Country	Article	Ref. in National Report	Question / Comment	Answer
Canada	Article 16.1	Section 16.1.2	Does France have documented plans or conditions for delaring the termination of a nuclear emergency?	The National Response Plan for Major Nuclear or Radiological Accidents (https://www.gouvernement.fr/sites/default/files/risques/pdf/national_plan_nuclear_radiological_accidents.pdf) explains that the termination of a nuclear emergency starts when radioactive releases have stopped and the facility has been brought back to a controlled and stable state, under the supervision of the French Nuclear Safety Authority (ASN) or the Nuclear Safety Authority for Defense-Related Facilities and Activities (ASND).
Canada	Article 16.1	Section 16.1.2	Does France consider any other factors when making protctive action decisions other than the nuclear specific indicators (ie psychsocial impacts, impacts on vulnerable populations)?	ASN makes recommendations for protective actions to the Government, which are mainly based on nuclear indicators (radiation protection considerations, state of the installation...). The Government or the Prefect decides on protective actions to be taken on the basis of ASN's recommandations but also on other considerations (capacity of evacuation, presence of vulnerable population...), with the support of the relevant services.
Canada	Article 7.2.1	Section 7.2.1	In France, the Environment Code sets out a specific system for "Basic Nuclear Installations" or BNIs, including nuclear reactors. BNIs are installations using radioactive or fissile materials or particle beams that can cause risks or adverse effects for public health and safety or protection of nature and the environment. It seems that new legislative provisions are being introduced into the Environment Code frequently. As indicated in section 7.2.1 of the report many "orders" under the Environment Code were issued between 1999 and 2018. Could it be explained if these orders are stand-alone documents or if they are part of the Environment Code, once issued?	The legislative and regulatory parts of the Environment Code contain most of the BNI creation authorisation provisions, their control and sanctions in this field. The code is supplemented by orders provided for in the Environment Code relating to a technical field for which the legislator or the Government has delegated its competence to the Minister responsible for nuclear safety to issue specific texts relating to the field of BNI and nuclear pressurised equipment. These orders are not integrated into the environmental code but are an integral part of the general nuclear regulations and are therefore applicable to BNI.

Romania	Article 11.2	11.2.4. ASN oversight	Please provide more details on the specific topics addressed by ASN's inspections on the training and qualification of NPP personnel with jobs important to nuclear safety. What regulations, guides and standards are used to derive the criteria for the inspections? For what categories of personnel is the systematic approach to training required by the regulator?	The high level requirements concerning training and qualification of staff are set out in the BNI ministerial Order. To adress this subject, inspectors can refer to ASN safety Guide n°30 (published) and the internal inspection guides : "management of skills" and "management of NPP operating skills". At EDF, the SAT (systematic approach to training) method has been deployed for all departments and all professions. There is no regulatory requirement regarding categories of personnel or the methods to be used by licensees.
Canada	Article 7	Figure 7-1	Decrees, Orders, and ASN resolutions are all tools in the "Legally Binding Field" of the French regulatory framework. The difference between these tools is not clear. What is the difference between these tools?	A decree is a regulatory or individual act taken by the Prime Minister. This act is part of the powers reserved to the executive power by the Constitution. An order is an administrative act issued by an administrative authority other than the President of the Republic or the Prime Minister. An order is inferior to a decree. The order may be issued by ministers, prefects, mayors, presidents of departmental or regional councils. According to the article L. 592-20 of the Environment Code (EC), the Nuclear Safety Authority is competent to take regulatory decisions of a technical nature to supplement the terms and conditions of application of the decrees and orders issued in its areas of competence, with the exception of the regulations relating to occupational medicine. According to these provisions, the ASN has a so-called derived regulatory power, i.e. limited in scope and content. It can, within the framework of the applicable laws and regulations, supplement the terms of application of the decrees and orders issued in its areas of competence.

Romania	Article 11.2	11.2.2. Measures taken for nuclear power reactors	Please provide information on the implementation of the systematic approach to training and qualification for personnel selected for managerial and supervisory positions important to nuclear safety.	SAT is implemented by : 1) skill management to ensure present and future required skills: - definition of required skills per work area and position - forward planning of employees and skills - job profile definition - training programmes definition - qualifications definition 2) Training management is used to have workers with a high level of knowledge and know-how 3) Unit direction and nuclear fleet direction are accountable for implementing and updating training programmes 4) Initial training use SAT process to bring knowledge and know-how to newcomers in order to be autonomous in their work 5) Continuous training use SAT process to enhance workers knowledge and know-how 6) Training methods allow trainees to acquire knowledge and know-how required for their work 7) Training efficiency assessment is systematically used to update the training in order to enhance the workers performance 8) keeping require individual and collective skills and the renewal of skills required to all the workers to be involved in its skills development, his team skills development, is professional development. For each position in the main departments (operation,

Bulgaria	General	General	1.How is the motivation of the staff maintained after the limitations imposed by the COVID pandemic? 2.How is effective knowledge transfer maintained at the change of generations?	Q1 : After the restrictions linked to the COVID pandemic were lifted, ASN took care to maintain an adequate level of quality of life at work. It has therefore adapted to changes in working methods by adapting its work organization around a remote working agreement signed in the first quarter of 2022 with staff representatives. The agreement allows employees to work, under certain conditions, from home for a maximum of 10 days per month, up to a maximum of 100 days per year. Q2 : The pandemic required the ASN to work on change in training methods and skills transfers. The use of videoconferencing and remote meetings, which were necessary during periods of lock down, remain a useful training method to increase efficiency and reduce the obstacles imposed by in-class training. A work on "blending learning" has been initiated at ASN. Regarding the more general context, ASN has always been subject to a constant turnover. As a consequence, no massive retirement waves is expected.
Romania	Article 19.2	19.2. Operational limits and conditions	Please provide information on whether technical operating specifications have been developed also for the plant equipment credited in the response to design extension conditions, including severe accident management (permanently installed, portable and mobile equipment used for accident management).	The technical operating specifications adress plant equipments mentionned by the safety demonstration, including SSCs involved in design extension conditions or severe accident management. Most of them are permanently installed.
Bulgaria	Article 7	page 58	It is not quite clear from the text of the report whose responsibility is the issuance of decommissioning decree and what kind of legal force this decree has – could you please give more information on this subject?	The decommissioning decree is an act of the Prime Minister prepared by the ministry responsible for nuclear safety issues the decommissioning decree, whose draft is submitted to ASN's opinion. This decree is legally enforceable like general regulations.

Bulgaria	Article 7	page 54	On page 54 it is mentioned that: "… the creation of a BNI is subject to the public debate procedure when it involves a new nuclear power production site, or if the new site (not nuclear power production) corresponds to an investment of more than €300 M." Does it mean that if a new reactor is going to be built on an existing site it will not be subject to public debate procedure?	Any project of a new nuclear reactor will always be submitted to a public debate, whether this project is to be built on an already nuclear site or on a new site. The criteria of an investment of more than €300 M on a new site is only addressing non power production nuclear project.
Bulgaria	Article 7	pages 54, 55	Would you please clarify what is the difference between public debate and public inquiry and what are their roles in the authorisation process?	The public debate is a procedure for prior consultation, introduced by created by Law No. 95-101 of 2 February 1995 on the reinforcement of environmental protection, was profoundly modified by Law No. 2002-276 of 27 February 2002 on local democracy. The public debate procedure is placed under the authority of the National Commission for Public Debate (CNDP), an independent administrative authority, which sets up a special commission for each debate. The very large projects listed in Article R. 121-2 of the Environmental Code and certain national plans and programmes in accordance with Article L. 121-8 of the same code are directly subject to this procedure. Although the debate itself takes place over a period of 4 to 6 months in principle, this participation and information procedure takes place prior to the commencement of the preliminary studies for the opening of the public enquiry. The public enquiry is a mechanism for informing and collecting the opinions of the population. It is initiated by the prefect and conducted by an investigating commissioner or an investigating committee appointed by the president of the administrative court and organised in the town halls concerned by the project. The public enquiry procedure is governed by the Environmental Code. For example Article L. 593-5: public enquiry for the establishment of a public utility easement; Article L. 593-8: public enquiry for the issue of the decree authorising the creation of an INB; Article R. 593-47: public enquiry for substantial modifications.

Bulgaria	Article 7	page 53	Could you please clarify the following statement: “Although commissioning does not require an authorisation, once the licensee has notified both the Minister responsible for nuclear safety and ASN of final shutdown of its BNI, it is carried out under the conditions prescribed in the decommissioning decree.”	The report contains a mistake, please read "decommissioning" instead of "commissioning". Since decommissioning generates indeed major changes in the operation of a nuclear facility, decommissioning operations must be carried out under a new decree.
Switzerland	Article 6	Article 6.3.1	In the report ten-yearly-outages are mentioned. How long will they approximately last? What is the lenght of "normal" outages in general? Are they annual?	Ten-yearly-outages have an average duration of: - 170 days on units of the 900MW series and the 1300MW series - 145 days on units of the N4 (1450MW) series The other two types of planned outages are: - An ordinary shutdown for refuelling and some minor maintenance or periodic testing for a standard period of: o 40 days on units of the 900MW series o 43 days on units of the 1300MW series and the N4 (1450MW) series - A partial inspection dedicated to refuelling and maintenance for a standard period of: o 85 days on units of the 900MW series o 95 days on units of the 1300MW series and the N4 (1450MW) series These two types of planned outages alternate at each generation cycle. 28 units of the 900MW series have an operating cycle of approximately 12 months 4 units of the 900MW series, 20 units of the 1300MW series and 4 units of the N4 (1,450MW) series have an operating cycle of approximately 18 months.

Slovenia	Article 15	Art. 15 / 15.2.2.1.	"Tritium and carbon 14 discharges, which are directly correlated with the power output by the units, remain stable." Q: Why can't the same principle of collection and treatment (quoted in the reference) be applied to H-3 and C-14?	Tritium is a radioactive isotope of hydrogen. Tritium combines with oxygen to form tritiated water (HTO), whose chemical characteristics are almost identical to those of water. Although technologies exist to extract highly concentrated tritium in small quantities of water (of the order of TBq/L), these are not applicable in nuclear power plant because the tritium volumic activity is too low (in average few MBq/L in the circuits, few kBq/L in liquid effluent storage tanks and few Bq/L in the discharge). The half-life of tritium being 12.33 years, it is not possible to wait for the natural decay of tritiated water before releasing it into the environment. The amount of carbon 14 is proportional to the energy produced by the nuclear reactor core. The majority of carbon-14 releases are gaseous. In the circuits, C-14 exists in different forms. There is no industrial technology available to extract C-14 (only the most volatile forms such as CO, CH_4 and CO_2 can be extracted).

Switzerland	Article 18	p. 167	What are the main provisions made further to the stress tests for existing nuclear power plants?	ASN asked EDF to further strengthen the safety of nuclear power plants, and to define a complete "hardened safety core" provision that can withstand extreme hazard situations (seismic and flooding). This "hardened safety core", which aims to prevent an accident with fuel meltdown and to limit massive releases and lasting effects in the environment, will be fully commissioned as part of the safety improvements linked to the 4th periodic safetyreview of 900 MWe and 1300 MWe reactors and to the 3rd PSR of 1450 MWe reactors. The main planned improvements are: - new systems for ultimate cooling of the containment and stabilization of corium in case of core meltdown, - a new crisis management center at each plant. - additional means to cool the water or increase water inventory of the spent fuel pool.
Switzerland	Article 6	Fokus 8	It is described that in view of the first results of SCC in the ECCS 12 NPPS has shut down by EDF. What it the current situation? How many NPPs are shut down right now due to SCC in the ECCS? What is the time line expected for repairing these pipes? Are there already NPPS repaired and back in operation?	As of December 16, 2022. The expertise carried out over more than a year have enabled EDF to identify the reactors whose safety injection circuit lines are the most sensitive to the development of stress corrosion cracking. These are the 16 most recent reactors: the 4 reactors of the N4 series and 12 reactors of the 1300-P'4 series. Of these 16 reactors, 10 were treated in 2022 or are in the process of being treated. The most-affected N4 reactors are going back in operation. The time required for repairs depends on the extension on the phenomenon (from several weeks to several months).

Switzerland	Article 18	p. 157	What are the results of the application of five levels of defence for the existing reactors during periodic safety reviews? What measures/backfittings have been performed?	Defence in depth is a general concept used in the design, assessment and regulation of NPP, and it is not possible to pinpoint safety upgrades specific to the application of this principle. Regarding the 4th level of defence in depth, ASN published in 2017 its guide n°22 adressing the design of new PWR NPP with a dedicated chapter on this topic adressing mitigation of severe accident as design extension conditions (DEC B). This guidance has also been used as a basis for safety improvement of operating NPP for their periodic safety review. The new systems for ultimate cooling of the containment and stabilization of corium in case of core meltdown are examples of backfitting on older plants.
Switzerland	Article 17	p. 151	With which method(s) is the SSE reassessed in light of the most recent data and the development of knowledge?	A deterministic appoach to caracterise a site specific seismic hazard is adressed by ASN guidance "Fundamental safety rule 2001-01". While this overall approach is still used as a reference, each step of this methodology (datas, formula, specific effets...) is kept up-to-date on the basis of knowledge improvement and reassessed as part of the periodic safety review.
Switzerland	Article 17	p. 152	Is one ultimate backup diesel generator set (DUS) available on site for each of french nuclear power reactors?	Yes, the ultimate backup diesel generators (DUS) of each power reactor were commissionned between December 2018 and February 2021.
Switzerland	Article 17	p. 149	Why is the procedure applied for industrial environment and communication routes risks (checking that the probability of unacceptable radioactive releases is sufficiently low) not also applied to seismic and flooding risks?	In France, it is accepted that anthropogenic external hazards (industrial risks and communication routes) can be excluded on a probabilistic basis. Indeed the modelling of these specific hazard is not complex and the definition of the relevant parameters rely on a wide database and experience feedback. On the other hand, assessments of natural hazards (such as earthquake, flooding, tornadoes,…) are quite sensitive to knowledge/lack of knowledge on complex physical phenomena. Hence, the safety approach for those hazards is, at first, based on a deterministic and conservative approach, completed with highlights from probabilistic assessment.

Switzerland	Article 7	7.2.1.1., page 49	After ten years of application, the revision of the "BNI Order" is in progress. Please elaborate the planned major amendments.	Most of the proposed amendments are based on feedback from the application of the legislation. They are proposed with a view to simplifying the existing provisions as far as possible and, in any event, to avoid any increase in the complexity of the legislation. The main changes proposed are: Definition of Protection Important Component, activities important for the protection of persons and the environment, defined requirement Definition of deviations Cascading Monitoring of suppliers and subcontractor Definition of the content of the general operating rules Application of the general regulations on classified installations for the protection of the environment Consideration of non-radiological risks Changes in some provisions relating to the environment Changes in some provisions relating to emergency management Waste management Decommissioning It is also proposed to modify some definitions, in particular for internal safe transport operations of radioactive material.

Switzerland	Article 7	7.3.4., page 57	Whereas substantial modification of the facility needs an authorisation application, the "other modifications" are noteworthy, and require either notification or authorisation by ASN. Please explain the procedure the qualification of a modification is unclear, if there is any.	classification of modification : 1) "substantial" : such modifications involve a change in at least one fundamental parameter of the authorization decree delivered by the government and are therefore submitted to a new application 2) non substantial modifications can be noteworthy according to their potential impact on the safety demonstration. The criteria and conditions to identify a noteworthy modification are defined by the ASN resolution 2017-DC-0616. Those noteworthy modifications are also subdivided into two categories according to their safety significance : the most important ones are submitted to ASN authorization, and the less important ones need only to be notified to ASN.
Switzerland	Article 8.1	8.1.4.2	How is the ASN financed? From the Government or from fees from the licensees?	All the personnel and operating resources involved in the performance of the responsibilities entrusted to ASN are covered by the State's general budget. In the 2021 Budget Act, the ASN budget (action 9 of programme 181 "Risk prevention") amounted to €67.15 million in payment credits (rapport de l'ASN sur l'état de la sûreté nucléaire et de la radioprotection en France en 2021).
Switzerland	Article 13	page 93	Most of the maintenance work is awarded to external service providers? How the licensee organisation assesses the risk of loosing the key knowledge when doing so?	EDF has a regulatory obligation to maintain internal skills to exercise its responsibility as an operator. It is based on a 'Forward planning of employees and skills', skills development plans and a training offer. An EDF Group policy defining Expertise management and the « knowledge management » organization allow to capitalize knowledge.

Switzerland	Article 13	page 93	What are the experiences concerning the effectiveness of the whistle-blower system? / With regard to the risk of possible fraud or counterfeit (Counterfeit, Fraudulent and Suspect Items - CFSI - as defined by the IAEA), EDF has, since 2017, been implementing specific provisions aiming to prevent and detect these risks, notably: - creation of a whistle-blower system guaranteeing anonymity, which can also be used by anybody from outside EDF;	The first aim of EDF is to ensure that the supply chain has implemented provisions to ensure the possibility for anyone to anonymously report wrongdoing. Suppliers have increasingly implemented this kind of provisions, but sometimes they are not fully satisfactory (contact of a person abroad, limited to French or English speaking, lack of communication towards the entire staff, difficult to find reporting device...). The recent experience shows that whistleblower devices can be used as a last recourse when a "collective complacency culture or system" was implemented in a company. So it's important that such device exists.
Switzerland	Article 13	page 92	How is the harmonisation between the management systems of the various entities and the specifications for the entire EDF organization being managed with regard to the various interfaces? / The activities governed by the IMS are carried out by the BNI operator or entrusted to national entities or outside contractors…	Harmonization is ensured by: - the “interest protection common policy DIPNN DPNT” which is applied by all EDF ’entities (operators ‘units and contributing engineering centers) as well as by suppliers - the “Joint Decision BNI Order Title II” which applies to DPN and DIPNN BNI operators and to contributing engineering entities - the “General Quality Assurance Specifications” (SGAQ applicable for reactors in operation and new construction projects like EPR in France) which applies to suppliers. It declines the principles of the Joint Decision Order Title II.

Switzerland	Article 12	general	France describes ist SOH/OHF approach, which must be taken into account in the same way as technical aspects when applying rules regarding the design, construction, operation, etc. of nuclear installation. Switzerland fully agrees on this. SOH/OHF safety research (e.g. research in the context of hign reliability organisations HRO), reveals that the focus on positive, every day performance gives also good indications on how to improve or strengthen safety. Is the issue of Safety-I vs. Safety-II (Safety-I [focus on error] vs. Safety-II [focus on positive performance]) also discussed in France? Could you please elaborate on this issue?	In France, the reflection on positive performance is currently carried out within the framework of research work. As part of the HTO (Human Technology Organisation) research program, the EPECT (Espaces de Partage et d'Exploration de la Complexité du Travail) method will be mobilized to analyze significant safety events that occurred in nuclear power plants based on success factors. This method was developed in the medical field (2017-2021) to identify and prevent risks to patients based on the analysis of the performance of medical teams. In practice, explanatory interviews conducted by ASN inspectors provide access to positive feedback.
Switzerland	Article 13	page 93	What kind of actions are used to raise the awarness for integrity and safety culture? / With regard to the risk of possible fraud or counterfeit (Counterfeit, Fraudulent and Suspect Items - CFSI - as defined by the IAEA), EDF has, since 2017, been implementing specific provisions aiming to prevent and detect these risks, notably: awareness-raising actions on the importance of integrity and the safety culture;	Although safety culture is not directly mentioned in the French regulation, ASN encourages as a good practice a CFSI training for all employees working on safety activities. A letter was sent by ASN in May 2018 to all licensees and their suppliers explicitely stating that raising awareness for CFSI was necessary at all levels, including within the supply chain. For example, EDF has set up training courses or asked suppliers to carry out equivalent training to raise awareness of the possibility of a nuclear accident, of CFSI in the supply chain, on the importance of self-checking, etc. EDF is in lead for the implementation of the ISO 19443 in its supply chain. As a leader, EDF decided also that its Nuclear Engineering entities have to be certified according to ISO 19443. Consequently, staff have been trained according to requirements of this standard, which include safety culture and CFSI risk management. In regards to inspectors that carry out the monitoring of manufacturing in factories, they follow a CFSI training every two years.

