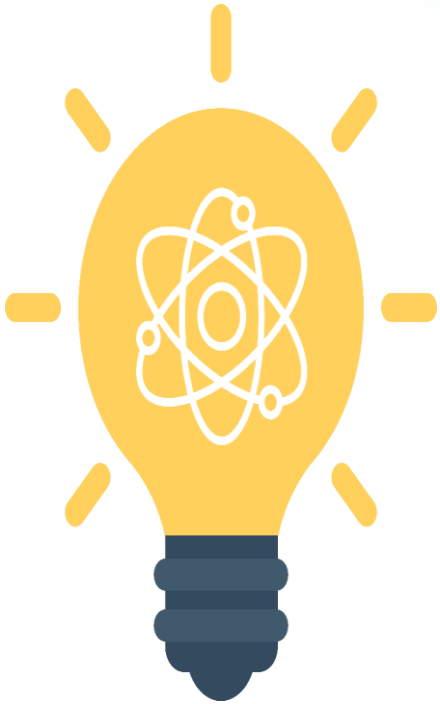
Images courtesy IAEA

EPC III
Initiation of Response

- Declaration of emergency based on EALs
  - Facility emergency or Alert
  - By on-site operating staff, based on:
    - Predetermined **abnormal conditions** (EALs) and/or other observables/indicators, e.g.:
      - Instrument readings, placards, labels, and markings on products being transported or stored, etc.
    - Report of a **potential radiological emergency**, or
    - Receipt of a **threat** to use radioactive material for **malicious** purposes
- Off-site notification point
  - Initiate the appropriate pre-planned off-site response to promptly provide assistance and, if needed, request for **off-site support**, e.g.:
    - Police
    - Fire-fighters
    - Medical assistance
    - Radiation specialists

Key Points for EPC III

- Emergencies at facilities in EPC III
  - Severe effects on-site
  - No off-site protective actions anticipated
  - Can cause considerable public concern
- Response concentrates on
  - Implementing immediate actions on-site
  - Obtain prompt local offsite support
  - Informing the public
- National officials support local officials
  - Assist in obtaining specialized treatment of exposed persons



EPC IV

- Concept of operations for category IV:
  - Supports planning for emergencies involving **mobile radioactive sources** at unforeseeable location
- **Category IV planning applies everywhere and represents the minimum level of preparedness appropriate for all States**
- Applies to emergencies involving:
  - Sources
  - Transport
  - Severe overexposure
  - Terrorist threats or criminal activities
  - Detection of elevated radiation levels of unknown origin or of commodities with contamination
  - Transnational emergency (that is not in EPC V)

Concept of Operations in EPC IV

- Emergency can occur at any location
- Local authorities have very important role
- Response under Unified Command and Control System
  - Emergency response commander or emergency response command responsible for overall response
- Local level response recognizes potential radiological emergency
- Local officials most likely need assistance from national level

Source Emergency

- Source emergencies apply to emergencies involving:
  - Lost or stolen dangerous source
  - Dangerous mobile sources
  - Fixed sealed source
  - Public exposure/contamination
  - Nuclear weapon emergency
  - Re-entry of radioactive satellites
  - Transport emergency
  - Severe overexposures

Source Emergency (cont.)

- **First responders** should promptly
  - Implement **life saving actions**
  - Provide **first aid** for serious injuries
  - **Isolate possible source of exposure** and then notify local and/or national officials

- **Local or national officials** should provide
  - **Advice**
  - **Assist** with monitoring, decontamination, media relations and medical treatment

Source Emergency (cont.)

- When a dangerous source is lost or stolen:
  - Description of device and hazard to public should be provided by operator
  - Operator must closely co-operate with law enforcement
  - Operator must also provide technical support
  - Public announcements describing source and stressing the hazard
  - If cross border transport is possible affected States and IAEA should be notified

Source Emergency (cont.)

