Questions & Comments Received on 5th Cycle U.S. National Report for the Joint Convention and Answers Current as of April 2015

Id	IAEA Article	Reference	Question/Comment	Answer
1	Article 12	A.4.2:p.10 / B.2.3.3:p.22 / H.1.3: p.108	In section B.2.3.3, it is said that: "Sources of 226Ra, other naturally naturally occurring radioactive materials (NORM) of similar hazard, and accelerator produced radioactive material designated as 11e.(3) and 11e.(4) are not defined to be waste, as such; it can be disposed of in either a licensed radioactive waste or a permitted non-radioactive waste disposal facility". May this type of waste be classified as LAW, even if there is no official legal definition of LAW in place in the U.S? There are no indications in section A.4.2 about disposal of this type of waste. It is said in section H.1.3 that hazardous waste facilities and municipal or industrial solid waste landfills are now used by the U.S. generators for some LAW disposal. Are these landfills different from the facilities mentioned in section D.2.2?	The term low-activity waste (LAW) does not have a statutory or regulatory definition, but generally means wastes that contain some residual radioactivity, including naturally occurring radionuclides, which can be safely disposed of in hazardous or municipal solid waste landfills. Such waste is invariably a fraction of the limits for Class A low-level waste (LLW) contained in Title 10 of the Code of Federal Regulations (CFR) part 61, and is often below concentrations that are considered safe for unrestricted release under international standards. Although these materials could be disposed of in a LLW disposal facility licensed under 10 CFR part 61, if a licensee so chooses, disposal at another type of facility, such as a hazardous waste facility, can be authorized under 10 CFR 20.2002. This is a provision in the Nuclear Regulatory Commission's (NRC) regulations that allows for other disposal methods, different from those already defined in the regulations, provided that doses are maintained as low as (is) reasonably achievable and within the regulatory dose limits in 10 CFR part 20. The disposal of LAW in hazardous or solid waste landfills is permitted, provided that the regulatory dose limits are met including the waste acceptance criteria at the receiving disposal facilities.
2	Article 12	A.4.5, 13	It is stated that by statute, DOE must apply every five years to EPA for recertification of the facility. In 2010, WIPP was recertified by EPAi¦. - What kind of documents should be required to apply for recertification? Do these documents include technical updates of safety assessment and/or environmental impact assessment for the facility operation? - How does EPA issue recertification for WIPP operation? Does it include technical review of documentation submitted?	As described in Title 40 of the Code of Federal Regulations (CFR) 194.15, the primary focus of the Compliance Recertification Application (CRA) is to update previous applications by describing changes that have taken place that could affect the long-term performance of the disposal system. For example, the Environmental Protection Agency (EPA) expects the CRA to address changes related to topics such as the design of the facility, waste inventory, physical or chemical parameter values (e.g., solubility), and the probability and significance of features, events, and processes (FEPs) (e.g., drilling rates). The CRA also includes updated performance assessments that incorporate these changes. EPA reviews the CRA to ensure that it provides thorough documentation to support these changes, such as experimental data or new modeling approaches, and meets quality assurance specifications. Experimental data can be derived from research conducted globally, not just at the Waste Isolation Pilot Plant (WIPP) or by the Department of Energy (DOE). Previous recertification reviews have required interaction with DOE to answer questions or provide additional information. EPA announces its recertification decision in the Federal Register (see 75 FR 70584, November 18, 2010 at http://www.gpo.gov/fdsys/pkg/FR-2010-11-18/pdf/2010-28806.pdf for the 2010 recertification decision). More information on recertification, including documentation supporting previous reviews, can be found at http://www.epa.gov/radiation/wipp.
3	Article 12	B.4.1	What is the USA practice to dispose the depleted uranium generated as a result of commercial enrichment activities?	Currently, if depleted uranium is considered to be waste, it would fall under the definition of low-level waste (LLW) in accordance with Nuclear Regulatory Commission (NRC) regulations. However, the current rule did not anticipate disposal of large quantities of depleted uranium in LLW disposal sites. In 2009, NRC pursued a limited rulemaking to specify a requirement for a site-specific analysis and associated technical requirements for unique waste streams including, but not limited to, the disposal of significant quantities of depleted uranium. This requirement along with other revisions to Title 10 of the Code of Federal Regulations (CFR) part 61, are currently under development. The revisions to 10 CFR part 61 would require site-specific analyses to demonstrate the performance objectives are met for disposal of LLW, including depleted uranium if the disposal site plans on accepting this material. Once the proposed rule changes are approved by the Commission and published in the Federal Register, the proposed rule and corresponding guidance document would be available for review and public comment. NRC would consider and address any public comments on the proposed rule before a final rule is issued.

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4	Article 12	H, 108	It is stated that NRC is currently working to revise certain portions of 10 CFR Part 61. - Could you provide the detailed contents of 10 CFR Part 61 to be revised in addition to K.6 item 2, and explain the background of revision?	The revisions are necessary because the current rule and its supporting environmental evaluation did not anticipate disposal of large quantities of depleted uranium in low-level waste disposal sites. The revisions to Title 10 of Code of Federal Regulations (CFR) part 61 would require site-specific analyses to demonstrate that performance objectives are met. These revisions (1) would include an update to requirements for an adequate performance assessment, (2) would include new requirements to conduct an inadvertent intruder assessment and demonstrate that defense-in-depth protections are provided, and (3) would maintain existing requirements for protection during operations and an analysis of long-term stability. The proposed revisions would also allow disposal facilities to determine site-specific waste acceptance criteria from the results of the site-specific technical analyses. The specific proposed rule changes would be available after the Commission publishes the proposed rule in the Federal Register. NRC would consider and address the comments received before a final rule is proposed.
5	Article 12	H.1, 108	It is stated that LLW disposal occurs at commercially operated LLW disposal facilities and could be licensed by either NRC pursuant to 10 CFR Part 61 or Agreement States pursuant to their regulations which are compatible with 10 CFR Part 61, and all currently operating sites are licensed by Agreement States. - How would be regulatory consistency of license review or inspection achieved for each disposal facility among Agreement States? - In this case, what are the main roles of NRC for LLW disposal?	All commercial low-level waste (LLW) disposal in the U.S. is licensed by individual Agreement States in accordance with Title 10 of the Code of Federal Regulations (CFR) part 61, as adopted by the State. States must maintain a specified level of compatibility with each part of 10 CFR part 61. In some cases, state regulations must be essentially identical to the Nuclear Regulatory Commission's (NRC's). In other cases, states have the flexibility to be more or less strict, while maintaining an overall equivalent standard for protection of health, safety and the environment. Periodically, state regulatory programs are evaluated by NRC personnel and their peers from other states during an Integrated Materials Performance Evaluation Program (IMPEP) review. Departures, if any, from standards of program adequacy and compatibility are noted and raised to senior state officials. NRC's main role in LLW disposal is promulgation of the overall regulatory framework and related guidance, program review and oversight, and provision of technical assistance upon request.
6	Article 12	H.1.3: p.109 / H.2.5: p.114 / K.6	COMMENT: Section H.1.3: "The CERCLA program administered by EPA has a long history of permitting residual materials to remain on site provided a reliable sytem of institutional controls is established. CERCLA requires a review every five years to ensure the controls are continuing to function". Section H.2.5: "Most radioactive waste disposal sites will not meet DOE criteria for unrestricted release at any ime in the foreseable future...DOE anticipates many of its facilities may never be released from active institutional control... DOE will use active institutional controls for at least 100 years following closure". Potential issues associated to institutional control without any possibity of release of sites at any time could be considered more in-depth in the text. NRC rulemaking activities related to this subject, if any, should be mentioned in section K, for example.	Thank you for your interest. The U.S. will consider addressing the topic of institutional controls in more detail in the next U.S 6th National Report.
7	Article 12	p. 108 (Section H.1.1)	Disposal of low-level radioactive waste Figure H-1 (page 110) shows the U.S. regional compacts for low-level waste disposal. The Texas Compact comprises Texas and Vermont which is remarkable given the large distance between these two states. Could you please provide an explanation for this build-up?	The Low-Level Radioactive Waste Policy Act (LLRWPA) established the legal and regulatory framework governing the disposal of low-level waste (LLW) in the U.S. The 1980 LLRWPA authorized a system of interstate compacts (under which states formed compacts to provide for the regional disposal of LLW in new LLW disposal facilities). The LLRWPA did not have a requirement that compacts be comprised of contiguous states. Hence, there are several other compacts made up of noncontiguous states- the Southwest, the Rocky Mountain, and the Atlantic Compacts. Less than a year after the 1980 passage of the LLRWPA, many states had grouped themselves into regions and were moving toward obtaining Congressional approval of their compacts. In response to the LLRWPA, the Texas legislature established the Texas Low-Level Radioactive Waste Disposal Authority in 1981, which was responsible for identifying potential disposal sites in Texas and for determining the viability of each site. In 1993, the

Id	IAEA Article	Reference	Question/Comment	Answer
				authority drafted an agreement to form a compact between Maine, Vermont, and Texas, making Texas the disposal site for the LLW generated by those three states. In 2004, Maine having decommissioned its nuclear plant withdrew from the Compact. For more information, see: http://www.tllrwdcc.org/ and http://www.senate.state.tx.us/75r/senate/commit/archive/c580/pdf/LLRWreport.pdf .
8	Article 13	B.3.2.2	NRC is to continue the Yucca Mountain licensing process until Congress authoritatively says otherwise or there are no appropriated funds remaining (section B.3.2.2); however, payment into the Nuclear Waste Fund is currently suspended (F2.3.2). What challenges does this pose for the funding of any future geological disposal facility?	As of September 30, 2014, the current balance of the Nuclear Waste Fund is approximately $32.9 billion. These funds continue to earn interest while the fee is suspended. When the Secretary is again able to conduct a legally adequate fee assessment, then fee payments will resume, assuming that some future determination concludes that further fees are necessary to ensure full cost recovery.
9	Article 13	K3, 130	What are the overall process and timeline for development of GTCC LLW repository?	The major milestones to be accomplished to establish a disposal capability for Greater-than-Class C (GTCC) Low-level waste (LLW) include: publication of the Final Environmental Impact Statement (EIS) for the Disposal of GTCC LLW and GTCC-like waste; submission of a Report to Congress that includes the disposal alternatives evaluated (in accordance with the Energy Policy Act of 2005), Congressional action, and a Record of Decision. The Final GTCC EIS publication is anticipated in calendar year 2015. The exact dates of availability of a GTCC LLW disposal capability are not known at this time. Site characterization and facility construction for various disposal alternatives are analyzed in the Draft GTCC EIS and a final EIS will be issued including responses to public comments.
10	Article 15	H.2.4, 113	It is stated that safety is ensured through specific waste management controls (waste acceptance criteria and waste certification programs), and based on regulatory requirements. - Who decides waste acceptance criteria and waste certification programs for each DOE facility? - and is there any process to review the suitability or adequacy of those WAC and WCPs by regulators?	Certain Department of Energy (DOE) waste management facilities (such as repositories for the geologic disposal of spent fuel and high-level waste (HLW), and storage facilities for spent fuel and HLW) are required to be licensed by the Nuclear Regulatory Commission (NRC). DOE's approval of the Waste Isolation Pilot Plant (WIPP) for disposal of defense TRU waste is certified by the Environmental Protection Agency (EPA). Construction or operation of facilities for disposal of LLW are approved by DOE's Deputy Assistant Secretary for Site Restoration and Waste Management in the Office of Environmental Management (EM) following review by the Low-Level Radioactive Waste Federal Review Group, composed of experts from across the DOE complex. Other spent fuel and radioactive waste storage and treatment facilities are approved by the responsible senior DOE official. The Office of Environment, Health, Safety and Security (EHSS) advises the Secretary of Energy on the status of compliance with regulatory requirements. As the DOE's "environment, health, safety and security advocate," the organization supports DOE by identifying the risks in these areas that could jeopardize DOE's mission. In addition, EHSS works closely with DOE line management which is ultimately responsible for ensuring that DOE's work is managed and performed in a manner that protects workers and the public as well as the DOE's material and information assets. (The Former Office of Health, Safety and Security was divided into two separate organizations on May 4, 2014: The Office of Enterprise Assessment and the Office of Environment, Health, Safety and Security).
11	Article 16	F, p. 99	What is the procedure and practice for inspection and compliance of waste packages stored in waste storage facilities regarding degradation and integrity of various waste packagings?	The integrity of spent fuel storage systems during the initial licensing period (up to 40 years) is addressed by a combination of design and inspection requirements set forth in Title 10 of the Code of Federal Regulations (CFR) parts 72.122 and 72.236, "Overall requirements" and "Specific requirements for spent fuel storage cask approval and fabrication," respectively. For example, the design of reinforced concrete structures are evaluated against American Concrete Institute (ACI) Standard 349, "Code Requirements for Nuclear Safety-Related Concrete Structures," to ensure that specific degradation modes are mitigated during service. Also, the design and fabrication of confinement systems are evaluated against the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section III, "Rules for Construction of Nuclear Facility Components, Division 1." The level of testing, inspection, and documentation provided during construction and maintenance is in accordance with the