Switzerland	Article 9	page 73	France states that the CEO has all the powers needed for EDF S.A. to exercise its duties as nuclear licensee. In particular, he or she determines the strategic orientation regarding nuclear safety and sets the general principles of organisation and resources to ensure that EDF S.A.'s responsibility as licence holder is properly exercised. In recent years, the Swiss nuclear industry has experienced the impact of diverse social, technological and economic changes. Changes that have an impact on the strategic orientation (e.g. recruting of operational personnel, leadership principles, digital transformation) of the organization of nuclear facilities. Does France also have to deal with these changes? If so, do these changes also have an impact on the strategic orientation of the nuclear facilities and on the responsibility for safety, respectively? Can you elaborate on this question?	Like Switzerland, France is undergoing social, technological and economic changes. These changes have been taken into account as input within the framework of the START2025 strategic plan of EDF's nuclear production division which was launched in 2020. This plan includes a line of action to "Embody management attentive to women and men within committed teams". Also, EDF has engaged in 2018 a digitalization programme, called SWITCH, to improve its performance including Plant Lifecycle Management, digital twins, supply chain platform, but which also has a positive impact on its attractiveness, especially towards younger generations. Finally, the main ongoing change is related to the preparation of the possible launch of a new nuclear power generation programme in France, especially in terms of skills and workforce. EDF is working with the Governement to improve the attractiveness of the nuclear sector and to develop education and professional training in order to meet the needs of the nuclear sector.
Ukraine	Article 6	pages 33-45	What companies supply fuel to French nuclear power plants? Is there nuclear fuel diversification?	The companies supplying fuel to the French nuclear power plants are Framatome and Westinghouse for UO2 fuel assemblies, and Orano for MOX fuel assemblies. UO2 fuel diversification is available for most of the plants and contributes to EDF strategy with respect to the security of supply.

Ukraine	General	4.1.4. Flamanville 3 EPR Page 12	It is stated that fresh fuel assemblies have been received and are stored in the fuel building pool. It seems that fresh and spent FAs are stored together in the same pool. If so, is the pool zoning used for fresh and spent FAs? Or they can be loaded into any pool cell?	At the time being, only fresh fuel assemblies are stored in the fuel building pool of Flamanville 3 EPR unit. During operation, the pool design allows loading any assembly (fresh or spent), into any pool cell: as regards the prevention of criticality, the design of the fuel building pool rack does not credit the burn-up of spent FAs.
Ukraine	Article 6	page34	In the list of nuclear installations in France only nuclear power and research reactors are mentioned. Are there on-site spent fuel storage facilities?	Appart from the spent fuel pool connected to each reactor and considered as part of the same nuclear facility, there is no stand alone spent fuel storage facility on site. When a spent fuel assembly is cold enough, it is sent to La Hague nuclear facility.
Ukraine	Article 18	para 18.3.2.2, page 166	As part of the stress tests for the control of EPR reactor a criterion - exceeding 24 hours in case of loss of power supply and heat removal was taken. What were the prerequisites for the establishment of this criterion? What voltage and power are provided for mobile generating stations (MGS) to energize receivers of safety systems during total blackout of power units?	The 24-hour grace period has been defined by the licensee as part of the stress-tests by determining the time available to recover safety functions in order to avoid cliff-edge effects related to loss of power supply and heat removal. The voltage and power of the mobile generating stations (MGS) are designed to ensure electrical power supply to all the safety systems required to cope with a severe accident (specific I&C, containment isolation valves…).
Ukraine	Article 6	page 34	Overview of safety-related events includes only events at NPP. Does anything happen at other facilities such as research reactor, storage facility, La Hague reprocessing plant?	Safety-related events also occur in other type of nuclear facilities. In 2022, there were 163 safety events in these facilities.
Ukraine	Article 15	para 15.2.2.2, page 127	The report presents an IRSN assessment of exposure doses for the public in the zone of NPP impact - 1µSv/year. Does this take into account radiation exposure doses from tritium and carbon-14?	The assessment of population exposure around a nuclear power plant includes all radionuclides (including tritium and carbon-14) emitted by the plant and all modes of exposure to these radionuclides (ingestion, inhalation, contamination).

Ukraine	Article 18	para 18.3.2.1, page 165	The Report contains information regarding digital I&C systems. The cybersecurity issues are significant for digital I&C. Are cybersecurity measures implemented in digital I&C systems? What regulations were used in the design, implementation and assessment of these cybersecurity measures?	Cybersecurity analysis of I&C is indeed part of the nuclear security assessment. For national security, sensitive facilities (including NPP) are subject to a global cybersecurity regulation under the scope of the Defense code. A specific cybersecurity design basis threat (DBT) has been established for nuclear facilities.
Ukraine	Article 15	para 15.2.2.1, page 123-126	Do the design values of carbon-14 and tritium discharges and releases coincide with the actual ones?	The limit values were designed on the basis of scenarios taking into account different reactor operating situations (excluding accidents). Discharges of radioactive effluents have indeed been far below those limit values since the beginning of reactor operation. Experience feedback, good operating practices (such as the use of lithine, which reduces the production of tritium in the primary circuit) have made it possible to reduce discharges over the years.

Ukraine	Article 12	Page 88	How is the socio-organizational and human impact analysis carried out? What criteria are used?	The SOH approach is oriented towards 3 main criteria: adaptation of the change to the real context and to the professionals' needs, appropriation by the professionals of the evolution (individual & collective capacity), acceptance by the professionals with regard to the values of the profession, the place in the organization and the cost of learning. This approach is based on the identification of the impacts of the change for the professions concerned, in order to specify this change (whether technical or organizational), and to define the main actions to be carried out in terms of change management. Five types of impact are assessed with the teams involved during working groups: requirements and constraints, tasks and mission, skills and resources, process and coordination, tools, documentation and working environment. If necessary, working groups are supplied by simulations (with mock-up/prototype) or field analyses. This approach involves covers the professions concerned involved from the first design phases and throughout the phases, which allows co-construction, which is a favorable condition for any change.

Ukraine	Article 15	para 15.2.2, page 123-126	What filters are used to clean gas and aerosol releases from nuclear power plants? Can you provide data on their effectiveness for tritium, carbon-14, radioiodine and aerosols? Are there special filtering methods?	Gaseous radioactive effluents are divided into 2 categories: - The “hydrogenated” gaseous effluents which come from the degassing of effluents from the reactor coolant system. These effluents are collected and stored in tanks previously filled with nitrogen, an inert gas. The effluents are stored for at least 30 days before discharge in order to allow the radioactivity to decrease. These effluents are analyzed before discharge to the main stack after passing through very high efficiency absolute filters for the retention of aerosols (efficiency > 1000) and through activated charcoal iodine traps for the retention of radioactive iodine (efficiency >100). - The “aerated” gaseous effluents which come from the collection of vents from the radioactive liquid effluent treatment circuits, from the depressurization of the reactor building, from the ventilation of the installations. The ventilation air passes through very high efficiency absolute filters (efficiency > 1000) and for certain circuits on activated charcoal iodine traps (efficiency > 100) before being discharged to the main stack. The main stack is equipped with devices that control discharge flow rate, the volumic activity and sampling devices for carrying out the periodic controls performed on tritium, FP-AP, iodine, aerosols, noble gazes and carbon-14. To date, there are no effective treatment devices adapted to the volumetric activities encountered on our installations for the filtration/retention of tritium nor carbon-14 before being released to the atmosphere.

Ukraine	Article 11	Page 85	What does the approach to forward planning of employees and skills imply?	The approach to forward planning of skills aims at identifying the needs for new employees in a department or for specific positions in the next 3 to 5 years. It takes into account expected retirements and promotions. The approach to forward planning of skills is linked to the previous approach. The objective is to have a snapshot of the main collective skills of a work team and a 3 years forward-looking picture. It is based on a 4 level scale for each skill (1 beginner, 2 autonomous, 3 experienced , 4 referent) and a minimum required people above level 2 and level 3. Building those collective skill pictures imply annual individual skill assessments (done through in the field observation, worker self-assessment, manager assessment...) and a manager global team assessment. The approach to forward planning of employees and skills helps to anticipate hiring, training and skill development.
Russian Federation	Article 14	paras.14.1.3, 14.1.3.1, 19.1.2 p. 171	What are the key safety issues of the EPR Reactor that have caused such long construction and commissioning preparation periods (since 2007)?	The Flamanville 3 Nuclear Power Plant is the first EPR (Generation 3 reactor) built in France. Its construction began in December 2007, and many evolutions had to be implemented during the construction phase, following the update of detailed design safety studies. Several events or anomalies have occurred during the construction phase such as a deviation on the brackets of polar crane (2013), a carbon concentration anomaly on the bottom and the closure head domes of the reactor pressure vessel (2015, cf. §4.1.4), and deviations on specifications for the welding of the main steam lines (VVP system), related to "break preclusion" requirements (2019, cf. §4.1.4). Main steam lines repairs are still ongoing.

Ukraine	Article 10	para 18.1.1, page 155	It is indicated that one of the basic principles in the design and construction of nuclear facilities is defense in depth. Are the IAEA requirements for the synergy of nuclear safety and security measures (INSAG-24, TECDOC-1801, etc.) taken into account in the development of projects? For example, such principles as defense in depth and graded approach are used both in nuclear safety and in nuclear security.	Synergy of nuclear safety and security has been taken into account in the developpement of new reactors such as EPR2 : early in the design phase EDF submitted both a safety options file to ASN and a security options file to the nuclear security division (DSN) of the Ministry of Environment. ASN and DSN, with their common TSO (IRSN), held joint meetings to share their assessment and identify interface topics with specific attention to items 56 and 57 of INSAG 24.

Korea, Republic of	Article 19	178	On the procedures for responding to accidents, 1) Regarding 'safety guidance document' (DOS), please provide a brief explanation of the history of its development, process to choose the procedures to apply, applicable operational modes of the procedures, and the scope of related procedures (such AOPs, EOPs, SAMGs). 2) In case of loss of all AC power accident, are response strategies established? If so, describe the following. - the procedures and provisions to use - decision making process and guides leading to enter the above procedures - related or supporting documents or procedures	1) The DOS (Document d'Orientation et de Stabilisation – Orientation and Stabilization Document) has been elaborated in the 90's as part of the entire set of State Oriented Approach (SOA) procedures. SOA procedures have been developed as a French response to TMI accident, in order to replace the set of Event Based Procedures (EBP). The DOS take into account the former EBP criteria, scanning at first the state functions and then other criteria such as loss of support functions. The objective is to prioritize the mitigation of thermal-hydraulic situations. The DOS can be applied in all operating modes except in cold shutdown with the core fully unloaded : in this case, a specific procedure is to be applied to manage accidents in the fuel pool irrespective of the plant operating conditions. The DOS application criteria detect a situation which is not manageable with normal or abnormal procedures (abnormal procedures are not in the set of emergency operating procedures). The limit conditions are mainly based on the following items : - Degradation of at least one state function, - Degradation of at least one confining barrier, - Activation of a protection or safeguard signal, - And finally, if the required operating strategy is not compatible with existing normal operating strategies. The SAMG application criteria are based on the monitoring of core temperature and containment radiation. They are not scanned in the DOS, but in the SOA safety engineer procedure. 2) Operating strategies based on back-up and to cope with the
Japan	Article 8.1	page 69	What are the difficulties in public consultation about long-term operation?	The main challenge is to explain complex technical topics with easy to understand documents in order to get the general public to inform itself and participate to the consultation.

Korea, Republic of	Article 16.1	130	According to p.130, pre-distribution of stable iodine is implemented through the network of pharmacies. (1) Please explain whether any instruction or information is provided when pre-distributing stable iodine through pharmacies. (2) Please explain the process for a resident to exchange, return and receive additional stable iodine when necessary.	(1) Pre-distribution always goes with information. Pre-distribution voluntarily takes place in pharmacies to foster a discussion between the population and health specialists. The pre-distribution campaign is also an occasion to enhance knowledge among the population concerning nuclear accidents and radiation protection through flyers and a dedicated website. Meetings are also organized for the mayors of the municipalities concerned by the pre-distribution. (2) To exchange, return or receive additional stable iodine, resident must go to a pharmacy within 20 km of the NPP and show a proof of adress to get iodine tablets.
Korea, Republic of	Article 15	119	Section 15.2.1 Radiation Protection of Workers (pages 118-119) describes monitoring of doses for radiation workers. Regarding this, (1) Please describe the procedure and methods to control exposures to flight attendants. (2) Do you differentiate the cabin crew from pilots when measuring and monitoring doses?	(1) The individual monitoring of external exposure from cosmic radiation to flight attendants is carried out with a calculation taking into account all the components of cosmic radiation of galactic and solar origin, including in the event of a flare, as well as all the parameters of the flights considered. This numerical evaluation is performed by the accredited dosimetry organisation. The employer shall provide the organisation with the information relating to each flight carried out by a worker during a specific period. When this method cannot be implemented for technical reasons, the individual monitoring is carried out with a dosimeter. (2) No, the method is the same.

Korea, Republic of	Article 16.1	130	According to p.130, each Prefect defines the modalities for distribution of stable iodine to the population in their Department. (1) Is there any national guideline which is applicable to all Departments? (2) Is there any system at national level in France to consolidate data about stockpile/(pre)distribution status of stable iodine from each Prefect? If so, which authority is in charge?	The national guidelines applicable to all Departments are described in a Government instruction of 11 July 2011 about the storage and distribution of potassium iodide tablets outside the nuclear emergency planning zones. Following these principles the Prefect is in charge of elaborating a dedicated plan (Orsec Iode plan) at the departmental level in order to define the provisions for the distribution of stable iodine from the national stocks. Santé Publique France is the national agency responsible for the management of the national iodine stocks.
Korea, Republic of	Article 14.1	98	With respect to the provided information, please explain the 3rd spent fuel cooling system (PTR) train as well as the 1st and 2nd spent fuel cooling system. And what is the difference between each system (safety class, seismic category, etc.)?	PTR systems (Fuel Pool Cooling Systems) are dedicated to remove the heat from spent fuel stored in the fuel pool. PTR 1&2 are dedicated to normal operations and DBC and PTR3 is dedicated to operate in case of DEC-A or when PTR 1 or 2 is under preventive maintenance. PTR 1&2 are F1A classified systems (resistant to single failure criteria, powered by main diesel in case of loss of off-site power, geographical separation between both systems), SC1 seismic classification. PTR3 is F2, as it is used as a diversified fuel pool heat removal system within DEC-A (its cooling chain is different from the one used for PTR1&2 and it is powered by SBO diesel) and has a SC1 seismic classification.

Korea, Republic of	Article 14.2	111	With reference to Article 14, page 111, checks, test, ISI and monitoring of operation are carried out to ensure accordance. What are the procedures and methods for Monitoring of Operation and related laws and regulations?	As regards laws and regulations, the provisions for monitoring of operation of the primary and secondary circuits are settled by the ministerial order of 10 November 1999. For other equipments, the provisions related to the monitoring of operation are set down by the ministerial order of February 7th, 2012 relative to basic nuclear installations, notably its article 2.5.1, which states that "II. — The elements important for protection are subject to qualification proportional to the importance of what they protect, aiming in particular at guaranteeing the ability of these elements to fulfil their assigned functions, with respect to the stresses and environmental conditions associated with the situations in which they are necessary. Design, construction, tests, inspection and maintenance provisions enable this qualification to be maintained for as long as necessary." Then the licensee defines his programmes to comply with the regulations. It includes a graded qualification program applied to elements important for protection.
Korea, Republic of	Article 13	93	It is described that the entities of the EDF Group as a whole have initiated a process of ISO 19443 standard certification since the beginning of 2021. With respect to the CFSI aspects, please provide more information about the provision of ISO 19443 such as training, detection, and supplier monitoring.	ISO 19443 has not been made mandatory by ASN. It is up to the licensees to decide whether or not ISO 19443 should be implemented in the supply chain and what arrangements are made to implement it. However, ASN considers that the implementation of ISO 19443 is a good practice. To know more about the provision of ISO 19443, this standard (as all ISO standard) is available on ISO website : https://www.iso.org/standard/64908.html

Korea, Republic of	Article 12	90	According to the section 12.4 of the national report, ASN conducts regulatory oversight on licensee's organizational and human factors. (1) Does this address the fitness-for-duty (FFD) issue of plant personnel? (2) Is there a regulatory standard to address the FFD issue?	When FFD of plant personnel concerns technical qualification of staff, ASN can indeed conduct regulatory oversight on the licensee's organizational and human factors. However, when FFD concerns physical ability (e.g. for fire fighting teams) this scope is under the responsability of occupational medicine and not ASN. FFD is the responsibility of the licensee. There is no specific regulatory requirement regarding the means used, but this topic is addressed in ASN guide n° 30.
Korea, Republic of	Article 13	92	Please introduce the ASN's regulatory activities and lessons learned to improve the licensee/supplier's safety culture.	Safety culture is evaluated by ASN in any regular inspection. It is a specific point discussed in the context of safety revues. The safety culture of operators is assessed by paying a specific attention to reaction in unfamiliar situation. Questioning attitude of operators is the main concern. The specific points that are considered for evaluating the level of safety culture are the freedom of speech of the operators and their ability and freedom to communicate safety gaps or deviaton. The ability of the Indepedant Safety Organisation to do its work without being constrained by the direction. After any event, ASN regional divisions perform an afterward analysis which is also a way to assess the safety culture of the operators.

Korea, Republic of	Article 10	80	Section 10.5 of the national report (page 80) states that ASN evaluates safety culture of nuclear operators by means of inspection, and along with document review and observation, trained inspectors employ interview techniques to assess safety culture. (1) Please elaborate on the format of the interview ASN does with licensees. (2) Describe the training the ASN inspectors receive regarding safety culture assessment.	(1) Safety culture is addressed in the context of thematic inspections (safety management, integrated management system, policy for protection of interests, etc.) and in the context of dedicated technical inspections (operation, maintenance, documentation, etc.). One of the methods used by ASN inspectors to address this topic is the explanatory interview. (2) Inspectors are made aware of this subject through several training courses : safety, event analysis and HOF. They are prepared to conduct interviews through training in explanatory interviewing. They can also benefit from the support of the ASN's FOH experts in the preparation and execution of the inspection.
Korea, Republic of	Article 10	77	IAEA GSR Part 2 which was referred to when establishing the safety policies of EDF NPPs has requirement 11. Management of the Supply Chain. - If suppliers who provide items that can affect safety are disqualified as a nuclear supplier, or if products become obsolete, what internal processes take place? Do you share the results of internal process with design and maintenance departments and operate a team to manage the performance?	The responsibility for the qualification of the safety elements belongs to the licensee. To mitigate the risk associated to the disqualification of a supplier or to the obsolescence of products, risk and sensitivity analysis are performed, which enable the identification of the relevant associated solutions. The qualification status is mentioned on the vendor list. The database is shared with all maintenance and design departments as well as the procurement division. In case of significant deviation (leading to specific surveillance and potential qualification suspension) an action plan is required. The implementation by the supplier and results are followed by EDF qualification department and technical support if needed.

Korea, Republic of	Article 10	79	According to page 79 of the national report, the safety perception questionnaire (SPQ) is done every two years, alternating with self-assessment. (1) Is the SPQ based on 10 traits and 40 attributes of WANO safety culture principles? How many questions does the questionnaire have (for example, 40 questions based on 40 attributes)? (2) Is the self-assessment cycle of nuclear operators two years? If the cycle is set, what are the reason and basis for that? (3) Are there predetermined measures (legal requirements, etc.) for self-assessment performed by a French NPP? What are the generally used self-assessment methods? (i.g. questionnaire + interview + observation)	The SPQ is an EDF tool. (1) The SPQ used by EDF is entirely based on the WANO PL-2013-01 document "Traits of a healthy safety culture". It includes 80 questions that allow to capture the 40 attributes. (2) The use of the SPQ every two years, alternating with a safety leadership self-assessment, is considered to be adequate to evaluate the effects of the actions implemented. Each site defines a safety culture roadmap that it develops according to its operating feedback and the results from these two surveys. (3) There is no regulatory requirement concerning safety culture self-assessment.

