WP4 – Long term governance

LONG TERM GOVERNANCE FOR RADIOACTIVE WASTE MANAGEMENT

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It has to be mentioned that after the last seminar held in Antwerp in July 2006, Lorraine MANN, from Scotland Against Nuclear Dumping, decided to withdraw her support to the work package in the light of the EC position about how COWAM could be used by the EU to justify a new generation of nuclear power stations throughout Europe.

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1. ETHICAL GUIDELINES: POINT OF VIEW OF HERMAN DAMVELD -INDEPENDENT RESEARCHER AND PUBLICIST - THE NETHERLANDS

1.1. Ethical theories

With storage of nuclear waste it is actually on making choices for the future. This is the field of ethics. In many discussions about nuclear waste the ethics of utilitarism is implicitly used. In this type of ethical reasoning, happiness and suffer, burdens and profits are weighed. It is also assumed that present weighs more than future: we can appoint happiness and suffer of future people more difficult than that of present people. Because of this uncertainty present people count for 100 percent and future lives weigh less. This is called discounting. This should be rejected.

I choose for what I call the ethics of justice, a bundle of elementary ethical standards. These are values that can apply to whole humanity on any place and on any moment. On basis of this ethics future generations shall be taken into account and discounting is not done. Given this ethics of justice, future people should have the same possibilities and should carry as much weight as present human beings.

1.2. Justice

If we put ourselves in the position of future people potentially developing cancer as a result of the stored nuclear waste, would we consider it justified that this nuclear waste had been produced at all? And why is it that government policies only mention the consequences for mankind? Don't other living creatures or the ecological system count? These questions should be addressed.

The storage of nuclear waste has to be justified to the present generation. This is a difficult issue. People that benefit from it are not always the same as those who are at a disadvantage. Nuclear industry pleads for compensating measures. However, compensation of residents in storage-location communities to spread the burdens more fairly seems not to function just like that. Studies show that inhabitants regard the offer of compensation as a signal of danger that threats them and that government tries to bribe them. The offer of compensation can stir up resistance against the storage, unless -–as is more en more the practice – the storage is planned at a location with or near nuclear facilities, also with pro-nuclear people. If local partnership is considered, it should be considered as a representative democracy on a micro-level. Compensation should be guaranteed not only for this generation but also for many future generations.

1.3. Risk acceptance

In what Ulrich Beck describes as a risk-society, the acceptability of a decision depends on the extent to which the people actually affected by the decision feel they can take part in the decision-process.
From literature I have derived some factors that influence the acceptance of risks:

1. Small accidents are being a signal that things go wrong.
2. Distribution over time and justice: no risks should be passed to future generations.
3. Globality: the more people can be victim, the more unacceptable the risk.
4. Involuntariness: one does not accept a by government or industry forced risk.
5. Trust in government and science is of overriding importance in storage plans.
6. Familiarity with the risk: as almost no one is familiar with nuclear waste a resistance against storage plans is result.
7. Personal controllability and reversibility: people have the feeling it is unable to control a nuclear waste storage and irreversible when things go wrong.
8. Stigmatizing: the fear that because of nuclear waste a community will get a bad name and will suffer economic damages.
9. Possibility to avoid: for the perception of risk there is a difference between the discussion about produced waste from closed nuclear power plants and the discussion about ongoing production from nuclear power plants in service or under construction.
10. The idea that insufficient money is reserved for future storage costs.
11. The acceptance of the people should depend on the conditions: - the understanding of the acceptor of the decision taken by those in power; - the believe that the decision is for the common good; - the believe by the acceptor that the decision is also in his or her own interests.

