



**Implementation of Council Directive  
2009/71/EURATOM of 25 June 2009**

**Establishing a Community framework for  
the nuclear safety of nuclear installations**

**as amended by the Council Directive**

**2014/87/EURATOM of 8 July 2014**

**Second Italian National Report**



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as amended by the Council Directive  
2014/87/EURATOM of 8 July 2014**

**Second Italian National Report**

**Under art. 9.1.**

**2020**

*This National Report has been prepared by the Italian Government on the basis of data provided by the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN)*



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## **Section A - *Introduction***



## A. Introduction

### A.1. Basis and purpose of the report

The Council Directive 2009/71/EURATOM, as amended by the Council Directive 2014/87/EURATOM, establishing a Community framework for the nuclear safety of nuclear installations, requires Member States to submit a report to the Commission on the implementation of the Directive and to argue how they have fulfilled their obligations under Article 9.1 of the Directive.

Italy has transposed the Council Directive 2009/71/EURATOM in October 2011 through the Legislative Decree No. 185/2011 and subsequently the Council Directive 2014/87/EURATOM in September 2017 through the Legislative Decree No. 137/2017.

This is the second Italian National Report, describing how the obligations of the Directive have met. The structure of the report follows the ENSREG guidelines, as appropriate considering the current status of nuclear activities in Italy.

In Italy all the nuclear installations realized in the frame of the national nuclear programme during the 60s – 80s were definitely shutdown in 1987, after three referenda concerning nuclear energy held on November 8, 1987 as aftermath of the Chernobyl accident, with the only exception of a few research reactors.

On such basis the present national policy is addressed to the decommissioning of nuclear installations and to spent fuel and radioactive waste management, with provisions and activities related to the siting and construction of the National Repository for LLW/ILW disposal and ILW/HLW long term interim storage.

Legislative Decree No. 45/2014, as amended by the Legislative Decree No. 137/2017, establishes a new competent regulatory authority in the field of nuclear safety and radiation protection, that is the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN).

The report focuses on national legislation, regulatory guidance, licensing processes, inspection and enforcement with particular reference to the decommissioning activities, spent fuel and radioactive waste management on nuclear installations sites and on operational research reactors; a specific focus is given to resources allocated to decommissioning activities.

Legislation and regulatory guidance are continuously developed taking into account nuclear safety research and advances in science and technology as well as operating experience.

The recent transposition of the Directive 2013/59/EURATOM by the Legislative Decree No. 101/2020, has repealed the Legislative Decree No. 230/1995, which has been kept as reference of the present National Report as it has been in force until 27 August 2020. On the basis of the present National Report, Italian Republic considers the obligations of the Council Directive fulfilled.

### A.2. Civilian Nuclear Installations

The following nuclear installations as defined in Article 3(1) of the Directive are operating under a licence as defined in Article 3 (4) of the Directive:

#### Nuclear Power Plants

Facility Name	Electric Power (MWe)	Type	Status	Owner/Operator
Caorso NPP	870	BWR	In decommissioning	Sogin S.p.A.
Garigliano NPP	160	BWR	In decommissioning	Sogin S.p.A.
Latina NPP	210 (160)*	Gas Graphite	In decommissioning	Sogin S.p.A.
Trino NPP	272	PWR	In decommissioning	Sogin S.p.A.

\* the power was reduced with respect to the design value

In the **Caorso** NPP, located at Caorso (PC), all the spent fuel was removed from the site. A decommissioning licence was granted in 2014 (based on one phase strategy until the unconditional release of the site). Up to now, several activities have been completed: the dismantling of thermal cycle and electric system components in turbine building and Off-Gas system (RHR towers), various RWM operations.

In 2017 the revision of the Off-site Emergency Plan was approved.

The radioactive waste (about 2365 m<sup>3</sup> in December 2018) is stored in the three on site storage facilities.

In October 2019 the qualification of the waste treatment and conditioning process by incineration of ~ 1250 m<sup>3</sup> of resin and radioactive sludge (~860 t) was completed in Slovakia. Shipments to Slovakia started in January 2020 with a first batch of 162 drums and in March with a second batch of 176 drums. They will continue once overcome the current difficulties due to the COVID-19 emergency.

The following activities are in progress or are about to start:

- realization of the waste management facility and storage buffer area in the turbine building;
- realization of a waste route between the reactor building and the turbine building.

The following main projects/plans of operations are under regulatory assessment:

- adaptation or refurbishment of existing interim storage facilities.

In the **Garigliano** NPP, located at Sessa Aurunca (CE), all spent fuel was removed from the plant since many years, the radioactive waste (in December 2018 about 2964 m<sup>3</sup>, 1897 m<sup>3</sup> of which is still to be conditioned) is stored in different storage facilities on site.

In September 2012 the decommissioning licence was granted based on the immediate dismantling, single step strategy.

The following activities have been completed on site:

- new access to controlled area;
- removal of asbestos from the components of the thermal cycle;
- refurbishment of the pre-existing diesel generator building in a structure for interim storage of radioactive waste,
- commissioning of the "D1" radioactive waste interim storage facility;
- remediation of two (out of three) underground trenches used to store technological VLLW;
- demolition of the old stack and commissioning of the new one;
- dismantling of part of big components in turbine building (generator)

The following activities are in progress:

- construction of a new radwaste system to manage the future decommissioning liquid waste,
- realization of a new water supply system in order to demolish of the piezometric tower,
- completion of the remediation of remaining underground trenches used to store technological VLLW,
- adjustment and recovery of reactor building auxiliary systems needed for nuclear island decommissioning,
- adjustment and recovery of turbine building auxiliary systems needed for dismantling of thermal cycle components (turbine, condenser, heater, steam pipes and valves, ...),
- refurbishment of an old interim storage facility.

In the **Latina** NPP, all the spent fuel was removed from the plant.

At present, about 2000 tons of radioactive graphite (moderating the chain reaction) are kept inside the reactor filled with dry air. Solid radioactive waste stored in interim storage facilities, resulting from past plant operation activities amounted, in December 2018, to approximately 1750 m<sup>3</sup>.

In May 2020 the decommissioning license was granted. The decommissioning strategy was updated with a two-phase decommissioning plan, with the first one aimed at the safety of all previous radioactive waste or produced by the dismantling of structures, system and components of the plant, and also to conservation of reactor building (with radioactive graphite inside) and the second one, to be implemented only after the siting and construction of the National repository, foresees the dismantling of all plant structures with the purpose to reach the green field end state (this phase two will be subject to specific authorization).

These operations are in addition to the preliminary ones already carried out or being implemented in the plant.

Some dismantling activities, considered preparatory for decommissioning, have already been performed:

- dismantling of primary circuit pipes and reduction of the metal materials derived in view of its shipping to treatment (fusion);
- demolition of the turbine building;

- commissioning of an interim storage facility;
- removal of large components stored in the spent fuel pond (Phase I);
- removal and decontamination of shells blower;
- recovery of waste stored in trench.

The following main activities have been approved and the following systems are under construction or being performed:

- hot test of LECO facility for the extraction and conditioning of radioactive sludge by cementation;
- realization of a treatment facility for materials deriving from dismantling activities;
- spent fuel pool sludge and water processing (Phase II);
- new liquid radioactive waste treatment facility (ITEA);
- removal of reinforced concrete shielding of the upper pipes of the primary circuit.

Approval of activities for the remediation and decontamination of the fuel pool (Phase III) and for the transportation abroad of metal materials to be subjected to the melting treatment, are underway.

At **Trino** NPP, located at Trino (VC), all spent fuel was removed from the plant and shipped abroad for reprocessing. Decommissioning licence was granted in 2012. At present radioactive waste (in December 2018 about 1111 m<sup>3</sup>, 692 m<sup>3</sup> of which is still to be conditioned) is stored in the two storage facilities on the site. Some semi-liquid radioactive waste (resins and sludge) is still to be conditioned.

At Trino NPP significant activities on conventional parts were conducted during the safe store phase, addressed to put out of service systems not any more necessary for the safe management of the plant.

Up to now several activities connected to decommissioning have been performed:

- dismantling of cooling towers;
- removal of some conventional parts;
- removal of asbestos;
- characterization and treatment of part of the radioactive waste coming from plant operation;
- decontamination of steam generators;
- implementation of a new water supply system;
- modification of containment ventilation system,
- removal of auxiliary systems no longer needed for the safe management of the plant;
- commissioning of a new radioactive waste buffer building.

The following activities are in progress:

- characterization and treatment of the remaining radioactive waste coming from plant operation;
- realization of the new treatment system for liquid waste;
- adjustment of the systems for internals and vessel dismantling.

The following projects are under regulatory assessment:

- realization of new radioactive waste interim storage facilities;
- treatment and conditioning facility for exhaust resins coming from past plant operation and steam generators decontamination.

## Research Reactors

Facility Name	Thermal Power (kW)	Type	Status	Owner / Operator
AGN 201 COSTANZA	0,02	HOMOG (S)	Operating	UNIVERSITY OF PALERMO
TRIGA MARK II LENA PAVIA	250,00	TRIGA MARK II	Operating	UNIVERSITY OF PAVIA
RSV TAPIRO	5,00	FAST SOURCE	Operating	ENEA
SM-1	0,00	SUBCRIT. ASS.	Operating	UNIVERSITY OF PAVIA
TRIGA RC-1	1000,00	TRIGA MARK II	Operating	ENEA
RB-3	0,10	ZERO POWER D2O	In decommissioning	ENEA
ISPRA-1	5000	HEAVY WATER	Shut down Without Fuel	Sogin S.p.A.
ESSOR	25000	HEAVY WATER	Shut down Without Fuel	EURATOM JRC Ispra
L-54M CESNEF	50,00	HOMOG (L)	Shut down Without Fuel	POLITECNICO DI MILANO

The only research reactors with spent fuel stored on site are the **TRIGA Mark II** at L.E.N.A. (Laboratory of Applied Nuclear Energy) of the University of Pavia with 9 elements, and the **TRIGA RC-1**, at Casaccia Research Centre of ENEA, located at Rome, with 12 elements.

An application for authorization for the execution of decommissioning operations was presented in 2019 for **L-54M CESNEF** by Politecnico di Milano and is currently under regulatory review.

## Spent Fuel Storage Facilities

Facility Name	Status	Operator
Deposito Avogadro	Operating	Deposito Avogadro S.p.A.
OPEC 1	Operating	Sogin S.p.A.
Fuel Pit Wells Storage Facility	Operating	EURATOM JRC Ispra

**Deposito Avogadro**, located at Saluggia (VC), currently still hosts about 13 t of spent fuel coming from the past operation of the Garigliano and Trino NPPs. This fuel is in the process to be transferred to France for reprocessing in the context of the existing intergovernmental agreement between Italy and France.

With regard to the **Fuel Pit Storage Facility** of the JRC of Ispra (VA) a specific project is in an advanced stage of implementation to move the fuel into a dry storage dedicated area. The spent fuel located in the dry-well pits will be removed and transferred for dry storage in a refurbished hot cell of the ESSOR research reactor. The spent fuel pots will be stored in a hot cell located inside the ESSOR installation.

## Nuclear Fuel Fabrication Plants

Facility Name	Status	Operator
<b>FN Bosco Marengo</b>	In decommissioning	Sogin S.p.A.

In **FN Bosco Marengo** (former Fabbricazioni Nucleari S.p.A.), an industrial scale plant for LWR fuel fabrication located at Bosco Marengo (AL), most of the nuclear material has been removed from the site and the operational radioactive wastes have been super compacted. In September 2011, refurbishment activities to convert the building Bld11 into a buffer storage facility were completed. In 2019, refurbishment activities to convert the building Room B106 into a new interim storage facility were completed. According to the decommissioning licence, once decommissioning activities will be completed, all waste will be located into the new interim storage facility until the National Repository will be available.

In 2015 the revision of the Off-site Emergency Plan was approved.

## Reprocessing Plants

Facility Name	Status	Operator
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EUREX	In pre-decommissioning <sup>(1)</sup>	Sogin S.p.A.
ITREC	In pre-decommissioning	Sogin S.p.A.

In the **EUREX** plant, located at Saluggia (VC), radioactive solid waste (LLW, ILW and HLW) is stored on site. The detailed design for a new storage facility (named D2) was approved in 2012. In 2015, construction and testing of the new storage facility's systems and components were completed. Loading started in 2019.

Liquid waste is stored in two dedicated storage facilities. High activity liquid waste is currently stored in a new facility located in a bunkered building. A project for the cementation of the liquid waste was authorised in 2015. In June 2019, the Ministry of Economic Development set the new time limit for the construction of the plant in 2023, establishing further requirements.

In December 2018, the total quantity of radioactive waste stored is 2918 m<sup>3</sup>, 2569 m<sup>3</sup> of which is still to be conditioned.

In the **ITREC** plant, located at Rotondella (MT), the radioactive waste on the site originates from the experimental reprocessing activities performed in the 70's. All the liquid waste (LLW, ILW and HLW) produced by the operation was cemented in the past. Sixty-four spent fuel elements are still stored in the pool. A detailed project to move the fuel into a dry storage has recently been approved. An already licensed facility for cementation of the radioactive liquid waste (U-Th) generated in the past as Final Product by the reprocessing activity, will be realized in the near future together with an interim storage facility for the resulting conditioned waste. In the pool of the facility is still stored 1,7 tHM of U-Th spent fuel.

In December 2018, the total quantity of radioactive waste stored is 3215 m<sup>3</sup>, 1963 m<sup>3</sup> of which is still to be conditioned. A project for the dry storage of spent fuel in dual purposes cask is under implementation.

In both EUREX and ITREC plants, waste management preparatory activities for the decommissioning of the plant are currently in progress.

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<sup>(1)</sup> The term "pre-decommissioning" defines a plant status in which preliminary activities of waste management and dismantling related to decommissioning are conducted according to specific authorizations in the wait of the decommissioning licence.



## **Section B - Reporting article by article**



# Article 4 – Legislative, regulatory and organisational framework

## 4.1 *National legislative, regulatory and organisational framework*

### Article 4

1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for the nuclear safety of nuclear installations. The national framework shall provide in particular for:
  - (a) the allocation of responsibilities and coordination between relevant state bodies;
  - (b) national nuclear safety requirements, covering all stages of the lifecycle of nuclear installations;
  - (c) a system of licensing and prohibition of operation of nuclear installations without a licence;
  - (d) a system of regulatory control of nuclear safety performed by the competent regulatory authority
  - (e) effective and proportionate enforcement actions, including, where appropriate, corrective action or suspension of operation and modification or revocation of a licence

The current Italian legislative and regulatory framework related to nuclear safety and radiation protection is the result of an evolution of rules and provisions that began in the early 60ties and that takes into account the experience of licensing and operation of NPPs of different types and generations and of other nuclear installations.

