

Emergency Preparedness discussions on a review of the current strategy

Ulrike Welte
SSK-Notfallausschuss
Germany/Hamburg



Picture: Muro2011



EU Scientific Seminar 2014
Fukushima-Lessons learned and issues
Luxembourg, 18 November 2014

Emergency Preparedness - discussions on a review of the current strategy

Remember...



Picture: TEPCO



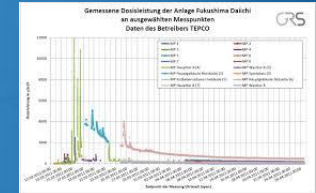
EU Scientific Seminar 2014
Fukushima-Lessons learned and issues
Luxembourg, 18 November 2014

Characteristics of the Fukushima Accident:



Very high and long-lasting release of radioactive material from different sources

*(into the atmosphere for about three weeks;
into the ocean for more than one month;
problems exist until today)*



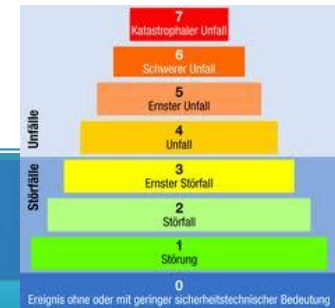
Heavy destructions of infrastructure caused by earthquake and tsunami hindered the internal and external emergency response



Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

Nuclear accidents even those of the INES Level 7 happen. Despite high safety requirements and the low calculated probability for such cases we can never be sure, that severe nuclear accidents do not happen.



Consequence:

Detailed Planning of emergency response is necessary even for Level 7 Accidents!



Emergency Preparedness - discussions on a review of the current strategy

Recommendation of the German Commission on Radiological Protection:

Reference source terms are required as a basis for detailed planning.

The „Level 7 Source Term“ was already used to determine extended planning areas.

The implementation of Level 6 and Level 5 source terms and source terms for long-lasting releases is discussed.



Emergency Preparedness - discussions on a review of the current strategy

Reference Source Terms as a Basis for detailed Planning of Emergency Response

Name	Release of Iod-131 Bq	Release of Cs-137 Bq	Assumed Start of major releases (only for planning purposes) Hours [h] after shutdown of the reactor	Duration of releases	Release via	
Q1	3.0×10^{17}	3.0×10^{16}	6	48 Hours	Building Roof	INES 7
Q1L	3.0×10^{17}	3.0×10^{16}	6	14 Days	Building Roof	INES 7 long
Q2	2.0×10^{16}	3.0×10^{14}	12	48 Hours	Building Roof	INES 6
Q2L	2.0×10^{16}	3.0×10^{14}	12	14 Days	Building Roof	INES 6 long
Q3 ⁶	3.0×10^{15}	3.0×10^{11}	12	48 Hours	Stack	INES 5
Q3L ⁶	3.0×10^{15}	3.0×10^{11}	12	14 Days	Stack	INES 5 long



Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

The area affected by an accident impact can be very large. The area in which protective measures (in particular evacuation) were implemented immediately after the accident happened was much larger than the planning zones in place in Germany at that time.



Consequence:
Change of Germanys Emergency Preparedness Planning Areas!



Emergency Preparedness - discussions on a review of the current strategy

Recommendation by the German Commission on Radiological Protection:

Planning areas for emergency response in the vicinity of nuclear power plants (www.ssk.de)

Previous	New
Central zone with a radius of 2 km	Central zone extends up to about 5 km around NPPs
Middle zone with a radius of 10 km	Middle zone extends up to about 20 km around NPPs
Outer zone with a radius of 25 km	Outer zone extends up to about 100 km around NPPs
Remote zone with a radius of 100 km	Entire Territory of Germany



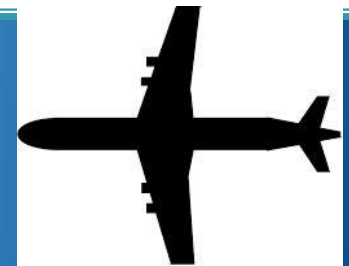
Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

Consequences of severe accidents are always international!

Lessons learned from Fukushima (in Germany!):

Regulations and plans for measures to be taken in case of accidents outside of Europe are not available!



Consequence:

Definition of Szenarios

which have to be covered up by regulations

EU Scientific Seminar 2014

Fukushima-Lessons learned and issues

Luxembourg, 18 November 2014



Emergency Preparedness - discussions on a review of the current strategy

Recommendation of the German Commission on Radiological Protection:

Basis for Planning: NPP-Szenarios

- Accident in a NPP in Germany
- Accident in a NPP in a neighboring country (less than 100 km from the border)
- Accident in a NPP in Europe (more than 100 km from the german border)
- Accident in a NPP outside of Europe



Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

Planning is necessary for all phases of an accident.

In particular, the planning for the Post-accident-phase must be improved so that the lives of people affected can be normalized as quickly as possible!



For the urgency phase a tool is needed which supports the situation judgement when only few facts are available.



