Role of IAEA in assessment and prognosis during a nuclear or radiological emergency

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Introduction

- As a lesson from Fukushima Daiichi accident Agency has new response role in case of emergency at NPP

Assessment of potential consequences and prognosis of likely emergency progression

IAEA Action Plan on Nuclear Safety

'Enhance transparency and effectiveness of communication and improve dissemination of information'

- "The IAEA Secretariat to provide Member States, international organizations and the general public with timely, clear, factually correct, objective and easily understandable information during a nuclear emergency on its potential consequences, including analysis of available information and prognosis of possible scenarios based on evidence, scientific knowledge and the capabilities of Member States."

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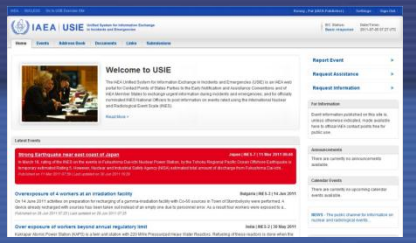
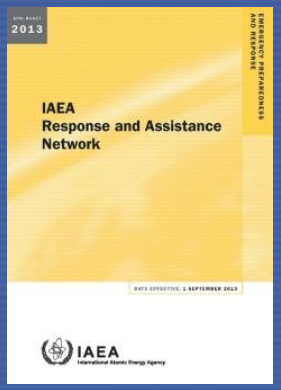
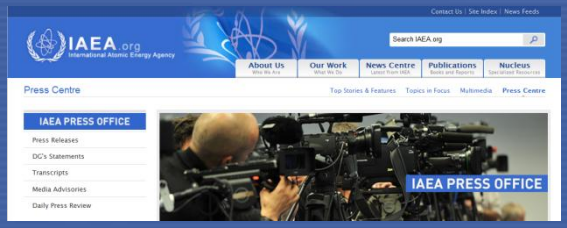
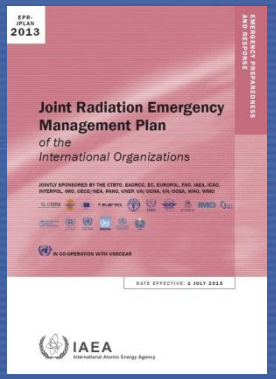
Introduction

- Other IAEA response roles
  - Notification and official information exchange
  - Provision of assistance on request
  - Provision of public information
  - Coordination of inter-agency response









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Introduction

- To fulfil Agency's expanded response role IAEA Secretariat developed 'assessment and prognosis' (A&P) process and specific arrangements in its operating documents
  - Detailed in GC(57)/RES/9 and GC(58)/RES/10
- This presentation provides overview of developed A&P process

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A&P Principle Goal

- To assess where and what protective and other response actions need to be taken by ‘Accident State’ and to provide advice, if needed (to ‘Accident State’ and potentially impacted States)
- To achieve this goal several specific activities/tasks need to be performed

Specific Tasks (1)

- Development of ‘reasonably’ bounding estimation of potential progression and associated radiation exposure, based on available information, evidence and scientific knowledge

- Evaluation of relevant information to assess if public is safe and will continue to be safe, and if not, identification of protective and other response actions that should be considered

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Specific Tasks (2)

- Evaluation of relevant information to asses if workers and emergency workers are safe and will continue to be safe, and if not, identification of additional actions that should be considered

- Identification of actions that should be considered to protect international trade and interests

- Active alerting of MSs in which response actions may need to be considered and providing advice, as required

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Specific Tasks (3)

- Assessment of protective and other response actions being implemented, recommended or discussed to asses if these are effective* and, if not, identification of actions that should be considered by MSs, relevant IOs and Agency

  *Doing more good than harm

- On-going assessment and prognosis process based on new information received

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Constraints and Limitations (1)

- Agency's A&P does not replace national responsibilities
- A&P is technically challenging – may generate variety of outputs (role of input data)
  - MSs capabilities actively utilized (via RANET)
- Significant information requirements
  - Timely sharing of technical data important, in particular with 'Accident State'

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Constraints and Limitations (2)

- Delayed or unavailable data will delay AP outputs
- AP process reflects this reality
  - based on Agency's Safety Standards and guidance
  - considers scenarios where minimum technical info is available
- Inherent uncertainties will exist and these need to be communicated clearly to MSs and public

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What is Needed

- Provision of critical set of technical parameters (in emergency) needed for AP
- Consistent evaluation of evolving scientific understanding of EPR issues
- Continues enhancement of capabilities
- Regular exercising both within Agency and externally with MSs and relevant IOs
- Informing MSs of Agency's arrangements and capabilities as they evolve

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A&P Process

- Builds on existing international EPR framework complemented by MS capabilities through RANET or other agreements
- Allows input from several parties (including ‘Accident State’) to develop common understanding during event
- When possible, will provide consistent message to public through agreed upon channels