The Italian regulatory system is made up of three types of rules of different legal force depending on their origin:

- legislation proper, that are Acts, legislative decrees and governmental or ministerial decrees;
- technical guides;
- technical standards.

### Legislation

In the Italian regulatory system, the source of legally binding rules must be either an Act of Parliament or a Legislative Decree issued by the Government thus empowered by Parliament. The Government can also issue governmental or ministerial decrees binding in law. The practice of laying down numerical limits and minute regulations in decrees issued by the Executive is very frequent in particular areas relative to Radiation Protection. An important feature of legally binding rules concerning Nuclear Safety and Radiation Protection in Italy is that contravention to obligations by operators and/or users constitutes a misdemeanour and entails a penal sanction; compliance can be enforced by means of criminal proceedings after due process of law.

The main corpus making up, inter alia, the Italian system are itemised below, as regards Acts and Legislative decrees:

- **Act No. 1860/1962:** published in the Italian Republic's Official Journal No. 27 of 30 January 1963, as amended by the President's Decree No. 1704 of 30 December 1965 and by the President's Decree No. 519 of 10 May 1975;
- **Presidential Decree No. 185/1964:** "Safety of plants and protection of workers and general public against the risk of ionising radiation associated to the peaceful use of Nuclear Energy replaced in 1996 by the Legislative Decree No. 230/1995, described below;
- **Act No. 393/1975:** which contains Administrative rules on the selection of the site for NPPs;
- **Presidential Decree No. 1450/1970:** which contains Requirements and procedure for the acquisition of the operational personnel licences;
- **Presidential Decree No. 519/1975:** "Civil responsibilities in the field of nuclear safety";
- **Legislative Decree No. 230/1995<sup>2</sup>:** published in the Supplement to Italian Republic's Official Journal No. 136 of 13 June 1995, which has been in force in Italy since January 1st 1996 - and replaces the Presidential Decree No. 185/1964, the previous radiation protection act, implements six EURATOM Directives on radiation protection (EURATOM 80/836, 84/467, 84/466, 89/618, 90/641 and 92/3). Legislative Decree No. 230/1995 needs a series of Government and Ministerial Decrees;
- **Legislative Decree No. 241/2000:** which has transposed European Union (EU) directive 96/29/EURATOM laying down basic safety standards for the radiation protection of workers and the public; the standards laid down in the directive incorporate the 1990 Recommendations of the International Commission on Radiation Protection (ICRP)

<sup>2</sup> repealed on 27 August 2020 with the entry into force of Legislative Decree No. 101/2020.

into EU radiation protection legislation. Legislative Decree No. 241/2000 has modified and integrated Legislative Decree No. 230/1995, the latter constitutes the main piece of legislation laying down radiation protection requirements for workers and the public;

- **Legislative Decree No. 257/2001**: which modified certain details in Legislative Decree No. 241/2000 concerning requirements for notification and authorisation of non-nuclear installations where ionising radiation is used for industrial, research and medical purposes;
- **Legislative Decree No. 52/2007<sup>3</sup>** which has transposed EU directive 2003/122/EURATOM on the control of high-activity sealed radioactive sources and orphan sources;
- **Legislative Decree No. 23/2009**: which has transposed EU directive 2006/117/EURATOM on the supervision and control of shipments of radioactive waste and spent fuel; Legislative Decree No. 23/2009 has modified pertinent administrative provisions previously contained in Legislative Decree No. 230/1995 concerning the transboundary shipments of radioactive waste. Legislative Decree No. 230/1995 now contains new provisions on the supervision and control of shipments of spent fuel;
- **Act No. 99/2009**, related to the process to start the new nuclear programme;
- **Legislative Decree No. 31/2010**. The Decree includes provisions for the site selection procedure of the national repository for the long-term radioactive waste management, giving the responsibility to Sogin S.p.A. and defining the relevant authorization procedure;
- **Legislative Decree No. 185/2011** which transposes the EU Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations. Legislative Decree No. 185/2011 has modified and integrated Legislative Decree No. 230/1995;
- **Act No. 27/2012** on economic development, through the Art. 24, establishes a new procedure to reduce the timing of the licensing phases for decommissioning activities, with a strengthened involvement of local administrations;
- **Legislative Decree No. 45/2014** which transposes the EU Directive 2011/70/EURATOM establishing a community framework for the responsible and safe management of spent fuel and radioactive waste. Legislative Decree No. 45/2014 establishes the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN) as the new competent regulatory authority in the field of nuclear safety and radiation protection and establishes the roadmap for the development of the National Program for radioactive waste and spent fuel management;
- **Joint Ministerial Decree of 7th August 2015** which establishes a new classification for radioactive waste more in line with the recommendations of the IAEA standards;
- **Act No. 58/2015** on the ratification of the Amendment to the Convention on Physical Protection of Nuclear Materials and Nuclear installations;
- **Legislative Decree No. 137/2017** which transposes the Directive 2014/87/EURATOM which amends the EU Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations;
- **Act No. 37/2019** that modifies and integrates Legislative Decree No. 45/2014 introducing provisions on responsibilities for radioactive waste and spent fuel management;
- **Legislative Decree No. 101/2020** which transposes the Directive 2013/59/EURATOM entered into force on 27 August 2020

On the consequences of the Fukushima accident, the Referendum held on 12 June 2011 definitely sanctioned the abandon of the nuclear power development programme in Italy started in 2009 and the following legislative provisions were issued:

- **Legislative Decree No. 41/2011** that amended the Legislative Decree No. 31/2010 with reference to the future nuclear development in Italy;
- **Act No. 75/2011** that modifies all the provisions given in the Act No. 99/2009 and in the Legislative Decree No. 31/2010, as amended by the Legislative Decree No.41/2011, concerning the development of new NPP in Italy, relinquishing the nuclear development in Italy. The provisions for the development of the national site for LLW-ILW disposal and ILW-HLW long term storage has been confirmed. Furthermore, the Act No. 75/2011, abrogating the Article 9 of the Legislative Decree No. 230 of 1995, slightly modifies the regulatory process by cancelling the “Technical Commission on Nuclear safety and Radiation Protection”. This Commission was entitled to formulate an independent technical advice to the competent regulatory authority during the assessment process connected to the granting of licences, authorizations and approval of detailed designs.
- **Act No. 214/2011** that abrogates the Nuclear Safety Agency (created with the Act No. 99/2009, but never applied) and the functions were temporarily assigned to ISPRA that in fact continued to exploit competent regulatory authority functions until ISIN has become fully operative.

A series of Governmental and Ministerial Decrees have also been issued to implement the Act No. 1860/1962 and the Legislative Decree No. 230/1995.

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<sup>3</sup> repealed on 27 August 2020 with the entry into force of Legislative Decree No. 101/2020.

The main functions of the Regulatory Body, as better identified under article 8, were in the past entrusted to the Directorate for Nuclear Safety and Health Protection (DISP) of CNEN, later on ENEA. Such functions, together with staff, technical structures, equipment and financial resources of DISP, were transferred to ANPA, then APAT, ISPRA, and now to ISIN. The Acts of legislative force on the institution and subsequent re-organisations of the competent regulatory authority are listed below:

- **Act No. 933/1960:** on the establishment of the National Committee for Nuclear Energy (CNEN);
- **Act No. 84/1982:** on the establishment of the State Agency for new technologies, energy and environment (ENEA);
- **Act No. 61/1994:** on the establishment of the National Agency for the Environment Protection (ANPA);
- **Legislative Decree No. 300/1999** and President of the Republic Decree No.207/2002: on the establishment of APAT, by merging ANPA with other national Technical Services;
- **Act No. 286/2006:** on the reorganisation of APAT as a legal entity of public administration, endowed with new institutional Organs;
- **Act No. 133/2008:** on the establishment of the Institute for the Environmental Protection and Research (ISPRA);
- **Legislative Decree No. 45/2014:** on the establishment of the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN) as the new competent regulatory authority in the field of nuclear safety and radiation protection;
- **Legislative Decree No. 137/2017** which transposes the Directive 2014/87/EURATOM which amends the EU Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations.

Italy has ratified international conventions related to nuclear safety with the following acts:

- **Act No. 10/1998** on the ratification of the Convention of Nuclear Safety
- **Act No. 282/ 2005** on the ratification of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management;

### Technical guides

Issuing of technical guides is assigned to ISIN, according to article 153 of the Legislative Decree No. 230/1995 and by art. 6 of Legislative Decree No. 45/2014.

Technical guides set up technical criteria to be taken into account by Operators in the siting of nuclear installations, submittal of specific projects for approval, conduct of operations as well as rules of good practice, management of radioactive waste. Technical guides represent a minimum set of safety requirements the operators have to comply with; in case of non-compliance, the licensee is requested to demonstrate that the safety case fulfils alternative equivalent or higher requirements. Compliance with Technical Guides is assessed during licensing process and inspection activities. A set of 29 technical guides have been issued on Safety and Radiation Protection matters ranging from licensing procedures to detailed technical guidance.

In addition, the existing wealth of international recommendations, such as those reported in IAEA (International Atomic Energy Agency) and ICRP (International Commission on Radiological Protection) publications and those of the group of experts set up under the terms of Article 31 of the EURATOM Treaty, is largely used in the Italian system.

The list of the Technical Guides is reported in Annex 1. A programme to update these technical guides is under implementation, essentially based on the national action plan established in the framework of WENRA activities related to the development of safety reference levels. The Technical Guide on safety criteria for the siting of a near surface disposal facility for low and intermediate level radioactive waste was issued in June 2014. Draft Technical Guide on safety criteria for radioactive waste storage has been recently submitted to public consultation and the final version will be soon published. Other Technical Guides for decommissioning activities, waste management and clearance have been developed taking into account regulatory experience and are expected to be issued soon according to the procedure defined in the Legislative Decree No. 230/1995 and will be used for regulatory review and assessment activities. A Technical Guide on safety requirements for disposal is also under development.

### Technical standards

These standards are mainly published by UNI (Ente Nazionale Italiano di Unificazione), the Italian National Standards Body. Selected standards are listed in Annex 3.

Other Standards often used were those published by CEI (Comitato Elettrotecnico Italiano) and by ISO (International Standards Organisation).

Standards documents are developed within an Expert Group and approved by UNI and/or CEI Technical Committees.

Standards developed within the above mentioned Bodies are intended to reflect the broad consensus of industry and research experts in the specific fields. These standards are thought to represent industrial good practice.

Moreover, in the design, construction and operation of nuclear installations, other rules such as the ones concerning firefighting, pressure components integrity, labour and health are applied. Among the other, foreign technical standards are often adopted and endorsed, on a case by case basis.

A wider list of the main different rules which comprise national Legal and Regulatory framework is reported in Annex 1.

#### **4.1.(a) Allocation of responsibilities**

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*Article 4*

*1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for the nuclear safety of nuclear installations. The national framework shall provide in particular for:*

*(a) the allocation of responsibilities and coordination between relevant state bodies;*

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The Italian Regulatory Body is, at present, a system made of by the Minister of Economic Development, which issues authorizations having force of law and by the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN) that is the competent regulatory authority for technical regulation, control and supervision in the field of nuclear safety of nuclear installations.

The Minister of Economic Development grants the operation licence and the decommissioning authorization, conditioning it to comply with conditions and technical specifications defined by ISIN, which supervises on their respect. Other administrations are also involved in the licencing process to provide their advice.

The competent regulatory authority in the field of nuclear safety and radiation protection, named National Inspectorate for Nuclear Safety and Radiation Protection (ISIN) was established by the Legislative Decree No. 45/2014 as amended by the Legislative Decree No. 137/2017.

#### **4.1.(b) National safety requirements**

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*Article 4*

*1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for the nuclear safety of nuclear installations. The national framework shall provide in particular for:*

*(b) national nuclear safety requirements, covering all stages of the lifecycle of nuclear installations;*

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National requirements concerning nuclear safety are established in general terms in the existing legislation, in particular in the Act No. 1860/1962 and in the Legislative Decree No. 230/1995 and subsequent amendments. It is to be highlighted that the Legislative Decree No. 185/2011, which transposes the Council Directive 2009/71/EURATOM in the Italian legislative system, and the Legislative Decree No. 137/2017 which transposes the Directive 2014/87/EURATOM on nuclear safety which modify the Directive 2009/71/EURATOM, amended the Legislative Decree No. 230/1995 too.

The nuclear safety competent authority (ISIN) is entitled by the law to issue Technical Guides as described previously. Specific safety requirements related to the construction of installations and their modifications, as well as conduct of operation and decommissioning activities of nuclear installations, are very often established in the technical specifications attached to the operating licence or to the decommissioning authorization.

In relation to current major activities conducted in the nuclear sites, new Technical Guides related to waste storage and decommissioning are in an advanced stage of development. They are based on the feedback of recent licensing experience and on WENRA Safety Reference Levels and IAEA Safety Standards. Technical Guides are issued after a period of consultation with public, stakeholders and administrations.

Information reported under article 4.1 and in Annex 1 provide a comprehensive picture of the national safety requirements and regulation for nuclear safety.

#### **4.1.(c) System of licensing**

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*Article 4*

*1. Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for the nuclear safety of nuclear installations. The national framework shall provide in particular for:*

*(c) a system of licensing and prohibition of operation of nuclear installations without a licence;*

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Act No. 1860/1962 establishes that the operation of nuclear installations is authorized by the Minister of Industry (now Minister of Economic Development). Authorization is granted according to provisions established in Chapter VII of the Legislative Decree No.230/1995, based upon the technical advice of ISIN, which is formulated as result of the assessment of the safety case submitted by the applicant. Chapter VII also defines the licensing procedure relevant for each phase of the nuclear installation life (i.e. from siting to final release of the site).

Any safety relevant modification has also to be authorized before being implemented.

Specific penal sanctions are established in the national legislation for cases in which a nuclear installation is constructed or operated without a licence (Legislative Decree No. 230/1995).

In relation to the current status of most of the nuclear installations, the decommissioning licensing procedure is hereinafter described in detail as established in Chapter VII of the Legislative Decree No. 230/1995.

The decommissioning of a nuclear installation is subject to prior authorization of the Ministry of Economic Development (decommissioning licence).

The authorization is granted on the base of a binding technical advice of ISIN which includes conditions and technical specifications formulated taking into account observations of other relevant administrations (Ministries of Environment, Interior, Labour and Health) and the Region concerned.

The entire decommissioning process is regulated by articles 55 - 57 of the Legislative Decree No. 230/1995.