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				quality assurance requirements as defined in 10 CFR part 72, subpart G or 10 CFR part 50, Appendix B. Storage systems are required to be monitored using inspections, tests, or other means to demonstrate that safe storage conditions are maintained. To meet this requirement, maintenance programs include monitoring activities (such as radiation, pressure, and temperature monitoring); visual inspections every 5 years per ASME Boiler and Pressure Vessel Code Section XI Article IWA-2210 VT-3 standards after the initial 20 years of operation to the extent allowed by the inspection equipment and accessible surfaces for defects that could reduce confinement effectiveness; periodic visual inspections of air flow vents for blockages that could reduce thermal performance; and other testing, as applicable, to verify that the radiation shielding, thermal, and confinement capabilities of the storage system are maintained. See NUREG-1536, Revision 1, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility" (http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1536) and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities" (http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1567) for more information.
12	Article 17	H.2.5, 114	It is stated that DOE will use active institutional controls for at least 100 years following closure. - Is this the minimum requirement for an active institutional control period of 100 years, and is this stipulated on DOE Policy? - Have the institutional control periods been decided for commercial disposal facilities like WCS in Texas? If not, when would institutional controls usually be determined for those commercial repository? - concerning institutional controls, is there any relation between DOE policy and 10CFR61 referred to 'Institutional control of access to the site is required for up to 100 years.'?	U.S. regulations for land disposal of commercial radioactive waste are specified at Title 10 of the Code of Federal Regulations (CFR) part 61. The regulations require the land owner or custodial agency to carry out an institutional control program to physically control access to the disposal site following transfer of control of the disposal site from the disposal site operator. Further, the regulations specify that the period of institutional control is determined by the Nuclear Regulatory Commission (NRC), but may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner. Agreement States, which regulate commercial low-level waste (LLW) disposal sites such as Waste Control Specialists (WCS) in Texas, are required to adopt these regulations. Department of Energy's (DOE's) requirements for institutional control are specified in DOE Order 435.1. DOE M 435.1-1 specifies that institutional control measures shall be integrated into land use and stewardship plans and programs, and shall continue until the facility can be released. DOE M 435.1-1 also specifies that for purposes of establishing limits on the concentration of radionuclides that may be disposed of near-surface, the performance assessment shall include an assessment of impacts calculated for a hypothetical person assumed to inadvertently intrude for a temporary period into the low-level waste disposal facility. For intruder analyses, institutional controls shall be assumed to be effective in deterring intrusion for at least 100 years following closure.
13	Article 19	A.4.2.3	Please clarify basic provisions of the risk-oriented approach to disposal which are planned to be included into 10CFR part 61 in the course of its revision?	The proposed revisions for Title 10 of the Code of Federal Regulations (CFR) part 61 would require site-specific analyses to demonstrate the performance objectives are met. These revisions (1) would include an update to requirements for an adequate performance assessment, (2) would include new requirements to conduct an inadvertent intruder assessment and demonstrate that defense-in-depth protections are provided, and (3) would maintain existing requirements for protection during operations and an analysis of long-term stability. The proposed revisions would also allow disposal facilities to determine site-specific waste acceptance criteria from the results of the site-specific technical analyses. The proposed rule was published on March 26th, 2015 and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML14289A152.
14	Article 19	NRC rulemaking activities	The IVth Report provided that due to inadequacy of capacities needed for LLW disposal, NRC had been updating "its guidance related to extended interim storage of LLW". What is the progress on these documents revision?	The Nuclear Regulatory Commission (NRC) reviewed its guidance related to interim storage of low-level waste (LLW) in regulatory issue summary (RIS) 11-09, "Available Resources Associated with Extended Storage of Low-Level Radioactive Waste", and concluded that its guidance was adequate. The RIS and other relevant resources can be found at: http://www.nrc.gov/waste/llw-disposal/public-outreach/llw-extended-storage-information.html

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15	Article 19	NRC rulemaking activities	The IVth Report provided that due to lack of capacities needed for LLW disposal, NRC was performing revision of RAW classification to dispose of the depleted uranium. What is the situation on RAW classification revision?	The proposed revisions for Title 10 of the Code of Federal Regulations (CFR) part 61 would require that site-specific analyses to demonstrate the performance objectives are met for disposal of low level waste, including depleted uranium if the disposal site will be accepting depleted uranium. These revisions (1) would include an update to requirements for performance assessments, (2) would include new requirements to conduct an inadvertent intruder assessment and demonstrate that defense-in-depth protections are provided, and (3) would maintain existing requirements for protection during operations and an analysis of long-term stability. The proposed revisions would also allow disposal facilities to determine site-specific waste acceptance criteria from the results of site-specific technical analyses. Once this rulemaking has been completed and implemented, the staff will evaluate the need for a low-level waste classification revision.
16	Article 19	NRC rulemaking activities	Whether any acceptance criteria for GTCC and HLW acceptance are under development?	Waste acceptance criteria for disposal facilities for Greater-than-Class C (GTCC) Low-level waste (LLW) and for high-level waste (HLW) are not under development at this time. The Department of Energy (DOE) is analyzing alternatives for the disposal of GTCC LLW and GTCC-like waste and continues to work on the Final Environmental Impact Statement (EIS) for the disposal of such waste. It would be premature to develop waste acceptance criteria for disposal of GTCC LLW or for HLW in the absence of the selection of specific disposal sites to provide the necessary design and performance requirements.
17	Article 19	p. 51	NRC and DOE have a memorandum of understanding (MOU) to clarify their roles and responsibilities, (e.g., to minimize or eliminate duplication of effort between the two agencies). Has the efficiency of this co-operation been evaluated?	The 1990 Memorandum of Understanding (MOU) was developed to specify roles and responsibilities of the parties Nuclear Regulatory Commission (NRC) and Department of Energy (DOE)) in the federally funded program for remedial actions at abandoned uranium mills under Title I of the Uranium Mill Tailings Radiation Control Act (UMTRCA). The 1990 MOU has since been superseded by a formal licensing process. Under UMTRCA, and in NRC's regulations at Title 10 of the Code of Federal Regulations (CFR) 40.27, DOE is generally licensed for the Title I sites. The license becomes effective when NRC accepts the Long-term Surveillance Plan for the site and agrees with the DOE's determination that the site remediation is complete. All remedial actions associated with the land surface have been completed and the general license is in effect at all but one of the sites, the Grand Junction site, which remains open under DOE control in order to accept small volumes of milling waste generated by current DOE activities. The actions that remain today at the sites are largely the long-term surveillance and/or groundwater remediation/monitoring. The roles and responsibilities for the long-term surveillance and groundwater remediation/monitoring are included in the MOU; however, as the sites are now under the general license the roles and responsibilities for those activities are well defined and duplication of effort is not anticipated.
18	Article 20	p. 57-58	Remediating radiologically contaminated sites listed on the CERCLA National Priorities List (NPL). The NPL includes sites licensed by NRC or Agreement States, as well as DOE sites. EPA and NRC entered into a MOU in October 2002, to avoid future confusion about the potential for dual regulation at decommissioned sites. This MOU defines conditions where the two agencies would consult on the decommissioning of NRC-licensed facilities. What are the experiences so far on the practical implementation of the MOU?	The Nuclear Regulatory Commission (NRC) and the Environmental Protection Agency (EPA) have exchanged consultation letters under a Memorandum of Understanding (MOU) on 17 NRC decommissioning sites. EPA has responded to each consultation request from NRC with a letter expressing its views on actions that NRC should consider that address the site-specific matter that triggered consultation. Over the course of consultations on 17 sites, there have been some reoccurring themes to EPA's views. Primarily, these are EPA recommendations to NRC to consider: (1) selecting institutional controls to ensure that some of NRC's assumptions about future human exposure at the site are not exceeded; (2) using more site-specific information when conducting dose assessment modeling; (3) a flexible approach to groundwater protection that still ensures the public is not exposed to contamination levels over drinking water limits; and (4) an approach similar to how EPA implements supplemental standards under uranium mill tailings regulatory standards at Superfund sites when the soil standard of 5 pCi/g (0.185 bq/g) is not being met. As part of the consultation process, NRC has considered EPA's views on these actions. Through the implementation of the MOU, NRC and EPA staff have continued to work together

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				in recognition of each Agency's authority and commitment to protect the public health and safety. The letters from NRC and EPA for each of these consultations may be found at the following website: http://www.epa.gov/superfund/health/contaminants/radiation/mouletters.htm More information about the MOU, including the letter transmitting it from EPA Headquarters to the field offices with information about rationale behind the MOU may be found at this website: http://www.epa.gov/superfund/health/contaminants/radiation/mou.htm
19	Article 20	p. 62	NRC can relinquish regulatory authority to individual states as Agreement State. How is it performed? Does the Agreement give the same power (e.g. enforcement) to the state authorities as NRC has?	The Nuclear Regulatory Commission (NRC) is authorized under federal legislation (the Atomic Energy Act of 1954, as amended) to relinquish certain licensing authority to a State provided that the State has a radiation protection program that is at least as protective as NRC's (adequate to protect public health and safety) and is compatible with NRC regulations and requirements. The State will adopt compatible legislation and regulations in accordance with their legal system. The State will also develop a program that includes procedures, fee recovery, and enforcement, and maintain sufficient staff for radiation protection programs for agreement materials (byproduct, source and special nuclear material of less than a certain, small amount). Once NRC is satisfied that the State has a program in place to allow a seamless transition from NRC to the State (no gaps in legal oversight and same level of protection to the workers and public), NRC will approve the Agreement. Once a State has developed a compatible program, it will have similar authority as NRC for the safety regulation of certain materials and facilities within that State, while NRC retains overall program review authority.
20	Article 20	p. 62	It is mentioned that some base requirements must be adopted by states, while states may choose not to adopt other rules. Why only some base requirements must be adopted by states, who decides about that?	When a state seeks initial authorization for its hazardous waste program, it must adopt all requirements identified by the Environmental Protection Agency (EPA) as necessary for such authorization. Once the state has been authorized to implement the "base program," new federal requirements which are more stringent than the state's existing hazardous waste program must be adopted, while states may choose not to adopt other rules which are considered less stringent. The example given in the report, which allows a conditional exemption from the Resource Conservation and Recovery Act of 1976 (RCRA) requirements for mixed waste for certain types of management in accordance with a radioactive materials license (Title 40 of the Code of Federal Regulations part 266, subpart N), provides for a less stringent method of managing these wastes. Therefore, states are not required to adopt this rule, and it would not become effective unless the state adopts and is authorized for it.
21	Article 21	p. 65	In which cases do licensees or operators of commercial disposal facility transfer their control of the site to Federal or governmental agencies?	Under applicable U.S. requirements, licensees of commercial disposal facilities eventually transfer title and control of those facilities to government agencies for long-term stewardship before their licenses can be terminated. There are two different cases, one for low level waste (LLW) disposal (Title 10 of the Code of Regulations (CFR) part 61) and the other for uranium mill tailings disposal (10 CFR part 40). The regulations (contained in 10 CFR part 61) require that all commercial licensees that are authorized for LLW disposal under the Atomic Energy Act of 1954, as amended, must transfer ownership of the site or the portion of land on which the waste is disposed to a governmental agency before the license is terminated. After the sites are closed, the licenses would be transferred to the government and terminated at the end of the institutional control period (of up to 100 years after closure). However, one of the four commercial LLW disposal facilities in the U.S. received an exemption from this government ownership requirement, based on information submitted to the State regulatory agency. In addition, there are commercial sites for the disposal of uranium mill tailings and related materials from uranium milling sites. Conventional milling sites (i.e., ore is brought to the surface for processing at the mill) will have the ownership of the land with the tailings pile transferred to the governmental agency. Milling sites that recover uranium in situ (i.e.,

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				solution mining) do not have wastes permanently stored on site; however, the licensees will have to demonstrate at license termination that the property can be released.
22	Article 22	F	The USA has given a good description of the steps taken to ensure that human resources working across the industry are suitably qualified and experienced (section F), but what steps are being taken to ensure that an adequate supply of such resource remains available for the future?	The Nuclear Regulatory Commission (NRC) has various financial assistance programs in place in the form of grants and cooperative agreements. Grants are awarded to U.S. educational institutions in the areas of Curriculum Development, Faculty Development, Scholarships and Fellowships (4-year institutions), and Trade School/Community College Scholarships (2-year institutions). The agency also has grant/cooperative agreement programs specifically for nuclear-related research, as well as Minority Serving Institutions that may focus more broadly on STEM (Science, Technology, Engineering, and Mathematics) education. These nuclear education grant programs help ensure that the U.S. maintains a highly trained and educated workforce in nuclear science, technology, and engineering fields from which to draw. Within NRC, we have established multiple programs as a means of hiring, developing, deploying, and retaining a high quality, diverse workforce with the skills necessary to carry out NRC's mission. Two examples are, the Nuclear Safety Professional Development Program (NSPDP) and Graduate Fellowship Program (GFP). The NSPDP is our entry level program for recent graduates. They receive extensive on-the-job training, formal classroom training, individual study, and rotational assignments. The GFP targets individuals who wish to gain highly-specialized technical knowledge by undertaking research-intensive full-time graduate work in a discipline identified as meeting NRC's current and future critical skill needs.
23	Article 22	F.2.3.1, Para 3, p68	It is mentioned in F.2.3.1 that the commercial LLW management facilities license applicant should ensure that its finance source is enough to cover the estimated costs of conducting all licensed activities over the planned operating life of the project, including costs of construction and disposal. Is the related cost of after closure of a disposal facility covered in the finance source? And please introduce the proportion of the cost of the institutional control in the total cost.	Subpart E of Title 10 of the Code of Federal Regulations (CFR) part 61 breaks financial assurance requirements into three parts: licensed operations, closure, and institutional control. The licensee must have necessary funds (or reasonable assurance of obtaining them) necessary to carry out licensed activities during the operating life of the site under 10 CFR 61.61 (http://www.nrc.gov/reading-rm/doc-collections/cfr/part061/part061-0061.html). The licensee must provide assurance that funds will be available to carry our closure and stabilization in the initial license application under 10 CFR 61.62 (http://www.nrc.gov/reading-rm/doc-collections/cfr/part061/part061-0062.html). Prior to licensing, the applicant must provide for Commission review a copy of a binding arrangement with the site owner that demonstrates availability of sufficient funds to carry out institutional control activities under 10 CFR 61.63, see: http://www.nrc.gov/reading-rm/doc-collections/cfr/part061/part061-0063.html. The proportion of the cost of institutional control to total cost will be a site specific determination based on the number and frequency of monitoring and site maintenance activities stipulated during the institutional control period.
24	Article 22	p. 66	Human resources are listed for NRC as the budget numbers for 2015. The Performance and Accountability Report - Fiscal Year 2013 is given as reference. No summary on the sufficiency of resources during the reporting period is given. Were the resources sufficient?	Yes, resources were sufficient for Nuclear Regulatory Commission (NRC) to meet its regulatory mission.
25	Article 22.2	Section F.2.3.2, pp. 68-69	What was the reasoning behind the November 2013 court ruling? Is it true that the Nuclear Waste Fund is no longer replenished from this source? COMMENT: The Report says that "The Nuclear Waste Policy Act of 1982 (NWPA) requires utilities having a contract with DOE for the disposal of spent fuel or high-level waste (HLW) to pay fees into the Nuclear Waste Fund sufficient to cover the costs associated with disposal activities for spent fuel and HLW. Following a November 2013 court ruling, the fee has been suspended. This fee, evaluated annually for sufficiency, previously was $0.001 per kilowatt-hour of nuclear power generated and sold."	The court reasoned that the Department of Energy (DOE) could not do a legally adequate fee assessment as required by the Nuclear Waste Policy Act until either the Yucca Mountain project is revived or until Congress enacts an alternative waste management plan. The current fee for nuclear power generated and sold is zero. As of September 30, 2014, the balance in the Nuclear Waste Fund was $32.9 billion. Interest will continue to accrue annually on the balance in the Fund.
26	Article 23	F.3.1, Para 2,	It is mentioned in F.3.1 that the applicant should establish and operate a QA system according to the NRC guidance; however, it is mentioned in F.3.2 that	The Nuclear Regulatory Commission (NRC) regulations cover all commercial licensees and some Department of Energy (DOE) facilities; DOE activities that are not subject to regulation

