

The Danish nuclear waste management process must be improved

Feature article by Palle Bendsen, NOAH Friends of the Earth Denmark, Editor Hans Pedersen, SustainableEnergy, Director Johan Swahn, MKG - Swedish NGO Office for Nuclear Waste Review and Senior Researcher Gerhard Schmidt, Nuclear Engineering & Facility Safety Division, Öko-Institut

Published in an abbreviated version in the weekly Ingeniøren, 30 October 2015

Currently in Denmark, the authorities plan how to manage and dispose of nuclear waste in the order of 5-10,000 m³, originating mainly from Risø National Laboratory. This process has lasted more than a decade, but never lived up to the legislators' intentions. It has been riddled with problems, causing resentment and criticism from local authorities, green NGOs, citizens groups, and not at least from independent international expert organisations: Among others, the criticism pertains to procedural issues – lack of transparency and public participation – deficiencies in the documentation presented to the public, classification of the nuclear waste and choice of repository types.

Not without a reason, these issues have been considered so controversial that initially several ministries competed with each other in order not to take responsibility of the nuclear waste management. Eventually, it ended up under the purview of the Health Ministry, but after the recent general election, it was transferred to the Ministry of Higher Education and Science. One can only hope that this marks a new beginning: More openness and transparency is required and there is an urgent need for new ideas from more stakeholders to be implemented in the political decision-makers' basis for decision, when Parliament approximately a year from now decides on how to manage the radioactive waste in the mid and long term.

First and foremost, it is crucial that the Research Minister draws three important lessons from developments in the past. Although the lessons emerge from Danish circumstances, they can be seen as archetypical of problems related to nuclear waste management programs almost everywhere. They are also representative of the debate that currently plays out at the European level on public participation in decision-making processes in this field.

The first lesson is that in spite of all odds, the criticism of the decision-making process and the final repository concept introduced by the government has actually worked: Even though almost nothing of what has been planned has turned out as expected, the result is now better. The reason is primarily the resistance that was initiated when twenty two potential sites for the planned final repository for low and medium level radioactive waste in 2011 were reduced to six in five municipalities – Bornholm, Kerteminde, Lolland, Skive and Struer. The local mayors protested and started to cooperate to obstruct the localisation process and citizens groups against nuclear waste were founded in all the affected municipalities.

Gradually, the local opposition won the support of established environmental organisations and the criticism acquired a more scientific dimension, when Swedish and Norwegian experts pointed out that the planned final repository did not live up to the safety and environmental standards in Denmark's neighbouring countries. E.g. the expert organisation, *The Swedish NGO Office for*

Nuclear Waste Review, MKG, that has followed the Danish decision making process for years, concluded that the authorities did not seek to implement the best available technologies and that their plans were founded on a safety culture, which was not in accordance with Swedish law. Furthermore, according to MKG, the localisation process did not meet international standards.

One of the criticism's highlights came last year, when the German *Öko-Institut* published a working paper, analysing the Danish final repository project. The Institute is known as one of the world's leading expert organisations in the field of nuclear waste management. Among those who have commissioned opinions from *Öko-Institut's* Division for Nuclear Engineering and Facility Safety are The European Commission, The European Parliament, EURATOM, OECD, and in Germany a long series of federal and state ministries, agencies, municipalities and energy companies.

In its assessment of the Danish final repository project, the Institute concluded that none of the Danish radioactive waste from Risø National Laboratory decays within the administratively controllable period of less than 300 years to below clearance levels, so none of it is suitable for the planned near-surface disposal. Only two of the Danish waste types decay enough within the time period to the next predicted ice-age to below clearance levels. One is slightly above that criterion, whereas all the other 18 waste types require confinement times of 100,000 years or more. Thus, the Danish method to evaluate the feasibility of disposal is unsound from a safety standpoint because it ignores the basic principles of safe geological disposal. The criteria should have been to identify impermeable geologic layers in a suitable depth (e.g. 300 to 800 m) with a geologically predictable long-term integrity. Therefore, the results of the performed site-selection process are useless. Altogether, *Öko-Institut's* conclusion is that the ongoing process to locate the final repository in one of the five designated municipalities should not be continued before clear and appropriate safety criteria for the repository have been established.

