International Experts' Meeting on Radiation Protection
17-21 February 2014

IAEA Activities Under the Nuclear Safety Action Plan

Gustavo Caruso
Special Coordinator for the Implementation of the Action Plan

IAEA Response to Fukushima Daiichi accident

IAEA response to Fukushima Daii-chi accident includes:

Nuclear Safety Action Plan:

- Defines a programme of work to strengthen the global nuclear safety framework
- Covers all relevant aspects relating to nuclear safety, emergency preparedness and response, and radiation protection of people and the environment

Fukushima Report:

Assessment of the accident that is comprehensive, factual and balanced, addressing the causes and consequences as well as lessons learned.

Nuclear Safety Action Team

Nuclear Safety Action Plan (NSAP):

Twelve key actions

1. Safety Assessments

2. IAEA Peer Reviews

3. Emergency Preparedness and Response

4. National Regulatory Bodies

5. Operating Organizations

6. IAEA Safety Standards

7. International Legal Framework

8. Member States Embarking on Nuclear Power

9. Capacity Building

10. Protection from Ionizing Radiation

11.Communication

12. Research & Development

NSAP: Communication and Dissemination of Information

Action 11: Enhance transparency and effectiveness of communication and improve dissemination of information

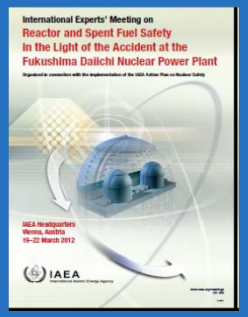
Why International Expert Meetings'

- IAEA was mandated to organize international experts' meetings (IEMs) **to analyse** all relevant technical aspects and **learn the lessons** from the Fukushima Daiichi accident
- IAEA **shares** these lessons worldwide

NSAP: Communication and Dissemination of Information

Action 11: Communication

International Experts' Meetings (IEM's)



IEM 1:

Reactor and Spent Fuel Safety

March 2012

IEM 2:

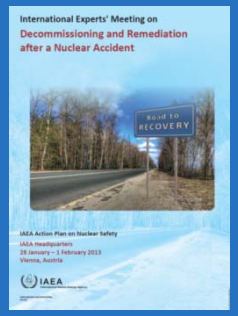
Transparency & Communication

June 2012

IEM 3:

Protection Against External Events

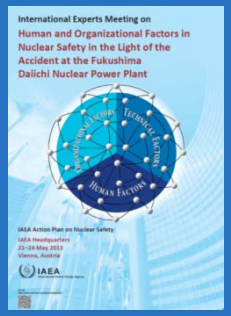
September 2012



IEM 4:

Decommissioning and Remediation

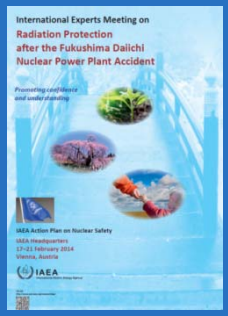
January 2013



IEM 5:

Human & Organizational Factors

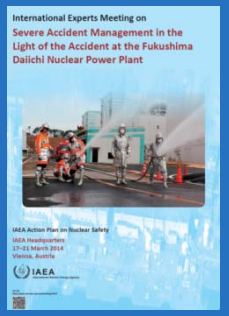
May 2013



IEM 6:

Radiation protection

February 2014



IEM 7:

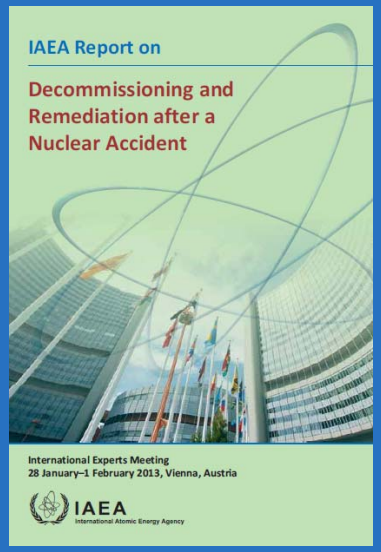
Severe accident management

March 2014

IEM 8: ***Research and Development*** *expected Q4 2014- Q1 2015*

NSAP: Communication and Dissemination of Information

International Experts' Meeting (IEM4): decommissioning and remediation after a nuclear accident



January/February 2013

Over 200 experts and government officials from 40 Member States, regulatory bodies, utilities, technical support organizations, academic institutions, vendors, and research and development (R&D) organizations.

Focus:

Short term and long term issues for decommissioning of accident-damaged facilities, management of radioactive waste arising from a nuclear accident and remediation of the off-site environment.