The applicant for a decommissioning license shall submit the Overall Decommissioning Plan to justify the selected decommissioning strategy and to provide demonstrations that the decommissioning operations will be safely implemented. The decommissioning authorization can be issued for intermediate phases leading up to the planned final state of the site. The current strategy for all national nuclear installations to be decommissioned is to reach unconditional release of the site. This possible subdivision into intermediate phases must be shown to be part of an overall decommissioning plan, to be submitted with the application for the authorization concerning the first phase.

Art. 55 of the Legislative Decree No.230/95 requires that the Overall Decommissioning Plan shall include:

- a description of the installation status, including the radiological characterization of plant systems, structures and components;
- a description of the expected status of the installation at the end of the decommissioning (or of each phase);
- the inventory of the radioactive materials (contaminated and/or activated) on the plant;
- the identification of the waste management and disposal;
- the safety analysis for the operations to be performed;
- the evaluation of the environmental impact of the decommissioning activities;
- a radioprotection program for normal, abnormal and accidental conditions;
- a proposal for a step by step dropping of mandatory operating constraints coming from the license.

The licensing process establishes the following steps:

- the documentation attached to the decommissioning applications shall be transmitted to the different relevant administrations (Ministries of Economic Development, of Environment, Land and Sea Protection, Interior, Labour, Health, and the Region concerned or the autonomous Province);
- after receiving the documentation, the above administrations transmit their possible observations to ISIN;
- taking into account the above comments and the results of its own review and assessment activities, ISIN issues a technical report which contains a safety and radiation protection assessment and identifies conditions and specifications for the conduct of the decommissioning activities. During review and assessment activity ISIN may formulate to the applicant requests of clarifications and additional information;
- ISIN transmits its technical report to the involved administrations which should formulate and send to ISIN their final observations;
- ISIN transmits its final advice, together with technical specifications and conditions, to the Ministry of

Economic Development;

- the Ministry of Economic Development posts on its institutional website the scheme of the decommissioning authorization decree with associated documentation to be submitted to a public consultation phase;
- the licensing process is concluded by the Ministry of Economic Development who grants the decommissioning authorization prescribing the compliance with conditions and technical specifications established by ISIN, taking into account observations coming from the public consultation phase.

If necessary, in order to gather the observations of the involved administrations, the Ministry of Economic Development can convene the so called "Conference of Services", attended by all the administrations as specified under the article 55 of the Legislative Decree No. 230/1995.

A separate Environmental Impact Assessment evaluation is performed under the coordination of the Ministry of Environment, Land and Sea Protection as required by the Legislative Decree No. 152/2006 which transposes, among the others, the Directive 2014/52/EU amending the Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

Annex I to the decommissioning license contains the specifications for the decommissioning operations which are subdivided in:

- management conditions and specifications which identify the records to be kept and archived, the modality to carry out the operations, the list of the mass and surface activity limits for clearance for all type of materials and each radioisotope present in the plant as resulting from the plant characterization documents, the requirements for a safety waste management, etc.;
- technical specifications stated to assure the operability of structure, systems and components relevant for the plant safety.

Annex II to the decommissioning license lists the decommissioning projects which describe all relevant activities for nuclear safety and radioprotection (e.g. dismantling of reactor building, modify or rearrange interim storage facilities, etc.) by identifying Detailed Projects (DP) and Plans of Operations (PO) to be approved by ISIN before performing specific activities. The decommissioning project list can be updated if necessary.

The information to be included in DPs and POs are described in Technical Guide No. 4 issued by ISIN and plant management specifications (Annex I to decommissioning license), respectively. Typical requested informations are: description of the system (including design and data sheets), norms and standards to be applied, design criteria, safety and seismic classification, accident analysis, test programs (including mock-up realization if necessary), dose optimization analysis, etc.

After an application for the decommissioning licence has been submitted and in the wait of the completion of the licensing procedure, according to art. 148 of the Legislative Decree No. 230/1995, some operations related to decommissioning may be authorized in order to achieve a more effective radiation protection (e.g. building of a radioactive liquid waste treatment facility, interim storage facility, waste management facility and maintenance or upgrade of auxiliary systems).

Furthermore art. 57 of Legislative Decree No. 230/1995, as modified by Legislative Decree No. 137/2017 requires that:

- at the end of decommissioning activities, the licence holder has to issue and submit to ISIN one or more reports describing the performed activities and the final state of the site;
- ISIN, on the basis of the performed controls and on the assessment performed on the reports submitted by the licence holder, issues the technical report with possible technical specifications to be sent to the Ministry of Economic Development and the other involved administrations;
- the Ministry of Economic Development, in consultation with ISIN and other involved Administrations, issues a Decree with technical specifications related to the status of the installation and the site at the end of the operation.

#### **4.1.(d) System of regulatory control of nuclear safety**

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##### *Article 4*

*1. Member States shall establish and maintain a national legislative, regulatory and*

*organisational framework ('national framework') for the nuclear safety of nuclear installations. The national framework shall provide in particular for:*  
*(d) a system of regulatory control of nuclear safety performed by the competent regulatory authority*

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National system of regulatory control is based on preventive controls and on-site controls:

- preventive controls are those performed by reviewing and assessing the documentation submitted by operators to verify the compliance with nuclear safety and radiation protection requirements; preventive controls are performed, among the others, on Overall decommissioning Plan, Detailed Projects, Plans of Operations, safety cases before the approval of the activities, but also on plant documentation as test programs and specifications, quality assurance programmes, surveillance requirements, operations manual, environmental surveillance programme, etc.;
- on site controls are performed through inspections and technical controls; inspections are performed by ISIN inspectors that, according to Art. 10 of the Legislative Decree No. 230/1995, have the authority to enter any area of the installation, as well as to have access to any relevant documentation. In case of infringement of specific rules of the nuclear act and licence conditions, including technical specifications, ISIN inspectors are entitled to report to the public attorney of the jurisdiction which the installation belongs to. The purpose of the regulatory inspections is to verify the fulfilment of the rules coming from national legislation and of the technical specifications which are part of the plant license conditions. On site control activities are performed by other ISIN technicians with the purpose of achieving data, information and other technically relevant elements to be evaluated with respect to technical regulations; for particular systems or structures whose malfunction can have a major impact on the safety and on the protection of workers and environment, also in factory surveillance activities are performed through technical controls.

Inspection activities may be ordinary (planned in advance for each technical area) or extraordinary (i.e. in case of unexpected findings or in case of abnormal events or incidents). Ordinary inspections are normally unannounced, with the exception of cases in which they are conducted in relation to specific operations and tests.

Priorities of the ordinary inspections are assigned on the basis of an algorithm that identifies the magnitude of the potential risk of an installation or of the activities performed at an installation, by considering general "criteria" (i.e. presence of waste, presence of spent fuel, carry on of activities that can mobilize contamination, etc.) and related "indicators" (i.e. HL liquid waste, not conditioned/conditioned waste, etc.) both with defined associated weight given by taking into account a graded approach. Technical controls are planned in advance on the basis of the activities performed on the plant.

ISIN is entrusted with general inspection powers for installation falling under the provisions of the Act and the Decrees. Preventive controls (review and assessment of the documentation submitted) are performed through national and international safety standards and national regulations (IAEA, ISO, UNI, ASME, IEEE, ASTM, NUREG, National Technical Guides), and the implementation of their outcomes are verified by on site controls.

The main topics reviewed and assessed by ISIN in the submitted documents are:

- radioprotection objectives;
- safety classification and design criteria of SSCs;
- radioactive waste management;
- structures systems and components;
- fire prevention and protection;
- safety analysis;
- radioprotection of people and workers;
- Quality Assurance Program.

Once the Systems, Structures and Components (SSC) foreseen in the DP or PO approved have been implemented, the operator has to send ISIN an "as built" document in which all changes compared to the DP or PO approved have to be reported with the relevant justifications. ISIN can decide to accept or not such changes, also requiring a different solution, in case safety requirements established in the approval are not satisfied.

Moreover, during the implementation of the decommissioning operations, QA/QC activities are performed on new SSCs during on site controls through the documents the operator shall keep up to date, as requested by the Quality Assurance Program approved.

## **4.1.(e) Enforcement actions**

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### *Article 4*

1. *Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for the nuclear safety of nuclear installations. The national framework shall provide in particular for:  
(e) effective and proportionate enforcement actions, including, where appropriate, corrective action or suspension of operation and modification or revocation of a licence*
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Article 58 of Legislative Decree No. 230/1995 establishes the procedure according to which, in case of non-compliance with the conditions attached to the licence, the Ministry of Economic Development can suspend or revoke the licence or the authorization.

Enforcement of applicable regulations and of licence conditions is ensured on the bases of the sanction system as established in Chapter V of the Act No. 1860/1962 and in Chapter XI of Legislative Decree No. 230/1995. According to Art. 10 of Legislative Decree No. 230/1995, ISIN Inspectors have the authority to request any information they deem relevant to ascertain the compliance of the activities performed at the nuclear installations with the requirements established in the Legislative Decree and in the licence conditions. Inspectors are entitled to report the results of their inspections to the public attorney of the jurisdiction the nuclear installation belongs to.

In the fulfilment of their duties, ISIN inspectors are vested with police powers, that is, they even have power of seizure on installations deemed to be non-compliant with relevant provisions laid down in law.

Apart from ordinary powers given to police, other authorities such as Labour Inspectorate, local Health bodies and regional Agencies for the Protection of the Environment are vested with competence in the fields entrusted to their surveillance.

The national regulatory inspection system is based upon the fact that legislation provides for penal sanctions in cases of non-compliances; ISIN inspectors are required under law to communicate every case of non-compliance to the Office of Public Prosecution.

Moreover, in Legislative Decree No. 230/95, as modified by Legislative Decree No. 137/2017, enforcement provisions have been improved with respect to the compliance of the conduction of decommissioning activities with DPs and OPs as approved by ISIN.

## **4.2 Maintenance and improvements of national framework**

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### *Article 4*

2. *Member States shall ensure that the national framework is maintained and improved when appropriate, taking into account operating experience, insights gained from safety analyses for operating nuclear installations, development of technology and results of safety research, when available and relevant.*
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The current Italian legislative and regulatory framework relates to nuclear safety and radiation protection, taking into account the Italian previous experience in licensing and operation of NPPs, of different types and generations, and other nuclear installations.

Nuclear safety requirements present in the actual national legislation derive from the evolution of the national and international regulations in the field of nuclear energy since the late 1960s; requirements are developed by taking into account technical developments and by transposing the EURATOM Directives and recommendations.

The national framework is also updated to reflect any change in the nuclear policy. As example, Legislative Decree No. 230/1995 was amended in the past to reflect the new decommissioning policy by establishing specific provisions related to the licensing procedures for decommissioning. In order to underpin the national decommissioning policy, Legislative Decree No. 31/2010 was issued to regulate the siting, construction and operation of the National Repository for radioactive waste.

EU Directives are generally transposed in the national legislation through the issue of Legislative Decrees developed by the Government on the basis of the Parliament's appointment. Main actors in the development of Legislative Decrees in the field of nuclear safety and radiation protection are the Ministry of Economic Development, the Ministry of Environment, Land and Sea Protection, the Ministry of Health, the Ministry of Labour, the Ministry of Interior and ISIN.

Moreover, according to article 153 of the Legislative Decree No. 230/1995 and by art. 6 of Legislative Decree No. 45/2014, ISIN is entrusted to issue technical guides that set up the technical criteria the operators have to take into account by submitting projects for approval, conducting activities relevant for nuclear safety and radiation protection. Technical guides represent a minimum set of safety requirements the operators have to comply with.

A specific example of recent improvement to the national framework is represented by the issue of the Legislative Decree No. 137/2017 that transposes the Directive 2014/87/EURATOM which amends the Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations.

## Article 5 - Competent regulatory authority

### 5.1 Competent regulatory authority

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#### Article 5

1. Member States shall establish and maintain a competent regulatory authority in the field of nuclear safety of nuclear installations.

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The key regulatory functions (rulemaking, licensing, assessment, inspection and enforcement) in the field of nuclear safety and radiation protection, related to NPPs (siting, construction, operation and decommissioning) as well as safe management of spent fuel and radioactive waste, are currently carried out by the following main bodies:

- a) The **Ministry of Economic Development**, in this report defined as the Licensing Body, is the authority which grants the licence/authorization for nuclear installations (from the design and construction to the decommissioning). Authorizations are granted on the basis of the technical advice provided by the competent regulatory authority ISIN and in agreement with the Ministries of Environment, Land and Sea Protection, Interior, Labour, Health and the Region concerned, after the issuing of the environmental compatibility statement by the Ministry of the Environment, Land and Sea Protection, when applicable;
- b) The **National Inspectorate for Nuclear Safety and Radiation Protection - ISIN**, in this report defined as the competent regulatory authority, is the governmental body responsible, among other functions, for the assessment and the inspection activities on nuclear installations, as well as for approving detailed designs of specific activities, which are part of authorizations granted by the Ministry of Economic Development for the construction of nuclear facilities and the implementation of their modifications, as well as the implementation of decommissioning projects as established in the decommissioning licence. ISIN was established with the Legislative Decree No. 45 in 2014 and entered in full operation in August 2018 by transferring personnel and functions from the previous national competent authority, the Nuclear, Technological and Industrial Risk Department of ISPRA (National Institute for Environmental Protection and Research). ISIN supervises the compliance with the requirements established in the legislation and the conditions and specifications established in the Ministerial authorization decrees throughout its inspection activity. ISIN inspectors are entitled by the law with the proper authority to request the licensee any information deemed necessary to ascertain compliance with legal requirements and licence conditions. In case of infringements, ISIN inspectors report to the Public Attorney of the jurisdiction the installation belongs to.

ISIN is also the competent body entitled to support the Governmental rule-making function in the field of nuclear safety and radiation protection. ISIN is also entitled to issue technical guides pertaining the different operational aspects of the regulatory process. It has also to be mentioned that duties and responsibilities assigned to ISIN include supervision activities on the use of radioactive sources, safeguards and physical protection, the exploitation of a technical support function in the field of emergency preparedness and of a control function in the field of environmental radioactivity.

### 5.2 Independence of the regulatory function

#### 5.2.(a) Functionally separation

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#### Article 5

2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:

- (a) is functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy, and does not seek or take instructions from any such body or organisation when carrying out its regulatory tasks;
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Legislative Decree No. 45/2014 and subsequent amendments states that ISIN is the competent regulatory authority, independent according to the directives 2009/71/EURATOM and 2014/87/EURATOM. It has regulatory, managerial and administrative autonomy; it is independent from any entity involved in the promotion or utilisation of nuclear energy and not subject to the supervision of any minister. ISIN is entitled to transmit a yearly report to the Government and the Parliament on the status of nuclear safety. ISIN is also entitled to provide data to the Ministry of Economic Development and to the Ministry for Environment and Land and Sea Protection for the preparation of reports under the present Directive.

