Article	Reference	Question	Comment	Answer
General	24	Section A.5.4 speaks to the National RD&D programme, please provide a response to the following questions: a) How are the public comments on the R&D programme report received? b) What period of time does the public have to submit these comments? c) What is the nature of comments typically received and how does it impact what R&D is performed?		a) Public comments should be submitted in writing, either by ordinary mail or – as preferred by SSM – by electronic means. b) SSM requests comments to be submitted within three months after the RD&D-program has been made public for comments. SSM should submit a statement to the government within six months from SKB:s submittal of the RD&D-program. c) Comments received vary very much depending on the individual member of the public or role of the commenting organization. SSM evaluates all comments and may, when SSM considers the comments relevant, make reference to them in the review report. In addition, and to ensure openness and transparency, SSM compiles and submits all comments, as submitted to SSM, to the government together with SSM:s statement on the review and evaluation of the program.
General	80	Please clarify how the members of the "local safety boards" are chosen and by whom? Further, are members who may be vocally opposed to nuclear power or waste included? Do the local safety boards have the ability to conduct or request any monitoring, whether of radiological parameters or others such as noise?		(1) The local safety board is an authority (so called board authority). Its members are appointed by the Government following proposals from the municipalities concerned. (2) There are no formal barriers to select members who are opposed to nuclear power. As already said, it is a matter for the political leadership of the municipalities concerned to propose members. It is unlikely that the government would oppose the approval of a member on the ground that he is opposed to nuclear power since the purpose of the local safety boards is to gain insight into safety and radiation protection work at the plant in order to inform the public concerned about this. (3) No. The committee may only request information about the safety and radiation protection work in progress at the facility. The reactor owner is obliged to provide the board such information.
General	132	Please clarify what qualifies as a fuel failure, as noted in section F.4.1.1. In relation to this, has technology been developed for interim storage and eventual disposal of the fuel in the event of a fuel failure?		There are many different types of fuel damage that require special methods to be managed in the KBS-3 system. For example, the damaged rods can be encapsulated individually or together in a control rod box. In order to ensure that all damaged fuels can be managed in the KBS-3 system, an inventory of damaged fuel and a plan of action for its management will be prepared during the coming RD&D period. The proper steps to take with damaged fuel at the nuclear power plants, Clink or other facilities will then be determined. There is also a small text on how to proceed with corroded spent fuel from the R1 plant in Sweden in the second to last paragraph of D1.1 in the fifth National Swedish report (Joint Convention). See further SKB's RD&D Programme 2013 (SKB TR-13-18 Chapter 11.3) that can be downloaded from www.skb.se.

General	Section A.3 Sum	It is clear that SSM is an independent safety regulator. However SSM's review of licence application for SNF disposal is very much integrated into environmental court decision making and timeschedule. How is it assured that SSM can independently make judgment of the safety?		The most important issue when considering an application for a final repository for spent nuclear fuel and nuclear waste is undoubtedly long-term radiation protection and safety. Because the Court lacks its own expertise in these matters it relies on the opinion that SSM provides the court. This means that without this opinion from SSM it is highly unlikely that the Court would initiate a main hearing in order to take a final decision on the matter. In the absence of procedural rules on this matter it may still be considered fairly safe that the court is awaiting SSM's opinion on radiation protection and safety.
General	Section A.4.1 Pas	p.16 it is describe that Ågesta reactor was shut down in 1974 and partially decommissioned in early 1990s. Why is the finalization of decommissioning postponed to 2020s?		The licensee decided to postpone the decommissioning as the final repository for short-lived low and intermediate level waste from decommissioning was at the time of decision scheduled to be operational by 2020.
General	Section A.5.5 No	p. 27 it is mentioned that Government agreed for a one-off compensation to cover future costs of non-nuclear waste disposal to SFR. Please elaborate on this agreement. Does this cover all future costs and all future wastes.		It covers the disposal of 7,000 drums of 200 l each (one drum equals 0.32 m3 disposal volume in SFR). Please note that it is not only non-nuclear waste that is covered by the agreement and the one-off payment, but also waste produced by Studsvik Nuclear AB.
General	Section A.6.3.1 F	p.37 the report shows the time schedule for SNF repository licensing and development. What are the main reason, and possible safety concerns that, for eight years license application review period.		There are several reasons why the Swedish review period is longer than in Finland. 1) Sweden has not yet, in contrast to Finland, decided on disposalmethod or site for the repository, this decision is included in the present review. 2) SSM has asked for extensive complementary information from the applicant (SKB). 3) SKB has chosen to include, as part of the complementary material, an application for extended (enlarged) storage capacity at Clab. 4) The Swedish review also includes questions related to the Environment Impact Assessment. 5) Both the Land and Environment Court and SSM are reviewing in parallel according to different legislation. 6) SSM has organized a national consultation (in two rounds) of SKB's license applications.
General	Executive summary		Sweden's 5th National Report should include an Executive Summary.	It is not clear what guideline this comment referes to. In the current report the Introduction (Section A) contains the information expected in an Executive summary.
General	Section K		Section K adresses correctly the new Guidelines regarding the Form and Structure of National Reports (INFCIRC/604/Rev.3 Draft 3).	Thank you.

General	-	In the control of geological disposal and near surface disposal of radioactive waste, must markers be installed as a means of preventing human access? If it is not necessary, what measures are you considering?	Regarding passive institutional control, no decision has yet been taken on such issues for geological repositories (including the SFR facility). For shallow land burials for very low-level radioactive waste the facility should be under active institutional control by the operator for 30 years post closure. In a statement to the Government in 2009 (SSM report 2009:29 on national plan for all radioactive waste), SSM advised the Government to consider the issue of record keeping for different types of disposal sites (including both geological repositories, near surface repositories, shallow land burials as well as disposal facilities for non-radioactive waste. SSM suggested that the Government appointed the responsibility for record keeping to one of the Natiional Authorities (Lantmäteriet).
General	K.2.2, 240	It is stated that SSM has promoted transparency and broad stakeholder involvement in the licensing review of the spent nuclear fuel repository. Is there any policy or laws of the promotion of the stakeholder involvement by the regulatory authority, the SSM? What is the most challengeable thing to manage this stakeholder interaction in parallel with the review?	In short the provisions for stakeholder involvement in the licensing of a spent nuclear fuel repository include: • Official documents with Swedish authorities are publicly available (no-one needs to justify a wish to see a public document or to reveal his or her identity to have access to a document) • It is SSM's policy to act as transparent as possible and to support stakeholder involvement. This approach is considered to be particularly important in issues of interest to the public and which are perceived as controversial. As an example SSM organises a national consultation of SKB's license application and meetings open to the public as part of its licensing review. • The Environmental code contains requirements on consultation with affected parties in the development of an environmental impact statement (environmental code) • There is a possibility to apply for funding from the Nuclear waste Fund for the participation in the siting and licensing process for a spent nuclear fuel repository (applies to affected municipalities and NGOs) • All SKB report series (except for work documents in progress) are open and can be downloaded from SKB's web-site www.skb.se • Sweden is since 2005 a party to the Aarhus Convention (Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters). A satisfactory environmental protection under the Convention is essential for human well-being and enjoyment of fundamental human rights. The Convention is based on the view that a good supply of information and a broad social participation in environmental decision-making lead to better decisions for better implementation of decisions and contributes to public awareness of

General	K, 235	SKB is the applicant for the licence to build the geological disposal. How is or will the safety case of the disposal facility be evaluated by SSM, when SSM can not hire expertise from SKB?	The integrity of SSM's licence application review is dependent on establishing a clear divide between the expertise at the regulatory authority's disposal and the interests of SKB and its owners. SSM has knowledge and experience of SKB's disposal concept and methods for safety analysis that has been built up over many years, primarily through oversight of the industry's research, development and demonstration programme but also independent research and safety assessments. During this period SSM and its predecessors have invested in research to investigate regulatory issues connected with geological disposal, building up a team of independent international specialist expertise from Sweden and around the world to ensure that specific skills are available to support its regulatory activities, independent from possible conflicts of interest. In support of the currrent licensing review SSM carried out a public procurment of more than 40 swedish and international experts in different competence areas. Strict criteria were defined to ensure their independence in relation to SKB (and their finnish counterpart Posiva).
General	A, 25	Are licensees of (certain types of) non-nuclear facilities (eg accelerators/cyclotrons or NORM industries) required to secure financial resources for the decommissioning of the facility? If yes, how is this regulated?	The issue of financing of non-nuclear radioactive waste is partly unregulated. Although this is not directly expressed in the Radiation Protection Act, to finance the final disposal of radioactive waste is part of the basic legal requirements on waste responsibilities. When it comes to high-active sources it is an explicit requirement to secure financing in the form of a bank guarantee. In some cases, the requirement of financing is designed as a license condition. In other cases, there is no more explicit regulation or condition beyond the basic requirement to safely dispose of radioactive waste arising in the activity.
General	À5.2, page 21	It was mentioned that safety measures applicable to spent and partially spent nuclear fuel are the same. Please provide definition for "partially spent nuclear fuel"?	At the nuclear power plants, the spent nuclear fuel is stored in the fuel pools for at least 9 months before it is transported to the central interim storage facility for spent nuclear fuel (Clab). The safety and security measures taken at the NPPs are the same for the finally discharged spent nuclear fuel that has reached its final burnup, as for fuel that is taken out of the reactor between irradiation or burnup cycles (partially spent fuel) and thereby has not reached its final projected burnup.