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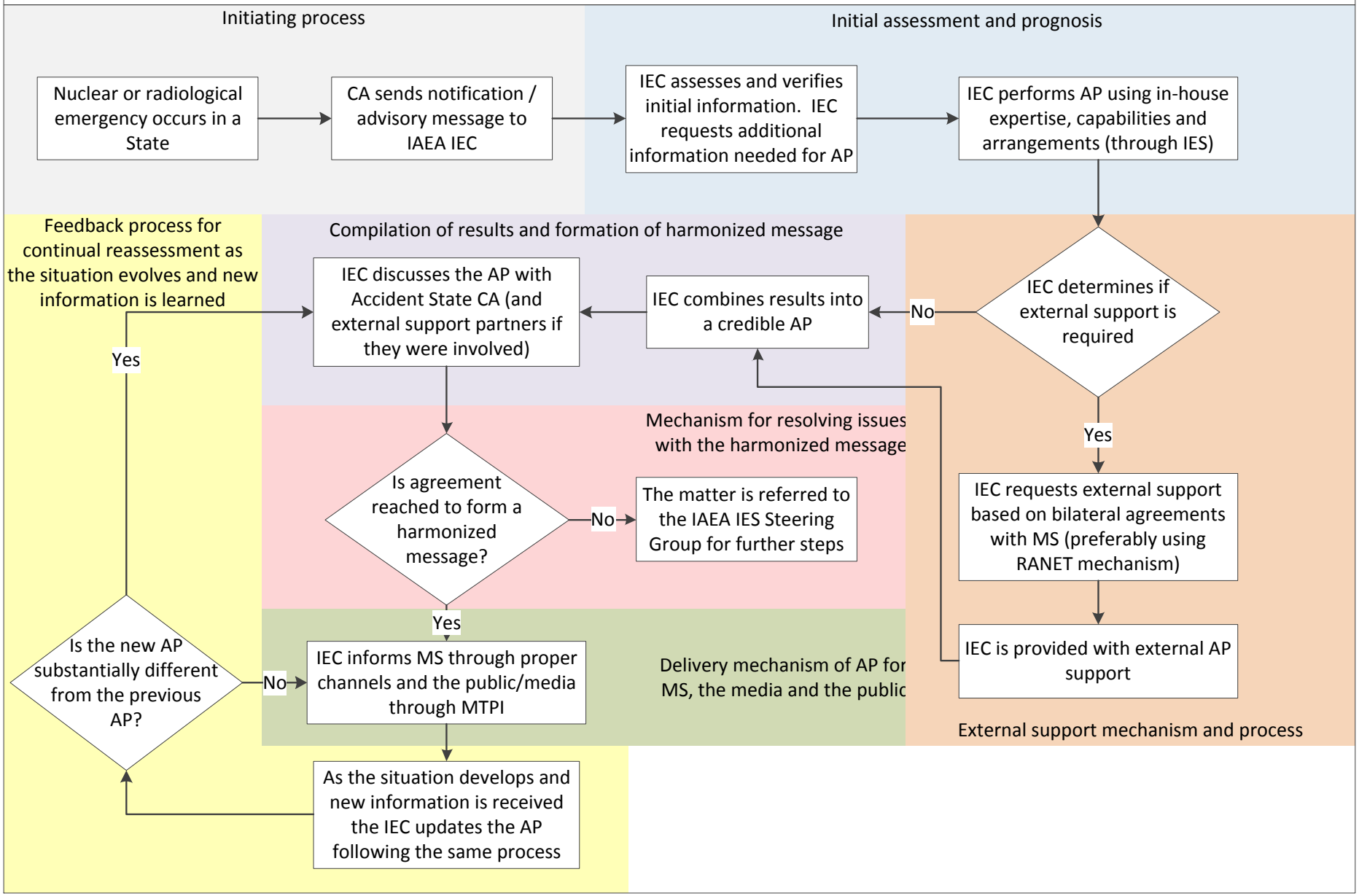
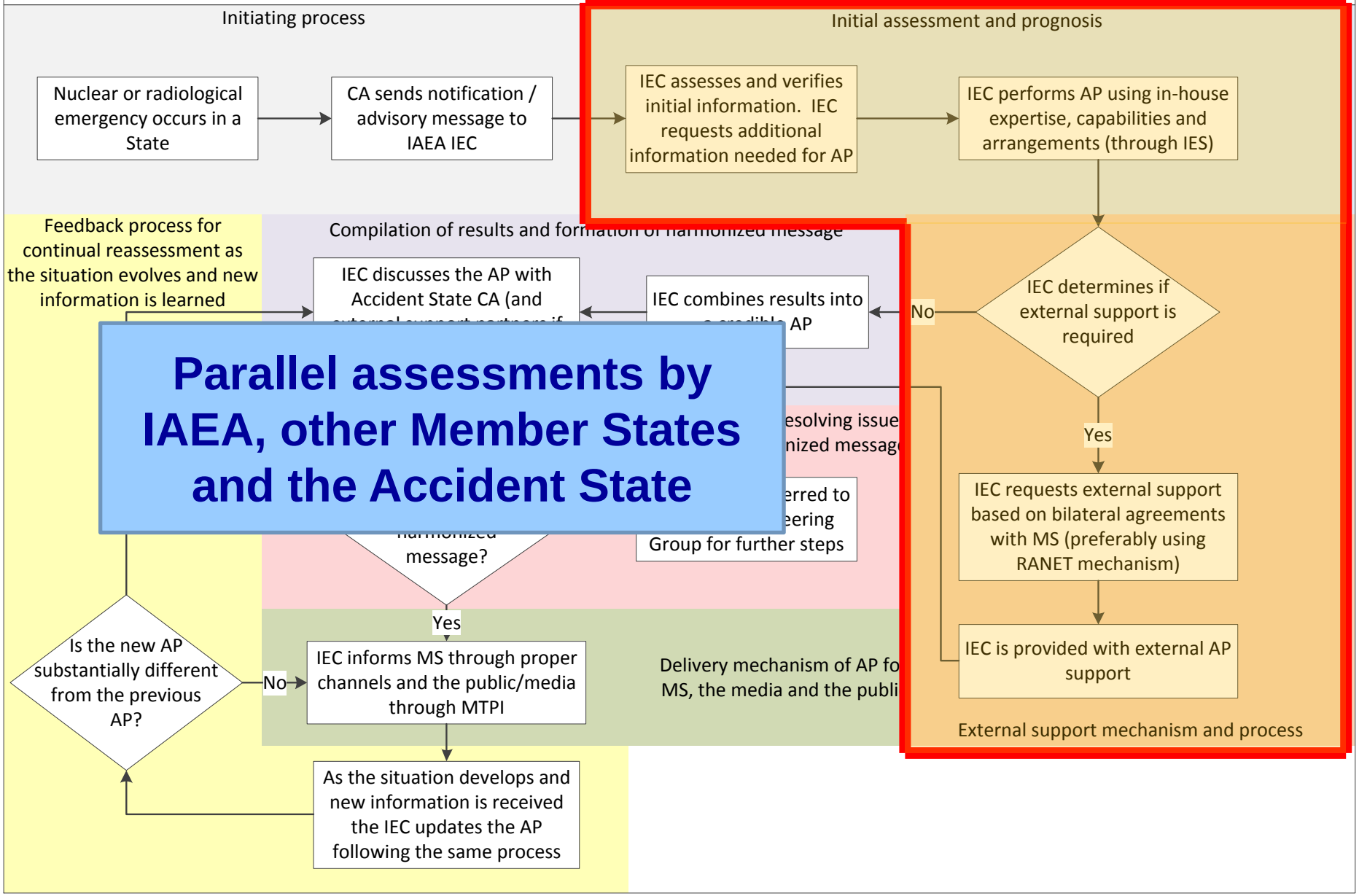
Assessment and prognosis process - Summary



