European Nuclear Safety Regulators Group
ENSREG

2nd Topical Peer Review – 'Fire Protection'

Country Review Report

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1. Brief overview of the candidate installations

The following installations were finally selected and included in the national assessment report (NAR).

Installation category	Number of installations	Name of candidate installations
Nuclear power plant		-
Research reactor	2	Lena Triga Mark II Tapiro Fast neutron
Fuel reprocessing facility		-
Fuel fabrication facility		-
Fuel enrichment facility		-
Dedicated spent fuel storage	3 (wet) 2 (dry) Total 5	Avogadro AFR (wet) ESSOR-plant (wet) ITREC-plant (wet) ESSOR-plant dry ITREC-plant dry
Installations under decommissioning	4	Latina NPP Magnox Trino NPP PWR EUREX FCF ESSOR RR
On-site radioactive waste storage	6	D1 (Trino) D2 (Trino) E1 (D2-Eurex) E2 (2300-Eurex) E3 (800/NPS-Eurex) OPEC2 (Casaccia site)
Total	**17**	

2. Regulatory framework

The NAR mentions that "*The national fire safety framework for nuclear installations is part of the broader national fire safety framework that deals with all installations and activities where there is a fire risk (nuclear and conventional installations)".*

The NAR provides a list of decrees adopted for the fire safety concept implemented in the installations: "*The main national legislative provision in the field of fire safety is the Ministerial Decree 10th March 1998, that established a procedure to perform the Fire Risk Assessment". This decree, updated over time, indicates fire prevention and protection measures for installations.*

The NAR mentions that a decree issued in 2015 *"(DM 3 August 2015) introduced a new engineering approach to fire safety, performance-based fire design*". The application of this decree is not mandatory for nuclear installations.

Finally, the NAR indicates that "*conditions and technical specifications attached to the authorization of the nuclear installations establish specific requirements attaining the management of the fire risk and the maintenance and testing of fire protection provisions*."

The NAR mentions that "*fire protection in relation to the possible degradation of safety functions and the release of radioactivity into the environment is regulated within the technical guides (TGs) issued by ISIN"* [regulatory body].

The NAR does not indicate if the WENRA SRLs are transposed in the regulatory framework. In response to the question of the TPR Team[1], Italy's reply was "*WENRA SRLs related to installations under decommissioning are fully transposed in the ISIN Technical Guide n.31. WENRA SRLs related to Waste and spent Fuel Storage Facilities are transposed in the ISIN TG n. 30 (for research reactors a TG for transposing the WENRA reference Levels is under preparation). In the Italian regulatory system, the requirement reported in the regulator technical guides have to be followed by the licensee to support the licensing process ore justified alternative valid solutions have to be provided. The TGs are also assumed as basis or the regulator inspections*".
These TGs, also on the basis of international standards, lay down requirements for fire protection against fires involving radioactive waste stored at installations and the decommissioning operations themselves". TGs n. 30 and n. 31 foresee requirements fully reflecting the WENRA SRLs in relation to fire protection.

3. Findings and significant improvements of approaches on the installations from the national self-assessment

Research reactors

LENA TRIGA MARK II

The following **strengths** related to fire protection were reported in the NAR for **LENA TRIGA MARK II:**

- The strong collaboration with city firefighters results in the availability of skilled external help in the evaluation and management of possible fire hazard situations.
- The adoption of policy, procedures and training programs to continuously improve the safety culture, both for management and employees.

The following **weaknesses** related to fire protection were reported in the NAR for **LENA TRIGA MARK II:**

- The lack of internal specialist personnel for evaluating and managing potential fire hazard situations and the associated need of acquiring additional human resources.
- The complete implementation of international standards due to the availability of resources and the size of the centre.
- The management of turnover of retired employees, that can lead to a know-how loss.

The following **lesson learned** related to fire protection was reported in the NAR for **LENA TRIGA MARK II:**

[1] 'The NAR in §1.2 presents the regulatory framework. If not yet clearly mentioned in the NAR, could you indicate whether the WENRA SRLs for NPPs, and RRs (if relevant for your country), which are used as reference for this topical peer review on 'fire protection' (as per the Technical specification) are binding or not in your country? If they are not binding, what is the status of the SRLs (non-binding, guidance, advisory..)?'