General	1	Has Sweden considered the lessons learned from the major event at WIPP, with respect to the safety of its existing and planned geological repositories - and if so what action has been taken?	The direct cause of the fire in a truck at WIPP was that flammable liquid met a very hot surface. The automatic extinguisher system had earlier been shut off. The engine room and two tires burned. The accident has been analysed and commented regarding possibilities for similar events in the Swedish facilities. All vehicles in the Swedish facilities have fixed extinguishers. In the routuine SD-130 "fire protection in vehicels" (only in Swedish) there is a description on how preventive actions regarding fires should be performed. Automatic extinguishers may never be shut off. Maintenance of vehicels are done regurlarly and systematically. The SD-130 routine must be applied for all vehicles regardless of their use. Plans for intensified education of the personnel are in place Also the regulations and the organsiation regarding responsibilities at a fire event have been revised.
General	K 1.4	The report states that Sweden's application of the post-Fukushima ENSREG Stress Tests to the Clab facility identified several measures to improve the facility's resilience to a beyond-design-basis earthquake. What are the planned timescales for implementation of these improvements?	In June 2015 SKB will report a final report summarizing the results of the stresstest analysis and all measures. Preliminary results presented to SSM has shown that the Clab facility withstands two times the design earthquake. SSM will take into account the results of the stresstests in the ongoing licensing ot the combined encapsulation and interim storage (the Clink) facility. The results of the stresstest analysis will bli implemented in the safety analysis resport of Clab in January 2016.
Article 3	A.7.3.2, pg. 45	An important example of SKB's international research cooperation is the Äspö Hard Rock Laboratory, where organizations from Finland, France, Germany, Japan, Spain, Switzerland, Canada and the Czech Republic are (or have been) carrying out joint studies. Please provide highlights of these activities during your National Country Presentation at the Fifth Review Meeting.	

Article 3	F.5.8, pg. 150	This section states that the licensees of the nuclear power plants and SKB, as a licensee of Clab have re-evaluated their safety assessments. Please describe the extent to which other classes of non-reactor facilities have been examined for any Fukushima-related enhancements.	More information on the re-evaluated safety assessments or “stress test” results for Clab is given in section K.1.4.2. To understand the limitation of the stress tests to Clab, beside the nuclear power plants, one has to take into account the Swedish and European context of stress tests. Shortly after the Fukushima Dai-ichi nuclear power plant accident on 11 March 2011, SSM in a written communication to the licensees pointed out the importance of immediately launching work to identify lessons learned from the situation, with the aim of assessing any further radiation safety measures that might be necessary at Swedish nuclear power plants as well as at the facility for storage of spent nuclear fuel (Clab). Following an extraordinary meeting in late March 2011, the Council of the European Union declared that Member States were prepared to begin reviewing safety at nuclear facilities in the European Union by means of a comprehensive assessment of risk and safety (‘stress testing’). The Council was of the view that the criteria should be defined on the basis of lessons learned from the situation in Japan so that the assessments could be conducted as soon as possible. The Council urged the European Nuclear Safety Regulatory Group (ENSREG) and the Commission to clarify these criteria through the participation of Member States and expert organisations such as the Western European Nuclear Regulators’ Association (WENRA). A specification for the scope and orientation of the stress tests was drawn up by WENRA and endorsed by ENSREG.
Article 4	Section G.1.3.1,	What are the main drivers for the reconsideration of nuclear waste fees for the period 2015-2017 and whether the existing plans for new reactor building in Sweden will be reflected in this decision?	The main drivers are that the projected costs reported by the industry for decommissioning and disposal have risen and that the future return of the Nuclear Waste Fund is expected to be lower. Possible new-build of reactors is not reflected in SSM's recommendation concerning the fees.
Article 4	E.3.2.2, page 11	What is the design service life established for SF containers at Forsmark storage facility? Is the opportunity of the SF containers (once placed into the Forsmark storage facility) retrieval foreseen?	The canisters will be placed in the repository and are normally not foreseen to be retrieved. However, it has been shown that the deposition method can be reversed and thereby that a retrieval is possible. After closure of the repository, retrieval of canisters will be a massive undertaking that would involve a lot of resources. Retrieval would though not be entirely impossible.
Article 4	A6.2.1	The present capacity of Clab is given as 8,000m3 and the predicted lifetime arising of spent fuel from Sweden’s existing power stations is said to be 12,000m3. What contingency plans are in place to cover the eventuality of a shortfall in spent fuel storage capacity in the event that the planned repository is delayed?	As already applied in the first rock vault the capacity of Clab can be increased by denser packing in bor-plated casks. If this procedure is also applied in cavern no 2,the total ty of Clab increases to 11 000 tonnes. If further capacity for some reason will be needed there are two options - one is to expand the Clab facility with a third cavern. Another option is dry storage at the nuclear power plants

Article 4.1	page 160	What are the legal or SSM requirements on the long-term (post-closure) criticality safety of the planned spent fuel repository at Forsmark? What kind of criticality safety analysis (scenarios) is the applicant required to produce?	In Sweden, there is no legal requirement related to criticality safety for the post closure phase in connection with the disposal of nuclear material and nuclear waste. In SSM's regulations SSMFS 2008:21 (The Swedish Radiation Safety Authority's regulations and general advice concerning safety in connection with the disposal of nuclear material and nuclear waste) in the general advice to section 9 it is stated that: "Particularly in the case of disposal of nuclear material, for example spent nuclear fuel, it should be demonstrated that criticality cannot occur in the initial configuration of the nuclear material. With respect to the redistribution of the nuclear material through physical and chemical processes, which can lead to criticality, it should be demonstrated that such redistribution is very improbable." The basis for this is that a criticality event in a final repository has a negative impact on long term safety due to e.g. an increasing inventory of certain harmful radionuclides and heat generation that may affect barrier performance. However, a criticality event in a sealed final repository would not have the potentially very severe impact as it could in an operational nuclear facility on the surface. In the context of the ongoing licensing review concerning a spent fuel repository in Sweden SSM has requested that the proponent (SKB) should provide additional information regarding 1) a comprehensive reporting on how burn-up crediting has been accounted for in criticality analysis, 2) a systematic inventory of criticality related events and circumstances, 3) a
Article 5	27	Are there any conditions on the licences for the spent fuel being kept in dry storage at Kjeller? For example, is the licence to store the spent fuel in dry storage at Kjeller contingent on a permanent disposal solution for the spent fuel, or is there a maximum permissible period of dry storage set out in the licence?	This question is addressed to Norway. The Australian NCP has been notified by e-mail.
Article 6	G3.2.2,172	Has been the decision to select Forsmark site supported by multicriterial analyses?	As is mentioned in G3.2.2 the Forsmark site was chosen after a systematic evaluation and comparison of the two final alternatives , Forsmark and Laxemar. The evaluation considered a lot of parameters of which the ones satisfying the requirements on long-term safety were judged to have the most importance. Some of the parameters included in the evaluation/ comparison were (among a lot of others): waterbearing fractures at repository depth and thereby the groundwater flow through the repository, risk for erosion of the surrounding bentonite clay, risk for earthquakes, rock stresses. Also parameters related to constructability and operation of the final repositiory were evaluated. Comparison regarding environment and health as well as social resources showed that the differences that exist between the sites were not of any decisive importance for the site selection.

Article 6	Section A p.27 / !	The Swedish legal framework for licencing of nuclear activities contains provisions governing transparency, openess, and public participation. Could Sweden provide detailed information on recent experiences of the mentioned practices of public presentation?	Please see Chapter K2.1 and K2.2 in Sweden's fifth national report for more information on this topic. In brief there has been an active engagement of many stakeholder groups in the ongoing licensing review. Engaged parties include the municipalities affected by SKB's license applications, environmental organisations and other non-governmental organisations as well as members of the public. SSM has sent SKB's license application for consultation in two rounds to about 70 organisations in Sweden. SSM has received a wide range of useful review comments (ranging from detailed scientific/technical comments on post-closure safety, e.g. regarding corrosion mechanisms, via technical feasibility to broad issues like justification for the proposed disposal method and alternative disposal methods) that have been taken into account in its own review. During the siting of the spent nuclear fuel repository SKB received about 2000 questions at the consultation meetings performed. In general the stakeholders have focused on different areas: • Nearby residents: Traffic, noise, groundwater lowering. • Municipalities: Infrastructure, local environment issues, pre- and post-closure safety. • Environmental organisations: Choice of site and method, long-term safety. • Regulatory authorities: Environmental impact, long-term safety, criteria for site selection, opportunities for and effects of retrieval of canisters. • Neighbouring countries: Transboundary environmental impact via air and water in connection with regular operation and accidents. For SKB it is a challenge to maintain the positive opinion standing among the people in the municipalities Östhammar and Oskarshamn which is in the order of about 80 % based on yearly opinion polls made by SKB." See also A5.6 "Provisions for openness and transparency" in the National report
Article 6	A.5.5, 29	Is there any plan for the development of near-surface disposal facility to dispose large components generated from NPP decommissioning?	No, there is no specific plan for a near-surface facility for large components. Wishes have though been expressed from the NPPs that larger components should be taken care of in SFR and the BWR reactor tanks to be taken down in SFR as whole components are such examples. A dialogue is still ongoing with the NPPs if there are other big components that needs special handling. Otherwise all radioactiove waste destined for SFR shall be placed in one of the licensed container types. Currently SKB is also developing a new and larger container intended for the BMA-vaults, specially meant for avoiding unneccesary cutting of components.