Korea, Republic of	Article 7	52-53	(1) According to Figure 7-2 and page 53, ASN places a great importance on consultation in the process for drafting its regulations and documents, and encourages participation of external stakeholders. How are the roles of the ASN staff and external stakeholders distinguished in the drafting stage? (2) Is there a set interval for review of the existing standards and documents?	1. A draft regulatory decision is based on the results of work carried out upstream, such as legal and regulatory monitoring, as well as technical knowledge of the safety and radiation protection status of the activities that it is planned to regulate more precisely. Stakeholders, and in particular the operators or industrialists concerned, may, at ASN's request, take part in technical discussions on which the ASN bases its draft text. The organisation chosen to prepare a draft text is set out in the guidance document n° 25 (https://www.asn.fr/l-asn-reglemente/guides-de-l-asn/guide-de-l-asn-n-25-elaboration-d-une-decision-reglementaire-ou-d-un-guide-de-l-asn), in particular with regard to any working groups (WGs) or contributions required. 2. After a few years of implementation of a text, the stakeholders may provide the ASN with feedback on the implementation of the text. Exchange meetings are organised if necessary. Based on the contributions received and any exchanges, the ASN draws up an analysis of the feedback. This analysis concludes whether or not it is necessary to modify certain provisions of the text and to revise it. It is presented to stakeholders or published on the ASN website. The feedback analysis is thus used as a basis for drawing up the programme and drafting a guidance document for the next

Korea, Republic of	Article 6	41	With reference to article 6.3.1, page 41, of the French national report, it is stated that in order to reduce the risk of spent fuel assemblies melting in the storage pool, spent fuel assemblies are put in place of a diversified system for cooling the spent fuel pool in the fuel building. With respect to the provided information in the article in question, Korea would like to inquire the following question: (1) Please describe "the diversified system" for cooling of the spent fuel pool. (2) How is it different from the spent fuel pool of other reactor types (1300MWe, 1450MWe)?	See answer to question 29625.

Korea, Republic of	Article 6	41	Following the Fukushima accident, the world has heightened concerns about a severe accident in NPPs. Most operating NPPs were not subject to regulatory requirements on severe accidents when they were built. Some argue the operating NPPs should be applied with the safety or regulatory requirements of the same level as the new NPPs. (1) Does France put in place the same regulatory requirements for mitigation of severe accidents for both operating and new NPPs? (2) If the requirements for operating and new NPPs are different, what are the legal grounds or justification for this?	The regulatory requirements for mitigating severe accidents are similar for existing plant and for new plants. ASN guide n°22 contains recommendations with regard to safety for the design of pressurised water reactors. The guide focuses essentially on the prevention of radiological incidents and accidents and the mitigation of their consequences. It details the general design objectives and principles and makes recommendations to help meet regulatory requirements. The safety objectives are similar to those set out in the technical directives and correspond to those of principle No.1 of the Vienna Declaration on Nuclear Safety. Although this guide applies primarily to the design of new-generation PWRs, its recommendations may also be used as a reference when seeking improvements to be made to reactors in service. Within the framework of the 4th periodic safety review of the 900 MWe reactors, ASN issued a position statement on the level of safety to achieve for continued operation of the reactors: the safety objectives adopted for this review have been defined with regard to the objectives applicable to the new generation reactors, particularly the reduction of the radiological consequences in the event of an accident (with or without core melt). As a result, modifications were implemented on the 900 MWe reactors to limit the consequences of a severe accident with reactor vessel melt-through by installing a corium stabilisation system on the basemat for accident situations with core melt (system
Korea, Republic of	General	Summary, 31	Under the Vienna Declaration on Nuclear Safety, principles applied to the new NPP and operating NPP are different, because the operating NPPs were constructed with the old design criteria. The first paragraph on page 31 states the term "safety objectives" related to the fourth PSR. - If safety objectives for PSR of the operating NPPs are set, how are they different from the safety objectives of the latest NPPs(EPR)?	Enhancing safety is a fundamental goal of periodic safety reviews. On this basis, the safety objectives set by ASN for the safety reassessment of the 4th PSR of 900 MWe reactors (oldest operating plants) is to study and implement plant modifications to reach, as far as reasonnably practicable, the safety objectives of new reactors.

Austria	Article 17	p. 149, 17.1.2	For the nuclear power plants in operation in France, are there plans to bring protection against aircraft crashes in line with that for EPR?	For the 4th PSR of 900 Mwe nuclear power plants, in order to adress the objective of practical elimination of core melt in the spent fuel pool in line with EPR (hence without any reference to a probabilistic cutt-off frequency), ASN asked EDF to postulate and to assess the consequence of an airplane crash against the spent fuel pool building. However, consistently with the level of protection of other buidlings, the types of airplane considered in this deterministic approach are those already considered in the basic safety rules RFSI.2.a (small civilian aircraft) and not the loading case of EPR (military fiighter aircraft).
Austria	Article 17	p. 153, 17.3.3	The definition of the "hardened safety core" earthquake (SND), to be taken into account for the hardened safety core SSCs, defined by a response spectrum which must (a) encompass the site's safe shutdown earthquake (SSE), increased by 50%; (b) encompass the probabilistic site spectra with a return period of 20,000 years; (c) take into account the specific site effects in its definition, particularly the nature of the soil. To what extent can or should the operating nuclear power plants be improved against the effects of earthquakes compared to the "hardened safety core" earthquake?	The "hardened safety core" comprises ultimate provisions against an exterme earthquake, beyond the safe shutdown earthquake. To be able to ultimately prevent a severe accident induced by such an extreme earthquake or to limit the consequences of such a severe accident, upgrades are scheduled for all operating NPP. Some existing SSC will be strengthened, others, fully designed to withstand this exterme earthquake, will be added.

Austria	Article 14	p. 113, Focus 24	Can all electrical power and I&C cables be replaced? If not, what are the procedures in case of non-replaceable safety criticial electrical power and I&C cables?	Special attention is given to cables, with R&D material studies, site sampling for expertise and reinforced plant monitoring. The R&D lifetime prediction models showed significant margins beyond 40 years of operation; tests on samples taken from site obtained very good electrical, mechanical or chemical properties after 30 to 35 years of operation. In-service monitoring showed good behavior of cables operating under nominal conditions. The cables subjected to particular ambient or operational stresses were identified and, as necessary, specific checks to detect aging symptoms (measurement of delta tangent and partial discharges for the MV cables, visual inspection for LV cables) were performed. This enables to make targeted replacements and to rule out a scenario of massive refurbishment. When a cable needs replacement, two options can be used : a cable replacement or the decommissioning of the old cable and installation of a new one.

Austria	Article 14	p. 98, 14.1.2	During commissioning and operation of the EPR in Finland (Olkiluoto 3) and China (Taishan 1+2), several problems have become apparent, e.g. with: Vibrations in the reactor cooling circuit and reactor core in Olkiluoto 3, challenges with the flow distribution device located at the bottom of the RPV, performance of the Self Powered Neutron Detector (SPND) in Taishan 1+2. Were comparable indications found in Flamaville 3 so far? What strategies are being used for improvements on generic and plant specific level?	The vibration levels observed in the pressurizer surge lines of Olkiluoto 3 and other EPR plants led to the development of various solutions to reduce vibrations of the pressurizer surge lines to an acceptable level. The device developed for Flamanville 3 is a vibration damper (tuned mass damper). In the current state of the Flamanville EPR reactor, no observations can be made regarding the efficiency of the Flow Distribution Device or the performance of the Self-Powered Neutron Detectors. Nevertheless, EDF is closely following the analyses that are currently being carried out by the reactor supplier Framatome, on the one hand to characterise the flows in the lower plenum of the reactor pressure vessel, and on the other hand to explain the behaviour of the SPND/ECI system as observed in Taishan. Once these analyses will be finished, EDF will consider whether modifications have to be implemented in the future.
Austria	Article 14	p. 104, Focus 18	Are there current site-specific studies on extreme external meteorological events? What were the results? To which extent these results have led to the safety improvements following the Stress Tests?	The stress tests analysis were focused on extreme seismic and flooding events. In complement, regarding the meteorological hazards, ASN requested, during the orientation phase of the fourth periodic safety review of 900 MWe reactors, that EDF updates the safety demonstration on the basis of the most recent scientific knowledge, taking also into account climate change. ASN did also provide a specific guidance letter about the safety approach about tornados. As a conclusion of this periodic safety reassesment, a set of safety improvements has been designed by EDF (to adress tornados, hot weather conditions,....) and are progressively being implemented.

Austria	Article 6	p. 38, Focus 6	Can you provide more details on the repair procedures for the emergency diesel generators to ensure that malfunction due to common cause failures can be eliminated in the future?	A root cause analysis was performed and corrective actions have been implemented to ensure that these faults do not occur again: • Actions related to the elastomer compensating sleeves of emergency diesel generator sets: the corresponding maintenance reference system has been updated to integrate feedback and to specify certain control criteria for this equipment. • Actions related to the cooling water pipes of the emergency diesel generator sets: the maintenance reference system has been updated to specify the procedures for the visual inspection of the pipes on the roof. • Actions related to the FASTON terminals of emergency diesel generators: the maintenance reference system on the control of connectors has been updated to integrate feedback and awareness-raising actions have been carried out. • Actions related to the anchorings of the LLS turbo-alternators: actions have been carried out in the “Anchorings” area with the prescription of the maintenance program and the setting up of training.

Austria	Article 6	p. 42, Focus 9	Can you provide information on the theoretical and experimental work and analyses that were necessary and performed to develop a "core catcher" suitable for the 900 MW reactors? Please provide information on the results obtained.	The ex-vessel corium stabilization strategy that has been developed by EDF for the 900MWe reactors values the R&D that has been performed for more than 30 years on molten core concrete interaction (MCCI) with top flooding. On the experimental side, several OECD programs such as MACE, MCCI-1, MCCI-2 and ROSAU (ongoing program) have identified phenomena that increase the heat transfer between corium and water when water is injected on the top of the corium pool. The experiments performed in these programs have also provided data for the validation of the modelling of these phenomena and more generally the numerical tools developed to perform reactor calculations. On the modelling side, several theoretical approaches have been developed to model the phenomena identified and quantified in the above-mentioned experimental programs: corium melt ejection by gas released from the concrete, cracking of the top crust in contact with water and water-ingression inside the cracks. Numerical simulations have been performed for concrete compositions representative of the basemat of French NPPs. These calculations have shown that the efficiency of the mechanisms that can increase heat transfer between corium and water depends on the concrete composition. The results for basemats of very siliceous composition are still under assessment. Depending on their conclusions, the concerned reactors could undergo a appropriate modification.

Ireland	Article 16	Page 141	A number of lessons have been identified from national nuclear emergency exercises. How will these be addressed?	The preparation of annual exercices begins six months in advance and involves the licensees, the ministries, the local authorities, ASN, the Defence Nuclear Safety Authority (ASND), IRSN and the national meterological service. During this preparation, objectives common to all exercises are defined taking into account the lessons learned from former exercices and described and shared with all the stakeholders in an annual instruction of the Government. Specific objectives can also be defined for each exercice during its preparation phase. In addition, a dedicated action plan based on the lessons from previous exercises is followed by ASN and examined during annual meetings with the different stakeholders.
Ireland	Article 15	Page 119	Can emergency exposures received by workers in response to an emergency be designated as such in the SISERI system? Is dosimetry data for all monitored workers (not just those liable to be exposed) in France included in the SISERI system?	Can emergency exposures received by workers in response to an emergency be designated as such in the SISERI system? The individual dosimetric monitoring of workers involved in radiological emergencies is recorded into SISERI. The employer must also record into SISERI the group 1 or 2 to which the radiological emergency worker is assigned. Definition of the groups of workers in a radiological emergency is given by the labor code (articles R.4451-96 to 110). Group 1: dose > 20 mSV during the emergency situation and Group 2: dose between 1 and 20 mSV Is dosimetry data for all monitored workers (not just those liable to be exposed) in France included in the SISERI system? No, only the dosimetry data of classified workers (category A and B) are transmitted to SISERI.

Ireland	Article 16	Page 137	Fourteen people who are EDF staff with various professional skills are assigned to each regional centre of the Nuclear Rapid Intervention Force (FARN). Are they permanently assigned to these roles?	The FARN staff counts around 300 people (five teams per regional center, each team composed of 14 people). They are not permanently assigned to these roles. These people are employed on the plant where their regional centre is located. Their daily activities are for both everyday life activities of the plants, and FARN activities (about 50% each).
Ireland	Article 11	Page 85	Between 2008 and 2018, the nuclear production division underwent a significant renewal of its human resources, with considerable turnover (12,000 new arrivals), which required a considerable amount of training. When staff retire from the nuclear industry after many years of service, is there a mechanism to capture the knowledge they have and to make it available for new staff?	In the French nuclear fleet, the main action was to anticipate staff hiring in order to have enough time for knowledge and skills development and to face human ressource renewal and long term operations programme. In addition, a knowledge transmission process had been developed and used, mainly by corporate engineering units. It is based on : - identification of the departing expert, - identification of the knowledge to transmit by meeting between the expert, his/her manager and the facilitator (people who knows the method). - work to accurately describe the activities, the used tools, the people involved... - a document written by the expert and the facilitator to help the expert successor(s) to appropriate expert knowledge, where to find information, who to work with, which tools and methods to use. - if needed, the knowledge can be transmit to more people by (web)-conferences, written documents. A training has been implemented for facilitators. A internal EDF wiki has been developed for a few years with about 16000 articles.

Belgium	Article 11.2	§11.2.2 (page 85)	With regard to the important renewal of human resources and the considerable turnover that occurred at EdF in the period 2008-2018: How - after a period of about 3 years with a significant percentage of newly trained employees - is it being evaluated whether the integration and performance of these newcomers is also effective and efficient? If appropriate, were actions taken to adjust the training programmes?	Integration and performance of the newcomers is evaluated through several means: - knowledge tests or skills evaluation at the end of some training courses - skills evaluation by a peer during the shadow training and on-job training and periodical discussions between the newcomer, the peer and the manager - skills evaluation by the manager/supervisor during the field observations (more often for a newcomer in order to gradually qualify them for different activities) - annual appraisal between the employee and his manager This feedback is taken into account by periodic skill committees (2 to 4 per year) at all the management levels to adjust training programmes: - for each nuclear power plant, at team, department and NPP level - at the corporate level: * per area (with participation of NPP department managers for each area) * for the whole fleet (with participation of NPP director) The corporate committees can decide adjustment of national training programs. NPP committees can decide adjustment of local training programs and scheduling of just in time training.
Ireland	General	Summary - Page 15	Desk-based inspection practices were rapidly put into place during the COVID-19 pandemic. They are considered to be a success and will continue to complement on-site inspections. What percentage of inspections in the future will be desk-based?	Fully remote inspections now represents between 2% and 5% (out of 1900 inspections). It is expected that remote inspections will be mostly used for specific topics, as being in the field is deemed particularly important for inspectors and oversight effectiveness.

Russian Federation	Article 8	Section 8.1.6.1	As an example of a "practical exception" of high-pressure core melt scenarios leading to an early and large accidental release, the use of special pressure relief devices in the EPR reactor is mentioned. What level of probability for such scenarios has been achieved and accepted by the regulator as acceptable for such scenarios to be considered “practicaly excepted”?	High pressure core melt scenarios could lead to large and early releases and shall be practically eliminated and shall be demonstrated to be extremely unlikely with a high degree of confidence, on the basis of both deterministic and probabilistic considerations. ASN considers that practical elimination cannot rely on a general target cut-off frequency. For high pressure core melt scenarios on the EPR, the probabilistic value is residual, far below 1e-8.
Belgium	Article 7.1	§ 7.2.3	The Basic Safety Rules (= Règles fondamentales de sûreté = RFS) are according to the ASN website to be replaced gradually by the Guides ("Les RFS ont vocation à être progressivement remplacées par les guides de l’ASN."). At present, the referred RFS in Appendix B are all rather (or very) old, while some of them deal with important matters of safety (such as PSA, seismic risk, etc.), Are these RFS still considered to be officially applicable and technically sufficiently state-of-the -art? Is there a precise planning to convert these old RFS in new Guides?	These BSR are considered as a basis. Most of them have been developed in the 1980s or 1990s and apply to installations currently in operation. It is important to note that these BSR apply to all nuclear instalation sand not only to nucléar reactors. Taking into account in particular the increased safety requirements for the new generation of PWRs, ASN guide n°22 presents on some points different approaches from those contained in the older BSR. For former reactors currently in operation, this safety guide can however be used as a reference target for periodic safety reviews. ASN knows that some BSR are old and should be amanded. A revue of all BSR is necessary to assess the need to replace them with a guide.
Russian Federation	Article 18	Section 4.5	Please clarify the difference if approaches to “breaks of primary and secondary circuit pipelines” to EPR and EPR 2.	The same break preclusion approach was adopted to EPR and EPR2, for the same scope of application i.e. the main primary lines and the main steam lines inside and outside the containment building.

Russian Federation	Article 7	Section 7.3.2	As per Section 7.3.2, an application for a permit to develop a reactor, which is submitted to the Nuclear Safety Authority (ASN), is accompanied, among other, with a preliminary safety analysis report. What is the difference of this report from the preliminary safety analysis report which is submitted for obtaining a NPP construction license? Is it necessary to apply for a development of the next series-made reactor or only to develop an innovative reactor?	The first step of the French licensing process is the "creation authorisation decree", which can be considered as a "construction license". There is no generic design license in France : the preliminary safety analysis included in the application file is specific to a facility and its site (as regards for example external hazards or meteorological condition associated with accidental radioactive releases). Prior to this first permit, it's possible to request ASN's opinion on the safety options of the facility. This step is not mandatory. When such an opinion has been issued, the preliminary safety analysis report shall mention how it has been addressed and its associated recommandations fulfilled.

Russian Federation	Article 14	Section 16	What time will be required to implement safety enhancement measures for reactors of 900 MW and 1300 MW power capacity subject to the fourth periodic safety assessment (additional protection of the containment basemate and introduction of EAS ND system)? What are the results of preliminary assessments of reduction of probability of large emergency release considering the implementation of the said measures for these reactors?	By the end of 2022, twelve 900 MWe units have already achieved their fourth ten-yearly outage and thirteen more will do between 2023 and 2025. These thirteen units will implement, during their 4th ten-yearly outage, the 4th PSR related modifications, including the Installation of the "corium stabilisation" system in the reactor pit and of the so-called "EAS-ND" system (See focus 9 of the National Report of France for details on these two modifications). By 2030, all the thirty-two 900 MWe units will have implemented all these major design features. The same safety enhancement measures will be implemented on the twenty 1300 MWe units as a result of their 4th PSR, during their fourth ten-yearly outage, between 2026 and 2035. For the 900 MWe units, the probability of melt-through of the reactor building foundations (basemat) is divided by ten compared to the risk evaluated for the 3rd PSR, which meets the objective of avoidance of long-term environmental effects, thanks to the modifications mentioned above. A similar reduction of the risk of melt-through of the reactor building foundations (basemat) is expected for 1300 MWe units owing to the implementation of design and operational measures like those implemented on the 900 MWe units.

