



**Implementation of Council Directive
2011/70/EURATOM of 19 July 2011
Establishing a Community framework for the
responsible and safe management
of spent fuel and radioactive waste**

First Italian National Report

2015

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Under art. 14.1.

2015

This National Report has been prepared by the Italian Government on the basis of data provided by the Nuclear, Technological and Industrial Risk Department of Institute for Environmental Protection and Research (ISPRA)

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Section A - Introduction

A. Introduction

Purpose of the report

The present report has been prepared to comply with Article 14.1 of EU Council Directive 2011/70/EURATOM. In particular it has been prepared following the process defined in art. 58-*quinquies* of Legislative Decree n° 230/1995 as amended to transpose the above mentioned Directive. It has been prepared by Ministry for Environment and Land and Sea Protection and by Ministry of Economic Development on the bases of information and data provided by the Nuclear, Technological and Industrial Risk Department of Institute for Environmental Protection and Research (ISPRA) which is acting as national competent regulatory authority.

Sources of spent fuel and radioactive waste

Commercial utilisation of nuclear power in Italy started in 1962 and within 1981 four nuclear power plants, namely the NPPs of Garigliano (BWR), Latina (Gas Graphite), Trino (PWR) and Caorso (BWR), and a LEU fuel fabrication installation (Fabbricazioni Nucleari S.p.A) had been commissioned.



During that period an extensive R&D programme on the nuclear fuel cycle was developed by the National Committee for Nuclear Energy (CNEN) - now the National Agency for New Technologies, Energy and the Sustainable Economic Development (ENEA) - with the operation of experimental fuel cycle installations (e.g. ITREC and EUREX). A fuel fabrication installation (Bosco Marengo) was also operated.

The three NPPs of Latina, Trino and Caorso continued to be operated until 1987, when they were definitively shut down based on a governmental decision which in such a way interpreted the results of a national referendum called upon after the Chernobyl accident. The NPP of Garigliano had been already shut down in

1978, for technical reasons. All other nuclear installations were also definitively shutdown. Only a few research reactors remained into operation.

At the time the nuclear programme was cancelled, the Interministerial Committee for the Economical Planning (CIPE) required the National Electricity Company (ENEL) to start the preparatory phase of the decommissioning of the NPPs. At this aim a "Safe storage" (IAEA level 1-2) option was adopted.

In 1999, in the frame of the privatisation process of ENEL, liabilities and assets connected to nuclear power were assigned to a newly established company, named SO.G.I.N. (Società Gestione Impianti Nucleari), whose shareholder is the Ministry of Economy and Finance, while the strategic and operational objectives are given by the Ministry of Economic Development. The primary mission of SO.G.I.N. is the decommissioning of all NPPs and fuel cycle installations according to a single step strategy, as well as the safe management of the spent fuel and radioactive waste related to those installations. A special fund allocation for financing all these activities is ensured by means of a specific levy on the price of the electricity.

Radioactive waste generated by medical, industrial and research applications is currently managed by authorized operators in the wait to be transferred to National repository.

The attached figure shows nuclear installations and storage facilities where SF and RW are currently managed. In the figure, the symbol of research center is used for installations operated in the past as fuel cycle pilot facilities.

SF and RW management policy

The current Italian national policy towards nuclear activities is strictly related to the outcome of the national referendum held on June 12-13, 2011, few months after the Fukushima Dai-ichi NPP accident. The result of the referendum led to the abandonment of the Government decision, taken in July 2009 by Act n° 99/2009, to reopen the nuclear option by envisaging the construction of new NPPs. As mentioned, all the nuclear installations realized in the frame of the national nuclear programme during the 60s – 70s had been definitely shutdown in 1987, and subsequently managed according to a "safe conservation and deferred dismantling" strategy until 1999, when the implementation of a decommissioning strategy finalized to achieve the unconditional release of the sites was decided.

On the above basis the national policy remains currently addressed to decommissioning of old nuclear installations and to spent fuel and waste management with provisions and activities related to the siting and construction of the National Repository of radioactive waste. A few research reactors are however still into operation.

The SF to be managed in Italy is that one resulting from the past operation of NPPs and from past research activities in the field of reprocessing. Almost all the SF coming from NPPs operation has been transferred abroad for reprocessing. A limited amount has still to be transferred to France. A few tHM of spent fuel is present in the ITREC reprocessing facility and in research facilities. For this fuel a dry storage strategy is envisaged to be adopted.

Since the beginning of its nuclear programme Italy had pursued the option of reprocessing abroad the spent fuel produced in its NPPs. After the political decision to stop all nuclear power activities, the shipments abroad of spent fuel for reprocessing were suspended with the last shipment to UK occurred in 2005 in the frame of a service agreement already in place. The opposition of local communities and authorities to the consequent choice of the on-site dry storage led the Government to reconsider the option of reprocessing abroad all the spent fuel still present (Directive of the Minister of Economic Development, March 2006).

SO.G.I.N. was charged to establish reprocessing agreements for all the remaining spent fuel still present in Italy.

Such a decision has become a part of the Inter-Governmental Agreement signed with the French Government on November 24, 2006, followed by a contract that SO.G.I.N. S.p.A. assigned to Areva NC on April 27, 2007. The Agreement includes the reprocessing of the remaining spent fuel of Italian NPPs (235 tHM) and envisages the return to Italy of the radioactive waste resulting from the reprocessing activity.

Waiting for the transfer abroad for reprocessing, the spent fuel is being maintained in the storage pools. With regard to the NPPs, spent fuel has been removed from Garigliano and Latina NPPs since many years. The transfer campaign from the Caorso site to France for reprocessing was completed in June 2010. Spent fuel for a total amount of about 30 tons is still present in the Trino NPP site and Deposito Avogadro and its transfer abroad is expected to be completed by 2016. Its safe management continues to be performed according to existing licence conditions and technical specifications.

As concern the research reactors, the national policy on spent fuel is to return to the country of origin spent fuel. The last shipment abroad of the spent fuel was in July 1999 when 140 fuel elements from TRIGA RC-1 have been shipped to the Department of Energy in the United States of America in the frame of the USA policy of withdrawal of spent fuel of US production.

In relation to radioactive waste, most of the waste existing in Italy was produced in the past operation of the nuclear installations. At present, almost all the waste originated by the past nuclear programme is stored in the site of each individual installation where it was generated. In the future additional RW will come from activities addressed to the routine safe conservation of shutdown installations and to their decommissioning activities as well as from the re-entry in Italy of the conditioned high and intermediate level waste resulting from the reprocessing abroad of the spent fuel and from the yearly production of RW from medical, industrial and research applications.

Waiting for the availability of a National Repository, radioactive waste continues to be stored in the nuclear installations of origin. Action plans are in progress to enhance the safety level of waste by implementing specific treatment and conditioning projects, by refurbishing existing buildings or by realizing already approved new storage facilities on the sites. New facilities will also be used to ensure temporary storage capacity for waste resulting from decommissioning activities.

The decommissioning of the nuclear installations and the associated SF and RW is managed since 1999 by SO.G.I.N. (Società Gestione Impianti Nucleari) S.p.A., whose single shareholder is the Ministry of Economy. SO.G.I.N. operates under strategic and operational guidelines provided by the Italian Government. The decommissioning policy calls for the unconditional release of the nuclear sites (green field). Pending the availability of the National Repository, all the legacy waste and the one that will be generated by dismantling activities will be stored on the sites in dedicated facilities (brown field).

According to Legislative Decree n° 31/2010, SO.G.I.N. has been also entrusted of siting, construction and operation of the national radioactive waste repository in compliance with criteria defined by the Competent Regulatory Authority whose role is currently exploited by the Nuclear, Technological and Industrial Risk Department of ISPRA.

A special fund allocation for financing all above activities is ensured by means of a specific levy on the price of the electricity.

In connection with the road map associated to the above mentioned Agreement, the Legislative Decree n° 31/2010 establishes the new procedure for the siting and the construction of a National Repository for the L-ILW disposal and the ILW-HLW long term storage, and assigns to SO.G.I.N. the role of the implementer responsible for the construction and operation of the National Repository.

The Legislative Decree n° 31/2010 also assigns to SO.G.I.N. the responsibility to propose suitable areas for the siting of the installation, based upon criteria established by the IAEA and by the competent regulatory authority and taking into

account results of Strategic Environmental Evaluation. The siting procedure, established with the Legislative Decree n° 31/2010, has started with the issue by Nuclear, Technological and Industrial Risk Department of ISPRA of a Technical Guide on siting criteria for low and intermediate level waste and a National Chart of Potentially Eligible Sites (CNAPI) has been proposed by the implementer.

Competent Regulatory Authority

The key regulatory functions (rulemaking, licensing, assessment, inspection and enforcement) related to nuclear safety and radiation protection matters, including also the safe management of spent fuel and radioactive waste, and decommissioning, are mainly exploited in Italy by the Minister of Economic Development which is the authority which grants the licence/authorization for nuclear activities, and by Nuclear, Technological and Industrial Risk Department of ISPRA, entrusted with the role of competent regulatory authority responsible for the assessment and the inspection activities on nuclear installations and activities, also including those related to RW and SF management.

Legislative Decree n° 45/2014 establishes a new competent regulatory authority in the field of nuclear safety and radiation protection, which is the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN), fully dedicated to the regulation and control in the nuclear field. The enactment of further legislative provisions is required for the full and formal establishment of the new regulatory authority.

According to the same Decree, until the entry into force of ISIN, the functions of competent regulatory authority shall continue to be carried out by the Nuclear, Technological and Industrial Risk Department of ISPRA.

According to the purpose of the peer review, an IRRS mission is planned in 2016. Peer review under Council Directive 2011/70/EURATOM will be organized after the conclusion of the IRRS mission.

Section B - *Summary*

B. Summary

The Council Directive 2011/70/EURATOM, establishing a Community framework for ensuring responsible and safe management of spent fuel and radioactive waste to avoid imposing undue burdens on future generations, requires Member States to submit a report to the Commission on the implementation of the Council Directive and to argue how they have fulfilled their obligations under Article 14.1 of the Council Directive.

Italy has transposed the Council Directive 2011/70/EURATOM in March 2014 through the Legislative Decree n° 45/2014.

This is the first Italian National Report, describing how the obligations of the Council Directive are met. The structure of the report follows the ENSREG guidelines HLG_p(2014-27)_137, as appropriate, considering the current status of nuclear activities in Italy.

The main change in current Italian national policy towards nuclear activities is strictly related to the outcome of the national referendum held on June 12-13, 2011, few months after the Fukushima Dai-ichi NPP accident. The result of the referendum led to the abandonment of the Government decision, taken in July 2009 by Act n° 99/2009, to reopen the nuclear option by envisaging the construction of new NPPs. It has also to be remembered that all the nuclear installations realized in the frame of the national nuclear programme during the 60s – 70s had been definitely shutdown in 1987, after three referenda concerning nuclear energy held on November 8, 1987 as result of the Chernobyl accident, with the only exception of a few research reactors.

On such basis the present policy is addressed to the decommissioning of old nuclear installations and to spent fuel and waste management, including the waste produced by medical, industrial and research applications, with provisions and activities related to the siting and construction of the National Repository. Large part of radioactive waste currently stored in nuclear installations is to be conditioned and several relevant projects are in progress. Almost all the spent fuel of NPPs has been transferred abroad for reprocessing and the resulting residual I-HLW is expected to be returned by 2025.

In particular, the National Repository envisages a near surface disposal facility for low and intermediate level waste and a long term interim storage facility for intermediate and high level waste. The siting process is ongoing and a National Chart of Potentially Eligible Sites will be examined in order to identify the National Repository site.

Legislative Decree n° 45/2014 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); according to the same Decree, until the entry into force of ISIN, the functions of competent regulatory authority shall continue to be carried out by Nuclear, Technological and Industrial Risk Department of ISPRA.

The draft of the National Programme proposal has been discussed by the Ministry of the Environment, Land and Sea and the Ministry of Economic Development and will be issued according to the procedure established by the Legislative Decree n.45/2014 including the strategic environmental assessment process.

