

Answers provide references to a section (§) or page (p) in the NAR. In some cases a generic reference to the NAR is given where a certain topic and the associated questions are treated. Where necessary further information is provided.

### Fire detection

- Please clarify what is the robustness against earthquake of the fire detection system and alarming system. [NPP, RRs]  
Most fire protection systems are not seismically qualified. As such they are not expected to ensure their function after an earthquake.  
They are however structurally/mechanically qualified against seismic events (e.g. anchoring in the walls and ceiling) and are not expected to fall and damage other safety-related SSCs.  
Newer fire protection equipment (e.g. in KCD12) are structurally AND functionally qualified against seismic events.  
  
Ongoing studies on seismically induced fires (SIF) may result in additional improvements in this field.
- How does the fire detection system allow to locate precisely the location of fires? Is the fire detection system addressable or not? [ALL FACILITIES]  
All the systems are compliant with Belgian standard NBN S21-100 on fire detection systems.  
Older non-addressable systems are required to have distinct detection loops in each compartment, this allows to locate the fire at the compartment-level. Most of these systems have been replaced by newer generation (see below).  
Newer systems have addressable detectors, providing higher resolution on the fire detection localisation.
- Please describe the strategy and criteria for selecting rooms where to install fire detectors in rooms. In which types of rooms are no fire detectors installed? [ALL FACILITIES]  
This is done on the basis of the fire hazard assessment.
- What is the ability of the fire detection system to function in case of loss of power? What is their emergency power supply arrangements, criteria and autonomy (how long can they work without power?)? [ALL FACILITIES]  
See § 3.2.1.1 and §3.2.2.1
- Please provide detail of the safety class of the fire detection systems. [NPP]  
Fire detection systems are not safety-classified.  
They are however covered by the technical specifications of the facilities, through specific inspection programs.

### Fire suppression

- Please clarify what is the robustness against earthquake of the fire suppression systems. [NPP, RRs]  
NPPs: see §3.2.1.2.  
RR: The parts of the fire extinguishing system that designed w.r.t. seismic robustness are mentioned in §3.2.2.2
- Please provide detail of the safety class of the fire suppression systems. [NPP]  
See fire detection systems above.
- Please clarify what can be adverse effects of fire water? Has this been assessed? What could be the adverse consequences of fire water system actuation or break? [ALL FACILITIES]

Water can for instance lead to electrical failures, criticality and/or spread of contamination. Where necessary and relevant this has been taken into account. In particular see §1.2.1.1: fire extinguishing systems shall be designed and installed such that their operation in the event of real fire, as well as their spurious operation, inadvertent start-up or failure does not prevent the structures, systems and components from completing their safety functions.

- Please clarify the emergency power arrangements for fire suppression. [NPP, RRs]  
See §3.2.1.2 and §3.2.2.2
- Please clarify the balance between fixed fire extinguishing and manual firefighting. What strategy has been applied? What are the main principles? Clarify how accessibility considerations during manual firefighting has been considered in this strategy. [ALL FACILITIES]  
The choice between manual and automatic extinguishing systems is based primarily on a risk analysis. Several aspects are taken into account: the importance of the asset to be protected, operating limits and conditions, the availability of personnel to perform tasks in areas as these may be difficult to access, nuclear and/or radiological risks, etc..

#### **Administrative and organisational fire protection issues**

- How far is the external fire brigade located? What is the intervention time needed in case of a fire inside the reactor hall outside normal working hours? How much time is needed, from the moment of fire detection, until actual firefighting starts in the field (i.e. considering need for presence of RP escort, security/access formalities, personal protection equipment for entering radiological controlled zone, etc.). [ALL FACILITIES]  
The location of the external fire brigade depends on the facility and is described in the NAR. For CNT the public fire fighters are quartered in the same street opposite of the site, so intervention times are very short. For KCD regular drills and exercise have demonstrated an intervention time below 20 minutes (usually around 15 min. between call and arrival on-site).
- What is the minimum staffing of the nearest off-site fire brigade? Can they respond to simultaneous fires inside and outside the NPP? Are there maximum or average times for arrival to the fire location for this brigade? [ALL FACILITIES]  
The external fire brigade can call upon other external fire brigades if necessary. In any case, this question is beyond the scope of TPR-II.
- What criteria are applied for calling or not the off-site fire brigade? Is this done every time a fire is detected? [ALL FACILITIES]  
This depends on the facility: CNT calls for each fire event; KCD calls if necessary based on the judgement of the internal intervention team/fire brigade.
- In case the off-site fire brigade(s) are called, what are the respective responsibilities among all actors? Who takes the lead? How is coordination ensured? [ALL FACILITIES]  
The off-site fire brigade leads and coordinated the response as soon as they are on location.
- How much time is needed between a fire alarm and presence of the onsite first intervention team at the location? Same question for the onsite second intervention team (if any) or the onsite fire brigade (if any). What are the actual times measured during recent unannounced drills and exercises? Is there any regulatory requirement for this? [ALL FACILITIES]  
This depends strongly on the facility, the location of the fire and the time of the fire. There is no nuclear safety regulatory requirement related to the intervention time. For CNT the public fire fighters are quartered in the same

street opposite of the site, so intervention times are very short. For KCD regular drills and exercise have demonstrated an intervention time below 20 minutes (usually around 15 min. between call and arrival on-site).

- If not yet explained in the report, please clarify whether there is a fire brigade on site ? If not yet done, please clarify how it is equipped (protection clothes and equipment, vehicles, ...). [ALL FACILITIES]  
See § 3.2.1.3 and §3.2.2.3.
- Please clarify whether the onsite first intervention teams / onsite fire brigades have other day to day duties that could impact their availability for firefighting duties. [ALL FACILITIES]  
This personnel could have other duties but this does not impact their availability for firefighting duties.
- What evaluation has been carried out in order to adapt / modify the active fire protection strategy considering the evolution from operation to decommissioning (including changes in the new fire safety analysis, changes in fire loads, ignition sources, radiological environment, decommissioning activities, ...) [DECOMMISSIONING].  
The differences between the operating NPP (CNT3) and the NPP (KCD3) in decommissioning are highlighted were relevant as part of each section in the NAR.

#### **Licensee and regulatory experience**

- Please clarify whether you have any interesting operating experience feedback from testing fire detection and suppression systems. [ALL FACILITIES]  
Unnecessary activation of fire suppression can be an issue.  
See p101.
- Please clarify what key learnings have been taken into account from past fire events in other NPPs or Research Reactors [NPPs, RRs].  
See §3.4.2 and p99.