Id	IAEA Article	Reference	Question/Comment	Answer
		p71£»F.3. 2, Para 3, p72	the DOE activities are subject to QA requirement of 10CFR 830.120. Actually, the structure and key points of these two are some different. What is the relation of the two QA systems? Should both of the two QA systems be met by the same facility?	by NRC are covered by DOE regulations, Orders and contract requirements. Both agencies' criteria aim to achieve adequate protection of the workers, the public and the environment, taking into account the work to be performed and its hazards, while they remain distinct and separate.
27	Article 24	F.4, 74	- What is the process to derive the transfer coefficients and bioaccumulation factors used in the radiological environmental impact assessment? - What are the transfer coefficient and the bioaccumulation factor applied to each radionuclide?	The process used to derive the transfer coefficients and bioaccumulation factors used in the radiological environmental impact assessment can be found in a Department of Energy (DOE) Standard, DOE-STD-1153-2002, "A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota," at http://energy.gov/ehss/downloads/doe-std-1153-2002 The derivation process for the bioaccumulation factors is described in the Standard on page M3-47-50 in Module 3 Part 2. A primary reference is John Till and H. R. Meyer (1983) Radiological Assessment: A Textbook on Environmental Dose Analysis. NUREG/CR-3332, ORNL-5968. The references in tables 4.1 and 4.2 on these pages are described in the "Front Matter" section of DOE-STD-1153-2002. The transfer coefficients and the bioaccumulation factor applied to each radionuclide can be found in Module 1 of DOE STD-1153-2002, on page M1-41 in Table 6.5. The references for this table are found at the bottom of the table.
28	Article 24	F.4, 80	In Limitations for decommissioning described in Table F-3 of the national report is as follows; ¡°Restricted Use : If institutional controls fail, not to exceed 1 mSv/a or 5 mSv/aj±. - What is the reason that those two standards, 1 mSv/a and 5 mSv/a, have been defined? Could you explain the difference between those two values?	The Nuclear Regulatory Commission's (NRC's) regulations in Title 10 of the Code of Federal Regulations (CFR) 20.1403 describe the criteria for license termination under restricted conditions. One of the requirements for restricted use, as noted in 10 CFR 20.1403(e), is that residual radioactivity at the site has been reduced so that if the institutional controls were no longer in effect, there is reasonable assurance that the Total Effective Dose Equivalent (TEDE) from residual radioactivity distinguishable from background to the average member of the critical group (the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for any applicable set of circumstances) is as low as (is) reasonably achievable and would not exceed either 100 mrem (1 mSv) per year or 500 mrem (5 mSv) per year. In order to utilize the 500 mrem/y (5 mSv) value, licensees must: (i) Demonstrate that further reductions in residual radioactivity necessary to comply with the 100 mrem/y (1 mSv/y) value of paragraph (e)(1) of 10 CFR 20.1403 are not technically achievable, would be prohibitively expensive, or would result in net public or environmental harm; (ii) Make provisions for durable institutional controls; (iii) Provide sufficient financial assurance to enable a responsible government entity or independent third party, including a governmental custodian of a site, both to carry out periodic rechecks of the site no less frequently than every 5 years to assure that the institutional controls remain in place as necessary to meet the criteria of 10 CFR 20.1403(b) and to assume and carry out responsibilities for any necessary control and maintenance of those controls. Acceptable financial assurance mechanisms are those in 10 CFR 20.1403(c).
29	Article 24	F.4, p.78-81	In the national report under Table F.3 "Major Radiation Protection Standards" it is not specified whether there is a dose limit in place for the lens of the eyes and skin (and/or extremities) of exposed members of the public. Could you please provide us with some clarifications on that matter?	Department of Energy (DOE) Order 458.1 limits the equivalent dose to the lens of the eye to 15 mSv (1500 mrem) in a year and the equivalent dose to the skin or extremities to 50 mSv (5000 mrem) in a year for members of the public. The Nuclear Regulatory Commission (NRC) does not specify a dose to the lens of the eye or skin for members of the public because significant localized exposure limits cannot be exceeded without exceeding the total effective dose equivalent to individual members of the public of 1 mSv (See Title 10 of the Code of Federal Regulations 20.1301(a)(1)).
30	Article 25	F.5.1.5, Para 2, p87	COMMENT: It is mentioned in F.5.5 that NRC is evaluating the effect of Fukushima Accident to the NPP reactors. Please introduce the effect of Fukushima Accident to the emergency preparedness of ISFSI, and please introduce the emergency planning for ISFSI.	The Nuclear Regulatory Commission (NRC) staff did not find safety concerns associated with the designs of spent fuel storage systems. The NRC's staff assessment can be found in a white paper on the lessons learned from Fukushima for facilities other than power reactors. The paper is publicly available and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML15042A367. Therefore, there was no effect of the Fukushima accident on Independent Spent Fuel Storage Installations (ISFSIs). The requirements of for an emergency plan for an ISFSI would depend on its location relative to an

Id	IAEA Article	Reference	Question/Comment	Answer
				operating nuclear power reactor (contents of an emergency plan for spent fuel storage facilities are included in Title 10 of the Code of Federal Regulations 72.32). The majority of the ISFSIs are collocated with an operating nuclear power plant; therefore, the same emergency plan applies. If an ISFSI is located at a site without an operating nuclear power reactor, an emergency plan is required for that facility. NRC has not received an application for a new facility with the purpose of managing spent nuclear fuel or radioactive waste, since the Fukushima event.
31	Article 25	F5, page 83	Please report on progress on transition from the emergency phase to decommissioning phase following an accident.	In the U.S. as part of the National Response Framework (NRF), there are three phases to a response to a radiological incident. These are the Early Phase, Intermediate Phase and the Late Phase (see http://www.remm.nlm.gov/response_phases.htm) The Early and Intermediate Phases are equivalent to Australia's Emergency Phase. The Late Phase would be equivalent to Australia's Decommissioning Phase. The transition from the Intermediate Phase to the Late Phase begins sometime after the commencement of the intermediate phase and proceeds independently of intermediate phase protective action activities. The transition is characterized by a change in approach, from strategies predominantly driven by urgency, to strategies aimed at both reducing longer-term exposures and improving living conditions. . The Late Phase uses an optimization process which considers many factors such as anticipated levels of exposure, future land use, radiological impacts, and non-radiological impacts, while ensuring that all doses are as low as (is) reasonably achievable (ALARA) . Consistent with the Environmental Protection Agency's (EPA) Protective Action Guides (PAG) Manual, which was revised in 2013 as "Draft for Interim Use," the optimization decision-making would consider current Federal, state, and local regulations and guidelines. Experience from existing programs, such as the EPA's Superfund program, the NRC's process for decommissioning and decontamination to terminate a nuclear facility license and other national recommendations may be useful for designing cleanup and recovery efforts that could apply to a radiological incident. Based on the incident, these cleanup levels may not be achieved immediately, and so the process of cleanup should be flexible in order to come to the final cleanup level goals in order to achieve normalcy and re-occupancy back to the affected community to the extent possible. Additional information on the Draft PAG Manual can be found at http://www.epa.gov/radiation/rert/pags.html
32	Article 25	K.2: p.130	COMMENT: The U.S. efforts to deal with the legacy of the accident will be more explicitly addressed within the context of the Convention on Nuclear Safety"… The U.S. is also examining how to address those (Fukushima) lessons learned relevant to radioactive waste storage and management".This last item is not addressed in the current fifth report. Mentioning some orientations, even preliminary, would nevertheless be helpful.	The Nuclear Regulatory Commission (NRC) has recently issued a draft white paper on the applicability of Fukushima lessons learned to facilities other than power reactors. The paper is publicly available and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML15042A367. For dry cask spent fuel storage systems, NRC performed a qualitative assessment considering the lessons learned at the Fukushima incident and common design characteristics (e.g., horizontal versus vertical systems) of spent fuel storage systems approved for use in the U.S. NRC did not find safety concerns associated with the designs of spent fuel storage systems. For low-level waste (LLW), the draft white paper discusses the four commercial disposal facilities that have been licensed to accept LLW in the U.S. NRC's analysis notes that these facilities are sited to avoid disruptive events through the licensing process, which includes: restrictions on the waste characteristics (e.g., limits to radiological concentrations and hazardous characteristics), siting characteristics (e.g., the four facilities are in low to moderate seismic zones, and 3 of the 4 are in a dry part of the country), waste classification (requiring higher concentrated waste to be buried deeper), and system design.
33	Article 26	F.6.1.1, 89	Section F.6.1.1 states on public meeting for PSDAR and LTP. - What is the main topic in public meeting? - What are the regulations on feedback after public meeting?	The public meeting on the Post Shutdown Decommissioning Activity Report (PSDAR) is for the Nuclear Regulatory Commission (NRC) to present the information that is in the PSDAR and to describe NRC's decommissioning regulatory process to the public. The public then has the opportunity to provide comments on the content of the PSDAR and the decommissioning

Id	IAEA Article	Reference	Question/Comment	Answer
				regulatory process to NRC at the meeting and/or in writing. NRC answers the questions in the meeting and addresses the comments in the documentation of NRC's review of the PSDAR. The public meeting on the License Termination Plan (LTP) is held by NRC to describe the content of the LTP and for NRC to describe the regulatory process for reviewing the LTP, amending the license, and the process for terminating the license once the requirements of the LTP have been satisfied. The public has an opportunity to provide comments to NRC whenever a licensee submits a PSDAR or a LTP. While there is not a requirement in the regulations for NRC to provide responses to public feedback received on the PSDAR or LTP, NRC endeavors to answer the questions asked in the public meetings and respond to summarized comments made on the content of these documents, and on NRC's regulatory processes, when NRC documents its licensing review.
34	Article 26	F.6.1.1, 89	As stated on the page 89, NRC will make Post-Shutdown Decommissioning Activity Report (PSDAR) publicly available. Is the PSDAR report going to be available for the public in a full range or will it contain some confidential parts? Is the safety analysis report part of the PSDAR?	For nuclear power plants, the Post-Shutdown Decommissioning Activity Report (PSDAR) is a description of planned decommissioning activities, a schedule of those activities, a discussion of environmental impacts relative to previously issued environmental impact statements or environmental reports, and a decommissioning cost estimate. The PSDAR is not a licensing document in the sense of needing approval by the Nuclear Regulatory Commission (NRC). Therefore, the PSDAR is not considered, nor does it contain, a safety analysis report. The licensee does submit a safety analysis report for changing the operating license to a defueled license. This is a license amendment request that requires approval by NRC, but is not part of the PSDAR. The PSDAR is publicly available in full once submitted to NRC by the licensee and processed into NRC's public document system.
35	Article 26	F.6.1.2, 91	Page 91 states that "NRC inspects the facility during decommissioning operations to ensure compliance with the DP". Please specify what relevant criteria are implemented in order to demonstrate the compliance with the DP? Does NRS have any requirements to update the DP regularly during decommissioning to reflect the possible changes at the facility?	Facilities undergoing decommissioning are inspected using the applicable portions of the Nuclear Regulatory Commission (NRC) Inspection Manual. Inspection Manual Chapters (IMCs) relevant to decommissioning include IMC 2561 - Decommissioning Power Reactor Inspection Program, and IMC 2602 - Decommissioning Oversight and Inspection Program for Fuel Cycle Facilities and Materials Licensees. Additionally, the Decommissioning Plan (DP) is reviewed by NRC and must be approved through the licensing process. As such, inspections are completed to ensure compliance with the approved DP. It is understood that changes to the facility could occur during decommissioning and that the DP would need to be updated. Often, licensees will include certain items in their DP that could be changed during decommissioning without additional NRC approval. These would represent categories of minor changes that do not change the original intent of the DP or create additional safety concerns. These changes must be documented and made available for inspection by NRC, if initially approved in the DP. Licensees licensed under Title 10 of the Code of Federal Regulations (CFR) part 50 may be able to make limited changes to the DP using processes outlined in 10 CFR 50.59 (Changes, tests and experiments). Records of changes per 10 CFR 50.59 must be retained and made available for NRC inspection. Modifications to the DP that are outside the scope of these minor allowable changes would require an amendment to the DP, which must be approved through NRC licensing process.
36	Article 27	p. 119	Department of Energy (DOE) has independent authority for imports and certain exports under the AEA. Thus, DOE imports and certain exports are not subject to NRC export/import licensing regulations. For example, NRC’s regulatory authority does not apply to DOE import of recovered disused sealed sources. Who controls import/export of radioactive material owning by DOE? Does DOE control its own?	The Department of Energy (DOE) and its contractors conduct imports, and some exports, of radioactive material pursuant to DOE's authority in the Atomic Energy Act of 1954 (AEA), as amended, and in accordance with DOE requirements, including those in DOE Order 462.1, "Import and Export of Category 1 and 2 Radioactive Sources and Aggregated Quantities." Certain DOE exports (e.g., exports of special nuclear material and source material as provided in section 111 of the AEA) are subject to Nuclear Regulatory Commission export licensing requirements. This order does not apply to sources within military or defense programs or Nuclear Regulatory Commission (NRC) regulated sources and materials.
37	Article 28	K.7, 134	What are the main issues or challenges on the significant commercial sealed source disposal in detail?	Disposal of commercial sealed sources continues to be a challenge for two main reasons. First, there are limitations on what the existing commercially available disposal sites in the U.S. will