Final Report available at
http://www.iaea.org/newscenter/focus/actionplan/reports/decommissioning0913.pdf

NSAP: Communication and Dissemination of Information

IEM

International Experts' Meeting (IEM4): decommissioning and remediation after a nuclear accident

Conclusions: IEM identified aspects where there is room for improvement

Recommendations:

- IAEA should strengthen its programme on remediation after a nuclear accident
- The international community should strive to develop a practical definition of 'safe' as an aid for communicating with the public.
- IAEA should assist MSs with the development of end states and decommissioning strategies for accident damaged facilities.
- IAEA should review its guidance on the management of wastes and materials with the view of ensuring their practical application after a nuclear accident.

Nuclear Safety Action Plan

Nuclear Safety Action Plan:

Action 10: Protection of people and the environment from ionizing radiation

:

1. Safety Assessments

2. IAEA Peer Reviews

3. Emergency Preparedness and Response

4. National Regulatory Bodies

5. Operating Organizations

6. IAEA Safety Standards

7. International Legal Framework

8. Member States Embarking on Nuclear Energy

9. Capacity Building

10. Protection from Ionizing Radiation

11.Communication

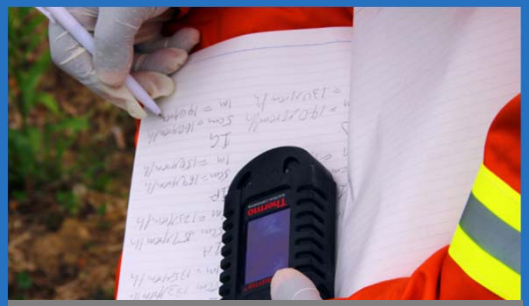
12. Research & Development

Protection of people & environment from ionizing radiation

Ensure the on-going protection of people and the environment from ionizing radiation following a nuclear emergency

Areas of work:

Facilitate the use of available information, expertise and techniques for:



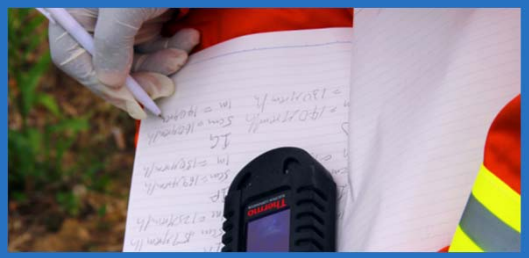
Assessment of radiation doses and any associated impacts on people and the environment

Removal of damaged fuel, management and disposal of waste from nuclear emergency

Monitoring, decontamination and remediation

Protection of people & environment from ionizing radiation

Action 10: Protection of people & environment from ionizing radiation



Action 10: Highlights

I. **International peer review:** Mid-and-Long-Term Roadmap towards the Decommissioning of the TEPCO's Fukushima Daiichi NPP

II. **IAEA Expert Mission** on Remediation of large contaminated area off-site at Fukushima Daiichi NPP

III. **IAEA Expert Mission** for Further Cooperation in Radiation Monitoring and Remediation at Fukushima

IV. **MODARIA:** Modelling and Data for Radiological Impact Assessment

Protection of people & environment from ionizing radiation

Highlights (I)

International peer review of the Mid-and-Long-Term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi NPPsUnits 1-4

First mission (April 2013):

- Review Decommissioning Roadmap, Challenges, condition of the reactors; management of waste; Protection of employees; structural integrity of reactor buildings and other structures.

Second mission (November 2013):

- Special focus on TEPCO's removal of fuel assemblies from Reactor Unit 4's Spent Fuel Pool and contaminated water management issues
- In addition, the review mission considered Japan's efforts to monitor radiation conditions in the marine environment, including seawater, sediments, and biota.

Protection of people & environment from ionizing radiation

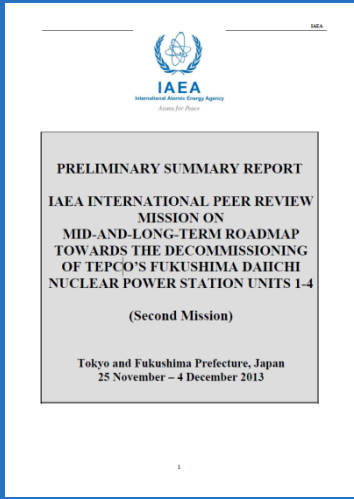
Highlights (I)

International peer review of the Mid-and-Long-Term Roadmap towards the Decommissioning of TEPCO's Fukushima Daiichi NPPs Units 1-4

Conclusions:

Japan has established a good foundation to improve its strategy and to allocate the necessary resources to conduct the safe decommissioning of Fukushima Daiichi. The situation, however, remains very complex, and there will continue to be very challenging issues that must be resolved to ensure the Plant's long-term stability."

