ENSREG
European Nuclear Safety Regulators Group

Topical Peer Review II

Fire protection at nuclear installations

Plenary session

Conclusions

Sylvie Cadet-Mercier - TPR II Chair

1 Some figures

2 Summary of discussions

3 Next steps

Plenary session

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1. Some figures

Attendance to this workshop

- 19 participating countries represented in person
- 44 licensees, 27 regulators (in person), 44 remote registered
- TPR Team:
- Organisations: IAEA, JRC, NEA, NEIL
- Observers: Luxembourg, Greece, South Africa

18 thematics sessions

- 5 on Fire safety analyses
- 5 on Prevention and Passive Fire Protection
- 4 on Active Fire Protection
- 4 on Transversal Topics

Findings

Proposal of 4 Good practices and 4 Challenges

Plenary session

2. Summary of discussions

General methodologies for deterministic FSA

- NPPs follow similar approaches. Learning from this knowledge should be beneficial for other types of facilities.

Approach to updating the FSA

- Countries have different approaches for the updates of FSA

Analyses of radiological consequences

- Clarification of the methodologies used in each country and the relevance of data used for calculations of potential radiological consequences for the population in the event of fire, as some of these data may be several decades old.

Use and application of FSA results

- Some types of installations could benefit from improvements made by other facilities. The more detailed contributions were dedicated to NPPs operating at full power. There is a margin for increasing the level of control on transient fire loads and ignition sources -assumptions in the Fire PSA- through the strengthening of the safety culture.

Fire PSAs in NPP : scope, criteria and conservatisme

- Most countries have developed Fire PSA level 1 and 2 for all operating modes at NPPs or have plans to do it. Some have also Level 3 PSA and some RR have performed PSA adaptations. Sensitivity and uncertainty analyses as well as plant modifications were reported by fewer countries.

Plenary session

2. Summary of discussions

Management of fire loads

- Crucial role of leadership/safety culture to prevent persisting unjustified loads and manage removal of combustible radwaste

Management of ignition sources

- No agreed definition of hot work or cold cutting. Need for reduction of hot work or alternatives. Construction/decommissioning provide several extra difficulties. New technologies are challenging (e.g. batteries)

Inspection and functionality testing of fire dampers

- Approaches/methods are similar among countries. Replacements mostly only when obsolete, due to new regulations or ageing.

Ventilation management in case of fire

- Facilities use varying level of automatization. Others have manual actions. Both consider nuclear or radiation safety (e.g. integrity of glove boxes, evacuation routes, operation of safety SSCs).

Ageing management of passive and active fire protection SSCs

- Seals inspections are similar everywhere (visual 10-15 years). Hydrants mostly are at least inspected visually, but some are using other method (e.g. ultrasound, endoscopy, or full flow tested.

Plenary session

2. Summary of discussions

Adequate strategies for installation of fire detectors and failure tolerance

•Most facilities use addressable fire detectors with full coverage of the premises. Full coverage seen as an aim by most delegates. Design for NPPs/RRs with robustness against single failures only implemented in few cases so far

Issues for the installation of extinguishing systems

- Extinguishing systems are important and useful for specific locations and systems. The choice for or against a system depends on fire load and risk. Use of gas extinguishing systems is important to save sensitive and safety critical equipment, often in restricted spaces

Harmful effects of fire-fighting water

- The countries demonstrated that the potential harmful effects of firefighting water are well understood, measures are provided where required and no further areas of follow-up were evident arising from this topic

Firefighting, different responsibilities, distribution of tasks, on-site,off-site

- Some common practices in the organisations in place to fight fires inside their installations with sometimes specificities due to the process or type of risk. The majority of these organisations rely on a quick response of second intervention team to stop propagation of the fire and extinguishing it. Multiple types of organisation were seen.

Plenary session

2. Summary of discussions

Use of experience feedback

- The fire safety related events are generally reported and the lessons are learned at the site level. Most countries contribute to the international Operating Experience Feedback but very few can provide examples of the consideration of an external/international lessons learned on their sites.