All these factors should be addressed fully

1.4. Democracy

The following of general conditions for a discussion should be met:

- In the starting phase of a discussion, participating parties should make clear their values, ethical principles and criteria for the judgement on nuclear waste storage.
- From the beginning it should be clear that ethical and societal factors play a full role in the discussion. All groups that have interest in the issue should have the possibility to join the discussion.
- When discussion starts, conclusions should be open. A discussion to legitimize already token decisions has little value. A discussion has to deal with general questions about storage and not about the suitability of locations on a prepared list of locations.
- A discussion will not automatically succeed, because of different ethical principles and different judgements about risks. The various parties have to get

used to each other and learn from each. This process, also called social learning, requires time and guidance.
- Government is not the best appropriate authority to organise the discussion, as it took clear side in history.
- An independent authority has to be established for the organisation of a discussion
- Those who are critical to storage should be given funds to found their arguments. Between the different parties there may be no financial unequality.
- A Decide-Announce-Defend situation should no longer be considered as acceptable.
- The democratic procedure should be so, that it gives the best chances to resolving the conflicts of value and interests that are presented by the technical object (the disposal of nuclear waste).
- Good information and communication is important. It is of importance to give clearness of party's agrees and disagrees. Often deeper study is needed, followed by a confrontation of different arguments.
- Discussion is only possible on basis of a clear definition of the amounts of waste that are involved. Given the fear that a discussion is used by government to build new nuclear power plants, government should give guarantees. A possibility is that government only makes a decision to build new nuclear power plants only after a binding referendum

1.5. Responsibility

I mention 2 principles:

1. Because of the long-term consequences, the lack of knowledge concerning those consequences ought to be reason for great reserves. A practical application of this is the prescription to take more heed of bad expectations than of the good expectations.
2. We should train ourselves by trying to imagine what may go wrong. In doing so, it is vital that the possible good or bad consequences for future generations are of influence.

For nuclear energy and nuclear waste it concerns the problem of the irreversibility of the liberated radioactivity. In order to have nuclear energy at our disposal for perhaps the next 50 years, we create radioactive waste that continues to be dangerous for thousands of generations. The release of radioactivity results in a situation that cannot be reversed by any later decision whatsoever. A minority (the present generation) makes a decision the majority (future generations) will be charged for. That is why the exploitation of nuclear power stations should be carefully addressed

1.6. All the waste

Nuclear energy leads to radioactive waste. We are often told that this flow of waste can be controlled, because its volume is limited. It is, however, not so much the volume but the radioactivity that matters. Besides, it is also kept quiet in discussions that due to Dutch nuclear power stations in other countries a lot of waste is set free. This can

particularly be applied to the radioactive waste originating from uranium mining; only for the nuclear power station in Borssele already approximately 11,000 tons of waste of ore is concerned annually.

1.7. Fairness

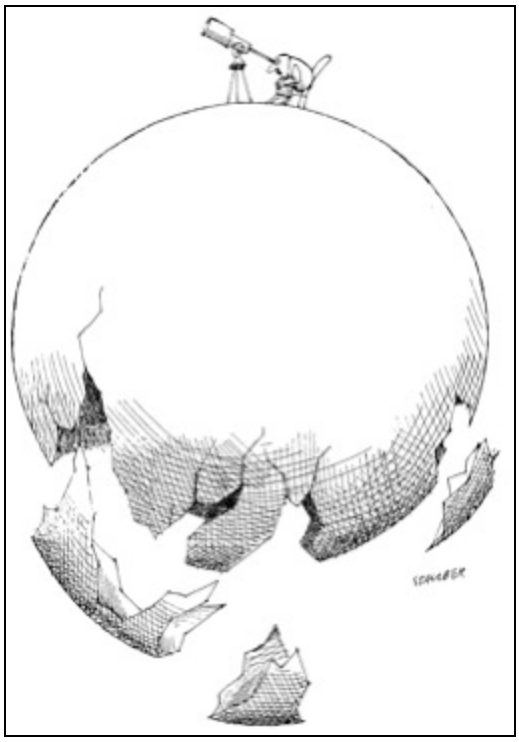
The procedural fairness means that the citizen should control the decision-making process, the final decision, have influence on the quality of the procedure, and be sure that the procedure is unbiased. Fairness should be guaranteed – in selecting radioactive waste management options, in site selection, in the decision making process.

The liability of the owners of nuclear power stations has been limited in the Treaty of Paris (1960) as well as in the Treaty of Brussels (1963). In the joint comment on the treaty of Paris we read: ”In the first place, because owners of nuclear installations would have unlimited liability according to standing law, while it is obvious that unlimited financial coverage cannot be obtained.” We can also find: “The extremely heavy financial burden, which could be the result of unlimited liability, might seriously endanger the development of nuclear industry.”