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

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

Section C - Reporting article by article

Article 4 – General principles

Article 4

1. *Member States shall establish and maintain national policies on spent fuel and radioactive waste management. Without prejudice to Article 2(3), each Member State shall have ultimate responsibility for management of the spent fuel and radioactive waste generated.*
 2. *Where radioactive waste or spent fuel is shipped for processing or reprocessing to a Member State or a third country, the ultimate responsibility for the safe and responsible disposal of those materials, including any waste as a by-product, shall remain with the Member State or third country from which the radioactive material was shipped.*
 3. *National policies shall be based on all of the following principles:*
 - (a) *the generation of radioactive waste shall be kept to the minimum which is reasonably practicable, both in terms of activity and volume, by means of appropriate design measures and of operating and decommissioning practices, including the recycling and reuse of materials;*
 - (b) *the interdependencies between all steps in spent fuel and radioactive waste generation and management shall be taken into account;*
 - (c) *spent fuel and radioactive waste shall be safely managed, including in the long term with passive safety features;*
 - (d) *implementation of measures shall follow a graded approach;*
 - (e) *the costs for the management of spent fuel and radioactive waste shall be borne by those who generated those materials;*
 - (f) *an evidence-based and documented decision-making process shall be applied with regard to all stages of the management of spent fuel and radioactive waste.*
 4. *Radioactive waste shall be disposed of in the Member State in which it was generated, unless at the time of shipment an agreement, taking into account the criteria established by the Commission in accordance with Article 16(2) of Directive 2006/117/Euratom, has entered into force between the Member State concerned and another Member State or a third country to use a disposal facility in one of them.*

Prior to a shipment to a third country, the exporting Member State shall inform the Commission of the content of any such agreement and take reasonable measures to be assured that:

 - (a) *the country of destination has concluded an agreement with the Community covering spent fuel and radioactive waste management or is a party to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management ('the Joint Convention');*
 - (b) *the country of destination has radioactive waste management and disposal programmes with objectives representing a high level of safety equivalent to those established by this Directive; and*
 - (c) *the disposal facility in the country of destination is authorised for the radioactive waste to be shipped, is operating prior to the shipment, and is managed in accordance with the requirements set down in the radioactive waste management and disposal programme of that country of destination.*
- Except for the provisions set out in Article 2(3):*
- (a) *repatriation of disused sealed sources to a supplier or manufacturer;*
 - (b) *shipment of spent fuel of research reactors to a country where research reactor fuels are supplied or manufactured, taking into account applicable international agreements;*
 - (c) *the waste and spent fuel of the existing Krško nuclear power plant, when it concerns shipments between Slovenia and Croatia.*
-

The protection of individuals, society and the environment against radiological and other hazards is covered by the legislative and regulatory framework for nuclear activities and by the general legislation on environmental protection.

The Italian legislative and regulatory framework, applicable to RW and SF management activities, defines the main principles related to nuclear safety and radiation protection and to applicable licensing procedures. Specific requirements to be met in any phase of the fuel cycle are than established in the context of specific technical licensing process.

Compliance with the legal requirements regarding nuclear safety and radiation protection is verified and enforced by the competent regulatory authority, Nuclear, Technological and Industrial Risk Department of ISPRA. The compliance is verified by reviewing safety analysis reports during the licensing steps and by supervising construction and operation, particularly through inspections.

SF management activities that continue to be performed in Italy are related to the storage in pools of the installations and the transfer to reprocessing facilities located abroad. The small amount of spent fuel still present in the national territory is stored in the pools of the individual facilities. It is expected that by 2016 all the existing fuel, with the exception of the Elk River spent fuel located in the ITREC plant and some small amount of fuel used in the past for research activities, will be transferred abroad. Elk River spent fuel is expected to be interim stored in a dry storage facility to be built on the site and then transferred in the National Repository.

With regard to the provisions established under this article the following can be highlighted:

- (i) as said, all spent fuel produced in Italy have been or will be reprocessed in European industrial reprocessing plants, with the only exception of the spent fuel stored at the ITREC facility. The waste production is mainly related to the wet storage (systems for cleaning and decontamination of the pool water), and operators are requested to keep it to the minimum practicable. As far as measures adopted to ensure that the generation of radioactive waste is kept at the lowest possible level, specific requirements are set out in the Technical Guide n° 26 on Radioactive waste management, in terms of waste mass, activity and volume minimization and optimisation of treatment and conditioning processes. In the specific national situation, according to which all nuclear installations are in the process of being decommissioned, the principle of waste minimization is applied during the licensing process of waste treatment and conditioning activities, as well as of dismantling and decontamination activities;
- (ii) the interdependencies among the different steps in spent fuel management, connected to the residual activities, are limited and are taken into account. In fact, since in Italy no nuclear power is produced and no domestic reprocessing capabilities are available, the spent fuel management approach only entails the following main steps: wet storage, transport to foreign European plants for reprocessing, return to Italy of corresponding nuclear material and conditioned radioactive waste. Regarding measures adopted to take into account interdependencies between the different stages of radioactive waste management, key related aspects are covered by the requirements established in the Technical Guide n° 26 previously mentioned. In particular, all technical, operational and administrative aspects which affect or might affect the quantity of radioactive wastes produced and their volume reduction and concerning different phases such as plant design and operation, services and processes selection, shall be optimised;
- (iii) protection measures of individuals and members of population are specified in the Legislative Decree n° 230/1995, as progressively modified to take the applicable Council Directives into account;
- (iv) a graded approach is adopted taking into account the actual radiological hazard which is obviously below the one of the operational phase;
- (v) all the Italian nuclear installation are public owned or financed and most of installations are at present in decommissioning. In this context, the financial resources to fulfil the respect of the nuclear safety requirements are guaranteed by the State. The former utility ENEL created, during NPPs operation, a fund to cover long-term liabilities for decommissioning and SF management. The fund was transferred to SO.G.I.N. at the time of its establishment;
- (vi) at the moment, all the licensed activities related to spent fuel have a quite limited perspective time horizon and therefore regulation or technical guides do not explicitly consider future generations; existing regulations do not identify any limitation in the time periods for which the principles related to practices have to be applied; moreover, licensing activities, which take international standards into account, consider also the long term perspectives. With regard to radioactive waste management, Technical Guide N° 26 specifically addresses the principle that the potential impact on future generation of radioactive waste management activities should be taken into account. As far as measures to avoid impacts on future generations are concerned, no specific provisions addressed to the control of radiological risk are currently envisaged in the longer term in the national legislation. Although no specific legislative provisions address prevention of undue burden to future generations the present strategy is however intended in perspective to fulfil this

objective, throughout the planning of the different steps to be performed before disposal. This principle is more explicitly referred to in the National programme.

Regarding the management of radioactive waste it is, and will be, carried out adopting well known and proved technologies, among the best ones today available worldwide; in this connection, the impact on future generations as well as the avoiding of undue burdens is properly taken into account.

With regard to transboundary movement of spent fuel and radioactive waste it is regulated into the national regulatory framework by the requirements stated in:

- Act on peaceful use of nuclear energy (Act 31 December 1962, n° 1860 as amended);
- Radiation Protection Act (Legislative Decree 17 March 1995, n°230 as amended);
- Council Regulation (EC) n° 1334/2000;
- The Act on authorization of export of dual-use products and technical assistance (Legislative Decree 9 April 2003, n°96).

In particular Italy follows the administrative procedures set forth in the Council Directive 2006/117/EURATOM implemented into the national regulatory framework by the Radiation Protection Act (Legislative Decree 17 March 1995, n° 230 as modified).

The Italian competent authority to grant the licence for export, import or transit of radioactive waste and spent fuel is the Ministry of Economic Development. For export of spent fuel in non EU countries the Council Regulation (EC) n° 1334/2000, setting up a Community regime for the control of exports of dual-use items and technology, is applied. In that case an authorization for export is issued by the Italian competent authority on the basis of a declaration of the consignee endorsed by the State of destination.

National experience of transboundary movements of spent fuel and radioactive waste are related to the reprocessing of spent fuel and the treatment of radioactive waste arising from nuclear fuel cycle and from medical or industrial activities. The spent fuel and radioactive waste shipped to UE countries are reimported after their treatment.

Both the Inter-Governmental Agreement signed with the French Government and the contract that SO.G.I.N. S.p.A. assigned to Areva NC for the reprocessing of the spent fuel of Italian NPPs envisage the return to Italy of the radioactive waste resulting from the reprocessing activity.

In relation to disposal of radioactive waste, the national regulation, as defined in article 32-*bis* of Legislative decree n.230/1995, states that any RW generated by national nuclear installations or activities have to be disposed of in the Italian territory. The contents of art. 4.4 of the Council Directive 2011/70/EURATOM is implemented in the mentioned article 32-bis, in which it is specified that the responsibility to inform the Commission on the shipment to a third country, regulated by an agreement with the State concerned, is in charge of Ministry of Economic Development after advice of the competent Regulatory Authority.

Article 5 –National framework

5.1 National legislative, regulatory and organisational framework

Article 5

1. *Member States shall establish and maintain a national legislative, regulatory and organisational framework ('national framework') for spent fuel and radioactive waste management that allocates responsibility and provides for coordination between relevant competent bodies. The national framework shall provide for all of the following:*
 - (a) *a national programme for the implementation of spent fuel and radioactive waste management policy;*
 - (b) *national arrangements for the safety of spent fuel and radioactive waste management. The determination of how those arrangements are to be adopted and through which instrument they are to be applied rests within the competence of the Member States;*
 - (c) *a system of licensing of spent fuel and radioactive waste management activities, facilities or both, including the prohibition of spent fuel or radioactive waste management activities, of the operation of a spent fuel or radioactive waste management facility without a licence or both and, if appropriate, prescribing conditions for further management of the activity, facility or both;*
 - (d) *a system of appropriate control, a management system, regulatory inspections, documentation and reporting obligations for radioactive waste and spent fuel management activities, facilities or both, including appropriate measures for the post-closure periods of disposal facilities;*
 - (e) *enforcement actions, including the suspension of activities and the modification, expiration or revocation of a licence together with requirements, if appropriate, for alternative solutions that lead to improved safety;*
 - (f) *the allocation of responsibility to the bodies involved in the different steps of spent fuel and radioactive waste management; in particular, the national framework shall give primary responsibility for the spent fuel and radioactive waste to their generators or, under specific circumstances, to a licence holder to whom this responsibility has been entrusted by competent bodies;*
 - (g) *national requirements for public information and participation;*
 - (h) *the financing scheme(s) for spent fuel and radioactive waste management in accordance with Article 9.*
-

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 begun in the early 60s and that took into account the experience of licensing and operation of NPPs of different types and generations and of other nuclear installations.

It applies to all nuclear installations and activities, including SF and RW management.

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

- legislation, that is Acts and Legislative Decrees, as well as governmental or ministerial decrees;
- technical Guides;
- technical standards.

The Italian Regulatory Body is a system made of by the Minister of Economic Development, which issues authorizations having force of law and by Nuclear, Technological and Industrial Risk Department of ISPRA 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, establishing conditions and technical specifications defined by Nuclear, Technological and Industrial Risk Department of ISPRA, which supervises on their compliance by the authorized party. Other administrations are also involved in the

licensing process to provide their opinion.

A new competent regulatory authority in the field of nuclear safety and radiation protection, named National Inspectorate for Nuclear Safety and Radiation Protection (ISIN), to be set up based upon structures of Nuclear Department of ISPRA, was established by the Legislative Decree n° 45/2014. In the meantime the new inspectorate will become operative duties and functions of the competent regulatory authority will continue to be exploited by the Nuclear Department of ISPRA.

As far as concern operational organization, in 1999 a new company, SO.G.I.N., Società Gestione Impianti Nucleari, was established with the primary mission of the decommissioning of all Italian NPP and fuel cycle installations, according to a single step strategy, as well as the safe management of the spent fuel and radioactive waste related to those installations. SO.G.I.N. has been also entrusted of siting, construction and operation of the national radioactive waste repository in compliance with criteria defined by the competent regulatory authority.

A special fund allocation for financing all these activities is ensured by means of a specific levy on the price of the electricity as better discussed under Art. 9.