Assessment and prognosis process - Summary



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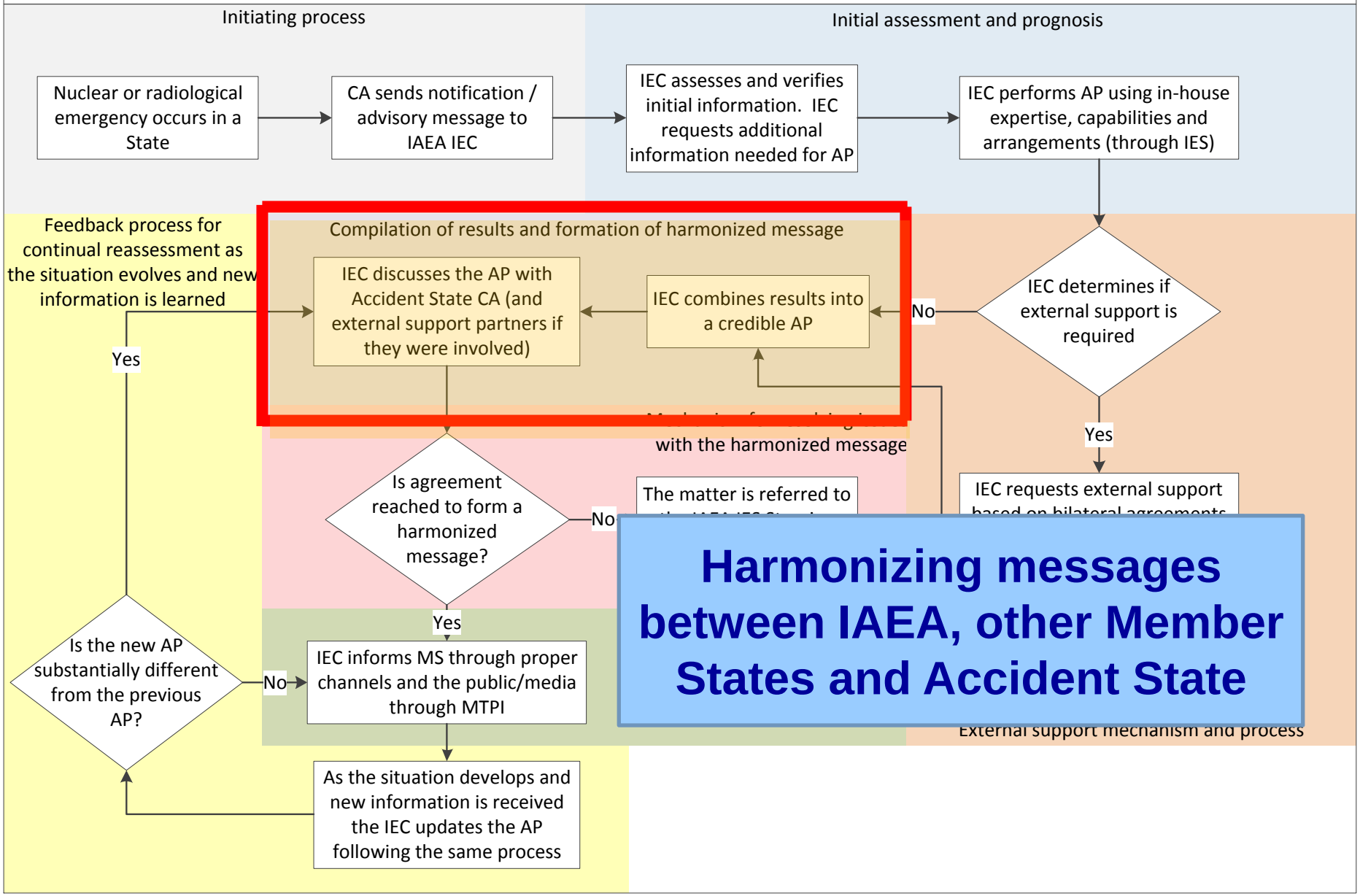