ISIN has a Director and an Advisory Board, nominated with a Decree of the President of the Republic following a designation from the Council of Ministers, upon a proposal of the Ministers of Environment and Economic Development and following the positive advice of competent parliamentary Commissions.

## **5.2.(b) Regulatory decisions**

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*Article 5*

*2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:*

*(b) takes regulatory decisions founded on robust and transparent nuclear safety-related requirements;*

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As previously said, licences are granted by the Minister of Economic Development on the basis of the independent and binding technical advice of ISIN which performs its regulatory functions in a fully independent and autonomous manner from the Minister of Economic Development. Moreover, any approval of specific safety related technical designs and operations are performed by ISIN, which may establish technical specifications.

ISIN is also the only body entitled to issue Technical Guides on specific aspects related to the regulatory process.

As example of transparency in the application of nuclear safety requirements, it can be highlighted that ISIN publishes on its institutional website most relevant inspections performed and related outcomes, the draft technical guides for public consultations, inform the public on the safety levels of nuclear installations and on the control activities performed by participating at the so called “transparency tables”, public meetings called by the Region hosting the nuclear installation where the public and interested stakeholders can directly interact with representatives of operators, local administrations and ISIN.

## **5.2.(c) Budget allocations**

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*Article 5*

*2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:*

*(c) is given dedicated and appropriate budget allocations to allow for the delivery of its regulatory tasks as defined in the national framework and is responsible for the implementation of the allocated budget;*

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According to its institutional law, Legislative Decree No. 45/2014, as amended by the Legislative Decree No. 137/2017, the financial resources for ISIN ordinary activities consist of the resources previously allocated to the National Centre for Nuclear Safety and Radiation Protection of ISPRA, an annual revenue of € 3.81 million by payment to ISIN's balance sheet of a corresponding share of the revenues of a levy on the price of the electricity and resources arising from the fees that ISIN is authorized to apply and collect by licence holders for the exploitation of its regulatory functions. ISIN can raise the need of additional budget if needed in the annual report to the Government and the Parliament.

## **5.2.(d) Staff**

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*Article 5*

*2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:*

*(d) employs an appropriate number of staff with qualifications, experience and expertise necessary to fulfil its obligations. It may use external scientific and technical resources and expertise in support of its regulatory functions;*

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As stated in the law, ISIN human resources can amount up to a total of 90 staff members, 60 of which are technical experts in the areas of competence of the Inspectorate, while the remaining 30 are related to administrative and support functions.

The current staff is mainly represented by the personnel of the previous ISPRA National Centre for Nuclear Safety and Radiation Protection. At present the technical experts transferred from ISPRA are quite less than 60 and, as also reported as recommendation of IRRS mission carried out in 2016, this number of qualified technical resources has to be increased. This is expected to be done on the basis of new human resources that, according to the ISIN institutional law, can be transferred from other administrations or by new recruitment based upon public contests. On the basis of its recruitment program, ISIN has published a call for mobility to recruit personnel from other public administrations; as a second step, a public contest for vacancies will be launched.

As stated in art. 6 of Legislative Decree No. 45/2014, to support its regulatory functions, ISIN can stipulate agreements with other technical support organizations that are requested to meet transparency and independence criteria with respect to promotion and management of nuclear activities: in this regard ISIN has in place agreements with Regional Agencies for Environmental Protection to perform independent measures on environmental samples collected around the site and on cleared materials and with ISPRA in relation to matters related to the National repository siting.

## **5.2.(e) Conflict of interest**

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### *Article 5*

*2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:*

*(e) establishes procedures for the prevention and resolution of any conflicts of interest;*

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According to Legislative Decree No. 45/2014, those who exercise, directly or indirectly, professional or consultancy activities, are directors or employees of private entities operating in the sector, hold elective or representative positions in political parties, have direct or indirect interests in companies operating in the sector, or falling within the cases of incompatibility and non-conferibility of the assignments at public administrations and at private bodies under public control cannot be appointed director, nor member of the Advisory Board nor can be part of ISIN. The Legislative Decree No. 45/2014 also establishes that the director, the Advisory Board and the staff of ISIN fall from office with the failure of the aforementioned requirements.

## **5.2.(f) Nuclear safety related information**

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### *Article 5*

*2. Member States shall ensure the effective independence from undue influence of the competent regulatory authority in its regulatory decision-making. For this purpose, Member States shall ensure that the national framework requires that the competent regulatory authority:*

*(f) provides nuclear safety-related information without clearance from any other body or organisation, provided that this does not jeopardise other overriding interests, such as security, recognised in relevant legislation or international instruments.*

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According to Legislative Decree No. 45/2014, ISIN is the national competent authority in the field of nuclear safety and radiation protection, has regulatory, managerial and administrative autonomy and is responsible for nuclear safety and radiation protection on the national territory.

Information on nuclear safety of nuclear installations and on the relevant legislation is provided by ISIN, without the prior authorization of other bodies or entities being required. Furthermore, if the information has relevance from a security point of view, the rules on the protection of classified information provided for by national legislation are applied.

## **5.3 Legal powers of the competent regulatory authority**

### **5.3.(a) National nuclear requirements**

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#### *Article 5*

*3. Member States shall ensure that the competent regulatory authority is given the*

*legal powers necessary to fulfil its obligations in connection with the national framework described in Article 4(1). For this purpose, Member States shall ensure that the national framework entrusts the competent regulatory authorities with the following main regulatory tasks, to:*

*(a) propose, define or participate in the definition of national nuclear safety requirements;*

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Among other duties and functions, ISIN is also the competent body entitled to support the Governmental rule-making function in the field of nuclear safety and radiation protection. ISIN is entitled to issue technical guides pertaining the different operational aspects of the regulatory process.

The entrustment of ISIN, according to article 153 of the Legislative Decree No. 230/1995 and to art. 6 of Legislative Decree No. 45/2014, to issue Technical Guides represents an example of definition of national requirements in nuclear safety and radiation protection field.

### **5.3.(b) Compliance with national nuclear safety requirements**

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*Article 5*

*3. Member States shall ensure that the competent regulatory authority is given the legal powers necessary to fulfil its obligations in connection with the national framework described in Article 4(1). For this purpose, Member States shall ensure that the national framework entrusts the competent regulatory authorities with the following main regulatory tasks, to:*

*(b) require that the licence holder complies and demonstrates compliance with national nuclear safety requirements and the terms of the relevant licence;*

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Several provisions exist in the national legislation which entrust the competent regulatory authority to require that the licence holder complies and demonstrates compliance with national nuclear safety requirements and the terms of the relevant licence. They refer either to the licensing process or to the inspection activities.

In particular, according to art. 38, point 2, of Legislative Decree No. 230/1995, during the licensing process ISIN can require any additional document aimed at demonstrating the compliance of submitted projects with nuclear safety and radiation protection requirements. ISIN can also establish specific conditions attached to the authorization. As example, in each decommissioning license the following condition is reported that: *"Activities relevant for nuclear safety and radiation protection shall be performed on the basis of decommissioning projects developed taking into account WENRA requirements on decommissioning and RWM...."*

In addition, art. 10 of Legislative Decree No. 230/1995 establishing the level of authority ISIN Inspectors are entrusted of clearly states that inspectors can conduct any investigation and request any information or documentation deemed as necessary to demonstrate compliance with legislative requirements and licence conditions.

### **5.3.(c) Regulatory assessment and inspections**

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*Article 5*

*3. Member States shall ensure that the competent regulatory authority is given the legal powers necessary to fulfil its obligations in connection with the national framework described in Article 4(1). For this purpose, Member States shall ensure that the national framework entrusts the competent regulatory authorities with the following main regulatory tasks, to:*

*(c) verify such compliance through regulatory assessments and inspections;*

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Regulatory assessment of compliance with national and international safety requirements on the documentation submitted by operators with their applications is part of the duties and functions assigned to ISIN by law.

The compliance of the activities conducted on the installations with the legislative requirements and conditions set in the license is performed by ISIN Inspectors that, according to Art. 10 of Legislative Decree No. 230/1995, have the authority to

request any information they deem relevant to ascertain the compliance of the activities performed at the nuclear installations with the requirements established in the national legislation and in the licence conditions.

### **5.3.(d) Enforcement actions**

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#### *Article 5*

*3. Member States shall ensure that the competent regulatory authority is given the legal powers necessary to fulfil its obligations in connection with the national framework described in Article 4(1). For this purpose, Member States shall ensure that the national framework entrusts the competent regulatory authorities with the following main regulatory tasks, to:*

*(d) propose or carry out effective and proportionate enforcement actions.*

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The enforcement system foreseen by national legislation and carried out by ISIN is based on measures graded on the relevance of non-compliances with set requirements and on the associated radiological risk.

The graded approach of the enforcement activities can foresee the involvement of:

- only inspectors, in case of a fee given and paid by the licensee for non-compliance with respect of approved decommissioning projects;
- the inspectors and the Prosecutor's Office in case of non-compliance with respect of requirements and conditions set in national legislation and in the license;
- the inspectors, the Prosecutor's Office and the Ministry of Economic Development in case of non-compliance with respect of requirements and conditions set in national legislation and in the license that can lead to suspension, cancellation or revocation of the license.

## Article 6 - Licence holders

### 6.1 Responsibility of the licence holder

#### 6.1 (a) Prime responsibility

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*Article 6*

*Member States shall ensure that the national framework requires that:*

*(a) the prime responsibility for the nuclear safety of a nuclear installation rests with the licence holder. That responsibility cannot be delegated and includes responsibility for the activities of contractors and sub-contractors whose activities might affect the nuclear safety of a nuclear installation;*

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According to Act No. 1860/1962 and the Presidential Decree No. 519/1975, the primary responsibility for safety is assigned to the licence holder. The principle that the prime responsibility for safety is of the license holder is clearly stated in article 58-bis of Legislative Decree No. 230/1995 as amended by the Legislative Decree No. 137/2017 which transposed the Directive 2014/87/EURATOM on nuclear safety into the national legislation. The article states that the responsibility cannot be delegated and includes responsibility for the activities of contractors and sub-contractors whose activities might affect the nuclear safety of a nuclear installation.

The licence holder is responsible for all the activities having direct influence on safety performed during design, construction, commissioning, operation as well as of all the activities performed during decommissioning and management of spent fuel and radioactive waste.

The regulatory system in place also ensures that appropriate supervision activity is exploited by ISIN to verify that the licence holder properly meets its responsibility.

A practical implementation that shows how responsibility is kept by licence holder with respect to contractors and subcontractors is, for example, that any documentation developed by contractors or subcontractors related to activities to be performed on the site is approved and issued by the licence holder.

#### 6.1 (b) Demonstration of the nuclear safety

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*Article 6*

*Member States shall ensure that the national framework requires that:*

*(b) when applying for a licence, the applicant is required to submit a demonstration of nuclear safety. Its scope and level of detail shall be commensurate with the potential magnitude and nature of the hazard relevant for the nuclear installation and its site;*

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The demonstration of the nuclear safety performed by the licensee is clearly stated in article 58-bis of Legislative Decree No. 230/1995 and subsequent amendments. The article states that *“the applicant is required to submit a demonstration of nuclear safety. Its scope and level of detail shall be commensurate with the potential magnitude and nature of the hazard relevant for the nuclear installation and its site”*.

As stated in art. 55 of Legislative Decree No. 230/1995 and subsequent amendments, the documentation to be submitted by the operator with the decommissioning license application shall include: plan of operations to be performed, a description of the plant status, the inventory of radioactive materials present, the indication of the status of the plant at the end of the phase (if the application foresees more than one decommissioning phase), the safety analysis concerning the operations to be carried out and the status of the plant at the end of decommissioning operations, the indication of the destination of the resulting radioactive materials, the evaluation of the decommissioning activities on the environment and a radiation protection program also considering possible emergency situations.

#### 6.1 (c) Systematic assessment of the nuclear safety of the nuclear installations

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*Article 6*

*Member States shall ensure that the national framework requires that:*

*(c) licence holders are to regularly assess, verify, and continuously improve, as far as reasonably practicable, the nuclear safety of their nuclear installations in a systematic and verifiable manner. That shall include verification that measures*

*are in place for the prevention of accidents and mitigation of the consequences of accidents, including the verification of the application of defence- in-depth provisions;*

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Legislative Decree No. 230/1995, art. 58-bis, comma 2, and subsequent amendments, requires that licence holders regularly assess and verify the nuclear safety of existing installations and continuously improve the safety of nuclear installations and the management of radioactive waste and spent fuel; this includes the verification that measures have been taken to prevent possible accidents and to mitigate their consequences, including the verification of the defence in depth implementation.

In relation to the decommissioning of nuclear installations, the preservation of high level safety conditions remains one of the key objectives of the regulatory oversight activity. A systematic review of the plant status, is requested to be provided in the application for the decommissioning licence. Once the decommissioning licence is granted, attached conditions and specifications require that Detailed Projects and Plans of Operations having relevance for nuclear safety have to be approved on the basis of a specific safety assessment to be filed with the approval submittal according to a specified standard content. A periodic updating of the Safety analysis report is also requested and a Quality assurance (QA) programme to be submitted and approved by the regulatory authority is also requested.

As regard the modifications relevant for safety, to be implemented in nuclear installations to which a decommissioning licence has not been granted yet, the licensing process requests the authorization by Licensing Authority based upon the technical advice of ISIN and of local administrations. In case of modifications related to new waste storage facilities, the advice of the Minister for Environment and Land and Sea Protection and of the Minister of Health is requested under the provisions of Act No. 1860/1962 and subsequent amendments. In order to be authorized to implement the modification, the licence holder shall submit the documentation related to the general design of the modification itself, containing its objective, reference design criteria, safety analysis criteria and methodology, evaluation of its impact on the safety of nuclear facility etc. The detailed design of the modification must be approved by ISIN before being implemented. The safety case to be presented to support the approval process shall have to provide a detailed demonstration of compliance with established safety objectives and criteria. The modification can be carried out on the nuclear facility once approved by ISIN.

It has to be noted that “ad hoc” safety assessment reviews have to be conducted upon specific request of the safety authority. It is the case of a recently performed review on the safety status of fuel pools currently still hosting spent fuel waiting to be transferred abroad for reprocessing or to be transferred to dry storage facilities to be built. A periodic safety review is also requested as a condition for the approval of new interim storage facilities.