With regard to ratification of relevant international conventions and legal instruments related to the scope of the Council Directive, the Italian Republic ratified the CNS by Act n° 10/1998 and JC by Act n° 82/2005.

5.1 (a) National programme

Article 5.1

(a) A national programme for the implementation of spent fuel and radioactive waste management policy;

Legislative Decree n° 45/2014 states that by decree of the President of the Council of Ministers, on the proposal of Minister of Economic Development and the Minister for Environment and Land and Sea Protection, taking into account the advice from the Minister of Health, the State Regions Joint Conference and the Competent Regulatory Authority, and duly taking into account observations of the public, is defined the national programme for the management of spent fuel and radioactive waste (“National Programme”), including all types of spent fuel and radioactive waste subject to national jurisdiction and all stages of management of spent fuel and radioactive waste, from generation to disposal.

According the same Decree the National Programme will cover all of the following:

- a) the general objectives of the national policy on the management of spent fuel and radioactive waste;
- b) the most significant milestones and clear timeframes for the achievement of these milestones in the light of the primary objectives of the national program;
- c) an inventory of all spent fuel and radioactive waste and estimates of future quantities, including those from decommissioning, which clearly indicates the location and the amount of radioactive waste and spent fuel in accordance with the classification of waste radioactive;
- d) projects or plans and technical solutions for the management of spent fuel and radioactive waste from generation to disposal, including the National Repository;
- e) projects and / or plans for the post-closure of the life of a disposal facility, including time over which appropriate controls are retained and the means to be employed to preserve knowledge of the facility in the long run;
- f) the research, development and demonstration activities necessary in order to implement solutions for the management of spent fuel and radioactive waste;
- g) the responsibility for the implementation of the national program and the key performance indicators to monitor progress in the implementation;
- h) an assessment of the costs of the national program and the hypothesis underlying this assessment, which must include a profile over time;
- i) the financing scheme in force;
- j) the policy or procedure on transparency set out in Article 58-*quater* of Legislative Decree n° 230/1995;
- k) any agreement with a Member State or a third country on management of spent fuel and radioactive waste, including the use of disposal facilities.

5.1 (b) National arrangements

Article 5.1

(b) national arrangements for the safety of spent fuel and radioactive waste management. The determination of how those arrangements are to be adopted and through which instrument they are to be applied rests within the competence of the Member States;

The draft of proposal of the Italian national programme for the safety of spent fuel and radioactive waste management has been discussed by the Ministry of Economic Development and the Ministry for Environment and Land and Sea Protection and its approval procedure as described in point 5.1 (a) will include the Strategic Environmental Assessment under Council Directive 2001/42/EC.

According to the law, the national program is reviewed and possibly updated by the Ministry of Economic Development and the Ministry for Environment and Land and Sea Protection, after consulting the competent regulatory authority, every 3 years, taking into account scientific and technical progress, as well as recommendations, best practices and lessons learned from international peer reviews. Following this evaluation, if the circumstances so require, the National Programme is updated with a new decree in accordance with the procedure referred to in point 5.1 (a).

The implementation of the legal instruments is performed by the competent regulatory authority through the use of technical specifications attached to the licence and technical guides.

The Technical Guide n° 29 on siting criteria for National repository has been published in 2014 after the IAEA review and the interministerial decree by the Minister for Environment and Land and Sea Protection and the Minister of Economic Development concerning a revised radioactive waste classification, also in relation to international standards, has been issued on August 7, 2015, replacing the old classification in force in Italy provided by the Technical Guide n° 26 ENEA-DISP dating back to 1987, and came into force on August 20, 2015.

A new Technical Guide on safety criteria for interim storage of radioactive waste and spent fuel will be shortly issued by the competent regulatory authority based on WENRA Safety Reference Levels and IAEA standards. A Technical Guide on near surface disposal facility is under preparation too.

5.1 (c) National system of licensing

Article 5.1

(c) a system of licensing of spent fuel and radioactive waste management activities, facilities or both, including the prohibition of spent fuel or radioactive waste management activities, of the operation of a spent fuel or radioactive waste management facility without a licence or both and, if appropriate, prescribing conditions for further management of the activity, facility or both;

Act n° 1860/1962 establishes that the operation of nuclear installations, including those related to SF and RW management, 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 n° 230/1995, based upon the technical advice of Nuclear, Technological and Industrial Risk Department of ISPRA, which is formulated as result of the assessment of the safety case filed by the applicant. Chapter VII also defines the licensing procedure relevant for each phase of the nuclear installation life (i.e. from siting to decommissioning).

Any safety relevant modification is 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 n° 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 the Chapter VII of the Legislative Decree n° 230/1995.

The decommissioning of a nuclear installation is subject to prior authorisation by the Minister of Economic Development in accordance with Minister for Environment and Land and Sea Protection, Minister of Interior, Minister of Labour and Social Policy, Minister of Health and the Region concerned, as well as relevant local authorities.

Nuclear, Technological and Industrial Risk Department of ISPRA prepares and submits to the Minister of Economic Development its opinion with an indication of any requirements. The Minister of Economic Development grants the authorization with the condition to comply with technical specifications defined by Nuclear, Technological and Industrial Risk Department of ISPRA. The technical advice of Nuclear, Technological and Industrial Risk Department of ISPRA takes into account observations expressed by different involved parties (i.e. Ministers of Environment, Interior, Labour and Health, and the Region concerned, as well as relevant local Authorities).

A separate Environmental Impact Assessment is performed under the coordination of the Minister for Environment and Land and Sea Protection as required by the Legislative Decree n° 152/2006 and subsequent amendments.

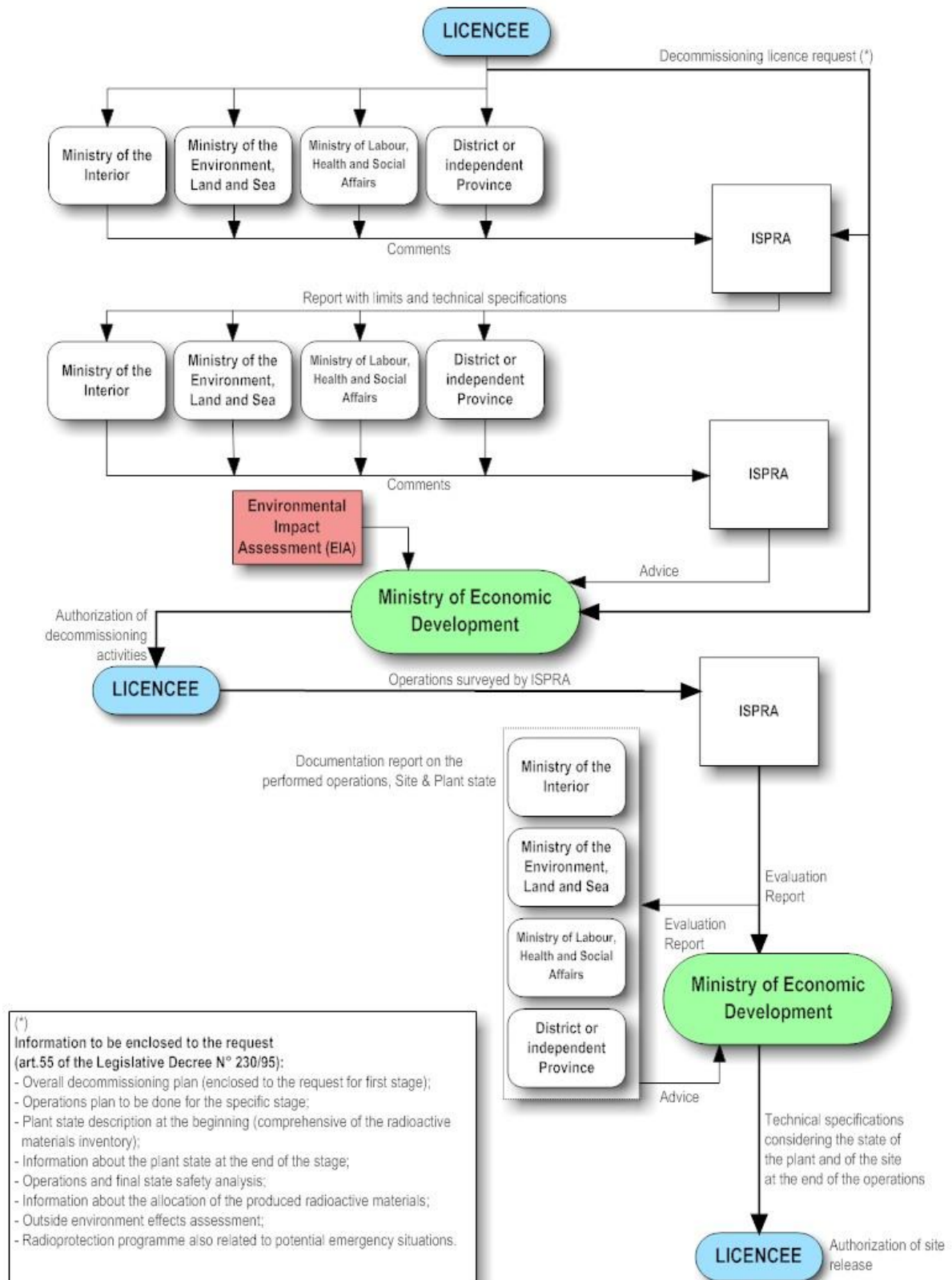
Furthermore, any specific management and storage activity of the radioactive waste which will be generated during decommissioning will require, on the basis of a specific decommissioning licence condition, the approval by the competent regulatory authority.

Decommissioning operations are carried out under Nuclear, Technological and Industrial Risk Department of ISPRA surveillance.

At the end of the decommissioning operations, the licence holder shall send to Nuclear, Technological and Industrial Risk Department of ISPRA an assessment on the operations and the state of the site and of the environment. After obtaining the advice of Nuclear, Technological and Industrial Risk Department of ISPRA and of other bodies on the final assessment, the Minister of Economic Development can issue specifications concerning the state of the site and of the environment at the end of the decommissioning operations.

It must be mentioned that Italian regulations define decommissioning as *"the whole planned actions up to the final dismantling or in any case up to unconditional release (release of site and/or buildings without any radiological constraints)"*.

LICENCING PROCESS SCHEME FOR EACH DECOMMISSIONING STAGE ACCORDING TO THE LEGISLATIVE DECREE N° 230/95



As explained above, a feature of the Italian administrative system is that a plurality of bodies has a role in the licensing process. In fact, each administrative body has to be a guardian of the public interest from its own point of view.

It has to be highlighted that, with the aim of accelerating the decommissioning activities on the sites, new provisions have been established with Act n° 27/2012. These provisions indicate a procedure for a single authorisation which takes into account also the position of local authorities.

With regard to the licensing of spent fuel and radioactive waste related activities, the following different cases can be pointed out as existing in the national facilities, together with the specific applicable legislative provision:

- a) storage of spent fuel in the pools of the nuclear installation where it was generated or used for reprocessing purposes;
- b) storage of spent fuel in facilities specifically devoted to the purpose;
- c) treatment and storage of radioactive waste in the facilities where it was generated;
- d) treatment and storage of radioactive waste in facilities under decommissioning;
- e) storage of radioactive waste in facilities specifically devoted to the purpose.

In the case of spent fuel stored in the pools of the nuclear installation where it was generated, or used for reprocessing purposes, its safe management is regulated by specific conditions attached to the licence and by the technical specifications defined for the nuclear installation.

Facilities specifically devoted to the temporary storage of spent fuel need to be authorised according to the provisions of Article 52 of Legislative Decree n° 230/1995, which requires a specific authorization to be granted by the Ministry of Economic Development, based upon the technical advice of Nuclear, Technological and Industrial Risk Department of ISPRA.

Activities connected with the treatment and the storage of radioactive waste in the facilities where it was generated are regulated by specific conditions attached to the licence and by the technical specification of the facilities. In the case of new and relevant waste management activities to be performed on the site (for example the construction of a temporary storage facility) they are authorised following the legislative procedure established for the authorization of plant modifications of nuclear installations, as defined by Article 6 of Act n° 1860/1962 and detailed in the Technical Guide n° 2 "Authorization procedure for nuclear installations modifications". For modifications involving radioactive waste storage facilities the advice the Minister for Environment and Land and Sea Protection and of the Minister of health is also envisaged.