- LENA hosted OMARR, INSARR and IRRUR peer review IAEA mission in the last ten years and no relevant threats or weakness were reported on fire hazards.

The following **improvements** related to fire protection were reported in the NAR for **LENA TRIGA MARK II:**

- Refurbishment of ventilation system and power supply.
- Ongoing renewal of all fire detection devices resulting from internal assessment revised in accordance with current legislation.

TAPIRO FAST NEUTRON

The following **strengths** related to fire protection were reported in the NAR for **TAPIRO FAST NEUTRON:**

- The dedicated connection of the TAPIRO fire alarm station to the local fire brigade central station.
- The availability of the local fire brigade 24/7.

The following **weaknesses** related to fire protection were reported in the NAR for **TAPIRO FAST NEUTRON:**

- Incomplete demonstration of the capability of the final prevention and protection system to preserve key safety functions.
- The fire protection system to be improved according to the results of the FHA to implement the corresponding actions related to the definition of the fire compartments and improvement of the ventilation system by inserting fire damper.

The following **lessons learned** related to fire protection were reported in the NAR for **TAPIRO FAST NEUTRON:**

- The regulatory oversight conducted on the received documentation leads to the conclusion that fire safety aspects require a close monitoring.
- A fire event occurred in August 1978 that initiated in a component of the console in the control room and involved several electrical cables and electronic devices. The reactivation operations of the console were characterized by the substitution of all cables with fire-resistant cables and the installation of short circuit protection circuits in the devices that have a high absorption of current. A significant improvement was made to the fire protection system with the installation in the control room of two automatic extinguishing systems, one for the power cord tunnel and one for the entire control room.

The following **improvement** related to fire protection was reported in the NAR for **TAPIRO FAST NEUTRON**

- Installation in the control room of two automatic extinguishing systems, one for the power cord tunnel and one for the entire control room (see lessons learned).

Dedicated spent fuel storage

AVOGADRO AFR (wet)

No strengths related to fire protection were reported in the NAR for **AVOGADRO AFR (wet).**

The following **weaknesses** related to fire protection were reported in the NAR for **AVOGADRO AFR (wet):**

- Old design of the fire protection provisions.
- Due to the ageing of the installations, there is a plan to remove the spent fuel from the pool, to be sent abroad for reprocessing.

The following **lesson learned** related to fire protection was reported in the NAR for **AVOGADRO AFR (wet):**

- The overall efficiency of fire protection systems and their required capacity/performance is ensured by REI certifications, components/system declarations of conformity and verified through periodic tests. The fire protection project and its updates are subject to the approval of local fire brigade command and also oversighted by the competent regulatory authority.

No **improvements** related to fire protection were reported in the NAR for **AVOGADRO AFR (wet)**.

ESSOR-PLANT (wet)

The following **strength** related to fire protection was reported in the NAR for **ESSOR PLANT (wet):**

- The spent fuel stored in the pool is quite old. There are large margins for decay heat removal performed by natural circulation and there is no need for an active heat removal.

The following **weaknesses** related to fire protection were reported in the NAR for **ESSOR-PLANT (wet):**

- The facility is quite old and fire safety system was designed according to fire hazard analysis based on an older approach. The specific provisions have therefore an old design. The fire hazard analysis has been conducted following national legislation and is periodically updated. Due to its age, the spent fuel stored in the pool has a very low decay power.
- The installation of smoke detection sensors inside the ducts of the ventilation system, the replacement of existing ducts with other ones classified REI and the installation of fire dampers are under evaluation.
- Due to the ageing of the installations, there is however a plan to remove the spent fuel from the pool to the already existing dry storage facility.

No **lessons learned** related to fire protection were reported in the NAR for **ESSOR-PLANT (wet).**

No **improvements** related to fire protection were reported in the NAR for **ESSOR-PLANT (wet).**

ITREC- PLANT (wet)

The following **strengths** related to fire protection were reported in the NAR for **ITREC- PLANT (wet):**

- The spent fuel stored in the pool is quite old. There are large margins for decay heat removal performed by natural circulation and there is no need for an active heat removal.
- One firefighting vehicle available on site, and nearby ENEA Research Center with its own fire-fighting facilities.