Article 7	p. 39 (Section A)	Planning for repository construction Thank you very much for providing an overview of the status and the next steps for realising the spent fuel repository. With regard to the construction of the facility, it is stated that “Each major step in the work is preceded by a decision gate aimed at evaluating the programme from a holistic perspective and establishing a more detailed plan for the period up to the next decision gate.“ Who has defined or will define the “major steps” in the construction phase? Is there or will there be a legally binding definition of these steps? What do you mean by “decision gate” in this context, and who is responsible for performing the evaluations which are foreseen at these points of time?		The client of the project (the Head of Nuclear Fuel Dept at SKB) defines the suitable major steps with respect to e.g. uncertainties in the licensing process. The project model of Vattenfall (VPMM) also sets requirement on the length of each step. No, there is no legally binding definition of these steps, at least not at this point. The authorities has though the possibility to define regulatory milestones for the programme. By "Decision gates" we mean project tollgates, such as “start of detailed design” or “investment decision”. A project review board (independent of the project) is responsible for performing the evaluation. With the above said, please note that the text that the question refers to describes the nuclear waste company's work with the RD&D programmes. This program is owned by the company who uses it for planning purposes. This should not is mixed with the stepwise licensing process described in figure A3, p 21, the report.
Article 8	G.5.3.1, p189		It is mentioned that applications of SKB are being evaluated in parallel by the Swedish Radiation Safety Authority (SSM) under the Act on Nuclear activities and by the Land and Environmental Court under the Environmental Code. Please describe the role of Land and Environment Court in the license application procedure.	According to the Environmental Code the Government shall consider the permissibility of certain activities such as interim storage or the disposal of spent fuel or waste. The Land and Environmental Court conducts hearings and reviews an application on permissibility, which thereafter is handed over to the Government for the final consideration. If the Government grants permissibility according to the Environmental Code, the examination continues at the Land and Environment Court. The court is bound by the Governments permissibility decision. The Courts continued examination of the application relates to the detailed envi-ronmental conditions that will apply to the activity.
Article 8	p. 236 - 237 (Sect	Results of stress test analysis for the Clab Facility It is reported that the licensee has presented an action plan of provisions for improvements at Clab. Does the categorisation of measures that applies to the measures listed in the national action plan also apply to the Clab action plan? What is the status of implementation of the measures listed under K 1.4.1 for improvement of Clab?		In June 2015 SKB will report a final report summarizing the results of the stresstest analysis and all measures. Preliminary results presented to SSM has shown that the Clab facility withstands two times the design earthquake. SSM will take into account the results of the stresstests in the ongoing licensing ot the combined encapsulation and interim storage (the Clink) facility. The results of the stresstest analysis will bli implemented in the safety analysis resport of Clab in January 2016.

Article 8	p. 191	Section G External reviews The report states: “The overall conclusion of the peer review was that SKB’s post-closure safety report is sufficient and credible for the decision at hand and that SKB generally gives a convincing illustration and technical basis both for the feasibility of the future repository, according to the KBS-3 design, and for its radiological long-term safety. However, the expert team also gave a number of recommendations for additional research and improvements that are needed for the safety cases supporting the next licensing steps. It is also said that the progression from the conceptual phase of SKB’s repository project to an implementation phase means that the industrial feasibility of the barriers and of the repository, including assurance of their quality, will become increasingly important.” Does this mean that the technical feasibility on principle has been shown for the repository so far but that the feasibility of the repository concept in terms of engineered barriers is still to be demonstrated in case that a one million year perspective is taken into account for the estimation of failures? (cf. p. 189). If so, is it possible to deduce from the results obtained so far where the largest potential for improvement is seen regarding the barriers?	The international peer review was requested by the Swedish government to support their and other bodies' review of SKB's license application. As such the final report by the international review team stands by itself and the views in it represent only the members of the team. SSM has considered the report in its own review, e.g. to identify review issues, but SSM will make its own assessment of SKB's license applications and how they meet SSM's regulatory requirements. Because the licensing review is still ongoing it is not possible for SSM, at this point, to comment on the technical feasibility or any other compliance aspects.According to the current time line SSM will provide a preliminary statement to the Land & Environmental Court for their main hearing of SKB in 2016 and the final statement to the government in 2017.
Article 8	p. 187	SKB argues that the detailed analyses demonstrate that canister failures in a one million year perspective are rare. Even with a number of pessimistic assumptions regarding detrimental phenomena affecting the buffer and the canister, they would be sufficiently rare. What does it mean “would be sufficiently rare” Could you give an example of the value and uncertainties for the analysis?	Even with a number of pessimistic assumptions regarding detrimental phenomena affecting the buffer and the canister, they are sufficiently rare that their cautiously modelled radiological consequences are well below one percent of the natural background radiation.

Article 8	G.5.3.2, p. 191	What work is being done under alternative technologies, including disposal of spent nuclear fuel in a very deep boreholes. At what stage is this work?	In the Act on Nuclear Activities section 12 it is stated that SKB has the responsibility to prepare or arrange for a programme for comprehensive research and development work, i.e. study and follow the development of other methods than KBS-3, including deep borehole disposal. SKB shall in its RD&D programme (sent to the authorities every third year) show the work done in this area. According to this legal framework and in order to answer questions within the ongoing licensing procedure the following work has been done during the last years: • Principles, strategies and systems for final disposal of spent nuclear fuel (SKB report P-14-20) • Comparison between the KBS-3 method and disposal in deep boreholes (SKB report P-14-21) • Radiological consequences of accidents during disposal of spent fuel in a deep borehole (SKB report P-13-13) • Modelling of thermally driven groundwater flow in a facility for disposal of spent nuclear fuel in deep boreholes (SKB report P-13-10) • The deep borehole concept. A conceptual model for gas generation and gas transport (SKB report P-13-11) • Review of geoscientific data of relevance to disposal of spent nuclear fuel in deep boreholes in crystalline rock (SKB report P-13-12) • Premises for drilling of and deposition in deep boreholes (SKB report P-13-08) The reports written in Swedish always have a summary in English. SKB continues to follow the development of other methods regarding for
Article 9	p. 195, Section G.	Reporting According to the report, the requirements for the reporting of incidents are specified in the general regulations concerning safety in nuclear installations (SSMFS 2008:1). Which kind of publication (e.g. prompt press releases, descriptions or lists in annual reports) for reportable occurrences is practised in Sweden with regard to the fact that openness and transparency are key elements of the Swedish policy?	Incidents reported to SSM according to our regulations SSMFS2008:1 are not published as a rule, but the public is entitled to request access to official records at SSM (or other authorities). Events of significance to other stakeholders are communicated to these parties.

Article 9	p. 196 (Section G	Decommissioning It is stated that “during the operation of a facility, observations and events that have significance for planning and execution of decommissioning shall be documented on an ongoing basis.” Does this include a systematic ongoing ageing management in order to cope with long-term alterations and ageing effects? If so, at what intervals is the documentation to be updated?	No, this requirement is to ensure that observations and incidents during operation which might have an impact on decommissioning are documented for future use. Ageing management is covered by other requirements. The licensee shall have a program for maintenance, analysis and control of systems, structures and components with safety significance. This shall consider ageing effects. The program shall be documented and reviewed and updated with respect to developments in research and technology. There is no specified interval for updating the document. This requirement is applicable during the whole lifetime of the facility. Also, in the decommissioning plan the licensee shall identify existing (as well as planned) systems and equipment which are planned to be used in the decommissioning.
Article 9	H5.2	The report states that a licence application for the expansion of SFR was planned for 2014. Has the licence application been submitted and have any major learning points emerged from the process?	The application was submitted 19th December 2014. SSM has recently finished the docketing review (i.e. a high-level screening to verify that the application is formally acceptable with regards to what is necessary). The review plan is currently under review and updating with regards to the revised time-schedule as well as other priorities and experiences from the ongoing review of the spent fuel disposal facility application.
Article 9.6	199, 223	The programme for handling operating experience is identified (p.199, G.6.2.6 and p.223, H.6.2.7). Were the recent incidents at WIPP evaluated as part of these programmes? If so, how?	The direct cause of the fire in a truck at WIPP was that flammable liquid met a very hot surface. The automatic extinguisher system had earlier been shut off The engine room and two tires burned. The accident has been analysed and commented regarding possibilities for similar events in the Swedish facilities. All vehicles in the Swedish facilities have fixed extinguishers. In the routuine SD-130 "fire protection in vehicels" (only in Swedish) there is a description on how preventive actions regarding fires should be performed. Automatic extinguishers may never be shut off. Maintenance of vehicels are done regurlarly and systematically. The SD-130 routine must be applied for all vehicles regardless of their use. Plans for intensified education of the personnel are in place Also the regulations and the organsation regarding reponsibilities at a fire event have been revised.
Article 11	Í.1.1.2, p. 224	Please specify methods and available technical capabilities of characterization/inventory of radioactive contents taking into account "hardly measurable" radionuclides such as Òñ-99, Nb-94 Zr-93, Np-237 and etc.	The nuclide inventory is normally identified with respect to gamma radiation energies and activities of alfa- and beta-decaying nuclides are calculated. Nuclides that are hard to measure are either separately calculated based on the correlation to so called "key nuclides" (Cs-137, Co-60, Pu-239/240), alternatively by sampling of waste streams followed by sophisticated analyses allowing the waste to be deposited according to its properties.

