



Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

2012

Answers to Written Questions on the Fourth National Report from Denmark



Article Section Page	Question / Comment	Answer
General Section H Page 38	Could you provide the outcomes of the public meeting regarding the studies of the project?	The public meeting was an information meeting arranged by one of the five municipalities. The project was presented and the attendees could ask questions and express their opinion to the project in general as well as to specific details. The meeting did not have a decisive outcome as such.
Article 4 Section G Page 26	What international solution does Denmark expect regarding the spent fuel that was mentioned as a challenge since the Third Review Meeting?	Denmark has investigated the possibility of reaching an agreement for storage or disposal of the minimal amount of Danish spent fuel in countries with well established waste management frameworks. Also, Denmark has observers in the European Repository Development Organisation (ERDO) which is a working group investigating the feasibility of a shared European repository.
Article 11 Section H Pages 27-39	What is the timeframe for which the safety assessment for the planned repository has been / will be carried out? This question is relevant in light of the fact that the waste to be disposed of in such a repository will have only moderate half-lives and the total activity is limited.	The timeframe has not been decided upon. However, the safety assessment shall provide reasonable assurance that the repository will provide sufficient level of safety and the timeframe shall therefore be long enough to ensure this.
Article 13 Section H Page 38	The National Repository localization shall be approved by Parliament. Is it necessary to obtain a local Government acceptance to reach this stage? If this is the case, what is the approach to facilitate the Municipalities acceptance?	The siting of the repository is a decision of the Danish national parliament alone. Acceptance of a local municipality is not required by law.

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Article 13 Section H Page 38	After limiting the number of possible areas for the disposal of low and intermediate level waste, do you have any time schedule for making a final decision regarding the site selection? When do you expect the planned repository to be operational?	There exists no timescale for the project. Any estimate of when the planned repository will become operational is uncertain. It is however clear that the decommissioning of the nuclear site at Risoe cannot be brought to an end before the repository is in operation.
Article 13 Section H Pages 27-38	Please briefly describe the main steps of the site selection process for the LILW repository, and in which step it is necessary to obtain public consent? What is the reason to choose a “Decide and Defend” approach, rather than a “Volunteer” or combine approach in achieving public acceptance?	<p>The first step of the project was to perform preliminary desktop studies. These were concluded in May 2011 and resulted in the identification of 22 potential sites, which based on geological suitability were reduced to 6 for further investigation. The next stage of the project is to perform the first preliminary field studies on all 6 selected sites and to examine if any planning and spatial reservations apply that cannot be set aside. Then Parliament will be recommended to pass an act that reserves the remaining sites and that ensures funding of the following extensive field investigations, safety assessments, environmental impact assessments, etc. These activities are expected to reduce the number of candidate sites and when finished Parliament will be recommended to pass another act in which the repository site is selected, further investigations and detailed planning of the repository is enabled and the precise role of the regulatory authorities is defined.</p> <p>The parliamentary act that initiated the process of establishing the disposal focuses on transparency and involvement of the public. Hence information meetings, public hearings, brochures and other material is planned for.</p> <p>The method of a parliamentary decision on the siting of the repository</p>

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		<p>rather than seeking volunteers is a normal Danish way of siting necessary infrastructure projects such as railways, motorways, power lines, etc. Also, it is not expected that there will be volunteers for hosting the repository.</p>
<p>Article 13 Section H Page 34</p>	<p>Why was the potential option of transport of waste to a geological disposal facility by rail rejected?</p>	<p>The Danish plans for a future repository for the Danish waste are for intermediate depth or near surface disposal with an option of a borehole. The plans do not include the option of geological disposal several hundred meters below surface.</p> <p>The concept of transporting the waste packages by rail would be to load the packages onto trucks at the Risoe site, transport them by road to a suitable train station and unload them at an in-transit area with a capacity similar to the capacity of the train. The packages would then be loaded onto the train, transported to a station in the vicinity of the repository, where they would be transferred to trucks, transported to the repository and unloaded.</p> <p>The advantage of using a train is that large amounts of goods can be transported in each voyage, minimising the overall risk and the doses related to the transport. In terms of radiation exposure it is an additional advantage that the driver will be placed relatively far from the waste packages.</p> <p>The disadvantages of this method are:</p> <ol style="list-style-type: none"> <li>1) The number of handling operations is extensive. The waste packages must be transported by trucks both to and from the train</li> </ol>