The following **weaknesses** related to fire protection were reported in the NAR for **ITREC- PLANT (wet):**

- Difficulties in adapting the prevention and protection measures to current standards due to the facility age.
- No fire detection system: the fire detection is expected to be provided by the operators present in the pool area during maintenance or other working activities.
- In the transition phase before transferring the fuel into the new dry storage facility, the strengthening of the fire detection function could be evaluated.

No **lessons learned** related to fire protection were reported in the NAR for **ITREC- PLANT (wet).**

No **improvements** related to fire protection were reported in the NAR for **ITREC- PLANT (wet)**.

ESSOR- PLANT (dry) and ITREC- PLANT (dry)

The following **strengths** related to fire protection were reported in the NAR for **ESSOR- PLANT (dry) and ITREC- PLANT (dry).**

- Dry storage facility in ESSOR plant has recently started operation, while ITREC dry storage facility is under construction. Therefore, both facilities are compliant with the current standards, including fire protection.
- The new dry storage facility has been assessed in front of a beyond-design-basis event with aircraft crash on the storage casks and subsequent fire involving the aircraft fuel.

The following **weakness** related to fire protection was reported in the NAR for **ESSOR- PLANT (dry):**

- The installation of fire dampers and of a new fire suppression system updated to the latest technical standard in cells of the ADECO Laboratory adjacent to that one hosting the dry storage facility (TSA), in order to avoid automatic discharge of gas during the presence of personnel in the premises, in connection to future activities in the TSA.

No **weaknesses** related to fire protection were reported in the NAR **ITREC- PLANT (dry)**.

No **lessons learned** related to fire protection were reported in the NAR for **ESSOR- PLANT (dry) and ITREC- PLANT (dry).**

No **improvements** related to fire protection were reported in the NAR for **ESSOR- PLANT (dry).**

The following **improvements** related to fire protection were reported in the NAR for **ITREC- PLANT (dry):**

- Insertion of some sectioning valves on the main ring to optimize maintenance activities on fire line.
- Dynamic implementation of preventive/planned maintenance on fire protection systems.
- Optimization of green maintenance activities to prevent fires inside and outside the installation.
- Optimization of waste management in areas dedicated to temporary storage.

Installations under decommissioning

LATINA NPP Magnox

The following **strengths** related to fire protection were reported in the NAR for **LATINA NPP Magnox:**

- Fire Safety Analysis are well established and strictly based on the actual configuration of the plant. On the other hand, safety analysis requires to be updated, following the progressive evolution of the configuration of the plant during the decommissioning period.
- The prevention and protection program are approved by the Regulatory Authority prior to any decommissioning activity.
- Fire protection features are improved by ensuring the technological update of the systems and procedures with respect to the current standards (e.g. revamping of the fire detection system, revamping of the fire hydrant extinguishing system).

No **weaknesses** related to fire protection were reported in the NAR for **LATINA NPP Magnox.**

The following **lesson learned** related to fire protection was reported in the NAR for **LATINA NPP Magnox:**

- For any decommissioning operation relevant to safety, a specific Plan of Operation has to be submitted by the licensee and approved by ISIN. The standard content of these plans must contain also the demonstration of specific adopted fire preventive and protection measures, in relation to the operations to be conducted. Therefore, this allows to verify for any operation the adequacy of fire protection provisions in place in the installation.

No **improvements** related to fire protection were reported in the NAR for **LATINA NPP Magnox.**

TRINO NPP PWR

The following **strengths** related to fire protection were reported in the NAR for **TRINO NPP PWR:**

- Due to the restriction of the admittance of combustible material in the classified area, a significant reduction about the produced waste volume has been performed. The reduction of combustible material is a principle that is well understood by employees and it is part of the safety culture.
- In view of relevant dismantling activities in area relevant for nuclear safety and radiation protection point of view, systems important for the conduction of the relevant operation (for example ventilation systems) have been refurbished, also taking into account fire safety requirements.
- The whole fire protection system is periodically assessed by the authorities (fire brigades) and its availability and rating are evaluated. If the system does not ensure minimal requests, it must be renewed.
- The firefighting team and the procedures regarding its staff requirements (minimum number of people, training, testing, etc.) have proved to ensure a ready and effective response. The tests performed two times a year enable the acquisition of information about lesser changes occurred on the plant which could be neglected and possible improvements.