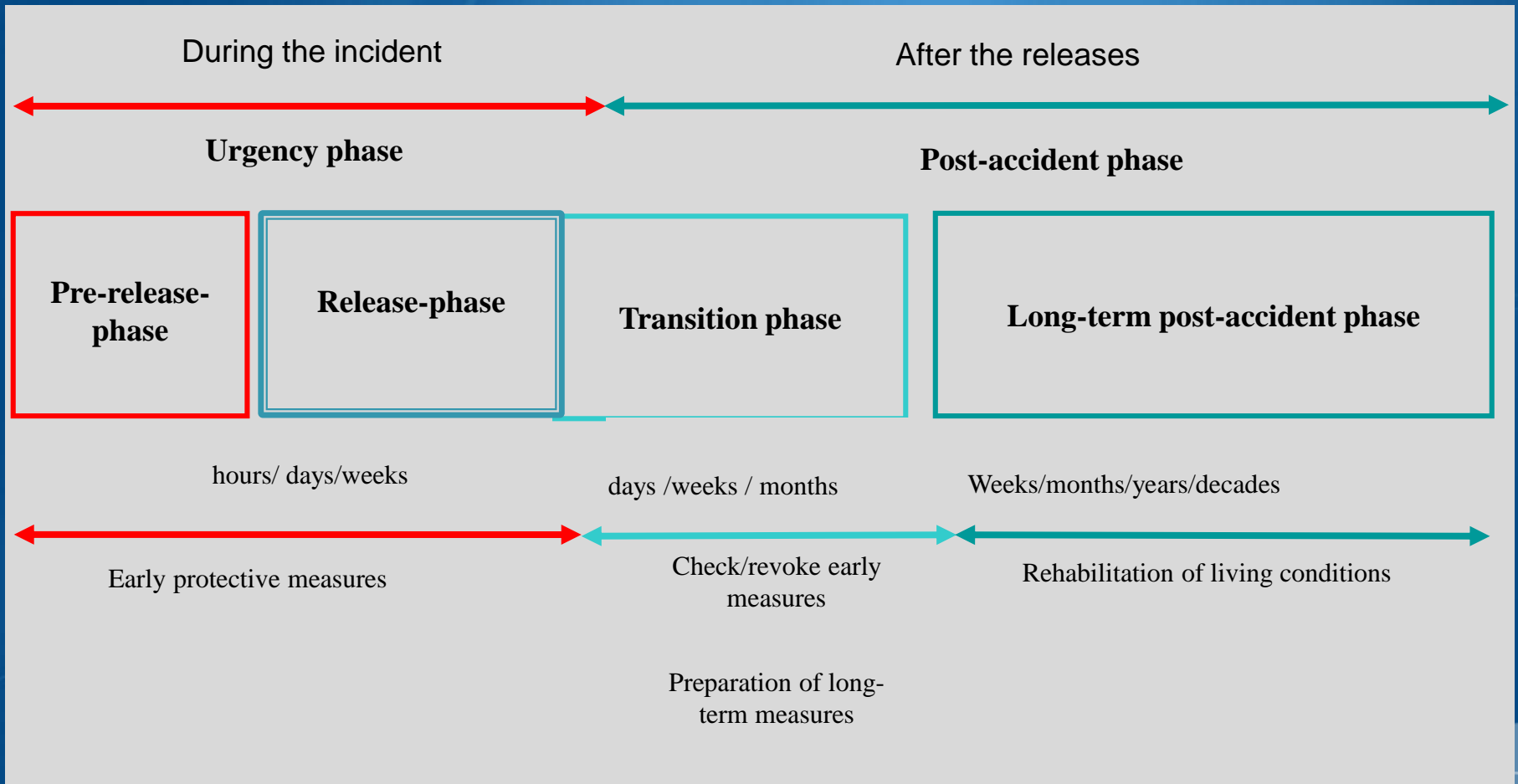
Consequence:

Enlargement of planning to all phases of accidents!



Emergency Preparedness - discussions on a review of the current strategy

The Phase Model for a Nuclear Accident



Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

In case of an emergency there is not enough time to develop optimal protection strategies for all phases of the accident.



Consequence:

Prepared Protection Strategies are needed for all types and phases of nuclear accidents.



Recommendation of the German Commission on Radiological Protection:

Protection strategies shall be prepared in advance for all types and phases of nuclear accidents.

In an emergency situation a further optimization of strategies is necessary.

Therefore a tool is needed.

Emergency Preparedness - discussions on a review of the current strategy

In Germany protection strategies have not been compiled yet.

Currently it is discussed whether the elaboration of a guideline is reasonable and whether the computer code RODOS can be used for the development and further optimization of protection strategies.



RODOS



Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

Lack of information on the nature, course, and extent of release of radioactive substances can complicate the crisis management very much.

The first “official source term” was announced one month after the start of the release and could not be used for decisions on protective measures any more.

Consequence:

Review of the methods for determining the source term in Germany.



Emergency Preparedness - discussions on a review of the current strategy

Recommendation of the German Commission on Radiological Protection (SSK):

The methods for determining source terms in accident situations shall be improved in Germany.

The SSK has therefore published its recommendation “prediction and estimation of source terms for nuclear power plant accidents” in 2014 (www.ssk.de).

SSK suggested to install a computer code in the emergency center of the operator. By this code, which based on PSAs, likely source terms can be predicted.

In addition a method for source term estimation on the basis of plant technical , radiological and meteorological information shall be implemented.



Emergency Preparedness - discussions on a review of the current strategy

Lesson learned from Fukushima:

Especially during build-up of the crisis organization, during the evacuation and also in the post-accident phase it became clear how important a good quality of planning is .



Consequence:

Review of the methods for quality assurance and quality assurance monitoring in Germany.



Results of the review:

There are sufficient regulations on quality assurance and monitoring for the NPP-internal emergency preparedness and response.

Quality assurance and quality monitoring of the competent authorities for emergency preparedness and response, however are not ensured sufficiently.

Emergency Preparedness - discussions on a review of the current strategy

Discussions within the SSK:

Do we need special rules for quality assurance and quality monitoring?

Shall we implement reviews by independent institutions?

Can Quality be improved by implementation of a certification eventually on a European level?



Emergency Preparedness - discussions on a review of the current strategy

Last but not least: HARMONIZATION

We need more harmonization not only among neighboring states but in Europa (better worldwide!).

Differences are only necessary, if required by specific local conditions.

The Council Directive 2013/59/Euratom seems to be a good basis for a new European approach.



Thank You for Your Attention!