Article 11	H 1	Should the expansion of SFR and/or the construction of SFL be delayed significantly, would it result in any significant challenges to safety on the existing sites particularly with respect to long term storage of radioactive wastes?	A delay in the expansion of SFR would not cause any major disturbances to current activities as regards disposal of operational waste. About one third of the disposal capacity is still available in the existing facility for continued disposal of operational waste. The situation in the case of decommissioning wastes is somewhat different. The predominant assumption was that the expansion of SFR to accommodate decommissioning waste should be realized so that decommissioning waste could be transported directly to SFR, without any need for long-term storage at NPP sites. The delay in SFR expansion has had an influence on the Barsebäck NPP, most noticeable related to delayed start of decommissioning activities and the need for temporary storage facilities to be established at the site (subject to regulatory approval). The main concern as regards the time schedule (and any delays) for SFL relates to the absence of acceptance criteria as a basis for proper conditioning of the long-lived waste. Long-lived waste are already stored at the reactor sites (subject to regulatory control) and additional storage capacities can be established if necessary.
Article 11.4	Â 1.2, page 50	What is the frequency of environmental assessments in the areas of possible impact from operation of NPPs or RAW depositories, and who performs the assessment?	In connection with an application for an authorization procedure of an activity an EIA should be included as a basis for the application. After approval has been granted there are no special requirements for periodic environmental assessments. However, according to the nuclear activities act the licence holders of a nuclear facility shall at least once every ten years make an overall assessment of safety and radiation protection of the facility. The assessment should take account of developments in science and technology. It should contain analyses and explanations of how the facility meets the legal requirements, terms and conditions. The assessment and the action this causes should be reported to the SSM.
Article 11.4	Â 1.5.1, page 51	The personnel doses at central RAW storage facilities are significantly below 6 mSv. Are there such working positions at these facilities that are classified as those where the work is done in the “controlled area”?	Yes there are areas classified as “controlled areas “ at RAW storage facilities in Sweden.
Article 13	H.3.2, 212	It is stated that the last facility that will be built in the LILW program is the repository for long-lived low and intermediate level waste, SFL. A decision on the siting of this facility will be made in a couple of decades at the earliest. - Compared to the world-first SNF repository expected to be constructed, is there any reason to build SFL relatively later than SNF repository? - Is there any possibility that a new SFL will be located in the same sites with SFR or SNF repository already operated or planned?	The three planned repositories are developed and constructed based on the needs of the power producers, on requirements posed by national legislation and on effective resource management. The licensing process for SNF is ongoing, but the development of SFL is still in an early stage. According to current planning, SFL will stay open until after the closing of SNF, to dispose of any long-lived waste from the Central storage for spent fuel and the Encapsulation plant. The siting of SFL is still an open question, and the possibility to locate SFL on the same site as SFR or SNF has thus not been ruled out.

Article 13	H3.2, 212	It is reported that SKB has developed the repository concept of SFL by its RD&D programme and SSM has reviewed that result every third years in H.3.2. - What is the legal basis that the SSM review the SKB's RD&D programme for SFL in detail? How does the SSM review the RD&D programme of SKB and how are the feedbacks from SSM applied to the SKB RD&D programme?	According to the Ordinance on Nuclear Activities (section 26) SSM shall submit its own opinion on the program to the Government. The opinion shall include a review and eval-uation of the program in terms of 1. The planned research and development activities, 2. presented research results, 3. alternative handling and final disposal methods, and 4. the actions to be taken. On the basis of SSM's opinion the Government may decide on the conditions for the continued RD&D programme. Even though it is not compulsory SKB usually also takes into account SSM's more detailed viewpoints that have not been included in the Government decision on SKB's programme.
Article 13	H.4.2, 214	It is stated that SKB has applied for a licence for interim storage of long-lived waste from the nuclear power plants in the extended SFR facility, commencing when the routine operation for the extended facility begins. - How should the space for the interim storage be used if long-lived waste will be moved to a new SFL to be build in the future after interim storage? - In addition to short-lived waste to be disposed of in SFR, are waste acceptance criteria separately applied to long-lived waste for interim storage?	The thought is that the long-lived radioactive waste will be moved out before before the last short-lived waste will be deposited. The long-lived waste will be interim stored in a cavern that later will be filled with low-level operational waste. There will be no empty volumes in the SFR when all waste is deposited. Yes, separate waste acceptance criteria for the interim storage of long-lived radioactive waste have been developed.
Article 13	H.4.2, 214	It is stated that SKB has together with the nuclear power companies carried out unit-specific and site-specific decommissioning studies to accumulate a more detailed body of data for estimating waste volumes, material quantities and activity quantities. The results of the studies have served as a basis for designing the capacity of future repositories for decommissioning waste. - Are these decommissioning studies conducted by SKB only in order to estimate the amount of decommissioning waste for designing the capacity of future repositories in the point of view of waste generated? - Connected to the above question, who is responsible for decommissioning of nuclear facilities, and who will finally perform the decommissioning works? Please, briefly explain how a decommissioning plan in terms of technical and practical aspects would be set up?	These decommissioning studies fulfill two main purposes and one of them is as mentioned to estimate waste volumes. The other purpose is to estimate the decommissioning costs of the nuclear power plants. These estimates serve as a basis for determining fees to be paid to the nuclear waste fund by the nuclear power companies. According to the legal framework in Sweden the license holder of a nuclear facility is responsible for the decommissioning and the work that will be performed. The main decommission work will be performed by contractors and managed by the licensee, but it is not decided in detail yet. In the decommissioning studies it is assumed that a project management organisation will be set up by the licensee and will be responsible for the decommissioning project. It will be supported by the organisation of the licensee and various contractors will be contracted depending on the work to be done. The requirements for a decommissioning plan is stipulated in the legal framework set by the Swedish Radiation Safety Authority according to SSMFS 2008:1, Appendix 5.

Article 13	H.4.2, 215	Studies on the design of SFR closure are very impressive. It seems that developed technology in facility closure has been accumulated from R&D programs in Sweden since the earlier license application and renewal of safety assessment. It is stated, in the national report, that the design of the closure will be described in a closure plan that will be included in the application under the Act on Nuclear Activities for a license to extend SFR. - Which aspects would be focused on when SSM reviews the current plan for closure including many uncertainties at this point? Does SSM also review the feasibility of closure plan in terms of current practical technology? -When would the final plan for closure of repository be confirmed? Is there any process for SSM to review and approve the final closure?	The focus of the review of the closure plan will clearly be on the effects of the closure on long-term safety. The interaction of the closure components with the repository near-field in terms of degradation of the closure components and the effect on radionuclide retardation will be reviewed. SSM will review if SKB's closure plan is judged to be feasible, possibly allowing for further detailed technical development. Before final closure it is foreseen that an updated decommissioning plan shall be submitted to SSM and that an updated safety analysis report shall be approved by SSM.
Article 14	H.4.2.3 p215	Questions about a full-scale test of a newly developed plug design (dome-shaped plug for a deposition tunnel), which has been installed in the Äspö HRL during 2013. The test will run over at least three year period. (1) What is an advantage of the dome-shaped plug comparing with a conventional plug design? What kind of overcome do you expect with a new plug design? (2) Please demonstrate a monitoring plan carried on the full-scale test at Äspö HRL if possible. Measuring parameters and the reason why you selected them (aims and objectives).	The dome plug transfers the load to the rock effectively by its arch. This means that the dome plug can be built much shorter than for instance a wedge plug. It was evaluated by SKB R-11-04 “Low-pH concrete plug for sealing the KBS-3V deposition tunnels” that the concrete dome can be constructed without reinforcement and this contributes to a faster installation and less iron in the repository. The risk for continuous cracks in a concrete dome plug is very small thanks to the use of cooling loops within the dome, thus the concrete temperature is always below 20 degrees Celsius during hardening and no (or insignificant) thermal cracks occur. One main purpose of the test design is to fully correspond to the KBS-3V reference conceptual plug design and to demonstrate that it is possible to fulfil requirements stated in the application for the Spent Fuel Repository to be built in Forsmark. It is a demonstration of the initial state of the deposition tunnel plug. This initial state is the starting point for safety analysis. Consequently, verification of the plug structure’s conformity to the design basis is vital for the accuracy of the safety case. Specific objectives for the experiment include further development of water tightness requirements on deposition tunnel plugs and plug production requirements. The leakage past the plug is measured by on-line recording of the collected water on downstream side of the plug: • Water pressure [MPa] • Leakage [liter/min] The initial plan for the experiment was to pressurize to 7 MPa of water