- Public contamination:
  - Isolation of contamination can be complex
  - Monitoring and interviews conducted to identify and isolate source
  - Medical facilities to treat contaminated patients should be identified with experienced radiation specialists
  - Field centres established for screening, decontamination and triage of contaminated people
  - Public evacuation of contaminated areas should be taken into consideration

Source Emergency (cont.)

- Keeping public and affected population **informed** is absolutely necessary
- If contaminated products went across border, potentially affected States and IAEA should be notified
- A system is established to assure that products and people leaving the area are not contaminated above predetermined criteria
- Criteria for clearance based on international guidance should be analysed and predetermined

Transport Emergency

- Carrier (*ad hoc* first responders) must
  - Take initial life saving actions
  - Isolate the source
  - Notify local officials
- First responders should
  - Isolate the emergency scene
  - Act according to action guides for transport emergency
  - Request radiological assistance from local/national officials

Serious Overexposure Emergency

- Investigation should be conducted to determine cause
- National officials should protect information concerning investigation until they are completely sure about cause
- Local/national officials must plan and conduct recovery operations
- Assistance can be requested from IAEA
  - For dose assessment
  - Medical treatment of overexposed persons
  - Recovery operations

Terrorist Threats or Criminal Activities

- Party receiving threat should notify national/local law enforcement
- Response actions should integrate law enforcement and radiological expertise
- Law enforcement tasks and radiation specialists should briefed about each others activities
- Response to radiological concern is similar to that for public contamination
- Joint press briefings are given to address public concern

Transnational Emergency

- Most of a country may be affected by a
  - Category I release
  - Deposition has complex pattern

