

# GOOD PRACTICES IDENTIFIED BY IRRS MISSIONS

Good Practices identified by the IRRS Missions held between 2006 and 2013 are collected and structured according to the IRRS Modules



**IAEA**

International Atomic Energy Agency

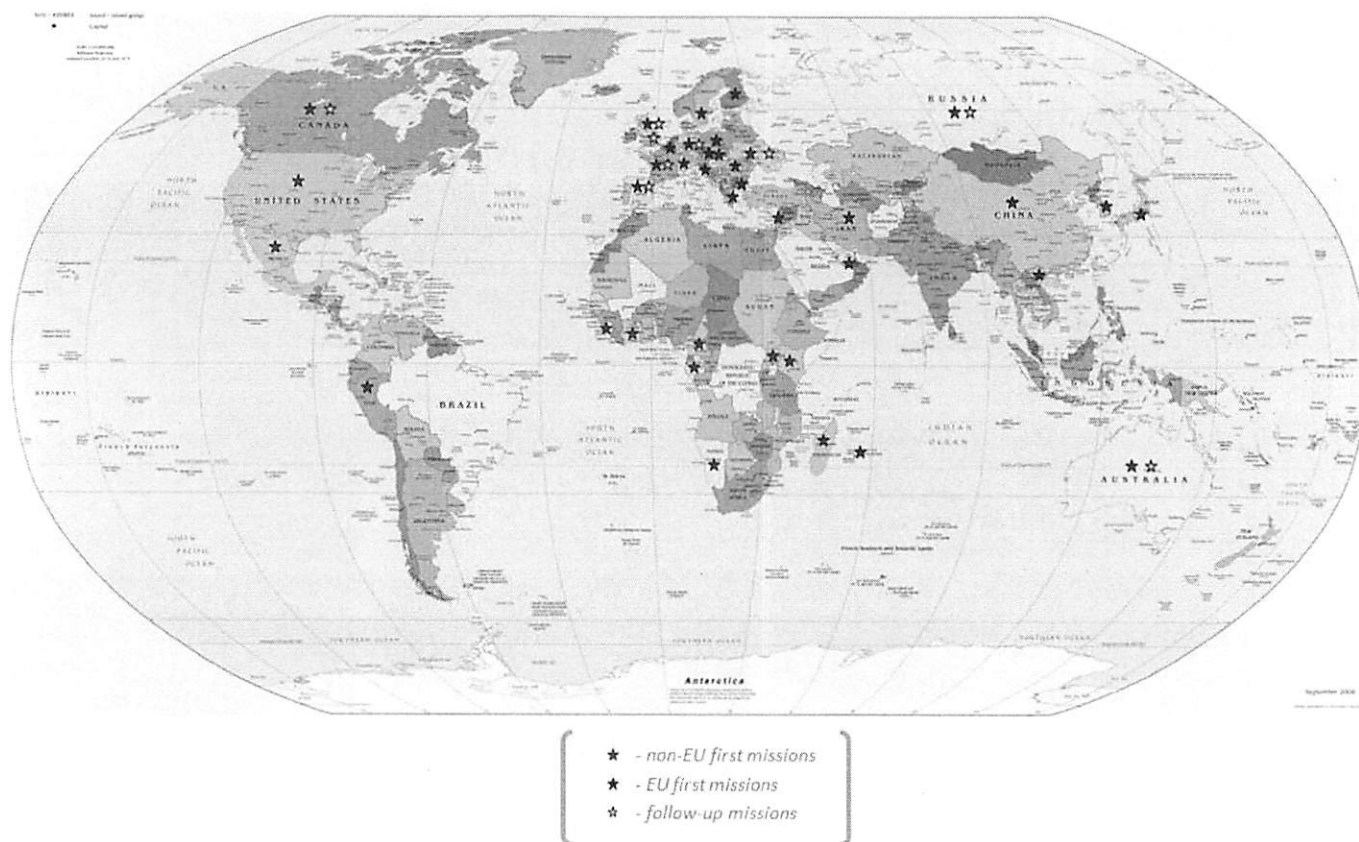
*2006-2013*

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### ALL IRRS MISSIONS IN 2006 - 2013



## **1. Responsibilities and Functions of the Government**

- 1.1 ASN makes extensive use of independent expert advisory committees on a variety of topics and themes in many areas. These advisory committees include experts from other countries (France, 2006)
- 1.2 The environment law provides for Public Debate and Public inquiries on the establishment of major facilities. ASN provides full information e.g. to Local Information Committees as part of this process (France, 2006)
- 1.3 The statutory requirement to take into account international best practice in radiation protection and nuclear safety in licensing decisions as required by s32(2) and s33(3) of the ARPANS Act is good practice (Australia, 2007)
- 1.4 Japan is continuously making efforts to update and improve its legislative and governmental framework with the aim of strengthening arrangements for nuclear safety in the light of incidents which have occurred and to prevent recurrence (Japan, 2007)
- 1.5 The IRRS Team was informed that all Mauritius legislation, including that for radiation safety, is subject to a public consultation and drafts are published on the Government website (Mauritius, 2007)
- 1.6 The detailed statement of operator responsibility now established in the Nuclear Energy Law by the 2007 amendments (Spain, 2008)
- 1.7 The legislation clearly specifies that regulatory requirements shall be developed with strict consideration of the recommendations of the competent international organizations. This will inevitably support the worldwide harmonization of nuclear and radiation safety requirements, as highlighted by INSAG-21 (Ukraine, 2008)
- 1.8 The long term (2005-2020) nuclear power development plan issued in October 2007 and the long term (2006-2020) plan on nuclear safety and radioactive pollution prevention issued in October 2007, include a clear nuclear policy statement – adhere to the “safety first/quality first principle”, and a commitment to strengthen the supervision of nuclear safety and its enforcement (China, 2010)
- 1.9 MEP (NNSA) has made available the basic conditions covering, inter alia, organisational, resource and safety culture factors for companies wishing to acquire a licence to have access to Chinese nuclear markets (China, 2010)
- 1.10 The MEP (NNSA) recommendations for universities and other training of engineers in some professional areas is very useful (China, 2010)
- 1.11 The qualification and registration of nuclear safety engineers in China is considered a good practice (China, 2010)
- 1.12 The NRC uses written Memoranda of Understanding with other agencies who have shared authority with the NRC (US, 2010)
- 1.13 Korea has a clear and structured national approach to set out in its policies and the corresponding implementation plans with well-defined priorities for the further development of the legal framework (Korea, 2011)
- 1.14 The establishment of the International Nuclear Safety School which provides a large variety of training and education opportunities for members of the regulatory body as well as for students and other interested parties (Korea, 2011)

- 1.15 The system in place to finance ENSI enables it to adjust its effective funding to its workload and then to obtain the resources necessary to fulfil its statutory obligation, without interference from government authorities (Switzerland, 2011)
- 1.16 The UAE developed a Nuclear Policy within a relatively short time frame but based on a firm analysis of future demand for electricity, consulted widely, formulated policy statements that will guide future activities in the nuclear field, made it publicly available and promulgated it through the Nuclear Law. Whilst this is a requirement, the way it was developed and negotiated is considered good practice (UAE, 2011)
- 1.17 The Nuclear Law provides the basis for establishing the Radiation Protection Committee that provides a framework for effective interaction between different agencies and other organisations of relevance (UAE, 2011)
- 1.18 Students that are going through the capacity building programmes have an opportunity to choose at the commencement of their career to work either with the regulator FANR or with the operator ENEC for the same salary. This is a good contribution towards the balanced development of the human capacity throughout the whole nuclear sector (UAE, 2011)
- 1.19 The team noted the strong commitment of GAEC to the training of medical physicists in radiation protection (Greece, 2012)
- 1.20 UJD SR is subordinated directly to the Government of the Slovak Republic, which is giving it a high degree of independence (Slovakia, 2012)
- 1.21 In Finland the political commitment to implement a geological repository and the regulatory process for implementing the geological disposal is well defined and has been in place for a long period of time (since 1983) (Finland, 2012)
- 1.22 The Government report on Nuclear Energy Competence in Finland is commendable and the IRRS team encourages the Government to continue to progress the actions arising from this work (Finland, 2012)
- 1.23 The application of a no blame policy for the investigation of nuclear and radiation safety-related events is commendable (Bulgaria, 2013)
- 1.24 The PAA proactively developed a framework for cooperation with the Office of Technical Inspection for periodic safety assessment (Poland, 2013)
- 1.25 SÚJB reports directly to the Cabinet and is able to draft new legislation for Government consideration and the ability to establish regulations with legal effect, which gives it a high degree of independence (Czech Republic, 2013)
- 1.26 Creation of a comprehensive State strategy to deal with unregulated radiation risks (Czech Republic, 2013)