Article 15	H.5.2.2. p. 219	"Based on the results of the assessment of long-term safety that is planned for 2016, preliminary requirements can be imposed on the site for the SFL repository, and preliminary waste acceptance criteria for the long-lived operational and decommissioning waste can be set. The continued research and safety assessment work will probably lead to modifications of these requirements before they are used to evaluate a candidate repository site." Question: Will the possibility of human intrusion be taken into account in the scenarios for developing of the waste acceptance criteria for the SFL?	Scenarios related to future human actions will be included in future safety assessments for SFL. However, these scenarios are not specifically used in the development of the waste acceptance criteria for SFL. The development of waste acceptance criteria are mainly guided by requirements related to the safety during handling, storage and transport of the waste prior to closure, and by the initial state and the processes related to the waste, containers, barriers etc. affecting the post-closure safety of the repository.
Article 15	H.5.3	Questions about the review process of the periodic safety report (PSR) for the SFR repository submitted in 2009. The national report (5th meeting draft) says that the PSR is not complete and there is a need for additional information such as (A) the effects of the prolonged operational time on maintenance and operation of the facility, and (B) instructions and planning in the area of radiation protection of workers. (1) Are these information completely lacked in the PSR? If these are described but insufficient, what is the problem? (2) According to the national report, SSM decided not to ask for further complementary information regarding the PSR because the remaining issues are expected to be addressed in SKB's planned application for an expansion of the existing facility. Why did SSM make its decision, despite a license application was not submitted yet? (It was just "planned".) (3) Are remaining issues including A and B sufficiently addressed in the updated safety assessment (a part of the expected license application), which was submitted in March 2014? If not so, how does SSM reconsider its decision not to ask for complementary information regarding the PSR?	Question 1. (A) The effects of the prolonged operational time on maintenance and operation of the facility are scarcely addressed in the PSR that was submitted to the authority in 2005. The submitted complement from SKB, which was addressed by the former authority SKI, did not address the prolonged operational time effect on repositories long-term safety. (B) In 2005 when the original PSR was submitted it consisted of 15 different areas. After the merger forming the new SSM authority, SSM added two new areas to be addressed in the PSR, namely radiation protection of workers and control of releases and environmental monitoring. As demanded by SSM, SKB submitted complementary reporting on these newly added areas in 2010. Question 2. The PSR that was reviewed was originally handed in 2005. Following a review by the former authority SKI, the PSR was complemented in 2009 specifically addressing the issues identified by the SKI. However, at the time SSM reviewed the complements the information in the PSR was "out-dated" for certain issues. For example, the SSM had more recent information from reviewing the up-dated safety assessment (SAR-08) in 2010, results from the supervision by the former authority SSI and by reviewing the RD&D-program in 2010. Furthermore, one key concern addressed by the SKI was coming change in the operation of the SFR facility. Before the 1st July 2009 Forsmarks Kraftgrupp AB operated the SFR on behalf of SKB, after this date the SFR is operated by the license holder (SKB). After finalizing the review of the PSR, SSM had to decide if SKB needed to complement and up-date the
Article 15	H.5.3.2	Please inform the progress of review process (or plan) for SKB's recent license application for the extension of the SFR facility if possible. Is there any problem/difficulty through the process? What are good efforts and practices?	The submittal of the application was delayed and it was submitted only by the end of 2014. SSM has recently finished the docketing review (i.e. a high-level screening to verify that the application is formally acceptable with regards to what is necessary). The review plan is currently under review and updating with regards to the revised time-schedule as well as other priorities and experiences from the ongoing review of the spent fuel disposal facility application.

Article 15	H, 220	Related to the review of the extension of SFR, in order to thoroughly review all pertinent issues, SSM will enhance its competence base by consulting external experts in a number of fields. - Please explain what the main issues for the consulting and the size of the external expert groups are?	The consultants are used to enlarge SSM's review capacity and to deepen specialized technical competence. Main areas for consulting tasks are linked to the SKB's site descriptive modelling, for instance hydrogeology and hydro-geochemistry, and SKB's safety analysis, for instance barrier degradation, waste forms, radionuclide transport modelling, and evolution of the rock surrounding the facility. About ten different fields of competence have been procured, implying about 10 to 20 consultants being involved in the review.
Article 15	Í.5.2.2, p. 219	Please specify the status of development acceptance criteria for long-lived operational and decommissioning waste and proposed methods and ways of compliance control.	Preliminary waste acceptance criteria for the long-lived operational and decommissioning waste will be developed based on the results presented by the ongoing assessment of long-term safety for SFL. Once preliminary waste acceptance criteria has been set, protocols for compliance control will be developed.
Article 19	section E.2.3.5	It is stated (pg 20 and 106) that the licensees have the responsibility for the safe management and disposal of RW and SF. It is also mentioned that the state has the “ultimate” responsibility for ensuring the safety of spent fuel and radioactive waste, which may seem overlapping with the licensee’s responsibility. Could Sweden clarify and give more elements about the ultimate responsibility and the role of the State?	Under Swedish law the licence holders has to safely take care of and finally dispose of the spent fuel and radioactive waste arising from the activity. The Swedish parliament has on several occasions stated that the state has the ultimate responsibility and that this responsibility is in the matter of course. The responsibility arises only if case of the license holders’ failures or the inability to fulfil his obligations and in the case of the long-term radiation safety. It is therefore not an overlapping but rather a secondary responsibility in relation to the first-line responsibility that lies with the waste producer. However, in a bill it is proposed that the states ultimate responsibility should be specified in law. The bill is currently being assessed by the government.
Article 19	80	How often are the licence holders for the major nuclear power plants required to provide updates to the local safety boards? Are the records from these meetings publicly available?	The obligation to provide information is not specified with the frequency or extent, but is expressed as general obligations for the license holder at the request of the board to provide information and allow the board to read available documents. The only restriction is that it should apply to such information that the board needs to fulfill its tasks, namely to inform the public about the radiation protection and safety work in progress at the nuclear plant.
Article 19	E.2.3.1, p98	It is mentioned in Section E.2.3.1 that Figure E2 shows a general schematic illustration of the licensing procedure for nuclear facilities. What is the licensing requirement and procedure of Underground Research Laboratory (URL) in Sweden? What is the difference between the licensing requirement and procedure of URL and the licensing requirement and procedure of nuclear facility?	According to the Swedish legal framework all activities subject to authorisation shall be specified in an act or an ordinance. An underground research laboratory would, according to Swedish legal requirements be defined as mining operations. In the examination of such activities, it is not possible to assess issues of long-term radiation protection and safety, only conventional environmental impact. For this reason, the Government has decided that the construction of tunnels in the rock (with the purpose of constructiong a final repository) is the initiation of nuclear activities. This makes it legally possible already at this stage of the examination to assess questions about the long-term radiation protection and safety.

Article 19	Section E, p. 73-7	in p. 73-74 it seems that SSM has no specific safety requirements for disposal facility construction. Is there plans for developing specific guidance.	There are no specific regulations/tehnical requirements for disposal facility construction, besides general requirements on robustness, multiple barrier functions and the use of best available technique as outlined in SSMFS 2008:21 and SSMFS 2008:37. The rationale being that it is the responsibility of the (presumptive) licensee to propose a specific location and method to be used for a specific disposal facility, with due consideration to the characteristics of the waste and the associated hazard. Thus, the "system solution" integrating specific natural and technical barriers depends very much on the concept chosen by the licensee. Also, most activities taking place in a disposal facility are more or less conventional activities. It is the responsibility of the licensee to propose measures to ensure that specificities of SF/RW disposal are properly taken into consideration in construction and operation of the disposal facility. It should in this context be emphasized that SSM's general regulations SSMFS 2008:1 contain basic provisions also applicable for facility construction. SSM has, however, initiated a review of the current regulations and associated general advice with the purpose to identify any need for clarification, e.g. by developing specific requirements/guidance for facility construction.
Article 19	E.2, 86	Section E.2 describes the regulation on the management of contaminated ashes occurred from a incineration facility(SSMFS 2012:3). - Except this regulation, 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.	We would like to clarify that the forest biofuel that is sent for incineration is not considered radioactive waste. The Swedish Radiation Safety Authority's (SSM) Regulations on Safety in Nuclear Facilities (SSMFS 2008:1) specify the responsibility of the licensee through a number of functional requirements on, among other things, nuclear materials/waste management. According to SSMFS 2008:1 the licensee must in the basic safety documentation, Safety Analysis Report, for any facility handling nuclear waste such as an incineration facility, include waste acceptance criteria. The Safety Analysis Report must be formally approved by SSM. There are however no specific requirements in the SSMFS 2008:1, or in any other regulation, on the waste acceptance criteria. Radioactive waste from medical care, laboratories and scientific applications (non-nuclear applications) may be sent for incineration as conventional, non-radioactive waste at a municipal facility, provided that the activity of the waste is below nuclide specific activity levels corresponding to the exemption levels in the European Basic Safety Standards directive (clearance for restricted use).
Article 19	E.2, 77	Both SKB as Studsvik are industry funded and owned as opposed to a (quasi-)government waste management organisations (WMO) in the Netherlands. What do you consider to be the the pro's and con's of industry owned WMO's?	This is a political question and SSM, as an authority responsible for radiation & safety refrains, from having any idea about this.