Compartmentation

- Countries prefer the use of containment approach –CA (influence approach used when CA not feasible). Compartmentation in installations improved over the years-many compensatory solutions mentioned. Deterministic mostly used for FSA. Re-assessments triggered by changes (load, modifications or regulations)

Combination of fire hazards

- Combinations of events are considered in the deterministic approach for most countries. Some countries/facilities consider them in the PSA. Seismic qualification is the most common approach in the FP SSC design or use flexible strategies. Different approaches to the aircraft crash scenario. Importance of OpEx sharing and of systematically analysing these events

Installations under decommissioning

- The safety relevant equipment from fire protection systems are kept operational. Necessary modifications according to risk and status of the installation generally approved by the regulator. Deterministic approaches for fire safety analysis are used (in one country, a fire PSA is used in the initial phase of decommissioning)

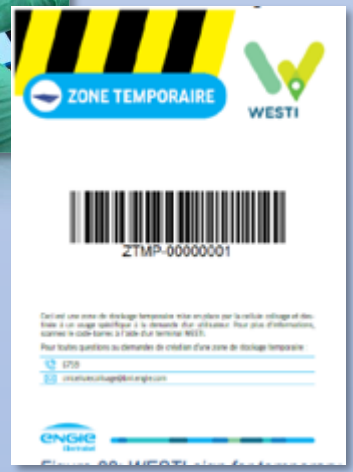
Plenary session

2. Summary of discussions

Management of fire loads

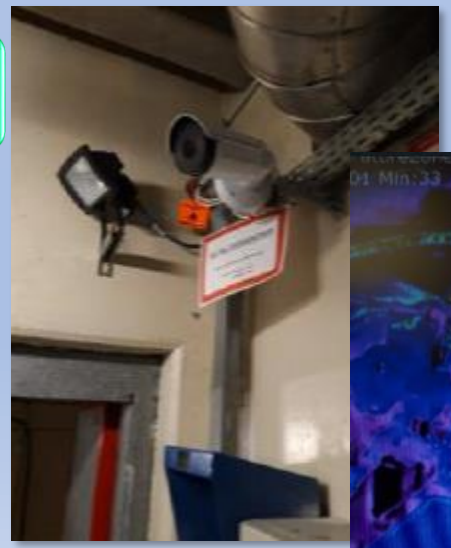
Mobile scanner device (PDA) with an intuitive IT tool, stickers with bar code

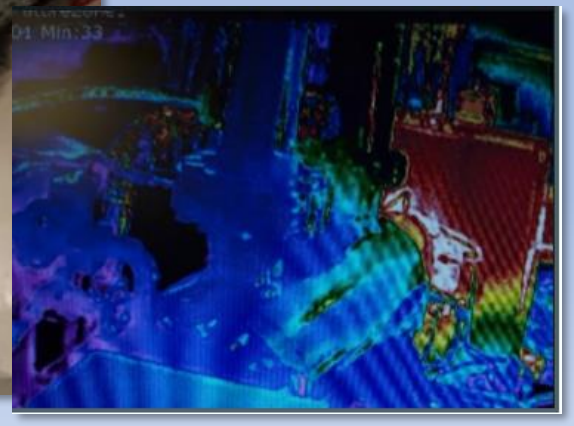
Application to easily identify any storage area, the allowed equipment or materials stored and the owner of the area and the equipment.
--> provides a simple solution for the traceability, verification of storage area, generation of the notifications



Adequate strategies for installation of fire detectors and failure tolerance

Cameras installed on worksites or in case of the failure of a detector, with different detection zone
Monitoring is carried out in the control room; an alarm is triggered either on a programmed temperature or a change in temperature





Plenary session

2. Summary of discussions

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General methodologies for deterministic FSA

Extensive series of tests to analyse the effects of fire on elements credited in the fire safety analyses to confirm their resistance (electrical equipment, fire doors, cables, seals…)

Use of experience feedback

Use of experience feedback from fire events outside nuclear installations

Plenary session

2. Summary of discussions

Topical Peer Review II

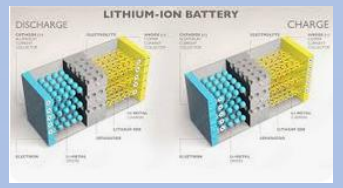
Fire protection at nuclear installations

General methodologies for deterministic FSA

- A need for guidelines to carry out FSA for non-NPP nuclear installations and NPPs not operating at full power
- A need to develop approaches with detailed provisions/instructions to meet high level requirements from standards

Management of ignition sources

- A need to consider new types of ignition sources (e.g. lithium-ion batteries…)