Id	IAEA Article	Reference	Question/Comment	Answer
				accept based on radioactive inventory, isotopic content, and geographic origin. Although a new disposal facility has opened and NRC has updated its Branch Technical Position on Concentration Averaging and Encapsulation, which increased the recommended constraints for disposal of certain high activity sources (such as high activity cobalt-60 and cesium-137) many commercial actinide sources (such as americium-241) still have no disposal pathway. Second, transportation of higher activity sources that require Department of Transportation Type B containers is expensive and large volume containers capable of transporting high activity sources are limited in availability. The Department of Energy (DOE) National Nuclear Security Administration (NNSA) is working with NRC and Agreement States to investigate financial assurances to ensure funding is set aside to manage sources once they reach the end of their working life. DOE NNSA has also been designing two Type B containers; one was recently certified by NRC, while the second design will be submitted to NRC for certification in 2016.
38	Article 28	p. 125 (Section J.1)	Disused sealed sources The reports states that the regulations in 10 CFR Parts 30, 31, and 32 allow for use of equipment requiring registration but not requiring a licence for use, and for sources and devices requiring neither registration nor licensing if they meet certain requirements. Could you please specify these “certain requirements” in more detail?	The sources and devices referred to in the regulations in Title 10 of the Code of Federal Regulations (CFR) parts 30, 31, and 32 are what the Nuclear Regulatory Commission (NRC) refers to as exempt products. The initial distributor must apply for and receive a license that allows for the distribution of these products to individuals that are generally exempt from licensing. Examples of these types of products include watches and gun sights containing tritium, and smoke detectors containing americium. The initial distributors must apply for an NRC license. In its review of that application, NRC will perform a safety evaluation of the products to ensure that the products meet the safety criteria in the regulations (examples are 10 CFR 32.23 and 10 CFR 32.27).
39	Article 32	A.4.1.4: p.8 / B.3.2.1: p.25 K.1: p.129	In support of the Administration's Strategy, DOE is performing R&D that will address critical scientific and technical issues associated with the long-term management of spent fuel, including storage, transportation and disposal. Is there any attempt in this R&D program to propose a reference temporay storage concept, including storage of damaged fuel assemblies, in line with the planned operations of a pilot interim storage facility by 2021?	The Administration’s Strategy is to construct a pilot consolidated interim storage facility by 2021 and then a larger consolidated interim storage facility by 2025. Conceptual designs of such facilities have been prepared. These designs reflect the research and development (R&D) results and operational experience from dry storage of spent fuel. R&D is being performed on the internal portions of storage casks and fuel assemblies inside the casks. The U.S. has longstanding experience storing spent fuel in independent spent fuel storage installations (ISFSIs). The Nuclear Regulatory Commission (NRC) is prepared to review any applications it receives for an interim consolidated storage facility. Although it has not been built, NRC has licensed an ISFSI (Private Fuel Storage) away from the reactor site.
40	Article 32	A.4.2.1: p.10 / B.2.3.2: p.21	COMMENT: The term "concentration averaging" is averaging of the radionuclide activities in waste over its volume or over its mass. In addition to using mathematical averaging, licenses may physically mix some types of LLW". Additional information could be added in order to better define these types of LLW and evaluate the allowable operating range of this "blending" method.	U.S. regulations, Title 10 of the Code of Federal Regulations 61.55(a)(8), allow averaging radionuclide concentrations in waste in determining waste classification. The regulations do not specify specific limitations in concentration averaging. The U.S. developed guidance in a branch technical position on concentration averaging and encapsulation (CA BTP), which was recently updated. The updated document is available in the Nuclear Regulatory Commission’s (NRC’s) Agencywide Documents Access and Management System. The CA BTP has two volumes, ML12254B065 and ML12326A611. The document provides guidance on appropriate volumes and masses to use in calculating average concentrations. NRC also recognizes that low-level waste (LLW), such as ion exchange resins, may be blended resulting in an essentially homogeneous mixture, where the average concentration of the final mixture is used for waste classification purposes. The CA BTP provides guidance for when waste may be blended and how and when to demonstrate that waste is adequately blended. The CA BTP also recommends constraints for discrete items based on their size and the amount or concentration of radioactivity they contain. The size, amount of radioactivity and/or concentration helps define the hazard to an inadvertent intruder who might directly handle the discrete item. More detailed information on LLW blending can also be found in the CA BTP.

Id	IAEA Article	Reference	Question/Comment	Answer
41	Article 32	A.4.2.2: p.11 / B.4.1: p.30	Global Laser Enrichment (GLE) proposed operating a new laser enrichment facility that could provide compensation to DOE for its DU hexafluoride inventories. What is the anticipated schedule for this operation and the ratio of DOE's DU that would escape from the DOE inventories ? Would GLE then be directly in charge of the management of the ultimate DU produced after enrichment, as a commercially generated waste?	In July 2013, the Department of Energy (DOE) released a request for offers (RFO) for its remaining inventories of high-assay depleted uranium hexafluoride (DUF6). The RFO specified the natural uranium created from the DUF6 could not enter the market before 2019 and would be limited to 2,000 metric tons natural uranium equivalent per year. The proposed Laser Enrichment Facility would re-enrich the DUF6, creating natural uranium in the form of UF6 that would then be sold into the uranium market. Commercial negotiations were originally expected to be concluded in early 2014, but they are still ongoing. No announcements have been made concerning when an agreement might be reached.
42	Article 32	A.4.2.3: p.11 / D.2.2: p.39	There are currently four operational LLW disposal sites in the U.S, including the new Federal Waste Disposal Facility (FWF) in Texas. It is said that for this disposal site, "all hazardous and radioactive waste is encapsulated in a robust liner and cover system, faturing a seven-foot thick liner system, which includes a one-foot thick layer of reinforced concrete and a RCRA compliant geosynthetic layer". Are there in this FWF site significant differences with regard to the three other mentioned operational sites? Would it allow disposal of out of standard waste packages that could not be accepted in the other sites?	The Federal Waste Facility is one component of the disposal facility operated by Waste Control Specialists, LLC (WCS) near Andrews, Texas. For a description of all WCS facilities please see http://www.wcstexas.com/facilities/. The facility benefits from favorable site characteristics such as significant depth to groundwater, arid climate, sparse population, and robust, engineering. While there is significant variability in the site characteristics of the four commercial sites, site performance of each is evaluated on the individual characteristics and engineered characteristics of each. Any decision to allow disposal of out of standard waste packages would have to be based on a site specific safety assessment and approved by the applicable regulatory authority. In the case of WCS, this is the Texas Commission on Environmental Quality (TCEQ). More specific information regarding the WCS FWF may also be requested from TCEQ at http://www.tceq.state.tx.us.
43	Article 32	B.3, 23	"It's stated that spent nuclear fuels are being stored on the site of NPPs that are already decommissioned. - Is there any opposition of local communities? - If there is opposition, how does US cope with it?"	There is, on occasion, some local opposition to storage of spent fuel in an Independent Spent Fuel Storage Installation (ISFSI) on the site of a decommissioned nuclear power plant from some public interest groups and individual citizens. The public can provide input on its positions during the hearing process for an ISFSI license and the rulemaking process for certification of a dry cask storage design. In addition, at any time during licensing/certification, construction, or operation of an ISFSI or dry storage cask, any member of the public may report safety concerns to the Nuclear Regulatory Commission (NRC) through various means (e.g., speaking with NRC staff, calling the NRC Safety Hotline, submitting a concern in writing, submitting a concern via the NRC public web site). NRC will evaluate the concern and respond back to the concerned individual or organization.
44	Article 32	B.3.1, p.24	Are there safety significant problems identified during commissioning and operation of dry SF storage facilities?	Since the first dry spent fuel storage facility went into operation in the 1980s, there have not been any significant safety problems identified during licensing or operation of dry spent fuel storage facilities.
45	Article 32	B.3.1, p23	Currently, most of spent fuels in US nuclear power plants are stored in the spent fuel pool inside plants or in the dry storage facilities close to the plants. What is the US governmentï¿½s plan to gradually transport spent fuel in wet pool or dry storage facility to the centralized facilities? What are the related policy and progress? What are the main factors that need to be considered when chosen spent fuel storage option in different alternatives e.g. in wet pool or in dry storage facility, decentralized in each NPP or in centralized facility? What are the specific regulatory requirements to the different spent fuel storage options?	Per the Administration's "Strategy on the Management and Disposal of Used Nuclear Fuel and High-level Radioactive Waste" (2013), the Administration currently plans to implement a program over the next 10 years that: sites, designs and licenses, constructs and begins operations of a pilot interim storage facility by 2021 with an initial focus on accepting used nuclear fuel from shut-down reactor sites; advances toward the siting and licensing of a larger interim storage facility to be available by 2025 that will have sufficient capacity to provide flexibility in the waste management system and allows for acceptance of enough used nuclear fuel to reduce expected government liabilities; and makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048. Full implementation of this Strategy will require legislation to enable timely implementation of the program elements described above. To lay the foundation for implementation of the Strategy, the Department of Energy has begun planning for large scale transportation of spent fuel. Ongoing activities include development of a transportation route planning tool; and development of a rail cask for transport of fuel from the reactor sites to a consolidate storage facility. Several cask designs currently exist for the transport of canistered fuel.

Id	IAEA Article	Reference	Question/Comment	Answer
				In the U.S., ISFSIs are licensed by the Nuclear Regulatory Commission (NRC) separately from a nuclear power plant under either a site-specific or a general license. Spent fuel pool storage co-located at a nuclear power plant is promulgated in Title 10 of the Code of Federal Regulations (CFR) part 50, "Domestic Licensing of Production and Utilization Facilities" and dry storage safety regulations are in 10 CFR part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste." The licensing and technical requirements for an ISFSI, whether centralized or decentralized, are the same but the licensing process is different. The regulations for ISFSIs can be found in 10 CFR part 72. NRC review criteria for a dry storage cask for use with a general license and site specific license can be found in NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems" (http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1536/) and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities" (http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1567/), respectively. At a high-level, the ISFSI must be designed to ensure that, during normal operations and after any potential accident or natural phenomena: off-site doses do not exceed the limits in NRC regulations (10 CFR 72.104 and 72.106, "Criteria for radioactive materials in effluents and direct radiation from an ISFSI or [Monitored Retrievable Storage] MRS" and "Controlled area of an ISFSI or MRS," respectively)), the ISFSI remains subcritical, and the temperatures if ISFSI components, including the spent fuel remain below material temperature limits, unless those components are not considered in evaluating offsite doses or criticality safety. The regulations for a wet storage facility that is not co-located at a nuclear power plant is the same as a dry storage facility not co-located at a nuclear power plant and would have to meet the requirements in 10 CFR part 72.
46	Article 32	B.3.1, p23-p24	It is mentioned in B.3.1 that the ISFSI is used decades. Please introduce the technical requirements of US NRC to spent fuel that stored in ISFSI. How to assess the integrity of spent fuel during its storage period? What kind of monitoring measures is needed during the storage period£¿ Who is the owner of the ISFSI, the licensee or the facility operator?	The technical requirements for storage of commercial spent fuel in an independent spent fuel storage installation are set by the Nuclear Regulatory Commission (NRC). These requirements are located in Title 10 of the Code of Federal Regulations (CFR) Part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste". Application of these requirements by NRC are discussed in the standard review plans that NRC uses to evaluate applications for spent fuel storage, NUREG-1536, "Standard Review Plan for Dry Cask Storage Systems" see: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1536/ and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities" see: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1567/ These requirements include 10 CFR 72.122(h) which requires protection of fuel cladding against gross rupture, unless the spent fuel is otherwise confined such that degradation of the fuel during storage will not pose operational safety problems with respect to its removal from storage. Additionally, 10 CFR 72.122(l) requires ready retrieval of spent fuel. Finally, 10 CFR 72.236, "Specific requirements for spent fuel storage cask approval and fabrication" contains subparts which require specific characteristics of the fuel that is to be stored, such as the burnup. NRC regulations contain requirements for fuel subcriticality and that the cask must be designed to store spent fuel safely for the term proposed, as well as permit maintenance as required. NRC has relied on results from the Idaho cask demonstration (NUREG-CR/6831, "Examination of Spent PWR Fuel Rods After 15 Years in Dry Storage," NRC's Agencywide Documents Access and Management System (ADAMS) Accession No. ML032731021) and the NRC's Interim Staff Guidance (ISG) - 11, Revision 3, "Cladding Considerations for the Transportation and Storage of Spent Fuel," (see www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf) to license the dry storage of low burnup spent fuel for both an initial license term as well as for renewal terms. NRC has also issued guidance for its reviews, provided in ISG - 11, Revision 3, to review the expected behavior of high burnup spent fuel (assembly average burnup exceeding 45 GWD/MTU) for up

Id	IAEA Article	Reference	Question/Comment	Answer
				to 20 years in dry storage in the same manner as low burnup spent fuel. NRC is expecting to obtain confirmation of high burnup spent fuel cladding behavior for storage periods beyond 20 years through a demonstration cask discussed further in ISG – 24, "The Use of a Demonstration Program as a Surveillance Tool for Confirmation of Integrity for Continued Storage of High Burnup Fuel beyond 20 Years" (see ADAMS Accession No. ML14058B166). Additionally, applicants can perform lead system examinations that would provide data on the cask and its internals after the initial storage period. These would indirectly confirm the condition of the fuel while it was in storage. During its initial licensing period dry cask storage systems have at least one monitoring system (e.g., pressure, temperature, or dose). The license holder must demonstrate how such systems will be used to provide information regarding possible off-normal events, and what surveillance actions may be necessary to ensure these systems function properly. Detailed maintenance and inspection procedures for these monitoring systems are developed and implemented by the license holder. In addition, the license holder conducts periodic visual surface and weld inspections on readily accessible surfaces. NUREG-1536, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility," provides additional information on dry cask maintenance and inspection programs. NRC may renew an independent spent fuel storage installation license or dry cask storage certificate of compliance for a term not to exceed 40 years as specified in 10 CFR 72.42 and 72.240, "Duration of license; renewal," and "Conditions for spent fuel storage cask renewal," respectively. The requirements for renewal include demonstration that degradation will be addressed by either (1) analyses or calculations to show that aging effects will not result in a loss of intended function of an important-to-safety system, or (2) implementation of aging management programs (AMPs) that will manage issues associated with aging of these systems. AMPs consist of condition monitoring, performance monitoring, mitigation or other prevention activities for each important-to-safety system, upon consideration of its material of construction and service environment. Therefore, the inspection and monitoring requirements, including method or technique, frequency of inspections, and acceptance criteria are determined by the specific aging mechanism causing the degradation, as well as accessibility and occupational dose constraints for the system. NUREG-1927, "Standard Review Plan for Renewal of Spent Fuel Dry Cask Storage System Licenses and Certificates of Compliance," see: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1927/ provides guidance on the essential elements of an AMP; however, it does not identify specific inspection frequencies or methods. These AMP details are proposed by applicants and evaluated by NRC on a case-by-case basis. For instance, NRC has evaluated AMPs for reinforced concrete structures against the requirements of the American Concrete Institute (ACI) standard 349.3R. The standard requires visual inspections of accessible above-grade areas of the concrete structure at a minimum interval of 5 years, and below-grade areas at a minimum of 10 years. Additional requirements include the monitoring of groundwater near the storage installation for the presence of aggressive chemicals. Welded stainless steel canisters have been required to be inspected on 5 year intervals for corrosion products that may be indicators of localized corrosion and stress corrosion cracking. The inspection may involve the use of visual testing per requirements of ASME Boiler and Pressure Vessel Code, Section V, followed by surface and/or volumetric inspection techniques consistent with the requirements of ASME Section XI. The licensee is the owner of the Independent Spent Fuel Storage Installation (ISFSI). In the event the licensee has contracted operation of the ISFSI, the licensee is still responsible for its safe operation.
47	Article 32	B.3.1, p23; B.3.2, p24	COMMENT: It is not mentioned the status of MOX fuel (spent fuel) in the US National Report. Please give more information about the MOX fuel, such as the MOX fuel in Catawba 1.	The fuel and clad examination results conducted by Oak Ridge National Laboratory (ORNL) of the post-irradiation examination (PIE) work of the Mixed Oxide (MOX) fuel rods were documented in the MOX PIE Fuel and Clad Examination Final Report dated September 30,