So, the nuclear incidents liability law particularly protects the nuclear industry: the nuclear industry is of greater value than the population and the environment. This I reject. So: unlimited liability should be guaranteed, or the nuclear power plants should be closed.

2. ETHICAL GUIDELINES: POINT OF VIEW OF ECKHARD KRUSE – GARTOW CHIRCH REPRESENTATIVE - GERMANY

With a little Cartoon I would like to demonstrate the issue of "long term governance".



In our working group No. 4 we have to discuss lots of term definitions. Some of you may think we are like this man with his telescope. Sometimes it seems those ethical topics have nothing to do with the topic of radioactive waste.

Normally the experts develop very special technical devices –in COWAM we focus on the quality of the decision making process. But our working group discussed different definitions of "future generations" and "long term periods":

- What means "long"?
- What is "long term"?
- When is "the beginning of future"?
- Is "future" tomorrow – or in thousands of years?

That is what we asked last year. And the future started – in the past.

Two days ago we had an interesting discussion about the definition of "Responsibility" and "Liability" – are parents liable for their little children? And in what case are parents "responsible" – and what has this really to do with the issue of radioactive waste?

On the other hand: our elaboration of "ethical guidelines" is really necessary. **We try to look at the whole scope.** And from this point of view the man with his telescope could be an expert. An expert focussing on a very special technical and detailed topic, who

seems to know very well the solution of an engineering problem. He may organize a lot of meetings with other experts in the worldwide nuclear community. May be they find a way of involving people in a local, national and international "Decision making process". But maybe the Dilemma of radioactive waste will still exist.

I am convinced that we have to bring those different views together: **We need people with a vision, and we need experts with the sight.**

The aim of COWAM 2 is, "to develop decision processes that are perceived as fair (and equitable) by the stakeholders involved."

We have to give recommendations from our working group. If the outcome of COWAM 2 should be just to give "ten simple Criteria", than each working group would have two sentences. I will give you two sentences. The first sentence should be:

- **Ethical issues are as important as management and technical decisions.**

The second sentence could be:

- **Governance of Radioactive Waste Management needs a continuous, but a very slow and sustainable process.**

Let me explain the necessity of such a slow and sustainable process. This means a process with enough time to find the same language and meanings to share. So that when words are used, there is an agreement of what they mean and what lies behind them.

I think the outcome of WP4 4 is that we are able to say: The presented "ethical guidelines" are our common sense and not the opinion of one expert.

3. NUCLEAR WASTE MANAGEMENT AND LONG TERM CONSIDERATIONS IN SWEDEN - CONTRIBUTION FROM OLOV HOLMSTRAND - THE WASTE NETWORK - SWEDEN

3.1. About the author

The author is a civil engineer with a Ph D in engineering geology, working as a researcher and consultant since the late 1960s. Many tasks have concerned hydrogeology and siting, for instance sanitary landfills. Simultaneously the author has been engaged in several NGOs, among others the Waste Network since the early 1980s. This engagement has included numerous visits to local groups, participation in meetings and seminars, writing statements etc.

The standpoints presented in this paper solely reflect the opinions of the author.

3.2. Overview of Swedish nuclear waste management

Simplified, nuclear waste management in Sweden might be described in the following steps.

1. 1950-1960. “The Swedish line” (uranium mining, heavy water reactors, reprocessing and nuclear weapons). No waste problem was openly acknowledged.

2. 1960-1970. The nuclear waste problem was still not seriously acknowledged. Spent fuel was considered to be a resource for further power production or perhaps still for bombs. In the middle of the 1960s some responsible politicians still believed that the amount of waste was so small that it was needed for medical purposes.

3. 1970. The Center Party, at that time explicitly anti-nuclear, put the nuclear waste issue definitely on the political agenda.

4. 1972. The first light water reactor started operating in Oskarshamn.

5. 1972-1976. The AKA state investigation presented a first outline of the KBS method (canisters deposited in the bedrock). Reprocessing was still a prerequisite. The deposit should be localised in a none-fissured or low-fissured part of the crystalline bedrock in the Scandinavian shield.