## 2. Global Nuclear Safety Regime

- 2.1 The Russian Federation is making an extensive use of the IAEA Safety Standards in developing its regulations and guides (Russia, 2009)
- 2.2 The NRC's information exchange programmes, and its active participation in the multilateral and bilateral cooperation programmes are providing a strong contribution to worldwide development of nuclear safety practices and to dissemination of knowledge to other countries (US, 2010)
- 2.3 Korea strongly promotes a global nuclear safety regime through multi or bi lateral actions, with countries having established nuclear programmes and those embarking on nuclear power, in technical, regulatory and research domains (Korea, 2011)
- 2.4 The regulatory body has developed and implemented a comprehensive OEF-system that is based around a number of effective initiatives including: collection and trending of data from a wide range of sources; well-populated and presented information databases; numerous key communication events; and close working with the licensees and other stakeholders on a national and international front (Korea, 2011)
- 2.5 The ENSI ordinance requires ENSI to undergo an IRRS mission periodically (Switzerland, 2011)
- 2.6 The Art. 2 of DETEC Ordinance n°732.114.5 issued in 2008 requires operators to review the design of their plant after every INES 1 event in their own plant or after any INES 2 event in another NPP in Switzerland or abroad without any additional request from ENSI (Switzerland, 2011)
- 2.7 In order to share and to record the research results and experience accumulated during the year, ENSI publishes an additional report, on regulatory safety research, lessons learnt from events in foreign NPPs, international cooperation and current changes and developments in the basics of the nuclear regulatory process (Switzerland, 2011)
- 2.8 UAE and FANR have given evidence of ambitious use of international peer review missions as well as demonstrated that the findings from these missions are incorporated into actions plans and that resulting actions are being implemented. The effectiveness and efficiency by which this has taken place is considered good practice (UAE, 2011)
- 2.9 STUK has an excellent record of active contribution to the global improvement of radiation and nuclear safety through its participation in relevant international activities. STUK has devoted high quality expertise to this activity and intends to continue in the future (Finland, 2012)
- 2.10 The BNRA operational and regulatory experience feedback system covers the use of information received during BNRA participation in international workshops, seminars and other fora. Results from BNRA participation in international forums are described in reports along with the suggestions for incorporation of international experience in the BNRA activities. Such reports are disseminated through the BNRA intranet. Referring to those reports the BNRA chairman ensures the implementation of raised issues or suggestions thereto (Bulgaria, 2013)
- 2.11 The creation by FANC of several international working groups to review the issue of flaws in Doel 3 and Tihange 2 pressure vessels represents a major initiative to address a new and significant safety issue (Belgium, 2013)

### **3. Responsibilities and Functions of the Regulatory Body**

- 3.1 The NSD has long been very active internationally, has promoted the implementation of good regulatory practices in many countries and has openly shared its knowledge and expertise (UK, 2006)
- 3.2 The ability of the Chief Inspector to amend a Site Licence to revise a licence condition or add a new one, following consultations with the Environmental Regulators, allows the regulator to respond swiftly when circumstances require (UK, 2006)
- 3.3 The skill assessment and staff individual training programmes are thorough and well managed (UK, 2006)
- 3.4 The formal designation of 4 specific levels of NSD-Operator meetings sets clear expectations to all parties as to purpose and expected participation (UK, 2006)
- 3.5 Reasons for the rejection of a submission are given not only in ASN decision letters, but also are published on the ASN web site (France, 2006)
- 3.6 The training programme is mature and well developed (France, 2006)
- 3.7 The involvement of ASN in the framework of international cooperation is quite active and exhaustive and bilateral agreements are well developed (France, 2006)
- 3.8 One of the functions of the CEO of ARPANSA is to promote uniformity of radiation protection and nuclear safety policy and practices across jurisdiction of the Commonwealth, the States and the Territories (Section 15 (1) (a) of the Act). The instrument for achieving uniformity is the National Directory of Radiation Protection (NDRP). The progress made by ARPANSA so far in promoting uniformity among the States and Territories has been remarkable (Australia, 2007)
- 3.9 ARPANSA's use of international peer review team and services from the IAEA is good practice (Australia, 2007)
- 3.10 The Graduate Recruitment portion of the Workforce Planning and Development will, if effectively implemented, ensure the ongoing availability of appropriately trained and qualified staff and is good practice (Australia, 2007)
- 3.11 ARPANSA is very engaged in the framework of international cooperation and in the establishment and implementation of international standards and undertakings. Bilateral agreements are well developed. These activities support the statutory requirement to incorporate international best practices into regulatory decisions. This is good practice (Australia, 2007)
- 3.12 NISA's relationship management programme is a well-structured and comprehensive programme that reflects best practice (Japan, 2007)
- 3.13 Communication with the public at the local level is well-structured and allows for regular and positive exchanges between NISA, the public and the operators (Japan, 2007)
- 3.14 The public is involved in NISA's advisory sub-committees (Japan, 2007)
- 3.15 NISA has a proactive recruitment, training and staff development policy which allows it to achieve and maintain high technical competence (Japan, 2007)
- 3.16 The RPB should be highly commended for the development of the Scheme of Service for Radiation Protection Officers. It is an exemplary initiative undertaken by the RPB. The Scheme of Service clearly describes the recruitment, hiring, promotion and professional development of all Radiation Protection Officers in the RPB. It demonstrates the RPB's commitment to

continuous staff training and development, thereby ensuring the highest professional standards of the staff of the RPB which would be to the benefit of all citizens of Kenya. The document is made available to all staff within the RPB. The review team encourages the RPB to share this Scheme of Service with regulatory bodies in other countries (Kenya, 2007)

- 3.17 The SNRCU formal training programme is well developed and based on Systematic Approach to Training principles, and succession planning for key technical staff, workforce aging and knowledge management are taken into account. SNRCU makes effective use of training at international level (Ukraine, 2008)
- 3.18 The proposal and actions taken by the SNRCU management to establish an advisory body with involvement of internationally recognized nuclear safety experts from abroad is seen as a demonstrated commitment to safety improvements (Ukraine, 2008)
- 3.19 SNRCU applies a good system for communication with the public and other stakeholders, including the establishment of a Public Council to ensure transparency of its decision making, as well as providing the public with direct access to SNRCU senior management through telephone hotlines (Ukraine, 2008)
- 3.20 The implemented regulations and procedures for staff qualification and its periodic control ensure that staff are trained, qualified and competent as required by the regulatory body (Ukraine, 2008)
- 3.21 UM BW allows its regulatory body a 10% increase of staff in order to recruit new technical people in anticipation of retirement (Germany, 2008)
- 3.22 ASN has created an organization specifically devoted to produce standards that involves ASN and IRSN experts, consults regulated industry, and a system to ensure consistency, completeness and state of the art of the standards produced (France – fu, 2009)
- 3.23 ASN takes significant part in harmonizing actions at the European level: European directive, and proactive and leading activities at the international level (France – fu, 2009)
- 3.24 ASN puts strong emphasis to avoid being isolated among relevant stakeholders establishing convention and protocols with local, national and international stakeholders (France – fu, 2009)
- 3.25 The ASN commissioners take into account long term consideration and regulatory positions in order to ensure long term safety in France and abroad (France – fu, 2009)
- 3.26 At the side of training we consider that the strong improvement of the training courses with modular composition of the courses and specific modules dedicated to specific area giving a comprehensive education to the personnel could be regarded as a good practice (France – fu, 2009)
- 3.27 The development of a common strategy for international relations between ASN and IRSN is considered to be a good practice (France – fu, 2009)
- 3.28 Most procedures to be followed in licensing processes, including necessary documents, information and other requirements, are compiled in an administrative regulation called 'TUPA' available on the IPEN Website (Peru, 2009)
- 3.29 The Memorandum of Understanding with Transport Canada is particularly comprehensive and could be considered as a model for similar applications (Canada, 2009)
- 3.30 The authority of CNSC to independently define its own employment conditions is considered to be a good practice (Canada, 2009)

- 3.31 The arrangement between CNSC and agencies in the United States of America on the approval process of fissile material transport packages facilitates the easy import and export across their borders, and could act as a model for other countries (Canada, 2009)
- 3.32 VARANS use of international peer review teams and services is a good practice (Vietnam, 2009)
- 3.33 VARANS is very much engaged in the framework of international cooperation to gain as much experience as possible. It cooperates with, and has concluded bilateral agreements with, some countries that have developed nuclear power programmes worldwide and in the region. These activities support and complement the statutory requirement to incorporate international best practices and experience into regulatory decisions (Vietnam, 2009)
- 3.34 ND has established a thorough transition programme and organization, dedicated to the handling of its transition to the new Statutory Corporation, especially the implementation of a detailed and thorough staffing programme (UK – fu, 2009)
- 3.35 The internal certification council activity is considered as a good practice (Russia, 2009)
- 3.36 Format of the records of the radioactive sources inside RAIS (Regulatory Authority Information System) is the same as in the IAEA RAIS and thus provides possibility of exchange of radioactive source information between the Russian Federation and the IAEA (Russia, 2009)
- 3.37 The Team recognized as a good practice the existence of such comprehensive and detailed records describing the situation at the facilities (Russia, 2009)
- 3.38 INRA management demonstrated a strong commitment to human resources development issues to cope with the rapidly increasing inspection and assessment tasks for BNPP (Iran, 2009)
- 3.39 The proactive, systematic and integrated human capital planning of NRC supported by information technology tools (US, 2010)
- 3.40 CSN issued IS-19 instruction on the management system based on the IAEA GS-R-3. This instruction requires the licensee’s strategic plan with the associated investments and human resources needs for the following four years be discussed in a high level meeting between the CSN plenary and the licensee top management (Spain – fu, 2010)
- 3.41 The Framework co-operation agreement between the Ministry for Health and the CSN signed in 2010 is an important initiative to coordinate national efforts on radiation protection (Spain – fu, 2010)
- 3.42 KINS has an effective practice to recruit successors 3 years before the actual retirement of experienced staff, in order to preserve knowledge and provide continuity (Korea, 2011)
- 3.43 The “safety experience” training course of KINS dedicated to students/parents, teachers, opinion leaders has been shown to positively influence public understanding and acceptance of the regulatory body’s activities (Korea, 2011)
- 3.44 SNSA has designed and use a register for licensed practices and sources which not only fulfil the IAEA requirements but also incorporates functions and tools that enables SNSA to be proactive in its licensing and supervisory roles (Slovenia, 2011)
- 3.45 FANR has at an early stage developed an integrated management system providing an important support function for the (UAE, 2011)
- 3.46 The transition of two regulatory bodies into the Swedish Radiation Safety Authority (SSM) organisation represented a considerable achievement. The organisational change management process adopted by the SSM Leadership and Management team brought about an integration of regulatory functions (Sweden, 2012)