Id	IAEA Article	Reference	Question/Comment	Answer
			The Post-irradiation Examination (PIE) for the irradiated MOX fuel from Catawba 1 was conducted by Oak Ridge National Laboratory. Please give more information about the progress and results of the MOX fuel examination.	2013. The report is not publically available. The purpose of the PIE was to verify the performance of the fuel rods contained in the MOX Lead Test Assembly and to produce data that can be used for fuel qualification.
48	Article 32	B.3.2.1, Para 2, p25	It is mentioned in B.3.2.1 that one of BRC¡¯s£¨Blue ribbon Commission£©suggestions is to prompt effort to prepare for the eventual large-scale transport of spent nuclear fuel and HLW to consolidated storage and disposal facilities when such facilities become available. What is the meaning of the eventual large-scale transport? And what special requirements for the eventual large-scale transport should be met?	The Blue Ribbon Commission on America's Nuclear Future's reference to "eventual large-scale transport" refers to future shipping campaigns to remove spent nuclear fuel from onsite storage at more than 70 nuclear power plant sites to a pilot interim storage facility, a consolidated interim storage facility, or to a geologic repository. Special requirements for eventual large-scale transport include: training and technical assistance to states and Native American Tribes through whose jurisdictions spent nuclear fuel will be transported; specialized equipment that will need to be designed, fabricated and tested, including a railcar compliant with the Association of American Railroad's S-2043 standard; and transportation casks with certificates of compliance from the Nuclear Regulatory Commission.
49	Article 32	B.3.3, 27	It is stated: "the final generic EIS and rule will be published on September 2014. Some addition information on the content and main features of the EIS and rule would be welcomed during the national presentation.	The Generic Environmental Impact Statement (GEIS) identifies the environmental impacts from continued storage of spent nuclear fuel for three time periods – 60 years beyond the operating life of a reactor, 160 years beyond the operating life and indefinite storage in the case where there would be no geologic repository for disposition. Environmental impacts are identified for both at-reactor and away-from reactor centralized storage. The final rule notes that the environmental impacts of continued storage can be generically determined and, therefore, those impacts do not need to be determined on a site-specific basis. The U.S. will elaborate more on this during the National Country Presentation.
50	Article 32	B.3.4, p.27	Does the USA consider restart of the commercial treatment of SF or in near future will conduct only scientific research, related to treatment?	The current U.S. practice is a once through fuel cycle meaning that all fuel rods are stored either in pool or dry cask storage which is planned to be followed by disposal in a deep geologic repository. However, this does not impede the Department of Energy (DOE) from pursuing active Research and Development (R&D) on used nuclear fuel recycling because it may offer improvements to the current fuel cycle. There are many different ways fuel rods may be recycled and the costs depend on a number of factors. Such information is available in a Study (https://inlportal.inl.gov/portal/server.pt/community/nuclear_science_and_technology/337/fuel_cycle_evaluation_and_screening_overview) recently sponsored by DOE to conduct a systematic evaluation of advanced nuclear fuel cycles, including those which may recycle used nuclear fuel. The Study takes into account multiple criteria including economics and costs associated with different fuel cycle options. The benefits and challenges associated with these options are being examined to better prioritize and guide long-term nuclear fuel cycle R&D efforts. As part of this activity, DOE has been investigating different potential fuel cycle strategies as discussed in the Nuclear Energy R&D Roadmap Report to Congress, accessible from DOE's website at http://energy.gov/ne/mission.
51	Article 32	B.4, Para 6, p28	COMMENT: It is mentioned in B.4 that a Draft Environmental Impact Statement for GTCC LLW has been published by DOE. Please introduce the technical route for GTCC LLW disposal in USA.	DOE continues to work on the Final Environmental Impact Statement for the Disposal of GTCC LLW and GTCC-like waste. The Department of Energy anticipates publication of this Environmental Impact Statement in calendar year 2015. As required by Energy Policy Act 2005 (EPAct05), DOE will submit a report to the U.S. Congress and await Congressional action before making a final decision on a disposal option(s) for GTCC LLW.
52	Article 32	D.2, 36	Section D.2 describes the radioactive waste management facilities. - What is the status, including features and so on, of radioactive waste incineration facilities currently operated in U.S.?	There is no requirement in the U.S. for radioactive waste incineration for volume reduction. Incinerators are uncommon. Their emissions are regulated under strict environmental laws for pollutants making them costly facilities to construct when there is little market demand. Waste generators may opt to so incinerate waste if there are overall cost savings, but it is usually not economical. Incineration is one of several thermal technologies employed by a few U.S. companies for some low-level radioactive waste streams that require treatment to destroy hazardous chemicals in the waste (mixed waste). The Department of Energy has no

Id	IAEA Article	Reference	Question/Comment	Answer
				incinerators for radioactive waste and utilizes these commercial firms. EnergySolutions Inc. operates an incinerator at its Bear Creek Processing facility in Oakridge, Tennessee. Their website is: http://www.energysolutions.com/waste-management/facilities/ In addition, EnergySolutions Erwin Resin Solutions Facility in Tennessee (formerly Studsvik) utilizes a Thermal Organic Reduction (THOR) process for dewatering resins (not incineration). Their website is: http://www.energysolutions.com/waste-management/facilities/. Perma-Fix Diversified Scientific Services, Inc. (DSSI) in Kingston, Tennessee has a thermal (boiler not incinerator) for liquid radioactive waste. Their website is:http://www.perma-fix.com/facilities/pf_nuclear_kingston/default.aspx. Finally, the Perma-Fix Northwest facility in Richland, Washington operates a thermal treatment facility for mixed waste. Their website is: http://www.perma-fix.com/facilities/pf_nuclear_richland/.
53	Article 32	p. 21	It was mentioned that if ownership of radioactive waste is transferred from DOE to a commercial entity licensed by NRC, the waste is then subject to NRC regulation (and classification). Does it mean that DOE and NRC have different classification of waste?	Yes, the Nuclear Regulatory Commission (NRC) has requirements, set forth in Title 10 of the Code of Federal Regulations 61.55, concerning classification of low-level waste (LLW) as Class A, B or C LLW, for disposal in facilities licensed by Agreement States (or potentially NRC). Such licensed LLW disposal facilities primarily dispose of LLW generated by commercial entities, although certain facilities also accept waste from the Department of Energy (DOE) if the waste meets the applicable classification and waste acceptance criteria for the licensed disposal facility. DOE manages and disposes of most of the LLW for which it is responsible in existing DOE LLW disposal facilities. In accordance with DOE Order 435.1, Manual 435.1-1 and related guidance, DOE performs site specific performance assessments taking into account specific site characteristics to determine what waste can be safely disposed of at a DOE site. DOE LLW disposal requirements and performance objectives are comparable to those of NRC, although DOE does not use NRC's (Class A, B, or C) LLW classification approach.
54	Article 32	p. 25	In January 2013, the Administration released its Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste. One of the main assumption of the Strategy is to make demonstrable progress on the siting and characterization of repository sites to provide for the availability of a geologic repository by 2048. Is there any possibility that Yucca Mountain will be that repository as referred in the Strategy?	The Secretary of Energy has determined that Yucca Mountain is not a workable option for a geologic repository due to lack of public acceptability. Any repository for spent nuclear fuel and high-level waste must be based not only on sound science but also on achieving public acceptance at the local, state and tribal levels.
55	Article 32	Sub sections B.3.3 (page 26 and 27)	About the "Continued Storage of Spent Nuclear Fuel" to be implemented by the revision of 10 CFR 51.23. Could the US explains a little more the meaning of this rule, its interfase with the licensing process and license renewal and safety requirements sets by 10 CFR 72 for ISFSF facilities?	The 2014 revision of Title 10 of the U.S. Code of Federal Regulations (CFR) 51.23 codifies the Nuclear Regulatory Commission's (NRC) generic determination regarding the environmental impacts of the continued storage of spent nuclear fuel beyond a reactor's licensed life for operation and prior to ultimate disposal. NRC prepared a final generic environmental impact statement (EIS) (NUREG-2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel" see: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2157 for a detailed evaluation of the environmental impacts of continued storage of spent nuclear fuel beyond the licensed life for operation of a reactor. NRC concluded that elements of this evaluation were applicable generically to all sites. NRC's findings were incorporated by final rule in 10 CFR 51.23. The final rule also clarifies that the generic determination applies to license renewal for an independent spent fuel storage installation (ISFSI), reactor construction permits, and early site permits. The final rule clarifies how the generic determination will be used in future NRC environmental reviews, and makes changes to improve clarity. Finally, the final rule makes conforming changes to the determinations on the environmental effects of renewing the operating license of a nuclear power plant to address issues related to the onsite storage of spent nuclear fuel and offsite radiological impacts of spent nuclear fuel and high-level waste disposal. NRC's licensing proceedings for nuclear reactors and ISFSIs have historically relied upon the generic determination in 10 CFR 51.23 to satisfy the agency's obligations under the National Environmental Policy Act (NEPA) with respect to the narrow area of the environmental impacts

Id	IAEA Article	Reference	Question/Comment	Answer
				of continued storage. Environmental reviews for future reactor and spent fuel storage facility licensing actions will not separately analyze the basis for the environmental impacts of continued storage and, as discussed in 10 CFR 51.23, the impact determinations from the generic environmental impact statement are considered incorporated into these EISs.
56	Article 32.1.1	p. 16 (Section A.4.9 Table A-4)	National policy for spent fuel management In January 2013, the Administration released its "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste". According to this document, the Administration plans to develop a pilot interim storage facility by 2021, a consolidated (centralized) storage facility by 2025, and a geological repository by 2048. Are there any interdependencies to be taken into account during siting of these facilities, e.g. in order to minimise future spent fuel transportation all across the country?	The Administration's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste" (2013) endorsed the Blue Ribbon Commission on America's Nuclear Future's recommendation to pursue a consent-based siting process for nuclear storage and disposal facilities. The Strategy acknowledges that "One of the consequences of a consent-based siting process could be the need to have more than one storage facility and/or repository," but also states that a consolidated storage facility "could be co-located with the pilot facility or the eventual geologic repository."
57	Article 32.1.1	p. 21 (Section B.2.3.1)	National policy for spent fuel management The United States declared a moratorium on domestic spent fuel reprocessing in 1977. The moratorium was rescinded in 1981, but commercial reprocessing never resumed. Within the last few years, the Department of Energy (DOE) has begun using the term "used fuel" to acknowledge that, in the future, the material may have residual value through recycling, although U.S. law uses the term "spent nuclear fuel". Is the usage of the term "used fuel" in compliance with, or a consequence of, the recommendations of the Blue Ribbon Commission (BRC), e.g. in order to retain the future option of a closed fuel cycle? Is optional reprocessing to be seen in the light of consolidated (centralised) storage of spent fuel?	The terms "used fuel" and "spent nuclear fuel" are used interchangeably. The current U.S. practice is a once-through fuel cycle, meaning that all fuel rods are stored either in pool or dry cask storage which is planned to be followed by disposal in a deep geologic repository. Even if a closed fuel cycle were to be adopted in the future, permanent geologic disposal will still be required for residual high-level radioactive waste. Cost, nonproliferation, national security, environmental issues, and technology limitations are some of the concerns that would need to be addressed before any future decision to close the U.S. fuel cycle through the use of recycling would be made. These factors reinforce the likelihood that the once-through fuel cycle will continue at least for the next few decades. This does not impede the Department of Energy (DOE) from pursuing actively Research and Development (R&D) on used nuclear fuel recycling. There are many different ways fuel rods may be recycled and the costs depend on a number of factors. Such information is available in a study recently sponsored by DOE to conduct a systematic evaluation of advanced nuclear fuel cycles, including those which may recycle used nuclear fuel.
58	Article 32.1.1	p. 25-26 (Section B.3.2.1)	National policy for spent fuel management In January 2013, the Administration released its "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste". The document outlines a plan that "makes demonstrable progress on the siting and characterization of repository sites to facilitate the availability of a geologic repository by 2048." How is the term "demonstrable progress" defined and evaluated in practice, who has defined it, and are there any legal consequences in case of non-compliance?	"Demonstrable progress" is not a defined term, but the Department of Energy (DOE) is confident that it will be able to move forward in its initial siting approach to allow for an interim storage facility to take the waste from the shutdown reactors in the U.S. Subsequent to that, the schedule calls for a larger consolidated storage facility to open several years later. The Administration supports an approach to system design that integrates consent-based siting principles and makes progress in demonstrating the federal commitment to addressing used nuclear fuel and high-level waste disposal. The terms "used fuel" and "spent nuclear fuel" are sometimes used interchangeably. The objective is to implement a flexible waste management system incrementally in order to ensure safe and secure operations, gain trust among stakeholders, and adapt operations based on lessons learned. The Strategy is to proceed, after the enactment of new legislation, with a step-wise, adaptable consent-based process resulting in characterizing, siting, licensing and constructing a repository by 2048. A consent-based process to be effective needs to be flexible and adaptive rather than forced by rigid deadlines.
59	Article 32.1.1	p. 8-9 (Section A.4.1.4)	National policy for spent fuel management In several sections, the National Report refers to the Department of Energy (DOE) research and development (R&D) activities, for example: – on pages 8-9: "The principal focus of DOE's R&D activities is to develop a suite of options that will enable future decision makers to make informed choices about how best to manage the spent fuel from reactors. An additional	Advanced and innovative recycling of used nuclear fuel is being investigated by the Department of Energy (DOE), and has been recognized as a topic in which DOE has an important leadership role. It involves scientists, engineers, professors and students from national laboratories and university partners. DOE recognizes the importance of maintaining the U.S. knowledge and expertise accumulated over the past 50 years in reprocessing technologies. In addition, Research and Development (R&D) in advanced recycling