Russian Federation	Article 19	para.19.8.2.	How the process of handing leaking fuel elements is arranged? Are FAs with leaking fuel elements or removed leaking fuel elements stored in the NPP spent fuel pool or transported to Orano reprocessing plant?	The leaking assemblies from the EDF fleet are stored in the spent fuel pool with the other fuel assemblies. There are multiple ways to proceed: - A lowly irradiated fuel assembly can be reloaded after repair. The leaking rods are replaced by inert ones, the leaking rods then being transported to the Orano reprocessing plant in special sheaths. - If EDF decides not to reload a leaking fuel assembly, it is transported to Orano reprocessing plant without being repaired. The mode of transportation depends on the type and level of damage. If necessary, it will be put into a particular container (called "a bottle") which can be transported inside a regular cask.
Russian Federation	Article 15	para.15.2.1.2.	It is stated: "The priority actions taken to reduce the source term today focus on the processing of certain radionuclides, such as 110Agm". What actions are undertaken to minimize the production of such radionuclides as 122Sb, 124Sb and 125Sb?	The 125Sb radionuclide is absent from liquid effluents of EDF's nuclear power reactors and does not contribute to the source term. Contribution of 122Sb and 124Sb to the reactor source term is lower, compared to 60Co, 58Co and 110mAg, and their origins are less diffuse. Main source of antimony contamination comes from the mechanical seals of several pumps in operation. EDF is currently studying possibility of removing antimony from these mechanical wear parts, as was done for the EPR design reactors (replacement by silicon carbide).
Russian Federation	Article 19	19.7.2 p.185	The National Report states: “In June 2022, EDF submitted a file describing the conclusions of its analysis and the measures it plans to take on the Flamanville EPR reactor. In particular, EDF plans to reinforce the structure of the assemblies to prevent damage to the fuel.” Could you please provide information on any other technical and administrative/organizational measures planned to prevent similar events at Flamanville?	EDF plans to load reinforced fuel assemblies in the affected zone (the periphery of the core) to prevent cladding failure. For the medium term, EDF is developping a solution to improve the hydraulic flow in the lower plenum of the reactor pressure vessel, which is the main cause of the issues encountered at Taishan NPP.

Russian Federation	Article 19	n/a	How do nuclear power plants document information on control over the limits and conditions of safe operation, are there appropriate procedures in place? How do nuclear power plants control compliance with safe operation limits and conditions established in technical specifications and safety reviews (SRR), are there appropriate procedures available?	Controls of compliance with safe operation limits and conditions established in OTS (Operational Technical Specifications) are declined in the following procedures: During daily operations: - For every shift, operators fill a document, which includes the parameters which represent limits and conditions for the current reactor state. Operators use this document as support to check the compliance with the technical specifications. - Every 15 minutes, one operator shall control certain key safety parameters. A comprehensive control room verification shall be completed every two hours. - Plant walkdowns are carried out by staff every shift to check compliance, with the information collected through a tablet. - The Chief of operation must checks compliance with safe operation limits as least once every shift. - The Safety engineer on call must check compliance with safe operation limits independently every day and compare his analysis with the Chief of operation, with the comparison report signed by both. This covers many fields, including the safety impact of ongoing activity, the anomalies identified and their safety impact, parameters in the control room… During outage, before a change of reactor state : - a committee is held in order to control and guarantee compliance with safe operation limits and conditions to proceed to the target state. Participants to this committee

Russian Federation	Article 15	para.15.2.1.2	Paragraph 15.2.1.2 "Optimization of radiation protection of workers" states that values of the collective irradiation exposure per NPP unit are within the range of 0.6 - 0.7 manSv. Could you please provide more detailed information regarding procedure for calculation of the collective dose: Does the collective irradiation exposure per NPP unit include: - doses received during scheduled repair and maintenance works; - doses received during upgrading works within the lifetime extension; - doses received during operation of common-plant facilities (fresh nuclear fuel storage, spent nuclear fuel storage, radioactive waste storage, etc.); - doses received during reprocessing of spent nuclear fuel and radioactive waste at NPP external facilities; - doses received during works not directly related to the operation of NPP units (for example, production of isotope products); - doses below the sensitivity level in conducting the personnel individual dosimetric monitoring.	Does the collective irradiation exposure per NPP unit include: - doses received during scheduled repair and maintenance works; YES - doses received during upgrading works within the lifetime extension; YES - doses received during operation of common-plant facilities (fresh nuclear fuel storage, spent nuclear fuel storage, radioactive waste storage, etc.); YES - doses received during reprocessing of spent nuclear fuel and radioactive waste at NPP external facilities; NO : the reprocessing of spent nuclear fuel and radioactive waste is performed in other facilities under the responsability of other licensees. - doses received during works not directly related to the operation of NPP units (for example, production of isotope products): NO for the same reason - doses below the sensitivity level in conducting the personnel individual dosimetric monitoring: The results of the workers' exposure is derived from the operational dosimetry (measured by the operational dosimeter).

Spain	Article 7	3. Page 62. “Artificial intelligence system used by ASN”	In this page of the report it is mentioned the tool SIANCE (artificial intelligence system for nuclear inspection and assessment). Question: Could you please give examples of the type of information useful for the ASN inspectors obtained with this artificial intelligence tool?	For the preparation of an inspection, inspectors have an easy access to findings observed during previous inspections on the facility, or similar facilities, on a selected period of time, and with a search tool not only focused on words search but, thanks to the AI program, to topics as a whole. Because of the high number of inspections carried out by ASN, it would not be feasible without a digital tool. Siance helps them to identify the most efficient points to control, where findings have been highlighted by other inspectors. It gives also inputs to the technical department for updating the inspection guides. When they write the follow-up letter, inspectors have access to the wordings for similar findings. Siance gives also trends to identify generic issues in order to define national actions with the licensee or suppliers.
Spain	Article 14	5. Page 112. “Focus 23 : New measures to prevent fraud”	In this page of the report, several actions carried by EDF to prevent fraud are described. Question Does ASN have specific inspection plans to detect fraud in suppliers, etc?	The detection and prevention of CFSI is one of the topics tackled during ASN vendor inspections. These inspections tackle both - organisational features related to CFSI : ASN inspects EDF and its suppliers to ensure that correct procedures are implemented to train, prevent and detect CFSI - operational/practical fetaures : ASN also performs checks by sampling during certain CFSI inspections to verify the validity of a given certificate, or the validity of certain signatures in the ITP's.

Spain	Article 14	4. Page 101. “Focus 16 : Safety objectives of the fourth periodic safety review of the 900 MWe reactors”	In the report it is said: For the 4th Periodic Safety Review of the 900 MWe plant units, EDF set itself the goal of moving towards the safety objectives of the EPR type 3rd generation reactors and to reduce early or large releases, in order to avoid long-term environmental effects. EDF thus implemented provisions in two areas: 1. Avoid all risk of radioactivity dispersal into the soil, by making the risk of melt-through of the reactor building foundations (basemat) a residual one, thanks to dry spreading of the corium and its cooling by passive flooding (immersion under water); this solution is in principle similar to that used on the EPR to stabilise the corium; 2. Avoid opening the containment venting device (filter U5) for accident scenarios with loss of safeguard systems, by implementing a special system called EAS ND which enables the water inventory (volume of water) to be maintained in the primary system and the residual heat from the core to be removed by transfer into the containment. Question: Could explain the degree of implementation of these measures in the 900 Mwe fleet?	1. Avoid all risk of radioactivity dispersal into the soil, by making the risk of melt-through of the reactor building foundations (basemat) a residual one, thanks to dry spreading of the corium and its cooling by passive flooding (immersion under water); this solution is in principle similar to that used on the EPR to stabilise the corium; for a global overview of the implementation steps of this measure, please see ASN 's regulatory provision AG-A-I and II from ASN decision 2021-DC-0706. 2. To avoid opening the containment venting device for accident scenarios with loss of safeguard systems, a special system called EAS ND has been designed. EAS-ND enables the water inventory to be maintained in the primary system and the residual heat from the core to be removed by transfer outside of the containment. This modification is scheduled during the 4th ten-yearly outages of 900 MWe NPP (see answer to question 30985 for the implementation of the 4th ten-yearly outage).
Spain	Article 14	5. Page 112. “Focus 23 : New measures to prevent fraud”	In this page of the report, several actions carried by EDF to prevent fraud are described. Question Does ASN have specific inspection plans to detect fraud in suppliers, etc?	The detection and prevention of CFSI is one of the topics tackled during ASN vendor inspections. These inspections tackle both organisational features related to CFSI - ASN inspects EDF and its suppliers to ensure that correct procedures are implemented to train, prevent and detect CFSI - and operational/practical ones - ASN also performs checks by sampling during certain CFSI inspections to verify the validity of a given certificate, or the validity of certain signatures.

Spain	Article 7	3. Page 62. “Artificial intelligence system used by ASN”	In this page of the report it is mentioned the tool SIANCE (artificial intelligence system for nuclear inspection and assessment). Question: Could you please give examples of the type of information useful for the ASN inspectors obtained with this artificial intelligence tool?	See answer to question n° 30968.
Spain	Article 6	1. Page 36. “The earthquake at Le Teil near the Cruas and Tricastin NPP”	In this page of the report, it is said that: A reassessment of the seismic hazard for the Cruas site was carried out, postulating extension of the network of faults which caused the Le Teil earthquake under the site and assuming the occurrence of an identical earthquake with a magnitude increased by 0.5. As this reassessed earthquake exceeds the seismic motion spectrum of the SSE adopted for the site’s third periodic safety review, within a limited frequency range, studies to verify the seismic behaviour of the installation and any needs for seismic reinforcement are in progress as part of the fourth periodic safety review. Question: Could you explain what type of methodology is used in the studies to verify the seismic behaviour of the installation?	The method that is used is based on i) international state of practice (including SMA and SPRA methods) complemented by ii) lessons learnt of previous seismic reassessments of French NPPs and iii) basic requirements regarding Periodic Safety Reviews (PSR) scope and safety demonstration. In practice, the method is based on a deterministic approach that includes safety significance of Structures, Systems and Components (SSCs) and that relies on either seismic walkdown or realistic seismic calculations. The method is very close to the one that was implemented at the occasion of the seismic re-evaluation of Bugey 900 PWR NPP in the frame of the 3rd PSR, which is described in detail in the reference below. Reference: Viallet et al., “Seismic re-evaluation of EDF Bugey 900 PWR nuclear power plant in the frame of the 3rd periodic safety review”, Nuclear Engineering and Design 240 (2010) 1306–1319

Spain	Article 7	2. Page 51. “7.2.4. French nuclear industry professional codes and standards”	In relation to codes and standards in this page of the report it is said: The RCC (design and construction rules) codes were drafted for the design, manufacture and commissioning of electrical equipment, civil engineering structures, mechanical equipment and fuel assemblies in NPPs. Production of these documents is the responsibility of industry, not ASN. ASN issued a position statement on the appropriateness of certain methods described in the AFCEN guide on which the RCC-M code (part of the RCC code relative to mechanical equipment) is based. This does not constitute an approval of the code, but a manufacturer which correctly applies these guides and the code is in the best position to ensure and demonstrate the compliance of its equipment with the essential safety requirements set out in the regulations Question: What is the process to apply changes in the RCC code to the NPPs in France?, What is the role of ASN?	With respect to the RCC-M, the ASN monitors changes to ensure that the code remains appropriate and takes into account the state of the art and the best practices. AFCEN implements a quality management system. Within this framework, the modification of a code is governed by a procedure including, for any request for modification formulated by any user of the code, an analysis of the risks and opportunities, an instruction by a working group designated for this purpose, a proposal for a code modification form or a proposal for refusal of the request (according to the case), and a decision of the president of the code drafting commission.

Spain	Article 15	15.2.1.2. Optimisation of radiation protection of workers. Page 122.	Implementation of specific processes for activities involving a significant risk of exposure to radiation: they apply to access to a prohibited areas (dose equivalent rate higher than 100 mSv/h), to limited stay areas (dose equivalent rate higher than 2 mSv/h) and to performance of radiographic inspections. 12Specific organisations were also designed and formally adopted, and each site is periodically assessed by teams from a Nuclear Inspection unit (independent of the operating sites) with regard to its compliance with common baseline requirements defining the targets and performance to be achieved. Question: Why are specific processes not considered for activities with a high risk of contamination?	The Labour Code (art. R.4451-19) provides for the following "basic" measures to be implemented by the employer when the measures already implemented do not make it possible to avoid a risk of contamination by radioactive substances or the suspension of aerosols or significant gaseous release: "1° Limit the quantities in the workplace; "2° Improve radiological cleanliness by implementing technical and organisational means to contain contamination, in particular by containment and suction at the source and by adapting the circulation of workers, the flow of work equipment and the means of protection "3° Deploy appropriate hygiene measures, in particular to ensure that workers do not eat or drink in the workplaces concerned 4° Ensure the availability of radiological monitoring equipment, particularly at the exit of the workplaces concerned; "5° Define, in liaison with the health professionals mentioned in the first paragraph of Article L. 4624-1, the procedures and means adapted to the decontamination of workers; "6° Organise the collection, storage and disposal of decontamination materials. The Labour Code (Article D4152-7) also provides that it is forbidden to assign or maintain a breastfeeding woman at a workstation involving a risk of internal exposure to ionising radiation.

Spain	Article 15	15.2.1.2. Optimisation of radiation protection of workers. Use and dissemination of experience feedback: Page 121-122.	Only just over 3% of workers exceed the 6mSv threshold, and the dosimetry average remains at below 1 mSv per worker (0.96 mSv in 2021). These results are also obtained in a context of significant maintenance and modification work on the EDF nuclear fleet, for which the years 2019 and 2021 constitute the 2 historical records in the volume of hours worked in the nuclear zone, with more than 7 million hours per year.Quesiont: How many workers exceeded 6 mSv in 2021 (out of 3% of the total?) How many workers in total? What were the maintenance works that led to the individual dose of 6 mSv being exceeded?	In 2021, 1,568 workers were exposed above the 6mSv threshold during some activities such as: mechanical and maintenance, site logistics (including thermal insulation and scaffolding assembly activities), maintenance of I&C and electrical material, metallurgical inspections, radiation protection activities.
Spain	Article 14.2	15.2.1.2. Optimisation of radiation protection of workers. Page 121	Nuclear power reactors. Pursuant to the principle of optimisation of radiation protection, EDF implements a dose optimisation approach based on four pillars: 1. Reduced contamination of systems: 2.- Preparation for interventions and dose optimisation 3.-Use and dissemination of experience feedback 4.-Implementation of specific processes for activities involving a significant risk of exposure to radiation: EDF implements a four-pillar dose optimisation approach: Are the dosimetric results reported in this report due to the application of EDF's dose optimisation scheme based on four pillars? Does each plant establish a Dose Reduction Plan or an ALARA Programme?	Are the dosimetric results reported in this report due to the application of EDF's dose optimisation scheme based on four pillars? Yes given that every activity planed in a nuclear zone in a NPP must follow the dose optimization approach according to EDF procedure. Does each plant establish a Dose Reduction Plan or an ALARA Programme? Yes, every NPP of EDF fleet share this optimisation approach

Spain	Article 15	15.1 The regulatory framework. Page 116. The Environment Code states that the licensee of a basic nuclear installation must define an organisation responsible for advising it regarding all questions related to the risks and detrimental effects of ionising radiation (Article R. 593-112). This organisation is built around a competence centre which acts as radiation protection adviser as defined by the Public Health Code (Articles R. 1333-18 and R. 1333-19.	The Environment Code states that the licensee of a basic nuclear installation must define an organisation responsible for advising it regarding all questions related to the risks and detrimental effects of ionising radiation (Article R. 593-112). This organisation is built around a competence centre which acts as radiation protection adviser as defined by the Public Health Code (Articles R. 1333-18 and R. 1333-19. Question: What is the structure of the organisation responsible for providing radiation protection advice to operators of facilities? What requirements are placed on its members and how are its members accredited? How is its work monitored through ASN inspections?	The "radiation protection competence centre" is a group of employees of the BNI, from different departments: risk prevention department, environment department, etc. The main characteristics of the competence centres are described in the general operating rules of the BNI, which are subject to approval by the ASN. Its members must meet the qualification requirements set out in the ministerial order of 28 June 2021 dedicated to such radiation competence centre : - members in charge of advisory missions must have a level of qualification corresponding to a master degree, - members in charge of field missions (e.g. measurements) must have a level of qualification corresponding to a bachelor degree. During radiation protection inspections, ASN controls that the competence centre carries out all its expected missions, is organized and staff in accordance with both the ministerial order and the approved chapter of the licensee's general operating rules.

Spain	Article 15	15.1.1. Protection of workers Page 116 -117 15.1.1 For all workers (salaried or otherwise) liable to be exposed during their professional activity, the Labour Code also sets provisions more specifically concerning: - dose limits for workers; - dosimetric and medical monitoring of workers; - the functional organisation of radiation protection within the establishment.	For all workers (salaried or otherwise) liable to be exposed during their professional activity, the Labour Code also sets provisions more specifically concerning: - dose limits for workers; - dosimetric and medical monitoring of workers; - the functional organisation of radiation protection within the establishment. Question: What code or regulation establishes the obligation for workers exposed to radiation in their professional life to have training in radiation protection (the labour code?) How is the radiation protection training of exposed workers monitored? Is this parameter checked during NSA inspections of nuclear facilities?	The Labour Code (Articles R.4451-58 and 59) provides that workers exposed to radiation must receive an initial and periodic (every three years) radiation protection training. The topics to be adressed by those trainings are also set by the Labour Code. During radiation protection inspections, ASN checks regulatory compliance with the training periodicity and with the content of the training course delivered.
Spain	Article 16	Page 135	How do you guarantee that the ASN emergency centre and the IRSN's crisis technical centre (CTC) are closely linked? What are the mechanisms to guarantee this in case of a situation of loss of communications? Is there any redundancy of alternative communication systems?	ASN emergency center and IRSN CTC are connected through a dedicated videoconference link. Both centers are also equiped with copper and satellite phone lines. In case of loss of the main telecommunication systems, secure phone lines can be used between the two centers.
Spain	Article 16	Page 138	In relation to the local emergency centre (CCL) of Flamanville, have you performed an emergency drill of the plant that required the use of the CCL? Is the capacity of the CCL sufficient for a situation of a simultaneous emergency in the three reactors? Are there any other CCL in service?	The CCL of Flamanville is the new emergency center of the nuclear plant and it is used during each plant emergency drill (most recently on December 13th-14th 2022). The capacity of the CCL is sized to host two teams : one for the two currently operating reactors and one team for the EPR reactor under construction. Tricastin's CCL is under construction and will be operational in 2023.

Spain	Article 14	Article 14, page 103 and 108 Article 6, page 34 and 35 Article 17, page 146 and 152	In terms of seismic hazard evaluation for the Nuclear Power Plants: • Are there any regulatory requirements: - focused on characterizing site-specific seismic hazards based on current methodologies and standards? - to develop and keep up to date a Seismic Probabilistic Safety Assessment? • Could you describe briefly the concept of “Extreme Seismic Hazard Level” established by EDF based on the requirements of ASN?	A deterministic appoach to caracterise a site specific seismic hazard is adressed by ASN guidance "Fundamental safety rule 2001-01". While this approach is still used as a reference, each step of this methodology (datas, formula, specific effects...) is kept up-to-date and reassessed as part of the periodic safety review. While PSHA is also developped to complement and highlight the deterministic approach to caracterize seismic hazard, there is no consensus yet in France on seismic PSA to assess the response of a plant to such hazard. Beyond the reference seismic hazard adressed as a design basis of the plant (safe shutdown earthquake), another extreme seismic hazard level has been taken into account after the Fukushima Daiichi NPP accident as part of design extension condition (hardened safety core approach). This extreme earthquake is defined by a response spectrum which must (a) encompass the site’s safe shutdown earthquake (SSE) increased by 50% (b) encompass the probabilistic site spectra with a return period of 20,000 years (c) take into account the specific site effects in its definition, particularly the nature of the soil.
Spain	Article 6	Article 4, page 20 Article 6, page 39	After Stress Corrosion Cracking was identified in Civaux Nuclear Power Plant, the reports of several plants with previous ultrasound results had to be re-analyzed. During the inspections, these results were not associated with Stress Corrosion Cracking, but additional inspections were performed to allow an in-depth expert assessment. Could you explain briefly what activities are being implemented by EDF to prevent that Stress Corrosion Cracking remains undetected in future inspections?	EDF developped a new inspection tool based on ultrasonic multi-elements dedicated to the detection of stress corrosion cracking cracks.