6. 1977. The Stipulation Act stated that no more reactors should get operation permits until a completely safe method had been developed for waste disposal and a binding contract for reprocessing had been presented. This law was a compromise on nuclear power forced by the Center Party as a condition to enter the non-socialist coalition government after the election in 1976.

7. 1978. The Government approved the KBS 1 method (deposition after reprocessing) according to the Stipulation Act. Reprocessing had been contracted with COGEMA

in La Hague. In reality this approval as a whole was a political and not a technical solution.

8. 1984. The Nuclear Technology Act replaced the Stipulation Act demanding an approval by the Government based on a statement of ongoing activities every 3 years. In 1984 KBS 3 (direct deposition without reprocessing) was approved according to the Nuclear Technology Act.

9. 1980-1985. Test drillings were performed by SKB (a company managing nuclear waste on behalf of the nuclear industry) in "type areas" with the purpose to find the best bedrock conditions for a final deposit. The drillings were finally stopped early in 1986 due to considerable local protests.

10. 1992-2000. Preliminary studies were performed in 8 municipalities after an inquiry for voluntaries to all municipalities in Sweden. Now the purpose had changed to find municipal acceptability. The validity of bedrock conditions was openly declared less important.

11. 2003. Test drillings were permitted and started in Oskarshamn and Östhammar, both municipalities depending on the nuclear industry because of hosting nuclear power plants. The EIA (Environmental Impact Assessment) process for an application started separately in both municipalities.

12. 2006. The local branch of the Social Democrat party in Oskarshamn declared to promote a nuclear waste deposit in the municipality. In reality the two municipalities compete to get the deposit.

3.3. Nuclear waste management in Sweden at present (2006)

From 1984 the Nuclear Technology Act demands that the nuclear industry shall account for its development of nuclear waste management every third year to the Government as a condition for nuclear power plant operation. On behalf of the nuclear industry SKB has presented research and development reports, which have been examined and agreed, sometimes with critical remarks, but never been rejected.

The Government´s demands on development of alternative methods have been weak and thus in the opinion of SKB the KBS 3 method is in reality approved. Solely based on the Nuclear Technology Act this might perhaps be a reasonable conclusion. However, presently the deposit should also be approved according to the Environmental Code. The Code states considerably more specific prescriptions on applications. This concerns e. g. precautionary principle, alternatives, BAT (best available technology) and resource economizing.

The present denomination of a method and site for nuclear waste long term storage is unclear in Sweden. When the waste problem was originally acknowledged in the 1970s final deposition was self evident and it was thought that the deposit should not need supervision and maintenance because the deposit should contain material of no value and of nobody´s interest. At least partly, this probably was a consequence of the fact

that originally only reprocessing residues should be deposited. The conditions started to change, when instead spent fuel should be deposited.

Thus, in some of the research and development plans presented by SKB in the 1990s the deposit was denominated “deep deposit”. This was a consequence of SKB´s plan to apply for stepwise deposition and presume retrievability and supervision. However, the Nuclear Technology Act still states “final deposit”, why SKB has changed back to the original denomination without changing the design and accomplishment of the method.

SKB, the company owned by the nuclear industry, is at present preparing a proposal for a final deposit (or deep deposit) either at the nuclear power plant in Oskarshamn or at Östhammar. According to present planning the proposal following the Environmental Code will be handed over to the Environmental Court in 2008. On the same time also the proposal for the encapsulation plant will be finished. Parallel applications will be made according to the Nuclear Technology Act.

The proposals worked out by SKB are expected to implement the KBS 3 method. The spent fuel will be deposited in canisters in the bedrock at a depth of about 500 meters. This is the only method seriously considered and developed since the early 1970s. Until the final deposit is in operation the spent fuel is kept in water basins in a rock cavern at 50 meters depth near the power plant in Oskarshamn. This interim storage is named CLAB and is claimed to be safe for at least about 100 years.

A proposal to increase the capacity of the nuclear power plant in Ringhals was the first nuclear energy project to be examined according to the Environmental Code. In April 2005 the regional Environmental Court denied permission on the following grounds:

- No site for a final deposit for spent fuel exists.