No **weaknesses** related to fire protection were reported in the NAR for **TRINO NPP PWR.**

The following **lessons learned** related to fire protection were reported in the NAR for **TRINO NPP PWR:**

- Following a spurious event, a release of extinguishing gas took place in the on-site main archive. Due to the changes in the norms regarding greenhouse gases, a new extinguishing gas was selected and replaced. Therefore, a review of the fire safety analysis was performed, taking also into account the contribution of the fire brigades technical office and a specific authorization was then issued.
- For any decommissioning operation relevant to safety, a specific Plan of Operation has to be submitted by the licensee and approved by ISIN. The standard content of these plans must contain also the demonstration of specific adopted fire preventive and protection measures, in relation to the operations to be conducted. Therefore, this allows to verify for any operation the adequacy of fire protection provisions in place in the installation.
- New system or specific activity required a new evaluation in compliance with actual norms and regulations. It is necessary to evaluate any interference with the current system.

No **improvements** related to fire protection were reported in the NAR for **TRINO NPP PWR.**

EUREX FCF

The following **strengths** related to fire protection were reported in the NAR for **EUREX FCF:**

- The fire protection systems are kept under control trough procedures and personnel training. The current efficiency of fire protection systems is verified in a documentary manner (e.g. fire certifications, plant declarations of conformity where existing).
- For any operation connected to decommissioning and relevant for nuclear safety, dedicated Operational Plans containing all the necessary safety demonstrations, including the assessment of the fire safety provisions in place, have to be developed by the licensee and approved by the regulator.

The following **weaknesses** related to fire protection were reported in the NAR for **EUREX FCF:**

- EUREX plant was built in the 60's. There is no real compartmentation, according to current fire protection certification of the plant. However, the facility is divided into sections and rooms, separated from each other by doors, and each section has an own ventilation system.
- Critical issues related to EUREX systems which date back to the time of the construction of the facility concern the updating and modifications of protection measures in compliance with

technical guide n. 31. They can be addressed during the ongoing process to grant the decommissioning licence.

No specific **lessons learned** related to fire protection were reported in the NAR for **EUREX FCF.**

No **improvements** related to fire protection were reported in the NAR for **EUREX FCF.**

ESSOR RR

The following **strengths** related to fire protection were reported in the NAR for **ESSOR RR:**

- The ESSOR Nuclear Plant (INE), is located at the Joint Research Centre of the European Commission in Ispra (VA) and is part of an extraterritorial context. In order to acquire the autonomy towards the territory and the neighbouring administrations, the site has organized itself with a rapid intervention fire station dedicated to emergency support for research activities and for the management of nuclear installations.
- The systems and components, although not in line with current technology, are continuously maintained to ensure their proper functioning.
- The extreme attention paid to the assessment of fire risks according to the VPI (Fire Risk Evaluation) internal procedure is highlighted. The risks have been well defined and analysed with a conservative approach considering the applicable legislation, the basic safety standards for similar plants and the state of the places. Actions are underway to comply with the stated fire safety requirements. The fire risk assessment has identified the functional requirements and performance criteria of fire protection systems to be adopted in the various buildings.
- The required capacity/performance required capacity/performance of fire protection systems is verified in a documentary manner (e.g. Fire resistance (REI) certifications, plant declarations of conformity).

The following **weaknesses** related to fire protection were reported in the NAR for **ESSOR RR:**

- Extraterritoriality implies the lack of jurisdiction for the Italian non-nuclear bodies in charge (such as the Italian Fire Authority) and consequently the inapplicability of the procedure for obtaining the Fire Prevention Certificate (CPI).
- A possible criticality is connected to the transformation of the Site due to evolving decommissioning activities. The renewal of fire protection provisions in the perspective of decommissioning, in compliance with technical guide n. 31, can be addressed in the ongoing process to grant the decommissioning licence.