- 3.47 SSM has developed a strong Man-Technology-Organisation (MTO) specialist regulatory competence and provided training in this area to a wide range of its inspectors. The training equips inspection teams to assess MTO matters in their routine compliance and supervision inspections at licensee sites in order to capture important MTO safety performance information (Sweden, 2012)
- 3.48 We concluded the Communications function in SSM was working well with evidence of some good practices and plans to further improve the area. In particular the training and briefing of specialists/experts to communicate complex regulatory and technical arguments on Television and Radio proved to be very effective. The use of social media to target specific groups in society and inform the public on some key health and safety information is working well and should be considered for deployment across a wider range of SSM's regulatory business (Sweden, 2012)
- 3.49 The team acknowledges the excellence of the national database system for radiation protection maintained by GAEC (Greece, 2012)
- 3.50 The team acknowledges the excellence of the Annual Report published by GAEC (Greece, 2012)
- 3.51 UJD SR has developed and implemented a structured approach to training and developing its staff based on the systematic approach to training (Slovakia, 2012)
- 3.52 UJD SR demonstrates a comprehensive, well-formalized and yet flexible and efficiently implemented strategic approach to informing and consulting interested parties, including the public, about nuclear safety related issues, activities and events (Slovakia, 2012)
- 3.53 BNRA has established a memorandum of understanding with broad spectrum of national technical support organizations and keeps an annually updated database on the available competences in these organizations providing support on the radiation and nuclear safety of nuclear facilities (Bulgaria, 2013)
- 3.54 BNRA periodically invites the media to seminars, training activities and exercises (Bulgaria, 2013)
- 3.55 BNRA publishes events at nuclear facilities and radioactive sources on its web page and makes them publicly available in multiple languages within 24 hours from the notification of BNRA (Bulgaria, 2013)
- 3.56 Senior management of the PAA has long experience and practice, in regulatory issues, and personally mentors and develops new inspectors (Poland, 2013)
- 3.57 Broad public consultations concerning the development of regulations and laws (broader than is required by regulations) have been conducted with the institutions engaged in Polish Nuclear Power Programme and the public (Poland, 2013)

## 4. Management System

- 4.1 ASN has developed application and declaration forms that provide clear guidance on the format and content of documents to be submitted by the operator in support of applications for authorization or for notification (France, 2006)
- 4.2 ASN has developed procedures for processing applications for authorization that result in either the granting of an authorization or its rejection, including the basis for the decision. Templates for authorizations have been developed for the respective areas of medical uses of radiation (France, 2006)
- 4.3 ARPANSA's regulatory strategic planning framework is systematic. This is good practice (Australia, 2007)
- 4.4 The ARPANSA Audit Committee provides an effective oversight of the effectiveness of the implementation of internal controls and assists in a value added manner the CEO in risk management and compliance with financial management and accountability. Also, ARPANSA has a thorough internal audit plan, which is developed using a risk-based approach (Australia, 2007)
- 4.5 The introduction (in a short period of time) of a well functioning, easy to use Regulatory Management Information System TRIM, which includes record management system, workflow monitoring and control, performance measurement, and collaborative working, is good practice (Australia, 2007)
- 4.6 ARPANSA's systematic and professional manner to improve and develop its Management System is good practice (Australia, 2007)
- 4.7 The establishment of the Quality Management Committee chaired by the Director General of NISA to oversee the activities necessary to establish as well as oversee the implementation of the QMS demonstrates the commitment that NISA attaches to this activity (Japan, 2007)
- 4.8 NISA is being extremely proactive in seeking to establish a comprehensive Quality Management System (Japan, 2007)
- 4.9 CSN has a well-developed documentation and information management system on the intranet that supports a consistent and efficient regulatory decision-making by providing staff with prompt access to all necessary documents as well as reference information such as previous regulatory decisions and safety assessments. The system also holds design and operational documentation from the regulated facilities (Spain, 2008)
- 4.10 The Harmonized Plan developed by CNSC is an excellent tool for driving improvement initiatives across the organization with clear management commitment and allocation of resources and is supported by a communications strategy (Canada, 2009)
- 4.11 INRA senior management promotes safety culture with the use of positive incentives (letters of recommendation and/or financial incentives) for demonstrated good performance related to safety (Iran, 2009)
- 4.12 The NRC's Open Door Policy, Non Concurrence Process and Differing Professional Opinions Programme are good instruments for reinforcing a questioning attitude at all levels of the organization and thereby promoting safety culture (US, 2010)
- 4.13 The internal audit process developed by CSN, with strong support from the senior management and staff participation, was implemented in a timely manner and allows the organization to assess the effectiveness of its regulatory processes and to identify opportunities for improvement (Spain – fu, 2011)

- 4.14 KINS has an excellent comprehensive integrated computerized information and data management system for establishing, maintaining and retrieving adequate records relating to the safety of facilities and activities (MIDAS and 19 additional information systems). This contributes considerably to improve effectiveness and efficiency of the regulatory performance (Korea, 2011)
- 4.15 The resources allocated to the development and implementation of the management system, as well as the considerable effort deployed to align it with GS-R-3 requirements and ISO 9001, are considered as proof of the commitment of the SNSA management to the continual improvement of the effectiveness of the organization (Slovenia, 2011)
- 4.16 The ENSI management system is properly established and supported by software applications, which provide a comprehensive platform to ensure that the system works properly, is user friendly and allows interconnection among various management system processes (Switzerland, 2011)
- 4.17 FANR has a very good electronic project management (EPM) system for planning, maintaining, retrieving, and record keeping all documents produced in the process of review and assessment (UAE, 2011)
- 4.18 SSM's decision to lead by example and demonstrate that it too is open to review and certification in choosing to certify against recognized international and national standards, including ISO 9001 (quality), ISO 14001 (environment), ISO 17025 (laboratory) and AFS 2001:1 (Systematic Work Environment Management) (Sweden, 2012)
- 4.19 SSM has taken a creative approach in how it chose to increase awareness of its key processes, reinforce their relative placement and interconnectedness, and provide a direct and simple means to access required guidance documents – SSM has developed, validated and posted an interactive process model to its intranet. This interactive tool represents one of many ways for staff to quickly gain access to the appropriate guidance documents and information for key processes (Sweden, 2012)

## 5. Authorization

- 5.1 The approach of asking the licence applicants to propose safety requirements for a new plant, and using the SAP's proven in the UK conditions to judge the acceptability of these requirements, provides both flexibility towards alternative technical solutions and a strong and transparent mechanism for maintaining the safety decisions firmly in the hands of the NSD. This approach gives a freedom to consider each design on its technical merits and to require additional safety features if found necessary with solid arguments from the UK point of view. It is thus ideally applicable for dealing with international nuclear industry (UK, 2006)
- 5.2 ASN has established a sophisticated system of authorizations adequately covering all stages and activities related to the lifetime of a NPP with a graded approach, with due account given to the complexity and safety impact of each activity. This includes involvement of the public in the authorization process (France, 2006)
- 5.3 The internal authorization process permits licensees to undertake activities outside the principal authorization based on guidance principles issued by ASN to the licensee. All proposed authorizations are passed to ASN staff in advance for their review and concurrence (France, 2006)
- 5.4 ASN internal performance indicators are used as a tool for on-line checking of status of individual regulatory activities with a positive effect on preventing delays in issuing authorizations (France, 2006)
- 5.5 While relatively new to authorizing the use of radiation in medical practices, ASN has developed clear requirements for what needs to be submitted, including details to demonstrate safety, and is developing clear procedures for how the information is to be assessed (France, 2006)
- 5.6 NISA has developed detailed guidance on the format and content of documents to be submitted for licensing and approval applications and on the timing of such submittals in the different stages of the regulatory process. The regulations and standards to be applied in the different areas have clearly been stated (Japan, 2007)
- 5.7 The regulatory process for the different stages of the basic licence and the following approval is well structured and guided by detailed requirements and standards (Japan, 2007)
- 5.8 NISA has developed its own programme for the licensing review and established an internal rule to perform the review, to interact with NSC and other stakeholders and to document the results of its reviews (Japan, 2007)
- 5.9 CNSNS staff responsible for licensing of NPP operators receives the same training as licensed operators (Mexico, 2007)
- 5.10 SNRCU utilizes its technical support organization in a well formalized, effectively organized, duly documented manner. SSTC NRS has the necessary expertise and experience (Ukraine, 2008)
- 5.11 Application of the 'pilot concept' in authorization of similar modifications in several plants is an effective method, if it is performed with due attention paid to differences between the plants (Ukraine, 2008)
- 5.12 IPEN requires that the potential for slope instability (such as landslides, rock slides taking into account past experience of the Nino) that could affect the safety of the research reactor be evaluated for the site and its vicinity and launch remediate actions. The Licensee has erected an embankment to protect the site against landslides (Peru, 2009)