Dec 2013, Peer review Team leader


IAEA

PRELIMINARY SUMMARY REPORT

IAEA INTERNATIONAL PEER REVIEW MISSION ON MID-AND-LONG-TERM ROADMAP TOWARDS THE DECOMMISSIONING OF TEPCO'S FUKUSHIMA DAIICHI NUCLEAR POWER STATION UNITS 1-4

(Second Mission)

Tokyo and Fukushima Prefecture, Japan
25 November – 4 December 2013

The team delivered a Preliminary Summary Report with 19 acknowledgements and 19 advisory points for Japan's consideration.

IAEA preliminary report available:

http://www.iaea.org/newscenter/focus/fukushima/missionreport041213.pdf

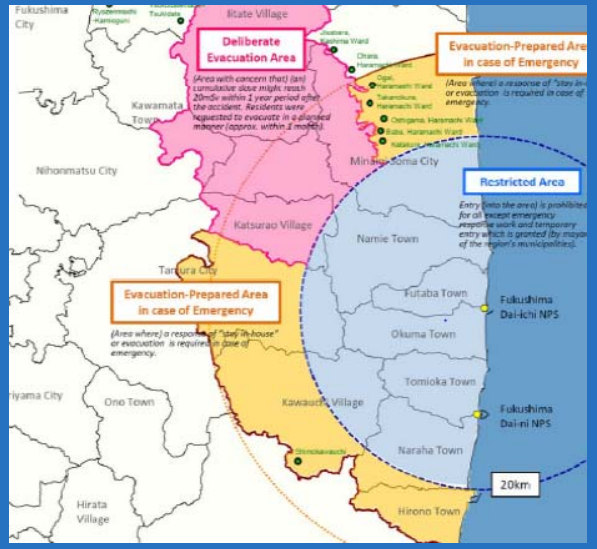
Protection of people & environment from ionizing radiation

Highlights (II)

IAEA International Expert Mission on Remediation of large contaminated area off-site the Fukushima Daiichi NPP

Fact finding mission (Oct 2011)

- Assist Japan's plans to remediate large areas contaminated by the accident at the Fukushima Daiichi NPP
- Review Japan's ongoing remediation strategies, plans and activities, including contamination mapping
- Share findings with international community to disseminate lessons learned from the accident.



Follow-up international mission (Oct 2013)

Analysed progress made and offered advice on several points where it is possible to further improve current practices

Protection of people & environment from ionizing radiation

Highlights (II)

IAEA International Expert Mission on Remediation of large contaminated area off-site the Fukushima Daiichi NPP

Conclusions:

- Significant progress achieved following the first IAEA mission in October 2011 on remediation of farmland and forest areas.
- Significant progress by municipalities and the national government in the development and establishment of temporary storage facilities for contaminated materials generated by on-going remediation activities.
- The mission team noted the progress made towards the national Government's creation of interim storage facilities, with the cooperation of municipalities and local communities.

IAEA final report Is available online

Protection of people & environment from ionizing radiation

Highlights (III)

IAEA Expert Mission to Japan: Further Cooperation in Radiation Monitoring and Remediation at Fukushima

3 years project

Objective: Assistance on issues of remediation, decontamination and low level radioactive waste management in the Fukushima Prefecture.

First mission (July 2013):

16 experts from 8 MS's and IAEA

To start implementation of the Practical Arrangements signed in December 2012 and April 2013 respectively between the Fukushima Prefecture and the IAEA

Protection of people & environment from ionizing radiation

Highlights (IV)

MODARIA: Modelling and Data for Radiological Impact Assessment

- **10 active working groups**
- 1st Technical Meeting (Nov 2012): 151 participants from 43 MS's
- 2nd Technical Meeting (Nov 2013): 153 participants from 43 MS's
- 3rd technical meeting (November 2014)

Main topics:

- Remediation strategies and decision aiding techniques
- Transfer data for assessment of radiological impacts
- Uncertainty associated with radiological impact assessments
- Biosphere modelling for radioactive waste disposal facilities
- Exposure models for accidental tritium releases
- Exposures and effects to flora and fauna
- Dispersion of radionuclides in the marine environment

EBP projects under the Nuclear Safety Action Plan

Decommissioning

- Decommissioning and environmental remediation after a nuclear or radiological accident
- An International Peer Review of Mid-and-long Term Roadmap towards the Decommissioning of Fukushima Daiichi Nuclear Power Units 1-4