Russian Federation	Article 13	n/a	What systemic issues did the companies of EDF group face in implementation of the standard ISO 19443:2018 «Quality management systems - Specific requirements for the application of ISO 9001:2015 by organizations in the supply chain of the nuclear energy sector supplying products and services important to nuclear safety (ITNS)»?	The implementation of the ISO 19443 standard is still in its early stage, therefore it is difficult to identify systemic issues related to it. However, main challenges in the implementation of the ISO 19443 standard appear to rely in the qualification of subcontractors, as well as to the declination of the requirements of the standard and their articulation with existing practices : EDF is in lead for the implementation of the ISO 19443 and the majority of its supplier are not yet certified by accredited bodies. So it is a challenge to justify the proper declination of the requirement of the standards by suppliers. Therefore, EDF strongly encourages its suppliers to be certified. Existing practices are in accordance with the French regulation ; definitions and concepts might be have some little differences. Clarification and alignment are in progress.
Finland	Article 6	Fault in the application of a post-weld heat treatment process in a manufacturing plant	Concerning the Focus 7, unexpected residual stresses were noticed even if local PWHT is performed correctly, see ASN report 2021 page 286 (https://www.french-nuclear-safety.fr/). Has licensee analyzed, whether unexpected residual stresses may be generated in too high PWHT-temperatures? How is the case, if PWHT has been performed in too low temperature?	The presence of axial stress highlighted here results more from the implementation of the heating device than from the temperature itself (over/under PWHT). The width of the heating device around the weld and the temperature gradient perpendicular to the weld have been found to be the main influencing parameters.

Russian Federation	Article 13	n/a	What criteria are used by the licensee to evaluate the bids of contractors in the framework of tender procedures? How does the licensee first make sure that the bidders «are considering using have the technical capability to carry out the work in question and control the associated risks»?	Suppliers and service providers are assessed upstream of any call for tender on their quality and safety management system (including compliance with the ISO 19443) and their technical capabilities in specific skill areas by EDF teams specialized in the field of evaluation and in the technical area. This leads (or not) to an EDF qualification in one or more technical areas. Only qualified companies are able to respond to the call for tenders. At the time of the call for tenders the offers are evaluated, by the client, on their compliance with the technical and organizational specific expectations to the services or supplies concerned by the call for tenders. Only technically admissible offers are studied for the award phase. Finally, the contract is awarded to the company that presents the best offer from a financial and technical point of view according to a technical-economic rating method.
Germany	Article 19.6	p. 181	Table 19.3 shows an increase of INES-1 events between 2016 and 2021. Could France please elaborate on the possible reasons for this development?	As shown on the table, the increase is slight and the trend goes down from 2020 to 2021. Firstly, the total number of events reported by BNI licensees in France every year is more than 1000. They are rated on the INES scale. INES level 1, represent less than 10%. The general trend is stable. Secondly, there is not a single cause to the variation of the number of INES 1 events. Events are assessed and trends identified. The conclusion of this assessment is presented in ASN's annuel report on nuclear safety and radiation protection, where the trending specificities found in the events analyses are detailed.
Finland	Article 6	Focus 8	About the stress corrosion issue, what is the overview, is this issue or phenomenon, which also concerns new nuclear power plants (e.g. EPR - Flamanville 3)?	ASN asked EDF to perform a sensitivity analysis on the Flamanville EPR reactor regarding the risk of stress corrosion cracking over time. Some controls will be performed before its commissionning.

Germany	Article 8.1	p. 70	In the 8th National Report the ASN Budget is specified with 84,45 M€ in 2018. In the current report it is specified with 67,15 M€. Could France please elaborate on this reduction?	In the 2021 Budget Act, the ASN budget (action 9 of programme 181 “Risk prevention”) amounted to €67.15 million in payment credits. The amount of €84,45 million corresponds to an (old) estimate of the full operating cost of ASN. Several operating costs (for the headquarters and the regional divisions) are incorporated into the support programmes of the Ministry for the Economy, Finance and Recovery (programme 218), the Ministry for Ecological Transition (programme 217) and the General Secretariat of the Government (programme 354). ASN’s assets for these various programmes, in terms of both actions carried out for ASN and credits, cannot be identified with any accuracy owing to the overall, shared nature of these support programmes.
Germany	Article 11.1	p. 83	Concerning the “Grand carénage” a total amount of 50.2 B€ is indicated. Could France indicate how much of the sum has already gone into the modernizations?	Concerning the “Grand carénage” total amount (50.2 B€) for 2014-2025 period, 36,1B€ has already been spent.
Germany	Article 7.2	p. 51	It is mentioned that the French regulation includes the WENRA Safety Reference Levels. Does this also include the 2014 Reference Levels?	The implementation of the 2014 Wenra Safety Reference Levels in the national framework is undergoing. At the moment, about 75 % of the SRLs related to NPPs and research reactors have been implemented. An ASN’s safety guide is about to be published in 2023 to implement the remaning SRLs.

Germany	Article 6	p .42	Focus 9 describes the installation of a "corium stabilization system". Would this measure be feasible for the entire nuclear fleet in France?	EDF updated its severe accident management strategy following the Fukushima Daiichi NPP accident. The previous strategy was based on a flooded reactor pit into which the corium is likely to spill. The new strategy is based on a dry reactor pit, which is over flooded after the corium being laid dry on the basemat. This strategy makes it possible to dispense with venting the containment to prevent overpressure.This new strategy provides a very notable improvement in the radiological impact of the severe accident management. These modifications are made within the framework of the 4th periodic safety review for the 900 and 1300 MWe reactors and during the third periodic safety review for the 1450 MWe reactors. The results for basemats of very siliceous composition are still under assessment. Depending on their conclusions, the concerned reactors could undergo a appropriate modification.
Germany	Article 6	p .45	It is mentioned that a series of CEA research reactors have been shut down finally. It would be appreciated if France could elaborate on the reasons why this large amount of research facilities is not needed anymore.	The research reactors shut down since 2017 have been shut down for various reasons: abandonment of the fast neutron reactor project, changes in experimental needs, etc. The RJH reactor under construction on the Cadarache site will ensure future experimental programs and produce radioelements for medicine.

India	Article 10	Section 10.5 Page No. 80	Safety Culture is identified as one of the nine challenges for all the Contracting Parties to the Convention during the 7th review meeting. The role of EDF, CEA, FIS and measures taken by ASN are aptly brought out the report in addressing the challenge towards 'safety culture' (Article 10 and Focus 14). Kindly provide additional details on the guidance material for ASN inspectors for 'safety culture assessment'?	The inspectors can refer to a ministerial order and to ASN Guide n°30 concerning requirements and guidance on safety policy and integrated management system of licensees. ASN guide n° 30 is publicly available (https://www.asn.fr/l-asn-reglemente/guides-de-l-asn/guide-de-l-asn-n-30-politique-en-matiere-de-maitrise-des-risques-et-inconvenients-des-inb-et-systeme-de-gestion-integree-des-exploitants)
Germany	General	p .20	Concerning the IRRS Mission it is reported that 40 out of 46 recommendations and suggestions have been closed or considered to be closed. Could France elaborate on the remaining recommendations and their status?	After the IRRS follow-up mission executed in 2017, 7 recommendations or suggestions were considered still open : - "The government and ASN should explore new ways to ensure that the human and financial resources needed for effective regulation of nuclear and radiation safety are sustained into the future as ASN's workload increases." ASN now updates every year its evaluations of its needed for the following years. Moreover, ASN is about to implement a new time management software to improve its estimation on workload and human resources needs. The recommendation is closed. - "ASN should consider updating relevant parts of the management system and associated processes to ensure the management system promotes and supports a strong safety culture in the regulatory body." ASN emphasized the importance of maintaining and developing a strong safety culture in its new strategic plan. ASN is also gradually clarifying in its management system documents how safety culture is implemented. The suggestion will be closed before the end of 2024. - "The regulatory body should consider issuing internal guidance on the review and assessment activities to be undertaken in the frame of the periodic safety reviews covering all safety factors of SSG-25." An internal procedure was written for non-NPP installations. The equivalent procedure for NPPs is underway. A draft resolution on periodic safety review was written and will be submitted for public

India	Article 6	Page 35./ Focus 2: Wear of the thermal sleeves	It is mentioned "Pending inspections of all the 1,300 MWe reactors at their refuelling outage, ASN asked EDF to conduct monthly rod drop tests (test normally carried out once when restarting a reactor after refuelling and once at the end of the cycle before the next refuelling) and, as a compensation measure, to put in place operating measures to ascertain that reactor trip remains effective even in the event of several RCCAs blockage." Could France elaborate on the compensatory operating measures for ascertaining that reactor trip remains effective even in the event of several RCCAs blockage?	The main compensatory operating measures were : - a more intensive monitoring of the position of the groups - a daily control of the maneuverability of the group R by the RGL system

India	Article 8	Section 8.1.5 Page No. 70	One of the elements of management system of ASN is 'performance indicators for measuring the effectiveness of ASN's actions'. Is it possible to share few examples of such performance indicators for assessment of regulatory effectiveness?	Regarding performance, ASN uses a list of indicators which have three purposes: - describe ASN workload - implement strategic orientations - support managers in the day-to-day operation of their structures. Example of performance indicators: - Authorization: rate of authorization application reviewed according to delays set in the regulatory framework - Authorization: rate of periodic safety reviews completed within a delay of 3 years or less from the reception of the licensee's file - Authorization: rate of commissioning authorizations issued according to delays set in the regulatory framework - Expertise: numbers of opinions of IRSN issued over 18 months and not taken up in an ASN position - Expertise: opinions of the ASN expert advisory committees issued over 18 months and not taken up in an ASN position - Inspection: follow-up letters issued 3 weeks after the end of an inspection - Inspection: rate of new staff certified inspectors over 12 months after their arrival - Experience feedback: events published on ASN's website according to delays set in the integrated management system - Regulation: draft regulatory guidance under preparation for more than 3 years since their approval - Emergency situations: 100% of staff part of the on-duty

India	Article 6	Section 6.2, Focus 1, Page 34	Through a resolution of 25 June 2019, ASN then required EDF to carry out additional embankment reinforcement to ensure its robustness beyond the SSE up to the extreme earthquake defined following the Fukushima Daiichi accident. Could France clarify on the following: 1. Whether 4th PSR review has been completed for Tricastin NPP (900 MWe)? 2. If so, kindly provide additional details on the safety enhancements stipulated for SSCs of Tricastin NPP w.r.t seismic robustness beyond the SSE up to the extreme earthquake? 3. Does French regulations require automatic shutdown of reactor on seismic event?	1. the PSR has been completed for the reactors n° 1 et 2 of Tricastin NPP 2. According to the ASN resolution 2021-DC-0706, Tricastin NPP will identify all the SSC that need reinforcement to seek robustness beyond the SSE in 2023. A program of work will be established to implement the necessary reinforcements between 2026 and 2030 on the 4 units. 3. ASN required EDF to study the pros and cons of an automatic shutdown on seismic event. As a conclusion of this study, EDF decided to implement such a safety provision.
Australia	Article 19.1	General	Section 19.1 refers to a decommissioning plan being part of the commissioning authorisation application but what activities are actually being undertaken by either the operating organisation or the Regulatory Body during operation to facilitate eventual decommissioning? The rest of this Article does not appear to mention decommissioning any further.	The decommissioning plan must be updated: - if necessary when commissioning the installation, - after substantial modification of the installation, - after significant modifications if necessary, - as part of the periodic safey review.
India	General	Page 20/ Part B summary	It is stated "EDF has also put in place, on all the reactors, specific control and leak detection provisions so as to be able to bring the reactors to a safe state if a leak is detected." Could France elaborate on the control and leak detection provisions implemented in these reactors?	The conservatory and compensatory provisions have been implemented by EDF since the 1st of April 2022 and updated in November 2022 to take into account the first operating feed-back. The main purpose of the provisions is to detect, as early as possible, a primary coolant leak and reduce thermal stresses or loads: - by early detection of possible primary leak through enhanced monitoring of primary leak balance evolution and detection of potential steam leaks using the fire detectors - by limiting thermal transient type constraints on lines potentially affected by CSC - and by strengthening controls in the event of penalizing transients.

Australia	Article 11.2	86	The section states that the subcontracting rate at ILL is less than 20% but do you have the equivalent figures for EDF and CEA? Are there any concerns regarding a possible over-reliance on subcontracted staff?	There are no concern regarding a possible over-reliance on subcontracted staff at this facility for several reasons: - the subcontracting rate at ILL is very low, - except for very specific activities, ILL always maintains the internal expertise within its staff, - for the critical activities that have to be subcontracted, ILL has setup a specific process to supervise the subcontractors and make sure the safety is preserved at all times. The CABRI reactor is operated by CEA personnel. The use of sub-contractors remains limited and is subject to contractual monitoring. For EDF, see also the answer to question 33486.
Australia	Article 13	94	It is not stated whether or not the ILL IMS is certified or not as it is noted that EDF is aiming for ISO 19443 certification and CEA is ISO 9001, 14001 and 18001 certified.	Although the ILL IMS follows the main lines of the quality management system ISO standard, it is not certified. ILL does not seek for a certification.
Australia	Article 10	79-80	It is not clear whether there are independent reactor safety committees advising the relevant Reactor Manager as required by SSR-3 Requirement 6. Could you please clarify?	For the ILL, the Quality Safety Risks Unit (CQSR) reports directly to the ILL director. The CQSR is independant. On each site operated by CEA, an independant entity reports directly to its Director on safety.
Australia	Article 11.2	85	New arrivals to EDF undertake an initial introductory basic training for 8 weeks followed by specific professional training. Is this for all staff or only operational and maintenance staff actually working on facilities?	The initial introductory basic training is also open for staff such as human resources, department assistant or managerial assistant, supply chain... on nuclear power plants and for corporate engineering units. Specific professional training is for "technical" jobs (operation, maintenance, radiation protection, security, fuel handling...)

Australia	Article 6	45	Have decommissioning strategies for the shutdown research reactors been determined yet? If so, is the same strategy being applied to all the reactors?	This question seems more of the scope of the Joint convention and more details can be found in the French report on the 7TH national report accessible on asn website : https://www.french-nuclear-safety.fr/content/download/172883/file/France%E2%80%99s%20seventh%20national%20Report%20on%20compliance%20with%20the%20joint%20convention.pdf In particular see the list of reactors undergoing decommissioning page 105 and page 304.
Australia	Article 8.1	70	This section states that the ASN management system is derived from ISO and IAEA standards but is it accredited or certified as such? It is not explicitly stated here or under Article 13.	The national ASN management system is not properly accredited nor certified. Only the department for nuclear pressure oversight is accredited according to ISO 17020.
Australia	Article 6	44	The second bullet point refers to safeguarding the tritium inventory by transforming tritium gas into tritiated water but does this approach take into consideration the significantly higher effective dose associated with tritiated water compared to tritium gas?	This matter has been taken into consideration. First the transformation of the tritium gas into tritiated heavy water will take place in glove boxes with all the safety required. Then the obtained tritiated heavy water will be diluted in the large volume of heavy water of the reactor (40 m3). This will lead to a slight increase in the activity of the reactor water, however remaining under the limit and fully compatible with the normal operation of the reactor.
Australia	General	12 and 13	Have the root-causes for the two anomalies identified been determined?	For the secondary pipes before the main steam isolation valves: lack of transmission and clarification of the specifications from the manufacturer to his suppliers and lack of supervision by the operator and the manufacturer. Defects in the control of welding and late management of deviations. For the EPR vessel (bottom and cover): the size of the shells and the requirements for the wrought iron rate led Framatome to adopt a new manufacturing process. The new manufacturing process, based on a large conventional ingot, had not been qualified beforehand. The controls carried out afterwards revealed the deviations.

Australia	General	18-20	Have the root-causes for the main safety events been identified and are there any commonalities (e.g. failures in QA/QC)?	Root causes must be identified for all the significant safety events. A first analysis report has to be transmited to ASN two months after the event, This report can be updated later on if needed (eg : if the analysis is not finished two months after the event). Some safety events have indeed commonalities such as failures in QA/QC.
Viet Nam	Article 14	14.1.1	Could you please share information on components of the application for decommissioning authorization?	Please refer to the French report for the 7TH review meeting of the Joint convention: https://www.french-nuclear-safety.fr/content/download/172883/file/France%E2%80%99s%20seventh%20national%20Report%20on%20compliance%20with%20the%20joint%20convention.pdf In particular see paragraph 2.2.4.4 page 125.
Viet Nam	Article 16	Fig. 16-1, page 141	Please explain the reasons of rapidly increase of the real events in 2009 and 2017?	Each year, there are between 1 and 5 real events, the differences being not statistically significant. There is no underlying reason which explains that there was 5 events in 2009 and 2017.
United States of America	General	Page 29	The US commends ASN on its collaborative safety review of the NUWARD SMR with STUK (Finland) and SUJB (Czechia), a first initiative of its type in Europe. (1) Please discuss the status of the safety review and the timeline of the project. (2) Please discuss lessons learned/insights/best practices gained from conducting a collaborative review with other regulators. (3) Please clarify if project reports are expected to be publicly available so that lessons can be shared with other international counterparts.	(1) The program of work is composed of six topics. The technical discussions have started in June 2022 and are expected to end in the second quarter of 2023. (2) The lessons learned, insights and best practices regarding the initiative will be identified at the end of the programme of work. (3) For each topic of the program of work, a joint synthesis produced by the regulators is sent to EDF. At the end of the initiative, a closure report will be produced by the working group. Its content and target audience are still to be defined.
Viet Nam	Article 6	6.4	Several nuclear reactors have been final shutdown since 2016. Are any of them preparing for decommissioning phase?	Since 2016, 2 NPP reactors (Fessenheim) and 6 research reactors (Orphée, Isis, Masurca, Phébus, Eole, Minerve) have been shutdown. All of them are preparing for decommissioning phase. Main operations consist in fuel and waste evacuation, premises reorganisation, utility network adaptations.

United States of America	General	Article 6, 8 Various Pages	The energy policy described in the 9th CNS Report has significant differences from the policy presented in the 8th CNS Report with respect to continued operation of nuclear reactors in France. Specifically, the policy presented in the 8th CNS Report, planned for nuclear power to make up 50% of electricity by 2035 (down from ~72%). The revised policy presented in the 9th CNS Report has not defined the contributions of nuclear power but extends the timeline for reducing nuclear energy's contribution to 2050. (1) How has ASN adjusted its long-term planning to accommodate the changes in the national energy policy? (2) Please discuss any challenges ASN anticipates if the nuclear contribution is maintained beyond 2035. (3) Please discuss changes to planned NPP decommissionings.	(1) ASN recently issued its multi-year strategic plan for the period 2023-2027. This plan takes into account the challenges related to the LTO of existing reactors and the launch of a nuclear power generation programme, with, in particular, the following lines of work: - ASN reinforces its oversight of the nuclear supply chain and the management of new build projects. - ASN develops a more iterative dialogue with project holders, in particular for SMR. - Inspector training is being revised, with a focus on soft skills (human and organizational factors, project management…). - ASN shares its vision of nuclear safety key issues, to promote anticipation of all stakeholders. (2) Most of the French nuclear fleet has been commissioned between 1980 and 1995. The renewal of this generation capacity, by nuclear or non-nuclear capacity, is the main challenge of the power system in the decades ahead. ASN considers that the main risk is for this renewal not to be sufficiently anticipated, with the consequence of a potential conflict between nuclear safety and electricity security policies. ASN has engaged, in relation with EDF, an evaluation of the LTO potential of existing reactors, to better inform the energy policy debate regarding nuclear safety issues. (3) Planned NPP decommissionings have not changed since the 7th CNR Report, but the French energy policy is being revised.