- 5.13 OTAN written procedures; “Authorization of Installations” and “Authorization of Individual Licences” include useful flow charts of the processes (Peru, 2009)
- 5.14 The Canadian regulatory framework provides for a comprehensive and robust authorization system, and processes are in place for authorizing/licensing for all facilities and activities. There are clearly documented authorities and responsibilities either through the commission or delegated to appropriate CNSC staff, e.g. designated officers (Canada, 2009)
- 5.15 Rostekhnadzor’s approach to assessing the competence of senior technical and plant managers is a good practice (Russia, 2009)
- 5.16 The authorization documents are managed in a systematic, well organized and effective way from their submittals to the issuance of the authorizations including the process of review and assessment (Iran, 2009)
- 5.17 The authorization procedures and regulations concerning nuclear safety equipment manufactured in China have been developed in recent years. The regulatory supervision has been strengthened and is organized in an effective way (China, 2010)
- 5.18 The NRC licensing process, and in particular the license renewal process is carried out in a very transparent manner, providing opportunities for hearing and public involvement. A number of meetings are held in the vicinity of the plants to provide the public with information on the license renewal process, solicit input on the environmental review, and to provide the results of the NRC’s inspections (US, 2010)
- 5.19 Vendors, contractors, or any individual providing services to the nuclear industry are required to inform on any failure of a facility or activity to comply with any applicable rule, regulation, order, or license, or if any basic component supplied to such facility or activity contains defects, which could create a substantial safety hazard, to the NRC. The NRC has the authority for issuing orders to vendors and contractors to enforce this regulation (US, 2010)
- 5.20 The suite of documents detailing how to make an application, what information to provide and the internal procedural guidance documents for the FANR personnel how to perform the licensing indicate sound management of the application process (UAE, 2011)
- 5.21 Systematic engagement with a prospective licensee in the area of organisational governance, structures, competencies and resources, based on documented regulatory requirements and expectations, is considered a good practice that contributes to successful implementation of the licensing process. The regulatory review and assessment is based on technical assessment guides guiding the regulatory body’s staff interactions with an applicant and supporting a consistent regulatory approach. This approach fostered a constructive relationship based on trust and mutual recognition of the other party’s roles, responsibilities and expectations (UK-fu2, 2013)
- 5.22 The establishment of a working group to exchange views between regulators and potential operators on the future GDF is a good practice (UK-fu2, 2013)
- 5.23 SÚJB has created a systematic matrix tool to identify resources needed for siting assessment of Temelín 3 and 4. This matrix includes qualifications, competencies and number of people. In addition to human resources, it addresses also different tools needed for siting assessment (Czech Republic, 2013)
- 5.24 SÚJB has made an arrangement through which the financial status of all licensees of radiation sources is regularly checked from the National Registry of Insolvencies (Czech Republic, 2013)
- 5.25 FANC has been proactive in ensuring those likely to encounter orphan sources are educated and assisted both legally and financially to ensure the safe detection, storage and recovery of orphan sources (Belgium, 2013)



## 6. Review and Assessment

- 6.1 The regulatory review meetings (RRM) which take place every three months and where the site-inspectors and the assessors report findings and issues of the plants and strategies are reviewed and priorities set for the coming quarter is a good practice (UK, 2006)
- 6.2 The newly introduced Integrated Intervention Strategy, which gives NSD a more proactive planning tool to review, assess and inspect facilities and activities under scrutiny, is a good practice (UK, 2006)
- 6.3 NSD performs a systematic and detailed review and assessment of work undertaken by the licensee during an outage. These reviews are all documented and the site-inspector produces a summary report including their own judgement regarding the readiness of the plant for start-up. Before the final consent for start-up is given, a start-up meeting takes place where all safety-relevant issues are discussed between the plant operator and the regulatory body. This review process is considered to be a good practice (UK, 2006)
- 6.4 The mid-cycle review meeting held between the licensee and NSD covers a wide range of important issues such as significant plant modifications, the management of safety cases, licensing issues, operational experiences. This review process is considered to be a good practice (UK, 2006)
- 6.5 The documentation providing the basis for decision making in project assessment report is a good practice (UK, 2006)
- 6.6 The use of risk insights from PSA for regulatory decision making in NSD is a good practices (UK, 2006)
- 6.7 The process for approving exemptions from the technical specifications and documentation for the decision is thorough and comprehensive and can be considered as a good practice (France, 2006)
- 6.8 ASN has developed a comprehensive programme for monitoring, tracking and evaluating thermal transients during the life of the plant (France, 2006)
- 6.9 The review and assessment process, including documentation, of the design, construction, manufacturing, maintenance and operation for primary and secondary components of NPPs can be considered as a good practice (France, 2006)
- 6.10 The French PSR approach, using extensive advice from the TSO and the Standing Committees and applying it with the same rigour to all Basic Nuclear Installations, is considered a good practice (France, 2006)
- 6.11 The annual statistical analysis and documentation of events for research reactors and fuel cycle facilities provides a valuable input to the regulatory programme (France, 2006)
- 6.12 In the context of medical exposures, the French regulatory framework establishes appropriate responsibilities and requires personnel (medical practitioners, medical physicists, radiation protection officers) with appropriate training and qualifications. There are specific requirements for training on patient radiation protection (France, 2006)
- 6.13 The French regulatory framework clearly establishes the principle of justification in medical exposures and, further, requires records to be kept in the patients notes for such justification. The professional societies are developing guidance on justification (France, 2006)
- 6.14 The regulatory requirement for reporting small annual patient dose surveys to IRSN as part of implementing DRLs is to be commended (France, 2006)

- 6.15 The regulations require that patients undergoing diagnostic and therapeutic procedures using radionuclides must be given oral and written guidelines on radiation protection that are of use to the patient, his/her relations, the public and the environment (France, 2006)
- 6.16 ASN has taken appropriate steps to investigate reported accidental medical exposures, to widely disseminate information on the accidents, to solicit input for further improvement from licensees and professional societies, and to remind licensees of the existing regulatory requirements (France, 2006)
- 6.17 The regulatory activities performed by SD1 in industry and research are covering all these sections of GS-R-1 (France, 2006)
- 6.18 As in France nuclear facilities under decommissioning stay to be BNIs until they are released from regulatory control, they are subject to the requirement of a PSR every ten years. The process of internal authorizations even requests an update of the safety report every 5 years. This is considered good practice exceeding the requirements of IAEA safety standards on decommissioning, because the status of facilities changes considerably under decommission. In view of a time frame of about 20 years for the dismantling a complete assessment of the achieved status every 5 years seems to be adequate (France, 2006)
- 6.19 The support organization of the regulatory body, JNES, collects and maintains a database on observed ageing phenomena. New information from that database is regularly incorporated into a technical review manual that provides guidance on issues to be looked at as part of the ageing management review. The database and the technical review manual are at the disposal of both operating organizations and NISA, and the information is being used for improving maintenance programmes (Japan, 2007)
- 6.20 Major events that have indicated increased nuclear safety risks have been thoroughly investigated, and appropriate countermeasures have been enforced by revised regulations (Japan, 2007)
- 6.21 NISA is proactive in seeking to include the assessment of human and organizational factors in its review and assessment and inspection practices (Japan, 2007)
- 6.22 Implementation of risk informed regulation is supported by a systematic build up of infrastructure: basic concepts and policy, improvement and quality assurance of PSA models, and collection of failure data from all licensees for the use of these models (Japan, 2007)
- 6.23 CSN has developed and implemented a user-friendly PSA tool for use by staff not expert in the understanding of PSAs. This contains detailed plant data for each of Spain's NPPs and supports the SISC system and its Significance Determination Process. This PSA tool enables all CSN technical staff, and not simply those who are experts in PSA, to understand the plant systems and operational conditions important to safety. In addition a special PSA tool is available on the CSN intranet for use by all inspectors The tool facilitates the risk-informed selection of the SSC for the SISC inspection (Spain, 2008)
- 6.24 Regular meetings with Spanish radiation protection societies and the Spanish health physics society are also organized to discuss review and assessment issues (Spain, 2008)
- 6.25 The UM BW has implemented regulatory control of NPPs' human resources to ensure adequate staffing for safety at all times (Germany, 2008)
- 6.26 The development of the ASN-SFRO severity scale as a tool to convey understanding of the significance of reported events and the development of the risk self-assessment guide for radiotherapy (France – fu, 2009)
- 6.27 The use of Facility Assessment Compliance Teams provides an integrated multi-disciplinary approach to the assessment of licensing actions (Canada, 2009)

- 6.28 The development and use by CNSC of processes and tools for risk informed decision making (Canada, 2009)
- 6.29 CNSC's expectations for scheduled reporting of research and development activities (Canada, 2009)
- 6.30 The review process for authorization of a licence for medical, industrial, and research activities is based on well established comprehensive guidelines and transparent procedures. The formalized assessment process includes an initial review, peer review and review prior to the Designated Officer issuing the licence (Canada, 2009)
- 6.31 CNSC regulatory guidance, including draft or proposed regulatory guidance is available to the applicant and licensees for medical, industrial, and research activities. This information provides the licensee with a very clear and transparent overview of their responsibilities. Licensees reported that CNSC staff were very approachable and attentive to their needs (Canada, 2009)
- 6.32 CNSC has an impressive evaluation process for supporting the issuance of a licence for medical, industrial, and research activities. The evaluation takes account of expectations of the licensee and is based on detailed and transparent assessment of the hazard associated with the activity (Canada, 2009)
- 6.33 The establishment of Nuclear Topic Groups to provide consistency across ND in technical assessment areas and to provide guidance for reviews is considered a good practice (UK – fu, 2009)
- 6.34 Establishment of the Technical Support Framework based on systematic and transparent selection of independent contractors that are pre-qualified for specific areas of expertise, and overall arrangements for contracting necessary technical support without undue delay is a good practice (UK – fu, 2009)
- 6.35 NNSD makes effective and efficient use of support in the area of review and assessment from the country of reactor origin (Iran, 2009)
- 6.36 The MEP (NNSA) supports the wide use of PSA by issuing a PSA Policy Statement (China, 2010)
- 6.37 The process of sharing lessons learned between NRC offices dealing with operating and new reactors respectively is very well controlled, including establishment of formal links, and provides for systematic future utilization of broad experience gained from supervision of operating reactors (US, 2010)
- 6.38 NRC maintains and utilizes internal capability for performing independent audit calculations by means of deterministic and probabilistic computer codes including development of such codes, and shares the computer codes and relevant experience with other regulatory bodies worldwide (US, 2010)
- 6.39 NRC as a standard practice identifies relevant precedent licensing actions and use them for new submittals. This practice significantly increases the efficiency of the review process by reducing expended resources (US, 2010)
- 6.40 NRC has developed and continuously updates a system of both procedural and technical guidance documents for review and assessment which are shared and made available to regulatory bodies worldwide (US, 2010)
- 6.41 NRC has developed and implemented a robust operational experience feedback programme, including also guidance for safety enhancement and corrective actions recommended on the basis of lessons learned. The programme and a unique database are available for sharing experiences with all interested parties both nationally and internationally (US, 2010)