- The risk of serious radiological accidents is too high with respect to what is stated in the Environmental Code.

- The amount of energy released by the cooling water is an unlawful misuse of resources.

The Court´s decision clearly illustrates the difference between the Nuclear Technology Act and the Environmental Code. However, according to the Code, the Environmental Court had to pass the final decision to the Government, which approved the increase of capacity at the power plant because of its alleged significance for the society as a whole.

Late in 2005 Prime Minister Persson suddenly and unexpectedly declared that he felt the KBS 3 method to be “out of date”. At least temporarily this caused a general sense of uncertainty concerning the further work on nuclear waste management in Sweden.

3.4. Environmental impact assessment in Swedish legislation

The first Environmental Protection Act in Sweden was established in 1969 and stated that environmentally harmful activities should have permits. However, nuclear activities were not treated fully by the law.

Even if the Environmental Protection Act did not stipulate an EIA, the proposals according to the Act tended to include descriptions of environmental consequences and sometimes also alternatives. EIA became a formal part of the environmental legislation in 1991. Alternatives should be presented and consultations carried out with the concerned stakeholders. But the rules were vague and often the EIA was only a document produced by the operator of the activity and shortly describing environmental consequences of a project.

In 1990 SKI (The Swedish Nuclear Inspectorate) initiated the so called Dialog project. The purpose was to create a dialog between different actors and stakeholders on the issue of handling a proposal for a nuclear waste deposit. Most organisations and authorities concerned participated, but SKB refused. Several environmental NGOs including the Waste Network also participated. A part of the project was carried out as a game on reviewing a fictitious application for a disposal. Some of the unanimous conclusions of the project, published by SKI in 1993, were:

- The EIA process should be open and allow active participation of other actors than the applicant.

- Other actors as municipalities, environmental NGOs and local populations must be given resources e. g. for engaging experts for serious participation in the EIA process.

- It should be considered to have an independent coordinator of the EIA process.

- Alternative methods compared to KBS 3 should be developed and valuated.

- The choice of site should be carried out in a systematic way according to a procedure presented in advance.

In 1999 the Environmental Code finally and more seriously introduced EIA into the environmental legislation and also extended its validity into several more laws on environmentally influencing activities. Nuclear activities such as a waste deposit should be approved according to the Environmental Code.

An EIA must include:
- Alternatives concerning method and site
- The consequence of no activity (“zero alternative”)
- Consequences concerning environmental conditions
- Mitigations to diminish the consequences, if necessary compensation.

The preparation of an EIA is an important part of proposal planning. The working out of an EIA should include consultations with authorities, organisations and the public. According to Swedish environmental legislation EIA is both a process and a document. The Environmental Code specially points out environmental NGOs to be consulted in the process.

Swedish environmental NGOs claim that the Environmental Code puts harder demands on an application than the Nuclear Technology Act. This opinion is supported by the decision of the Environmental Court on the case of the Ringhals power plant as described above. Thus the work carried out by SKB so far on choosing method and site might be insufficient according to the Code, even if the work was approved according to the Nuclear Technology Act.

3.5. Elements of long term governance and responsibility

3.5.1. What is long term?

It is rather unclear what should be meant by "short" and "long" term. Based on Swedish conditions short term could be the next 100 years coinciding with the supposed operation time of CLAB, the interim storage in Oskarshamn. Real long term could be beyond the next 1000 years. Based on the most common opinions on the safety of the KBS method the period 100-1000 years from now might be regarded as a less controversial medium term period.

The Swedish debate on nuclear waste long term management has preferably been focused on technical safety, pollution of groundwater and environmental impact on humans and biosphere. The debate has often started from specified amounts of years. Three figures describing long term often appear in the debate.

5000-10 000 years.
The period is supposed to last until the next glaciation (ice age). SKB claims the KBS method to be "absolutely" safe, but NGOs claim that safety is not proved and radioactivity might reach groundwater and biosphere probably before this period. This beginning of this period approximately coincides with the requirement presented by IAEA in the "Draft safety requirements for geologic disposal of radioactive waste" (2005-04-28).