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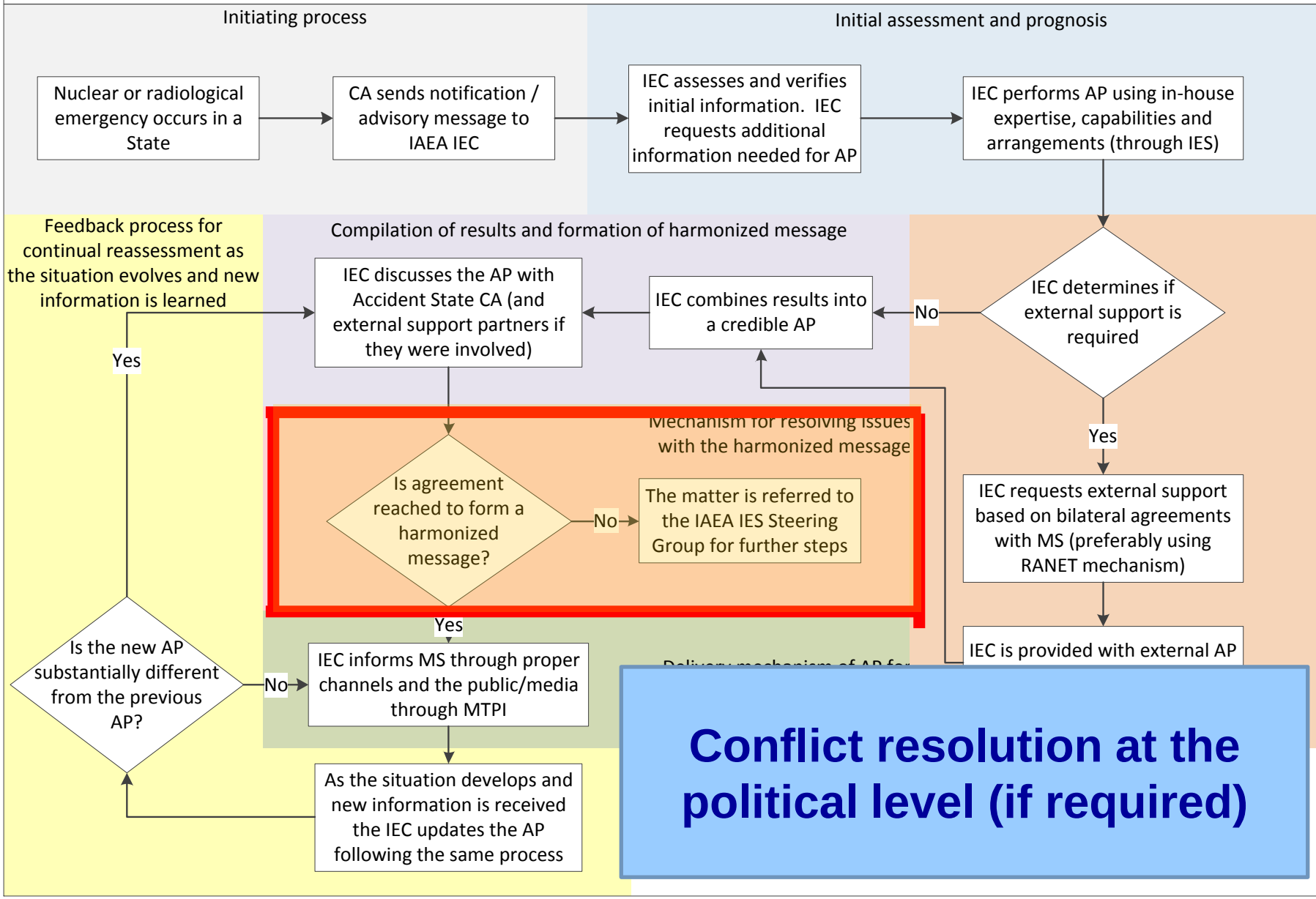