- 6.42 NRC collects and documents unique generic lessons learned in US from aging management, and is committed to continue to share them with nuclear community through the IAEA and other international channels as essential contribution to maintaining safety during long term operation of NPPs (US, 2010)
- 6.43 In addition to enhancing efficiency of the review and assessment process by means of continuous monitoring, evaluation and feedback the KINS publishes every year a book of "Good Practices (Best Regulation)" which contains selection of exceptional results of the regulatory works and findings (Korea, 2011)
- 6.44 KINS maintains and utilizes its internal capability for performing independent audit calculations by means of a number of deterministic and probabilistic computer codes including development and validation of such codes, and sharing the computer codes and relevant experience with other regulatory bodies (Korea, 2011)
- 6.45 The rules for back-fitting have clear initiation points, criteria on what safety goals must be fulfilled and the measures that may be needed for their implementation (Switzerland, 2011)
- 6.46 ENSI is using PSA in different areas of its regulatory activity in an advanced and comprehensive manner (Switzerland, 2011)
- 6.47 ENSI has clear closure criteria to shut down NPP based on the status of the reactor vessel and the containment is an example for an effective ageing management (Switzerland, 2011)
- 6.48 The NPPs refurbishment program as required by SSM is a good practice (Sweden, 2012)
- 6.49 UJD SR carries out its review and assessment activities in well controlled manner, based on established procedures. The personnel are well trained for the job, including the experienced and dedicated division equipped with various safety analysis tools to carry out control safety analyses (Slovakia, 2012)
- 6.50 STUK has established a comprehensive set of technical and radiological acceptance criteria and associated safety assessment requirements for all plant states including adequate consideration of different design extension conditions and severe accidents (Finland, 2012)
- 6.51 For novel design solutions adopted in new reactors, such as those associated with mitigation of severe accidents and security threats, STUK has verified the demonstration of effectiveness of such solutions by extensive independent analytical and experimental justification, including use of relevant research results (Finland, 2012)
- 6.52 The elaboration of detailed ONR guidelines and their application in the practices of ONR on the application of Graded Approach and the principles for regulatory assessment (UK-fu2, 2013)
- 6.53 SÚJB tracks the on-going assessment of CEZ's initial preliminary safety report for Temelín 3/4 with a very detailed and systematic database tool, and justifies properly the assessment of every single statement of the report (Czech Republic, 2013)

## 7. Inspection

- 7.1 ASN inspectors develop detailed agendas based upon off-site preparation activities that are used to facilitate on site inspection conduct (France, 2006)
- 7.2 ASN inspectors document inspection findings in at least 3 documents related to an inspection. Documentation of inspection results is readily retrievable for use in inspection programme development as well as serving as a readily available resource for recalling the regulatory history of a facility (France, 2006)
- 7.3 ASN has a robust and comprehensive accreditation programme for its inspectors (France, 2006)
- 7.4 Given that the regulatory system for radiation protection in medical exposures places significant reliance on approved persons and organizations performing radiation protection controls, it is commended that ASN has a system for inspecting the activities of such organizations, with feedback into their authorizations (France, 2006)
- 7.5 ASN is to be commended for developing in-depth guidelines for the conduct of its inspections in medical practices using radiation (France, 2006)
- 7.6 a) The preparation of inspections prior to their execution; and, b) the explanations and information provided by ASN inspectors to the operator at the end of inspections on identified good practices and deficiencies or deviations (France, 2006)
- 7.7 In the observed source, waste and decommissioning inspections, ARPANSA staff closed the inspection by asking the licensees for feedback about the conduct of the inspection. This is good practice (Australia, 2007)
- 7.8 NISA holds counterpart type meetings with all nuclear power plant inspectors four times per year to share inspection findings and lessons learned (Japan, 2007)
- 7.9 NISA has a well defined and clear code of ethics and conduct for individuals with a role in the nuclear power plant inspection programme (Japan, 2007)
- 7.10 a) CNSNS utilizes comprehensive checklists in the preparation for inspections, and b) conducts thorough discussions with the licensee regarding identified deficiencies or deviations. The explanations and information provided by CNSNS inspectors to the licensee at the end of inspections demonstrated good communications between CNSNS and the licensee regarding identified deficiencies or deviations (Mexico, 2007)
- 7.11 CNSNS has developed an effective Performance Indicator programme that effectively tracks a variety of indicators related to LVNPP (Mexico, 2007)
- 7.12 Inspection findings are summarized every six months in a detailed Assessment Report that is prepared for internal distribution at CNSNS. Trends are analysed in a qualitative manner. Insights on performance are included (Mexico, 2007)
- 7.13 CSN management of the inspections with all the documents available on the intranet across all facilities and activities is highly effective. The processes include the regular review of inspections and their findings as well as the follow up of plans with associated resources. The conduct of the inspection programmes in this area as well as others covered by the IRRS review is made in a transparent and traceable way (Spain, 2008)
- 7.14 The SIC'S programme results are thoroughly presented on the CSN web site. The status of the utility is clearly presented and the related safety questions if any are presented in an easily understandable way. Also in-depth information can be found (Spain, 2008)

- 7.15 Inspection reports for radiation facilities and X ray facilities for medical diagnosis are published on the CSN web-site. The only information that is excluded is information that is considered sensitive (personal data, commercial, security aspects etc). This makes the CSN activity transparent to the public, raises public credibility in the regulatory system and can promote the safety of the facilities (Spain, 2008)
- 7.16 The CSN inspection programme for facilities for operational waste disposal and for discharge control, and the verification of the protection of the public and the environment from operating and decommissioned facilities through environmental monitoring, is highly structured, conducted in a highly competent manner, and followed up according to clear procedures (Spain, 2008)
- 7.17 The Legislature's initiative (Article 25 of Law of Ukraine "On the Use of Nuclear Energy and Radiation Safety," 1995) to provide inspectors assigned to NPPs with compensation competitive with or equal to the compensation paid to the staff of the NPP has resulted in higher retention rates and more experienced SNRCU inspectors available to perform high quality inspections (Ukraine, 2008)
- 7.18 The approach for the systematic assessment and oversight of organizational and human factors (KOMFORT system) represents an innovative, structured and useful means of incorporating safety culture insights into the regulator's annual assessment process (Germany, 2008)
- 7.19 The placement of radiotherapy practice inspection reports on the ASN website is a powerful enforcement tool (France – fu, 2009)
- 7.20 The targeted use of inspections to focus limited regulatory resources on poor performance is an excellent example of optimization of regulatory resources to encourage licensees to improve their regulatory performance (Canada, 2009)
- 7.21 The CERTS application developed for event inspection, assessment and corrective action tracking constitutes an efficient tool for event tracking, related inspections and corrective actions (Canada, 2009)
- 7.22 The implementation of a robust and detailed inspection programme for radiation facilities (medical, industrial, and research) associated with high quality consistent documentation and a database carried out by CNSC allow a high level of feedback into the regulatory process (Canada, 2009)
- 7.23 The use of a Licensing and Inspection Mapping System is an excellent method for tracking compliance and maintaining continuity from inspection to inspection. It is also valuable tool for knowledge transfer as the history of a licensee's performance is recorded in the database (Canada, 2009)
- 7.24 INRA/NNSD found an effective temporary solution for the training issue related to the need for improvement of the knowledge and practical skills of inspectors. A training programme was developed within the framework of the IAEA Technical Cooperation programme and implementation of the training has started (Iran, 2009)
- 7.25 The MEP (NNSA) training programme for inspectors includes simplified reactor behaviour simulation training as well as licensee provided material on site equipment and systems (China, 2010)
- 7.26 MEP (NNSA) has initiated periodic meetings between Chinese manufacturers to promote the exchange of important manufacturing information (China, 2010)
- 7.27 Inspection programme has clear goals and a logical structure to verify that plants are operated in compliance with the NRC regulations and licence conditions (US, 2010)

- 7.28 Inspection procedures, plant specific inspection reports and assessment results are publicly available (US, 2010)
- 7.29 NRC has provided training and procedures to their inspectors to observe safety culture factors in licensee's performance. These observations are collectively evaluated according to an assessment process every six months (US, 2010)
- 7.30 There are effective ways to support inspection activities and share inspection findings within the region and HQ. This enables that generic inspection findings can be identified and adequately addressed with the licensees and also taken into account in different regulatory processes (US, 2010)
- 7.31 NRC has established several ways for inspectors to share experience and compare practices. This enables development of inspection practices and promotes consistent way of working of the inspectors and implementation of the inspection programme (US, 2010)
- 7.32 Resident inspectors have risk tools (including SAPHIRE models) available to focus their inspections on risk significant items and to perform risk calculations to evaluate risk significance of component unavailabilities (US, 2010)
- 7.33 The annual Quality Assurance inspection plan produce by KINS ensures that all major vendors to the Korean nuclear programme are subjected to a KINS QA inspection at least once in the 12-month period, including all overseas suppliers (Korea, 2011)
- 7.34 At the end of each NPP outage, SNSA prepares a report with the summary, analysis and action plan based on the inspection findings (Slovenia, 2011)
- 7.35 SNSA has developed, maintains and uses an integrated database (INFOURSJV) that contains all information important for the activity of the regulatory body and what is available for the entire regulatory staff (Slovenia, 2011)
- 7.36 The integration of rated inspection results with the safety assessment system provides a useful and systematic tool for ENSI to continuously evaluate the safety of the nuclear power plants (Switzerland, 2011)
- 7.37 SSM prepares and publishes (and makes publicly available on website) summary reports on inspection findings and incidences in different uses of radioactive sources including suggestions on how to improve level of safety and compliance, with regulatory requirements and license conditions. In case of medical practices in public hospitals, the summary report is discussed with the representatives of the county (Sweden, 2012)
- 7.38 Every 6 months UJD SR performs a systematic and formal assessment of inspection results to draw information from experience feedback and has launched a project for continual improvement of its inspection process (Slovakia, 2012)
- 7.39 Establishing a clear, objective goal that provides a clear expectation that the focus of resident inspection is direct observation and assessment in the field (Bulgaria, 2013)
- 7.40 Rostechnadzor has initiated joint inspection activities with foreign regulatory bodies to share best practices and experience in nuclear facilities supervision (Russia – fu, 2013)
- 7.41 The representation of SÚJB management in the SÚJB Committee for the Evaluation of Inspections provides an effective methodology for the assessment of licensee performance and overall regulatory programme feedback (Czech Republic, 2013)
- 7.42 Nuclear power plant operator safety culture is inspected, evaluated, documented and reported to utilities in systematic and comprehensive manner (Czech Republic, 2013)