Radiation assessment & protection

- Rapid environmental mapping of the Fukushima Prefecture
- Administrative Support and Coordination of Radiation Safety & Monitoring Projects Addressing Remediation, Decontamination, Land Use
- Off-site Remediation and Decontamination of Land to Support Safety of Early Repatriation of Evacuated People
- Guidance for the implementation of integrated strategies to reduce radiological impacts to the population subsequent to deposition of radionuclides on inhabited and agricultural areas
- Strengthening capabilities for radiation protection of workers in emergency situation and occupational radiation protection appraisal services

Waste management

- Guidance on the establishment of radioactive waste and spent fuel management strategy following emergency situations
- Management of Radioactive Waste from Remediation Activities
- Processing, Storage and Disposal of Liquid and Solid Waste resulting from the Accident at Fukushima Daiichi Nuclear Power Plant

Criteria for food & water

- Developing Radiation Safety Criteria for Land Use and Food Production.
- TECDOC "Criteria for Food and Drinking (Potable) Water Contaminated as a Result of a Nuclear or Radiological Emergency - a Synthesis of the Current Situation"

Medicine

- Enhancing global radiation medicine education
- Strengthening research cooperation in radiation disaster
- Development of a specific training package for medical radiation physicists

NSAP: Protection From Ionizing Radiation

On-Going projects (start 2013 – estimated end 2017)

Assessment of radiation doses and any associated impacts on people and the environment

- Review of the generic criteria for radioactive material in food, animal feed and drinking water. (in cooperation with WHO, FAO and other relevant international organizations)
- Update of MARIS (Marine Information System) with new marine environmental radioactivity data relevant to the Fukushima Daiichi NPP accident
- Practical arrangement with the Fukushima Medical University to undertake collaborative activities in the area of radiation effects on human health and radiation risk management in Fukushima Prefecture.
- Development of a specific training package for medical radiation physicists in support to nuclear or radiological emergency situations.

NSAP: Protection From Ionizing Radiation

On-Going projects (start 2013 – estimated end 2017)

Monitoring, decontamination and remediation

- Report on the experience and lessons learned worldwide in clean-up and decommissioning of nuclear facilities in the aftermath of accidents.
- Report on approaches, techniques, tools and equipment to deal with environmental remediation after an accident.
- Report on Criteria for Food and Drinking Water Contaminated as a Result of a Nuclear or Radiological Emergency - a Synthesis of the Current Situation"
- Project on Rapid environmental mapping of the Fukushima Prefecture using unmanned aerial vehicle with mobile gamma spectrometer on an.

NSAP: Protection From Ionizing Radiation

On-Going projects (start 2013 – estimated end 2017)

Removal of damaged fuel, management and disposal of waste from nuclear emergency

- Guidance on the establishment of radioactive waste and spent fuel management strategy following emergency situations taking into account existing experience
- Project on Management of Radioactive Waste from Remediation Activities

IAEA answer to Fukushima Daiichi accident

IAEA Fukushima Report:

5 Working Groups

1. Description and context of the accident

2. Safety Assessments

3. Emergency Preparedness and Response

IEM6

4. Radiological Consequences

5. Post-Accident Recovery

IAEA Fukushima Report

Working Group 4

Radiological Consequences

Co-Chairs:

- Mr Abel González (ARGENTINA)
- Mr Miroslav Pinak (IAEA NSRW)
- Mr Rethy Chhem (IAEA NAHU)

Areas:

- Radioactivity in the environment
- Radiation exposure
- Radiological protection
- Health consequences
- Impact on the environment

IAEA Fukushima Report

Working Group 5

Post-Accident Recovery

Co-Chairs:

- Mr Geoff Williams (AUSTRALIA)
- Ms Irena Mele (IAEA NEFW)
- Mr Gerard Proehl (IAEA NSRW)

Areas:

- Remediation preparedness prior to the accident
- Remediation (off-site recovery)
- On-site post-accident stabilization and recovery towards decommissioning
- Waste management
- Revitalisation of infrastructure and community

Conclusions

Nuclear Safety Action Plan:

- Continue to make significant progress in implementing the Action Plan
- IAEA will continue reporting to the Board of Governors and General Conference
- More work still to be done

IAEA Fukushima Report:

The Report is on track to be finalized by the end of 2014:

- Complexity of the work given number of players and diversity of activities
- Over 1000 pages from contributions and more than 170 experts to make a technically comprehensive Report understandable to a wider audience
- Self-contained chapters avoiding overlaps

Thank you!

Nuclear Safety Action Team