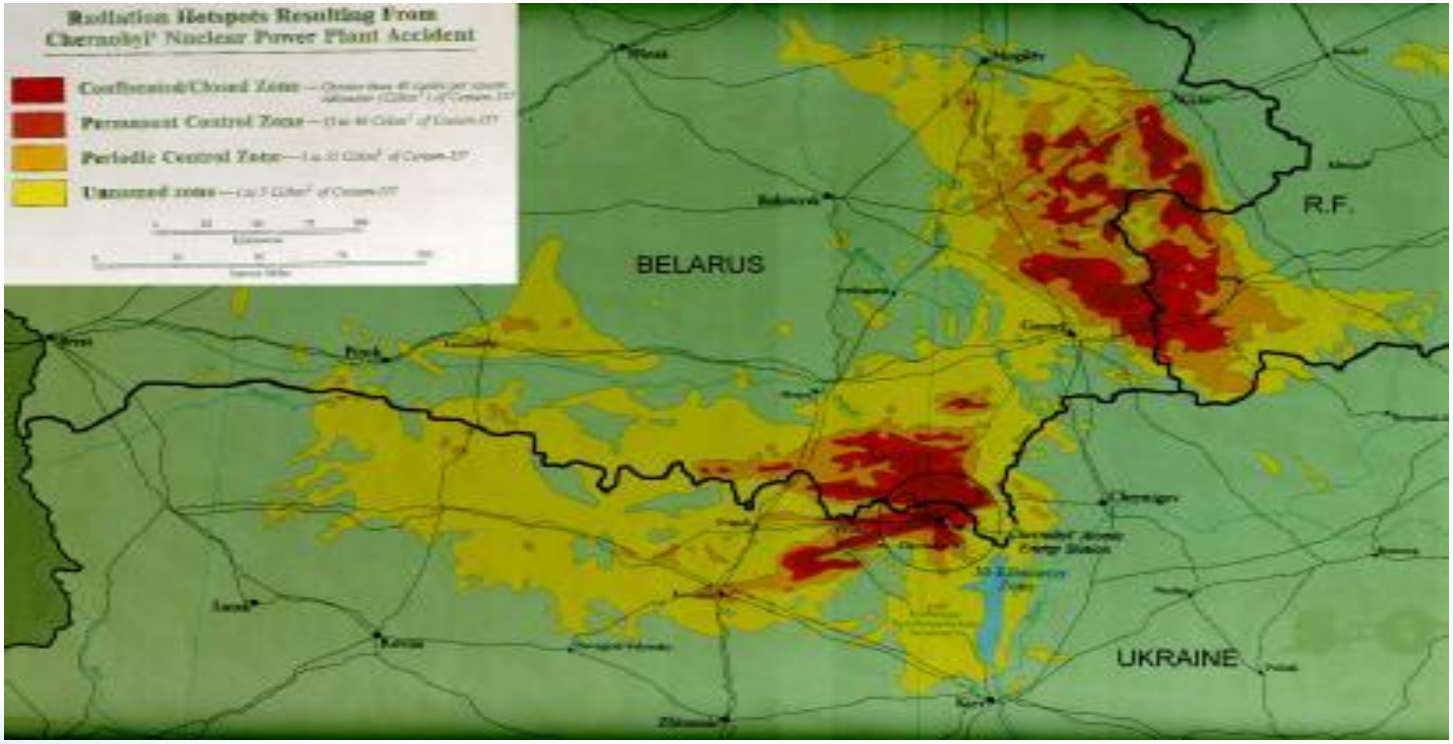
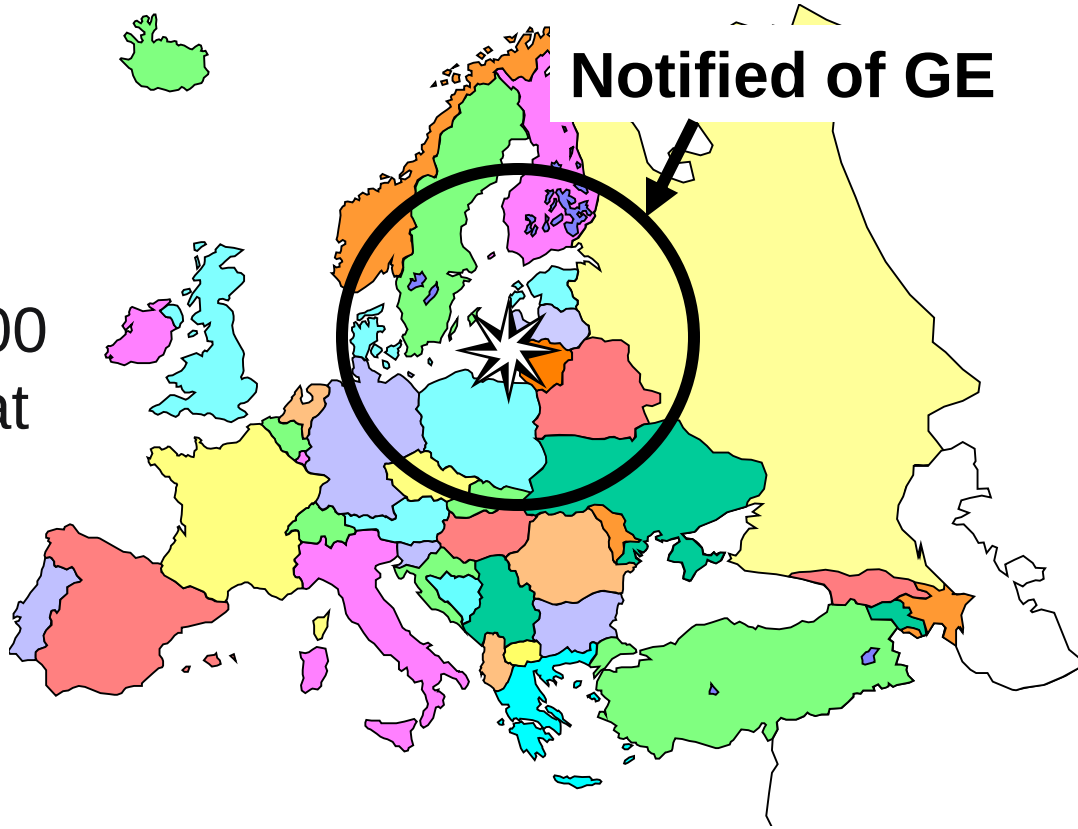


Image courtesy IAEA

Transnational Emergency (cont.)