Any management and storage activity of radioactive waste during decommissioning requires a specific approval by the competent regulatory authority in the frame of the overall authorization of the decommissioning plan which is granted in compliance with the procedure defined in Articles 55-56 of the Legislative Decree n° 230/1995.

As far as the radioactive waste management associated with decommissioning activities are concerned, Articles 55-56 of Chapter VII of the Legislative Decree n° 230/1995 establish that a decommissioning plan of nuclear installations has to be approved taking into account the proper management of the radioactive wastes already existing on the sites and of all the wastes which will result from the dismantling activities. The approval is granted by the Ministry of Economic Development based upon the technical advice of Nuclear, Technological and Industrial Risk Department of ISPRA and taking into account observations expressed by different involved Ministries as well as relevant Regional authorities. A separate Environmental Impact Assessment procedure is performed under the coordination of the Ministry for Environment and Land and Sea Protection. Furthermore, any specific management and storage activity of the radioactive waste which will be generated during decommissioning will require, on the bases of specific decommissioning licence conditions, the approval by the competent regulatory authority.

For radioactive waste storage facilities, different from nuclear installations, a specific authorization is also required. In particular, in the case of installations for temporary storage or for disposal of radioactive wastes their authorization is required under Articles 27, 28 and 29 and Article 33 of Legislative Decree n° 230/1995. The authorization is granted by the Ministry of Economic Development, in agreement with other involved Ministries, regional administrations and based upon the technical advice of Nuclear, Technological and Industrial Risk Department of ISPRA. For minor facilities, authorization is granted by Prefect.

The most important requirements for storage facilities are identified in Technical Guide n° 26, issued by the competent regulatory authority. As already mentioned, an updating of above requirements is in progress. A first issue of a technical guide related to storage requirements is under preparation taking into account IAEA safety standards and WENRA "reference levels". Above criteria are however already adopted in the safety assessment associated to the licensing of new radioactive waste storage facilities.

As far as concern the National Repository the siting procedure established by law envisages that the National Chart of Potentially Eligible Sites is approved, following a public consultation phase, by the Ministry of Economic Development, in agreement with the Ministry for Environment and Land and Sea Protection and the Minister of Infrastructures and Transports, based upon the advice of the competent regulatory authority. The same procedure is followed for the final approval of the selected site. The authorization for construction and operation is granted by the Ministry of Economic Development, in agreement with the Ministry for Environment and Land and Sea Protection and the Ministry of Infrastructures and Transports based upon the advice of the competent regulatory authority and the results of the Environmental Impact Assessment.

5.1 (d) System of supervision

Article 5.1

(d) a system of appropriate control, a management system, regulatory inspections, documentation and reporting obligations for radioactive waste and spent fuel management activities, facilities or both, including appropriate measures for the post-closure periods of disposal facilities;

The supervision on safe management of SF and RW is conducted through the assessment activities related to nuclear safety and radiation protection issues done in connection to authorizations or approvals granted before any new construction or operation in the installations is started. Safety assessment on the licence holders safety cases are conducted by the technical units of Nuclear, Technological and Industrial Risk Department of ISPRA. An assessment activity is also conducted on several specific documents connected to construction activities or conduct of operation activities (e.g. test programs and specifications, quality assurance programmes, surveillance requirements, operations manual, environmental surveillance programme, etc).

During the nuclear installations life (both during construction and decommissioning) regulatory inspections on the sites are regularly conducted. They are aimed at verifying compliance with rules established in the Legislative Decree n° 230/1995 and with technical specifications and conditions which are part of the licence.

According to the Legislative Decree n° 230/1995, inspection duties to ascertain compliance with nuclear safety and radiation protection requirements in nuclear installations are assigned to Nuclear, Technological and Industrial Risk Department of ISPRA, which performs these duties by means of its inspectors.

Plant walk-down are also frequently performed by other Nuclear, Technological and Industrial Risk Department of ISPRA professionals with the purpose of achieving data, information and other technically relevant elements to be evaluated with respect to technical regulations. Inspection activities may be ordinary (planned in advance for each technical area) or extraordinary. Ordinary inspections are normally unannounced, with the exception of cases in which they are conducted in relation to specific operations and tests. Extraordinary inspections are conducted in case of abnormal events or incidents.

The system of controls provided for in the Italian rules is based upon the following pillars:

1. the analysis of the safety reports and other relevant documents, the analysis on the results of tests and measurements, the performance of additional or repeated tests;
2. the independent verification of the safety reports and other relevant documents, the analysis on the results of tests and measurements, the performance of additional tests;
3. the performance of periodic audits to the Applicant and to the Licensee for the purpose of verifying, inter alia, that Licensee maintains the capability in terms of staffing and competences adequate to completely undertake the activities during the lifetime of the facility from siting to decommissioning. Periodic audits to Architect Engineers, Vendors, Manufacturers, and Suppliers in general were also conceived as an indirect tool of control of the Applicant and of the Licensee activities;
4. the inspection system, in order to verify compliance with applicable rules and technical specifications, at all stages from design to operation of facilities as well as during the phases of decommissioning and during all stages of the management of the spent fuel and radioactive waste;
5. the sanction system, in case of non compliance, either with provisions of the Law or with conditions and technical specifications attached to the licence. The system envisages penal and administrative measures. The former can entail deprivation of freedom and fines; the latter consists in suspensions or, in worst cases, revocation of the licences. The penal sanctions are applied by Courts following trial proceedings initiated by reports from Nuclear, Technological and Industrial Risk Department of ISPRA inspectors. The administrative measures are applied by the Ministry of Economic Development. Before applying the administrative measures, the Ministry can issue an injunction to comply with applicable regulations and prescriptions.

The national legislation ensures that in case of lack of the licensee holder state administrations will take care of spent fuel and radioactive waste.

5.1 (e) Enforcement actions

Article 5.1

(e) enforcement actions, including the suspension of activities and the modification, expiration or revocation of a licence together with requirements, if appropriate, for alternative solutions that lead to improved safety;

Enforcement of applicable regulations and of licence conditions is ensured on the bases of the sanction system as established in Chapter V of Act n° 1860/1962 and in Chapter XI of Legislative Decree n° 230/1995. Nuclear, Technological and Industrial Risk Department of ISPRA 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, in case of non-compliance, are required to communicate the results of their inspections to the public attorney of the jurisdiction the nuclear installation belongs to. In case of non-compliance with the radiation protection rules for workers, inspectors have the power to apply a pecuniary sanction directly to the person in charge; the penal sanction is applied in case of non-compliance with the terms for payment.

In the exercise of their duties inspectors are judicial police officers. They have the authority to:

- access to the site and nuclear installations during construction, operation, and decommissioning;
- impose the operator to take actions deemed necessary in order to ensure safety and radiation protection of workers, public, and environment;
- give order, if any, to suspend activities on construction, operation, or decommissioning of nuclear installations which can put safety of workers and public in danger.

The purpose of such inspections is to verify the fulfilment of binding rules having legal relevance. In case of infringement of specific rules of the nuclear act and licence conditions, including technical specifications, Nuclear, Technological and Industrial Risk Department of ISPRA inspectors are entitled to report to the public attorney of the jurisdiction which the installation belongs to.

Legislative Decree n° 230/1995 establishes the procedure according to which the licence or the authorization can be suspended or revoked by the Minister of Economic Development in case of non-compliance with the requirements contained in the authorization, in the operating licence, or in case of deviations in the execution of approved projects.

5.1 (f) Allocation of responsibility

Article 5.1

(f) the allocation of responsibility to the bodies involved in the different steps of spent fuel and radioactive waste management; in particular, the national framework shall give primary responsibility for the spent fuel and radioactive waste to their generators or, under specific circumstances, to a licence holder to whom this responsibility has been entrusted by competent bodies;

According to the Act n° 1860/1962 and the Presidential Decree n° 519/1975, the primary responsibility for a safe management of SF and RW is assigned to the operating organisation. The principle of prime responsibility for safety of the license holder is also clearly stated in article 58-bis of Legislative Decree n° 230/1995 and subsequent amendments. The operating organisation is therefore fully responsible of all the activities performed during design, construction, commissioning and operation having direct influence on safety.

Furthermore, all the activities involving the management of the spent fuel and radioactive waste require an authorization.

The regulatory system in place also ensures that appropriate supervision activity is exploited to verify that the license holders meet their responsibility.

The main body involved in the SF and RW management is SO.G.I.N. which primary mission is the decommissioning of all Italian nuclear installations according to a single step strategy, as well as the safe management of the spent fuel and radioactive waste related to those installations.

The responsibilities assigned to SO.G.I.N. S.p.A. as implementer are in particular related to the following activities:

- Treatment and conditioning into certified form of all liquid and solid wastes, ready to be delivered to the national repository.
- Perform all the actions needed for managing spent fuel.
- Contribute to the decommissioning of all nuclear facilities owned by other licensees.
- Implement the single phase decommissioning strategy in all nuclear installations, reactors and fuel cycle facilities in a 20 years time frame, pending the realization in due time of the temporary and final repository of radioactive waste.

Responsibilities assigned by the law to the Ministry of Economic Development, to Nuclear, Technological and Industrial Risk Department of ISPRA and to other governmental bodies are described in other sections of the Report.

5.1 (g) Public information and participation

Article 5.1

(g) national requirements for public information and participation;

In the Italian legislation measures are implemented for providing information to the public. The provisions are directed to the right of the public to have access to documents and decisions, with their background, of public administrations; in addition specific provisions have been implemented also in the specific legislation in the nuclear field.

The principal legislation concerning the access to documents and decisions is Act n° 241 “*New rules concerning administrative procedure and right of access to administrative documents*”, issued in 1990.

As concerns the transparency requirements, the main regulation is the Legislative Decree n° 33/2013 “*Reorganisation of the rules concerning the obligations of publicity, transparency and dissemination of information by public authorities*”.

More specific for nuclear activities, Legislative Decree n° 230/1995 states that the competent regulatory authority takes the necessary actions to make available to the general public and workers information on the regulation of nuclear safety as well as spent fuel and radioactive waste and, with regard to the planned National Program for the management of spent fuel and radioactive waste, Legislative Decree n° 45/2014 requires that the Ministry for Environment and Land and Sea Protection and the Ministry of Economic Development provides the necessary opportunities for an effective participation by the public in the decision-making process. In addition, in relation to the construction and operation of the National Repository for radioactive waste, Legislative Decree 31/2010 requires SO.G.I.N. to promote widespread and capillary information campaigns and communication to the public.

In the frame of the procedure to identify the site of the National Repository legislative Decree n° 31/2010 states that, after the publication of the National Chart of Potentially Eligible Sites (CNAPI), the implementer has to promote a national debate, by organizing a national conference, in which the interest ministries, local authorities, the competent regulatory authority and other stakeholders, universities and research institutes are invited to take part. Interested parties are also invited to formulate observations and proposals. The outcome of this seminary contributes to the final revision of CNAPI to be submitted by the implementer to the involved Ministries for approval, following the final advice of the competent regulatory authority.

5.1 (h) Financing scheme(s)

Article 5.1

(h) the financing scheme(s) for spent fuel and radioactive waste management in accordance with Article 9.

Since 1962, by Act n° 1860/1962, Italian legislation required that the applicant for an authorization related to a nuclear installation must demonstrate adequate technical and financial capacity.

Legislative Decree n° 230/1995 set up specific requirements for the licence holder to provide adequate financial and human resources in order to properly discharge its responsibility for safety.

Have to be firstly noticed that all the Italian nuclear installation are public owned or financed and that most of installations are at present in decommissioning. In this context, the financial resources to fulfil the respect of the nuclear safety requirements are guaranteed by the State.

In this frame we have to highlight the specific situation of the JRC Ispra of the European Commission with which an agreement exists with Italian Republic for the application of the national regulatory system to the installations of the Centre, and of the Deposito Avogadro, that is the only Italian nuclear installation owned by a private company but operated under a service contract with SO.G.I.N. which is the owner of the stored spent fuel.