## **6.1 (d) Licence holder management system**

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### *Article 6*

*Member States shall ensure that the national framework requires that:*

*(d) licence holders establish and implement management systems which give due priority to nuclear safety;*

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Although the legislative system does not contain specific provisions regarding quality assurance in nuclear installations, QA requirements are detailed in specific Technical Guides issued by the Regulatory Authority since the 70s, in the frame of a more general programme of development of technical guides to support the regulation of installations of the national nuclear programme. On the bases of the requirements established in the technical guides, licensees developed proper QA General programmes for conduct of operation and/or Quality Procedures Guidelines/Instructions under the supervision of the competent regulatory authority. Reference to a list of the major Technical Guides developed by the competent regulatory authority in matter of Quality Assurance is reported in Annex 1.

For installations which have submitted the request of licence for the decommissioning plan, conditions attached to the licence will establish the requirements for the licensee to perform the decommissioning activities according to a QA programme to be submitted and approved by the competent regulatory authority.

With regard to new facilities connected to the treatment and the storage of radioactive waste to be realized as preliminary activities for decommissioning, QA requirements (as defined in the Technical Guide No. 4 related to the standard content of applications for detailed design of relevant parts of nuclear installations) are applied. In particular, an adequate demonstration with regard to quality assurance related aspects is requested to be provided by the licensee in the specific safety case, developed according to the Technical Guide No. 1, submitted to support the authorization.

With reference to the current implementation level, it is to be mentioned that the QA system of Sogin S.p.A., as the main national licensee, is documented through three levels of documentation applicable for all projects:

- Management System Manual related to the main organization;
- Quality Assurance Programme related to the dismantling activities and operation of each site;
- Quality procedures/Guidelines Instructions and a third level of specific documentation for each project, related to Job Order documents.

Also for the establishment and the implementation of QA safety requirements, the process put in place in Italy is a development process similar to the other safety requirements.

## 6.1 (e) Emergency procedures

### Article 6

Member States shall ensure that the national framework requires that:

*(e) licence holders provide for appropriate on-site emergency procedures and arrangements, including severe accident management guidelines or equivalent arrangements, for responding effectively to accidents in order to prevent or mitigate their consequences. Those shall in particular:*

- (i) be consistent with other operational procedures and periodically exercised to verify their practicability;*
- (ii) address accidents and severe accidents that could occur in all operational modes and those that simultaneously involve or affect several units;*
- (iii) provide arrangements to receive external assistance;*
- (iv) be periodically reviewed and regularly updated, taking account of experience from exercises and lessons learned from accidents;*

Article 58-bis of Legislative Decree No. 230/1995 establishes, inter alia, the obligation of the license holder to implement adequate emergency procedures and measures on the site, including indications for the management of severe accidents or equivalent measures, for the purpose of an effective response to the accidents aimed at preventing or mitigating their consequences.

Specifically, such procedure and measure shall:

- be consistent with the other operating procedures, with the off-site emergency plan (as provided from Chapter X, Section I of the same legislative decree), and be subject to periodic exercises to verify their practicability and effectiveness;
- concern accidents and serious accidents, which could occur in all operating modes and those that involve or affect several units simultaneously;
- establish measures to receive external assistance;
- be reviewed and updated periodically taking into account the results from the regular exercises and the lesson learned from past accidents.

Moreover, the articles 37-bis and 37-ter of the Legislative Decree No. 230/1995 and subsequent amendments, establish that for the purpose of achieving the nuclear safety objectives to prevent accidents and, if they occur, to mitigate the consequences, the license holder is required to apply a defence in depth approach aimed to ensure, among others:

- the minimization of the impact of extreme external risks of natural or unintended human origin;
- the control of serious plant conditions, including the prevention of the accident progression and mitigation of the consequences of severe accidents, as defined by IAEA;
- the implementation of arrangements pursuant to articles 46, 47, 48 of the same legislative decree, where provisions for the plant operator about organization, responsibilities, tasks and procedures are reported making reference also to the emergency plant conditions and to the on-site emergency planning.

Particularly, pursuant art. 47, the license holder is requested to draw up within the Operational Manual (the document where provisions and procedures are provide making reference to the plant as a whole and to its components, for the different operating conditions) a specific section (manual for the exceptional conditions, i.e. emergency conditions) which includes, the accident management plant procedures, measures to prevent or mitigate the accident consequences, the on-

site emergency plan and the provisions and procedures for the coordination with the off-site emergency plan, in all phases of the emergency.

The emergency planning concerning nuclear installations and installations for the management (including the transport) of the spent fuel and/or of the radioactive waste, are also regulated by the Chapter X (Articles 115 to 135) of the Legislative Decree No. 230/1995 and subsequent amendments.

For the preparedness of the emergency plans, license holder is requested to submit to regulatory Authority the accident analysis, including the hazard assessment for the worst postulated accident (event with very low occurring probability) describing the postulated accident scenarios, the accident progression, health impact on the population and environmental consequences.

The regulatory Authority reviews the document and draws up its own accident assessment (*Article 117 of Legislative Decree no. 230/1995*).

The outcomes of such assessments represent the technical bases on which both the on-site emergency planning, by the Operator, and the off-site emergency plan, by external authorities, are prepared. International standards are used in the regulatory review of the accident assessment, and it is common practice that extreme external risks of natural or unintended human origin are taken into account.

Considering the current condition of the nuclear installation in Italy (no NPP in operation), the fire events are the most common postulated accident and frequently represent the worst scenarios. Nevertheless, arrangements for receiving external assistance are in place among the operator and the emergency services, the off-site response organization, typically the local Fire Brigades or the emergency medical rescue. These arrangements and the procedure for implementing them address the coordination between operator and external emergency services during an on-site intervention and are recalled within the on-site as well as off-site emergency plans.

Pursuant to the art. 58-bis of the same legislative decree and in line with provisions provided by the Technical Specifications annexed to the license, emergency exercises are regularly conducted typically on a yearly base. As a part of the regulatory oversight activities, the emergency exercises are attended by regulatory Authority officers. During the emergency exercise the oversight activities are addressed to verify the effectiveness of the procedures and the training level of the personnel with duties in an emergency situation.

## **6.1 (f) Licence holder financial and human resources**

### *Article 6*

*Member States shall ensure that the national framework requires that:*

*(f) licence holders provide for and maintain financial and human resources with appropriate qualifications and competences, necessary to fulfil their obligations with respect to the nuclear safety of a nuclear installation. Licence holders shall also ensure that contractors and subcontractors under their responsibility and whose activities might affect the nuclear safety of a nuclear installation have the necessary human resources with appropriate qualifications and competences to fulfil their obligations.*

### **Financial resources**

During the operation of the NPPs, the license holder (National Electricity Company - ENEL) decided to start accumulating decommissioning funds even without a formal obligation. At the time of the premature shut down of the plants however all the necessary decommissioning funds were not available. When in 1999 all the liabilities and assets related to nuclear power plants belonging to ENEL were transferred to the newly established company Sogin S.p.A. (Società Gestione Impianti Nucleari), new funding mechanisms were identified to finance the full decommissioning costs. Since January 2000 the financial resources are provided by a levy on the price of the kWh to the consumers in combination with the pre-existing ENEL funds that have been transferred to Sogin S.p.A. which is responsible for performing decommissioning and waste treatment activities for all Italian nuclear installations. Funding of the fuel cycle facilities in decommissioning has been included in the above mentioned levy.

Every year Sogin S.p.A. shall submit to the Italian Regulatory Authority for Energy, Networks and Environment (ARERA) an updated report on technical and economic plans for the decommissioning projects. The yearly reports have also to contain an update of the decommissioning plans and of cost estimates. The levy on kWh, paid by the final users, is adjusted every 3 months. In this way, possible additional costs due to changes of strategies and the activities needed for safety reasons, can

be endorsed by ARERA. Efficiency criteria related to the program management and to the progress of activities are taken into account in performing such adjustments.

The main component of the total decommissioning costs is the waste management and, in particular, the waste disposal cost, which strongly depends on the fees that will be required for the disposal in the final repository. The following activities were taken into account in the decommissioning scope:

- Site care and safe management;
- Project management and licensing;
- On-site interim storage of spent fuel;
- Structure, systems and components decontamination aiming at maximizing conditional and unconditional recycling, re-use or free release;
- Radioactive waste treatment including volume reduction (e.g. compaction);
- Conditioning and packaging of historical/operational waste, e.g. sludge, ion-exchange resins as well as decommissioning waste;
- Dismantlement of power reactor/fuel cycle facility civil structures;
- Dismantlement of conventional plant buildings, e.g. turbine hall;
- Radioactive waste disposal;
- Disposal or recycling of non-radioactive waste material;
- Final site surveys;
- De-licensing of the site.

### **Human Resources**

Art. 58-ter of Legislative Decree No. 230/1995 and subsequent amendments states that *“The license holder shall maintain and increase skills and competences of its personnel who have safety responsibilities for nuclear safety, spent fuel and radioactive waste management, in order to acquire, maintain and develop nuclear safety and preparedness skills and capabilities for emergency management on the site, through suitable training and updating programs provided by competent institutes and bodies”*.

Since the inception of the National Nuclear Programme, the licence holder was committed to provide human resources throughout the entire life cycle of the plant in order to ensure a safe operation.

It is important to highlight that Sogin S.p.A., the national company responsible for the NPPs decommissioning activities, is implementing a recruitment program of young professionals, in order to overcome difficulties due to the retirement of experienced staff.

National Laws state that the operating personnel for the NPPs must follow an appropriate training programme and their capacity to operate in a nuclear installation must be certificated. Qualified positions in the staff of the NPPs are approved by the Regulatory Body together with the Operation Rules. To certificate the operator qualification, many examinations must be passed by each person. The Radiation Protection Expert established by the Directive 59/2013/EURATOM must be recorded in the national professional register of “Qualified Experts” at level 3 (the highest one) as defined in annex V of Legislative Decree No. 230/95, and to reach this level has to pass specific examinations in the field.

Today, staff qualification requirements for decommissioning and radioactive waste and spent fuel activities are the main focus of human resources management. Technical and operating staff undertake training regarding technical and legal issues, according to the specific policy of Sogin S.p.A. established at corporate level. Moreover, staff qualification for the performance of any safety-related activity is among the relevant aspects that are assessed during the licensing process. In nuclear installations and facilities key positions, only licensed personnel can operate. In such installations the Operation Rules, required by the Italian law, establishes requirements about the organization and the roles of the technical and operating staff, to ensure a safe management of the installation (even regarding the activities related to waste management and dismantling operations) in ordinary and emergency conditions.

Many internal activities related to human resources training are carried out by the Sogin S.p.A. “Radwaste Management School” (RMS).

RMS has been operating since 2008, providing education and training to the staff of Sogin Group and external companies in accordance with international safety standards and requirements established by the ISIN. In this way Sogin S.p.A. ensures

high-level professional updating, promoting managerial and technological innovation based on the experience and specialized know-how in the field of decommissioning and radioactive waste management. The development of highly specialized know-how is part of the Sogin S.p.A. strategy to guarantee maximum safety and implement an integrated knowledge management, education and training system. This is done in the light of transferring skills to future operators and satisfying the increasing knowledge demand in the sector both at international and national level.

The Radwaste Management School aims to:

- train the resources of the Sogin Group, with particular attention to the safety aspects and to the management of radioactive waste and nuclear fuel;
- promote, improve and extend best practices in the nuclear safety culture, radiation protection and environmental safeguard;
- ensure integration, enhancement and sharing of the knowledge management system;
- involve universities and national/international nuclear training centres;
- training the "operators of the future", for example university and high school graduates in the disciplines related to decommissioning and radioactive waste management.

In the last years, the Radwaste Management School has developed a series of partnerships with certified national and international training organizations, research & development institutes, universities and scientific associations in order to integrate educational programs.

With regard to subcontractors, Art. 58-ter of Legislative Decree No. 230/1995 and subsequent amendments states that *"The license holder shall assess that subcontractors, appointed to perform activities relevant for nuclear safety and the safe management of spent fuel and radioactive waste, provide a certificate of having been adequately trained in specific training courses"*. ISIN, in the framework of the controls performed on Quality Assurance Programs, for particular systems or structures whose malfunction can have a major impact on the safety and on the protection of public, workers and environment, performs also in factory control activities conducted by ISIN technicians at subcontractors' facilities.

## Article 7 – Expertise and skills in nuclear safety

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### Article 7

*Member States shall ensure that the national framework requires all parties to make arrangements for the education and training for their staff having responsibilities related to the nuclear safety of nuclear installations so as to obtain, maintain and to further develop expertise and skills in nuclear safety and on-site emergency preparedness.*

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Act No. 1860/1962 states that the technical operation of nuclear facilities should be given to people recognized with suitable technical capacity for the task they have to perform.

Legislative Decree No. 230/1995, art. 58-ter, set up specific requirements for the licence holder to maintain and enhance the experience and expertise of its staff who have responsibility in the field of nuclear safety and in the management of spent fuel and radioactive waste, through appropriate training and refresher programs. The licence holder is also required to ensure that the staff of third parties, who are contracted to carry out activities that are relevant to nuclear safety and the management of spent fuel and radioactive waste, provide a certificate to have been adequately formed with specific training courses.

Current regulation establishes specific qualification requirements for the staff involved in the operation of the nuclear installations. Additionally, staff qualification for the performance of any safety-related activity is among the relevant aspects assessed during the licensing process.

Since 1970, according to Presidential Decree No. 1450/1970 Operator's personnel allocated in some positions of the organizational structure having relevance to nuclear safety have to be licensed passing a dedicated examination in front of a Technical Commission established and coordinated by ISIN and made up of experts of different administrations. Legislative Decree No. 137/2017 envisages amendments to Presidential Decree No. 1450/1970 related to the establishments of periodic verifications of personnel qualification requirements.

As stated by Legislative Decree No. 45/2014 art. 6, comma 18, as amended by Legislative Decree No. 137/2017, the new regulatory authority ensures the maintenance and development of skills in the field of nuclear safety and radiation protection of its staff, through appropriate training tools and retraining. The main tool at present adopted for the young members of the staff is the training on the job in licensing and inspection activities.

The competent regulatory authority will also grant to its staff the opportunity to attend, where necessary, specific training programs mainly related to topics relevant to the regulation of decommissioning as well as spent fuel and radioactive waste management.