Id	IAEA Article	Reference	Question/Comment	Answer
			objective is the demonstration of technologies necessary to allow commercial deployment of solutions for the sustainable management of spent fuel that is safe, economic, and secure." – on pages 27-28: "DOE recognizes that research and development (R&D) of sustainable fuel cycles and waste management activities are important to support the expansion of nuclear energy. DOE is conducting R&D in nuclear fuel and waste management technologies that will enable a safe, secure, and economic fuel cycle. The long-term R&D strategy is to investigate the technical challenges in developing sustainable systems that reduce waste while improving resource utilization and safety." – on page 106: "DOE has developed and is executing a research and development (R&D) program that will address critical scientific and technical issues associated with the long-term management of used nuclear fuel. DOE is identifying alternatives and conducting scientific research and technology development to enable long-term storage, transportation, and geologic disposal of used nuclear fuel and radioactive wastes generated by existing and future nuclear fuel cycles. The research focuses on sustainable fuel cycle options and technologies that minimize waste generation, improve safety, and complement institutional measures in limiting proliferation risk. The main objective in this R&D is to develop a suite of options that will enable future decision makers to make informed choices about how best to manage the used fuel from reactors. This R&D will be performed on functions in storage, transportation, and disposal in a variety of geologic environments, as well as work to better understand the potential degradation mechanisms involved in long-term dry cask storage." Are the R&D activities solely directed to storage and disposal options, or is reprocessing also in the focus of DOE?	technologies promotes students' education to build world-class nuclear energy and workforce capability.
60	Article 32.1.2	p. 23-24 (Section B.3.1)	Storage of spent fuel In the most commonly used designs for dry storage, spent fuel is loaded in canisters that are subsequently placed in storage casks or vaults/bunkers. What is the repair concept for a leaking cask? Are there hot cells e.g. for cask repair operations available on-site after NPP permanent shutdown and during the entire storage period until transfer to a consolidated (centralised) storage facility?	In the event a licensee determined a canister was leaking, the method of repair would be determined by the licensee. The method of repair would depend on the severity of the leak and consider potential doses to workers repairing the leak. The selected method of repair must comply with applicable safety requirements, even if costly repairs are required. Hot cells are not required at nuclear power plants after permanent shutdown or after decommissioning of the decommissioning of the reactor facility.
61	Article 32.1.5	p. 108 (Section H.1.3)	Classification of radioactive waste The National Report states: "Although the U.S. does not have an official legal definition in place for the low activity waste (LAW) term, licensees do have the ability to manage and dispose of materials that fall into that category of waste. LAW is also a term frequently used by other nations and organizations involved in radioactive waste management. One of the primary reasons LAW has become a focus of attention is the unusually large volumes to be managed in comparison to conventional LLW from the ongoing operations of nuclear facilities. Decommissioning or clean-up of contaminated sites in particular can generate large volumes of LAW." What are the differences between LAW and LLW from the U.S. point of view?	Low-activity waste (LAW) does not have a statutory or regulatory definition, but generally means wastes that contain some residual radioactivity, including naturally occurring radionuclides, which can be safely disposed of in hazardous or municipal solid waste landfills. Such waste is invariably a fraction of the limits for Class A low-level waste (LLW) contained in Title 10 of the Code of Federal Regulations (CFR) part 61, and is often below concentrations that are considered safe for unrestricted release under international standards. Although these materials could be disposed of in a LLW disposal facility licensed under 10 CFR part 61, if a licensee so chose, disposal at another type of facility, such as a hazardous waste facility, can be authorized under 10 CFR 20.2002. This provision in the Nuclear Regulatory Commission's (NRC) regulations allows for other disposal methods, different from those already defined in the regulations, provided that doses are maintained as low as is reasonably achievable and within the regulatory dose limits in 10 CFR part 20. DOE has provisions for case- and site- specific considerations of LLW. If a case and site specific

Id	IAEA Article	Reference	Question/Comment	Answer
				prospective dose assessment demonstrates that it would be protective, LLW maybe approved as for disposal in a hazardous or municipal landfills which have a waste acceptance criteria (WAC) permitting such disposal. The disposal of LLW in hazardous or solid waste landfills is permitted, provided that the regulatory dose limits are met including the waste acceptance criteria at the receiving disposal facilities. Mill tailings from extraction and concentration from uranium thorium are disposed of under a separate set of regulations.
62	Article 32.2.3	p. 38 (Section D.2.1)	Processing of defence high-level waste The Department of Energy (DOE) is currently building the Waste Treatment and Immobilization Plant (WTP) at the Hanford site to manage defence high-level waste that has been stored for decades in 177 large underground tanks. The WTP will separate radioactive liquid waste and turn it into a stable glass form suitable for disposal. The liquid waste will be vitrified and poured into stainless steel canisters. The plant is designed to operate for 40 years. In addition to this, the Fourth National Report of the United States announced: "Design of the plant will be complete by 2013; construction is scheduled to be completed just three years later, in 2016, and start-up of plant systems will begin. In 2019, all facilities and systems will be fully operational and begin the process of vitrifying tank waste." This information has been removed from the Fifth National Report. Does that mean that there are any delays in the original time schedule? If so, what are the reasons for them? Could you please provide an updated time schedule for the different milestones mentioned in the Fourth National Report?	The schedule for the Waste Treatment and Immobilization Plant (WTP) is currently the subject of a lawsuit in Federal court.
63	Article 32.2.3	p. 40 (Section D.2.2.2)	Disposal It is mentioned that 4 commercial LLW disposal sites (Beatty, Maxey Flats, Sheffield, and West Valley) are now closed. Could you please provide information about the monitoring strategy/programme (or "long-term surveillance") and the existing experiences?	The closed sites are in Agreement States and subject to those states' regulatory programs. Post-closure activities at the four closed sites are performed in accordance with site specific closure plans required by the state regulatory authorities. These typically include periodic monitoring of groundwater, air, vegetation, and fauna as well as direct radiation measurements. If measurements were to exceed prescribed "action" levels, the licensee or custodial organization would be required to take appropriate mitigating action. Post-closure activities also include periodic site maintenance and maintenance of physical access controls. Site specific information can be obtained by contacting state regulatory authorities. Beatty, NV- Bureau of Health Care Quality and Compliance, Radiation Control Program, http://health.nv.gov/HCQC_Radiological.htm Maxey Flats, KY- Cabinet for health and Family Services, Radiation Health Programs, http://www.chfs.ky.gov/dph/radiation.htm Sheffield. Il- Illinois Emergency Management Agency, Division of Nuclear Safety http://www.iema.illinois.gov West Valley, NY- New York State Health Department, Division of Environmental Health Investigations http://www.nyhealth.gov/radiation.
64	Article 4	A.4.2.3	What is the situation to ensure adequate capacities for LLW disposal? Whether creation of new LLW RAW disposal facilities (A.4.2.3) resolves the problem concerned with capacities lack for LLW disposal that has been discussed in the IVth Report?	With the opening of the Waste Control Specialists (WCS) facility in 2012, and the willingness of the Texas Low-Level Radioactive Waste Disposal Compact Commission to accept out-of-compact waste (the Texas Compact includes the states of Texas and Vermont), the availability of disposal capacity for waste generators throughout all of the U.S. has improved considerably. However, such availability is always subject to change based on circumstances within the states that control access. There are no new sites anticipated in the foreseeable future.

Id	IAEA Article	Reference	Question/Comment	Answer
65	Article 4	F.7.2, 94	Section F.7.2 describes that although some operators of a LLW incinerator acquires NRC's license, most of incinerations are performed by small number of commercial incinerators. - Then, what is the regulatory requirements on the waste acceptance criteria of these radioactive waste incineration facilities? - Especially, if there is a nuclide specific limit, please explain it.	The regulation for incineration is under Title 10 of the Code of Federal Regulations (CFR) 20.1302(c) and 10 CFR 20.2002. The licensee is authorized to dispose of licensed material by incineration, provided the gaseous effluent from incineration does not exceed the limits specified for air in Appendix B, Table II, 10 CFR part 20. In accordance with 10 CFR 20.2002, the license may dispose of incinerator ash containing hydrogen-3 and carbon-14 as ordinary waste in a landfill, provided the concentrations of the isotopes, expressed in microcuries per gram of ash, at the time of disposal, do not exceed 10 percent of the values listed in Table II, Column 2, 10 CFR part 20, Appendix B. If more than one radionuclide is present in the ash, then the sum of fractions rule applies (10 CFR 20.2003).
66	Article 4	F.7.2, p93	The waste minimization of USA is introduced in F.7.2. Is there a suggested quantitative value for waste minimization for the US NPP? Please introduce LLW disposal price charged by the operator of the commercial disposal facility and the influence of waste disposal price to waste minimization of the US NPP.	The Nuclear Regulatory Commission's (NRC's) May 2012 policy statement on low-level waste (LLW) management and waste volume reduction can be found at (http://www.nrc.gov/reading-rm/doc-collections/commission/policy/). It reiterates the desirability of such reduction to conserve disposal capacity and to reduce the overall cost of disposal. However, there is no quantitative value for such reduction suggested. In the U.S., the rising unit cost of disposal has had some impact on overall volume reduction. Unit disposal costs for various classes of LLW vary from site to site. Costs are based on complex formulae that account for package weight, volume, overall radioactivity, waste classification, and surface contamination, difficulty in handling as well as various state and local surcharges. Because of LLW compact constraints, waste generators often have no choice of disposal site regardless of cost if the state in which the generator is located is a member of a regional compact that has a disposal facility. This is a major reason that generators try to minimize the amount of radioactive waste that requires disposal.
67	Article 4	G, 103	What are the expected radiological impacts from operation of spent fuel dry storage facilities? What is the dose constraint for the public during operation of dry storage facilities?	There are no expected radiological impacts from operation of an independent spent fuel storage installation. The dose limits for operation of an Independent Spent Fuel Storage Installations (ISFSIs) are in Title 10 of the Code of Federal Regulations (CFR) part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste". The dose limits for normal operation and anticipated occurrences (in 10 CFR 72.104, " Criteria for radioactive materials in effluents and direct radiation from an ISFSI or MRS") limit the annual dose equivalent to any individual who is located beyond the controlled area to 0.25 mSv to the whole body, 0.75 mSv to the thyroid and 0.25 mSv to any other critical organ as a result of exposure to: (1) Planned discharges of radioactive materials, radon and its decay products excepted, to the general environment, (2) Direct radiation from ISFSI or Monitored Retrievable Storage(MRS) operations, and (3) Any other radiation from uranium fuel cycle operations within the region. The dose limits in 10 CFR 72.106, "Controlled area of an ISFSI or MRS" state that a person at or beyond the nearest boundary of the controlled area may not receive from any design basis accident the more limiting of a total effective dose equivalent of 0.05 Sv, or the sum of the deep-dose equivalent and the committed dose equivalent to any individual organ or tissue (other than the lens of the eye) of 0.5 Sv. The lens dose equivalent may not exceed 0.15 Sv and the shallow dose equivalent to skin or any extremity may not exceed 0.5 Sv.
68	Article 4	G.1, p103	It is mentioned that no new specific licenses for ISFSIs have been issued in the past three years; however, there are nine general licensees authorized for storing spent fuel in dry casks at current or former NPPsites in B.3.1 and that a general license to store spent fuel at an ISFSI is automatically granted to any nuclear power plant licensee that has a license in G.1, What is the difference between a specific license and a general license for ISFSI? What are the specific technical requirements and licensing procedures of the two kinds of licenses?	The difference between a general and specific license is in who can obtain each type of license. Nuclear power reactor licensees can pursue either a site-specific or general license for an independent spent fuel storage installation (ISFSI). ISFSIs not located at a nuclear power plant must be approved via site-specific licensing. The technical requirements for the two types of ISFSIs are the same but the licensing process is different. The regulations for the two types of ISFSIs can be found in Title 10 of the Code of Federal Regulations (10 CFR) part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." NRC's review criteria for a general license and site specific license can be found in NUREG-1536, "Standard Review Plan for Dry