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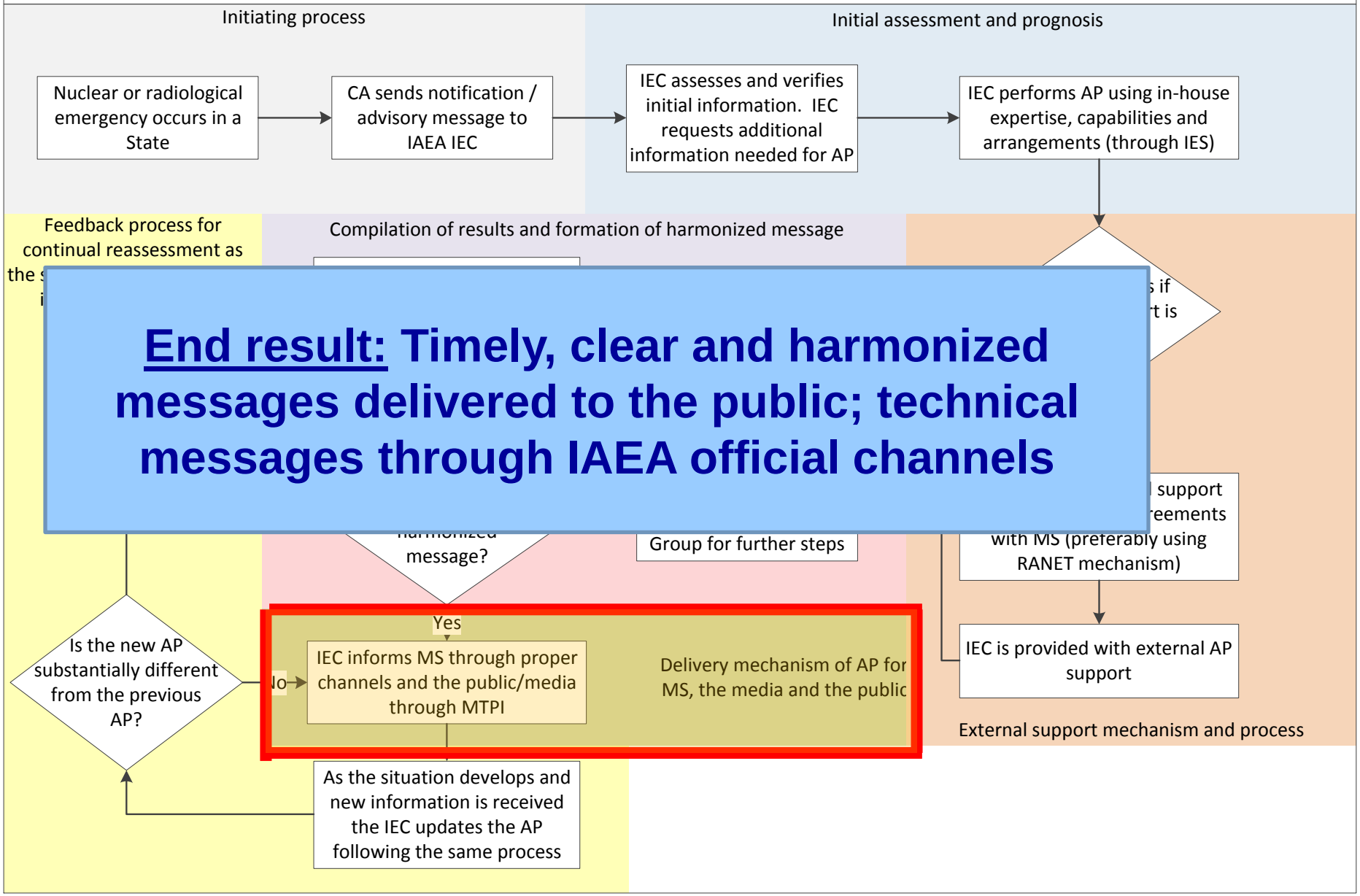
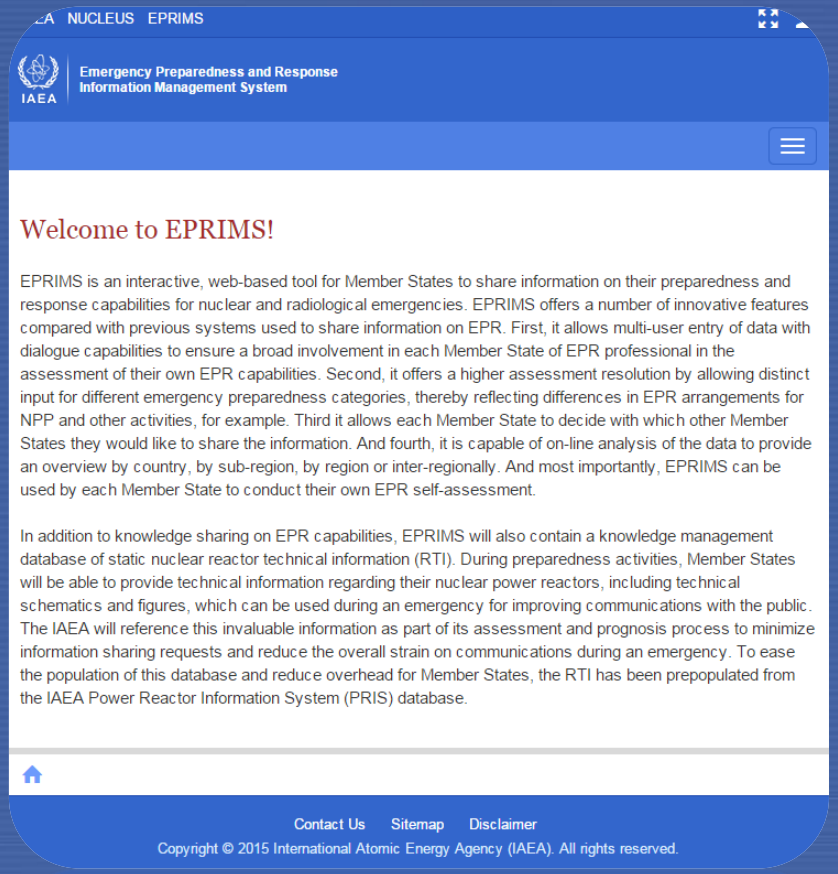
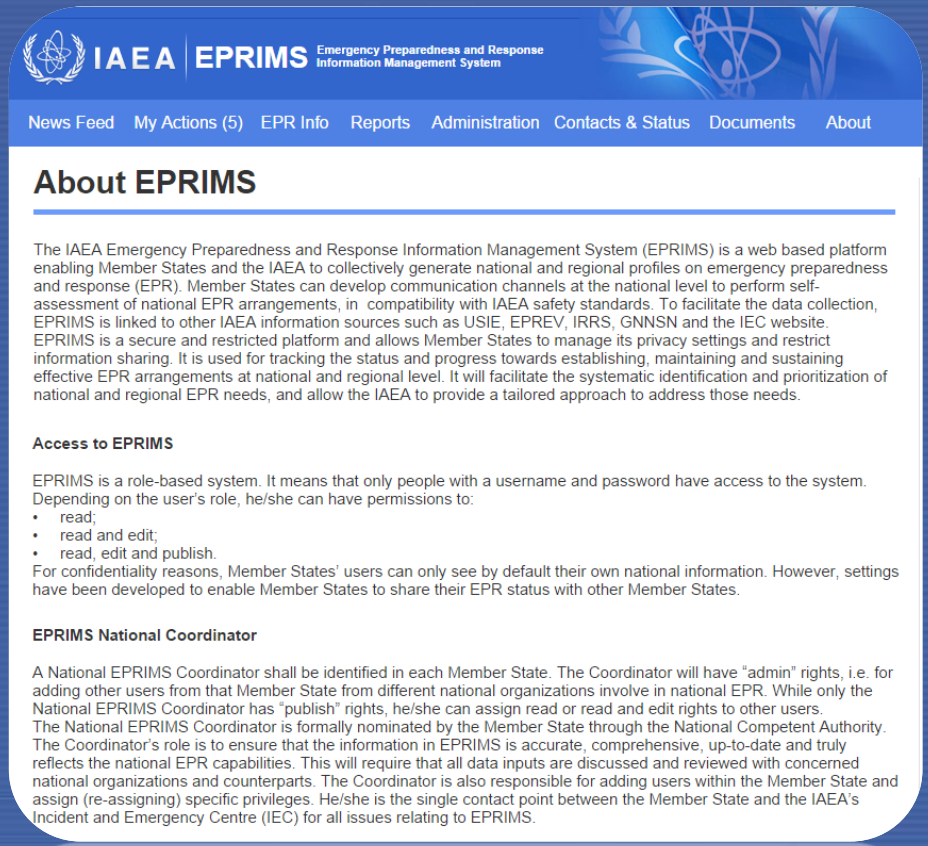


Process Challenges

- Sharing critical technical information
- Timeliness delivery of information
- Complex nuclear technologies require diverse and robust strategy to meet all potential scenarios
  - Need to fully understand capabilities of partners
  - Partners need to fully understand Secretariat capabilities
- Providing technical information to MS and clear, easily understandable information to public
- Clearly communicating uncertainties