- Initiation of Response
  - By facility upon declaration of a General Emergency (GE)
  - All countries within 300 km notified for a GE at a large reactor



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Transnational Emergency (cont.)

- Immediate Actions
  - Operate under UCCS – Emergency Response Commander
  - Instruction to public, farmers and others on measures to take to protect food/products
  - Provide media and public information through a PIC
  - Promptly notify IAEA if significant contamination is detected

Transnational Emergency (cont.)

- Follow-on Actions
  - Conduct monitoring and sampling
    - Initial decisions based on dose rate OILs
    - Decisions confirmed by laboratory analysis OILs
  - Long term programmes developed
    - Considering the long-term sociological, psychological and economic impact

Transnational Emergency (cont.)

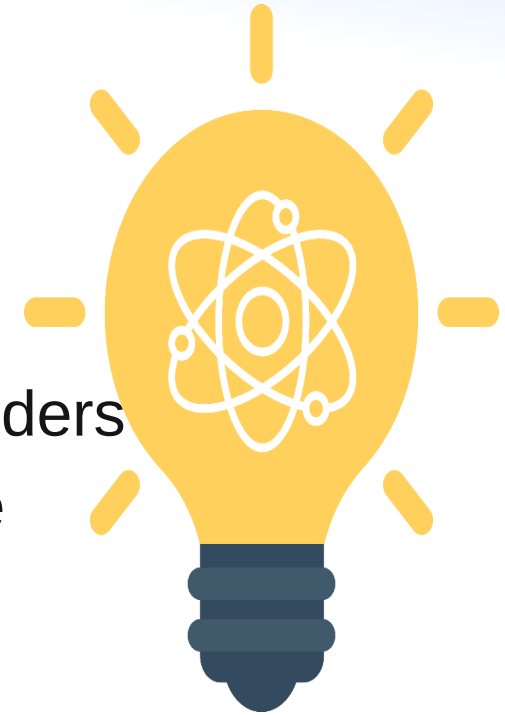
- Following contamination
  - Identifying products needing restriction based on
    - Deposition dose rates OILs for initial assessment
    - Laboratory analysis OILs to confirm
    - OILs consistent with international standards
  - May need early restrictions to protect economy

EPR-Method 2003

- EPR-METHOD 2003: Action Guides for Radiological Emergencies (Appendix 7)
- Action Guides for first responders and radiological response according to the type of emergency
  - Check list for response to radiological emergencies
  - Description of the hazards (public – responders)
  - Description of actions to be taken by organisations and emergency workers

Key Points for EPC IV

- An Unified Command and Control System (UCCS) must be in place
- First priorities are:
  - Live saving
  - Treating injuries and
  - Ensuring safety of the public and responders
- Immediate steps must be taken to minimize radiological risk for
  - Public
  - Emergency workers and
  - Environment