Id	IAEA Article	Reference	Question/Comment	Answer
			Should the safety analyses report for ISFSI be submitted when the construction license of NPP is applied?	Cask Storage Systems" see: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1536/ and NUREG-1567, "Standard Review Plan for Spent Fuel Dry Storage Facilities," see: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1567/ respectively. At a very high-level, the ISFSI must be designed to ensure that, during normal operations and after any potential accident or natural phenomena: off-site doses (due to direct dose and effluents) do not exceed the limits in NRC regulations (10 CFR 72.104 and 72.106, "Criteria for radioactive materials in effluents and direct radiation from an ISFSI or [Monitored Retrievable Storage] MRS" and "Controlled area of an ISFSI or MRS," respectively); the spent fuel remains subcritical; and the temperatures of ISFSI components, including the spent fuel remain below material temperature limits, unless those components are not considered in evaluating offsite doses or criticality safety. An applicant for a site-specific ISFSI license must describe in detail all aspects of the planned ISFSI, the site description, the storage system design and operations, and the ongoing controls and programs that will be in place to assure safe operations. An opportunity for a public hearing is part of the licensing process for site-specific licenses. When NRC issues a site-specific license, that license includes conditions and technical specifications that identify specific requirements for the design and operation of that ISFSI. A general license to construct and operate an ISFSI is automatically conveyed to all holders of an NRC power reactor license. This general license allows a plant to use a currently certified dry cask storage system listed in 10 CFR 72.214, "List of approved spent fuel storage casks" without submitting another application to NRC. The reactor licensee must perform and document evaluations to confirm that their site, fuel characteristics, and programs are all bounded by the analyses approved by NRC for the certified dry cask storage system it has chosen to use. A public hearing is not part of the general license process, however, the public is able to comment through the rulemaking process which considers approving new or amended dry cask storage system, and therefore adding them to the list of approved spent fuel storage cask systems in 10 CFR 72.214. The Safety Analysis Report for the ISFSI should not be submitted at the same time as the construction license, since dry storage technology continues to evolve over time and dry storage is not needed until many years after the reactor has been operating.
69	Article 5	G.2	What are the requirements established for monitoring and inspection of SNF stored in long-term dry storage facilities (schedule, its methods and tools provided)?	Monitoring and inspection requirements for spent fuel in long-term dry storage facilities is established and implemented through the licensee's aging management plan (AMP) that is developed and approved by the Nuclear Regulatory Commission (NRC) during the license renewal process. NRC may renew an independent spent fuel storage installation license or dry cask storage certificate of compliance for a term not to exceed 40 years as specified in Title 10 of the Code of Federal Regulations (CFR) 72.42, 72.240, "Duration of license; renewal," and "Conditions for spent fuel storage cask renewal," respectively. The requirements for renewal include demonstration that degradation will be addressed by either (1) analyses or calculations to show that aging effects will not result in a loss of intended function of an important-to-safety system, or (2) implementation of aging management programs (AMPs) that will manage issues associated with aging of these systems. AMPs consist of condition monitoring, performance monitoring, mitigation or other prevention activities for each important-to-safety system, upon consideration of its material of construction and service environment. Therefore, the inspection and monitoring requirements, including method or technique, frequency of inspections, and acceptance criteria are determined by the specific aging mechanism causing the degradation, as well as accessibility and occupational dose constraints for the system. NUREG-1927, "Standard Review Plan for Renewal of Spent Fuel Dry Cask Storage System Licenses and Certificates of Compliance," (http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1927/) provides guidance on the essential elements of an AMP; however, it does not identify specific inspection frequencies, methods, etc. These AMP

Id	IAEA Article	Reference	Question/Comment	Answer
				details are proposed by applicants and evaluated by NRC on a case-by-case basis. For instance, NRC has evaluated AMPs for reinforced concrete structures against the requirements of the American Concrete Institute (ACI) standard 349.3R. The standard requires visual inspections of accessible above-grade areas of the concrete structure at a minimum interval of 5 years, and below-grade areas at a minimum of 10 years. Additional requirements include the monitoring of groundwater near the storage installation for the presence of aggressive chemicals. Welded stainless steel canisters have been required to be inspected on 5 year intervals for corrosion products that may be indicators of localized corrosion and stress corrosion cracking. The inspection may involve the use of visual testing per requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel (B&PV) Code, Section V, followed by surface and/or volumetric inspection techniques consistent with the requirements of ASME B&PV Code Section XI. A storage installation may also perform periodic radiation monitoring at the controlled area of the installation to ensure compliance with regulatory requirements for direct radiation and radioactive materials in effluents.
70	Article 6	F9.3, page 97	What is the status of the "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste" and the progress through Congress?	The Department of Energy (DOE) is currently laying the groundwork for implementing interim storage, including associated transportation, per the Administration's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste". The intent is to make progress on this important national issue within existing legislative and budgetary authorizations. The objectives are to develop and begin implementation of an integrated plan to (1) implement interim storage; (2) improve the overall integration of storage as a planned part of the waste management system; (3) prepare for the large-scale transportation of spent nuclear fuel and high-level radioactive waste, with an initial focus on removing spent fuel from the shutdown reactor sites; and (4) develop foundational information, resources, and capabilities needed to support these objectives and future implementation decisions and actions. Full implementation of the Strategy will require legislation.
71	Article 6	Section F9.3, page 97	Could you please elaborate in what way this can change the existing procedure of public and stakeholder involvement? At which stages throughout the implementation of storage facilities and repository projects consultations with local public and public hearings will be held and whether the local communities will have the veto right? COMMENT: The Report says that: "The Administration's Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste embraced the core findings of the BRC and affirmed that any workable solution for the final disposition of used fuel and nuclear waste must be based not only on sound science, but also on achieving public acceptance at the local, state and Tribal levels".	Currently, the Department of Energy (DOE) is laying the groundwork for implementing interim storage of spent fuel, including associated transportation, per the Administration's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste." DOE is working to engage stakeholders in the early planning stages. To be successful, a consent based process should not be prescriptive but rather adaptive. The process should result in an informed deliberation leading to consent by affected State, Tribes and the local community to hosting a storage or disposal facility. The Administration has committed to work closely with Congress to develop a path forward that maximizes the likelihood of success.
72	Article 7	p. 98 (Section F.10)	Design of facilities Could the United States please provide information which lessons learned from the Fukushima accident have been considered in the design of new facilities for the management of spent fuel and radioactive waste, e.g. with respect to beyond design basis accidents?	The Nuclear Regulatory Commission (NRC) staff has recently issued a draft white paper on the applicability of Fukushima lessons learned to facilities other than power reactors. (These lessons learned are summarized in 12 recommendations, which included consideration of beyond design basis events). The paper is publicly available and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML15042A367. NRC staff did not find safety concerns associated with the designs of spent fuel storage systems.
73	General	54	When is EPA's next five year review of WIPP? How are the 2014 incidents at WIPP expected to affect that review of compliance, if at all?	The Department of Energy (DOE) submitted its third Compliance Recertification Application (CRA) in March 2014, shortly after the two incidents in February. The Environmental Protection Agency's (EPA's) initial review of the CRA for completeness was delayed by the February incidents. EPA has indicated its expectation that DOE will provide additional

Id	IAEA Article	Reference	Question/Comment	Answer
				information describing how it plans to address the February 2014 incidents in order to reopen the facility (e.g., through facility modifications). Once the application is deemed to be complete, EPA has six months to approve or deny the application. EPA is reviewing technical aspects of the CRA that are not expected to be affected by the incidents, and has already communicated with DOE on some of these issues. More information on EPA's CRA review can be found at http://www.epa.gov/radiation/wipp
74	General	A.3.4, 6 and Article 25 F.5.3, 87	NRC is also evaluating the applicability of lessons learned from the Fukushima event. These lessons will be reflected in such areas as emergency preparedness and response. Does this evaluation comprises also safety aspects of ISFS (e. g. consideration of new / updated external hazards)?	The Nuclear Regulatory Commission (NRC) has recently issued a draft white paper on the applicability of Fukushima lessons learned to facilities other than power reactors, including Independent Spent Fuel Storage Installations (ISFSIs). These lessons learned are summarized in 12 recommendations, which include consideration of beyond design basis events. The paper is publicly available and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML15042A367. NRC found that the existing regulatory framework ensures safe and secure storage designs for radioactive material licensed by NRC. Further, NRC determined that no regulatory action was necessary. The NRC's regulations require evaluating natural hazards (e.g., earthquakes and tornadoes) as part of an application.
75	General	A.4.1.2, Para.1, p8	About Yucca Mountain Spent Fuel Program, after the decision by United States District Court in August 2013, the US Nuclear Regulatory Commission (NRC) decided to complete the Safety Evaluation Report (SER) on the application submitted in November 2013. NRC is currently conducting the safety assessment on the application and preparation the necessary safety assessment report. Does it mean that it is possible for the Yucca Mountain Spent Fuel Program license application to pass the NRC's review in the near future? Would the Yucca Mountain project be pushed forwards once again? And would the related activities continue?	The Nuclear Regulatory Commission (NRC) staff completed its safety evaluation report of the Department of Energy's (DOE's) Yucca Mountain application in January 2015. The safety evaluation report (SER) represents the technical review of the information provided by DOE, and NRC's staff determination as to whether the NRC's regulations for a geologic repository have been met. The report also includes the recommendation that NRC should not authorize construction of the repository because DOE has not met certain land and water rights requirements identified in Volume 4 of the SER, published in December 2014, and because a supplement to DOE's environmental impact statement has not yet been completed. The full safety evaluation report is available as NUREG-1949, "Safety Evaluation Report Related to Disposal of High-Level Radioactive Wastes in a Geologic Repository at Yucca Mountain, Nevada," Volumes 1-5, on NRC website, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1949/. Completion of the safety evaluation report does not represent NRC's decision on whether to authorize construction. A final licensing decision, should funds beyond those currently available be appropriated, could come only after completion of a supplement to the DOE's environmental impact statement, hearings on contentions in the adjudication, and NRC's review. In a March 12, 2015 Federal Register Notice, NRC staff provided notice of its intent to complete a supplement to DOE's environmental impact statement. The Administration has determined that Yucca Mountain is not a workable option as a geologic repository.
76	General	A.4.1.4, p8-p9	COMMENT: It is mentioned in A.4.1.4 that DOE is searching the technical gaps related to extended storage of spent fuel. Please introduce the main viewpoints and considerations of US NRC on the extended storage of spent fuel. Please introduce the requirements of US NRC to the long term storage of spent fuel.	The Nuclear Regulatory Commission (NRC) regulates storage of spent fuel in dry storage systems under both site-specific and general licenses, at a facility referred to as an Independent Spent Fuel Storage Installation (ISFSI). Under a site-specific license, the ISFSI design and operation must meet regulations under Title 10 of the Code of Federal Regulations (CFR) part 72, "Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste." The licenses are for terms of up to 40 years, and can be renewed for additional terms. A general license for an ISFSI allows a nuclear power plant licensee to operate an ISFSI using casks certified under 10 CFR part 72. The cask certificates of compliance are issued for terms of up to 40 years, and can be renewed. At present, dry storage ISFSIs in the U.S. are operating under their initial term or first renewal. NRC is currently evaluating what potential changes, if any, are needed to its regulations to address more extended periods of storage. As part of this evaluation, NRC issued a report in May, 2014, entitled Identification and Prioritization of the Technical Information Needs Affecting Potential Regulation of Extended Storage and Transportation of Spent Nuclear Fuel (available in NRC's Agencywide Documents Access and Management

Id	IAEA Article	Reference	Question/Comment	Answer
				System (ADAMS) at Accession No. ML14043A423). This report identified several areas for further investigation, including potential stress corrosion cracking), pitting, and crevice corrosion of stainless steel canister body and welds, and possible swelling of fuel pellets and fuel rod pressurization. In addition, the report prioritized additional study of more realistic thermal calculation methods, effects of residual moisture after drying, and in-service monitoring methods for storage systems and components. The U.S. has been storing spent nuclear fuel longer than originally envisioned, and as time has gone by, higher burn up fuels has also increased. In an effort to provide insights on some technical considerations of storage of these high burn-up fuels, DOE has performed technical gap analyses to evaluate any issues with the cask and fuel systems storing the fuel. The DOE Gap Analysis, "Gap Analysis To Support Extended Storage of Used Nuclear Fuel" (http://energy.gov/ne/downloads/gap-analysis-support-extended-storage-used-nuclear-fuel-0) In addition to the work performed by DOE to evaluate technical information gaps, other organizations such as NRC, Electric Power Research Institute, Nuclear Waste Technical Review Board and Extended Storage Collaboration Project have performed evaluations of the storage and transportation of spent nuclear fuels. DOE analyzed these other documents to evaluate the similarities and differences as they relate to the DOE Gap Analysis, "Review of Used Nuclear Fuel Storage And Transportation Technical Gap Analysis" (http://energy.gov/ne/downloads/review-used-nuclear-fuel-storage-and-transportation-technical-gap-analysis)
77	General	A.4.2.1, Para 6, p10	It is mentioned in A.4.2.1 that US NRC had required disposal facilities to conduct a site-specific performance assessment for disposal of LLW. Please introduce how to conduct this assessment, what the results of this assessment are and how to establish a connection between the results of this assessment and the licencing of the disposal facility.	The Nuclear Regulatory Commission (NRC) is proposing revisions to Title 10 of the Code of Federal Regulations (CFR) part 61. The proposed rule was published on March 26th, 2015, and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML14289A152. The regulation, if approved, would specify the requirements for an acceptable site-specific performance assessment (PA). NRC is also proposing guidance with the rule that, when combined with existing guidance, would provide acceptable methods for demonstrating that the PA requirements in the revised rule are met. The results of the site-specific PA would need to provide reasonable assurance that the performance objectives are met in order to support issuance of a license. Under the revised provisions, a disposal facility licensee, with NRC, or NRC Agreement State approval, could develop site-specific waste acceptance criteria from the results of the site-specific PA.
78	General	A3.4	The USA has reported on improvements required to be made to the storage of spent fuel in ponds following analysis of the Fukushima accident (section A.3.4). Has the USA made any recommendations regarding the dry storage of spent fuel?	No, the Nuclear Regulatory Commission (NRC) has not identified improvements to dry storage facilities of spent fuel. In 2015, NRC determined that the current regulatory framework ensures that the designs for storing radioactive material licensed by NRC are safe and secure. The NRC staff's assessment can be found in a white paper on the lessons learned from Fukushima for facilities other than power reactors. The paper is publicly available and can be found in NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML15042A367 (http://adamswebsearch2.nrc.gov/webSearch2/view?AccessionNumber=ML15042A367).
79	General	A4.1.4/ K.5 p8-p9/p131	What kinds of ageing phenomena are considered in keeping spent fuels (particularly high burnup fuel) in interim storage, and how are such phenomena controlled? In this connection, are restrictive temperatures, etc. prescribed for contained spent fuels, and if so, how have such limits been established?	The Nuclear Regulatory Commission's Interim Staff Guidance (ISG) - 11, Revision 3, "Cladding Considerations for the Transportation and Storage of Spent Fuel," (see www.nrc.gov/reading-rm/doc-collections/isg/isg-11R3.pdf) discusses the expected effects of creep and radial hydrides as aging phenomena for both high and low burnup fuel in interim storage. ISG - 11, Revision 3 also provides guidance to the staff on maximum cladding temperatures and stresses that result in acceptable operational considerations when loading spent fuel into storage casks and transportation packages. ISG - 11, Revision 3 provides that for all fuel burnups (low and high), the maximum calculated fuel cladding temperature should not exceed 400°C (752°F) for normal conditions of storage and short-term loading operations (e.g., drying, backfilling with inert gas, and transfer of the cask to the storage pad). For off-normal and accident conditions, the maximum cladding temperature should not exceed 570°C (1058°F). ISG - 11, Revision 3,