United States of America	General	Page 9, 28	The report states France has announced the start of a new nuclear reactor construction program and ASN expects the “creation authorization” application for the new EPR2 reactor to be submitted in March 2023. (1) How far into development is the new program? (2) Please discuss any updates on the EPR2 reactor review since the issuance of the French report in August 2022. (3) Are there any additional details that can be shared regarding plans for new construction NPPs in France? (4) How will lessons learned from the Flamanville 3 project influence the new construction program?	(1) (2) The construction program of six EPR2-type nuclear reactors, including possibly the first two reactors at the Penly site in Normandy, are currently the object of a public debate. It relates both to a local dimension (as regards to the Penly project) and to a national dimension (as regards to the national industrial programme proposed). Public files are available at the following link https://www.debatpublic.fr/nouveaux-reacteurs-nucleaires-et-projet-penly/le-projet-en-resume-3365 : it includes a 127 pages, detailed file (in French), presenting all the answers to the questions raised by the USA (the French energy context, the EDF proposal for a new EPR2 program, the technical characteristics of the EPR2 nuclear plant, the 2-plants Penly project…). The implementation of this new program is not yet decided. Follow-up actions depend on the debates and the post-debate possible decision by EDF. (3) The French energy policy will be updated in 2023, including a law which will define objectives for the power generation mix. (4) The experience feedback from the Flamanville EPR reactor has been taken into account in the EPR2 design. The Excell plan (nuclear excellence) implementation includes the creation in

Russian Federation	Article 14	p. 104	Have stress tests been carried out on long-term shutdown and decommissioned reactors, for example, taking into account factors that could lead to the destruction of buildings with reactors or other buildings on the sites of these reactors? If so, have any "changes" been made to these reactors? / It is written: «Following the stress tests performed after the Fukushima Daiichi NPP accident, EDF implemented modifications to all of its reactors in service...».	With regard to EDF, the stress test reports for the BNIs undergoing decommissioning (Bugey 1, Chinon A1, A2 and A3, Saint-Laurent-des-Eaux A1 and A2, Chooz A, Superphénix, Brennilis) and the Fuel Evacuation Facility (APEC) (Creys-Malville) were submitted on 5th September 2012. ASN gave its conclusions on 10th October 2014. It considered that the procedure followed complied with the specifications and asked for further information relative to the seismic risk in the APEC and the Gas-Cooled Reactors (GCRs), and the flood risk in the GCRs.
Russian Federation	Article 8	para.8.2	"It is written in the text: «The High Council for the Prevention of Technological Risks (CSPRT) which assists the Ministers responsible for Installations Classified for Protection of the Environment (ICPE), for nuclear safety and for industrial safety». What ministries are headed by these ministers? Is there a public authority responsible for implementation of the state nuclear safety policies?	The high council reports to two ministries: - Ministry for ecological transition and territories - Ministry for energy transition Currently, the minister in charge of nuclear safety is the minister for energy transition. As the French safety authority, ASN is in charge of the oversight of nuclear safety and radiation protection.

Russian Federation	Article 11	para.11.1.1.	Please describe in more detail the actions to be undertaken if the situation is "insufficient or inadequate." Is it possible to allocate funds from the state budget to finance decommissioning costs if the utility is incapable to provide such funding? / It is written in the paragraph: «The legal arrangement aims to secure the funding for nuclear costs, in compliance with the “polluter-pays” principle. The Environment Code defines the arrangements for securing the financing of the nuclear costs linked to the decommissioning of nuclear facilities, the management of spent fuels and the management of radioactive waste (articles L. 594-1 to L. 594-14). The Environment Code also stipulates that the licensees must make a prudent assessment of the costs of decommissioning their facilities, and the cost of managing their spent fuel and their radioactive waste (article L. 594-1). The nuclear licensees must thus make provision for this financing by creating a portfolio of dedicated assets equivalent to the anticipated costs. They are obliged to submit triennial reports on these costs and annual update notices to the Government. The securing of funding is under the direct supervision of the State. The General Directorate for Energy and the Climate (DGEC) at the Ministry for Energy Transition is the competent administrative authority for this supervision: it analyses the situation of the licensees and may prescribe the necessary measures in the event that this is insufficient or inadequate.»	The system set up by France for financing the decommissioning of BNIs and managing the spent fuel and radioactive waste produced by these installations is defined by articles L. 594-1 to L. 594-14 and D. 594-1 to D. 594-18 of the Environment Code, by the Order of 21 March 2007 concerning the securing of financing of nuclear costs, as well as by the French accounting standards. The licensees shall make an evaluation of corresponding costs (the “nuclear costs”), book provisions accordingly and cover these provisions by dedicated assets (the “covering assets”), under the control of the Government, which can use enforcement and sanction powers (see below). The realisable value of covering assets shall be at least equal to the amount of these provisions, except for those linked to the operating cycle. Any removal of dedicated assets is forbidden under a 120 % coverage rate threshold (except for paying the nuclear costs). These arrangements aims to ensure that the prime responsibility to finance nuclear charges rest with licencees, whereas the State only has ultimate responsibility. If the Government identifies any insufficiency or inadequacy, it may, after hearing the licensee’s observations, prescribe the steps needed to remedy the situation, setting deadlines for compliance (article L. 594-5 of the Environment Code). In particular, if funds are not sufficient (for example, in case of increase in estimated or effective costs or in case of losses affecting covering assets), the maximum timeframe for the

Russian Federation	Article 7	para.7.4.2.	If the inspection carried out by the Nuclear Safety Authority (ASN) is based on the principle that the inspection is neither systematic nor exhaustive, but is based on sampling and focuses on facilities with the highest potential consequences, how is the selection of such a facility determined for inspection performance?	First of all, nuclear facilities in France are categorized in 3 categories: category 1 for the ones with the higher risks (like NPPs), to category 3 for those with lower risks. The yearly inspection programme requires more inspections for category 1, much less for category 3. Topics to be inspected are selected on a multi-year basis so that when a cycle is completed, all major topics have been inspected at least one on a given NPP. Then, ASN has an evaluation process: every year, nuclear facilities are evaluated and the result drives the inspection programme: a facility deemed less performant is likely to have more inspections or specific ones aimed at the identified weaknesses. Finally, regional offices focus their inspections based on their field knowledge.
Russian Federation	Article 7	para.7.4.2.	Does the Nuclear Safety Authority (ASN) conduct an analysis of the inspection results with presentation of recommendations on measures to prevent similar events at other nuclear power plants?	All of the NPPs operated in France are of similar model, and operated by the same licensee. This situation facilitates the consideration of the inspection findings regarding the potential to be found on other NPPs, not only by ASN but also by the licensee. Inspection results are first assessed at a regional office level, with follow-up letters signed by the management, who then has an oversight of the regional findings. Then, if necessary, those findings are communicated to the technical directorate (which nevertheless has a copy of follow-up letters) which evaluates if verifications have to be carried out on other NPPs. Also, inspection results are part of the inputs for establishing the next year inspection programme. Topics are discussed among all of the heads of NPPs regional departments and headquarters technical departments.

Russian Federation	Article 7	para.7.3.6.	Is there a specialized organization (enterprise) that deals with decommissioning after final termination of the NPP (nuclear facility) commercial operation?	The licensee remains responsible for the decommissioning of its facility after final shutdown. The licensee may call on specialised providers to carry out, under its supervision, decommissioning operations.
Russian Federation	Article 7	para.7.3.6.	What is the anticipated final state for the decommissioned NPP unit (green field or brown field)?	The final state of a nuclear facility after its decommissioning is prescribed in the decommissioning decree. It depends on the operation history and related pollutions, as well as on the future use of the site. ASN advocates to reach a final state in which all hazardous substances have been removed, when feasible. As an example, for the Fessenheim NPP, EDF aims to reach complete clean-out.
Belarus	Article 7	Article 7.3, p.53	Please, explain for which procedures the safety assessment or expertise of the regulatory body is implemented, and for which procedures a safety assessment or similar procedure is implemented by other organizations.	The legislation makes provision for several BNI-related authorisations: - the BNI creation authorisation (L. 593-7 of the Environment Code), - the commissioning authorisation (L. 593-11 of the same Code), - the change of licensee authorisation (R. 593-41 of the same Code), - the BNI substantial modification authorisation (I and II of Article L. 593-14 of the same Code) and that for the performance of certain noteworthy modifications (L. 593-15 of the same Code). For all those procedures, the safety assessment or expertise is performed by ASN with the support of IRSN (its technical support organization).
Belarus	Article 7	Article 7.4.2, p.62	Apart from using the available statistics for building diagrams, estimating average values, what other data processing algorithms are used and what data are processed?	SIANCE processes the text of the follow-up letters, not figures or numbers, hence the need of AI to analyse text and to be able to consider parts of texts as topics. Apart from the follow-up letters, lists of NPP systems subject to significant events is processed, but with no specific algoithm, only to add information to the already processed data from the follow-up letters.

Italy	Article 16	Page 140	One of goal of national nuclear exercise is to “develop a pedagogical approach aimed at civil society, so that everyone can make a contribution to their own safety by adopting appropriate behaviour”. Was it possible to involve the population during the exercises that were carried out? If so, what kind of feedback were received by the population and what are the lessons learned?	For each exercice, a public meeting is organized in order to inform the public about the exercise but also about nuclear risks and the appropriate behaviours in case of an accident. However, it remains difficult to involve the population at a large scale, especially for evacuation simulation. ASN has observed an increasing involvement of mayors in exercises.
Italy	Article 15	Page 117	The report states that, according to an interim provision, in the period from 1 July 2018 to 30 June 2023 the dose limit for the crystalline lens of the eye contain a cumulative limit value of 100 mSv (provided that the dose received during 1 year does not exceed 50 mSv), while from 1 July 2023 the new limit of 20 mSv is applied: could you explain why in the above mentioned periods a different dose limit is applied?	The exposure limit values for the crystalline lens of the eye were lowered in 2018, from 150 millisieverts (mSv) to 20 mSv. This change is accompanied by a transitional provision of the Decree No. 2018-437, to allow for the adaptation of the workstations concerned. From July 1, 2018 to June 30, 2023, the cumulative limit value for the lens of the eye is set at 100 mSv over five years, provided that the dose received during a year does not exceed 50 mSv.
Italy	Article 16	Page 134	With reference to the statement “IRSN, which also deploys the experts from its “mobile means for environmental analyses”, in order to assist the public authorities with their decision-making. This implies deployment of resources in the field…” How many mobile means for environmental analysis IRSN is able to deploy in the fild in case of major accident?	The IRSN has mobile means for characterizing radiological contamination of the environment following a nuclear accident. These means consist of mobile automatic beacons, mobile gamma spectrometers on board aerial vectors (drone, helicopters or planes) or terrestrial (car, backpack, quad) and make it possible to map the contamination. IRSN also has team members trained to perform in situ measurements as well as samples that will be analyzed in IRSN's mobile laboratories deployed near the impacted area. IRSN's environmental mobile unit is made up of around 40 to 50 people.

Italy	Article 16	Page 130	The Act of 13 August 2004 on the modernisation of civil protection provide the performance of exercises involving the population as far as training activities for the population. Have these exercises been organized with the population? On this regard, what participation and feedback have the Authorities received from the population?	The annual exercices sometimes include civil protection actions involving the population. For example, for the exercice of Flamanville on december 13th 2022, 118 schools performed a test of their protection plan. Also, for each exercice, the local authority (prefecture) organises a public meeting in order to inform the public about the exercise, nuclear risk and appropriate behaviour in case of an accident. However, it remains difficult to involve the population at a large scale, especially for evacuation simulation.
Italy	Article 16	Page 133	Does the post accident phase start after the end of the release or after the declaration of the termination of the emergency? Does the post accident phase include also remediation activities?	The post-accidental phase starts with the end of the radioactive release and the return of the the facility to a controlled and stable state, with no more threat of releases. This corresponds, in France, to the declaration of the termination of emergency, even if some protective actions remain. Remediation and decontamination activities begin as soon as possible during the post-accidental phase, provided that the radiological situation in the environment is sufficiently well characterized.
Italy	Article 6	General	The past summer 2022 was one of the hottest ever since the nuclear power was developed: the lack of water in the rivers and the consequent loss of ultimate heat sink could lead to problems of fuel cooling: considering the safety improvements already introduced at France NPPs after the Stress Tests, does ASN foresee to request EDF to implement additional safety systems to face possible future loss of the ultimate heat sink?	The dry summer of 2022 did not call into question the availability of the reactor heat sink. the safety provisions already implemented to deal with such an event are still considered sufficient. The main concern during this dry summer was not about safety but about the environmental impact of normal operation of some plants (hot water and chemical/radiaoctive releases while the river flow rate is very low)

Italy	Article 7	Page 62	“Focus 12 : Artificial intelligence system used by ASN. As part of its multi-year strategic Plan, ASN initiated work on the digital transformation of nuclear safety inspection. SIANCE (artificial intelligence system for nuclear inspection and assessment) is one of the projects involved in this action. SIANCE aims to utilise the data from the ASN inspection follow-up letters (nearly 23,000 in 2020) to assist the inspectors in their work. ..” Has it been planned to deepen, strengthen and develop the use of SIANCE at national level for the preparation and conduct of inspections and not just for follow – up, as a digital tool that can help the inspectors in their work?	Yes, indeed. SIANCE is used to prepare inspections and to evaluate the need to revise inspection guides, as well as preparing the inspection programme. See answer to question 30968 for some more details.
Hungary	Article 18.2	Page 160	"A safety classification approach is applied for safety important equipment. This approach allows appropriate requirements to be defined in terms of design, manufacture, qualification, operation and in-service monitoring, proportionate to their importance for safety. Equipment items can be classified under the prevention of incidents and accidents, the mitigation of their consequences or protection against hazards, and according to their type (mechanical, electrical, etc.)." Is this safety classification approach publicly available?	There is no regulation or ASN guidance on safety classification approaches. The licensee shall present its safety classification approach in its safety case. Part of it publicly available as part of the public enquiry file of the authorisation of creation. The remaining information, which is considered as an environment-related information, can be asked to the licensee.
Italy	Article 6	Page 42	A wide program of safety improvement is foreseen for the three France reactor fleets: could you give more information on why the installation of a "corium stabilisation" system is foreseen only for 900 MWe reactors and not also for 1300 MWe and 1450 MWe reactors?	The corium stabilization system is foreseen to be implemented on each type of reactors. The implementation will occur during the outage envisaged for the implementation of modifications identified through the PSR process. Thus 900 and 1300 MW reactor will implement these modification during their 4th PSR outage (approximately 40 years) and 1450 MWe reactor during their 3rd PSR outage (approximately 30 years).

Hungary	Article 18.2	Page 162	"The ASN-approved organisations assess the regulatory compliance of the level N2 and N3 NPE items. These organisations are called upon directly by the manufacturer. The activity of these organisations is regularly inspected and audited by ASN." How are these organizations financed? Are they paid by the manufacturer? Do these organisations have the same responsibility as ASN? Is the enforcement for non-conformances found by this organization done by ASN?	For N2 and N3 equipment, the framework is similar to the framework for non-nuclear pressure equipment, which is defined by the european directive 2014/68/UE, the main difference being that the conformity assessment bodies have to be recognized by ASN. As a consequence, these organizations are financed directly by the manufacturers. They also cannot issue a conformity certificate if the manufacturer has not implemented appriopriate corrective measures.
Hungary	Article 7	Page 62, Focus 12	"By analysing inspection follow-up letters, SIANCE can also identify trends and detect early warning signs." Is SIANCE developed by ASN? What are the main experiences with it?	SIANCE was developped jointly by ASN and a subcontractor specialised in AI. Lessons learned during the process are multiple: - importance to manage a team, conduct a project, and most of all have strong support from the highest level of the organisation; - conduct the project with agility, carry out a risk analysis at the beginning and keep in mind user needs; - follow the constant progresses in AI to not miss opportunities; - anticipate training of users and management of change.

Hungary	Article 14	Page 106	"ASN more particularly collected the opinion of its Advisory Committees on various topics, more specifically: safety classification" What was the opinion of the Advisory Commitee about the safety classification of the Flamanville EPR unit? What were the key findings?	Advisory Committee considered that the EPR functional classification approach is on the whole compliant to the principles established by the Technical Guidelines (TD) for the design and construction of the next generation of pressurized water nuclear reactors, applicable to the EPR reactor of Flamanville 3. Principal findings were as follow: - Safety class “F2” includes SSCs whose safety roles can be very different and therefore it is not possible to define a set of general requirements applicable to all of these SSCs. A case-by-case analysis is in practice necessary to define the appropriate requirements for each F2 classified SSC. - The classification of SSCs which monitor functions of systems classified “F1” during normal operation constitutes a significant improvement of the EPR-FA3 compared to the reactors in the operating fleet. - Safety classification of the functions necessary to achieve and maintain a controlled state in the event of an accident with meltdown as “F2 class” appears to be satisfactory. - Safety classification of functions and equipment involved in the “practical elimination” of situations that could lead to early or large releases was considered as an improvement. On a case-by-case basis, such functions and equipment may require, in consideration of their role in the safety demonstration of “practical elimination”, a functional classification higher than F2 - Regarding the SSCs necessary for the protection against
Hungary	General	Page 25	"EDF group entities have initiated the ISO 19443 certification procedure. By early 2022, a large number of EDF entities had already obtained ISO 19443 certification (for the others, the procedure is in progress)." What other requirements are in place for a supplier management system other than ISO 19443?	Apart from ISO 19443, requirements for suppliers are covered by the “General Quality Assurance Specifications” (SGAQ applicable for reactors in operation and new construction projects like EPR in France) which is based on the ISO 19443 version 2018 and ISO 9001 version 2015.

Hungary	General	Page 29	"These discussions, which concern the main safety options of the NUWARD™ SMR project sponsored by EDF, are under way with the Finnish nuclear regulator (STUK) and the Czech nuclear regulator (SUJB). This tripartite initiative, launched by ASN in the 1st quarter 2022, is a first in Europe. It aims to achieve a joint assessment of the main safety options considered by EDF." When will the results and conlusions of this multilateral review be available?	Technical discussions on the program of work are expected to end in the second quarter of 2023. At the end of the initiative, a closure report will be produced by the working group. Its content and target audience are still to be defined.
China	Article 16.1	16.1.2/P132	It's stated that "However, the PPIs also comprise a “reflex” phase which involves the licensee immediately alerting the populations within a 2 km radius around the facility, requiring them to take shelter and await instructions." Question: Could you introduce who is responsible for deciding that the licensee immediately alerts the population within a 2 km radius around the facility to take shelter and await instructions?	In reflex phase the licensee is responsible for the triggering of the alert, based on criteria defined in its on-site emergency plan. For example: - the rupture of steam generator pipes on a NPP - exceeding of a radiation threshold at the stack of the NPP
Hungary	Article 13	Page 93	"since 2017, been implementing specific provisions aiming to prevent and detect these risks, notably: creation of a whistle-blower system guaranteeing anonymity, which can also be used by anybody from outside EDF" Is the anonymity guaranteed with IT tools? Are there indicators to follow the improvement in procurement?	See answer above for question 33488. In addition: suppliers are asked to implement anonymous whistleblowers provisions. As the anonymity is guaranteed, no personal data is available. In case of CFSI, relevant people get only the needed information in order to be able to deal with (the data is filtered to not reveal the identity of the whistleblower). From 2023, suppliers qualifying criteria will explicitly include the implementation of such provisions, which are also required by an European Council Regulation (n° 2988/95).