EPC V

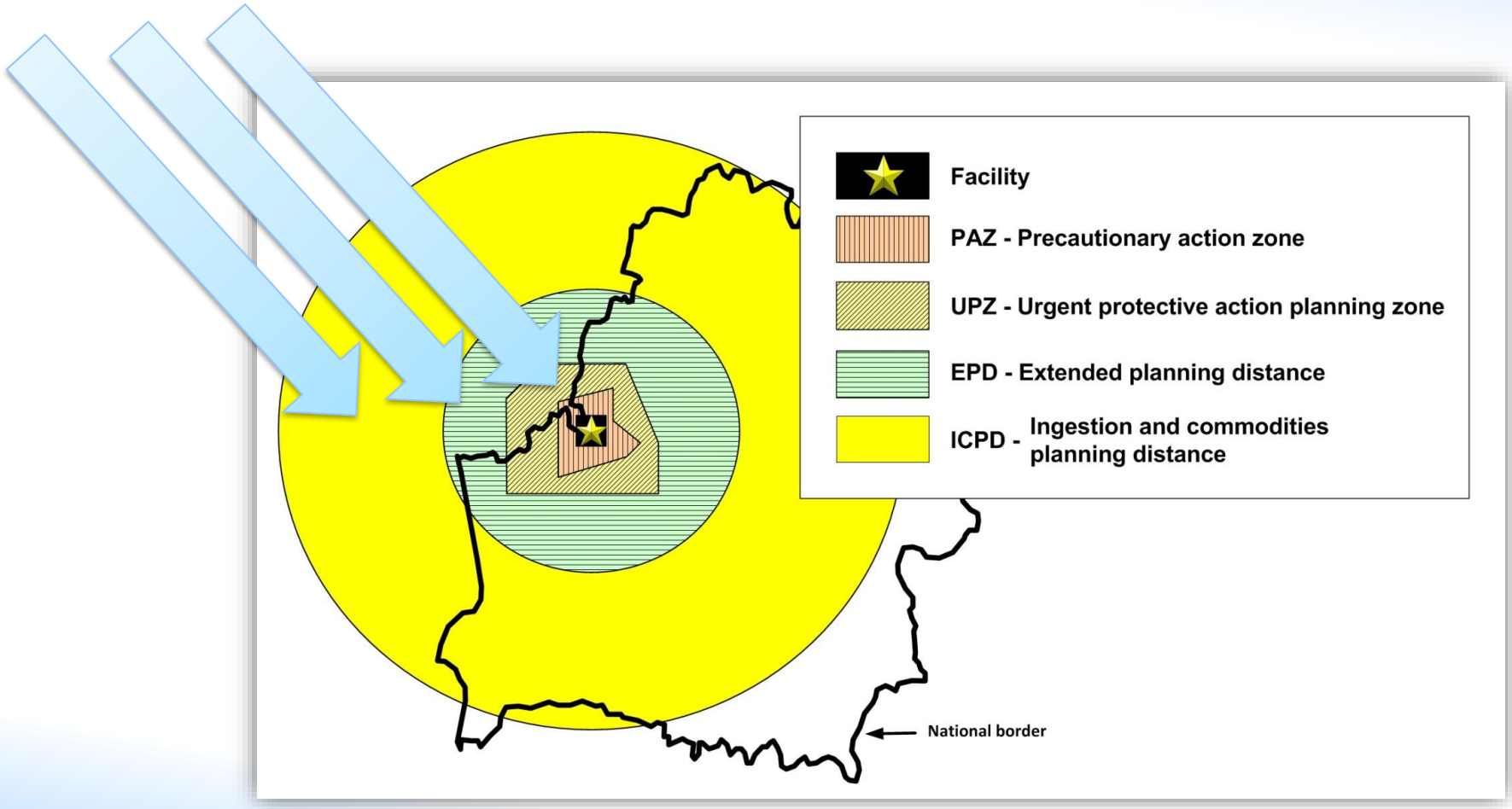
- For **EPC V – the radiological risk comes from accidents at facilities in EPC I or II situated in a neighbouring State**, very close to the border
  - Atmospheric releases and the possibility of severe health effects off-site
- Risk can be reduced by taking urgent protective actions
  - Before (or shortly after) a release (e.g. evacuation close to the facility)
- In addition, other protective actions are required:

Difference between EPC IV Transnational and EPC V

- EPC IV is for **ANY EVENT** at an unforeseen location. Regarding EPC IV transnational, this encompasses a release not included in the EPC V definition (i.e. outside of planning zones predetermined by neighboring countries)

- EPC V is for a country within the emergency planning zones and distances of a foreign EPC I or II facility

Areas in EPC V



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EPC V Planning

- Affected State does not have direct oversight of operating organization
- Notification and information must be coordinated internationally
- Internationally harmonized response needed in order to maintain public trust

EPC V Planning (cont.)

- Clear allocation of responsibilities on decision making in case of emergency
  - Local versus national
- Arrangements for receiving notification at both local and national level
  - Designated contact point
  - Bilateral treaties
- Special criteria for classification of the emergency and activation

EPC V Planning (cont.)