Static Technical Parameters





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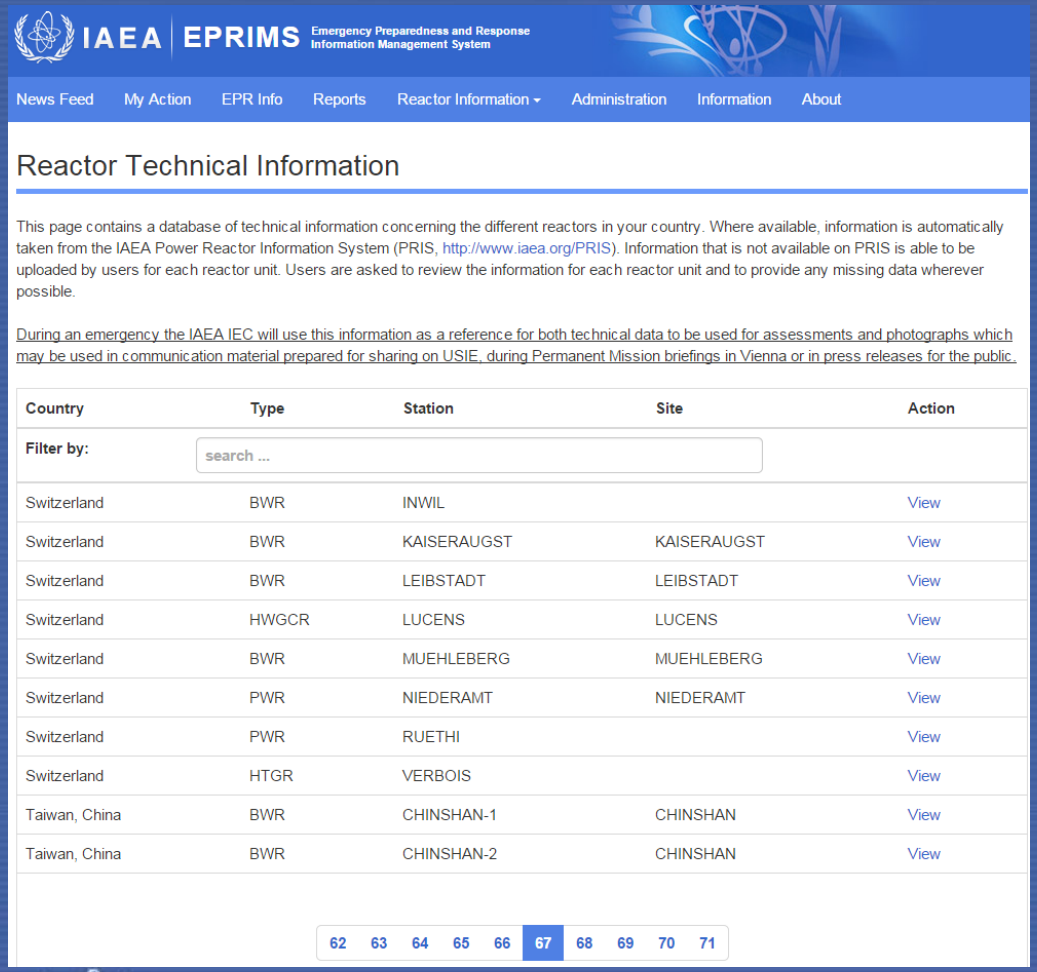
Static Technical Parameters



- Digital resource for reactor information
- Detailed database, repopulated from existing IAEA resources
- Allows Member States to provide additional data such as pictures, graphs, etc.

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Dynamic Technical Parameters

- If static information is shared in advance, only dynamic information needs to be shared during an emergency
- Dynamic parameters (e.g., containment pressure) establish the status of critical safety functions
- IAEA has developed a list of the dynamic parameters that may be needed
  - What actually is needed to be shared depends on the type of emergency
  - IAEA staff follows procedures and uses tools to identify and request only the relevant technical parameters during an emergency

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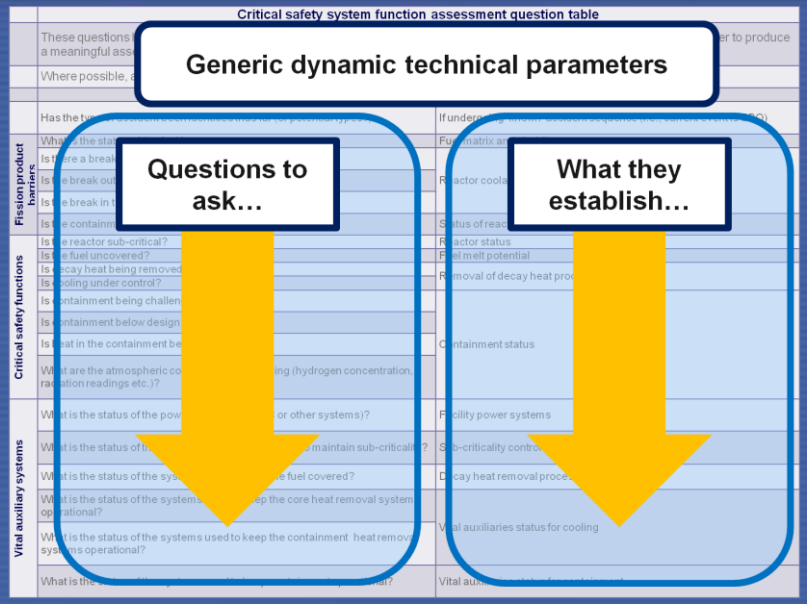
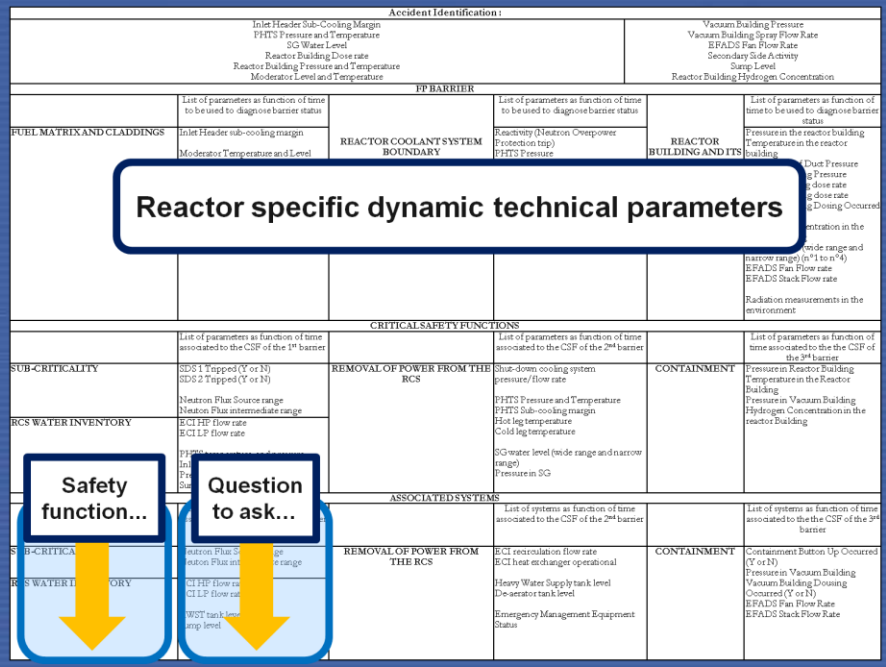
Dynamic Technical Parameters