- 7.43 The regulatory body has developed a methodology and training for the inspection of class I and class IIa facilities to capture, analyse and report observations of safety culture (Belgium, 2013)
- 7.44 The inspection programme for carriers of radioactive materials is graded based on risk and is recognized by other countries as a good practice (Belgium, 2013)

## **8. Enforcement**

- 8.1 HSE/ND has developed and implemented a public and formal enforcement policy statement and enforcement management model (UK – fu, 2009)**

## 9. Regulations and Guides

- 9.1 A comprehensive set of internal guidance documents exist to describe many elements of how the regulatory body functions (UK, 2006)
- 9.2 The document "Safety Assessment Principles for Nuclear Facilities" (first issued 1979, revised 1992 further draft issued for public consultation April 2006) is a comprehensive description of the principles that are the foundation of nuclear safety and offers guidance as to how they may be achieved (UK, 2006)
- 9.3 The Law 2006-686 on "Transparency and Security in the Nuclear Field", through the instrument of the periodical safety review establishes a method for requesting improvement in the safety level of the installation (France, 2006)
- 9.4 The regulatory activities performed by SD1 with respect to industry and research are covering these sections of GS-R-1 (France, 2006)
- 9.5 The 2006 Programme Act on the Sustainable Management of Radioactive Materials and Wastes now comprehensively provides the necessary legal and regulatory framework in the field of radioactive waste management (including disposal), decommissioning and remediation.. This is considered to be good practice (France, 2006)
- 9.6 The way the ASN is regulating, giving quantitative guidance for discharge of short lived radionuclides and controlling the discharges of installations other than Basic Nuclear Installations (France, 2006)
- 9.7 RB-STD-10-06, Regulatory Guidance for the Decommissioning of Controlled Facilities under the Australian Radiation Protection and Nuclear Safety Act 1998, although not yet finalized and endorsed by the CEO of ARPANSA, represents a good practice because it provides a comprehensive collection of requirements and recommendations for the full process of decommissioning of nuclear facilities (Australia, 2007)
- 9.8 NISA is developing performance-based standards referring to IAEA safety standards (Japan, 2007)
- 9.9 CSN practices a well based and thorough approach that requires the licensees to systematically assess advances in international standards and to take relevant standards into account and to make them binding for licensees. The practice of annual reviews of the development of safety standards related to the licensing base as well as considering additional standards and practices in the context of license renewal processes supports continuous development of plant safety (Spain, 2008)
- 9.10 The CSN approach to keep track of the development of regulations and guides in countries of origin to take into consideration comments from interested parties and the feedback of experience is very systematic and comprehensive (Spain, 2008)
- 9.11 The material available on the CSN web site, including guides and training courses in radiation protection, is comprehensive for the various practices and is an efficient tool to contribute to safety improvements among the many operators involved in radiation facilities or using X rays for medical diagnostic purposes (Spain, 2008)
- 9.12 Guidelines for submission of the safety analysis report (SAR) for the use of ionizing radiation sources and for the format and content of annual reports are examples of clear and comprehensive documentation that can enhance the safety and security of sources through their application (Ukraine, 2008)
- 9.13 The process for developing KTA technical standards is very comprehensive and systematic. It covers a broad range of technical issues, taking into consideration state of the art in science

- and technology. The consultation process allows for consideration of comments from all interested parties. The documents are reviewed and, if necessary, revised every 5 years (Germany, 2008)
- 9.14 The Radiological Safety Regulation is based both on International Standards and national feedback in the field of radiation safety (Peru, 2009)
  - 9.15 Where appropriate the CNSC adopts or adapts national and international standards when developing regulatory requirements. The Canadian government promotes participation in standard setting activities of the IAEA and to the Canadian Standards Association (Canada, 2009)
  - 9.16 The Regulation Making Process is very open and transparent with extensive pre-consultations built into the process. Interested parties are consulted already before starting to draft the regulation (Canada, 2009)
  - 9.17 The processes to issue legal documents in the field of nuclear energy include comprehensive provisions to take comments from all interested parties into consideration (Vietnam, 2009)
  - 9.18 Development and implementation of a comprehensive programme for review, update and completion of the suit of guidance documents with clear responsibilities for each individual document and for overall coordination, including detailed time schedule for the whole process, taking into account the importance of the TAGs and resource availability is a good practice (UK – fu, 2009)
  - 9.19 A broad scope comparison of IAEA, USNRC and INRA safety regulations and guides has been performed to specify the range of regulations and guides to be developed by INRA for the safety regulation of BNPP (Iran, 2009)
  - 9.20 The graded approach is implemented in accordance with a risk-based categorization of radioactive sources and radiation-emitting devices. For sealed sources, China has adopted the IAEA categorization of sources and extended it to unsealed sources and radiation-emitting equipment (China, 2010)
  - 9.21 The NRC has developed a systematic and completed set of regulations and guides, and developed practicable and useful working documents, such as standard review plan, reactor oversight process, and related procedures and programmes. This is a good way and useful not only for standardization of use of regulations but also for knowledge management (US, 2010)
  - 9.22 The rulemaking process is very well-documented, comprehensive for the different stakeholders, with clear organisation and responsibilities for each actors, overall coordination, consultation of interested parties and regulatory analysis taking into account impact on the licensees, the public and the NRC (US, 2010)
  - 9.23 KINS Technical Standard Committee plays a key role in reviewing draft comments by giving expert opinions. A significant number of external experts allow for broader stakeholder input. As per regulations, the Nuclear safety committee also includes a wide range of experts outside the Regulatory body (Korea, 2011)
  - 9.24 The drafting process for regulations and guides explicitly includes identification then comparison to domestic and international standards, including IAEA safety standards. Since nearly a decade, there have been several comparison exercises between Korean regulations and guides and IAEA safety standards, in an effort to improve harmonisation with those standards (Korea, 2011)
  - 9.25 During the process of developing a guideline there is an extensive process of consultation of stakeholders. It is an open and transparent process (Switzerland, 2011)

- 9.26 The licensees are required by law to back-fit their installations to the extent that is necessary, based on worldwide operating experience and the state of current back-fitting technology (Switzerland, 2011)
- 9.27 The UAE has developed, in a relatively short period of time, a comprehensive national regulatory framework for nuclear safety. For the establishment of its own regulatory requirements and guidance, the FANR has made extensive use of IAEA Safety Standards. The obligation of the FANR to take account of internationally recognized standards and recommendations, such as the IAEA Safety Standards, when developing the national regulations and guidelines, is explicitly stated as a mandatory requirement in the UAE Nuclear Law (UAE, 2011)
- 9.28 SSM assessment of packages takes account of work done by other Competent Authorities. This approach is novel, not widely used elsewhere, helps where resources are limited and maintains safety levels (Sweden, 2012)
- 9.29 The process to develop and revise regulations is described well in a dedicated procedure which involves interested parties and the public at different stages. The process of requiring a periodic, two-yearly review of regulations is a good practice (Bulgaria, 2013)
- 9.30 The use of Radioactive Waste Management Case for every single waste stream contributes to the demonstration that the interdependences among the various steps in the predisposal management of RAW are considered in a comprehensive way (UK-fu2, 2013)
- 9.31 The proactive approach taken by Rostekhnadzor, in coordination with the other national organizations concerned, to revise the national regulations of the Russian Federation for transport of radioactive material in parallel to the revision of the relevant IAEA Safety Standards (SSR-6) is a good practice (Russia-fu, 2013)
- 9.32 FANC has taken a constructive approach to improve industrial radiography compliance by holding stakeholder meetings to seek industry feedback and explain new regulatory requirements (Belgium, 2013)

## 10. Emergency Preparedness and Response

- 10.1 The number of drills per year involving BNIs is very high and considering the relative similarity of French NPPs, the level of knowledge and experience on how to act in a nuclear emergency is very high. The response time to get the emergency centre operational is very short (France, 2006)
- 10.2 An ambitious and well thought through planning for the handling of 'un-planned' events, such as the handling of orphan sources, is in place (France, 2006)
- 10.3 ARPANSA has a strong health physics capability and a well equipped, very mobile, well trained and motivated Emergency Operations Unit for meeting short notice requests and deploying wider ARPANSA staff to aid in a large scale radiation incident (Australia, 2007)
- 10.4 CSN established an integrated network-based database system for management, control and recording of doses, enabling control of doses received by emergency worker. Effective management of dose records significantly contributes to an effective emergency management and protection of emergency workers (Spain, 2008)
- 10.5 An effective framework for managing the situation in case of uncontrolled source emergencies in metallurgy recycling sector has been established. Adaptation of the Protocol for Radiological Surveillance of Metal Recycling, a Collaboration of Government and Industry, with effective involvement of CSN, ensures a high level of readiness for this type of emergency at national level (Spain, 2008)
- 10.6 The SNRCU has implemented a graded approach to emergency preparedness and response for facilities of Threat Category III (Ukraine, 2008)
- 10.7 ASN has established a formal relationship with the Ministry responsible for the environment allowing the development of a national approach to the treatment of contaminated sites regardless of who has the regulatory responsibility for the sites (France – fu, 2009)
- 10.8 VARANS recognized that good knowledge of counterparts is essential for the effective and efficient work in the group. Therefore, VARANS plans to provide basic training on radiation protection and emergency preparedness for the provincial officials, who will take part in the working group, which is going to draft provincial radiological emergency plan (Vietnam, 2009)
- 10.9 The establishment of an emergency preparedness framework (NEPLG) and benchmarking (off-site plans) with external organizations is a good practice (UK –fu, 2009)
- 10.10 NRC commissioned a detailed study to determine the effectiveness of the licensees public awareness programme to find out how the public understands the information on risks and actions to be taken in case of an emergency (US, 2010)
- 10.11 The NRC introduced performance indicators for emergency preparedness, e.g. Drill/Exercise Performance; Emergency Response Organization Drill Participation; Alert and Notification System Reliability, which are evaluated every three months (US, 2010)
- 10.12 A sound and detailed on-site and off-site emergency exercise programme has been developed over the last thirty years, for a variety of scenarios with well balanced and comprehensive set of objectives, which are tested – based on previously defined evaluation criteria - by a series of exercises over a six year period (US, 2010)
- 10.13 CNCAN's involvement in the development of a common software platform for data and information exchange during emergencies (Romania, 2011)