100 000 years.
This figure is normally mentioned to describe the end of responsibility for the waste. Within this period one or more glaciations might occur. During a glaciation the rock conditions are not as stable as in the inter-glacials. The heavy ice sheet might cause earthquakes, rock displacements and change the groundwater flow. SKB still claims the deposit to be safe, but not so absolutely. NGOs claim the risks during a glaciation to be unknown, ignored and considerable.

1 000 000 years.
This is beyond normal human conception. SKB claims the waste to be harmless. NGOs claim that parts of the waste still have not declined totally and could be spread out completely long before it is harmless.

As mentioned above the general idea originally was to construct a final deposit not needing any supervision. But future generations should be informed that something dangerous was deposited 500 meters down in the bedrock. NGOs have doubted that information still might be preserved and understandable several thousand years into the future. Looking back about 3000 years one example is the rock carvings in many parts of Sweden and especially inside the north part of the west coast, by coincidence near Kynnefjäll, known for the 20 years vigil against test drillings. The people who made the rock carvings obviously wanted to deliver a message. However, today we are not at all sure how to interpret their message.

3.5.2 Ethical considerations by Swedish NGOs

Nuclear waste management has been a matter of debate within environmental groups and organisations (NGOs) in Sweden at least since the early 1970s. However, there are no completely agreed ethical standpoints on nuclear waste within the engaged groups and committed individuals. In some cases the opinions are even clearly contradictory as for instance concerning the fundamental question if a final solution should be sought now or should be left to future generations.

NGOs in Sweden often claim that nuclear waste must be defined in two categories, the waste that already exists and the waste that still has not been produced. The first category is inevitable, but the second category can be avoided by shutting the nuclear reactors. We all have a moral duty to take care of the first category, even if some of us never have approved the production of it. This is not valid concerning the second category. Thus, the further production of nuclear waste must be validated concerning all the risks and environmental effects of nuclear technology.

Much ethical considerations by NGOs in Sweden have concerned the production of nuclear waste as the result of nuclear power operation. NGOs have resisted the KBS method as such and also as a product of SKB being the representative of the nuclear industry. NGO groups claim that the work of SKB is corrupted by the connection to nuclear power operation.

Even if NGOs in Sweden have no agreed ethical standpoints on nuclear waste the following have been discussed and put forward to other stakeholders:

- The ethical ambition should be not to expose us or future generations to unnecessary risks, responsibilities or costs due to produced nuclear waste.

Based on this overall ethical ambition three functional conditions, partly contradictory, were formulated in the 1990s, partly coinciding with the principles presented by KASAM (Swedish National Council for Nuclear Waste):

1. The deposit should be designed not to demand supervision or maintenance.

2. The deposit should be designed to admit retrieval if and when this is found necessary for repair and improvement.

3. The deposit should be designed to admit breaking the possibility of retrieval, if future generations find this necessary, e. g. if retrievability is supposed to be too risky.

Nuclear waste should be looked on and treated from a holistic view on society and development. Nuclear waste does not appear naturally and should therefore not be treated only as a technical problem to be solved without questioning the production. What is the object of solving the nuclear waste problem? Is it self evident that nuclear waste management is just a question of long term storage under specific conditions concerning the difficulty to change this storing? The connection between nuclear technology as a whole and nuclear waste is in now way a hidden agenda according to the Swedish environmental NGOs.

Nuclear waste must therefore be looked upon considering the nuclear technology as a whole. This includes:

- Uranium mining creating large amounts of wastes in the areas of indigenous peoples
- Nuclear power plants causing accident risks or being targets for terrorists
- Nuclear weapons proliferation and tests
- A manifold of transports creating risks
- The risk of actions by terrorists not bothering about radiation hazards.

The nuclear waste problem might be solved today using the existing knowledge and resources to create a final deposit with the aim to restrict later changes. If so, this is an expression that the people living now want to lift off this problem from future generations. On the other hand a group of nuclear enthusiasts appose any final disposal making the access to the waste difficult. In their opinion the waste is a valuable source of energy (or maybe bombs).