## Article 8: Transparency

### 8.1

#### 8.1 (a)

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*Article 8*

*1. Member States shall ensure that necessary information in relation to the nuclear safety of nuclear installations and its regulation is made available to workers and the general public, with specific consideration to local authorities, population and stakeholders in the vicinity of a nuclear installation. That obligation includes ensuring that the competent regulatory authority and the licence holders, within their fields of responsibility, provide in the framework of their communication policy:*

*(a) information on normal operating conditions of nuclear installations to workers and the general public;*

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Art. 58-quater of the Legislative Decree No. 230/1995, as amended to transpose the directives 2009/71/EURATOM, 2011/70/EURATOM and 2014/87/EURATOM, establishes that the Competent Regulatory Authority puts in place all the possible measures to make accessible to workers and the public all information concerning the regulation of nuclear safety as well as spent nuclear fuel and radioactive waste management. Particular attention has in this regard to be devoted to local authorities, population and other interested stakeholders in the vicinity of nuclear installations.

The same article also establishes that the Competent Regulatory Authority publishes in its web site the results of its regulatory activity and the licensees have to provide workers and population with all information related to the nuclear safety of their installation during normal operation.

Authorization decrees for decommissioning also establish a specific requirement for the license to implement an information plan on the status and progress of decommissioning activities with the involvement of interested administrations and other stakeholders through periodic interactions.

Also Environmental Impact Assessment Decrees on NPPs decommissioning activities require Sogin S.p.A., as national implementer of decommissioning programmes, to develop a specific information strategy on environmental monitoring during decommissioning.

In terms of implementation ISIN regularly publishes in its web site news section any relevant information on its regulatory and inspection activities, as well as relevant reports and publications (e.g. National reports for nuclear safety convention, reports on environmental radioactivity, Reports to the Government and the Parliament etc.).

Sogin S.p.A. has implemented a specific information portal, named REMO (Monitoring Network), accessible to the public, where all information on the status of decommissioning activities and the results of environmental monitoring are regularly published.

All authorization decrees are published in the web site of the Ministry of Economic Development.

With regard to information addressed to local authorities and population in the vicinity of nuclear each nuclear installation periodic meetings are organised (once-twice a year) by the Regions concerned. In these meetings Sogin S.p.A. informs on the status of decommissioning activities, any issue relevant from the point of nuclear safety and radiation protection and results of environmental monitoring. Also ISIN, as national competent authority, is invited to provide a regular update on its regulatory activity.

It has also to be highlighted that all information is made available in agreement with the Legislative Decree No. 195/2005 regulating access of the public to environmental information. Confidential information, classified according to national legislation and typically related to security aspects, can be omitted.

#### 8.1 (b)

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*Article 8*

*1. Member States shall ensure that necessary information in relation to the nuclear safety of nuclear installations and its regulation is made available to workers and the general public, with specific consideration to local authorities, population and stakeholders in the vicinity of a nuclear installation. That obligation includes ensuring that the competent regulatory authority and the licence holders, within*

*their fields of responsibility, provide in the framework of their communication policy:  
 . (b) prompt information in case of incidents and accidents to workers and  
 the general public and to the competent regulatory authorities of other Member  
 States in the vicinity of a nuclear installation.*

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Chapter X of Legislative Decree No. 230/1995 establishes specific provisions regulating information to be provided to the interested population in case of incidents and accidents.

Specific implementation provisions are detailed in the Off – site emergency plan managed by the Prefect of the Province where the installation is located.

In case of accidents interesting nuclear accidents occurring in NPPs of neighbouring countries implementing provisions regulating information to the interested population are established in the National Plan to counteract nuclear and radiological emergencies, which include severe accidents occurring in NPPs located in neighbouring countries.

Bilateral agreements are in place between ISIN and the nuclear safety Authorities of France, Switzerland and Slovenia regulating, inter alia, the exchange of information relevant for emergency resulting from accidents at nuclear installations.

## **8.2**

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### *Article 8*

*2. Information shall be made available to the public in accordance with relevant legislation and international instruments, provided that this does not jeopardise other overriding interests, such as security, which are recognised in relevant legislation or international instruments.*

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As said, all information is made available in agreement with the Legislative Decree No. 195/2005 regulating access of the public to environmental information. Confidential information, classified according to national legislation and typically related to security aspects, can be omitted.

## **8.3**

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### *Article 8*

*3. Member States shall, without prejudice to Article 5(2), ensure that the competent regulatory authority engages, as appropriate, in cooperation activities on the nuclear safety of nuclear installations with competent regulatory authorities of other Member States in the vicinity of a nuclear installation, inter alia, via the exchange and/or sharing of information.*

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Bilateral agreements are in place since many years between the Italian Regulatory Authority (now ISIN, previously ISPRA) and the competent regulatory authorities of France (ASN), Switzerland (ENSI) and Slovenia (SNSA), on cooperation in nuclear safety matters and mutual exchange of information in case of accidents.

ISIN is entitled to stipulate such bilateral agreements by article 58-quater of Legislative Decree No. 230/1995.

## **8.4**

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### *Article 8*

*4. Member States shall ensure that the general public is given the appropriate opportunities to participate effectively in the decision- making process relating to the licensing of nuclear installations, in accordance with relevant legislation and international instruments.*

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Legislative Decree No. 230/1995, art. 56, establishes that the Ministry of Economic Development, as licensing authority, has to ensure participation of the public in decisional processes related to the granting of authorizations for decommissioning

of nuclear installations, by publishing in its institutional web site the scheme of the authorization decree with associated documentation, so as that the public or stakeholders can express their observations and that formulated observations are duly taken into account.

This participation process has been recently applied to the Latina NPP authorization process for decommissioning.

## Article 8a – Nuclear safety objective for nuclear installations

### 8a.1

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#### Article 8a.1

*Member States shall ensure that the national nuclear safety framework requires that nuclear installations are designed, sited, constructed, commissioned, operated and decommissioned with the objective of preventing accidents and, should an accident occur, mitigating its consequences and avoiding:*

*(a) early radioactive releases that would require off-site emergency measures but with insufficient time to implement them;*

*(b) large radioactive releases that would require protective measures that could not be limited in area or time.*

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Art. 37-bis of the Legislative Decree No. 230/1995 as amended to transpose Directive 2014/87/EURATOM clearly establish the requirement that nuclear installations shall be designed, sited, constructed, commissioned, operated and decommissioned with the objective of preventing accidents and, should it occur, it shall be mitigated so that to avoid early radioactive releases which would require off-site emergency measures but with insufficient time to implement them and to avoid large radioactive releases which would require protective measures that could not be limited in area or time.

### 8a.2

#### 8a.2 (a)

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#### Article 8a.2

*Member States shall ensure that the national framework requires that the objective set out in paragraph 1:*

*(a) applies to nuclear installations for which a construction licence is granted for the first time after 14 August 2014;*

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As well known, Italy relinquished the use of nuclear energy for electricity production in 1987, after the Chernobyl accident, on the basis of the results of a national referendum. This decision was confirmed with a second referendum in 2011. No construction licence for new nuclear installations has been therefore granted since that time.

#### 8a.2 (b)

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#### Article 8a.2

*Member States shall ensure that the national framework requires that the objective set out in paragraph 1:*

*(b) is used as a reference for the timely implementation of reasonably practicable safety improvements to existing nuclear installations, including in the framework of the periodic safety reviews as defined in Article 8c(b)*

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As already described all Italian nuclear installations – i.e. the four NPPs (Latina, Garigliano, Trino and Caorso) and the other fuel cycle facilities operated in the past national nuclear programme (Bosco Marengo Fuel Fabrication Facility, ITREC and EUREX pilot reprocessing facilities) - are shutdown since decades. In these sites decommissioning and waste management operations are ongoing, with different stages of implementation. Spent fuel is still present, in small amounts, only in Deposito Avogadro storage facility, ITREC reprocessing facility, JRC of Ispra and OPEC plant in Casaccia Research Centre. All the spent fuel has a very low residual heat. The spent fuel located in the Deposito Avogadro Facility is to be transferred abroad for reprocessing in the frame of the in-place agreement with France. A dry storage strategy is under implementation with specific projects for the remaining spent fuel. Other decommissioning and waste management activities are in progress at the JRC Ispra installations.

Four research reactors have remained into operation (TRIGA RC-1 e RSV TAPIRO in Casaccia Research Centre, TRIGA MARK II reactor at University of Pavia and AGN-201 “Costanza” Reactor at University of Palermo). The TRIGA RC-1 reactor in Casaccia Research Centre has a power of 1 MW while all the others have a power less than 1 MW.

For nuclear installations in decommissioning the implementation of requirements to comply with objectives set up in art. 8a.1 have necessarily to be applied according to a graded approach.

Nuclear safety improvements and reduction of the radiological consequences of possible accidents are strictly related to the progress in the implementation of decommissioning activities.

In particular, spent fuel has been removed from NPPs since many years and this has allowed to eliminate the main source of radioactivity present in the sites so significantly improving at the root the safety conditions.

The spent fuel still present in Italy amounts to only 15 tons, in part still to be transferred abroad and in part to be stored in dry storage facilities under construction.

Radioactivity still present in the nuclear installations under decommissioning is that of radioactive waste or still present in the form of contamination or activation in structures to be dismantled. In this regard specific projects are under implementation. For these projects requirements to achieve safety objectives established by the EURATOM Directive are established in the decommissioning licence or by the competent regulatory authority in the approval of specific projects according to their safety relevance.

Taking into account the residual activity still present on the nuclear sites in decommissioning and the adopted safety measures as reviewed and assessed by the competent regulatory authority the performed safety cases underpinning the licensing procedures show the compliance with large margins with the safety objectives established by the directive.

# Article 8b – Implementation of the nuclear safety objective for nuclear installations

## 8b.1

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### Article 8b.1

*1. In order to achieve the nuclear safety objective set out in Article 8a, Member States shall ensure that the national framework requires that where defence-in-depth applies, it shall be applied to ensure that:*

- (a) the impact of extreme external natural and unintended man-made hazards is minimised;*
  - (b) abnormal operation and failures are prevented;*
  - (c) abnormal operation is controlled and failures are detected;*
  - (d) accidents within the design basis are controlled;*
  - (e) severe conditions are controlled, including prevention of accidents progression and mitigation of the consequences of severe accidents;*
  - (f) organisational structures according to Article 8d(1) are in place..*
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Implementation of defence-in-depth principle by licensees is clearly required by art. 37-ter, point 1, of Legislative Decree No. 230/1995 by explicitly referring to all the objectives listed in art. 8b.1 of the directive. These requirements are applied to the national installations with a graded approach, taking into account their status of in progress decommissioning as described in point 8a2(b). Their application is verified and assessed by the competent regulatory authority during the pertaining licensing process.

Specific provisions concerning requirements on the organizational structure of the Licensee are also established in art. 46 of Legislative Decree No. 230/1995. In particular, the organization structure adopted by the licensee for normal and emergency conditions, with particular reference to position relevant for nuclear safety has to be approved by the competent regulatory authority.

## 8b.2

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### Article 8b.2

*In order to achieve the nuclear safety objective set out in Article 8a, Member States shall ensure that the national framework requires that the competent regulatory authority and the licence holder take measures to promote and enhance an effective nuclear safety culture. Those measures include in particular:*

- (a) management systems which give due priority to nuclear safety and promote, at all levels of staff and management, the ability to question the effective delivery of relevant safety principles and practices, and to report in a timely manner on safety issues, in accordance with Article 6(d);*
  - (b) arrangements by the licence holder to register, evaluate and document internal and external safety significant operating experience;*
  - (c) the obligation of the licence holder to report events with a potential impact on nuclear safety to the competent regulatory authority; and,*
  - (d) arrangements for education and training, in accordance with Article 7*
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Art.37-ter, point 2 of Legislative Decree No. 230/1995 establishes provisions for the competent regulatory authority and the licensees to promote and strengthen an effective safety culture, including a proper management system, requirements for the licensee to register, document and evaluate relevant internal and external operating experience relevant to safety, to notify to ISIN important events having relevance to nuclear safety.

Provisions related to education and training of the staff of the regulatory authority and the licensee are respectively established in the institutional law of ISIN (Art.6 of Legislative Decree No. 45/2014) and art.58-ter of Legislative Decree No. 230/1995. It has to be noted that this requirement for education and training are established also for the contractors of the licensee.

## Article 8c – Initial assessment and periodic safety review

### 8c. (a)

*Member States shall ensure that the national framework requires that:*

*(a) any grant of a licence to construct a nuclear installation or operate a nuclear installation, is based upon an appropriate site and installation-specific assessment, comprising a nuclear safety demonstration with respect to the national nuclear safety requirements based on the objective set in Article 8a;*

As already said, following the referendum of 2011, no new construction license has been granted after 14 August 2014.

All nuclear installations are under decommissioning at different stages of implementation. For the four research reactors still in operation the only authorizations to be granted are those related to modifications, if needed.

Art. 37-bis of the Legislative Decree No. 230/1995 however establishes all the general requirements related to the siting, design, construction and operation of nuclear installations in line with objectives of Directive 2014/87/EURATOM.

### 8c. (b)

*Member States shall ensure that the national framework requires that:*

*(b) the licence holder under the regulatory control of the competent regulatory authority, re-assesses systematically and regularly, at least every 10 years, the safety of the nuclear installation as laid down in Article 6(c). That safety reassessment aims at ensuring compliance with the current design basis and identifies further safety improvements by taking into account ageing issues, operational experience, most recent research results and developments in international standards, using as a reference the objective set in Article 8a.*

Art. 37-quarter of Legislative Decree No. 230/1995 establishes the obligation for the licensee to systematically re-evaluate and assess at least every ten years the safety of nuclear installations, taking into account aging, operating experience, state of art of research and international standards.

According to art. 58-bis the licensee is obliged to assess, verify and improve nuclear safety of nuclear installations.

For nuclear installations under decommissioning, whose operations by themselves already imply an improvement of safety, the licence obliges the licensee to report every year on the progress of planned activities. For interim storage facilities in the nuclear sites a periodic safety review is requested in the approval granted by the regulatory authority. For spent fuel storage facilities, in the wait of fuel transfer in dry storage facilities or abroad for reprocessing, a review on the status of pools and associated systems has been requested by the regulatory authority every 5 years.

For the operating research reactors, the licence requests the operators to report on the safety status every five years.

## Article 8d – On-site emergency preparedness and response

### 8d.1

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#### Article 8d.1

*1. Without prejudice to the provisions of the Directive 2013/59/EURATOM, Member States shall ensure that the national framework requires that an organisational structure for on-site emergency preparedness and response is established with a clear allocation of responsibilities and coordination between the licence holder, and competent authorities and organisations, taking into account all phases of an emergency.*

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Concerning the organizational structure for on-site emergency preparedness and response, article 46 of the Legislative Decree No. 230/1995 and subsequent amendments requires the operator to submit to the approval of the regulatory authority, the “Operating Rules” where the organization and functions of the personnel in staff for the conduction and maintenance of the plant and for the physical and medical surveillance of the radiation protection, are defined covering all phases of the plant life. A specific section of the document dealing with exceptional plant conditions (the condition determined by the prediction or the occurrence of a nuclear emergency) is also submitted to the approval of the regulatory Authority.