With regard to decommissioning activities, the Italian system defines a single implementer to which the property of all facility in decommissioning, except research reactors, was transferred. As previously said, the decommissioning of the nuclear installations is managed since 1999 by SO.G.I.N. S.p.A., which operates under strategic and operational guidelines provided by the Italian Government and whose single shareholder is the Ministry of Economy. A special fund allocation for financing all above activities is ensured by means of a specific levy on the price of the electricity defined by the Ministerial Decree on January 26, 2000, later modified by a new Ministerial Decree on April 17, 2001.

5.2 Improvement of National framework

Article 5

2. Member States shall ensure that the national framework is improved where appropriate, taking into account operating experience, insights gained from the decision-making process referred to in Article 4(3)(f), and the development of relevant technology and research.

As previously described, the current Italian legislative and regulatory framework, which is applicable to safe management of SF and RW, takes into account the Italian previous experience in licensing and operation of NPPs, of different types and generations, and other nuclear installations.

The source of legally binding rules of the Italian regulatory system is in the law.

Legislative Decree n° 230/1995, that is the main piece of legislation regulating the licensing process and laying down radiation protection requirements for workers and the public, defines the procedure for the issue of further decrees that are required for updating the conditions of applicability of the same decree, taking into account the technical developments and the directives and recommendations of the European Union. With such decrees rules for specific situations and activities are also identified in relation to the technical developments as well as to directives and recommendations of the European Union.

The national framework is also updated to reflect any change in the nuclear policy. As example, Legislative Decree n° 230/1995 was amended in the past to reflect the new decommissioning policy that includes also the SF and RW management by establishing specific provisions related to the licensing procedures for decommissioning. In order to underpin the national decommissioning policy, Legislative Decree n° 31/2010 was issued to regulate the siting, construction and operation of the National Repository for radioactive waste.

An IRRS mission (IAEA's Integrated Regulatory Review Team) is foreseen to be carried out in 2016 and ISPRA as competent regulatory authority is conducting a self assessment to develop its action plan.

Article 6 - Competent regulatory authority

6.1 Competent regulatory authority

Article 6

1. Member States shall establish and maintain a competent regulatory authority in the field of nuclear safety of spent fuel and radioactive waste management.

The key regulatory functions (rulemaking, licensing, assessment, inspection and enforcement) related to the nuclear safety and radiation protection matters, including also the safe management of spent fuel and radioactive waste, and decommissioning, are mainly exploited in Italy by the following bodies:

- the Minister of Economic Development is the authority which grants the licence/authorization for nuclear activities (from the design and construction to the decommissioning and waste disposal) and for major practices involving the use of ionising radiations. Authorizations are granted on the bases of the technical advice, to be considered binding, provided by Nuclear, Technological and Industrial Risk Department of ISPRA. For specified activities, in particular for decommissioning activities, also the advice of Ministries of Environment, Interior, Health, Labour and Social Policy and by the Region where the installation is located is required;
- Nuclear, Technological and Industrial Risk Department of ISPRA is entrusted with the role of competent regulatory authority responsible for the assessment and the inspection activities on nuclear installations, as well as for approving detailed designs or activities related to the construction of nuclear facilities, which are part of the general construction licence granted by the Minister of Economic Development. ISPRA as Governmental Institute operates under the aegis of the Minister for Environment and Land and Sea Protection. Any licence/authorization issued by the Minister of Economic Development is based on the technical advice and specifications formulated by Nuclear, Technological and Industrial Risk Department of ISPRA which supervises, throughout its inspection activity, the compliance with the requirements established in the authorization, issued as Ministerial Decree with attached conditions and technical specifications. Nuclear, Technological and Industrial Risk Department of ISPRA inspectors are entitled by the law with the proper authority to request licence holders any information deemed necessary to ascertain compliance with legal requirements and licence conditions. In case of infringements, inspectors report to the Public Attorney of the jurisdiction the installation belongs to and have the authority to establish specifications in order to interrupt any violations in place. Nuclear, Technological and Industrial Risk Department of ISPRA is also the competent body for giving support to the Governmental rule-making function in the field of nuclear safety and radiation protection and it is also entitled to issue Technical Guides.

Legislative Decree n° 45/2014 establishes a new competent regulatory authority in the field of nuclear safety and radiation protection, which is the National Inspectorate for Nuclear Safety and Radiation Protection (ISIN), fully dedicated to the regulation and control in the nuclear field. The enactment of further legislative provisions is required for the full and formal establishment of the new regulatory authority.

According to the same Decree, until the entry into force of ISIN, the functions of competent regulatory authority shall continue to be carried out by Nuclear, Technological and Industrial Risk Department of ISPRA.

6.2 Independence of the regulatory function

Article 6

2. Member States shall ensure that the competent regulatory authority is functionally separate from any other body or organisation concerned with the promotion or utilisation of nuclear energy or radioactive material, including electricity production and radioisotope application, or with the management of spent fuel and radioactive waste, in order to ensure effective independence from undue influence on its regulatory function.

Legislative Decree n° 45/2014, in the establishing of the new competent regulatory authority, states that ISIN has regulatory, managerial and administrative autonomy; it will be 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.

According to the same Decree, until the entry into force of ISIN, the functions of the competent regulatory authority shall continue to be carried out by the Nuclear, Technological and Industrial Risk Department of ISPRA.

ISPRA is a scientific institution, with legal personality under public law and with technical-scientific, organizational, financial, managerial and accounting independence.

ISPRA is subject to the supervision of the Minister for Environment and Land and Sea Protection, which gives general guidelines to which the Institute abides in the pursuit of its duties. In relation to its functions of competent regulatory authority in nuclear safety and radiation protection matters, the Nuclear, Technological and Industrial Risk Department of ISPRA is explicitly referred in the pertaining legislation to provide advice in the authorization process and in the preparation of implementation decrees, to establish conditions and technical specifications for the licence holders, to issue specific approvals, to perform supervision on nuclear installations and activities involving the use of ionizing radiation. Nuclear, Technological and Industrial Risk Department of ISPRA is also entitled to perform control activities on physical protection measures at nuclear installations and to support civil protection authorities in the field of emergency preparedness and response.

ISPRA, as public entity under the aegis of the Minister for Environment and Land and Sea Protection, is formally separated from other body or organization concerned with the promotion or utilization of nuclear energy, as well as radioactive waste and spent fuel management activities. The Institute's budget is funded primarily by the State.

As previously said, licences are granted by the Minister of Economic Development on the basis of the independent technical advice of Nuclear, Technological and Industrial Risk Department of ISPRA. Nuclear, Technological and Industrial Risk Department of ISPRA 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 Nuclear, Technological and Industrial Risk Department of ISPRA, which may establish technical specifications.

Nuclear, Technological and Industrial Risk Department of ISPRA is also entitled to issue Technical Guides on specific aspects related to the regulatory process.

6.3 Legal powers and resources of the competent regulatory authority

Article 6

3. Member States shall ensure that the competent regulatory authority is given the legal powers and human and financial resources necessary to fulfil its obligations in connection with the national framework described in Article 5(1) (b), (c), (d) and (e).

Both Nuclear, Technological and Industrial Risk Department of ISPRA and the upcoming new Inspectorate for Nuclear Safety and Radiation Protection are entitled by law to require the licence holder to comply with the national safety requirements and with the terms of the licence either in the licensing process or in the inspection activity. In particular, any safety demonstration to be provided by applicants or by licence holders is independently assessed in the licensing process. The nuclear safety competent authority establishes technical specifications or conditions in the frame of its advice to the Licensing authority for authorizations, as well as in its approvals related to specific nuclear safety relate projects or operations.

The national competent authority has the power, throughout its inspectors, to suspend operation or activities at the nuclear installations in case of any violation of licence conditions or technical specifications. Violations can also be reported by the nuclear safety competent authority to the licensing body which could entail a suspension or revocation of the licence.

The system of controls provided in the Italian rules is primarily based on:

- assessment of safety reports and other relevant documents, results of tests and measurements;
- inspections system, in order to verify compliance with applicable rules and licence conditions and specifications at all stages of the installation life, from construction to operation as well as during decommissioning and during all stages of spent fuel and radioactive waste management;
- periodic audits performed by Nuclear, Technological and Industrial Risk Department of ISPRA aimed to verify, inter alia, that the licence holder maintains the capability in terms of staffing and competences adequate to completely undertake safety related activities during the lifetime of the facility from siting to

- decommissioning. Periodic audits are also addressed to Architect Engineers, Vendors, Manufacturers, and Suppliers to verify on the licence holder surveillance activities on contractors; the licence holder organizational structure and management system for nuclear safety and radiation protection is approved by Nuclear, Technological and Industrial Risk Department of ISPRA as established by the in force legislation;
- sanctions system in case of violation of law provisions or licence conditions and specifications, which implies penal and administrative measures. The former can entail deprivation of freedom and fines; the latter consists in suspensions or revocation of the licence in worst cases. The penal sanctions are applied by Courts following reports from Inspectors. The administrative measures are applied by the Minister of Economic Development.

The regulatory authority functions in ISPRA are carried out by the Nuclear, Technological and Industrial Risk Department to which the Institute assigns human and financial resources.

Concerning the upcoming new regulatory authority, the establishment of ISIN, as required by the Legislative Decree n° 45/2014 referred under the Article 9, will be largely based on a targeted reorganization of the ISPRA's Nuclear, Technological and Industrial Risk Department. At present ISPRA is funded through the State budget. When the new Inspectorate (ISIN) financial resources will consist of the resources currently allocated to the Nuclear, Technological and Industrial Risk Department of ISPRA, and resources coming from the fees that ISIN is authorized to apply and collect from the licence holders for the exploitation of its regulatory functions. The value of the fee is to be determined on the basis of the costs actually incurred in the performance of the related services.

In the above mentioned reorganization process of the competent authority a specific attention is expected be given on the recruitment of new personnel, in particular to cope with the already occurred and expected professionals retirement and the increased regulatory activities at national level on spent fuel and radioactive waste management and on decommissioning, including siting and construction of a National Repository, as well as on nuclear safety related activities required by a new regional and international context followed to the Fukushima accident and in order to strengthening the regulatory control on radiation sources.

Article 7 – Licence Holders

7.1 Responsibility of the licence holder

Article 7

1. Member States shall ensure that the prime responsibility for the safety of spent fuel and radioactive waste management facilities and/or activities rest with the licence holder. That responsibility cannot be delegated.

According to the Act n° 1860/1962 and the Presidential Decree n° 519/1975, the primary responsibility for a safe management of SF and RW is assigned to the operating organisation. The principle that the prime responsibility for safe management of SF and RW is of the license holder is also clearly stated in article 58-*bis* of Legislative Decree n° 230/1995 and subsequent amendments.

The article clearly states that:

- the holder of an authorization must be in possession of technical and professional skills required by current regulations, especially with regard to nuclear safety;
- the holder of an authorization has the prime responsibility for the safety of nuclear installations and facilities management of spent fuel and radioactive waste;
- the responsibility cannot be delegated.

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

Furthermore, all the activities involving the management of the spent fuel and radioactive waste require an authorization. The regulatory system in place also ensures that appropriate supervision activity is exploited by Nuclear, Technological and Industrial Risk Department of ISPRA to verify that the licensee holder properly meets its responsibility.

7.2 Systematic assessment of the nuclear safety of the nuclear installations

Article 7

2. Member States shall ensure that the national framework in place require licence holders, under the regulatory control of the competent regulatory authority, to regularly assess, verify and continuously improve, as far as is reasonably achievable, the safety of the radioactive waste and spent fuel management facility or activity in a systematic and verifiable manner. This shall be achieved through an appropriate safety assessment, other arguments and evidence.

Legislative Decree n° 230/1995 and subsequent amendments requires that licence holders regularly assess and verify the nuclear safety of existing installations.

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. In addition to that, special attention is devoted by the regulatory authority to verify that the licence holder performs in due time waste conditioning, final spent fuel management and dismantling activities relevant to improve safety, perform any activity in compliance with safety and radiation protection requirements and produces adequately conditioned radioactive wastes.