There are also people in NGO groups apposing any solution now. One opinion is that future generations probably will find better ways to handle the waste. Another opinion is unwillingness to discuss the matter at all before the closure of all nuclear reactors. These examples show that groups expressing the same opinion might have very different motives.

Reasons for implementing a fast solution (pessimistic):

- Those who have benefited from nuclear power should also take the whole responsibility to solve the waste deposition.

- It is not possible to relay on the stability of the society either from technical, moral or economical viewpoint.

- The Swedish nuclear waste fund might not be sufficient in the future due to wrong calculations, later technical or organisational problems or a general economic collapse.

Reasons for not implementing a fast solution (optimistic):

- It is up to future generations to find an acceptable solution, as we are not able to do that today.

- It is wrong to finalize a deposit now, which might not be accepted by future generations and which makes it difficult for them to change if they want to.

- We should not finalize a deposit now, which is not completely safe. It is better to continue keeping the waste in a guarded interim storage.

- Future generations will probably develop methods for eliminating the waste completely.

3.5.3 Financial resources

Nuclear waste management in Sweden is financed by a tax on nuclear energy. The money is collected in the Nuclear Waste Fund, founded in 1981 in accordance with the Financing Act.

Money from the Fund is transferred to SKB for financing its research and development work. This reimbursement is decided by SKI (the Nuclear Power Inspectorate). SKI may also transfer some money to municipalities concerned by SKB activities. Some local NGO groups have secondly got limited grants by the municipalities. However, up to 2005 the Financing Act did not allow grants to be given directly from the fund to NGOs.

NGOs have pointed out some weaknesses of the fund and the statutes of the fund:

- The fund prescribes that one solution is to be decided and executed. When the chosen solution is completed the fund should be empty. This does not allow any re-start if the chosen solution for some reason must be given up uncompleted.

- If the deposit has been completed and somewhat later needs maintenance or complementary actions, no money is available.

- If the deposit needs supervision this is not foreseen in the statutes of the fund.

- The general risks of social and economical collapse.

Within the Waste Network it was expected that environmental NGOs should be given the opportunity to get grants from the waste fund as a consequence of the Dialog project. This became even more important when SKB during the 1990s claimed to have started the working out of an EIA. But still in 1998 the Government rejected applications for resources referring to what was stated in the Financing Act and showing no intention to change the rules. Finally in 2003 things started to change.

In October 2003 several environmental NGOs were invited to a meeting on the issue of economic resources for participating in the EIA process concerning a nuclear waste deposit. It was obvious both to the investigator and most of the NGOs that it would be unpractical to administer a lot of grants to many NGOs. Therefore at the meeting the NGO group proposed a coordinated NGO secretariat to manage the EIA participation. The investigator agreed on this idea and proposed the Government to change the Financing Act in this way. Grants should be given to NGOs or groups of NGOs fulfilling the same conditions (formal organization, at least 2000 members and at least 3 years of activity) stated by the Environmental Code for appealing against a permit given according to the Code. The Government proposed the change of the law in March 2004 and the parliament later came to the decision. From 2005 it is possible for NGOs to apply for grants from the Nuclear Waste Fond, 3 million SEK per year during 4 years.

The following grants have been given in 2005 and 2006.

- The Swedish NGO Office for Nuclear Waste Review (MKG) was founded by the Swedish Society for Nature Protection (by far the biggest environmental NGO in Sweden), Fältbiologerna (the Field Biologists, a youth organisation) and OSS (the local group in Östhammar associated to the Waste Network). MKG got 1 950 000 SEK in 2005 and 1 925 000 SEK in 2006.

- The Nuclear Waste Secretariat of the Swedish Environment Movement (Milkas) was founded by the Swedish Anti Nuclear Movement (FMKK) and Friends of the Earth Sweden (MJV). Milkas got 1 000 000 SEK in 2005 and 1050 000 SEK in 2006.

- MFK (Environmentalists for Nuclear Power), a pro-nuclear organisation mostly engaging people employed by the nuclear industry, got 50 000 SEK in 2005. The grant was not used to participate in the EIA process, but was given as a scholarship to a student at a technical university. No application was made for 2006.