During the strategic environmental assessment of the repository project, the criticism was repeated in a long series of position papers from among others nuclear authorities in Sweden, Germany and Poland. The result was that so much doubt was raised among the political decision-makers that they chose to let the precautionary principle guide their policy decisions. Instead of opting for a flawed final repository concept, the political parties in Parliament began seriously contemplating the possibility of interim storage of waste for up to a hundred years. The decision on which alternative to choose – final disposal or interim storage – is expected to be made at the end of next year. In this context, it should be clearly communicated that the Danish waste inventory, even after a prolonged interim storage period, in any case requires the later geological disposal of those wastes.

The second important lesson is that the criticism should be if not institutionalised, then at least integrated in the decision-making process and have better conditions to evolve. For decades, nuclear waste management has been perceived as a technical issue, only to be administered by the authorities and a few technical experts. However, this is no longer the case. Today, it is recognised all over Europe that public participation – particularly in local communities near potential repository sites – is crucial to the decision-making process. That has been confirmed by almost all research on this subject done under the auspices of EURATOM, the European Commission and the Joint Research Centre: The best possible standards relate not only to goals, but also to means, including the best and most democratic practices. Apart from being the right policy in itself, without these it is impossible to generate enough trust to gain public acceptance for any large scale nuclear waste infrastructure project, considering the projects' risks and a long time horizons for site selection, permitting process, operation and post-operational processes.

Thus, we propose the establishment of a broadly composed contact forum with participation of the organisations and authorities responsible for the management and disposal of the radioactive waste from Risø, representatives of civil society, including green NGOs and citizens groups, affected local and regional authorities, independent international expert organisations, and relevant nuclear authorities from neighbouring countries. The forum, which should be integrated into the decision-making process on all the potential infrastructure projects, should meet up regularly. This will ensure that public participation will be a permanent phenomenon and not as now, random and sporadic.

One of the reasons that the forum should be as broadly composed as possible is that it diminishes the risk of wrong, irreversible decisions due to inexperience. International cooperation has already been proposed by MKG and *The Swedish National Council for Nuclear Waste* that both recommend Danish cooperation with The Swedish Radiation Safety Authority and The Finnish Radiation and Nuclear Safety Authority. Both have more experience with nuclear waste management than the Danish authorities. E.g. the cooperation could include an overhaul of the nuclear waste management process in its totality, particularly the technical issues with respect to the establishment of the final repository and the interim storage facility, and not at least the risk aspects.

Furthermore, one of the benefits of international representation is that the third option in the nuclear waste management process – exportation of parts or all of the radioactive waste – is revived. So far, this has been perceived as unrealistic, but close contact with nuclear authorities in neighbouring countries in this early phase of the decision-making process makes the idea of Scandinavian cooperation a possibility. The most difficult complication with the Danish radioactive waste inventory is the existence 233 kg of pieces of spent fuel rods from the Risø hot lab facility. This waste is high-level radioactive waste even though some attempts have been made by Danish authorities to classify it as medium-level. In Sweden, the high-level waste is put in special steel containers and stored in the Swedish centralised intermediate storage site for spent nuclear fuel together with the over 6,000 tonnes of spent fuel from the Swedish nuclear reactors. For Sweden to manage and dispose of the Risø spent fuel rods would be a very simple solution technically, but there would be a need needs for much work politically to get an agreement to do this.

Moreover, German expert representation in the contact forum could promote bilateral cooperation with the German authorities. Currently, these plan a large final repository for high-level radioactive waste, where in principle also the small spent fuel portion of the Danish waste could be disposed of. The German HLW inventory is much larger than the Danish inventory (approx. 10,550 tons of spent fuel plus the high-active waste from the reprocessing of 6,244 tons spent fuel). And most of the rest of the Danish wastes is very small compared to the capacity of the final repository Konrad in Salzgitter in Northern Germany, located 800-1300 m. underground in a former iron ore mine. The inventory of low and medium level radioactive waste supposed to be disposed at Konrad, is more than 33-fold as that of the Danish inventory. Disposal here would not only be much safer than in a surface-near disposal facility as currently envisaged in Denmark but also much cheaper than if Denmark had to build a geological repository with similar safety features for its own small inventory.