Id	IAEA Article	Reference	Question/Comment	Answer
				identified creep deformation as the most likely mechanism for cladding breach in storage and hydride reorientation as potentially having a significant effect on cladding behavior during accidents. The temperature and stress provisions in ISG - 11, Revision 3, were also found to limit creep. Based on the data available at that time, it was also determined that these temperatures and stresses would prevent hydride reorientation from occurring. However, subsequent research has shown that hydrides may still reorient radially even if the temperatures and stresses indicated in ISG - 11, Revision 3, are not exceeded. Radial hydrides can represent an additional embrittlement mechanism if the cladding temperature decreases below a ductile-to-brittle transition temperature and the rods are subjected to significant stresses. Mechanical properties that account for the extent of radial hydride precipitation and the ductile-to-brittle transition temperature are important for the evaluation of cladding performance.
80	General	A4.5, page 12	What is the current status of WIPP?	The Waste Isolation Pilot Plant (WIPP) suspended operations on February 5, 2014, following a fire involving an underground vehicle. Nine days later, on February 14, 2014, a radiological event occurred underground, contaminating a portion of the mine primarily along the ventilation path from the location of the incident, releasing a small amount of contamination into the environment. The Department of Energy (DOE) appointed an Accident Investigation Board (AIB), which conducted and completed an investigation of the underground fire. AIB published their report on March 13, 2014. Similarly, DOE appointed a second AIB to determine the cause of the February 14 radiological release and to develop recommendations for corrective actions. This second AIB is using a two-phased approach. Phase 1 focused on the response to the radioactive material release, including related exposure to aboveground workers and the response actions. The Phase 1 Report was issued on April 24, 2014. The Report is available at http://www.wipp.energy.gov/Special/AIB_Final_WIPP_Rad_Release_Phase1_04_22_2014.pdf. Phase 2 of the investigation is focused on the root and contributing causes of the radiological release. The AIB will provide its findings when the investigation is complete. In addition, DOE created a Technical Assessment Team (TAT), which is an independent team made up of technical experts from national laboratories, to evaluate the mechanisms and chemical reactions contributing to the failure of a waste drum at WIPP. In its report, the TAT concluded that one drum, Drum 68660, was the source of radioactive contamination released during the February 14, 2014, radiological event at WIPP. The TAT Report was issued on March 17, 2015. The Report is available at: http://energy.gov/em/waste-isolation-pilot-plant-wipp-recovery. The Waste Isolation Pilot Plant Recovery Plan outlines the proposed strategy, key activities, and management approach to safely return WIPP to its Congressionally-mandated mission of defense-generated transuranic waste disposal operations. Ongoing and future actions include: decontamination activities; implementation of recovery corrective actions; safety management program improvements; Documented Safety Analysis Revision; underground stabilization activities; interim closure of the affected emplacement panels; continuing radiological surveys; cleaning, maintenance and upgrading of underground equipment and infrastructure; ventilation upgrades, and activities to ensure protection to the environment.
81	General	B4, 28	The registration and review completed as part of REACH classifies Boric Acid (CAS 10043-35-3/11113-50-1) as H360FD (May damage fertility. May damage the unborn child.) How is this fact reflected in Radioactive Waste Management Practices?	In the U.S. hazardous materials are required to be treated to reduce the hazard prior to disposal. If the waste is being disposed in a low-level waste (LLW) disposal facility, any contaminated boric acid would need to be properly treated "...to reduce to the maximum extent practicable the potential hazard from the non-radiological materials." (Title 10 of the Code of Federal Regulations 61.56(a)(8)). The same part of the regulations requires limiting the liquid or gaseous form of the waste.
82	General	F7.1 p92	Is the concept of Gd-credit taken into account in criticality analyses in USA?	To date, no applicants have requested gadolinium (Gd) credit in its criticality analyses. The U.S. has not provided any guidance for Gd credit in criticality analyses for the storage of spent

Id	IAEA Article	Reference	Question/Comment	Answer
				fuel in an independent spent fuel storage installation. If any applicants wanted to claim credit for Gd in its criticality analyses NRC would review the request on a case-by-case basis.
83	General	General	Can the USA describe any measures it has taken to integrate safety and security in spent fuel management, as per the President's report from the previous review?	In the U.S., Nuclear Regulatory Commission (NRC) spent fuel regulations for the safety of spent fuel pool storage at commercial nuclear power plants are contained in Title 10 of the Federal Code of Regulations (CFR) part 50 (Domestic Licensing of Production and Utilization Facilities), and safety requirements for dry spent fuel storage and spent fuel pool storage not co-located at a nuclear power plant are in 10 CFR part 72 (Licensing Requirements for the Independent Storage of Spent Nuclear Fuel and High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste). Security regulations for these facilities are in 10 CFR part 73 (Physical Protection of Plants and Materials). These regulations work in an integrated fashion to ensure the safety and security of spent fuel management.
84	General	p. 13	Section A.4.5 reports incidents in WIPP which have taken place in 2014. Were there any incidents during the reporting period of 2011-2013?	Two "off-normal" incidents at the Waste Isolation Pilot Plant (WIPP) were investigated by the Environmental Protection Agency (EPA), as described below. On December 7, 2011, EPA received a report that waste had been received at WIPP with external surface contamination on the payload inside the shipping container. Further investigation and laboratory analysis supported the hypothesis that the contamination resulted from the decay of radon progeny, and that no loss of containment had occurred. The payload was cleared by WIPP Radiation Control. On June 20, 2012, EPA was notified that a drum had been punctured by a forklift in the underground on the previous day (Panel 6, Room 5). The drum was a 100-gallon container holding super-compacted "pucks" from the Idaho National Lab at the Advanced Mixed Waste Treatment Project. The incident was immediately reported, the facility shifted into filtration mode, and no release was detected. WIPP provided a written summary to EPA and the New Mexico Environment Department on June 21, 2012 (see http://www.epa.gov/radiation/news/wipp-news.html#punc_drum2 for a description of the incident).
85	General	Page 7 / A.4.1.1	As explained in the report, recently the USA is following the approach of Continued Storage of SF and its direct disposal at a High-Level Waste Disposal Facility. We would appreciate very much any additional information on the reasons to select such a strategy and its advantages in comparison with the reprocessing option.	The U.S. Administration's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste" endorses many of the recommendations of the Blue Ribbon Commission (BRC) on America's Nuclear Future including a consent based approach to siting future nuclear waste management facilities, and prompt efforts to develop one or more consolidated storage facilities while making progress on a geologic disposal facility. Full implementation of this Strategy will require legislation. The Department of Energy (DOE) is undertaking activities within existing Congressional authorization to plan for the eventual transportation, storage, and disposal of used nuclear fuel. As noted in the Strategy, the BRC concluded that "it is premature at this point for the U.S. to commit irreversibly to any particular fuel cycle as a matter of government policy…" and pointed out that "it is… very likely that disposal will be needed to safely manage at least some portion of the existing commercial [used nuclear fuel] inventory." Even if a closed fuel cycle were to be adopted in the future, permanent geologic disposal will still be required for residual high-level radioactive waste. Cost, nonproliferation, national security, environmental concerns, and technology limitations are some of the concerns that would need to be addressed before any future decision to close the U.S. fuel cycle through the use of recycling would be made. These factors reinforce the likelihood that the once-through fuel cycle will continue at least for the next few decades. Nevertheless, consistent with past practice and the BRC's recommendations, DOE will continue to conduct research on advanced fuel cycles to inform decisions on new technologies that may contribute to meeting the US's future energy demands while supporting non-proliferation and used nuclear fuel and high-level radioactive waste management objectives.

Id	IAEA Article	Reference	Question/Comment	Answer
				The 2014 revision of Title 10 of the Code of Federal Regulations (CFR) 51.23 codifies the Nuclear Regulatory Commission's (NRC's) generic determination regarding the environmental impacts of the continued storage of spent nuclear fuel beyond a reactor's licensed life for operation and prior to ultimate disposal. NRC prepared a final generic environmental impact statement (EIS) (NUREG-2157, "Generic Environmental Impact Statement for Continued Storage of Spent Nuclear Fuel" (http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2157/) which provides a detailed evaluation of the environmental impacts of continued storage of spent nuclear fuel beyond the licensed life for operation of a reactor, the conclusions of which were incorporated in this final rule. The Commission found that this evaluation was applicable generically. The final rule also clarifies that the generic determination applies to license renewal for an independent spent fuel storage installation (ISFSI), reactor construction permits, and early site permits. The final rule clarifies how the generic determination will be used in future, specific NRC environmental reviews, and makes changes to improve clarity. Finally, the final rule makes conforming amendments to the determinations on the environmental effects of renewing the operating license of a nuclear power plant to address issues related to the onsite storage of spent nuclear fuel and offsite radiological impacts of spent nuclear fuel and high-level waste disposal. NRC's licensing proceedings for nuclear reactors and ISFSIs have historically relied upon the generic determination in 10 CFR 51.23 to satisfy the agency's obligations under the National Environmental Policy Act (NEPA) with respect to the narrow area of the environmental impacts of continued storage based upon the NRC's generic determination of those impacts. EISs for future reactor and spent-fuel-storage facility licensing actions will not separately analyze the basis for the environmental impacts of continued storage, and as discussed in 10 CFR 51.23, the impact determinations from the generic environmental impact statement are incorporated into these specific EISs or other environmental evaluations.
86	General	Page 8 / A 4.1.4	The report states that of DOE's R&D activities is to develop a suite of options that will enable future decision makers to make informed choices about how best to manage the spent fuel from reactors. An additional objective is the demonstration of technologies necessary to allow commercial deployment of solutions for the sustainable management of spent fuel that is safe, economic, and secure. Could USA provide some information about achievements and challenges on the recent developments of the Mixed Oxide (MOX) Fuel Fabrication Facility project.	The Department of Energy (DOE) conducted a preliminary analysis in 2014 of options to disposition U.S. surplus, weapon-grade plutonium, which documented that the current Mixed Oxide (MOX) fuel fabrication approach is significantly more expensive than anticipated. An independent assessment of DOE's preliminary analysis is ongoing.
87	General	Section A4.5, page 13	According to your estimates when the waste emplacement operations can be resumed? COMMENT: The Report indicates that "two events occurred in February 2014 temporarily impacting the ability to dispose of TRU wastes at WIPP."	The Department of Energy's goal is for initial waste emplacement operations to resume early in calendar year 2016. Full return to normal operations is expected to take several years.
88	General	Section K.1, page 129	What progress has been made towards the implementation of this recommendation? COMMENT: The Report states that: "The Blue Ribbon Commission (BRC) on America's Nuclear Future provided recommendations for developing a safe, long-term solution to managing the Nation's used nuclear fuel and nuclear waste". The BRC's final report of January 2012 contained a recommendation concerning the establishment of a new organization dedicated solely to implementing the waste management program and empowered with the authority and resources to succeed.	The Administration's Strategy envisions a new waste management and disposal organization (MDO) to provide stability, focus, and credibility to build public trust and confidence. The MDO would be charged with the management and disposal of commercial used nuclear fuel and the associated interface with possessors and operators. Pending enactment of new legislation to establish the MDO, DOE has responsibility for implementing the Strategy within existing authorizations. DOE will take necessary steps to advance the program while taking every precaution to avoid compromising the later ability of the newly-established MDO to succeed. At this time, no legislation has been enacted to create such an organization.

Id	IAEA Article	Reference	Question/Comment	Answer
89	General	Section K.1, page 129	What are the key points to be included in such legislation and has some progress been made already in developing the new legislation? COMMENT: The Report states that: "The Blue Ribbon Commission (BRC) on America's Nuclear Future provided recommendations for developing a safe, long-term solution to managing the Nation's used nuclear fuel and nuclear waste". … Legislation is needed for full implementation of the Administration's strategy."	Action by U.S. Congress in the form of new authorizing legislation and appropriations is necessary to fully implement the Administration's Strategy. As stated in the Strategy, critical elements for successful implementation include the establishment of a consent-based siting process, a new organization to execute the waste management mission and implementation of a process for long-term stable funding. A bipartisan Senate bill introduced in 2014 was not enacted.
90	Planned Activities	25 and 129	Please provide a status update on the siting process for the pilot interim used fuel storage facility. Specifically: - How many sites are being considered? - What investigations have been conducted (geological and other wise)? - Have any permitting or licensing processes begun?	The Department of Energy (DOE) is currently laying the groundwork for implementing interim storage, including associated transportation, per the Administration's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste." There are currently no active site investigations being conducted. DOE is conducting generic planning with program stakeholders, but has not identified any specific sites for consideration.
91	Planned Activities	38	As referenced to in section D.2.1 of the 5th national report (NR), the fourth NR provides additional information the on the Hanford liquid waste treatment plant; specifically, the schedule indicated that the design and construction of the Hanford liquid waste treatment plant would be complete by 2013 and 2016 respectively. Please provide a status update on the design and construction.	The schedule for the Waste Treatment and Immobilization Plant is currently the subject of a lawsuit in Federal court.
92	Planned Activities	p. 136, 145, 146	There are the same licensee and regulator (e.g. DOE) in some installations. How is it possible?	The Department of Energy (DOE) and the Nuclear Regulatory Commission (NRC) each have responsibilities to regulate nuclear materials under U.S. law. NRC generally has licensing and regulatory authority over commercial licensees, but NRC generally does not have licensing authority over DOE facilities and activities, except as specifically provided in section 202 of the Energy Reorganization Act of 1974 (e.g., for a DOE Independent Spent Fuel Storage Installation). DOE exercises regulatory authority over DOE activities not subject to licensing by NRC in accordance with DOE regulations, Orders and guidance, in a manner which is protective of human health, safety, and the environment.
93	Planned Activities	Subsection K.1 page 129	Item K.1 refers the Administration plans for the spent fuel management which include the licensing, construction and operation of a pilot interin storage facility by 2021, a lager interim storage to be available by 2015, beside the process on siting and characterisation of sites to facilitate the availability of a geologic repository by 2049. Could the US provide information on the on going specific developments for the implementation of each of the mentioned solutions in particular of those regarding the storage facilities?	The Department of Energy (DOE) is currently laying the groundwork for implementing interim storage, including associated transportation, per the Administration's "Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste." Full implementation of the Strategy will require legislation.