A systematic review of the plant status, also with regard to SF and RW, is requested to be provided in the application for the decommissioning licence. Once the decommissioning licence is granted, attached conditions and specifications require that 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 Nuclear, Technological and Industrial Risk Department of ISPRA 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 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 Nuclear, Technological and Industrial Risk Department of ISPRA 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 Nuclear, Technological and Industrial Risk Department of ISPRA.

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.

7.3 Prevention and mitigation of consequences of accidents

Article 7

3. *As part of the licensing of a facility or activity the safety demonstration shall cover the development and operation of an activity and the development, operation and decommissioning of a facility or closure of a disposal facility as well as the post- closure phase of a disposal facility. The extent of the safety demonstration shall be commensurate with the complexity of the operation and the magnitude of the hazards associated with the radioactive waste and spent fuel, and the facility or activity.*

The licensing process shall contribute to safety in the facility or activity during normal operating conditions, anticipated operational occurrences and design basis accidents It shall provide the required assurance of safety in the facility or activity. Measures shall be in place to prevent accidents and mitigate the consequences of accidents, including verification of physical barriers and the licence holder’s administrative protection procedures that would have to fail before workers and the general public would be significantly affected by ionising radiation. That approach shall identify and reduce uncertainties.

In relation to the construction of nuclear installations, but also for major modifications, legislative provisions (i.e. Legislative Decree n° 230/1995, Chapter VII) establishes that applications for authorization have to contain a safety analysis report where all measures to ensure nuclear safety and radiation protection are described. A specific assessment is performed by Nuclear, Technological and Industrial Risk Department of ISPRA which provides its advice to the Ministry of Economic Development acting as licensing authority.

Also the licensing procedure for decommissioning requires the presentation of a specific safety analysis of the involved operations which is assessed by Nuclear, Technological and Industrial Risk Department of ISPRA and also by other involved administrations before the licence is granted.

During the assessment of the safety analysis Nuclear, Technological and Industrial Risk Department of ISPRA takes particularly into account all the characteristic parameters related to the SF and RW, performing also specific independent analysis.

Emergency planning at nuclear installations is regulated in Italy by the provisions reported in Articles 115 to 135 of the Legislative Decree n° 230/1995 and subsequent amendments. In addition, the general legislation governing emergency preparedness and response provisions in all cases of accidental events and disasters, as reported in the Act n° 225/1992 and subsequent amendments, is applicable.

Technical specifications attached to the licence regulate the performance of periodic emergency drills. As a normal practice these drills are also attended by representatives of the regulatory authority.

As far as off-site emergency preparedness response concerns its organization differs depending on extension and type of the consequences of the postulated events (namely events which could affect a local area or a larger part of the national territory).

If the potential consequences of postulated reference events result to be manageable at local level, the off-site emergency plan is prepared under the authority of the Prefect of the province where the installation is located, as stated in Articles 118, 119 and 120 of the Legislative Decree n° 230/1995. According to Article 117 of the same legislative decree, the technical basis for the plan are established by the Licensee and revised by the regulatory authority. The plan is prepared taking into account the provisions reported in the Act n° 225/1992.

At present, all nuclear installations have in place an off-site emergency plan. An updating of the emergency plan is performed following the authorization of the decommissioning plan, and in any case, following the removal of spent fuel from the site based upon a re-evaluation of the technical bases.

The Legislative Decree n° 45/2014 modified the previous Legislative Decree n° 31/2010 with introducing a specific article in which is defined the procedure for the closure of a plant for the disposal of RW.

7.4 Management systems which give due priority to nuclear safety

Article 7

4. Member States shall ensure that the national framework require licence holders to establish and implement integrated management systems, including quality assurance, which give due priority to safety and are regularly verified by the competent regulatory authority.

The principle of priority to safety is clearly addressed in the Legislative Decree n° 185/2011, with which Council Directive 2009/71/EURATOM on nuclear safety has been transposed into national legislation.

On the implementation side, the principle of priority to safety is addressed by requirements on: Quality Assurance, Operating Organisation rules and authorization conditions. Moreover, in the above frames, the licence holders are required to issue appropriate documents on their policies on quality, environment and safety, establishing due priority to such topics.

The legislative framework and the Italian regulatory practice, that have been long in use even before the publication of IAEA Safety Fundamentals, stimulate licence holder to be committed to reach and maintain an high level of safety by implementing a proper management system.

This is achieved by means of several regulatory tools which require licence holder to provide a continuous demonstration of the safety level of the installation (developing and updating of Safety Analysis Reports, safety assessment in detailed design reports, periodic safety review, periodic assessment and reporting of performances, inspections).

Today, the current implementation of the “priority to safety” principle for the Italian nuclear installations mainly regards their safe management and activities associated to decommissioning and spent fuel and radioactive waste management. In particular, it attains to modifications of still existing safety related systems, construction of new systems and facilities for proper radioactive waste management, and performance of decommissioning activities where needed.

In the Italian nuclear installations, even those in decommissioning, legislation requires that a document named “Regolamento di esercizio” (“Regulation for operations”), in which the organization structure, with associated duties, for the management of the installation is defined, with regard to both normal and accident conditions. Such a document has to be approved by Nuclear, Technological and Industrial Risk Department of ISPRA.

Some key positions in the licence holder organization, defined in “Regulation for operations”, have to be covered by licensed personnel. Safety culture and priority to safety attitudes are addressed during examinations to licence plant personnel. The examinations are conducted by a commission established by ISPRA and made by members of other administration and ISPRA itself.

The licence holder is required by law to set up a special plant Council of Delegates at each nuclear installation site, which has the responsibility to assess any decisions (e.g.: plant hardware or procedures modifications) relevant to safety conditions. The composition of the Council of Delegates, made up mainly by plant personnel involved in key function relevant to safety, is required by law to be approved by Nuclear, Technological and Industrial Risk Department of ISPRA.

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 in the middle of 70’s and at the beginning of 80’s, in the frame of a more general programme of development of technical

guides to support the regulation of installations of the national nuclear programme. Technical guides are normally used as key references regulatory tools during the Licensing process. They do not have a mandatory character but, in case of non compliance, the licensee is requested to demonstrate that the safety case fulfil alternative equivalent requirements. 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.

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 n° 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 n° 1, submitted to support the authorization.

With reference to the current implementation level, it is to be mentioned that the QA system of SO.G.I.N. S.p.A., as the main national licensee involved in the management of spent fuel and radioactive waste, is documented through two 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 Q.A. safety requirements, the process put in place in Italy is a development process similar to the other safety requirements.

In addition to the issuing of the above listed Technical Guides, the regulatory control during the licensing process is based on the analysis and review of QA Programmes submitted by the Applicant to Nuclear, Technological and Industrial Risk Department of ISPRA for approval.

An additional primary tool of Regulatory Control is the possibility to perform periodic audits to the Applicant and to the Licensee.

7.5 Financial and human resources

Article 7

5. Member States Member States shall ensure that the national framework require licence holders to provide for and maintain adequate financial and human resources to fulfil their obligations with respect to the safety of spent fuel and radioactive waste management as laid down in paragraphs 1 to 4.

Since 1962, by Act n° 1860/1962, Italian legislation required that the applicant for an authorization related to a nuclear installation must demonstrate adequate technical and financial capacity.

Legislative Decree n° 230/1995 set up specific requirements for the licence holder to provide adequate financial and human resources in order to properly discharge its responsibility for safety.

Have to be firstly noticed that all the Italian nuclear installation are public owned or financed and that most of installations are at present in decommissioning. In this context, the financial resources to fulfil the respect of the nuclear safety requirements are guaranteed by the State.

In this frame we have to highlight the specific situation of the JRC Ispra of the European Commission with which an agreement exists with Italian Republic for the application of the national regulatory system to the installations of the Centre, and of the Deposito Avogadro, that is the only Italian nuclear installation owned by a private company but operated under a service contract with SO.G.I.N. which is the owner of the stored spent fuel.

With regard to decommissioning activities, the Italian system defines a single implementer to which the property of all facility in decommissioning, except research reactors, was transferred. As previously said, the decommissioning of the

nuclear installations is managed since 1999 by SO.G.I.N. S.p.A., which operates under strategic and operational guidelines provided by the Italian Government and whose single shareholder is the Ministry of Economy. A special fund allocation for financing all above activities is ensured by means of a specific levy on the price of the electricity defined by the Ministerial Decree on January 26, 2000, later modified by a new Ministerial Decree on April 17, 2001.

The funds are transferred to SO.G.I.N. which has been also charged to perform plans and cost estimations. The cost estimation is done according to a best estimate approach. It however includes a contingency depending on the specific activity and on the time of expenditure, together with the management costs.

The same decree quoted above states that every year SO.G.I.N. has to submit to the National Authority for the Electricity and Gas an updated report on technical and economic plan of the global decommissioning project. The yearly reports have also to contain an update of the decommissioning plan and cost estimate. The levy on the price of electricity, paid from the final users, is adjusted regularly on the basis of the contents of the yearly reports. In this way, possible additional costs, due to changes of strategies and activities needed for safety reasons, require to be endorsed by the Italian Regulatory Authority for Electricity, Gas and Water. Efficiency criteria related to the program management and to the progress of activities are taken into account in performing such adjustments.

In relation to the licence holder adequacy of human resources, it can be highlighted that a specific verification is performed in the licensing process for the approval of "Regolamento di esercizio" ("Regulation for operations") in which the rules governing the organization and the roles of the technical and operating staff to ensure a safe management of the facility, both during ordinary and emergency conditions, are stated. Implementation is verified during inspection activities.

SO.G.I.N. recently started a recruitment program of young professionals to compensate the ongoing process of retirement of senior staff at several nuclear installations.

Article 8: Expertise and skills

Article 8

Member States shall ensure that the national framework require all parties to make arrangements for education and training for their staff, as well as research and development activities to cover the needs of the national programme for spent fuel and radioactive waste management in order to obtain, maintain and to further develop necessary expertise and skills.

Act n° 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 n° 230/1995 set up specific requirements for the licence holder to maintain and enhance the experience and expertise of its staff that 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. These requirements are also applicable to radioactive waste and spent fuel management facilities which are operated under the licensing conditions of the main nuclear installation they belong to. Additionally, staff qualification for the performance of any safety-related activity is among the relevant aspects assessed during the licensing process.

According to the specific company policy, SO.G.I.N. has created in Caorso a dedicated School where SO.G.I.N. personnel and operators of qualified companies, selected to work in the decommissioning activities, are trained.

In order to promote qualification and quality, SO.G.I.N. has enhanced its own organization creating, within the Division for Waste Management and Decommissioning, new Units: one dedicated on radioprotection of working people and population, one to investigations on new technologies and one related to Safety & Management System.

For the new regulatory authority, there is a specific legislative provision to which the competent 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 9: Financial resources

Article 9

Member States shall ensure that the national framework require that adequate financial resources be available when needed for the implementation of national programmes referred to in Article 11, especially for the management of spent fuel and radioactive waste, taking due account of the responsibility of spent fuel and radioactive waste generators.

The current Italian decommissioning programme foresees a single step strategy until the unconditional release of the sites. In order to finance the decommissioning cost, the Ministry of Productive Activities (now Ministry of Economic Development) issued the Decree of 26th January 2000, which established the related instrument with a levy on the price of the electricity.

The funds are transferred yearly to SO.G.I.N. which is responsible for performing decommissioning and waste treatment activities for all Italian nuclear installations. For this purpose, SO.G.I.N. has been also charged to prepare dismantling plans and cost estimations.

The cost estimation is done as a best estimate. However, it includes a contingency depending on the specific activity and on the time of expenditure, together with the management costs.

The same decree quoted above states that every year SO.G.I.N. has to submit to the National Authority for Electricity Gas and Water (AEEGSI) previously, up to December 2013, National Authority for the Electricity and Gas, a report containing an update of the decommissioning plan, together with SF and RW management, and cost estimate. The levy on the price of electricity, paid from the final users, is adjusted regularly on the basis of the contents of the yearly reports. In this way, possible additional costs, due to changes of strategies and the activities needed for safety reasons, need to be endorsed by AEEGSI. Efficiency criteria related to the program management and to the progress of activities are taken into account in performing such adjustments.