Besides, the Operation Manual provided for in article 47, same decree, shall contain the identification of the personnel in staff to the plant to whom, in case of an exceptional situation, emergency tasks are assigned.

Pursuant article 49 of the same decree, the license holder is supported by the Committee of delegates for plant safety whose composition is approved by the regulatory Authority. The Committee has advisory functions including the preparedness of the on-site emergency planning and its review and updating in agreement with the external emergency services. The Committee also advises the plant Director in taking measures that are necessary to deal with emergency situations or abnormal plant operational conditions.

Pursuant art. 122, same decree, the Plant Director has the duty to immediately notify the local Authorities and the other emergency organizations of any nuclear accident or event that could lead to an emergency. He has to indicate all the measures taken to contain the accident progression and communicate any other technical data useful for the implementation of the off-site emergency plan, specifying the foreseeable extent of the accident. The plant Director has also the duty to take all measures to reduce the effects of the accident and to carry out a first provisional assessment of the consequences of the emergency, providing his contribution to the off-site emergency response.

The national emergency management system is governed by the current legislation regulating the National Civil Protection Service (Legislative Decree No. 1/2018) and by the (off-site) emergency plans provided for the Chapter X of the Legislative Decree No. 230/1995 and subsequent amendment. Therefore, Operator’s functions and tasks are also specified by the off-site emergency plan which is prepared and adopted by the Prefect of the province where the nuclear installation is located. Regulatory Authority provides advice to the Prefect during the planning activities.

### 8d.2

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#### Article 8d.2

*2. Member States shall ensure that there is consistency and continuity between the on-site emergency preparedness and response arrangements required by the national framework and other emergency preparedness and response arrangements required under Directive 2013/59/EURATOM.*

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Consistency and continuity between on-site and off-site emergency preparedness and response arrangements were already assured by provisions in the Legislative Decree No. 230/1995. With the recent transposition of the Directive 2013/59/EURATOM by the Legislative Decree No. 101/2020, which has repealed the Legislative Decree No. 230/1995, very few new elements were introduced making the new legislation fully compliant with the Directive.

Notably, the main regulatory innovation will concern the introduction of the concept of the reference level and the associate operational criteria, instead of the intervention level. The definition of the reference level for the emergency exposure situation will be provided by a Decree of the Presidency of the Council of the Ministers. Until then, the current intervention levels continue to be into force. Another new topic concerns the need to take into account the aspects connected with the

transition from an emergency exposure situation to an existing exposure situation. General requirements to meet for moving towards the management of an existing exposure situation will be provided. Their implementation will be defined within the off-site emergency plans. Finally, The new legislation will regulate the role and duty of the relevant organizations under the framework of the international early notification systems, and to establish requirements to support the international cooperation specially in responding to emergency entailing transboundary consequences.

## Article 8e – Peer reviews

### 8e.1

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*Member States shall, at least once every 10 years, arrange for periodic self-assessments of their national framework and competent regulatory authorities and invite an international peer review of relevant segments of their national framework and competent regulatory authorities with the aim of continuously improving nuclear safety. Outcomes of such peer reviews shall be reported to the Member States and the Commission, when available.*

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An Integrated Regulatory Review Service (IRRS) mission hosted by ISPRA (that was the competent regulatory Authority in Italy until 2018, now the functions of the competent regulatory Authority are carried out by ISIN) took place in Italy in November 2016.

The IRRS mission was a full scope one covering modules on responsibilities and functions of the Government, global nuclear safety regime, responsibility and functions of the regulatory body, management system of the regulatory body, and has been addressed to radiation sources, research reactors, radioactive waste facilities and NPP under decommissioning. The mission provided useful recommendations and suggestions for improvements.

As conclusions of the IRRS mission the following good practices and recommendations were identified:

*Good practices:*

- the use of the “state of the art” standards in the field of decommissioning and waste management;
- the development and use of a comprehensive data base and the related tools for extracting and analysing transport safety issues;
- the Italian system for education and training of qualified experts which is of high quality in radiation protection.

*Recommendations:*

The Government should:

- provide the regulatory body with sufficient competent staff for the proper and timely implementation of its assigned responsibilities;
- continue the efforts to develop a national policy and strategy for safety and national policies and strategies for decommissioning and management of radioactive waste including disposal;
- complete the legal framework in regards to approval of technical services, establishment of national data bases related to safety and improvements in aspects of the authorization process.

The Regulatory Body should:

- establish and implement an integrated management system;
- strengthen the regulatory framework for review and assessment, including periodic safety review, authorization, inspection, emergency preparedness and response, and for the occupational and public exposure control;
- improve existing communication strategies.

Part of the recommendations and suggestions have been implemented with Legislative Decree No. 137/2017, transposing Directive 2014/87/EURATOM, with the establishment of the new competent regulatory authority (ISIN), in which the number of inspectors was increased.

The remaining recommendations and suggestions will be implemented with the approval of the legislative decree transposing Directive 2013/59/EURATOM, and the implementation of the ISIN management system.

The IRRS report is published either in the IRRS portal of IAEA web site and in the ISIN web site ([https://www.isinucleare.it/sites/default/files/contenuto\\_redazione\\_isin/irrs\\_italy\\_final\\_report.pdf](https://www.isinucleare.it/sites/default/files/contenuto_redazione_isin/irrs_italy_final_report.pdf)) and was transmitted to the Commission.

## 8e.2

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*Member States shall ensure that, on a coordinated basis:*

- (a) a national assessment is performed, based on a specific topic related to nuclear safety of the relevant nuclear installations on their territory;*
  - (b) all other Member States, and the Commission as observer, are invited to peer review the national assessment referred to in point (a);*
  - (c) appropriate follow-up measures are taken of relevant findings resulting from the peer review process;*
  - (d) relevant reports are published on the above mentioned process and its main outcome when results are available*
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Italy participated in the first Topical Peer Review whose topic, ageing management of nuclear power plants, has been identified during the 30th Meeting of the European Nuclear Safety Regulators Group (ENSREG) in July 2015.

According to the Terms of Reference and Technical Specification, the Peer Review focused on the Ageing Management Programmes (AMPs) at Nuclear Power Plants (NPPs) and Research Reactors (RRs) above 1 MWth.

The peer review process examined the application of the AMPs to the selected systems, structures and components (SSCs) in four thematic areas: electrical cables, concealed piping, reactor pressure vessels, or equivalent structures, and concrete containment structures.

The objective of the first Topical Peer Review was to examine how well Ageing Management Programmes in participating countries meet international requirements on ageing management (in particular WENRA Safety Reference Levels – (SRLs) and the IAEA Safety Standards).

In the first phase national self-assessments were conducted against the WENRA Technical Specification. Results of the self-assessments were documented in the National Assessment Reports (NARs), published at the end of 2017, available here: <http://ensreg.eu/country-specific-reports/EU-Member-States/Italy>.

As well known, in Italy all NPPs were definitively shutdown in the middle of the 80's.

The Italian National Assessment Report (NAR) for the Topical Peer Review 2017 on Ageing Management, therefore, provided an overview on the national regulatory framework applicable only to research reactors and in particular described the ageing management approach for two reactors, the TRIGA RC-1 reactor (1 MWth), operated by ENEA (Italian National Agency for New Technologies, Energy and Sustainable Economic Development), located in the Research Centre of Casaccia in Rome, and, on a voluntary basis, the TRIGA MARK II (0,250 MWth), operated by the Applied Nuclear Energy Laboratory (LENA), University of Pavia.

The second phase of the TPR started in January 2018 when the National Assessment Reports were made available for questions and comments from stakeholders. In May 2018, ENSREG organized a workshop to discuss the results of the self-assessments, the questions and comments on the National Assessment Reports, as well as the replies to the questions, with a goal to identify and discuss both generic and country-specific findings on Ageing Management Programmes.

A delegation from the National Centre for Nuclear Safety and Radiation Protection of ISPRA (that was the competent regulatory Authority in Italy in 2018), together with the licensees of the research reactors TRIGA RC-1 (ENEA) and TRIGA MARK – II (University of Pavia), participated to the Conference, presenting and discussing the National Report and contributing to the Peer Review process.

In the third and final phase of the Topical Peer Review, a Topical Peer Review Report and country specific findings have been compiled to provide input for national action plans and ENSREG work.

The national action plan with the response for Italian Research Reactors to the outcomes of the TPR process, providing the Action Plan for the implementation of the related measures has been published in October 2019 and is available here: <http://ensreg.eu/tpr-national-action-plans/EU-Member-States/Italy>

## **Section C - Annexes**



# Annex 1 – List of National Legislation, Technical Guides and standards

## Acts and Decrees

**Act No. 933/1960:** on the establishment of the National Committee for Nuclear Energy (CNEN);

**Act No. 1860/1962:** published in the Italian Republic's Official Journal No. 27 of 30 January 1963, as amended by the President's Decree No. 1704 of 30 December 1965 (Italian Republic's Official Journal No. 112 of 9 May 1966) and by the President's Decree No. 519 of 10 May 1975 (Italian Republic's Official Journal No. 294 of 6 November 1975);

**Presidential Decree No. 185/1964:** "Safety of plants and protection of workers and general public against the risk of ionising radiation associated to the peaceful use of Nuclear Energy replaced in 1996 by the Legislative Decree No. 230/1995, described below;

**Presidential Decree No. 1450/1970:** which contains Requirements and procedure for the acquisition of the operational personnel licences;

**Presidential Decree No. 519/1975:** "Civil responsibilities in the field of nuclear safety";

**Act No. 393/1975:** which contains Administrative rules on the selection of the site for NPPs;

**Act No. 84/1982:** on the establishment of the State Agency for new technologies, energy and environment (ENEA);

**Act No. 61/1994:** on the establishment of the National Agency for the Environment Protection (ANPA);

**Legislative Decree No. 230/1995<sup>4</sup>:** published in the Supplement to Italian Republic's Official Journal No. 136 of 13 June 1995, which has been in force in Italy since January 1st, 1996 - and replaces the Presidential Decree No. 185/1964, the previous radiation protection act - implements six EURATOM Directives on radiation protection (EURATOM 80/836, 84/467, 84/466, 89/618, 90/641 and 92/3). Legislative Decree No. 230 needs a series of Government and Ministerial Decrees;

**Act No. 10 of 19th January 1998:** promulgated for the ratification of the Convention on Nuclear Safety;

**Legislative Decree No. 300/1999 and President of the Republic Decree No. 207/2002:** on the establishment of APAT, by merging ANPA with other national Technical Services;

**Legislative Decree No. 241/2000:** which has transposed the directive 96/29/EURATOM laying down basic safety standards for the radiation protection of workers and the public; the standards laid down in the directive incorporate the 1990 Recommendations of the International Commission on Radiological Protection (ICRP) into EU radiation protection legislation. Decree No. 241 has modified and integrated Legislative Decree No. 230 of 1995, the latter constitutes the main piece of legislation laying down radiation protection requirements for workers and the public;

**Legislative Decree No. 257/2001:** which modified certain details in Legislative Decree No. 241 of 2000 concerning requirements for notification and authorisation of non nuclear installations where ionising radiation is used for industrial, research and medical purposes;

**Act No. 368/2003:** establishing the procedures for the site selection of a national repository for HLW;

**Act No. 239/2004:** promulgated for the rearrangement of the energy sector extends the procedures established by the Act No.368 of 2003 also for the site selection of a national repository of LLW;

**Decree of 2nd December 2004** of the Ministry of Production Activities (now Economic Development) provides directives to Sogin S.p.A. for the implementation of decommissioning and radioactive waste management activities. The Decree also charges Sogin S.p.A. to explore the feasibility of sending all the spent fuel currently stored in Italy to abroad for reprocessing;

**Act No. 282/2005:** promulgated for the ratification of Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management;

**Act No. 286/2006:** on the reorganisation of APAT as a legal entity of public administration, endowed with new institutional Organs;

**Legislative Decree No. 52/2007<sup>5</sup>** which transposes EU directive 2003/122/EURATOM on the control of high-activity sealed radioactive sources and orphan sources;

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<sup>4</sup> repealed on 27 August 2020 with the entry into force of Legislative Decree No. 101/2020.

<sup>5</sup> repealed on 27 August 2020 with the entry into force of Legislative Decree No. 101/2020.