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		<p>leading to a large number of on- and off-loading operations</p> <ol style="list-style-type: none"> <li>2) This method also requires an in-transit area at the train station, which is likely to be situated in the vicinity of a comparatively densely populated area. An in-transit area would have to be access-controlled leading to further doses of guards.</li> <li>3) The consequences of an accident may be relatively larger due to the larger amounts of waste pr. voyage.</li> <li>4) The railroads in Denmark typically intersect the city centres, thereby increasing the potential consequences of an accident.</li> </ol> <p>Thus the conclusion of rejecting the transport by rail is based primarily on the number of and the relative complexity of the handling operations that are inferred for shipment by train. These are limiting factors, as both the number and complexity of handling operations have direct implications for the potential doses, especially to the crew. Moreover, the consequences of potential accidents such as a train collision in a central city location are judged to be relatively severe because of the amount of waste that may be involved in an accident close to densely populated areas.</p>
Article 13 Section H Page 38	How have the local communities reacted to the identification of the possible areas of interest for a geological repository?	<p>The Danish plans for a future repository for the Danish waste are for intermediate depth or near surface disposal with an option of a borehole. The plans do not include the option of geological disposal several hundred meters below surface.</p> <p>The local communities have opposed to being identified as potential hosts for a LILW repository.</p>

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Article 13 Section H Page 38	What are the timescales for developing and opening an LILW disposal facility?	There exists no timescale for the project. Any estimate of when the planned repository will become operational is uncertain. It is however clear that the decommissioning of the nuclear site at Risoe cannot be brought to an end before the repository is in operation.
Article 13 Section H Page 39	Do the lifetimes of the current waste storage facilities match when a disposal facility will become available or will new storage facilities be required?	Although the amounts of future waste, including decommissioning waste is assessed with some uncertainty, the current waste storage facilities are expected to suffice.
Article 13 Section H Page 27	The report outlines a process for siting a future waste disposal facility. What are the mechanisms for waste generators to share the cost of site selection and development of a waste management facility?	The establishment of the future repository will be financed entirely by the Danish state. However, the waste generators pay a small fee for collection of the radioactive waste.
Article 13 Section H Page 38	Having identified 22 potentially suitable repository sites in desktop studies, what are the next specific steps for narrowing the list of sites, e.g., activities, schedule and public interaction?	The first step of the project was to perform preliminary desktop studies. These were concluded in May 2011 and resulted in the identification of 22 potential sites, which based on geological suitability were reduced to 6 for further investigation. The next stage of the project is to perform the first preliminary field studies on all 6 selected sites and to examine if any planning and spatial reservations apply that cannot be set aside. Then Parliament will be recommended to pass an act that reserves the remaining sites and that ensures funding of the following extensive field investigations, safety assessments, environmental impact assessments, etc. These activities are expected to reduce the number of candidate sites and when finished Parliament will be recommended to pass another

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		<p>act in which the repository site is selected, further investigations and detailed planning of the repository is enabled and the precise role of the regulatory authorities is defined.</p> <p>The parliamentary act that initiated the process of establishing the disposal focuses on transparency and involvement of the public. Hence information meetings, public hearings, brochures and other material is planned for.</p>
Article 13 Section H	Are the conclusions reached regarding the feasibility of the various modes of transport specific to the situation in Denmark, or more generally valid? Please provide details if the latter is the case.	The evaluation of the feasibility of the various modes of transport was performed taking into consideration Danish waste and Danish conditions only. Whether the conclusions hereof are generally valid is improbable, as the Danish conditions with relatively small amounts of waste that will be shipped in one campaign, combined with lack of necessary infrastructure on the present waste storage site, high population density and railroads passing through central city locations is probably specific for Denmark.
Article 13 Section H	When will the field investigations be carried out?	The initial field investigations are expected to take place in 2012. Additional and more extensive field investigations are planned for later in the process.
Article 14 Section H Page 28	We would highly appreciate more information about the specific licensing procedure for the repository	The specific licensing procedure has not been decided upon yet by the Parliament, but the licensing is expected to be performed by the Danish Nuclear Regulatory Authority after a thorough and independent evaluation, including an international peer review. The detailed procedure is planned to be defined in an act passed by Parliament where the

