Swedish Nuclear Waste Council seminar -

Ethical Perspectives on the Nuclear Fuel Cycle

INTRODUCTION TO THEMES

The seminar has four major themes – uranium mining, site selection, added value agreements and the nuclear fuel cycle. In this introduction, the Swedish situation is explored in an international context and some ethical aspects are introduced for each one of the themes.

Uranium mining – are the "principles of uranium stewardship" followed in practice?

Uranium to be used in nuclear reactors is mined in well-developed as well as in less developed countries. A number of ethical issues can be raised in this context such as ***risk of worker exposure versus the benefits of electricity generation***, ***uneven distribution of knowledge about potential exposures*** (between workers and local population on one side and industry and government agencies on the other hand), ***uranium from countries with less advanced regulatory systems*** and the use of nuclear power, etc. It may be of interest to use the ***World Nuclear Association Principles of Uranium Stewardship*** as a point of departure for discussion:

1. The safe and peaceful use of nuclear technology
2. Continual improvement of our health, safety, security and environmental performance to minimize the impact of our activities on people and the environment
3. Recognition of fundamental human rights
4. Contribute to social and economic development of the regions where we operate
5. Open, honest and transparent communication
6. Operate ethically with sound corporate governance
7. Share knowledge to encourage widespread adoption of best practices
8. Act responsibly in the areas that we manage and control, and share our concern in other sectors of the nuclear fuel cycle
9. Provide responsible sourcing, use and disposition of uranium and all its by-products
10. Act as an industry to regularly review, update and communicate to our stakeholders our progress in implementing these principles.

Reference: http://www.world-nuclear.org/uploadedFiles/org/WNA/Publications/WNA_Position_Statements/PD-UraniumMining.pdf

The site selection programme and activities of a participatory nature – how to design a fair process?

Individual countries follow their own practices in site selection for final disposal of nuclear waste due to their legal framework, institutional structure and culture. Especially "public participation" is generally acknowledged as a necessary element but practices differ. Some countries follow strictly EIA requirements in a formal way whereas other countries are more ambitious and introduce "innovative" and more informal ways for dialogue. In some countries cooperation between e.g. the implementer and local authorities is established as partnerships whereas independence and autonomy is the core principle in other countries. In some countries (Sweden and Finland) the role of public participation processes decreases when it comes close to licensing, whereas in other countries (Czech Republic) their originally informal public participation processes are transformed to become institutionalized.

The Swedish site selection process went through a number of phases over a period of some 30 years. It developed from basically being a R&D programme, to site investigation with consultation according to legal requirements of Environmental Impact Assessment (EIA), finally to the current licensing phase. Different actors have taken their own initiatives to position themselves and to improve the transparency of site selection.

The Swedish are in a strong position to make demands having in the end a veto right. During the site selection process they wanted to participate and be an active part in the whole process of decision making, from start to final closure. There was general agreement that, in order for the site to be available and the project to be feasible, there must be political and public acceptance in the concerned municipality and among nearby residents. For most of the time, both Oskarshamn and Östhammar clearly marked their positions as being independent from SKB. They had funding from the Nuclear Waste Fund during the entire programme for their participation. Within that framework, many types of activities were organized in the municipalities such as working groups set up by the municipality councils, seminars, information in public arenas, etc.

Not only the municipalities have taken their own initiatives to enhance the quality of the decision making process. First SKI, the Swedish regulator at that time, initiated the still well-known Dialogue project (1990−93) and also funded the development of the RISCOM Model for transparency in 1996−98. Later the Swedish National Council for Nuclear Waste organized the Transparency Programme in 2006–2010 within which a number of hearings were held to clarify what was going on in the nuclear waste management programme. In summary, in addition to the EIA process for which SKB has been responsible, there have been a large number of initiatives for public participation taken by municipalities, licensing authorities and the Swedish National Council for Nuclear Waste all the way since 1990 until a license application was submitted in 2011. All this has been done while safeguarding the integrity of all stakeholders, thus maintaining their independence in the legal and political decision making processes. Furthermore, in 2004 the NGOs were given the opportunity to seek funding from the Nuclear Waste Fund to participate in the consultation process, further extended to participate in the licensing review.

In relation to the site selection processes, a number of ethical issues can be discussed. One of the basic ones is whether one should strive ***for the safest possible place or if a "safe enough site"*** meeting established safety criteria is enough. Experiences show that the latter approach gives room for a democratic process with stakeholder involvement whereas the safest possible site may mean a less democratic process. Another issue is the ***fairness of a process*** where on one hand the implementer, industrial and national actors have financial resources, knowledge and competences already at the beginning − on the other hand for example communities are weaker financially and in competences, and certainly nuclear waste disposal does not belong to their normal work areas. ***Is it reasonable to put such a high responsibility on local authorities for an issue of national priority***? Or the other way around – shouldn't normal rules for division of responsibilities between national and local authorities (which in some countries includes a local veto right) be followed also in this case? Concerning the decision making process and stakeholder involvement it may be relevant to ask what is in reality the responsibility of the implementer and other actors – ***is it justifiable simply to follow the legal requirements or should they have higher ambitions?***

The Added Value Agreement – normal business agreement or a form of bribery?