Article 19	À, page 25	Please provide more details on internal regulatory documents developed and in place in support of IAEA requirements, specifically of those defined in GS-R-3 “Management System for Facilities and Activities. Safety Requirements” as applied to the integrated management system in the field of SF and RAW management?	The purpose with section A.6 of the Swedish report is to describe the overall national approach for managing (i.e. “system for managing”) spent fuel and radioactive waste. This has unfortunately been described as a “Management system …” which is misleading. Thus, requirements defined in GS-R-3 “Management System for Facilities and Activities” are not applicable in this context. The requirements defined in IAEA GS-R-3 have, as appropriate, been transposed as requirements in SSM’s regulations as basis for regulatory review of activities and facilities with regards to (integrated) management systems
Article 19.1	À 6.1, page 29	Please specify the date of review of SSM SSMFS 2008:24, SSMFS 2008:26, SSMFS 2008:51 and SSMFS 2008:52 for compliance with requirements of Directive 2013/59 / Euratom.	There are no specific dates set for this. However, in relation to Directive 2013/59 / Eurat-om, necessary changes in SSM's regulations and other regulatory framework must be completed before 6 February 2018
Article 19.2.1	section E 2.2.3 p	To what extend are the WENRA – WGWD Safety Reference Levels on waste and spend fuel storage, decommissioning and waste disposal included in the Swedish regulations or in SSM requirements ?	As a WENRA member Sweden has agreed to implement the WENRA (WGWD) Safety Reference Levels (SRLs) in the Swedish regulations. For Decommissioning as well as for Storage, the SRLs are already implemented in the Swedish Radiation Safety Authority’s Regulations and General Advice concerning Safety in Nuclear Facilities (SSMFS 2008:1). Work is currently being initiated to benchmark existing regulations against Disposal SRLs to identify any need for changes to accommodate also those.
Article 19.2.2	37	SKB’s schedule for licensing of the spent fuel repository includes a two-year “trial operation” stage between construction and operation (p.37). Please clarify if the trial operation includes used fuel, if it involves the encapsulation plant and the repository, and whether an update to the Safety Analysis Report is required at end of the trial stage and in support of the application for a licence for routine operations.	Yes, trial operation will be made with used fuel and thereby it will also involve the encapsulation plant. In SSMFS 2008-1 it is stated "A preliminary safety analysis report shall be drawn up before a facility may be constructed and, for an existing facility, before major refurbishing or rebuilding work or major modifications are carried out. The safety analysis report shall be updated before trial operation of the facility may commence so that the report reflects the construction of the facility. The safety analysis report shall be supplemented, taking the experiences of such trial operation into account, before the facility is subsequently taken into regular operation. The preliminary safety analysis report as well as the updated and supplemented safety analysis report in accordance with the second paragraph as rules, such as industrial standards, that the licensee also applies to the facility shall at all stages have been reviewed and approved by the Swedish Radiation Safety Authority. The safety analysis report shall be kept up to date thereafter."

Article 19.2.2	À5.2, page 21	Is there a requirement for a specific license for transportation of SF and RAW?		Yes, for transport on Swedish territory and Swedish Vessels, a Swedish Permit is compulsory: - Regarding transport of Fissile/Nuclear Materials (SF included) and waste from a Nuclear Facility (RAW); a permit according to the Swedish Nuclear Activity act is mandatory. Also, the directive 2006/117/EURATOM is applicable (SF and RAW). - Regarding transport of Radioactive material otherwise; a permit according to the act on Swedish Radiation Protection is mandatory. (E.g. RAW from Non-nuclear facilities and Radioactive contaminated equipment's and tools used in a Nuclear Facility) Also, the ordinance 1493/93/EURATOM (Within EC) or the IAEA Code of conduct on the safety and security of radioactive sources, IAEA, Wien 2004 (To or from Counties outside of EC), is (usually) applicable. For of operators who often need to transport SF and RAW usually a general license for the transportation is granted. However, any individual shipment shall apply the notification procedures under the Swedish act on the transport of dangerous goods and Council Directive 2006/117/ Euratom.
Article 22	F2.1.2,12	If the post-closure institutional control and monitoring is not required in the Swedish management system for spent fuel and radioactive waste, are there available sufficient financial resources and planes for conducting institutional control and monitoring after a repository closure?		Under the Act (2006: 647) on financial measures for the handling of waste products from nuclear activities, fees shall be paid for, inter alia, monitoring and control of a final repository. How and by whom the long-term control and monitoring will be implemented remains to be determined. The issue is also related to the principle of States ultimately responsible.
Article 22.2	Section F, page 1	Could you please elaborate whether SKB activities are taxed in the same way any commercial entities are or due the specific nature of SKB's activities being the national operator and the funding it receives from the Nuclear Waste Fund SKB has a particular legal status and is exempt from tax?	The Report states that the reimbursements to SKB are decided on by SSM and the Nuclear Waste Fund makes the payments in accordance with SSM's decisions.	SKB:s activities are treated as a taxable company, but the VAT on our revenues coming from Nuclear Waste Fund is treated as government grants and is therefore free from VAT.
Article 22.2	À5.2, page 24	The Report provides data on construction and operational costs for the intermediate SF storage facility and for the low- and intermediate-level RAW storage facility. Please specify the date (year) for which the costs are calculated and provide (if possible) similar data at the values of the year under review?		The costs mentioned in the report are aclculated in January 2013 cost level. More detailed information on the calculations and the calculation methods can be fould in the Plan 13 report SKB TR-14-16 (can be downloaded from www.skb.se). On page 42 -45 you can both find a table where running costs (just added and not calculated for persent day values) and in the circle diagram calciulations are done with present day values (January 2013).

Article 23	F 2	What are the main topics of R&D activities currently underway in Sweden in the field of SF disposal?	The SKB research programme focuses on the technology development that is needed to design, construct and operate the SNF ssytem for spent nuclear fuel. The structure of the research work is Shown in Technical report TR-13-18 (RD&D Programme 2013). Technology development is divided a number of "production lines" . The development work for the barriers are persued in production lines for fuel, canister, buffer, backfill, closure and underground openings. Also technical systems for for logistics and machines that are unique for the final disposal facility. Research is also beeing done for the assessment of long-term safety, see page 9-14 in TR-13-18.
Article 23	F3	Which of the RAW minimization measures taken within the review period are most efficient?	Wrong reference to the National report - not clear what waste minimization measures that are referred to.
Article 24	19-20	How many staff members are employed at the IFE facility in Himdalen?	This question is addressed to Norway. The Australian NCP has been notified by e-mail.
Article 24	F.4, 130	Operational radiation protection is described in Section F.4(Article 24). - What is the amount(TBq) of the liquid radioactive effluent released from nuclear power plants? - What is the amount(TBq) of the gaseous radioactive effluent released from nuclear power plants? - Is there the limit of total amount of the liquid or gaseous effluents discharge from the nuclear power plant?	There is no regulatory limit for the release of radioactive nuclides in TBq. The limit for releases is given in dose to the public (individual in critical group/ representative person) and is 0,1 mSv/year. The releases to air (Bq) are dominated by C-14, H-3 and noble gases. The main releases to air in 2013 from Forsmark 1 NPP are given below. Nuclide TBq C-14 0,052 H-3 0,011 Kr-85 0,0048 Kr-85m 0.01 Xe-133 0,35 Xe-137 0,039 I-131 0,0000055 Co-60 0,00000082
Article 24	p. 138	What kind of measures have been taken to stop tritium release in Agesta reactor?	During operation the heavy water was kept in closed systems. Nevertheless, tritium is nowadays abundant in many parts of the reactor enclosure. There are also detectable levels in the water in the surrounding cave structure. The facility is designed to limit ingress of water into the enclosure of the plant, which thus limits the uptake of tritium in water and the potential for releases to the environment. Any water that enters the facility is collected and sampled and measured for tritium. The water is pumped to the drainage system of the site which ends in a small open ditch which leads to a nearby lake. The tritium levels are also regularly measured in water samples at the discharge point in the ditch.

Article 24	F 4, page 133	It was mentioned that tunnels into the SF storage compartments would be closed by bentonite. Does this mean that there are plans to absolutely prevent any access to the materials stored in the storage compartments? How do you plan to ensure continued monitoring of the storage facility?		SKB - yes, after closure of the repository access to the tunnels and thereby the disposal locations should not be an easy task. However, if (for some unknown reason) a retrieval should be demanded by the authorities, retrieval of the waste should not be totally impossible. Monitoring of the nearfield around the deposition locations in the final repostory are not foreseen since such monitoring could (with high probability) impair the long-term safety of the repository system.
Article 25	Section F p.148 / Section K p.243		As reported in section K, Sweden should present the provisions made in anticipation of a potential nuclear power plant accident in terms of : • Role and responsabilities of national actors during the post-accidental phase; • Objectives and strategy for recovery and waste management (waste characterization and segregation ; volume reduction); • Dedicated waste management facilities during the post-accidental phase	The County Administrative Boards in Sweden are responsible for handling an accident at a nuclear facility. This responsibility covers both the emergency phase and the recovery phase. The County Administrative Boards are obliged by law to establish plans for decontamination after a nuclear accident and other authorities are obliged to supply the County Administrative Boards with both manpower and resources for the necessary decontamination tasks. The decontamination plan also covers issues related to the objectives and strategy for recovery including waste management. All waste from decontamination is treated as nuclear waste, including transport of waste from decontamination sites to treatment/storage facilities. However, the plans concerning waste management are not detailed when it comes to e.g. waste characterization, waste segregation or volume reduction. Possible sites for waste storage from decontamination sites are identified by the County Administrative Boards although dedicated waste management facilities are not predefined in the decontamination plan.
Article 25	D1.2.3, page 61,	In which of the IAEA CONVEX exercises did Sweden participate within the review period? Were there any changes introduced into the emergency preparedness and response system for the purposes of improvement based on the results of such exercises?		Sweden has participated in all smaller exercises during the review period, i.e. the ConvEx-1a, ConvEx-1b and ConvEx-2a exercises. Sweden has only participated in one of the larger exercises, ConvEx-2b (RANET 2013). The lessons learned from the smaller exercises have led to the harmonization of instructions at the NWP (Swedish Meteorological and Hydrological Institute) and the CA (Swedish Radiation Safety Authority) during the review period.
Article 26	F, 153	Chapter 9 of the general regulations SSMFS 2008:1 requires decommissioning plans to be kept up to date and reported to SSM every 10 year. A revised safety analysis report and a safety review is required for the final version of the decommissioning plan. Is a safety review for the initial and intermediate versions of decommissioning plans required as well? And if so, please describe the scope and depth of the safety review in support of initial decommissioning plans?		Safety review, i.e. review of safety related documents performed by the licensee, is only required for safety analysis reports, not for decommissioning plans. There is no need for a safety analysis report or a safety review in support of initial or intermediate decommissioning plans. However, the decommissioning plan shall include an assessment of radiological risks and consequences associated with the planned decommissioning activities. The level of detail is based on what is deemed reasonable at the given time. For initial and intermediate decommission plans, the assessment of risks and consequences is made on a strategic level, based on evaluation of pros and cons with different foreseen options for dismantling and waste management.