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		repository site is selected, detailed investigations and planning is enabled and necessary funds are provided.
Article 14 Section G and H Pages 31 - 34	How do the first and the third conceptual design of the repository (near surface) consider the migration from long lived waste as well as from a small amount of spent fuel?	At this stage of the project some preliminary conceptual modelling of the migration has been performed for all three designs and for a long range of factors whose values are not known in detail at this stage. The conceptual modelling indicates that all concepts can be used. In a latter phase of the project the migration from the repository will be analysed in more detail and with more knowledge in general. At that stage one or more of the conceptual designs might prove to be unsuitable.
Article 15 Section H Pages 30 - 31	For expected development of the repository after closure, the dose constraint for individual members of the public is set as low as exemption criteria (0,01 mSv per year). What were the reasons to set the dose constraint so low?	When the repository has been closed and the oversight of the site, incl. environmental monitoring has been terminated the situation is very similar to a clearance case – no regulatory control, no information to the local population, etc. Hence, the same dose criteria apply as for clearance of radioactive material from licensed facilities.
Article 22 Section F Page 21	What are the requirements for training of the regulatory personnel involved in emergency response? What forms of training are in practice (workshops, briefings, exercises, etc.)?	There are no specific regulatory requirements to training of regulatory personnel involved in emergency response. Also, regulatory personnel involved in emergency response are trained for radiological emergency situations in general and not specifically towards emergency situations at facilities which are subject to the convention. However, exercises planned and performed by the license holder usually include involvement of the competent authorities at the theoretical and practical level.

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		<p>Training includes workshops, table top exercises as well as more practical search and rescue type exercises. Training of emergency personnel is also to some degree carried out in emergency preparedness exercises planned by a Nordic nation and open to the other Nordic countries. A new initiative aims to exchange table top exercises between the Nordic countries. Also preparation and execution of specific high visibility events such as the UN COP-15 climate change conference in Copenhagen has proven extremely valuable as on the job training. Training is also carried out as on the job training where the handling of incidents by experienced senior staff members is followed by new and less experienced members of the emergency staff.</p>
Article 22 Page 22	How successful have the internal courses and seminars been at maintaining adequate and qualified human resources as described for decommissioning and waste management?	<p>So far, no problems have been experienced in recruiting new staff, and sufficient resources are available in the organisation for providing the necessary training in e.g. radiation protection. New engineering staff members who are going to be engaged in decommissioning planning do, furthermore, participate in decommissioning training courses or workshops abroad. In addition a number of staff members take part in IAEA activities and other international forums for exchange of experience.</p>
Article 24	Is any specific guidance on how to apply generic exemption levels in Denmark? And for Clearance levels?	<p>Clearance is governed by the Ministry of the Interior and Health (now Ministry of Health and Prevention) Order No. 192 of 2 April 2002 on exemptions from Act on the use of radioactive substances. The order requires a specific license for clearance from the Regulatory Authority (National Institute of Radiation Protection) for all licensed facilities. The order includes principles and criteria for clearance levels with reference</p>

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		<p>to e.g.</p> <ul style="list-style-type: none"> <li>• European Commission Radiation Protection 113, Recommended Radiological Protection Criteria for the Clearance of Buildings and Building Rubble from the dismantling of Nuclear Installations, 2000.</li> <li>• European Commission Radiation Protection 114, Definition of clearance levels for the release of radioactively contaminated buildings and buildings rubble, 2000.</li> <li>• European Commission Radiation Protection 117, Methodology and models used to calculate individual doses from the recycling of metals from the dismantling of nuclear installations, 2000</li> <li>• IAEA Safety Guide No. RS-G-1.7, Application of the Concepts of Exclusion, Exemption and Clearance.</li> </ul>
Article 24 Section H Page 31	Table 7 contains the reference dose of 1 mSv per year for potential incidents. Are there any measures prepared for such incidents?	<p>The Danish emergency preparedness does in general have plans to mitigate such incidents.</p> <p>With the present stage of the project of establishing a Danish repository, no specific measures have been prepared to prevent such incidents to occur at the repository.</p>
Article 25	What was the development of the system for automatic monitoring of radioactivity within last 10 years?	<p>The Danish Emergency Management Agency (DEMA) operates the automatic monitoring system. The system for monitoring radioactivity in the environment consists of 11 permanent monitoring stations (called PMS-stations). The stations are developed around sodium-iodine crystals, which provide spectra and ion chambers, which provide the total radiation levels. The spectra are used to automatically distinguish</p>