China	Article 14.2	14.2.2.2/P113	It's stated that "EDF in particular defined a strategy in order to extend the validity time of the initial qualification for accident conditions (including earthquake) of the electrical and mechanical equipment." Question: Could you introduce EDF's strategy to extend the validity time of the initial qualification for accident conditions (including earthquakes) of electrical and mechanical equipment?	The EDF's methodology to extend qualified life duration of the initial qualification for accidental conditions of electrical and mechanical equipment has been presented at 2017 and 2022 IAEA PLiM (Plant Life Management Conference). The reference papers are the following : - H.A Brossier and All ''Reassessing and extending equipment qualified life for the EDF 900MW NPP series" – PLiM 2017 IAEA-CN-246-003 - S. Jayet-Gendrot and S. Salvatores ''EDF Experience on Long Term Operation for the 900MW PWR fleet'' – PLiM 2022 IAEA-CN-297-046

China	Article 15	15.2.2.1/P123	It's stated that "EDF is therefore attempting to limit discharges, mainly by improving the effluent collection and treatment circuits and by reducing its production at source." Question: Could you introduce the work of EDF to improve the effluent collection and treatment circuits?	The overall regulation is based among other things on the optimization principle. This principle has been integrated in the design of the systems as well as in the operating procedures of all EDF NPPs in operation in order to "reduce as far as reasonably possible and at an acceptable cost" the discharges of effluents. With this goal in mind, since the commissioning of the first NPPs, EDF has implemented the best operating modes, treatment processes and liquid discharges procedures at an acceptable cost to get to an optimized management of the discharges. These constant efforts to keep radioactive liquid discharges at a minimum level are based on: - Reducing the generation of liquid wastes from their various sources. During operational inspections the main sumps are inspected to detect any significant flow of effluent ; Plexiglas covers were installed on the inlet manifolds of some of the sumps in order to see the origin of the effluents ; Procedures for tracking leaks were also implemented. - Improving the selective collection of the different effluents, their treatment methods and in some cases their recycling while maintaining an adequate proportion between liquid discharges and solid wastes. Spent liquid effluents are selectively collected under four categories : Drain waters from floors, Service-drain effluents, Chemical effluents, Residual drain waters) in order to send them to the treatment that best suits their characteristics (filtration, evaporation, or demineralization). - Monitoring in order to verify the efficiency of effluent

China	Article 14.1	14.1.2.2/P101	It's stated that "Reduce the risk of spent fuel assemblies melting in the storage pool: putting in place of a diversified system for cooling the spent fuel pool in the fuel building;" Question: Could you introduce the diversified cooling system in spent fuel pool?	The PTR-Bis system (*) aims at providing closed loop cooling water for spent fuel pool in the Fuel Building in case of unavailability of the two PTR cooling trains or in case of total loss of the heat sink. This feature relies on a fixed part inside the fuel building connected to the pool suction and discharge pipes, and a mobile part to be connected through a protective blockhouse. This mobile part is made of a container (standard 20 feet type) including a pump and plate heat exchanger. The latter is connected to an autonomous mobile pumping unit made of a floating pump which provides cooling using water from the natural environment (diverse heat sink). This equipment is transported on-site by the nuclear rapid intervention force (FARN, see Focuses 18 and 30). PTR-Bis system is designed and built to resist extreme external hazards (earthquake, flooding, tornado). This new feature is a significant safety improvement notably with regard to extreme external hazards that could impact the entire site. In these situations, the PTR-Bis can be implemented on all the units of a same site if needed. These features are the same for the entire French fleet. (*) Please refer to the Figure 7 of the paper by S. Jayet-Gendrot and S. Salvatores ''EDF Experience on Long Term Operation for the 900MW PWR fleet'' at PLiM 2022 Conference IAEA-CN-297-046. It presents the 3rd train for fuel pool cooling feature in a
China	Article 14.2	14.2/P112	It's stated that "To prevent the risk of fraud, EDF adapted its surveillance practices, notably making greater use of unannounced inspections or cross-inspections." Question: What punitive measures will EDF take against fraud?	On a case by case basis, EDF reserves the right to file a complaint in Court for any proven CFSI case in which it feels it has been wronged. The consequences then depend on the decisions of the Court.

China	Article 6	6.3.2/P44	It's stated that" installation of the (redundant) groundwater system to guarantee that the fuel remains flooded and cooled. This system may also be used for fire-fighting;" Question: Could you introduce how the (redundant) groundwater system can guarantee that the fuel remains flooded and be used for fire-fighting？	The groundwater circuit is a "hardened safety core" system robust to extreme external hazards. It enables the water inventory of the cooling of the core to be replenished in extreme situations. Because of the relatively low power released by the reactor core, maintaining this inventory in liquid water is sufficient for its cooling. In addition, in the event of a fire, it is possible for fire-fighting teams to connect to the groundwater circuit to use this water as extinguishing water in certain premises.
China	Article 14.1	14.1.2.2/P101	It's stated that "some items of equipment are reaching their design-basis lifetime. The studies concerning the conformity of the installations and the management of equipment ageing therefore need to be reviewed to take account of the degradation mechanisms actually observed and the maintenance and replacement strategies adopted by EDF;" Question1: Could you explain what strategies EDF has taken to extend the life of equipment? Question2: Could you introduce the strategies of life extension of NPPs？	The LTO program on the French nuclear fleet therefore started with the 4th periodic safety review of the 900 MWe PWR fleet. The related technical areas of work address the three following safety issues: - Conformity and compliance with safety requirements, as a basis for safety upgrade: this part relies on a combined approach between technical reviews, systems testing and on-site inspections. - Aging management of replaceable and non-replaceable components: analysis of SSC/aging mechanism couples, verification of mechanical resistance, qualification programs to secure functioning, in-service monitoring, plus, when needed, changes of equipment or protecting measures. This approach requires a high level of anticipation in the program. - Design safety upgrades, driven by Gen III safety goals. This implied a highly demanding licensing process. The proposed 4th PSR is therefore a wide-ranging programme of inspections and reviews. Actions undertaken specifically for the purpose of LTO are presented in the following paper: S. Jayet-Gendrot and S. Salvatores ''EDF Experience on Long Term Operation for the 900MW PWR fleet'' – PLiM 2022 IAEA-CN-297-046.

China	General	4.1.6/P14	It's stated that" These new oversight methods enable ASN's resources to be focused on the activities with the highest risks, oversight to be made more efficient, and EDF to be repositioned as holder of prime responsibility for the safety of its installations." Question: Could you introduce how to define the activities with the highest risks in the new oversight methods？	In the new outage oversight method developed by ASN, activities with the highest stakes are defined based on a range of different elements, such as the content of the outage presentation file provided by EDF, the warnings stemming from the previous outage on the same unit, applicable EDF's commitments, as well as generic positions issued by ASN concerning all reactors, and the generic operating feedback from the NPP fleet. The activities targeted through the oversight may concern for instance the correction of generic or specific deviations, the deployment of plant changes, significant maintenance activities performed on safety equipment, or actions associated to the taking into account of significant safety events.
China	General	4.1.1/P10	It's stated that "ASN made sure that the maintenance and outage operations were pushed back by EDF in compliance with the applicable safety rules." Question: Could you introduce the applicable safety rules for EDF to postpone the maintenance and outage operations?	Requests to postpone maintenance operations on the main primary circuit and the main secondary circuit must be approved by ASN. EDF is responsible for the postponement of the other maintenance operations, with an information of ASN. In the end, few operations were postponed because of Covid-19 (no significant increase of deferred maintenance activities or postponed shutdowns than in normal times).
China	General	4.1.2/P10	It's stated that "Several steps were taken to involve the public in the generic phase2 of the 4th periodic safety review of the 900 MWe reactors." Question: Can you introduce how to select the public who participate in the safety review?	The public was not selected. In fact, the main challenge was to involve all different kinds of public (such as local information commission members, NGOs, individuals, etc.).
China	Article 19.3	19.3.3/P177	It's stated that "This preventive maintenance is carried out periodically in accordance with validated procedures and accompanied by a risk assessment if the intervention could affect safety." Question: Could you explain how to conduct risk assessment if the intervention may affect safety？	For example, preventive maintenance of safety-relevant system will render it unavailable for the duration of the maintenance operation. Such a situation must be the subject to a preliminary analysis so as to identify compensatory measures.

China	Article 19.4	19.4.1/P177	It's stated that "After commissioning, ASN is informed of the noteworthy modifications to these rules, the most significant of which are subject to ASN authorisation." Question: Could you introduce which modifications to these rules are the most significant modifications that require ASN authorisation？	The classification rules and the set of criteria used are defined by the ASN resolution 2017-DC-0616. This resolution provides a list of criteria and conditions to identify if a modification of the GORs requires an authorization. It is available on the ASN website : https://www.asn.fr/l-asn-reglemente/bulletin-officiel-de-l-asn/installations-nucleaires/decisions-reglementaires/decision-n-2017-dc-0616-de-l-asn-du-30-novembre-2017
China	Article 19.1	19.1.3/P173	It's stated that "The examination aims firstly to check that the conclusions of the previous technical examinations are duly taken into account, secondly to check on the prevention and limitation of the risks and drawbacks created by operation of the installation." Question: Could you introduce what measures have been taken to prevent and limit the risks and drawbacks created by operation of the installation？	The provisions taken by the licencee in order to prevent the risks and drawbacks generated by the operaiton of the installation are defined in the general operating rules (GORs). These GORs are fully part of the commissionning autorisation application. They are the operational implementation of the hypotheses and conclusions of the safety demonstration. GORs adress a very large scope : from periodic testing od SSCs (periodicity and acceptance criteria), the limit and conditions of operation, as well as emergency operating procedures.
China	Article 19.2	19.2.2/P175	It's stated that "The STEs evolve to integrate the lessons learned from their application and the modifications made to the reactors. The licensee can amend them temporarily on an ad hoc basis, for example to carry out an operation in conditions that differ from those initially considered in the nuclear safety case. In such cases the licensee must demonstrate the relevance of this temporary modification and define adequate compensatory measures to control the associated risks." Question: Could you clarify whether the licensee is allowed to temporarily modify STEs before reporting to ASN?	The licensee can temporarily modify STEs before reporting to ASN only if the modification is not safety significant. If the temporary modification is safety significant, it must, prior to its implementation, be declared to or authorised by ASN (depending on its safety significance). ASN resolution n°2017-DC-0616 defines the safety classification criteria.

China	Article 17.1	17.1.2/P148	It's stated that "The operating measures comprise:·alert systems in the event of a foreseeable hazard that could lead to flooding of the site;·agreements with organizations within or outside EDF;·specific operating rules in case of flooding; local procedures. " Question1: Could you introduce what operating procedures have been written for power plant aiming at flooding? Question2: Are these operation procedures managed in SOP or GAEC?	1. Based on multi-staged criteria, to anticipate the occurrence of a flooding situation, such flooding procedure addresses preventive reactor shutdown and flooding situation preparedness (level of the feedwater tanks and diesel generators' fuel tanks, deployment of mobile anti-flooding devices, etc.). 2. Those procedures are neither in SOP nor in GAEC. They are a complement of normal operation, to adapt operation and configuration of the reactor, in order to prepare a foreseeable flooding situation (there objective is not yet to cope with a flooding situation).
China	Article 18.2	18.2.3.1/P161	It's stated that "ASN has devoted particular attention to the qualification of equipment for severe accident conditions." Question: Could you introduce whether the identification requirements are applicable to the old plants? How does ASN consider the identification under serious accident conditions?	Following the Fukushima accident, EDF changed its severe accident management strategy. The previous strategy was based on a flooded reactor pit into which the corium is likely to spill. The new strategy is based on a dry reactor pit, which is over flooded after being laid dry on the basemat. The new new strategy is implemented during the 4th periodic safety review of the 900 and 1300 MWe reactors and during the third periodic safety review of the 1450 MWe reactors. This change in the severe accident management strategy induces an evolution of the severe accident sequence and conditions within the reactor containment building. Hence the requirements to achieve the severe accident qualification of equipements had to be updated and the equipments will have to be checked against this new reference.
Pakistan	Article 19	19.4 Page 177	France may like to provide the information of the process for recording near miss.	When an incident or accident occurs, licensees have to notify ASN without delay of any accidents or incidents (see 19.6. Reporting of incidents significant to safety). Technical and organisational lessons have also to be learnt from operational experience feedback, including near misses (see 19.7. Operational experience feedback)

China	Article 17.1	17.1.2/P146	It's stated that "For the design of new reactors, EDF considers: la "seismic interaction" approach which is implemented in order to prevent an essential SSC from being damaged by equipment that is not seismic-classified in the event of an earthquake; loss of the off-site electrical power supplies further to an earthquake insofar as they are not designed to withstand the earthquake. This is to be considered in the safety case under the reference accidents; the SSE resistance requirements of the fire protection measures (DPCI - Dispositions de Protection Contre l'Incendie): fire sectorisation, fixed fire detection and extinguishing systems) contributing to nuclear safety." Question: Are there any improvement actions for the old units with regard to anti-seismic design, "to prevent an essential SSC from being damaged by equipment that is not seismic-classified in the event of an earthquake"?	Yes, this "seismic interaction" approach has already been implemented on older units as part of former periodic safety review .

Pakistan	Article 14	14.1.2.2 Page 100	It is mentioned that modifications are grouped into modification batches for greater consistency in the batch of modifications. France may like to share details of this process.	More than 150 modifications are necessary to achieve the 4th PSR related objectives (please refer to Focus 16). Considering the amount of associated works, activities and operating changes, progressive implementation of these modifications has been deemed necessary to ensure a sustainable and safely-achievable industrial program that does not impair overall safety (including day-to-day safety related to the heavy works and activities performed) during the related 10-yearly outage and that provides successive manageable steps of operating procedures changes, new systems implementation, in regard to human factor impacts. In this context, an a decision-making process that considers all relevant factors, including safety of the design and of the day-to-day works and activities, human & operational factors, security, environment protection, supply chain availability and capacity, costs, has been developed and is being used by EDF. This resulted in the decision to group the 4th PSR related modifications into two batches for the 900 MWe units to meet the EDF industrial trajectory and ensure safe and manageable implementation of the modifications on site, prioritizing modifications having the highest safety benefits (e.g. EAS-ND).
Pakistan	Article 15	15.3.2 Page 129	France may like to share the details regarding the changes made in regulatory requirements for the discharges from nuclear reactors based on best available techniques and experience feedback from the NPPs in operation.	The regulatory framework for radioactive effluent discharges is established when a nuclear facility is commissioned. Later on, the safety and environmental impact is re-assessed every 10 years as part of the periodic review. This periodic re-assessment provides feedback and data on actual releases from nuclear power plants and is a basis for ASN to adapt and, when possible, to decrease the radioactive effluent limits.

Netherlands	Article 6	Art.6 and Art.10, section 6.2 p.34, section 10.6, p.81	The shutdown of the four Tricastin reactors: could this have been prevented? How could this deviation occur? What lessons has ASN learnt from this case?	Update of seismic studies as well as extended control of the dike composition contributed to the emergence of this deviation. For ASN, the main lesson learn is that periodic safety review, including extended conformity check, is working as intended and is an important safety process to promote.
Indonesia	General	page 10	page 10 states "Steps were taken to guarantee an emergency response capability." and "EDF decided to extend the provisional durations of all the scheduled outages and to postpone or cancel certain others." 1. What steps were taken to guarantee an emergency response capability during COVID, especially with the spread prevention measures implemented? 2. How does the ASN ensure the safety of the reactor during this period? And also, what are the standards used in determining which ones can be postponed or canceled?	1. Emergency response remained guaranteed following the regular standards but with health protection provisions as necessary. 2. During the first lockdown, ASN maintained contact with licensees and quickly set up means for remote inspections, prioritised to keep an insight on the safety of operations. See anwer to question n° 29620 for the postponement of maintenance operation.
Netherlands	Article 14.2	p.113	Within the aging management strategy for NPPs, is aging of safety concepts dealt with? For example upgrading redundancy separation in existing plants may not be reasonably possible; however the insights/requirements may have become more strict.	The objective of the ageing management strategy for NPP is to cope with physical degradation of SSCs induced by ageing mechanism or with obsolence of old components. Upgrading safety is adressed not by ageing management program but through the safety reassessment part of the periodic safety review.
Netherlands	Article 19	Focus 34, p. 171	What is meant by the 'primary source clusters'?	In the text (Focus 34, p. 171), 'grappes sources primaires' was translated as 'primary source clusters'. It corresponds to the primary neutron sources which are placed in primary source rods.
Netherlands	Article 14.1	Page 108	The measures proposed by EDF following the specific phase of the 4th PSR of the 900 MWe reactors will be subject to a public inquiry. What does this public consultation entail? Does this address solely the license changes (if necessary) or also technical reports?	The provisions proposed by the operator are presented to the public in its report concluding the periodic review. The goal of this public inquiry is to get public feedback on the sufficiency of the safety upgrades proposed by the licensee, considering operation for 10 additional years.

Netherlands	Article 18.1	18.1.1	The technical directives for next-generation PWRs are mentioned. In the 3rd it is mentioned that large early releases have to be 'practically eliminated'. Can that aim be numerically expressed as a certain (minute) chance of such a release happening? How is the verification of meeting the requirement done?	The avoidance of early releases and large releases is adequately achieved by demonstrating practical elimination showing either that the scenario is physically impossible or that its occurrence can be considered as extremely unlikely with a high degree of confidence. Demonstrating practical elimination via “extreme unlikeliness with a high degree of confidence” has to be based on deterministic and probabilistic considerations. ASN considers that practical elimination cannot rely on a general target cut-off frequency. For more information, see The “practical elimination” approach of accident situations for water-cooled nuclear power reactors", Revision 1, 2020 published by IRSN.
Netherlands	Article 19.1	19.1.2 p.170	It is stated that partial commissioning before completing authorisation is possible for specific operating tests requiring introduction of radioactive materials into the installation. Can you give examples of such a test?	The efficiency of safety iodine filters has to be checked to ensure compliance with the criteria of the safety case. To carry out such operating tests, a radioactive iodine source is needed. Introduction of this radioactive materials into the installation is submitted to a partial commissioning authorization.

Netherlands	Article 6	Focus-1, p.34	It is stated that the embankments need to be reinforced. Was it ever considered to reinforce the safety critical buildings so that they could keep their function in case of minor failure of the embankment?	In 2013, the ASN published its safety guidance n°13 taking into account advances in knowledge about the risk of flooding from external sources (see: https://www.asn.fr/l-asn-reglemente/guides-de-l-asn/guide-de-l-asn-n-13-protection-des-installations-nucleaires-de-base-contre-les-inondations-externes). This guide clarifies the reference flooding situations against which nuclear installations must be protected, including the failure of embankment. On this specific topic, ASN guidance states that : "a conventional break is postulated, unless: - a rupture can be excluded based on design requirements and in service monitoring of the structure - there is no malfunction, intrinsic failure or hazard likely to lead to a rupture. In the case where the rupture is excluded, the possibilities of degradation or dysfunction are nevertheless studied : overflows of structures or increase of percolation". In compliance with this guidance, a minor failure of the embankment was postulated and associated flooding situarion studied for Tricastin NPP
Netherlands	Article 7	7.4.2 ASN BNI oversight, p.62, Focus 12	The SIANCE artificial intelligence tool seems to be a promising development. Is this tool already in use in current inspection practices?	Yes it is functional and used, while still being upgraded. See answer to question 30968 for some more details.