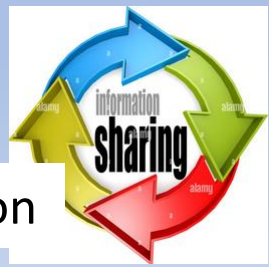


Adequate strategies for installation of fire detectors

- Solutions for the use of detectors in high radiation areas to be investigated

Use of experience feedback

- A need for an unique repository for sharing information on fire events for any nuclear installation



Plenary session

3. Next steps

Topical Peer Review II

Fire protection
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Objective

End of November

- **Summary report** to be completed to reflect the discussions, conclusions and findings
- **New/revised Country Specific Findings** resulting from the information provided during the workshop
  - ✓ to be discussed during the Country Workshop (Country Group session)

Plenary session

3. Next steps

Topical Peer Review II

Fire protection
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- **Registration before 20 September**
- **Comments expected before 20 September** on the draft CRR transmitted end of August
- **Attendance**
  - TPR team expected at the country workshop
  - National delegation (at least at their national presentation) to enable discussion after the presentation
- **New/revised Country Specific Findings** resulting from this workshop transmitted to the Countries **4 days** before the Country workshop

Objective

End of November


EN·SREG

European Nuclear Safety Regulator's Group
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2nd Topical Peer Review – 'Fire Protection'

Country Review Report

France

COMPLETED

3. Next steps

Monday 30/09		Tuesday 01/10		Wednesday 02/10		Thursday 03/10	
CG1	CG2	CG1	CG2	CG1	CG2	CG1	CG2
		Lithuania 9h - 10 h Presentation: 40 mn Discussion : 20 mn	Finland 9h -10h30 Presentation: 60 mn Discussion : 30 mn	Turkey 9h - 10h Presentation: 40 mn Discussion : 20 mn	Czech Republic 9h - 10h Presentation: 40 mn Discussion : 20 mn	Austria 9h - 9h45 Presentation: 25 mn Discussion : 20 mn	Hungary 9h -10h30 Presentation: 60 mn Discussion : 30 mn
Plenary 10h-10h15							
Germany 10h30 - 12h Presentation: 60 mn Discussion : 30 mn	Belgium 10h30 - 12h Presentation: 60 mn Discussion : 30 mn	Spain 10h30 - 12 h Presentation: 60 mn Discussion : 30 mn	Slovakia 11h - 12h Presentation: 40 mn Discussion : 20 mn	Switzerland 10h30 - 12h Presentation: 60 mn Discussion : 30 mn	Bulgaria 10h30 - 12h Presentation: 60 mn Discussion : 30 mn	Ukraine 10h30 - 12 h Presentation: 40 mn Q/A: 20 mn Discussion : 30 mn	Italy 11h - 12h30 Presentation: 60 mn Discussion : 30 mn
LUNCH BREAK							
Netherlands 14h - 16h Presentation: 80 mn Discussion : 40 mn	Romania 14h - 16h Presentation: 80 mn Discussion : 40 mn	France 14h -16h 15 Presentation: 90 mn Discussion : 45 mn	Sweden 14h - 15h30 Presentation: 60 mn Discussion : 30 mn	Slovenia 14h - 15h Presentation: 40 mn Discussion : 20 mn	United Kingdom 14h - 16h15 Presentation: 90 mn Discussion : 45 mn	PLENARY 14h-14h30	
			Denmark 16h - 17h Presentation: 40 mn Discussion : 20 mn	Poland 15h30 - 16h15 Presentation: 25 mn Discussion : 20 mn			

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We thank you for your fruitful participation!

Introduction

Definition of findings

Good Practice: should be understood as an aspect of fire protection, which is considered by the TPR review Team to go beyond what is required in meeting the appropriate national or international standards.

It is identified in recognition of an arrangement, practice, policy or programme significantly superior to those generally observed in participating countries and having a clear safety benefit.

It is likely to be applicable to other participating countries with similar programmes and it is for each country to review and decide on its implementation in relevant nuclear installations to improve safety.

Challenge (EU wide): should be understood as aspects in the implementation of fire protection that are considered by the TPR Peer Review Team to be common to many or all countries and are areas where action at a European level, in addition to action at national level, would help to increase available knowledge, drive consistency or produce beneficial new techniques or technology to assist in enhancing fire protection at nuclear installations or the fire safety case.