General questions to establish status of safety functions

Complimentedd with detailed parameters relevant for each function based on the reactor technology



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Dynamic Technical Parameters

- Reduce the information being requested to only those questions and parameters that apply during a specific situation
- IAEA shares technical information with supporting Member States reducing burden on Accident State to provide such data
- Follow-up requests for additional data can go to from other countries to IAEA to accident state, coordinating and reducing technical demands on Accident State
- IAEA can act as focal point to harmonize technical assessments internationally for consistent public messaging

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Deliverables

- Summaries with technical conclusions and visual imagery shared with Member States and International organizations
- Public statements

At no point would an assessment of the situation or prognosis of likely emergency progression be shared with the public without knowledge of the ‘Accident State’

VIDEO

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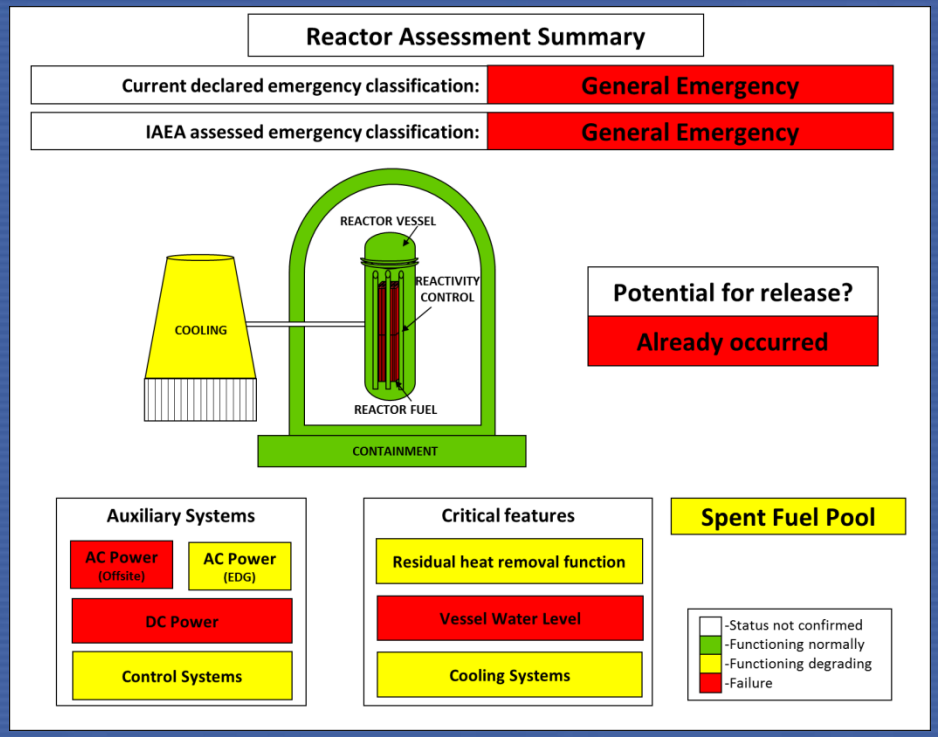
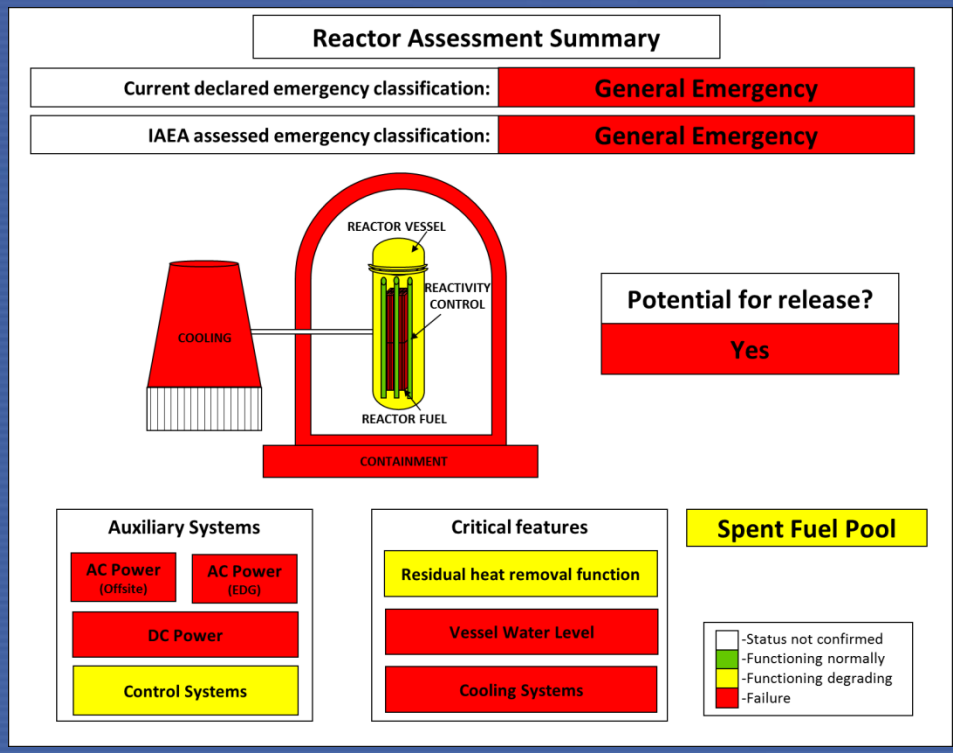
Example of Clear Technical Messages