However, against the idea of exportation could be objected that every country should take responsibility of its own radioactive waste – an objection that should be taken seriously. The initial discussion on this subject could also take place within the framework of a contact forum.

In similar situations in the U.S., Great Britain and Germany, independent commissions and expert groups have been established to assess and revise the existing nuclear waste management planning and put forward recommendations to improve it – mechanisms that go further than what is suggested here.

The model we propose is a mixture of formal and informal public participation that does not require new legislation to be adopted, only more flexible dialogical practices based on goodwill and a willingness of the authorities to share more knowledge with the stakeholders. However, this sharing should not limit itself to what the authorities want to disseminate on their own initiative. This might have as a consequence that not everything is shared, not necessarily because the authorities intend to withhold information, but because they might have other views on what is relevant. A proper information level is a necessary condition for capacity building, but one cannot expect that it is possessed by all stakeholders. So in addition to what they are told, they must have the opportunity to obtain knowledge by themselves and to the widest possible extent on their own terms. Hence, within the framework of the contact forum it should be possible for the participants to submit written questions to the authorities before decisions are made, with a guarantee that they are answered appropriately (and not only formally).

We ourselves cannot take credit for the idea of more comprehensive and better organised public participation. It has already been described in the EURATOM Directive from 2011, according to which it is the responsibility of the EU Member States to provide the public with the necessary information on the management of radioactive waste. This obligation is incumbent on the competent regulatory authority and the public must be given real opportunities to participate effectively in the decision-making process during all its phases, starting with a repository type selection process, definition of safety standards, first site selection process, site evaluation process, etc.

It should also be noted that a contact forum has already been proposed by some of the Danish authorities: It is recommended both in the existing basis for decision for a final repository for low and intermediate level radioactive waste from 2008 and for an interim storage facility for low and intermediate level radioactive waste from 2015. The necessity of transparency and public participation is also mentioned in the Research Ministry's recent document on the financing of the research of interim storage and in the basis for the original parliament decision from 2003 on the disposal of the waste. However, these recommendations were ignored by the Ministry of Health that until recently was responsible for the nuclear waste management program.

The third lesson is that the criticism should be supported by sufficient resources. With advantage, these could be distributed among the members of the contact forum. In this context, resources are not only financial means, but also knowledge and capacity building, experience, available time, etc. Sufficient resources should be allocated not only to the organisations and authorities, responsible for implementation of the nuclear waste management, but also for local authorities, environmental organisations and citizens groups. The allocation should happen independently of the authorities that implement the regulatory bodies' decisions in this field. First and foremost, the stakeholders should be rendered capable of commissioning independent experts opinions on the plans that the authorities put forward and the concrete measures they propose.

Although it could be argued that the devil is in the detail, when it comes to complicated technical issues, the biggest change should take place at the most general level. Long ago, time has run out on the top-down attitude that so far has characterised the nuclear waste management process.

Generally, this perception can be described by means of the acronym DAD – *Decide, Announce and Defend* – which loosely can be translated into: ‘We know best, decide things for ourselves, inform about them no more than we have to, and defend our decisions with all available means’. This attitude has destroyed the building of trust in civil society that is so crucial to the execution of the nuclear waste infrastructure projects.

Instead, it should be realised that in order to manage and dispose of radioactive waste with the proper speed, the necessary time has to be invested – even if at first glance it looks like the decision-making process is delayed. The slowness of the process is mainly due to the fact that nuclear waste management planning was not a mandatory part of the basis for decision to build the research reactors at Risø. Furthermore, it has not been an integrated part of the planning of any new nuclear power programs anywhere in the world. Thus, reservations and objections from stakeholders must be addressed, until all problems are solved. The inclusion of civil society in the nuclear waste management must be so thorough and credible that it is ensured that all future decisions fully meet the public’s need for information and participation and guarantees that the political choices not only are socially, culturally, politically and economically acceptable, but also technologically viable and sound.