The following activities were taken into account in the overall costs evaluation:

- on-site storage of fuel;
- spent fuel reprocessing;
- decontamination for conditional, unconditional recycle, re-use or release;
- selection of appropriate treatment and conditioning technologies for volume reduction of radioactive waste materials;
- packaging of historic/operational waste, e.g. sludge, ion-exchange resins;
- dismantling of reactor/fuel cycle facility building;
- dismantling of conventional plant buildings, e.g. turbine hall;
- disposal of radioactive waste;
- disposal or recycling of non-radioactive waste material;
- final site surveys and release without radiological constrains (de-licensing)

It has to be underlined that the operators are also liable for the cost of managing any radioactivity discovered after the de-licensing process has been completed if they continue to be the owners of the site.

As already said, the regulatory authority functions in ISPRA are carried out by the Nuclear, Technological and Industrial Risk Department to which the Institute assigns human and financial resources.

Concerning the upcoming new regulatory authority, the establishment of ISIN, as required by the Legislative Decree n° 45/2014 referred under the Article 9, will be largely based on a targeted reorganization of the ISPRA's Nuclear, Technological and Industrial Risk Department. At present ISPRA is mainly funded through the State budget. The financial resources for ISIN ordinary activities will consist of the resources currently allocated to the Nuclear, Technological and Industrial Risk Department of ISPRA, and resources arising from the fees that the ISIN is authorized to apply and collect by the licence holders for the exploitation of its regulatory functions. The value of the fee is to be determined on the basis of the costs actually incurred in the performance of the related services.

Particular attention will be given on the recruitment of new personnel, also to cope with the personnel retirements and the expected increase of regulatory activity at national level on spent fuel and radioactive waste management and on decommissioning, including siting and construction of a National Repository, as well as on nuclear safety related

activities required by a new regional and international context followed to the Fukushima accident and in order to strengthening the regulatory control on radiation sources.

Costs for appropriate institutional controls and monitoring arrangements to be continued for the period deemed necessary following the closure of a disposal facility have not been evaluated yet.

Article 10: Transparency

Article 10

1. *Member States shall ensure that necessary information on the management of spent fuel and radioactive waste be made available to workers and the general public. This obligation includes ensuring that the competent regulatory authority inform the public in the fields of its competence. Information shall be made available to the public in accordance with national legislation and international obligations, provided that this does not jeopardise other interests such as, inter alia, security, recognised in national legislation or international obligations.*
 2. *Member States shall ensure that the public be given the necessary opportunities to participate effectively in the decision- making process regarding spent fuel and radioactive waste management in accordance with national legislation and international obligations.*
-

Information is made available to the public in accordance with Italian legislation and in compliance with international obligations.

Act n° 241, issued in 1990 on Transparency of Public Administration, recognises, in general, the right of the public to have access to documents, decisions and to their background.

The transparency requirements concerning the organization and activities of the Public Administrations are regulated by the Legislative Decree n° 33/2013 on the “Reorganization of the rules concerning the obligations of publicity, transparency and dissemination of information by public authorities”, which rules the obligations of publicity, transparency and dissemination of information by public authorities in order to guaranty the accessibility of information and the right to open government at the service of the citizen. Among the general principles, the decree seeks to ensure the quality of data and information, the constant updating, completeness, timeliness, ease of consultation, comprehensiveness, consistency, easy accessibility, the conformity to original documents in the possession of the administration, indicating their origin and reusability.

More specific for nuclear activities, Legislative Decree n° 230/1995 states that the competent regulatory authority takes the necessary actions to make available to the general public and workers information on the regulation of nuclear safety as well as spent fuel and radioactive waste and provides to publish on its website the results of its performed regulatory activity and all useful information in its fields of competence. The above mentioned article also states that information is made available with the exception of classified ones, having in particular relevance for security.

The Nuclear, Technological and Industrial Risk Department of ISPRA makes use of a dedicated section of ISPRA website to provide information on its activities. Information on relevant licensing and supervision activities, as well as reports on international Conventions, is posted on the web site. It is in particular done for Technical Guides, as it has been recently the case of the Technical Guide on siting criteria of a near surface disposal facility for low and intermediate radioactive waste.

It has to be mentioned that the same Legislative Decree n° 230/1995 and the authorization decrees for decommissioning establish specific requirements for the licence holder to regularly provide information on safety related matters to workers and public.

In addition, it is the case to mention that information is regularly provided to stakeholders by the licence holder and the regulatory authority in the context of periodic public meetings (Transparency Tables) organized by the Administrations of the regions concerned.

As far as other administrations it has to be mentioned that the Minister for Environment and Land and Sea Protection has developed a dedicated portal on Environmental Impact Assessments, also available in English, which provides information relating to Environmental Impact Assessment procedures under state jurisdiction related to the activities of decommissioning of nuclear installations and radioactive waste treatment.

Ministry of Economic Development regularly publishes on its web site relevant authorization decrees, with associated conditions and specifications, in particular those related to decommissioning licence.

Arrangements to provide information in emergency situations are defined in a specific section of off-site Emergency plans issued by local protection authorities. The Civil Protection Department has a specific section of its web site dedicated to nuclear and radiological emergencies.

In addition, in relation to the construction and operation of the National Repository for radioactive waste Legislative Decree n° 31/2010 requires SO.G.I.N. to promote widespread and capillary information campaigns and communication to the public.

In relation to opportunities of public participation it is also the case to mention that, with regard to the National Programme for the management of spent fuel and radioactive waste, Legislative Decree n° 45/2014 requires that the Ministry for Environment and Land and Sea Protection and the Ministry of Economic Development provide the necessary opportunities for an effective participation by the public in the decision-making process concerning the management of spent nuclear fuel and radioactive waste through the publication on their institutional web sites of the proposed National Programme. As the National Programme will be reviewed through the strategic environmental assessment process, public participation will be also ensured according to the Legislative Decree n° 152/2006, implementing the Council Directive 2001/42/EC.

Article 11: National programme

11.1 Implementation of the national programme

Article 11

1. Each Member States shall ensure the implementation of its national programme for the management of spent fuel and radioactive waste ('national programme'), covering all types of spent fuel and radioactive waste under its jurisdiction and all stages of spent fuel and radioactive waste management from generation to disposal.
-

The draft of proposal of the Italian national programme for the safety of spent fuel and radioactive waste management has been discussed by the Ministry of Economic Development and the Ministry for Environment and Land and Sea Protection and its approval procedure as described in point 5.1 (a) will include the Strategic Environmental Assessment under Council Directive 2001/42/EC.

The national policy as indicated in the National Programme is based on the general principles set out in Article 4 of Council Directive 2011/70/EURATOM. In particular it is based on the principle of protection of population and the environment from the effects of ionizing radiation and on the principle to avoid undue burden to next generations.

The general objectives of the national policy are the following:

1. fulfil decommissioning activities finalized to the unconditional release of the nuclear sites (green field) and treat and condition all liquid and solid radioactive waste present in the nuclear sites where they will be interim stored waiting to be transferred to the National Repository;
2. complete transfer abroad of NPPs spent fuel still present in Italy for reprocessing, in accordance with specific government agreements. At the end of the reprocessing the resulting radioactive waste will be returned to Italy according to the stipulated agreements. For the limited amount of spent fuel present in installations other than NPPS, a dry storage strategy is currently envisaged;
3. update annually the national inventories of spent fuel and radioactive waste;
4. safe disposal of the radioactive waste generated in Italy, as a priority in the national territory as required by Council Directive 2011/70/EURATOM;
5. site, build and operate the National Repository for radioactive waste generated in the national territory, from industrial, research and medical activities and from the previous management of nuclear installations coming from civilian activities; the National Repository will be part of a Technological Park with a centre of studies and research as specifically required by Legislative Decree n. 31/2010 and will be composed of a near surface disposal facility and an interim storage facility;
6. dispose off low and intermediate level radioactive waste, coming from civilian activities, in the near surface disposal facility which will be part of the National Repository;
7. store high level radioactive waste as well as intermediate level waste (not suitable to be disposed off in the near surface disposal facility) and spent fuel, coming from civilian activities, in the interim storage facility of the National Repository. As it is broadly accepted that the disposal of high level radioactive waste and spent fuel will be into geological formations, Italy will support and promote any research activity for a regional solution, which appear more appropriate for the national case, also from economic perspective, considering the limited amount of high level radioactive waste (including spent fuel) to be disposed off;
8. fulfil obligations established in the agreement between Italy and the EURATOM on the management of radioactive waste present in the JRC Ispra site;
9. implement a research program for the spent fuel and radioactive waste management in accordance with the content of the National Programme;
10. adopt a transparent approach based upon an objective and accurate information and an effective participation by the public in decision making process concerning the management of spent fuel and radioactive waste.

In relation to the above objectives of the National Programme the following steps related to their implementation can be highlighted:

- a. enactment of decree of August 7, 2015 on a new classification of radioactive waste;
- b. several projects are in progress in relation to treatment and conditioning of waste; in particular cementation projects to condition the liquid waste originated by the reprocessing activities at EUREX and ITREC facilities have been licensed and construction activities have been started;

- c. many decommissioning operations are in progress in the nuclear installations. In the period 2012-2014 the decommissioning licence has been issued for Garigliano, Caorso, Trino NPPs while licensing process for Latina NPP is in the final stage. For other installations, preliminary decommissioning activities are conducted on the basis of specific authorizations granted case by case as established in the legislation;
- d. transfer abroad of spent fuel for reprocessing is almost completed. A small amount is still present at Avogadro storage facility and its transfer abroad is expected to be completed in 2016; an example of the implementation of dry storage strategy, dedicated facilities are envisaged in the JRC Ispra and in the ITREC facility which are currently at different stages of realization;
- e. one of the most significant milestones, especially in the period from 2015 to 2018, refers to the procedure that will lead to the siting and construction of the National Repository and the connected Technology Park; the proposal of a national chart of potentially eligible sites has been prepared and it will be published following an authorization from involved Ministries; following this publication a national debate will start;
- f. the national inventory of radioactive waste is updated on an yearly base by ISPRA – Nuclear, Technological and Industrial Risk Department.

11.2 Review and update of the national programme

Article 11

2. Each Member State shall regularly review and update its national programme, taking into account technical and scientific progress as appropriate as well as recommendations, lessons learned and good practices from peer reviews.

Legislative Decree n° 45/2014 states that the National Programme is reviewed by the Ministry of Economic Development and the Ministry for Environment and Land and Sea Protection, after consulting the Competent Regulatory Authority, every three years, taking into account the scientific and technical progress, as well as recommendations, best practices and lessons learned from international peer reviews. Following this evaluation, if the circumstances so require, the National Programme is updated with a new decree in accordance with the same procedure used for the first issue.

Article 12: Structure of the national programme

12.1 Implementation of the national policies for the responsible and safe management of SF and RW.

Article 12

1. The national programmes shall set out how the Member States intend to implement their national policies referred to in Article 4 for the responsible and safe management of spent fuel and radioactive waste to secure the aims of this Directive, and shall include all of the following:

....

(c) an inventory of all spent fuel and radioactive waste and estimates for future quantities, including those from decommissioning, clearly indicating the location and amount of the radioactive waste and spent fuel in accordance with appropriate classification of the radioactive waste

....

2. The national programme together with the national policy may be contained in a single document or in a number of documents.

Current Inventories

Spent Fuel Inventory

Total inventory of the spent fuel stored in pool in Italy on December 31st, 2013 amounts to a total of about 30 tHM, as detailed in Table 12.1

Table 12.1 - Total inventory of the spent fuel stored in Italy (December 2013)			
Facility	Fuel Type	N° of fuel elements	Mass (tHM)
AVOGADRO AFR Facility	PWR - TRINO UO2	1	0,31
	BWR-GARIGLIANO MOX	63	12,88
TRINO	PWR - TRINO UO2	39	12,05
	PWR - TRINO MOX	8	2,46
ITREC	ELK RIVER U-Th	64	1,68
OPEC-1		580 (*)	0,12
JRC Ispra		-	0,658
TRIGA Mark II		9(**)	0,0017
TRIGA RC-1		12(**)	0,0023
TOTAL		-	30,162

(*) – N° of rods, some partially dismantled

(**) – Irradiated fuel in dry pit or still cooling in tank inside reactor waiting to be returned to the country of origin.