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		<p>between natural and unnatural radiation, so that we have been able to respond to very small levels of unnatural radiation.</p> <p>The PMS system is now quite old and has a growing number of technological faults. Thus a new system has been installed, called the NSM (Nuclear Stationary Monitoring) system. The new system replaces each PMS station with two units at each location. One unit is a Sodium Iodide detector (giving spectral information), while the other is a GM-based unit. The two units are independent of each other.</p> <p>In addition to the old locations, three new locations on Greenland have been added to the system. DEMA also have seven additional GM units that can be placed on short notice if measurements from other locations than the permanent locations are needed. In addition DEMA can also perform handheld measurements in an emergency situation.</p> <p>DEMA have also replaced our two air-filter stations with new ones that capable of filtering both particles and gases.</p> <p>DEMA have also installed a measurement station on the Faroe Islands. Monitoring on the Faroe Islands is a matter of the Faroese authorities though.</p>
Article 25	Wherever possible, the Danish nuclear emergency preparedness system is based on organizations and preparedness arrangements already in force for other	At national level the ministries and agencies etc. are responsible for planning within their respective areas of responsibility. Thus the ministries and agencies etc. are also responsible for the adequate amendments in the case of a nuclear or radiological event that can affect

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	<p>purposes with the adequate amendments regarding special matters within the nuclear area.“</p> <p>Which authority is responsible to issue those amendments? If there is more than one authority which one is the coordinator of these tasks?</p>	<p>Danish territory.</p> <p>Danish Emergency Management Agency leads the Danish response to nuclear emergencies. In case of a major incident coordination will take place within the frame of The National emergency Operative Staff. The staff is a forum for coordination in the case of major incidents. The staff is chaired by the Danish National Police. In general the members of the staff are the relevant authorities depending on the nature of the crisis.</p> <p>The staff creates and maintains clarity and an overview of the given situation in order to facilitate decision-making and coordination.</p>
<p>Article 25 Page 5</p>	<p>A thorough revision of the nationwide nuclear emergency preparedness plan is ongoing in 2011 and a revised plan is expected to be implemented in 2012. What significant changes are expected from this review?</p>	<p>The most significant changes regard to establish the same frame for coordination of operative measures and facilitation of decision-making in case of a major nuclear incident as what regards for major incidents of other natures.</p> <p>Danish Emergency Management Agency leads the Danish response to nuclear emergencies abroad. In case of a major incident coordination will take place within the frame of The National emergency Operative Staff. The staff is a forum for coordination in the case of major incidents. The staff is chaired by the Danish National Police. In general the members of the staff are the relevant authorities depending on the nature of the crisis.</p> <p>The role of The National emergency Staff is not described or integrated in the present nationwide nuclear emergency preparedness plan since The National emergency Staff has been established since the present plan.</p>

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		Thus the plan is undergoing revision to ensure that coordination among relevant authorities will take place within the frame of The National emergency Staff and also to consolidate the individual role and responsibility of the authorities in question.
Article 26 Section F Page 28	How is the decommissioning of facilities, mentioned in this section, financed and who is responsible for the control that unfreezed funds are really used for the decommissioning activities?	The decommissioning is entirely financed by the Danish state. The decommissioning company, Danish Decommissioning is ensured funds for normal operation on the state budget, but must apply for funds with the government for decommissioning of each facility and only after acceptance of a decommissioning plan by the nuclear regulatory authority. The responsibility of efficient use of the funds lies with Danish Decommissioning.
Article 26 Section F Page 25	What were the radiological criteria for decommissioning waste of the DR2 reactor and what are the radiological criteria for the “green field”?	<p>The mass specific criteria for free release of decommissioning waste is based on the IAEA Safety Guide No. RS-G-1.7, Application of the Concepts of Exclusion, Exemption and Clearance.</p> <p>The surface specific criteria for free release of decommissioning waste is based on European Commission Radiation Protection 113, Recommended Radiological Protection Criteria for the Clearance of Buildings and Building Rubble from the dismantling of Nuclear Installations, 2000.</p> <p>The dose criteria for “green field” are the same as for decommissioning waste. Release of buildings and areas from regulatory control is done by the Nuclear Regulatory Authority and only after a thorough documentation by the operator.</p>
Article 26	The national report does not provide	The decommissioning of the Danish nuclear facilities is being performed