**Legislative Decree No. 23/2009:** which has transposed EU directive 2006/117/EURATOM on the supervision and control of shipments of radioactive waste and spent fuel; Legislative Decree No. 23/2009 has modified pertinent administrative provisions previously contained in Legislative Decree No. 230/1995 concerning the transboundary shipments of radioactive waste. Legislative Decree No. 230/1995 now contains new provisions on the supervision and control of shipments of spent fuel;

**Act No. 99/2009,** related to the process to start a new nuclear programme, in Article 29, establishes a new Nuclear Safety Agency with the role of Regulatory Body. As already mentioned, the Agency will be made by the resources of the Nuclear Department of ISPRA and by resources from the Agency for New technologies, Energy and sustainable development (ENEA). The full establishment of this new Safety Authority has, however, still to be completed;

**Legislative Decree No. 31/2010** related to the future nuclear development in Italy, provides criteria for the site selection procedure with the involvement of local administration, for the approval and for the compensation of the local municipality. The Decree includes also provisions for the site selection procedure of the national site for radioactive waste disposal giving the responsibility to Sogin S.p.A.. Following the referendum in 2011 the decree was amended by abrogating parts related to the construction of new NPPs;

**Legislative Decree No. 41/2011** amended the Legislative Decree No. 31/2010 with reference to the future nuclear development in Italy;

**Act No. 7/2011** that modifies all the provisions given in the Act No. 99/2009 and in the Legislative Decree No. 31/2010, as amended by the Legislative Decree No. 41/2011, relevant to the development of new NPP in Italy, relinquishing the nuclear development in Italy. The provisions for the development of the national site for LLW disposal and ILW-HLW interim storage has been confirmed. Furthermore, by abrogating the Articles 8 and 9 of the Legislative Decree No. 230/1995, The Act 75/2011 slightly modifies the regulatory process by cancelling of the “Technical Commission on Nuclear safety and Radiation Protection”. This Commission was entitled to formulate an independent technical advice to ISIN (ex ISPRA) during the assessment process connected to the granting of licences, authorizations and approval of detailed designs;

**Legislative Decree No. 100/2011** which modifies the provisions of article 157 of Legislative Decree No. 230/1995 concerning the radiometric surveillance of metal scraps;

**Legislative Decree No. 185/2011** which transposes the Council Directive 2009/71/EURATOM establishing a Community framework for the nuclear safety of nuclear installations;

**Act No. 214/2011** abolished the Nuclear Safety Agency (created with the Act No. 99/2009, but not yet applied) and the functions have been temporarily assigned to ISPRA (that in fact continue its work as nuclear authority) waiting for a definitive asset of the regulatory organization;

**Act No. 27/2012** on the economic development, through the Art. 24, establishes new procedures to reduce the timing of the licensing phases for decommissioning activities with a strong involvement of local administrations;

**Act No. 100/2012:** regarding provisions on civil protection reorganisation;

**Legislative Decree No. 45/2014** which transposes the Directive 2011/70/EURATOM establishing a community framework for the responsible and safe management of spent fuel and radioactive waste;

**Joint Decree of 7th August 2015** of the Ministry of Environment, Land Protection and Sea and the Ministry of Economic Development regarding a new radioactive waste classification;

**Act No. 58/2015** on the ratification of the Amendment to the Convention on Physical Protection of Nuclear Materials and Nuclear installations;

**Legislative Decree No. 137/2017** which transposes the Directive 2014/87/EURATOM on nuclear safety;

**Act No. 37/2019** that modifies and integrates Legislative Decree No. 45/2014 introducing provisions on responsibilities for radioactive waste and spent fuel management;

**Legislative Decree No. 101/2020** which transposes the Directive 2013/59/EURATOM entered into force on 27 August 2020.

## Technical Guides

**Doc. DISP (87) 10** “General Design Criteria for PWR NPPs“

**Doc. DISP (87) 11** “Design Requirements for the limitation of the worker exposure for the PWR NPPs”

1. **T.G. No. 1** Content of Preliminary Safety Analysis Report (PSAR) for NPP's, pursuant to Articles 37 and 38 of Decree No. 185 (1975)
2. **T.G. No. 2** Procedure for the Authorization of Changes in Nuclear Plants (1975)
3. **T.G. No. 3** Certification of the Compliance of NPP Components with Procurement Specifications (1975)
4. **T.G. No. 4** Implementation of the Article 42 of Decree No. 185 (Detailed Construction Plans) (1975)
5. **T.G. No. 5** Procedures for the Approval of the Design Type B and fissile class Packages (1977)
6. **T.G. No. 6** Procedures for the Approval of the Shipment of Radioactive and Fissile Material (1976)
7. **T.G. No. 7** Technical Information Required for the Authorization of the Irradiation Plants, Pursuant to Article 55 of Decree No. 185 (1978)
8. **T.G. No. 8** Quality Assurance General Criteria for Nuclear Plants (1977)
9. **T.G. No. 9** Quality Assurance - Description of the Documentation Required for Design and Construction Phases Prior to Carry out Nuclear Tests. (1978)
10. **T.G. No. 10** Technical Control of NRA on Preliminary Activities on Site of NPP's. (1978)
11. **T.G. No. 11** Criteria for the Compilation of Information Reports on the Operation of NPP's to be sent to NRA. (1978)
12. **T.G. No. 12** Technical Information Required for the Authorization of Plants for the Handling of Sealed Radioactive Sources, Pursuant to the Article 55 of Decree No. 185 (1978)
13. **T.G. No. 13** Technical Information Required for the Authorization of teletherapy Equipments (1978)
14. **T.G. No. 14** Technical Information Required for the Authorization of medical uses of Radioactive Materials (1978)
15. **T.G. No. 15** Technical Information Required for the Authorization of Radioactive Material Commercial Operations Pursuant to the Article 34 of Decree No. 185 (1978)
16. **T.G. No. 16** Withdrawn in November 1991
17. **T.G. No. 17** Criteria for the Use and the Efficiency Verification of Personal Protective Means against Radioactive Material Inhalation - Revision 1. (1987)
18. **T.G. No. 18** Periodic Tests of Health Protection Instrumentation - Revision 1 (1987)
19. **T.G. No. 19** Technical Information Required for the Authorization of High Power Equipment Producing Ionizing Radiations, Pursuant to Article 55 of Decree No. 185. (1980)
20. **T.G. No. 20** Quality Assurance. Description of the Documentation Required for the Operation Phase of NPP's. (1981)
21. **T.G. No. 21** Quality Assurance - Content of the Operating Regulations, as referred in Article 45 of Decree No. 185. (1981)
22. **T.G. No. 22** Quality Assurance - Guide for Collection, Storage, Preservation and Safekeeping of Quality Assurance Records for NPP's. (1983)
23. **T.G. No. 23** Quality Assurance - Guide for the Procurement of Items and Services for NPP's. (1983)
24. **T.G. No. 24** Quality Assurance - Guide for Auditing on Quality Assurance Programs for NPP's. (1983)
25. **T.G. No. 25** Quality Assurance - Guide for Applying Quality Assurance on design Activities of NPP's. (1984)
26. **T.G. No. 26** Radioactive Waste Management. (1987)
27. **T.G. No. 27** Design, Construction and Installation Requirements for the In Service Inspections and Testability of Mechanical Structures and Components in the NPP's. (1985)
28. **T.G. No. 28** Criteria for the internal Contamination Surveillance. (1986)
29. **T.G. No. 29** Siting criteria for a near surface disposal facility for low and intermediate level radioactive waste. (2014)

## Technical Standards

### UNI standards related to decommissioning

The Standards applicable to the decommissioning of Italian installations are set out in a single document issued by the national standards organisation (UNI): **UNI 9498**.

That standard contains eight sections covering different topics. The contents of the individual sections of the document are summarised below.

In general, the present standard pertains explicitly to the following type of installations:

- nuclear reactors;
- nuclear subcritical units;
- nuclear power plants;
- nuclear research plants;
- nuclear plants for spent fuel reprocessing;
- plants for preparation and fabrication of special fissile materials and of nuclear fuel;
- storage of special fissile materials and of nuclear fuel;
- installations for reprocessing, conditioning or temporary storage of radioactive wastes.

The standard is not applicable to:

- uranium mines;
- storage of final disposal of radioactive wastes;
- plant where during the operation, no radioactivity has been produced;
- plants which have been converted to a new nuclear related use.

#### UNI 9498/1 - General criteria

This standard gives a general picture that includes principles and factors which have to be considered for the decommissioning of a nuclear plant. It includes the general requirement that all the procedures, either of a management, accounting and administrative type, or of a technical type, must be planned and done in a controlled and documented way. The standard is addressed to the operator of nuclear plants to be decommissioned and to persons responsible for the planning and execution of decommissioning operations; it provides indications and recommendations about the methods and the technical options which are convenient in order to maintain an adequate health protection for workers, public and environment, and, finally, to minimise the radiological risk associated to the plant.

The scope of the standard begins at the decision of the owner/operator to permanently shut down the plant, and terminates when a situation without radiological constraints is reached. The status of the plant taken as a reference in the present standard is the configuration existing at the moment the decision is made to permanently shut down. The radioactive substances considered are those associated with the normal operation of the plant itself. The standard does not deal with decommissioning activities following a severe accident.

The aspects related to processing, conditioning, transportation and disposal of radioactive wastes are not included in the scope of the standard. The numerical definition of radioactivity limits for materials free from radiological constraints are also not included. Nor the management, accounting and administrative aspects. The standard does not exempt the user from observing the rules and authorising procedures in force.

#### UNI 9498/2 - Decontamination techniques

The section describes the principles and the methodologies which have to be considered for the planning and the execution of decontamination activities at a nuclear plant being decommissioned, for the case of either immediate or deferred dismantling. It provides technical information and recommendations necessary to the owner/operator of the plant and to people responsible for the planning and execution of all the decontamination procedures which are useful in improving the conditions of radiological protection at the plant as well as in achieving the optimum management of wastes.

It is not applicable to plants which, following an accident, show a generalised contamination of components, structures and buildings and of the site itself. In this case, specific decontamination techniques will be have to set up, which are allowed to be different to those described in the present standard.

#### UNI 9498/3 - Storage and surveillance

This section identifies the fundamental activities which are necessary to be done on a nuclear plant at the end of operation, to leave it in a safe condition for an adequate period of time. It is concerned in particular with plants where the existing radioactivity, after the complete removal of all fissile materials, is due primarily to radioisotopes which have decay times which justify placing the plant in a conservation and maintenance (C&M) state for appropriate period, in order to allow the plant to be completely dismantled with a greatly reduced level of radioactivity.

#### UNI 9498/4 - Dismantling of structures and components

This section describes the principles and the factors which have to be taken into account for the dismantling and removal of structures and components which have become contaminated and/or activated during the operation of the plant.

#### UNI 9498/5 - Radioactive inventory

This section specifies the methodologies to be followed in the evaluation of the remaining radioactivity and of the associated radiation fields in order to carry out the radiological characterisation of the nuclear plants to be decommissioned. Such methodologies must be programmed and performed in a checked and documented way.

#### UNI 9498/6 - Radiological characterisation and classification of materials

This section deals with the factors which have to be taken into account to characterise and classify the materials produced during the decommissioning of nuclear plants. It provides the criteria against which the most appropriate methodology for characterisation and classification of materials as a function of their type is to be chosen, as well as provides guidance for the choice of measurement instrumentation appropriate to define the radiological state of the materials.

#### UNI 9498/7 - Criteria for partial release of a nuclear plant and/or site

This section deals with those nuclear plants to be decommissioned for which a decision has been made to delay final dismantling for a sufficiently long period of time, such that they will have to be placed in a C&M state.

The decision of putting a part of a nuclear plant in a C&M state depends on the requirement to release some zone where other activities of a non-nuclear type can continue to be performed.

Usually the part of the plant that will be put in a C&M state will be that part where the radioactivity cannot be easily removed but can be confined for long periods of time in well-defined and sealed zones. Usually these are areas where the major part of the radioactivity is coming from neutron activation.

#### UNI 9498/8 - Requirements for the temporary storage of radioactive wastes and materials

This section gives the criteria to be followed in the design of a temporary store for the radioactive wastes resulting from the operation and dismantling of the nuclear plants. It also provides the general technical requirements which have to be fulfilled either in the design and the management of the new temporary store, or in the modification of already existing facilities.

Furthermore, it provides the criteria for environment protection against pollution resulting from management of radioactive wastes, in order to minimise the individual and collective doses of population and workers, and to preserve the quality of the environment for the present and future uses of the site.

The radioactive wastes mentioned above include those arising from reprocessing and/or conditioning activities, that are solid and satisfy the radioactivity concentration limits according to present standards for temporary storage or for disposal at an appropriate site.

#### **UNI standards related to radioactive waste management**

In the framework of the National Standardization Organisation (UNI) activities, the following standards aiming to the standardisation of the procedures for radioactive waste management have been developed:

<b>UNI 10621 (2004)</b>	“Radioactive waste packages characterization”;
<b>UNI 10704 (2004)</b>	“Radioactive waste classification”;
<b>UNI 10755 (2004)</b>	“Recording and labelling of RW packages”;
<b>UNICEN 189 (2001)</b>	“Solid materials from nuclear plants - Radiological methods and procedures for the clearance”;
<b>UNI11193 (2006)</b>	“Qualification of conditioning processes for cat. 2 packages”, that sets out the general requirements for the conditioning process qualification and the specific test to which the waste form and/or packages should be verified (mechanical and physical/chemical properties for homogeneous and heterogeneous waste form and for High Integrity Containers);
<b>UNI 11194 (2006)</b>	“Radiological characterization of Cat.2 packages”, that establishes methods and requirements for radiological characterization of radioactive waste packages before their disposal (i.e. measurement system performances, typical radionuclides relevant for disposal to be measured, sampling preparation, correlation factors);

- UNI 11195 (2006)** “Information management system for the disposal of Cat. 2 packages”, that sets out the requirements and the methodologies for the management of the Surface Disposal Information Management System (i.e. data acquisition, waste reception plan, inspection and monitoring data base, long term management of the information system);
- UNI 11196 (2006)** “Containers for the final repository of Cat. 2 packages” That defines the requirements (dimension, mechanical characteristics) of the identified containers for LLW packages and qualification process;
- UNI 11197(2006)** “Identification procedure and traceability of information for Cat.2 Packages”, that defines the requirements for the implementation of a suitable Data Base and for the organization of the information needed to appropriately manage radioactive waste packages at a near surface disposal facility;**UNICEN 214-1 (2003)** “Category 2 Radioactive Waste Engineered Repository”, that is structured as follows:
- Part 1: Basic Design Criteria;
  - Part 2: Basic Qualification Criteria for Engineered Barriers;
  - Part 3: Surveillance and Monitoring basic criteria.

## Annex 2 - List of Abbreviations and Acronyms

ANPA	Agenzia Nazionale per la Protezione dell’Ambiente (National Environmental Protection Agency)
APAT	Agenzia per la Protezione dell’Ambiente e per i servizi Tecnici (Agency for Environment Protection and Technical Services)
BWR	Boiling Water Reactor
C&M	Conservation and Maintenance
CEI	Comitato Elettrotecnico Italiano (Italian Electrotechnical Committee)
CNEN	Comitato Nazionale per l’Energia Nucleare (National Committee for Nuclear Energy)
CNS	Convention on Nuclear Safety
DISP	Dipartimento di Sicurezza e Protezione (Nuclear Safety and Health Protection Directorate)
ENEA	Agenzia nazionale per le nuove tecnologie, l’energia e lo sviluppo economico sostenibile (Agency for New Technology, Energy and Sustainable Economic Development)
ENEL	Ente Nazionale per l’Energia Elettrica (National Electricity Company)
EU	European Union
HLW	High Level Waste
IAEA	International Atomic Energy Agency
ICRP	International Commission on Radiological Protection
ILW	Intermediate Level Waste
ISIN	Ispettorato nazionale per la sicurezza nucleare e la radioprotezione (National Inspectorate for Nuclear Safety and Radiation Protection)
ISO	International Standards Organization
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale (Institute for the Environmental Protection and Research)
JC	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
LLW	Low Level Waste
LWR	Light Water Reactor
NPP	Nuclear Power Plant
NRA	Nuclear Regulatory Authority
PSAR	Preliminary Safety Analysis Report
PWR	Pressurised Water Reactor
QA	Quality Assurance
UNI	Ente Nazionale Italiano di Unificazione (Italian Organization for Standardization)
WENRA	West European Nuclear Regulators Association

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