- 10.14 The CSN's successful carrying out of a field exercise with other relevant agencies as a part of the table-top INEX 4 exercise on radiological emergency consequence management (Spain – fu, 2010)
- 10.15 The operation and continuous enhancement of AtomCARE and the development of a Nationwide Integrated Management System for Environmental Radiation / Radioactivity Monitoring is a good example of integrating information and data gathering systems into an effective and efficient national emergency response organization (Korea, 2011)
- 10.16 Coordination principles between all stakeholders at the national level are set in the *National Emergency Response Plan for Nuclear and Radiological Accidents*, and an efficient mechanism for this coordination is provided through the establishment and operation of an inter-ministerial committee chaired by SNSA (Slovenia, 2011)
- 10.17 The SNSA has developed a *Communication System During an Emergency* (MKSID), which is a web tool for communication between emergency response organizations, at the national level (14 organizations) (Slovenia, 2011)
- 10.18 Excellent tools, both electronic and paper-based, have been developed and are available for radiological monitoring and consequence assessment as well as for public information (Switzerland, 2011)
- 10.19 Good coordination and cooperation between federal and cantonal organizations involved in the national nuclear emergency preparedness and response system as well as with the neighbouring countries (Switzerland, 2011)
- 10.20 SSM has established a state-of-the-art Emergency Response Centre, equipped with all necessary tools, procedures, as well as a national network of mobile and stationary laboratories to manage the emergency response (Sweden, 2012)
- 10.21 The regional cooperation initiative of the Nordic countries NEP is a good example of regional collaboration (Sweden, 2012)
- 10.22 GAEC's real time monitoring of radioactivity levels at various locations in the country by means of a network of telemetric stations contributes significantly to identifying the initial phase of a potential radiation emergency due to events within or outside the country (Greece, 2012)
- 10.23 GAEC has successfully advocated the inclusion of the radiation protection course, which covers the recognition of radiation injuries, into the basic curricula for medical doctors (Greece, 2012)
- 10.24 The detailed requirements existing in the current legislation for on-site and off-site planning provide for very efficient, reliable and harmonized arrangements at local level and therefore for prompt and coordinated response at the first level of intervention in case of emergency at nuclear facilities (Slovakia, 2012)
- 10.25 The extensive and regular training programs conducted by the UJD SR for its own interventional staff and emergency managers are recognized as a good practice (Slovakia, 2012)
- 10.26 All teams of the regional Departments for Rescue Services of the Ministry of Interior are equipped with electronic dose rate meters and responders are trained in their use. This allows first responders to detect the radiation hazards and take appropriate actions in a timely manner (Finland, 2012)
- 10.27 STUK has excellent tools, facilities and organizational arrangements to perform the necessary evaluation of the emergency in a timely manner and to provide appropriate recommendations

- for protective measures. The organization and conduct of the emergency exercises and the coordination with other stakeholders is exemplary (Finland, 2012)
- 10.28 Decision makers at high political level participate in national emergency exercises which strengthens their engagement and proper preparedness for the decision making challenges required during a real emergency (Finland, 2012)
- 10.29 Instructions recommended by the BNRA can reach the public through an efficient system developed and maintained by Ministry of Interior by sending voice and text messages through the national radio and TV broadcasting networks (Bulgaria, 2013)
- 10.30 The development of a method based on the use of comparative emergency capability maps for estimation of the level of on-site and off-site emergency readiness enables an early identification of gaps, performing a benchmarking and facilitates further development in the area of EPR (UK-fu2,2013)
- 10.31 The requirements for the emergency plans contents for all types of activities and practices are clearly and extensively defined in regulations (Russia-fu, 2013)
- 10.32 The introduction of a systematic exercise evaluation tool is considered a good practice (Russia-fu, 2013)
- 10.33 The Russian Federation, through its leadership and collaboration with various international stakeholders, has contributed effectively to the development of measures and programmes that may strengthen the global safety regime in the wake of the TEPCO Fukushima Daiichi accident (Russia-fu, 2013)
- 10.34 The nuclear and radiological emergencies are very well integrated on the national structure to face all other emergencies (e.g. conventional emergencies) where SÚJB would play a key role if a radiation emergency occurs (Czech Republic, 2013)
- 10.35 SÚJB promotes and is part of a very detailed bilateral cooperation with Austrian competent authority including provision of real time data (source term, on site weather data and measurement data) as input to Austrian's decision support system. This cooperation is periodically tested in yearly exercises (Czech Republic, 2013)

## 11. Other Areas

- 11.1 ASN played a very proactive role in the elaboration, discussion and approval by the Government of the 2006 Programme Act on the Sustainable Management of Radioactive Materials and Wastes. At the same time ASN took the lead in the elaboration of the first draft of the National Plan for Radioactive Waste Management, which includes NORM and TENORM which should be presented to the Government for approval before 31 December 2006, and that should be updated every three years for all kinds of radioactive waste streams (France, 2006)
- 11.2 ASN has contributed to determine whether any intervention is needed for reasons of radiation protection, bearing in mind that the reduction in detriment resulting from the reduction in dose should be sufficient to justify the harm and the costs, including social costs, of the intervention. A lot of work has been done to identify situations requiring remediation actions (France, 2006)
- 11.3 The establishment by ASN of a list with the qualified organisations capable to evaluate the impact of existing chronic exposure scenarios and making recommendations to the authorities regarding actions to be carried out is considered a good practice (France, 2006)
- 11.4 ASN's information and communication strategy represents international good practice. It provides extensive information to all stakeholders, especially to the general public, the public with some knowledge of nuclear safety, and the media. Using this strategy ASN is promoting its core values of independence, competence, stringency and transparency (France, 2006)
- 11.5 The particular use of a quite elaborate opinion survey, including a lot of discussions and face to face meetings with stakeholders, seems to be a very powerful tool to assess the impact of the information programme and is also a good way to obtain a performance indicator (France, 2006)
- 11.6 The CNSNS training programme for metal recyclers is building trust and cooperation between industry and the Regulatory Body (Mexico, 2007)
- 11.7 CNSNS officially supports the ININ effort to modify and develop its environmental monitoring programme in accordance with IAEA International Standards (Mexico, 2007)
- 11.8 Spain has established strong measures for ensuring effective management of sources at the end of their life; a condition of license that there be arrangements for return to the supplier or for proper disposal or storage, supported by financial guarantees. In exceptional circumstances confiscation of the source and its recovery from public fund is provided (Spain, 2008)
- 11.9 Spain has a consistent and stable policy of organizing and carrying out state campaigns for restoring appropriate control over orphan sources. IAEA methodology for combined administrative and physical search of orphan sources is comprehensively implemented (Spain, 2008)
- 11.10 The Transport Management Database System incorporating databases on packages subject to approval, packages not subject to approval, carriers, Type B(U) packages, authorizations, inspections, and incidents and all other relevant documentation is considered to be comprehensive, user friendly and a practical management tool (Spain, 2008)
- 11.11 To assist all relevant stakeholders the CSN has for a number of years produced a detailed correlation table between the current IAEA TS-R-1 and the current ADR by theme, paragraph number and a comment indicating the relevant changes in each document. This pro-active approach is very practical and meets the needs of the operators, staff etc. (Spain, 2008)