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Section F Page 23	information on how the regulator ensures that records important to decommissioning are maintained, please elaborate. Also, please discuss how decommissioning is considered during the siting, design, construction and operation of nuclear facilities in Denmark per Articles 7/14 and 9/16.	<p>by Danish Decommissioning, a state owned company. This company operates under a set of rules, Operational Limits and Conditions (OLC), set out by the nuclear regulatory authorities. Subject to the OLC, Danish Decommissioning is required to document the decommissioning of the facilities in reports that must be approved by the regulatory authorities. Additionally, the OLC dictates that all radioactive waste shall be registered in detail in a waste documentation system as described on page 22 in the national report.</p> <p>The only nuclear facilities in Denmark are those being decommissioned at Risoe. The future repository is the only new nuclear facility that is planned for in Denmark and decommissioning of buildings and equipment at the closure of the repository will be planned for in the different stages of establishing and operation of the repository.</p>
Article 27 Section I Page 40	Did your national competent authority find any noncompliance related to the transboundary shipments of spent fuel or radioactive wastes?	The national competent authority has not found any non-compliances related to transboundary shipments of spent fuel or radioactive waste since the last review meeting.
Article 28 Section J Page 41	Is there any recommendation in Denmark's regulations that considers the possibility of returning disused sealed sources to the country of origin?	Danish legislation requires as a licensing condition for sources with an activity above a certain level that an agreement with the producer is established for return of the source when it becomes disused.
Article 28 Section D	Section D.3 states that - The smallest reactor DR 1 is fully	The decommissioning of DR1 produced approximately 40 tons of radioactive waste and 150 tons non-radioactive waste. The

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Pages 10 - 11	<p>decommissioned and the building has been released for other non-nuclear purposes.</p> <ul style="list-style-type: none"> <li>- Also DR 2 is fully decommissioned, but the reactor building has not been released from regulatory control</li> </ul> <p>Table 6(Section D.3) states that the dismantling of fuel fabrication will be followed by the "green field" plan.</p> <ul style="list-style-type: none"> <li>- How much decommissioning waste did DR1 and DR2 produce, respectively?</li> <li>- What is the regulatory standard for free release of the site after decommissioning?</li> <li>- What are the definition and regulatory standards for green field?</li> </ul>	<p>decommissioning of DR2 produced approximately 170 tons radioactive waste and approximately 440 tons non-radioactive waste.</p> <p>The mass specific criteria for free release of decommissioning waste is based on the IAEA Safety Guide No. RS-G-1.7, Application of the Concepts of Exclusion, Exemption and Clearance.</p> <p>The surface specific criteria for free release of decommissioning waste is based on European Commission Radiation Protection 113, Recommended Radiological Protection Criteria for the Clearance of Buildings and Building Rubble from the dismantling of Nuclear Installations, 2000.</p> <p>The dose criteria for "green field" are the same as for decommissioning waste. Release of buildings and areas from regulatory control is done by the Nuclear Regulatory Authority and only after a thorough documentation by the operator.</p>
Article 28 Section J Pages 41	<p>Please provide brief information on disused sealed sources, such as transfer from a holder to the state/central storage and how many such transfers occur on average per year? How do the holders provide financial security for the safe management of spent sources?</p>	<p>Disused sealed sources are either returned to the producer or transferred to Danish Decommissioning, a state owned company responsible for the storage of the Danish radioactive waste, incl. disused sources. The company is financed by the Danish state, but users of radiation sources pay a small fee for collection of the disused sources. There are a few hundred transfers to Danish Decommissioning per year.</p>
Article 28 Section J	<p>Is there a program for collecting disused radiation sources? If yes, how this program</p>	<p>Disused sealed sources are either returned to the producer or transferred to Danish Decommissioning, a state owned company responsible for the</p>