- Arrangements needed with local and national officials of the State where the facility in EPC I or II is located:
  - Exchange of information between decision making authorities
  - Coordinating the emergency response within the EPZs
  - Provision of information and warnings to the population within the EPZs
  - Public communication
  - Provision of mutual support

Concept of Operations in EPC V

- Developed during preparedness stage
- Need for appropriate information from State where facility in EPC I or II is located :
  - Reactor related information, classification system, criteria for taking protective actions, means of communication, etc.
- Only off-site response has to be planned
  - Same off-site response as for EPC I or II
- Roles and responsibilities should be assigned for all response organizations at local and national level

Concept of Operations in EPC V (cont.)

- **Local** planning
  - Receiving the notification and exchange of information with the Accident State
  - Urgent protective actions within UPZ (if needed)
  - Actions for agricultural and ingestion control

- Off-site **national** planning
  - Receiving the notification and exchange of information with the Accident State
  - Early and long term protective actions within UPZ, EPD and ICPD

Emergency Declaration and Actions

- Based on direct notification from the facility or officials from the Accident State
  - Predetermined abnormal conditions or criteria
    - Official reports of a potential radiological emergency
    - Instrument readings of early warning systems within EPZs, etc.
- Activate the Unified Command and Control System (UCCS)
- Coordinate off-site response
- Coordinate medical response
- Conduct monitoring
- Facilitate public information
  - From a common PIC and coordinated with the Accident state

Off-site Response

- Warn the populations in the PAZ and the UPZ
  - Instructions to be provided in multiple languages, if needed
- Introduce urgent protective actions
- Coordinate with the accident state
- Restrict food consumption of products coming from the EPZs and movement of contaminated food until it has been monitored
- Provide for medical support and treatment
- Conduct monitoring
- Communicate with the public

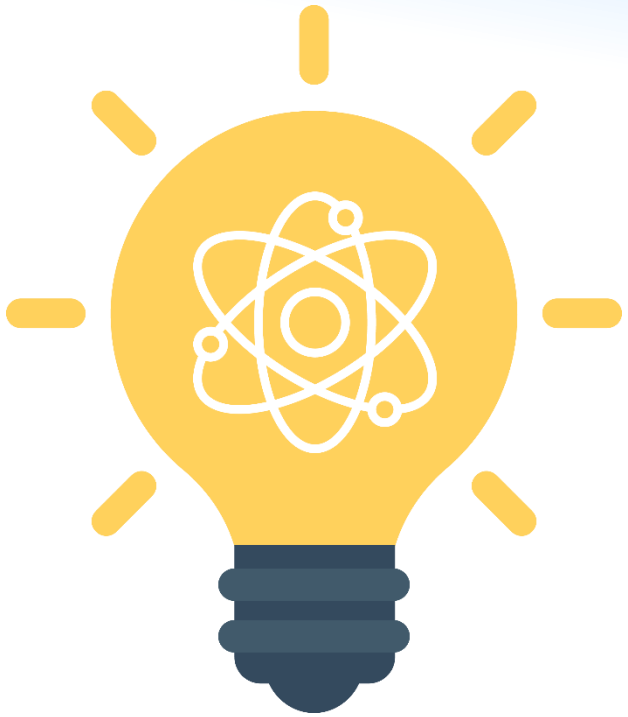
Conduct Monitoring

- Off-site emergency staff:
  - Conducts monitoring
  - To confirm the implementation/optimization of protective actions based on Operational Intervention Levels (OILs)
- No persons and items leaving the area are contaminated or exposed

Image courtesy IAEA

Key Points for EPC V

- A potentially affected State may not have direct control or oversight of the EPC I or II facility
- Need to coordinate planning with the State where the facility in EPC I or II is located
- Internationally harmonized response is needed to maintain public trust