- 11.12 The national system involves the obligation of ENRESA to draw up the General Waste Management Plan (PGRR), which cover all waste streams and also incorporates the views of different affected parties in the establishment of the national strategies. The PGRR is a comprehensive document that allows for assessment of interdependencies and priorities (Spain, 2008)
- 11.13 In the area of decommissioning of nuclear power plants and other fuel cycle facilities, an infrastructure has developed and matured over the years, including regulatory experience, that allow decommissioning projects to be carried out efficiently and with minimal delays. This may serve as an international benchmark (Spain, 2008)
- 11.14 SNRCU has prepared a reference book containing pictures of radioactive material that can be found in scrap. The book has been distributed to scrap dealers. This is a good practice to help scrap dealers in identifying abandoned radioactive material in scrap (Ukraine, 2008)
- 11.15 The SNRCU and the Ministry of Emergency Situations responsible for the record keeping in the area of radioactive waste management have established a comprehensive record keeping system, requirements on which were elaborated in detail by SNRCU requirements on the content and format of data submitted on regular basis to the regulatory body (Ukraine, 2008)
- 11.16 The revision and review of the status and the safety assessment of RADON facilities with the intention to upgrade their technological characteristics and to enhance their safety features is considered as a good practice to be followed by other countries with the same type of facilities (Ukraine, 2008).
- 11.17 Despite the fact that the operation of the national geological repository will commence only after several decades SNRCU has already prepared a regulatory document with the safety requirements for geological repositories. This document will be periodically updated and will provide the regulatory framework for the development of this kind of facility (Ukraine, 2008)
- 11.18 France has operated a comprehensive register of sources for many years. The Register includes sources of all IAEA source categories which exceeds the categories specified in General Principle 11 (France – fu, 2009)
- 11.19 Strong measures have been established for ensuring the effective management of disused sources including provisions for the return of sources to their suppliers and financial warranties that address the possible default of these source suppliers (France – fu, 2009)
- 11.20 The role of IPEN in influencing the improvement of legislation, and ensuring that sanctions are set at levels which are proportionate to the costs of compliance are both good practices (Peru, 2009)
- 11.21 The CNSC's on-line sealed source tracking system is outstanding, and provides an excellent model for others to follow (Canada, 2009)
- 11.22 The implementation of bilateral agreements is an important initiative in order to fully implement the provisions of the Code of Conduct concerning import and export of radioactive sources (Canada, 2009)
- 11.23 In nuclear safety, under the draft action plan on "Strengthening capacity in nuclear safety oversight for nuclear power programme in Vietnam" as specified in Part IV "Enhancing human resource for nuclear safety oversight" provides a detailed programme and action plan for training the staff of the regulatory authority for NPP project review. This draft plan is very comprehensive and sufficient for training regulators is the assessing and reviewing the NPP project (Vietnam, 2009)
- 11.24 The regulations and guides issued by the NRC to avoid the potential for adverse effects on safety from security and vice versa are comprehensive and provide an appropriate

- framework to assure that the licensees put in place an adequate management of the safety/security interface (US, 2010)
- 11.25 The procedures developed and implemented by NRC establish clear responsibility of assignments and communication channels to allow an effective management of its internal interfaces between safety, security and emergency preparedness (US, 2010)
- 11.26 The arrangements for a transparent and technically sound siting process for the Central Temporary Storage (CTS) facility and its associated technical centre is good practice (Spain – fu, 2011)
- 11.27 CSN has integrated its security inspection and oversight program into its Integrated System for Plant Oversight (SISC) (Spain – fu, 2011)
- 11.28 CSN has been very proactive in working with multiple national organizations that are competent authorities in areas interrelated with physical security of nuclear facilities, nuclear materials and radioactive sources. This has resulted in excellent collaboration and cooperation, resulting in considerable progress being made on some very sensitive and complex security-related issues (Spain – fu, 2011)
- 11.29 The Korean national response to the Fukushima accident was well-coordinated and addressed key areas in a short timeframe. In particular, national environment radiation monitoring was reinforced, contamination of goods and people was monitored at airports and harbors, public concerns were addressed by significant communication involvement, and cooperation with Japan was conducted through staff support and technical meetings
- The swift launch of the Special Safety Inspection process led to the prompt identification of first measures to improve safety. As part of the response to the implications of the Fukushima accident, the exceptional involvement of external experts in the Special Safety Inspection further enhanced the transparency and further reinforced the credibility of the inspection process, while promoting information sharing with interested parties (Korea, 2011)
- 11.30 SNSA is performing a comprehensive National Monitoring Program and control of Operational Monitoring as prescribed at JV10. Environmental data are regularly assessed and published in a transparent manner (Slovenia, 2011)
- 11.31 The CNSC's use of systematic inspections of Radiation Protection Programs of carriers to facilitate the periodic assessments of radiation doses to transport workers, as required by para. 308 of TS-R-1, is considered to be a good practice (Canada – fu, 2011)
- 11.32 The CNSC Regulatory Document RD-364 "Joint Canada-United States Guide for Approval of Type B(U) and Fissile Material Transportation Packages" is a very detailed and comprehensive guide to assist applicants to demonstrate compliance with the Regulations as well as to assist competent authorities in the review and approval of applications. As such it contributes to a harmonized practice between Canada and the U.S. in the field of package design assessment and approval (Canada – fu, 2011)
- 11.33 The Canadian Transport Emergency Center (CANUTEC) together with the CNSC 24 hour/7 days a week ability to provide technical assistance and regulatory oversight, the Emergency Response Assistance Plans (ERAPs) of consignors and the Federal Nuclear Emergency Plan (FNEP) provide an excellent system for emergency response (Canada – fu, 2011)
- 11.34 The CNSC has performed a systematic and thorough review of the implications and the lessons learned from the Fukushima accident for the safety of the Canadian NPPs, making full use of all the information available, including the review of the actions taken by other international nuclear regulators. The CNSC has set up an Action Plan for addressing all the findings and

- recommendations arising from the review conducted under the CNSC Fukushima Task Force. The Task Force Report has been made publicly available (Canada – fu, 2011)
- 11.35 Jointly developed Guideline by ENSI, FOPH and SUVA. (ENSI-B04, Release of Material and areas from controlled zones) has led to consistent results at the facilities regulated by the different regulators (Switzerland, 2011)
  - 11.36 The use of the Sectorial Plan as the instrument for the repository site selection is an open and transparent process that involves stakeholders (Switzerland, 2011)
  - 11.37 Sectorial Plan provides very good process for confidence building among all stakeholders. ENSI is leading the Technical Forum Safety meetings with all stakeholders, but also international experts and interested community are involved in the review process (Switzerland, 2011)
  - 11.38 The integrated approach adopted by ENSI in the review and assessment as well as supervision of plant modifications, which always involve in a systematic manner safety and security experts, promote a very effective management of the existing interfaces so as to optimize mutual benefits on nuclear safety and security measures and to avoid possible mutual detrimental effects (Switzerland, 2011)
  - 11.39 In order to exchange technical experience, ENSI interaction with authorities competent for security matters in other sectors is quite positive (Switzerland, 2011)
  - 11.40 ENSI should be commended for their prompt implementation of first measures and the development of a comprehensive action plan based on an analysis of the TEPCO Fukushima Dai-ichi accident (Switzerland, 2011)
  - 11.41 The provision of guidance material on the protection and the safety of workers and for the completion of the application for a license is acknowledged as a positive indicator of a high level of commitment from the FANR in order to foster the implementation of the regulations concerning the occupational exposure (UAE, 2011)
  - 11.42 The provision of guidance material for specific areas where ionizing radiations are used and/or produced as well as the identification of actions to be undertaken for improving the regulations on the protection and the safety of workers is acknowledged as a positive indicator of a high level of commitment from the SSM in order to foster the implementation of the regulations concerning the occupational exposure (Sweden, 2012)
  - 11.43 As well for the nuclear as for the non-nuclear activities, the requirements for identifying Radiation Protection Experts and the guidance material concerning their training and competence is acknowledged and efforts for maintaining such level of supporting material are encouraged (Sweden, 2012)
  - 11.44 Financial resources are evaluated periodically (e.g., every three years) by SKB, SSM and the government to ensure financial resources are sufficient and consistent with the technical work needed to develop the repository and demonstrate its safety, including resources for regulatory review. The Swedish approach for public participation and stakeholder consultations regarding the RD&D programs and environmental impact assessments has built a trust in the Swedish high level waste management system, as well as the integrity of the regulator (Sweden, 2012)
  - 11.45 SSM established a review team to ensure potential impacts to post-closure safety are considered across all operational activities (e.g., monitoring activities, closure activities) and other relevant facilities (e.g., encapsulation facility) during the review of the license application (Sweden, 2012)

- 11.46 SSM requires all licensees to determine the diagnostic standard dose for all specified examinations at least each third year, and to provide this information upon request. Using these data SSM demonstrates continuous decreasing trend in DSD (Sweden, 2012)
- 11.47 In 2011, referral criteria were published by the Hellenic Radiological Society based on European Guidance (Greece, 2012)
- 11.48 Greece has developed the technical capability to perform biological dosimetry in case of overexposures (Greece, 2012)
- 11.49 GAEC requires the scrap metal industry and the customs authorities to establish portal monitoring (Greece, 2012)
- 11.50 UJD SR has established a comprehensive and exhaustive set of regulations and guidance in the area of waste management and decommissioning that encourages waste minimisation (Slovakia, 2012)
- 11.51 STUK inspectors responsible for compliance monitoring of medical exposures have the opportunity for hands-on training in a clinic conducting the licensed activity. This allows the inspectors to obtain a thorough understanding of all aspects of the regulated practice (Finland, 2012)
- 11.52 STUK has developed outstanding expertise in the area of quality assurance of all aspects of radiation dose delivery in radiation therapy and diagnostic radiology (Finland, 2012)
- 11.53 The National Dose Registry as established by the Regulation 28 and as operated by NCCRRP contains information not only on the doses received by occupationally exposed workers but also medical and workplace monitoring data, training information and information on exposure to conventional chemicals in the workplace in such a way that all the relevant information for future cause-effect analysis can be found in one database (Bulgaria, 2013)
- 11.54 Poland has introduced changes to the ALA and regulations, including those related to decommissioning, at an early stage in the NPP program (Poland, 2013)
- 11.55 The HSE website provides access to a large range of information on radiation protection, available to employers and workers, including Radiation Protection News (UK-fu2,2013)
- 11.56 SÚJB and SÚRO have performed thorough analysis of the accidents and incidents in radiotherapy, the results of which have been communicated and used for optimisation and training purposes (Czech Republic, 2013)
- 11.57 The database radiation monitoring system MonRaS enables:
  - Collection of data from all components of the NRMN including foodstuff contamination, dose rate monitoring made by mobile groups and environmental samples,
  - Automatic sending of information and warning messages to an expert on duty and to other relevant personnel from regional and national organizations that may be involved during a radiation emergency,
  - Using the data for preparing recommendation on making decision about countermeasures in an extraordinary radiation event (Czech Republic, 2013)
- 11.58 FANC has an effective policy of stakeholder engagement to promote radiation safety amongst the relevant clinical professions and members of the public. This ensures that guidance documents and initiative programmes are embraced by stakeholders and used accordingly (Belgium, 2013)