Spent fuel already sent abroad for reprocessing

Since the beginning of nuclear activities, Italy has pursued the reprocessing option using foreign reprocessing facilities. In this connection “service agreements” contracts were stipulated by ENEL.

After the political decision to stop all nuclear power activities, no new reprocessing agreements were established.

Before 1978, 963,2 tHM has been sent to UK for reprocessing without returning of residues to Italy.

After 1978 and until 2005, some 716 tHM have been sent to UK for reprocessing where the return to Italy of radioactive waste resulting from reprocessing is envisaged.

As already mentioned, in April 2007 SO.G.I.N. signed a contract with AREVA for reprocessing of the spent fuel still present in Italy (about 235 tHM), with the only exception of the Elk River spent fuel present in the ITREC facility. In June 2010 the shipments of 190,4 tHM of spent fuel from Caorso NPP was completed.

Transfer of the spent fuel stored in the Avogadro AFR storage pool and in the Trino NPP should be completed by 2016.

Table 12.2 presents the situation at December 2013 of the spent fuel sent abroad for reprocessing after 1978.

Table 12.2

Reprocessing country		Contractual Quantity	Delivered	Reprocessed	To be reprocessed
		tHM	tHM	tHM	tHM
UK	ENEL	716,197	716,197	716,197	0
	CNEN	0,059	0,059	0	0,059
F		234,960	207,266	190,427	16,839

As far as radioactive waste returning in Italy from reprocessing is concerned, table 12.3 presents the situation of the amount already produced and stored in UK and France with respect to the total amount that will be returned to Italy.

Table 12.3

Reprocessing country	Radioactive waste	RW stored abroad at December 2013	Total amount of RW to be returned
		Volume (m ³)	Volume (m ³)
UK	Vitrified waste (HLW)	18,7	18,7(*)
F	Vitrified waste (HLW)	11,4	19,4
	Compacted waste (ILW)	32,8	53,4

Radioactive waste inventories

The overall national inventory of the radioactive waste, spent sealed sources and spent fuel presently stored in the Italian Nuclear Installations in Italy is continuously updated by Nuclear, Technological and Industrial Risk Department of ISPRA. The Data Base is able to present the data in terms of volumes, mass, activity and physical status.

The inventory of the radioactive waste currently stored in Italy is, presented in Table 12.4 on December 31, 2013,

Figure 12.1 shows contribution from different sources of radioactive waste.

Figure 12.1 – Sources of radioactive waste in Italy (2013)

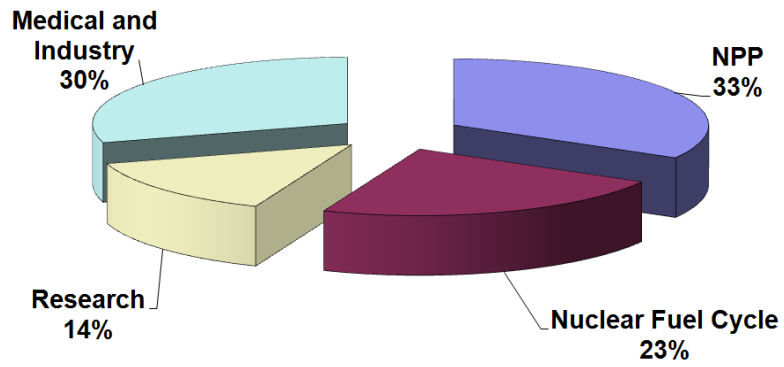


Table 12.5 presents the expected conditioned waste volumes from the current RW inventory and from the decommissioning of the nuclear installations, by category and different time horizons. It also includes waste to be returned from reprocessing.

Table 12.4 – Radioactive waste stored at the nuclear installations at December 2013. Data for Non Conditioned waste are presented, under brackets an estimation of the final volume (m³) of conditioned waste is given.

Type of Facility		VLLW ¹		LLW		ILW		HLW ²		TOTAL
		C	NC	C	NC	C	NC	C	NC	
Caorso	NPP		18.2	558	1906 (1342)					2482
Garigliano NPP	NPP			1695	1520 (1125)					3215
Latina NPP	NPP		421	294	926 (1676)		13 (860)			1653
Trino NPP	NPP			824	366 (876)		62 (130)			1252
EUREX	Reprocessing		1156	186	1163 (2554)	25	317 (1965)			2847
ITREC	Reprocessing		285	1116	1775 (1434)		64 (370)			3240
OPEC 1	Fuel Cycle research				2 (7)		7 (7)			9
IPU	Fuel Cycle research						110 (273)			110
Bosco Marengo	LEU fabrication			255	155 (155)					410
Avogadro	SF wet storage				77 (340)					77
NUCLECO	RW Management		415	590	5590 (5203)		12 (235)			6607
JRC Ispra	Research Centre		562		2347 (7700)	705	304 (945)			3918
Campoverde	Medical/industrial		295		403 (980)					698
Cemerad	Medical/industrial		1026		94 (230)		20 (25)			1140
Protex	Medical/industrial		949		200 (530)					1149
SORIN	Medical/industrial		184		672 (860)					856
CESNEF	Research reactor				10 (10)					10
LENA	Research reactor				4 (5)					4
TOTAL			5311	5518	17210 (25027)	730	909 (4810)			29677

1. For VLLW, waiting for the new classification, the volumes of the 1st Category GT26 are indicated.
2. There are not HLW presently stored in Italy. Only HLW coming from reprocessing of spent fuel abroad is foreseen.

Table 12.5 – Expected waste volumes (m³) from the current inventory and from decommissioning.

YEAR	VLLW	LLW	ILW	HLW
2020	10 036	38 087	5 911	
2030	17 870	48 927	11 463	38,1
2040	22 467	54 579	13 713	38,1

The next Table 12.6 presents the previous RW classification according TG 26, meanwhile the next tables 12.7 and 12.8 present the new system of classification as defined in Ministerial Decree August 7, 2015, and the correlation between the new classification and previous ISPRA TG 26.

Table 12.6 – Old radioactive waste classification
(as provided in the ISPRA TG n.26)

Category I:	Wastes which decay in a few months to radioactivity level below safety concerns (disposal performed according to toxic waste regulations)
Category II:	Wastes which decay to radioactivity level of about 370 Bq/g within few centuries. Activity of several radionuclides shall not exceed given values. (near surface disposal)
Category III:	Long lived wastes; high level wastes from reprocessing of spent fuel and alpha bearing wastes from the fuel cycle and R&D activities. (geological disposal)

Table 12.7 – Final destination of the different waste categories according to the new classification (not including waste containing radionuclides of natural origin)

Category	Conditions and/or Activity concentrations		Final destination
Exempt waste (EW)	<ul style="list-style-type: none"> Art. 154 Section 2, n° 230/1995 Art. 30 or Article 154, paragraph 3-<i>bis</i>, of Legislative Decree n° 230/1995 		Compliance with the provisions of the Legislative Decree n° 152/2006
Very short lived waste (VSLW)	<ul style="list-style-type: none"> $T_{1/2} < 100$ days Reaching the following conditions in 5 years: <ul style="list-style-type: none"> Art. 154 paragraph 2 of Legislative Decree n° 230/1995 Art. 30 or Art. 154 paragraph 3-<i>bis</i> of Legislative Decree n° 230/1995 		Temporary storage (art. 33 Legislative Decree n° 230/1995) and disposal in compliance with the provisions of the Legislative Decree n° 152/2006
Very low level waste (VLLW)	<ul style="list-style-type: none"> ≤ 100 Bq/g (with alpha contribute ≤ 10 Bq/g) 	Achievement in $T \leq 10$ years of the condition: <ul style="list-style-type: none"> Art. 30 or Art. 154 paragraph 3-<i>bis</i> of Legislative Decree n° 230/1995 Not achievement in $T \leq 10$ years of the condition: <ul style="list-style-type: none"> Art. 30 or Art. 154 paragraph 3-<i>bis</i> of Legislative Decree n° 230/1995 	
Low Level Waste (LLW)	<ul style="list-style-type: none"> short-lived radionuclides ≤ 5 MBq/g ^{59}Ni-$^{63}\text{Ni} \leq 40$ kBq/g long- lived radionuclides ≤ 400 Bq/g 		Surface, or small depth, disposal facilities with engineered barriers (National Repository according to Legislative Decree n° 31/2010)
Intermediate Level Waste (ILW)	<ul style="list-style-type: none"> short- lived radionuclides > 5 MBq/g ^{59}Ni-$^{63}\text{Ni} > 40$ kBq/g Long- lived radionuclides > 400 Bq/g No heat production 	Alpha-emitting radionuclides ≤ 400 Bq/g and beta-gamma emitters in concentrations which meet the radiation protection objectives established for the surface disposal facility. Radionuclides in concentrations which do not comply with the radiation protection objectives established by the surface disposal facility.	
High Level Waste (HLW)	Heat production or high concentrations of long-lived radionuclides, or both such characteristics.		Temporary storage facility of the National Repository (Legislative Decree n° 31/2010) waiting for the geological disposal

Table 12.8 – Correlation between New classification and previous ISPRA TG 26

New classification	Classification according ISPRA TG 26
Very Short Lived Waste VSLW	I st Cat.
Very Low Level Waste VLLW	
Low Level Waste LLW	II nd Cat.
Intermediate Level Waste ILW	III rd Cat.
High Level Waste HLW	

National Programme

In the sections of the National Programme document the following topics are dealt with:

- legislative, regulatory and organizational framework,
- origin of the spent fuel and radioactive waste with its classification,
- overview of the national operators;
- agreements with other Member States and third countries;
- evolution of the national policy on the management of spent fuel and radioactive waste from the 60s, with specific reference to future objectives;
- milestones and time limits for the implementation of these steps in the light of the future aims of the National Programme;
- inventory of spent fuel and radioactive waste and estimates of waste to be produced in the future;
- management, from generation to disposal, of spent fuel and different streams of radioactive waste coming from nuclear installations, including RW from the decommissioning, and from research, medical and industrial activities;
- short description of the National Repository and post closure phase;
- responsibilities for the implementation of the National Programme;
- measures to ensure transparency and participation of the public in decision making concerning the management of spent fuel and radioactive waste;
- cost of the National Programme, including decommissioning of nuclear installations and management of existing waste, construction and operation of the National Repository and Technology Park, management of radioactive waste arising from the use of radioisotopes for medical and industrial activities and research and development solutions for the management of spent fuel and radioactive waste.

The above topics are covered in the National Programme document taking into account the national policy elements as describe in point 11.1 and reported in the National Programme itself.

As said, the National Programme will be issued as a decree of the President of the Council of Ministers following the steps described in point 5.1 (a).

Annex - List of Abbreviations and Acronyms

AEEGSI	Autorità per l'Energia Elettrica il Gas ed il Sistema Idrico (Regulatory Authority for Electricity Gas and Water)
BWR	Boiling Water Reactor
CIPE	Comitato Interministeriale per la Programmazione Economica (Interministerial Committee for the Economical Planning)
CNAPI	Carta Nazionale delle Aree Potenzialmente Idonee (National Chart of Potentially Eligible Sites)
CNEN	Comitato Nazionale per l'Energia Nucleare (National Committee for Nuclear Energy)
CNS	Convention on Nuclear Safety
DISP	Direzione Sicurezza nucleare e Protezione sanitaria (Directorate Nuclear Safety and Health Protection)
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
ILW	Intermediate Level Waste
IRRS	Integrated Regulatory Review Service
ISIN	Ispettorato nazionale per la sicurezza nucleare e la radioprotezione (National Inspectorate for Nuclear Safety and Radiation Protection)
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
JRC	Joint Research Centre
LILW	Low Intermediate Level Waste
LLW	Low Level Waste
NPP	Nuclear Power Plant
PWR	Pressurised Water Reactor
QA	Quality Assurance
R&D	Research and Development
RW	Radioactive Waste
SF	Spent Fuel
SO.G.I.N.	Società Gestione Impianti Nucleari (Company for the Nuclear Installations Management)
TG	Technical Guide
WENRA	West European Nuclear Regulators Association