Czech Republic	Planned Activities	page 8, 29	Q1: What changes to the French legislation will be necessary for the successful inclusion of SMR technologies in the French energy mix? Q2: According to the French regulatory body, what are the bottlenecks in the future licensing or construction of SMRs in France? Q3: Are special guidance documents being prepared for licensing SMR technologies?	Q1 : At this stage, it appears that the inclusion of LW-SMR on specific site doesn't require changes to the French legislation. Legislative adaptations may be required for advanced technologies and for the transport of factory-fueled reactors. These adaptations should be adressed timely, in relation with the development of these projects. However, French regulation (adressing the safety demonstration and the content of safety analysis report) is objective based and technology neutral ; only some guidance by ASN may be dedicated to a specific technology (eg. safety guide adressing the design of PWR). Q2 : the main bottlenecks expected in the future licensing of SMRs are related to advanced SMRs: - R&D programs required to achieve proven technology and qualified modelisation codes for advanced SMR (HTR, MSR, LFR...) - industrial availability of new fuel cycles. Q3 : ASN has engaged the review of its guidance documents to assess their compatibility with LW-SMR designs.
Netherlands	General	Summary, p.28 EPR2	EDF has planned submitting its construction authorisation application for a first pair of EPR2 reactors at the Penly site in March 2023, following on a public debate to take place in the autumn 2022. What is the impact and scope of the debate with respect to the application?	The scope of the debate is the construction of two EPR2 reactors at the Penly site in Normandy, with a perspective on 4 additional units (on other unspecified sites). After the debate, taking into consideration the comments of the public, EDF will decide whether to build new units at Penly. In this case, EDF will submit a BNI creation request. Public files are available at the following link https://www.debatpublic.fr/nouveaux-reacteurs-nucleaires-et-projet-penly/le-projet-en-resume-3365

Czech Republic	Article 14.1	Section 14.1	Does ASN issue any form of permission to start-up the unit after the planned outage? If not, which tools does ASN have to prevent the unit from starting-up after a planned outage in the event that nuclear safety is compromised?	Outage operations, including permission to start up after a shutdown, are regulated by the ASN resolution 2014-DC-0444 of 15 July 2014 . Every planned outage is controlled by ASN on this basis. 4 months before the beginning of a planned outage, EDF has to inform ASN about the most significant activities expected to be performed (modifications, maintenance operations, correction of deviations…). During the outage, ASN conducts inspections to control different activities. At the end of the outage, the start-up of the reactor is submitted to ASN permission. ASN decision is based on the safety significance of unsolved deviations (safety analysis based on ASN guidance n°21) .
Czech Republic	Article 14.1	Paragraph 14.1.1, page 98	What is the experience with public involvement under Article R. 59319?	The public inquiry into the provisions proposed by EDF for the 4th periodic review of Reactor 1 at the Tricastin nuclear power plant took place from January 13, 2022 to February 14, 2022. This public inquiry resulted in 1,816 online contributions, 30 observations on the registers and one letter handed in during the investigating commissioners' offices. At the end of this inquiry, the Commission of Inquiry issued an opinion in favor of the "provisions proposed by EDF", with several remarks aimed in particular at desirable improvements in terms of education and readability of the next files to be submitted to the public for the periodic reviews of the reactors.

Czech Republic	Article 13	Section 13.1; 13.2, page 92	Are there any regulatory provisions and requirements or plant integrated management system procedures concerning to commercial grade items dedication with respect to: EPRI_Guideline for the Acceptance of Commercial_Grade Items in Nuclear Safety Related Applications - Rev 1 to EPRI NP_5652 and TR_102260 (2014) or Quality Assurance Guideline for Procuring High Quality Industrial Items Aimed at Supporting Safety Function in Nuclear Facilities (2022)?	There is no regulatory provision in France, nor guidance by ASN, concerning the use of commercial grade items dedication in a nuclear facility. In this field, the French nuclear regulation is focused on two objectives (and not on the means to achieve those objectives): qualification of SSCs important to safety and quality insurrance of all activities related to their design and manufacturing.

Czech Republic	Article 13	Section 13. 2, page 93	On page 93, it is stated, among other things, that “With regard to the risk of possible fraud or counterfeiting (Counterfeit, Fraudulent and Suspect Items - CFSI - as defined by the IAEA), EDF has been implementing special provisions since 2017 to prevent and detect these risks." In this context, it further states that "from the beginning of 2021, the entities of the EDF group as a whole have started the certification process according to the ISO 19443 standard, the provisions of which include specific requirements for training, detection, monitoring of suppliers and information with regard to CFSI aspects”. Q1: What is the identified number of CFSI seizures by the authority, possibly what is the trend of their seizures in the last three years as part of its supervisory and control activities, possibly what is the trend of seizures from the point of view of EDF's permit holder? Q2: What is the most significant problem to identify when verifying the declared origin of items in this fraudulent activity from the point of view of EDF's management system? Q3: Could you please briefly describe the authority's position in the exercise of public administration in the field of peaceful uses of nuclear energy, including how it cooperates with EDF, its suppliers in the case of purchases of commercial spare parts and carrying out appropriate related dedication processes according to Article 3.2 of ISO 19443 for their use in nuclear facilities.	ASN does not seize any component, even in the event of CFSI. As for EDF, the components will be destroyed in case of doubt about a possible CFSI. Licensees are required to notify ASN in case of detection of a suspected CFSI. As a result, several CFSI cases are still being investigated to analyse whether or not it was an intentional act before a position can be taken on the case. Intentionality of a CFSI to be opposed to a simple mistake is the main issue to investigate and is leading to a fraud case. The use of CGD is not implemented in the French nuclear supply chain; therefore, there are no checks done by ASN on this topic. Nevertheless, ASN is conducting inspections in the supply chain to ensure that checks on incoming materials are performed by the vendors. Those checks appear indeed to be a good practice to detect CFSI and avoid non conformities when receiving componants.

Czech Republic	Article 10	Section 10.5, page 81, pagraph 2 (analysis of significant events, ...)	Q1: What are the criteria for classifying events at the NPP as significant? Q2: Are all significant events at French NPPs analyzed in this way or only selected ones? If only the selected events, what are the selection criteria for analysis?	Q1: criteria for rating an event as significant are defined in an ASN guidance, which is available in English (https://www.french-nuclear-safety.fr/asn-regulates/asn-guides/guide-to-the-declaration-procedure-and-coding-system). This guidance is under revision. Q2: all of the events are subject to to at least a preliminary analysis by ASN. An in-depth analysis (including on-site inspection) can be decided on a case by case basis according to the inspector assessment.
Czech Republic	Article 13	Section 13.2, page 92	Could you please specify in more details the requested scope of plant-specific integrated management system (IMS)? Are there established specific regulatory requirements relating integration of nuclear safety, occupational risk prevention, environmental protection, physical protection, quality and economic aspects into one management system to guarantee that nuclear safety is adequately taken into account in all the activities of the organisation?	The Integrated safety Management System covers all the regulatory requirements applicable to the BNI. They come from regulatory requirements concerning the protection of the environment and population (environmental code), the protection of workers (labor code) and the physical protection of facilities (defense code).

United Arab Emirates	Article 14.2	14.2.2.2 Ageing management Page 113	It is reported that EDF has also implemented a major programme of work on equipment ageing in view of the continued operation of the facilities beyond 40 years. To do this, EDF's industrial programme consists of: demonstrating the ability of the non-replaceable items and of the replaceable items to fulfil their function beyond 40 years or else replacing or renovating them. EDF in particular defined a strategy in order to extend the validity time of the initial qualification for accident conditions (including earthquake) of the electrical and mechanical equipment. Please share the ASN's experience of challenges with making decisions of any items for the continued operation of the facilities beyond 40 years.	During the 4th periodic safety review, ASN focused its assessment on the ageing analysis process developed by EDF. Complementarily, ASN requested specific analyses for environmentally assisted cracking, in particular for steam generators. Attention was also carried out on the containment systems, with a request to update the maintenance and the possibility of carrying out non-destructive examinations on the pre-stressed cables. As a conclusion of its assessment, ASN made several requests to EDF on the following specific topics: - internal swelling phenomena in concrete, - the effects of ageing on the heat insulators of the primary and secondary systems, - the state of the vessel internals screws on one reactor in particular (Bugey), - possible corrosion of transfer tubes and their non-destructive examination, - the detection and repair of defects that could compromise the integrity of the pools.
United Arab Emirates	Article 15	Page 117	Dosimetry monitoring of workers: How are the contractors' dosimetry monitored, especially for those workers coming from other countries?	EDF provides all workers, including foreign workers, with operational dosimeters. For foreign workers, the results of this individual dosimetry monitoring is then transmitted to their employer.

United Arab Emirates	Article 7	Page 60	It is reported that since 2021, ASN has developed specific inspections with situational exercises for the operating teams on the full-scope reactor simulator. The aim of these inspections is to verify the operating team's ability to manage an accident scenario, and in particular: over almost the entire duration of a shift, complying with the applicable best practices (operational communication, self-checking, responsibilities of the players, etc.), during the phases to reach a safe state, during changes of shift, the applicability in the field of the instruction sheets associated with the procedures. Please provide a further description as to how these exercises differ from those exercises conducted for emergency preparedness and response.	The role of ASN as safety authority is quite different in case of an inspection on EP&R and during an exercise. During an inspection ASN acts as a controlling body. It checks the conformity of the organization of the licensee with regulatory requirements. During an exercise ASN acts not as a controlling body but is part of the crisis organisation, like other stakeholders (TSO, prefecture, mayors...). In case of an inspection with a situational exercise, others stakeholders are not involved and inspectors checks specific points without mobilisation of the whole crisis organisation.

United Arab Emirates	Article 7	7.4.1, 7.4.2 Page 59, 62	It is reported that the ASN's oversight procedures are tailored to the specificities and risks of the installations (NPPs, research reactors, nuclear waste facilities, etc.) and are implemented by means of the following action: inspection, generally on the site. The inspections carried out by ASN are based on the following principles: the inspection is neither systematic nor exhaustive; it is based on sampling and focuses on the subjects with the highest potential consequences. Please provide a further description of the inspection program in place for each of operating NPPs in terms of technical areas covered, frequency, approach, criteria etc.	See answer to question 29078 for reference to procedures for establishing the inspection programme on NPPs. It is not possible to briefly summarize the whole inspection programme for the 18 NPP sites in France. However, details can be found in the ASN annual report. For NPPs, more than 500 inspections are performed per year. Additional information are available on ASN Report on the state of nuclear safety and radiation protection in France for 2021 in section 3.1.2 (https://www.french-nuclear-safety.fr/asn-informs/publications/asn-s-annual-reports/asn-report-on-the-state-of-nuclear-safety-and-radiation-protection-in-france-in-2021). Inspection topics are defined to cover all safety related subjects including oragnisational and human factors, materials, operation, radiation protection, emergency management... Every year, an analysis is performed t update the frequency of inspections on each topic and identify priorities.
United Arab Emirates	Article 6	6.4 Page 45	It is reported that in 2020, the two 900 MWe reactors at the Fessenheim NPP were shut down. Please provide us with the process and main safety reasons that led to this shut down decision for these particular units.	The two reactors at Fessenheim NPP were definitively shut down on the basis of energy policy and not for safety reasons. Indeed, prior to this shutdown decision, an energy policy law capped the nuclear electrical power capacity. Hence, before commissionning any new nuclear reactor (such as the Flamanville EPR), older nuclear electrical power facilities have to be shut down.

United Arab Emirates	Article 7	Chapter 7.4 Page 58	How do you insure the exhaustiveness of the system of regulatory inspection and assessment of nuclear installations? For instance, how do you insure that compliance with ALL the regulatory requirements is verified and that all the components of a basic nuclear installation (BNI) are inspected in an exhaustive manner?	In France, the prime responsability for safety lies with the licensees. The inspection system put in place by ASN does not intend to be fully exhaustive but focuses on the subjects with the highest potential consequences and ensures all topics of interest are inspected within a cycle of several years. This cycle is ajusted according to the assessment of the site performed the inspectors and this is complemented by sample inspections. Also, the newly developped SIANCE software (see p62) is used to check if topics of interest may not have been left aside for a few years. See also answer to question 29080.
United Arab Emirates	General	4.5 Page 29	It is reported that EDF plans to submit its safety options dossier for the NUWARD™6 small modular reactor (SMR) project and that ASN, assisted by IRSN, will start examining the safety options dossier as of 2023. Please provide a description of the France's regulatory framework for SMRs.	French licensing process is common to all nuclear facilities, including SMR. It comprises three steps: - safety options: non-mandatory pre-licensing step which enables a prospective licensee to get an early feedback from ASN on its design. The prospective licensee can define the scope of this assessment ; - the authorization Decree: mandatory step which has to be completed before the start of the construction of the nuclear installation. The authorisation takes the form of a Decree signed by the Minister in charge of nuclear safety ; - the commissioning authorisation: mandatory step which has to be completed before the use of radioactive substances in the nuclear installation. The commissioning authorisation takes the form of a resolution issued by ASN. More detailed information of the licensing process can be found in the Environment Code (articles R.593-14 to R.593-37).

United Arab Emirates	Article 6	6.3 Page 40	It is reported that on completion of the PSRs, ASN may issue technical requirements governing the continued operation of the installations. Please share instances where ASN issued technical requirements governing the continued operation of the installations.	Reports and resolutions related to the continued operation of nuclear power plants are available on the ASN website: https://www.asn.fr/l-asn-controle/reexamens-periodiques/reexamens-periodiques-pour-les-centrales-nucleaires#calendrier-des-reexamens-periodiques-des-centrales-nucleaires
United Arab Emirates	General	4.5, 14.2.3 Page 28, 115	It is reported that following the peer review and its conclusions, improvement measures were defined in France on: the performance of "opportunity" inspections of underground pipes when they become accessible as a result of other works. Please share the experience with any ageing degradation of underground pipes uncovered by the activities of "the performance of "opportunity" inspections of underground pipes".	The result of opportunity inspections indeed highlighted some ageing degradation of underground pipes. Based on this result, an exceptional inspection and maintenance program for underground piping as been asked by ASN and is currently being deployed by EDF at all sites. ASN will be able to share the lessons learned at the end of this progam.
United Arab Emirates	General	4.5 Page 28	It is reported that the additional technical information provided by EDF led to the conclusion that the adoption of a break preclusion approach for the primary and secondary system pipes was acceptable. Please provide a further description on the break preclusion approach for the primary and secondary system pipes.	In a letter dated September 15, 2021, the ASN took a position on the use of the break preclusion approach for the primary and secondary system pipes. This letter explains the conditions under which it has taken this position. The letter (reference CODEP-DCN-2021-040400) is available on the ASN website: https://www.french-nuclear-safety.fr/asn-informs/news-releases/break-preclusion-epr2-reactor

United Arab Emirates	General	4.1.2, 4.6, 6.3, 14.1.3.2 Pages 11, 30, 40,108	It is reported that following the review of the generic phase of the 4th periodic safety review of the 900 MWe nuclear reactors, ASN issued a resolution at the beginning of 2021 on the conditions for the continued operation of the reactors. Following this generic phase, EDF will - from 2020 to 2031 - carry out the specific phase of the fourth periodic safety review of each of the 900 MWe reactors. It is also reported that the PSRs integrate the developments in safety standards, particularly those of the IAEA. With regard to the nuclear power reactors, the OSART missions conducted on the sites or at the Licensee's head offices are also based on the IAEA standards and current best practices. Please provide a description of the conditions for the continued operation of the reactors issued by ASN in 2021. Please also explain the differences between the generic phase and the specific phase of periodic safety reviews in terms of focus areas, timelines, processes, and criteria used in each phase to determine needs for safety improvements and a decision for continued operation. Please also elaborate France's PSR practices in comparison with IAEA Safety Standards PSR for NPPs SSG-25 with respect to the scope and process.	As EDF's fleet of 56 reactors comprises only three differents reactor types, most of the safety assessment is done in a "generic" manner for each reactor type. Most of the provisions of the ASN decision n° 2021-DC-0706, which concluded the generic phase of 4th PSR if the 900 MW reactors, impose the implementation of safety improvements and additional safety studies. The decision is available on the ASN website (https://www.asn.fr/l-asn-informe/actualites/la-poursuite-de-fonctionnement-des-reacteurs-de-900-mwe-au-dela-de-40-ans). Individual PSRs focus on plant or reactor specificities (external hazards, environment protection...). Prior to the submission of the report concluding the PSR of each reactor, EDF conducts a ten-yearly outage of the reactor. During this outage, EDF carries out extensive work related to compliance control and safety reassessment. In particular, during this outage EDF carries out ten-yearly tests of the containment and the main primary circuit. To take into account constraints related to controlling the volume of work on the facilities, industrial capacities, and the ability of field teams to integrate the various changes in the facilities, EDF informed the ASN in February 2017 of its industrial strategy, which consists of deploying the modifications associated with the fourth periodic review of 900 MWe reactors in two phases (during the ten-yearly outage,

United Arab Emirates	General	4.1.1, APPENDIX E – Management of Covid-19 Pages 10, 15, 204-205	It was reported that the pandemic has been a powerful accelerator of the transformations already under way, but also the starting point for new oversight practices. During the pandemic period, ASN adapted its oversight methods, notably by developing remote-inspections for certain subjects. Please provide any instances of postponement of the maintenance and outage activities and any challenge of meeting the operational technical specifications during the pandemic. Please also share the ASN's lessons learned of any compliance verification approaches/methods used during the COVID-19 pandemic that will/have changed the approach to compliance verification after the pandemic. Kindly provide examples.	Remote inspections mostly consist in targeting documentation to be verified at the office, then conducting interviews with licensees to complete the inspection. In certain instances, remote access to some computerized systems were granted to ASN inspectors for the time of the inspection. Those methods replaced on-site inspection, for the same verifications, but on-site verifications must be privileged when possible. An advantage of off-site inspections is the ability to gather a team of inspectors from different regional offices to perform inspections at multiple sites with the same team. It spares a lot of travels and facilitate setting up the team.
United Arab Emirates	General	4.1.2 Page 10	It is reported that ASN involved the public as of 2016 in the development of its position on the "major objectives" of the 4th periodic safety review of the 900 MWe reactors. It then pursued this approach in the development of its generic resolution on the 4th periodic safety review of the 900 MWe reactors in early 2021. Please explain how the input from such public consultation helped formulate the ASN's position on the major objectives of the 4th PSR of the 900 MWe reactors.	The expectations and concerns of the public were taken into account by ASN: - to define the objectives to be achieved and to guide the assessment of the various topics of the PSR, - by ensuring that the subjects raised by the public were actually examined during the PSR, - by ensuring that the products of the review explicitely address the public expectations.

Switzerland	General	A. General comments on National Report as a process of self-assessment of the implementation of the obligations of the Convention	The national report provides comprehensive and detailed information about France's nuclear power program, nuclear safety policy and energy policy. It includes a summary of the major recent achievements, the future main activities and the steps taken to meet the obligations of the Vienna Declaration. Furthermore, it provides a detailed description of the French legislative and regulatory framework and addresses international peer review results. The summary of the main safety events in chapters 6.2 ("focus" in text boxes) can be highlighted positively. The national report addresses all aspects of the obligations in Art. 6 to 19 as requested in guideline INFCIRC/572/Rev. 6 and follows an article-by-article approach.	
Switzerland	General	B. Comments on progress made on previous Challenges and Suggestions identified at previous Review	ASN reports the activities related to the 5 challenges which were identified for France. Obviously, good progress was made in general.	
Switzerland	General	C. Proposals of Good Practices, Challenges, Suggestions	The activities with regard to the public involvement in the 4th PSR of the 900 Mwe reactors could be considered as a good practice.	
Switzerland	General	Implementation of the Vienna Declaration	As regards the 1st principle of the VDNS (safety objectives for new NPPs) the national report discusses the design of the EPR reactor. As regards the 2nd principle of the VDNS (Complete and systematic safety assessments; safety improvements) France describes the safety improvements implemented after the Fukushima accident (related to severe accident management in case of SBO or a loss of the heat sink).	

Switzerland	Article 10	page 78, page 79	Switzerland read with interest that the priority of safety is based, on strong commitments in terms of behaviour (e.g. compliance with the rules) and safety culture. The latter includes a range of tools making it possible to determine a position, to debate and discuss safety practices within a unit, the departement and the safety teams. I.e. safety is made of compliance ("follow the rules") and integrity ("do the right thing"). This is a very interesting approach for the understanding of safety culture as well as to adapt with the changes in the world outside the NPP.	
Ireland	General	Summary	Ireland thanks France for its comprehensive national report which is structured in accordance with the articles as given in the Convention.	
Ireland	Article 7	Page 61	The digital tool SIANCE (artificial intelligence system for nuclear inspection and assessment) is an excellent example of the use of modern technology to deal with large volumes of information and streamline the inspection process.	
Ireland	Article 15	Page 128	The online system (www.mesure-radioactivite.fr) which France has established to make environmental monitoring data available to the public is an excellent example of how measurements from a number of different organisations can be made available on one easily accessible platform.	
Australia	General	9	It would have been beneficial to include a brief bullet-point summary of the 6 different electricity mix scenarios here for those readers not familiar with the Energy Pathways 2050 report.	
Netherlands	General	Summary, p.29	The cooperation of ASN with its colleagues of STUK and SUJB on the assessment of the safety options dossier for the NUWARD6 SMR, may be an area of good performance.	