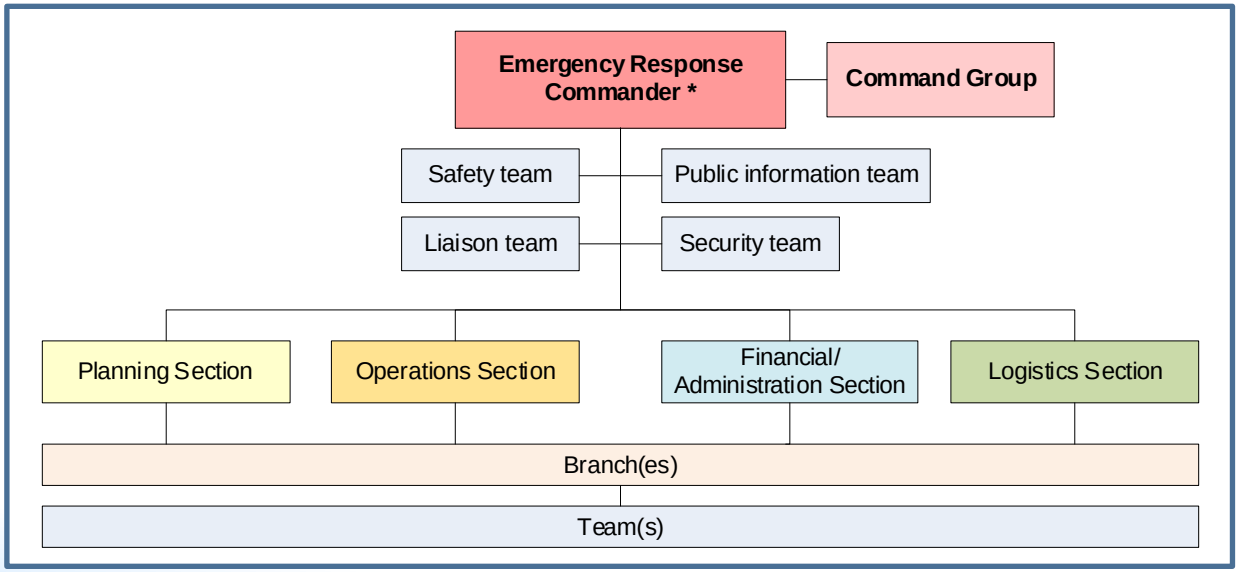


Common Elements for Concept of Operations

- The Unified Command and Control System is activated
  - Emergency Response Commander is in charge
- Management of the medical response
  - Provide medical attention
  - Predetermined and assigned hospital
  - Registration of all persons entering the system
- Public is informed
  - Promptly, coordinated and useful information
  - Establish a single Public Information Centre (PIC) as soon as possible

Unified Command and Control System is Activated

- Response under Unified Command and Control System
- One person in charge (Emergency Response Commander *)
- Near the scene (Emergency Response Command Post)



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Management of the Medical Response

- Provide **medical attention** to all those needing it
- **Transport** potentially contaminated, (over)exposed or evacuated persons needing further care in predetermined and specially assigned hospital

Possible radioactive contamination is NO JUSTIFICATION for delaying transport or treatment.

Provide advice!

- **Register** all those evacuated even if no medical attention is required

Management of the Medical Response (cont.)

- Treat severe **deterministic effects** in predetermined specialized hospitals
- Gather information helpful for **reconstructing the dose**
- Consult doctors with **experience** in severe overexposures
- Provide **psychological** counselling
- Obtain **international assistance** (if necessary)

Public information

- Provide prompt, coordinated and useful information to the public through the **media**
- Best done from a single **Public Information Centre (PIC)** as soon as possible

- Official **spokesperson(s)**
  - Briefs the media; provides information/instructions
  - Puts the health hazard in perspective!
- **National** officials
  - Monitor media and public response
  - Address public concerns
  - Address inappropriate actions taken

Non-radiological consequences

Where to Get More Information

- IAEA EPR-Method (2003)
- IAEA GS-G-2.1 (2007)
- IAEA EPR-First Responders (2006)
- IAEA EPR-NPP Public Protective Actions (2013)

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Atoms for Peace and Development

Thank you!

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