Offering benefits to local communities for hosting radioactive waste disposal has been practice in several countries. The underlying assumption has been that a repository will be a risky burden for the community for which it therefore should be compensated. Ethical aspects of the concept have been discussed by academia as well as by concerned actors over a long period of time. However, it may not necessarily be the case that a future repository is seen as something negative which needs to be compensated for. Instead it could be an opportunity for enhancing local and regional infrastructure, education and research, tourism etc. and then the concept of "added value" may be more relevant than "compensation". Another aspect is that site selection processes typically take place over a long period of time during which local and regional authorities are expected to take active part, and for this effort they could be compensated.

In Sweden, the added value approach with an element of "partnership" with SKB came in only at the very end of the site selection process as it was made in 2009 and the site selection had been going on since 1992.

The initiative for the Added Value Agreement came from the municipalities Oskarshamn and Östhammar and it was signed between them, SKB and its owners. The purpose is to contribute to create good conditions for living, for running business and for a positive enterprise climate promoting new establishments and companies in the host municipalities Östhammar and Oskarshamn. This is up to a potential maximum value of 2 billion SEK with 20% available until the necessary licenses are granted and the remaining part afterwards. The allocation of resources was decided to be 25% for the municipality to be selected for the repository siting (Östhammar was selected in 2010) and 75% for the other municipality

(Oskarshamn). This allocation between the selected and the other municipality was thus set up and decided before SKB announced its site selection decision.

The Agreement promotes possible benefits of mutual interest, in addition to the direct establishment of the planned facilities. No money is handed out or distributed directly but projects are selected by the parties of the Agreement. A sample of projects handled within the framework of the Agreement shows large variety, such as a technology and energy college, entrepreneurship education in elementary school, feasibility study regarding hotel in Östhammar, Nova research and development in Oskarshamn, attractive Oskarshamn (marketing) and harbor development studies. It should be noted that the Agreement is consistent with the municipality position of being autonomous actors maintained all through the site selection process.

From the introduction to this theme, the following questions can be asked from an ethical point of view: If the repository is seen as a burden – should an "added value agreement" be seen simply as ***compensation or a form of bribery***? If the repository is seen as something positive – is an "added value agreement" at all justified? One can also ask who has the stronger position: The industry with the implementer who has the financial resources or the communities who must give their consent? Finally, ***why is an agreement between municipalities and the industry discussed as something special in the nuclear waste area?*** Does not this kind of agreements belong to the normal business relationship between municipalities and industries – both parties get something positive out from it.

The nuclear fuel cycle and final disposal – how to accommodate the interests of future generations?

In principle, there are two possible nuclear fuel cycles – open and closed. In the open fuel cycle, used in Sweden, spent fuel is disposed of as waste that will remain radioactive for hundreds of thousands of years. In the alternative closed fuel cycle, spent fuel is reprocessed in order to extract uranium and plutonium, which can be re-entered into the fuel cycle and used again. In the closed cycle, the lifetime of radioactive waste is significantly reduced. One might question the concept of the nuclear fuel cycle, which associates to environmental friendly recycling - would it be more relevant to talk about the nuclear fuel chain?

From an ethical perspective, the fuel cycles can be analyzed with ***the idea of intergenerational justice***. One can argue that people living today should deal with the burdens of nuclear power because we will enjoy its benefits, thus the closed fuel cycle should be preferred because it reduces the radioactive lifetime of waste and the burdens placed on future generations. On the other hand, the closed cycle creates extra short-term safety, security and economic burdens for people currently alive.

Partitioning and Transmutation makes possible the development of an extended closed fuel cycle based on multiple recycling and new reactor technology. This technology, however, may require decades of development before it can be practically applied and become

economically feasible. Nonetheless, it represents a potential breakthrough that could be used as an argument against direct disposal, i.e. that maybe it would be better to wait and see how the new technology develops.

Another ethical dilemma with direct disposal, which can be linked to possible future technology breakthroughs, is ***if, and in that case to what degree, the spent fuel in a repository should be possible to retrieve***. The interest in keeping underground disposal reversible varies quite much between countries, Sweden perhaps being one of the most skeptical ones. This discussion becomes more and more complicated, the longer the estimated operational lifetime of a repository becomes due to e.g. the life time of nuclear power programmes. What to do at the end of the operation of a disposal facility will become as much a social and political decision as it will be a technical one.

Basically, we should apply to future generations the same attitudes toward human beings that we consider to be fundamental for ourselves and our own responsibility. Already in 1988, the Nuclear Waste Council formulated the opinion that a final repository should be designed to render monitoring and controls unnecessary, but not impossible. ***This principle entails that future generations should have the freedom to utilize the spent nuclear fuel if they want, but also the freedom not to use it.***