The following **lessons learned** related to fire protection were reported in the NAR for **ESSOR RR:**

- Notes/observations and inspection reports with requirements from the competent authorities.
- The gas system of some cells has recently undergone an unexpected degradation of the extinguishing charge. Analysis of this situation led to the following conclusions:
    - the extinguishing gas is NAF S III, no longer in compliance with the regulation and therefore no more usable;
    - the current good technique provides for the prohibition of any gas fire extinguishing system in the event of the presence of personnel;
    - the provision of portable auxiliary fire extinguishers available during specific operations based on the ERSS assessment;
    - the disposal by protocol of the gas no longer in accordance with the rules.
- For any decommissioning operation relevant to safety, a specific Plan of Operation has to be submitted by the licensee and approved by ISIN. The standard content of these plans must contain the demonstration of specific adopted preventive measures. The double verification on fire prevention carried out by both the regulator and the local fire brigade led to a continuous re-evaluation of the prevention measures and systematic checks also by the operator with punctual records of all interventions carried out on fire prevention and protection measures.

The following **improvements** related to fire protection were specifically reported in the NAR for **ESSOR RR:**

- In order to eliminate the emergency generator (building 84a) and related diesel storage tanks located in building 84a, a new dedicated power supply is being developed.
- Some renovations have recently been carried out on the outer ring of the hydrant network.
- The removal of electrical cables and components within the Controlled Zones has begun.

On-site radioactive waste storage

TRINO (D1 and D2 waste storage facilities)

The following **strengths** related to fire protection were reported in the NAR for **TRINO (D1 and D2):**

- The organizational framework has shown to be capable to withstand changes as required to introduce improvements due the age of installation systems.
- New waste storage facilities, like the facility D2 of Trino (under construction), for which the fire suppression strategy is based on the use of hydrants, the water used to extinguish the fire, is collected in dedicated tanks by means of suitable drainage system realized in the floor of the facility to prevent the possible release of contamination to the environment.
- With regard of administrative and organisational fire protection issues, the firefighting approach adopted in installations and also for waste storage facilities located in their sites, is based on the availability of internal firefighting resources, with the important contribution of the local fire brigade command. In this regard, specific training programs and drills are conducted, also to enhance coordination between the personnel of the installation and the external response team, as well as the knowledge of installation and the existing hazards.

The following **weaknesses** related to fire protection were reported in the NAR for **TRINO (D1 and D2):**

- The existing D1 and D2 are quite old and the need of their upgrade has been identified also in relation to the fire protection system.
- The existing D1 and D2 waste storage facilities are not provided with a ventilation system. The refurbishment of both storages does not foreseen a ventilation system, since only conditioned wastes will be stored in D1 and D2 facilities.

The following **lesson learned** related to fire protection was reported in the NAR for **TRINO (D1 and D2):**

- As result of Inspections and regulatory oversight conducted by ISIN on the Trino D1 and D2 waste storage facilities, in particular for the design of the D2 installation under refurbishment, the conducted fire hazard analysis for these installations is resulted in compliance with established safety requirements. Documentation controls and verifications for the fire protection certificate ("Certificato Protezione Incendi" – CPI) updates, which is foreseen every 5 years, together with compliance with Fire Authority prescriptions have been successfully performed.

The following **improvements** related to fire protection were reported in the NAR for **TRINO (D1 and D2):**

- The Trino NPP Decommissioning Project foresees the refurbishment of both D1 and D2, in order to comply with the actual safety and security standards. The D2 facility will be the first one to be refurbished. In order to allow the reconstruction activities, the waste present in the D2 facility has been temporary transferred in an interim storage facility on the site.
- In the new facilities, once the refurbishment will be completed, all the stored wastes that will be placed in will be conditioned, so the ventilation system is not necessary.
- When the new storage facility will enter into operation, updated procedures will be adopted to minimize the presence of combustible materials and to control possible ignition sources. As said, existing combustible radioactive wastes are expected to be conditioned in the near future.