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Pages 41	is financed?	storage of the Danish radioactive waste, incl. disused sources. The company is financed by the Danish state, but users of radiation sources pay a small fee for collection of the disused sources. There are a few hundred transfers to Danish Decommissioning per year.
Article 28 Section J Pages 41	The national report includes a discussion on the development of a strategy to address disused sources within the scrap metal area. Please describe what this strategy is and how it is being carried out within Denmark. How are other disused sources within the country handled?	<p>The strategy mainly aims to further decrease the risk of sources becoming orphan, but it also comprise a more reactive course if and when orphan sources occur.</p> <p>By experience orphan sources in scrap are likely to originate from ceased or suddenly terminated companies, which are abandoned and eventually demolished. Therefore, the regulatory authority source database is presently being cross-referenced with the national Central Business Register (CVR), in order to identify companies that both possess sources and are announced insolvent or bankrupt. This will enable the competent authority to prompt the removal of sources prior to eventual demolition of the physical entities of a terminating company. A similar coupling of the competent authority source database and the national Central Office of Civil Registration (CPR) is anticipated to enable a swift registration of suddenly terminated one-man companies, at which sources may be left unattended. Cross reference with the CVR- and CPR-registers is to be performed on a daily basis by an automated electronic search and notification routine.</p> <p>Another preventive effort, deals with scrap that may originate from accelerator facilities. It essentially comprise new provisions and detailed guidance on handling of activated material e.g. during reconstruction or</p>

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		<p>deconstruction of facilities and as regular operational waste.</p> <p>Since the vast majority of Danish metal scrap is passing a few “bottle necks” i.e. the major scrap dealing Danish companies which supply smelters abroad, it is anticipated to disseminate relevant information, via the bottle-neck companies to their subcontractors. The “reactive” part of the strategy of the regulatory authority aims to supply improved incident guidance as well as relevant information to these companies, through their umbrella organization. Relevant information will comprise: new occurrences, tendencies, monitoring systems, consequences of the EU-regulation on “end-of-waste”, as well as a planned revised national guide on sources in scrap.</p> <p>Disused sealed sources are either returned to the producer or transferred to Danish Decommissioning, a state owned company responsible for the storage of the Danish radioactive waste, incl. disused sources.</p>
Article 32 Section D Pages 13	What period of time is covered by Danish Decommissioning plan and what the final status (end state) of the site after decommissioning is foreseen?	According to the time schedule set out in the decommissioning plan, the decommissioning of the DR 3 will be completed by the end of 2018, and the end state will be unconditional free release (green field).
Article 32 Pages 9	Has the build up of unconditioned waste at the Intermediate Storage facility caused any safety problems at that facility and is there a programme to manage/condition the waste?	The storage of waste has caused minor problems such as corrosion of waste drums. Such problems however are known of and are managed before becoming a safety problem. The waste packages are closed and the plan is to perform the conditioning either just before moving the units to the future final disposal site or at the disposal site before placing the

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		packages in the repository.
Article 32 Pages 12	Wire cutting of shot concrete was reported as not being successful for decommissioning DR2 and alternatives have to be sought in future decommissioning projects. What alternatives have been found and how successful have they been?	There was no shot concrete in the DR 2 biological shield, but there were a number of plugs for the beam tubes, which contained resin with steel pellets that turned out to be very difficult to cut. Experiments carried out in preparation for the DR 3 project have shown that wire cutting in shot concrete is problematic. Therefore, in the decommissioning plan for the DR 3 it is foreseen to use a combination of wire cutting and hydraulic hammering for the demolition of the shielding, which mainly contains shot concrete around the beam tube penetrations and in the top shield plug. For DR 2 the major part of the shielding was demolished by means of hydraulic hammering, which was cheaper than wire cutting and turned out to be quite efficient.
Article 32 Pages 18	It was reported on Page 18 that the process of acquiring the remotely operated grit blasting equipment for decontaminating the Hot Cells has resulted in extensive delays to the project due to legislative complications associated with EU public tender regulations. Have these problems been resolved?	The problems are related in particular to general Danish state tender requirements to the contractors, but also to EU regulations. The problems have been solved in the sense that equipment has been acquired following a change in the planned procedure to one that did not pose any special requirements to the particular piece of equipment (a manipulator arm), but could use an off-the-shelf product. Similar problems are foreseen as a potential source of delay for future acquisitions.
Article 32 Section A Pages 3	A final DR-3 Decommissioning Plan was sent to the National Regulatory Authorities in August 2011 (Page 3). This is also mentioned in Section D.3 on page 10 and	The decommissioning plan was examined thoroughly by the Nuclear Regulatory Authorities, i.e. the National Institute of Radiation Protection and the Danish Emergency Agency. After a process of enquiries made by the authorities and responses to these inquiries submitted by the