Article 26	F.6.1, pg. 154	Please describe the provisions for periodically reviewing decommissioning cost estimates and the adequacy of funds.	Every three years licensees are required to submit estimates of all future costs for management and disposal of spent nuclear fuel and nuclear waste, and decommissioning. The cost estimates are submitted to the Swedish Radiation Safety Authority (SSM) for review. SSM prepares a proposal to the government for the nuclear waste fee for each of the reactor licensees that the reactor licensee is to pay over the following three calendar years. SSM prepares the proposal: • based on the cost estimates, • taking into account the certain specified additional costs, and • so that all expected costs, after having taken into account previous payments, are expected to be covered by the fees that the reactor licensee will pay over the remaining operating period of the reactor. Decommissioning cost estimates are an important element in the overall estimates. The decommissioning cost estimates are evaluated separately, taking into account the current decommissioning plans and schedule. Discussions are continuing between SSM, the licensees and SKB on further developing the decommissioning cost estimates, including risk analysis at the project level.
Article 28	J1.2, p232	It is mentioned that the State will provide financial resources for the management and disposal of the orphan source if the licensee responsible cannot be identified and up to a total of 2 million SEK per year in 2013 and 2014 was provided for the management and final disposal of orphan sources and legacy radioactive waste from past practices. Are there some practices of orphan source disposal until now? And what are the acceptance criteria of orphan sources or disused sealed sources disposal?	Several orphan sources are found and taken care of every year, using the financial resources provided by the State. Most, if not all, of the orphan sources found so far have been low activity sources. The orphan sources are managed by Studsvik Nuclear AB at the Studsvik site outside of Nyköping. The sources are treated, conditioned and stored pending disposal. Short-lived disused sealed sources, including orphan sources, can be sent to the existing SKB repository for operational waste, SFR. The disused sealed sources have to meet the same criteria as any short-lived LILW, described in waste type descriptions (WTD), in order to be disposed of in SFR. Depending on factors such as the activity content and chemical characteristics, the wastes are directed to different parts of the repository. The majority of the disused sealed sources are long-lived. These sources are stored at the Studsvik site until SKB's planned disposal facility for long-lived low and intermediate level waste, SFL, is in operation.

Article 28	J.1.2, 232	Section J.1.2 states that the State will provide financial resources for the management and disposal of the orphan source and this is made possible through a special government funding arrangement. - What is detailed management procedure of the orphan source if it is discovered?		The finder of an orphan source has to contact SSM and apply for funding for the safe management and disposal of the source. SSM commissions Studsvik Nuclear AB to manage and dispose of the orphan source. As Studsvik Nuclear AB accepts to manage and dispose of the orphan source, the company takes on the ownership of the source. The orphan source is collected by Studsvik Nuclear AB and transported to the Studsvik site outside of Nyköping. At the Studsvik site the source is treated and stored, pending disposal. There are two options for disposal: if the source meets the waste acceptance criteria for SFR, SKB's existing disposal facility for short-lived low and intermediate level waste, it will be disposed of in SFR. If the source does not meet the waste acceptance criteria for SFR, it will be stored at the Studsvik site until SKB's planned disposal facility for long-lived low and intermediate level waste, SFL, is in operation.
Article 32	B1.5.2, p52		About the categorisation of radioactive waste in Table B.1, please give the definite restricted values for Long-lived nuclides with a half-life longer than 31 years which mentioned for LLW-SL, ILW-SL and LILW-LL respectively.	In Sweden, WAC 's for the content of radioactive substances in individual waste packages have only been defined for waste to be free released or deposited in shallow land burials (VLLW). For wastes disposed of in the SFR facility (LLW -SL , respectively ILW -SL) total nuclide specific limits set for the various parts of the repository in SFR: Nuclide BLA (GBq) BMA (GBq) BTF (GBq) Silo (GBq) C-14 2.6 2.9E2 1.3E2 6.8E3 Ni-59 2.3E1 1.0E3 1.5E2 6.8E3 Ni-63 1.9E3 8.8E4 1.5E4 6.3E5 Nb-94 2.3E-2 1.0 1.5E-1 6.8 Tc-99 1.1E-1 8.8 3.6 3.3E2 I-129 6.4E-4 4.7E-2 2.2E-2 1.9 Cs-135 6.4E-3 5.3E-1 2.2E-1 1.9 Pu-238 4.7E-1 3.1E1 1.7E1 1.2E3 Pu-239 1.9E-1 1.2E1 6.9 3.8E2 Pu-240 2.9E-1 1.9E1 1.1E1 7.8E2 Am-241 3.8E-1 2.4E1 1.3E1 1.0E3 Note, in Sweden there is no legally defined half-life that distinguishes between short-lived and long-lived radio nuclides. SSM has therefore not approved the exclusion of Cs-137 and Sr-90 from the list of long-lived nuclides. For waste that will be disposed of in the final repository for long-lived waste (SFL) no WAC 's have been derived, partly since the disposal concept is still under development and that a safety analysis as a basis for deriving WAC's therefore has not yet been presented.

Article 32	D1.4.4, p68	It is shown that short-lived LILWs with different maximum dose rate limits were disposed of in the silo, BMA, 1BTF, 2BTF, BLA respectively. Except dose rate limits, are there any requirements of specific activity or total activity for radioactive waste disposal? And please give detailed information if there are some related requirements.	No specific WAC 's for the content of radioactive substances for individual waste packages have been developed. However, the total nuclide specific activity content for each part of the SFR repository have been stipulated in the issued radiation protection conditions:Nuclide BLA (GBq) BMA (GBq) BTF (GBq) Silo (GBq) H-3 - - - 1.3E5 C-14 2.6 2.9E2 1.3E2 6.8E3 Fe-55 2.3E3 1.0E5 1.7E4 7.1E5 Ni-59 2.3E1 1.0E3 1.5E2 6.8E3 Co-60 5.8E3 2.6E5 4.0E4 1.8E6 Ni-63 1.9E3 8.8E4 1.5E4 6.3E5 Sr-90 7.1E1 6.5E3 2.7E3 2.5E5 Nb-94 2.3E-2 1.0 1.5E-1 6.8 Tc-99 1.1E-1 8.8 3.6 3.3E2 Ru-106 2.1 1.7E2 6.2E1 6.1E3 I-129 6.4E-4 4.7E-2 2.2E-2 1.9 Cs-134 2.6E2 2.2E3 1.1E4 8.1E5 Cs-135 6.4E-3 5.3E-1 2.2E-1 1.9 Cs-137 1.4E3 1.3E5 5.3E4 4.9E6 Pu-238 4.7E-1 3.1E1 1.7E1 1.2E3 Pu-239 1.9E-1 1.2E1 6.9 3.8E2 Pu-240 2.9E-1 1.9E1 1.1E1 7.8E2 Pu-241 1.5E1 9.4E2 5.4E2 4.2E4 Am-241 3.8E-1 2.4E1 1.3E1 1.0E3 Cm-244 4.4E-1 2.8 1.5 1.2E2 Sum 1.2E4 6.0E5 1.4E5 9.2E6
Article 32	D1.4,65	What is the activity of long-term radionuclides in AM and AU storage facilities?	The Svafo company manages to a large extent very old waste packages for which the content were not registred nuclide specific. The activity is therefore not known in such a detail. The numbers available for long lived radioisotopes are those from the safeguard register (numbers in grams for U and Pu).