EUREX E1 (D2 waste storage facility)

The following **strengths** related to fire protection were reported in the NAR for **EUREX E1 (D2):**

- The fire suppression strategy is based on the use of hydrants, the water used to extinguish the fire is collected in dedicated tanks by means of suitable drainage system realized in the floor of the facility to prevent the contamination to the environment.
- Compartments, qualified barriers and fire dampers are present.
- An aircraft crash is assumed with a subsequent fire involving the aircraft fuel and analysed in relation to the associated radiological consequences.
- With regard of administrative and organisational fire protection issues, the firefighting approach is based on the availability of internal firefighting resources, with the important contribution of the local fire brigade command. In this regard, specific training programs and drills are conducted, also to enhance coordination between the personnel of the installation and the external response team, as well as the knowledge of installation and the existing hazards.

No **weaknesses** related to fire protection a were reported in the NAR for **EUREX E1 (D2).**

The following **lessons learned** related to fire protection were reported in the NAR for **EUREX E1 (D2):**

- No fire events are reported or investigated. Spurious actuation of automatic fire suppression system by water is one of major event reported in licensee experience related to similar facility and, for this reason, a manual activation with 24 hours' surveillance has been adopted.
- When the fire authority issues the authorization, it also gives specific prescriptions to be followed.

EUREX D2 is a new facility whose design complies with most recent standards. Therefore, **no planned specific improvements** related to fire protection, was recently approved.

EUREX E2 (2300)

The following **strengths** related to fire protection were reported in the NAR for **EUREX E2 (2300):**

- With regard to maintenance, inspections and tests on fire-fighting systems this is regulated by National legislation and Standards which are very stringent and require the registration of all interventions.
- In addition to the "Fire Prevention Register", there are Checklists in which the Operability Tests of the fire-fighting systems are reported.
- The training of internal fire-fighters personnel is also regulated by National legislation, as are fire drills. Off- site fire brigade is the National Fire Brigade.

The following **weaknesses** related to fire protection were reported in the NAR for **EUREX E2 (2300):**

- Due to the age of the facility, the fire protection systems are obsolete and it is difficult to maintain old fire alarm system in working order.
- The fire suppression provisions do not have specific hazard tolerance (against seismic events or combined hazards).
- The fire scenario in 2300 storage facility is the worst for the Saluggia site and it has been assumed as the main critical event in the impact Analysis for the Off-site Emergency Plan. For this purpose, the transfer of the radioactive waste from 2300 to D2 radioactive waste storage facility is ongoing.

The following **lesson learned** related to fire protection was reported in the NAR for **EUREX E2 (2300):**

- As result of Inspections and regulatory oversight conducted by ISIN on the candidate waste storage facilities, the conducted fire safety analysis for these installations resulted in compliance with established safety requirements. Documentation controls and verifications

for the fire protection certificate ("Certificato Protezione Incendi" – CPI) updates, which is foreseen every 5 years, together with compliance with Fire Authority prescriptions have been successfully performed.

The following **improvement** related to fire protection was reported in the NAR for **EUREX E2 (2300):**

- The facility will terminate its operation shortly (all the waste are in the process to be transferred into the new facility D2). After that, the facility's structures and systems will be completely reconstructed, including the fire protection system which will comply with current standards.

EUREX E3 (800/NPS)

The following **strength** related to fire protection was reported in the NAR for **E3 (800/NPS):**

- NPS storage facility is a bunker structure assessed in front of severe liquid waste is currently stored in a dedicated storage facility located in a bunkered building in the site, which has been designed considering severe accidents including external aircraft crash.

No **weaknesses** related to fire protection were reported in the NAR for **EUREX E3 (800/NPS).**

The following **lesson learned** related to fire protection was reported in the NAR for **EUREX E3 (800/NPS):**

- When the fire brigade issues the authorization, it also gives the prescriptions to be followed.

The following **improvement** related to fire protection was reported in the NAR for **EUREX E3 (800/NPS):**

- In order to reduce the hazard posed by the high-level liquid waste, a new conditioning facility called CEMEX is envisaged. The CEMEX design contains a detailed Fire Hazard Analysis and entails Fire Protection Concept compliant to applicable WENRA Safety reference levels.

OPEC2 (Casaccia site)

The following **strengths** related to fire protection were reported in the NAR for **OPEC2 (Casaccia site):**

- The FHA developed for OPEC 2 demonstrate that any credible fire scenario, including external aircraft crash, do not lead to an unacceptable radioactive release to the public and environment.
- The OPEC 2 waste storage is substantially "still", except for loading campaigns of limited duration and currently largely completed. In the current configuration, during the lifetime, ignitions and consequent developments of fire are extremely unlikely.
- Flooding is excluded due to site characteristics.