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Example of Clear Public Messages

Based on these reports and the information that has been made available, the IAEA considers the public is safe and sees no reason why this should not continue to be the case in the future.

…[IAEA] considers that the food supply chain is safely under control.

Events and highlights on the progress related to recovery operations at Fukushima Daiichi NPS

February, 2014

Section 1: Executive summary

(1) The fact sheet uploaded in the link below is a summary of the current situation
http://www.kantei.go.jp/foreign/96_abe/decisions/2013/pdf/factsheet.pdf

(2) Information update from the previous fact sheet
There have been no updates from the previous fact sheet.

(3) The link of the previous fact sheet
There is no previous fact sheet at the moment.

Section 2: Current conditions and forecast onsite

2.1: Relevant information pertaining to issues related to the and fuel debris management)

(1) New Information

(i) Newly added topic (in past three months)

Newly added topics of the past three months are as issues, please refer to "related information".

- Decommissioning of Units 5 and 6 at Fukushima Daiichi Electric Power Company (TEPCO)) (January 31, 2014) http://www.tepco.co.jp/en/announcements/2014/123
- Nuclear Emergency Response Headquarters decided Pr Measures for Decommissioning and Contaminated Wat Economy, Trade and Industry (METI))(December 20, 20 http://www.meti.go.jp/english/earthquake/nuclear/de 001.pdf
- The results of the investigation and examining on matters of the Fukushima Nuclear Accident (TEPCO)(De http://www.tepco.co.jp/en/press/corp-com/release/20
- NRA's Action to TEPCO's Fuel Removal from Unit 4 Authority (NRA))(December 9, 2013) http://www.nsr.go.jp/english/data/131209.pdf
- Fuel removal from Unit 4 spent fuel pool has sta (TEPCO)(November 18, 2013) http://www.tepco.co.jp/en/press/corp-com/release/20
- Nuclear Regulatory Authority (NRA)'s actions toward T reactor building, Fukushima Daiichi NPS (NRA)(Novemb

IAEA assessment on aspects presented in the February 2014 report *"Events and highlights on the progress related to recovery operations at Fukushima Daiichi NPS"*

The final IAEA Peer review report

The Final Report of the IAEA International Peer Review on the Mid- and Long-term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi Nuclear Power Station Units 1-4 was published on the IAEA website on 13 February 2014. The mission was conducted from 25 November to 4 December 2013. The report acknowledges Japan's progress towards preparing Fukushima Daiichi for decommissioning and offers technical and policy advice on a range of issues, including fuel removal efforts, contaminated water management, and waste storage. As for the growing amounts of contaminated water at the site, the report advises that, to find a sustainable solution to the problem of managing contaminated water, TEPCO should consider all options, including the possible resumption of controlled discharges to the sea within authorized regulatory limits. TEPCO was advised to perform an assessment of the potential radiological impact to the population and the environment arising from the release of water containing tritium and any other residual radionuclides to the sea in order to evaluate the radiological significance and to have a good scientific basis for taking decisions. It is clear that final decision making will require engaging all stakeholders, including TEPCO, the NRA, the National Government, the Fukushima Prefecture Government, local communities and others. In this context, the report also stresses that the NRA should further enhance the seawater monitoring programme by coordinating interlaboratory comparisons to ensure good harmonization of the environmental data.

A press release describing the report is available on the IAEA webpage as is the full report:

- http://www.iaea.org/newscenter/news/2014/decommissioning.html
- http://www.iaea.org/newscenter/focus/fukushima/final_report120214.pdf

Measurements taken in the sea and surrounding areas

There is an intensive sea area monitoring programme established at the Fukushima Daiichi NPS. It comprises collection of seawater, sediment and marine biota, and is also focused primarily on fish. Recent results in the sea area around Fukushima Daiichi NPS have indicated that the radionuclide concentration levels outside the port and in the open sea have been relatively stable.

The measures from TEPCO to prevent contamination of the sea have been shown to be successful. The levels measured in seawater in the vicinity of the F1 area have remained relatively stable. Cs-134 and Cs-137 are in most cases below the detection limit of the analytical methods and are mostly below 1 Bq/L. As a comparison, the concentrations after the accident in March/April and May were about a factor of 10^5 (approximately 100,000 times) higher than the present levels. The reported levels of tritium are below any concern. See the following figure which shows the trend of some of the measurements at one location over time:

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Currently

- Agency's Incident and Emergency Centre is developing in consultation with MSs critical set of parameters needed for AP
- Testing A&P process in exercises to identify areas needing improvement

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What Remains to be Done (1)

- Agreement with MSs on provision of critical set of technical parameters during emergency
- Promoting registration in RANET
  - Increasing current registered capabilities
  - Adding new registrants
  - Extended RANET functional areas as of September 1, 2013
- Develop detailed operational protocols with RANET MSs
- Continue to exercise exchange of information and development of harmonized messages

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What Remains to be Done (2)

- Continue to ensure sustainable and efficient capability for A&P in response to emergency
- Continue to train Agency's response staff
- Expansion of capabilities within Agency
  - New procedures and tools to meet gaps
- Continue to discuss with Competent Authorities process improvements

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Conclusion

Strong commitment and coordinated efforts of Member States and Secretariat are required for success of A&P in an emergency

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Thank you!

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