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	D.3.3 on page 13. What is the regulatory review process, what government agencies are involved, and how is a final approval decision reached? How is the public involved?	operator, a new version of the overall decommissioning plan was submitted and approved with sets of requirements on performance, reporting, partial safety assessments as the project proceeds and knowledge increases, etc. There is no public involvement in the specific decommissioning plan for DR3, however before any decommissioning was initiated on the Risoe site an environmental impact assessment was made which prior to acceptance was published for public hearing.
Article 32 Section D Pages 15	Phase 1 decommissioning for DR 3 (remaining peripheral systems) was planned for late 2011 completion. Has this work been completed? What were the significant challenges and lessons learned?	The decommissioning of the peripheral systems of DR 3 has been completed as planned by the end of 2011. The most significant challenge was clogging of the filters in the I-cam monitors during plasma cutting inside the reactor building. This situation was solved by installing additional local exhaust ventilation. Some of the lessons learned are: <ul style="list-style-type: none"> <li>– Pockets of heavy water in the helium cover gas purification system were discovered after several years of drying out.</li> <li>– Work plans are very good as documentation during such a long project.</li> <li>– During clean-up of equipment you need to be absolutely sure, that there will be no more use of the components, before you discard it.</li> <li>– The polar crane needs to be maintained as there is a continued need to use it.</li> </ul>
Article 32 Sections D and G	A small amount of spent fuel is currently stored under safe and secure conditions awaiting a decision on the final	Should Denmark not be successful in finding an international solution for the minimal amount of spent fuel, it will be disposed of in the future Danish repository and is therefore included when planning for the

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	<p>management. This applies to less than 1 kg of spent fuel from the research reactor DR 1 and about 233 kg of experimentally produced and irradiated spent fuel of power reactor type remaining from post-irradiation investigations in the former Hot Cells. In case that an international solution for the disposal of this spent fuel cannot be found, the preferred option would be to dispose of this spent fuel in the planned Danish repository for low and intermediate level waste.</p> <ul style="list-style-type: none"> <li>- What is the latest status to find a repository site for this spent fuel?</li> <li>- Is there a practical solution, including safety case, for the disposing of spent fuel in the Danish repository?</li> <li>- For realising an international solution, which activities or initiatives have already been taken, and which practical steps are planned for the near future?</li> </ul>	<p>repository.</p> <p>The status of the project of establishing a disposal for radioactive waste in Denmark is that preliminary desktop studies have been performed where 22 areas in Denmark were identified as potential sites and 6 of these were selected for further investigations. The next stage of the project is to perform the first field studies on all 6 selected sites and to examine whether any planning and spatial reservations apply that cannot be set aside.</p> <p>Denmark has investigated the possibility of reaching an agreement for storage or disposal of the minimal amount of Danish spent fuel in countries, with well established waste management frameworks. Also, Denmark has observers in the European Repository Development Organisation (ERDO) which is a working group investigating the feasibility of a shared European repository.</p>
Article 32 Sections D Page 13	Which was the destination of heavy water from Reactor DR3 decommissioning?	The heavy water was not considered to be waste. It was exported in 2007 to Canada for reuse.
Article 32	As regards the clearance of equipment and	Scaling factors have been established in order to determine the contents

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Sections D Page 17	parts from the Hot Cells: It is said that the clearance will be based on gamma spectrometric measurements in the Clearance Laboratory. Do you have Scaling Factors to estimate the activity concentration of other alpha or beta emitters like i.e. Sr-90?	of a range of alpha and beta emitters, including Sr-90, based on measurement of Cs-137, cf. for instance <a href="http://www.nsf.org/NSFS-2011/documents/session-14/S14-O2.pdf">http://www.nsf.org/NSFS-2011/documents/session-14/S14-O2.pdf</a> .
Article 32 Sections D Page 17	Which values for clearance of surface contamination are you currently applying?	Potentially contaminated items, equipment, buildings etc. are released from regulatory control on the basis of European Commission Radiation Protection 113, Recommended Radiological Protection Criteria for the Clearance of Buildings and Building Rubble from the dismantling of Nuclear Installations, 2000.



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