No **weaknesses** related to **fire protection** were reported in the NAR for **OPEC2 (Casaccia site).**

The following **lesson learned** related to fire protection was reported in the NAR for **OPEC2 (Casaccia site):**

- As result of Inspections and regulatory oversight conducted by ISIN on the candidate waste storage facilities, the conducted fire safety analysis for these installations resulted in compliance with established safety requirements. Documentation controls and verifications for the fire protection certificate ("Certificato Protezione Incendi" – CPI) updates, which is foreseen every 5 years, together with compliance with Fire Authority prescriptions have been successfully performed.

No **improvements** related to fire protection were reported in the NAR for **OPEC2 (Casaccia site).**

4. Peer-review conclusions

4.1 Attributes of the NAR and the information provided

The candidate installations are the ones which were the subject of the Board's review prior to the national self-assessment. The recommendation of the Board (consideration of on-site waste storage) was addressed.

In general, the information provided in the NAR was sufficient for the peer review.

However, the structure of the NAR made it difficult to find relevant information.

The outcomes of the self-assessment appropriately mentioned the findings, which were well-illustrated and clearly described.

Adequate information was provided in reply to the written questions.

Additional information and updates provided in reply to written questions and in the national presentations in the country review workshop were taken into account in the definition of the findings below in section 4.2.

4.2 Peer review findings

The self-assessment revealed some weaknesses in the fire protection of the nuclear installations. The findings in the table below were acknowledged as areas for improvement by the TPR Team.

Areas For Improvement mentioned in the NAR as weaknesses and acknowledged as such by the TPR Team	
AFI (1)	**Nuclear installation: TAPIRO FAST NEUTRON RR** Based on the FHA results, the fire protection system for RSV TAPIRO has to be improved, in particular with regard to the fire compartmentation and to the ventilation system.
AFI (2)	**Nuclear installation: ITREC- PLANT (wet)** There is a need to strengthen the fire detection provisions in the context of the planned fuel transfer into the new dry storage facility.
AFI (3)	**Nuclear installation: EUREX FCF and ESSOR RR** There is a need to update the fire protection provisions in compliance with technical guide n. 31, in the context of the ongoing licensing process for decommissioning.
AFI (4)	**Nuclear installation: ESSOR-PLANT Spent Fuel Storage (wet and dry)** There is need to reassess the fire protection measures to decide whether to install new provisions (e.g. fire dampers, smoke detectors, ventilation ducts).

The TPR team recommends that Italy addresses these areas for improvement in the National Action plan.

During the country review workshop, the findings identified during the peer review phase have been discussed. Based on these discussions, the TPR team concluded on the following findings:

Areas of Good Performance		
Nuclear installation: Waste Storage Facilities (OPEC 2 Casaccia Site and D2 EUREX Site)		
AGP (1)	**Finding**	Fires resulting from a military aircraft crash onto waste buildings are considered at the design stage and compliance of the consequential impact with established radiological objectives verified
	Justification	The analysis of a fire resulting from aircraft crash event with the combustion of the aircraft fuel is not commonly performed for waste storage facilities.
Nuclear installation: ESSOR RR at JRC of Ispra		
AGP (2)	**Finding**	Permanent presence on the site of the research reactor under decommissioning of a well-resourced on-site fire brigade.
	Justification	The permanent presence of this fire brigade contributes to responding to fires in a timely and robust manner.

Definition of the types of findings

According to the TPR II Terms of Reference, the country group workshop discussions should lead to conclude on the findings categorised as an 'area of good performance' or 'area for improvement'. These are defined therein as follows:

A National area of good performance which should be understood as an arrangement, practice, policy or programme related to fire protection that is recognized by the TPR Review Team as a significant accomplishment for the country and has been undertaken and implemented effectively in the country and is worthwhile to commend.

A National area for improvement which should be understood as an aspect of fire protection identified by the TPR Peer Review Team where improvement is expected, considering the arrangement, practice, policy or programme generally observed in other participating countries. It may also be self-identified by the country itself (i.e. self-assessment) where improvement is appropriate.