Article 32	D1.4.2, 67	Why is the dose rate limit for waste package different for SILO (500 mSv/yr), BMA (100 mSv/yr) and BTF (10 mSv/yr) and what is the limit for long-lived radionuclides in these facilities?	The differences between the maximum allowed dose rate that can be handled in the different parts of the repository are due to differences in the handling the waste and the degree of shielding after the waste is deposited. In both the BMA and the silo the handing of the waste is remote controlled, while the waste in BTF is handled using trucks. The limits only apply to the handling at the SFR , and limitations in other parts of the waste management system might restricte the maximum allowed dose rate of the waste packages. This means that different restrictions might apply for different waste producers. For the maximum allowed content of long-lived radionuclides, see table:

Nuclide	BLA (GBq)	BMA (GBq)	BTF (GBq)	Silo (GBq)
C-14	2.6	2.9E2	1.3E2	6.8E3
Ni-59	2.3E1	1.0E3	1.5E2	6.8E3
Ni-63	1.9E3	8.8E4	1.5E4	6.3E5
Nb-94	2.3E-2	1.0	1.5E-1	6.8
Tc-99	1.1E-1	8.8	3.6	3.3E2
I-129	6.4E-4	4.7E-2	2.2E-2	1.9
Cs-135	6.4E-3	5.3E-1	2.2E-1	1.9
Pu-238	4.7E-1	3.1E1	1.7E1	1.2E3
Pu-239	1.9E-1	1.2E1	6.9	3.8E2
Pu-240	2.9E-1	1.9E1	1.1E1	7.8E2
Am-241	3.8E-1	2.4E1	1.3E1	1.0E3

Article 32	D1.4.5,69	What is the limit for long-lived radionuclides in the waste acceptance criteria for shallow land burials?	The nuclide specific concentration, as well as a total inventory, limits are given in the radiation protection conditions to each license. The concentration limits apply at the time when the active institutional controll of the shallow land burial is planned to be withdrawn; 30 years after the final disposal of waste in the repository. The following concentration limits for alfa decaying nuclides apply: U-238 1 Bq/g Pu-238 0,1 Bq/g Pu-239 0,1 Bq/g Pu-240 1 Bq/g Am-241 0,1 Bq/g Cm-244 1 Bq/g For the presence of several nuclides, including those that decays by beta decay, the total of the ratio between the activity concentration and the limit value for each nuclide is less than or equal to 1. The limits apply to the contents of a landfill campaign. For a single package activity concentration can be 10 times higher. The limits apply at the time when the active institutional control is planned to be completed.

Article 32	Section B.1.2 Spe	in page p. 50 it is said that CLAB storage capacity is sufficient for NPP SNF until year 2023. Is there plans for storage capacity increase since disposal is planned to start in 2030.	There are no plans for the moment for a capacity increase in the form of new pools in the CLAB facility. However there are possibilities for a capacity increase with a denser packing of the spent nuclear fuel in Clab. This denser packing demands another type of storage canisters which already are in use for some of the spent fuel stored in Clab. Another possibility (if i.a. the repository for some reason will be delayed) a third cavern with storage pools could be constructed at Clab or some dry storage casks could be used to increase the interim total storage capacity.
Article 32	Section A: p.15 /	In 2012, the Swedish Government authorized to export separated plutonium from former research and development activities in Sweden to the United States. In 2014, the Swedish Government also authorized the transfer of the ownership of 834 kg of separated plutonium stored in the Sellafield facility to the UK Nuclear Decommissioning Authority (NDA). Could Sweden clarify the presentation of the plutonium inventory ? If relevant, could Sweden provide information on the planned strategies for plutonium management?	The current plutonium inventory in Sweden is approximately 65.6 ton in spent nuclear fuel (55.2 tons of this is in spent fuel at the Clab interim storage and the rest in spent fuel in the reactor ponds and the reactor cores of the 10 nuclear reactors; there is also a minor part of Pu in spent fuel at the Studsvik research site – for post irradiation examination). Spent fuel containing plutonium is planned to be disposed of in a deep geological repository in accordance with the KBS-3 method. In addition there is 0,768 kg plutonium (as of November 2013) in Sweden not associated with spent fuel. Of this is 0,642 kg in waste drums that will be disposed of in a future storage for long lived radioactive waste (SFL). The plans for the remaining 0,126 grams of plutonium is less definite but it is envisaged that they will also be disposed of in SFL. The export of separated plutonium to USA in 2012 was made under the Global Threat Reduction Initiative (GTRI). With regard to the transfer of ownership of the separated plutonium to the NDA in 2014, the reason was that the option for producing MOX fuel to be used in Swedish reactors was no longer available.
Article 32	D.1.4.6 p. 72	"Westinghouse disposes of waste with very low uranium content, typically CaF2, metal and construction wastes at municipal landfills as permitted by the Swedish Radiation Safety Authority." Question: What are the criteria for the clearance for wastes containing alpha emitters?	The clearance levels have been stated as conditions in the permission for disposal of very low level waste from Westinghouse. Clearance levels are given for the following radionuclides: U-234, U-235, U-236, U-238, Ra-226 (10 kBq/kg) and U-232, Th-230, Th-228, Pa-231, Ac-227, Pu-239, Pu-240 (1 kBq/kg). Clearance levels are also given for Th-234 (1000 kBq/kg) and Am-241, Co-60 (0,1 kBq/kg). The clearance levels shall be applied on the mean concentration in the waste being disposed of at the same time. Individual waste packages may contain 10 times higher concentration. For mixtures of nuclides, a summation formula shall be applied.

Article 32	B.1.5, 52	According the section B.1.5.2 of the Swedish National Report, it seems that Sweden has no legal RW classification system, so RW generators such as the operator of NPP follow the classification scheme of RW by the repository. - if so, how does the regulatory body supervise the pre-disposal management actitivites (for instance, classification, treatment and storage of RW) of RW generator in terms of the radioactive waste categorization?	SSM supervises the waste producers' handling of waste before disposal through multiple tools. Before a type of waste may be produced and disposed of a Waste Type Description (WTD) must be presented by the waste producer and SKB to the SSM for approval. In this WTD the waste producer and SKB must clarify that the waste meets the WAC's derived for the waste management system. The approved WTB should be included in the SAR of both the waste producer and SFR, thereby providing a basis for the supervision by SSM. Having several approved WTD's, the waste producer has an option to steer the waste to different disposal routes. As an additional requirement, the regulatory body has required the waste producers to specify how different types of waste are handled and steered towards different disposal options, and when doing this, taking into account the nuclide content in the waste and the protective capability of the different parts of the repository. SSM also supervises the characterization of the waste. This has been done both by independent maeasurements as well as inspections of the different techniques, methodes and QA-programme used by the waste producers.
Article 32	A.4, pg. 17	Sweden's two research reactors are shut down, and preparations for dismantling are ongoing. Please provide an overview of the decommissioning process and schedule during your National Country Presentation at the Fifth Review Meeting.	
Article 32	A.6.3.1, pg. 41	The repository for long-lived and intermediate level waste (SFL) is scheduled to begin operations in 2045. The waste volume destined for SFL is relatively small compared to other SKB facilities. During 2014-2016 the focus is on evaluating long-term safety of various alternatives. It appears that these wastes could be easily disposed of in the spent fuel repository. Is this path being considered, and if so, please provide information on such an alternative.	No, this path for the long-lived and intermediate level waste is not considered. The reason is that this type of waste will need a specific safety analysis since it will demand some different barrier systems. If placed in the SFR or the SNF it could have an impact on the long-term safety analysis for these facilities.
Article 32	A.7.2, pg. 44	Currently the cooperation partners for Sweden are: Russia, Ukraine, Moldova and Georgia. Previously, Sweden had similar cooperation programmes with Armenia, Kazakhstan, Belarus, Estonia, Latvia and Lithuania. In 2013, the funding allocated by the Swedish Government for these purposes amounted to 5 million Euros. Please describe information on the major accomplishments of this collaboration.	The funding available for this cooperation is targeted for activities in the fields of nuclear safety, non-proliferation, emergency preparedness and the management of radioactive and nuclear waste. With specific reference to the ongoing activities in the field of nuclear and radioactive materials management, projects have been implemented which create management and security systems for radioactive waste and spent nuclear fuel in north-west Russia; contribute to the state control over radioactive sources in Ukraine and establishment of a centralized storage for these materials. In Georgia, efforts are made to collect radioactive sources at various abandoned factories and production sites and in Georgia security systems are established (in cooperation with the USA) at the national site for storage of radioactive materials.

Article 32.1.1	Section B.1.2, pa	In this regard, are there some plans to further increase the Clabs's capacity?	The Report states that the current Clab facility's capacity is sufficient to provide SNF storage up to 2023. However the SNF repository is expected to commence its operation only in 2029.	There are no plans for the moment for a capacity increase in the form of new pools in the CLAB facility. However there are possibilities for a capacity increase if a denser packing of the spent nuclear fuel in Clab. This denser packing demands another type of storage canisters which already are in use for some of the spent fuel stored in Clab. Another possibility (if i.e. the repository for some reason will be dalayed) a third cavern with storage pools could be constructed at Clab or some dry storage casks could be used to increase the interim total storage capacity.
Planned Activities	General questior	what are SSM plans for resource and competence development in SNF disposal. This in relation to getting prepared for disposal facility and CLINK construction and several licence applications (SNF disposal, SFR extension, possible SFL licensing, Bärsebäck decommissioning)		Maintaining a high quality licensing and supervisory capability very much depends on the continued future access to human resources and competence on both the national and international levels. Maintaining review competence is vital for the on-going licensing review of a SNF disposal. Another challenge is to prepare for a transition from science to engineering skills and competences needed for supervising the implementation phase of a spent fuel repository (pending approval by the authorities and a Government licensing decision). The SSM overall strategy on knowledge management include: - The procurement of international experts as a pool of complementary resources. - To support basic and applied research at Swedish universities in order to develop and maintain national competence as well as future candidates for recruitment. - A systematic transfer of senior staff skills and experiences to newly employed staff in order to facilitate generational shifts. - Formal competence requirements and compulsory training programmes for all personnel with supervisory tasks. - Participation in international working groups and conferences. - Participation in technical training courses. In a competence assessment conducted in 2011, SSM identified a number of critical competence areas. Work has since then continued with the mapping of staff competences and a gap analysis as a basis for the assessment of strategic competence needs.