- SERO (Swedish Renewable Energies Association), an organisation mainly active in supporting renewable energy, got 25 000 SEK in 2006. SERO has not earlier been actively engaged in the nuclear waste issue or cooperated with other NGOs on this issue.

3.6. NGO demands to be presented in the EIA Process

As explained above Swedish environmental NGOs have no complete consensus on the issue of nuclear waste management. However, concerning the demands on the EIA

process most of the opinions coincide. The following standpoints generally reflect those represented by MKG as interpreted by the author:

- Continuation of nuclear waste production, also in connection with uranium mining, is inconsistent with sustainable development.

- The problems of nuclear waste management must be dealt with now and not left to an undecided future. However, this does not automatically mean that any final solution needs to be implemented within a short period of time.

- Irrespective of storage or disposal method nuclear waste is a possible source for nuclear weapons for a very long time and must therefore be subject to long-term safeguards.

- Any storage or disposal must be designed considering the risk of intentional or unintentional intrusion.

- The management of nuclear waste is a national task. The EIA process should thus be performed on a national scale, not as now in the municipal and to some extent regional scale.

- The choice of method should precede the choice of site.

- The choice of method should be made according to a systematic process and considering functional conditions set up in advance. Different alternatives should be evaluated and compared according to strict long-term environmental standards that comply with sustainable development. This demands extensive information on more than one possible method.

- The choice of site should also be made according to a systematic process and considering functional conditions set up in advance. A clear and understandable sieving process at a national scale should be performed to find the best possible site considering environmental conditions.

- Changes have to be made so that an independent body supervises the EIA process instead of the nuclear industry. This increases the chance that the choice of method and site gain legitimacy and acceptance in the eyes of ordinary citizens.

4. RADIOACTIVE WASTE MANAGEMENT IN GERMANY - OVERVIEW OF CURRENT STATUS - JÜRGEN WOLLRATH - FEDERAL OFFICE FOR RADIATION PROTECTION (BFS) - GERMANY

4.1. Introduction

Since 1998, the federal government has made a pronounced change compared to the previous energy policy. It is intended to phase out nuclear energy use for electricity generation. According to the agreement of 14 June 2000 the federal government and the utilities agree to limit the future utilisation of the then existing 19 nuclear power plants. For each installation the amount of energy it may produce is calculated from 1 January 2000, until its decommissioning. According to this, the time of operation of a nuclear power plant amounts to 32 calendar years on average, starting at the beginning of commercial operation. The new policy is enforced by the latest amendment of the Atomic Energy Act (AtG) which became effective on 27 April 2002. Pursuant to the coalition agreement between CDU/CSU and SPD from 11 November 2005 the agreement of 14 June 2000 between the federal government and the utilities and the AtG shall remain unchanged.

According to the new approach to waste management and disposal, the suitability of Gorleben as disposal site is doubted. Therefore, its exploration is interrupted since October 2000. The disposal of radioactive waste into the Morsleben repository will not be resumed. The licensing procedure remains restricted to decommissioning. In February 1999 the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) set up a special expert group (AkEnd) to develop repository site selection criteria and respective procedures on a scientifically sound basis. The recommendations of AkEnd were published on 17 December 2002 (http://www.akend.de).

4.2. Radioactive Waste Management Strategy

Radioactive waste disposal policy in Germany is based on the decision that all types of radioactive waste are to be disposed of in deep geological formations. The AtG gives the responsibility for the disposal of radioactive waste to the federal government with Federal Office for Radiation Protection (BfS) as the responsible authority. According to present legislation in Germany, radioactive waste disposal is a federal task while the waste producers' role is confined to the reimbursement of the necessary expenses.

According to the German disposal approach radioactive waste is basically subdivided into waste with negligible heat generation (i.e., LLW and ILW) and heat-generating waste (i.e., HLW and SNF). Radioactive waste with negligible heat generation comprises all types of radioactive waste originating from the operation, decommissioning and/or dismantling of nuclear facilities, e.g. nuclear power plants, reprocessing facilities, nuclear industry for supply and disposal of radioactive materials, research and development establishments, smaller waste generators such as hospitals, industry and universities.

As to the radioactive waste arising, the BfS carries out an annual inquiry into the amounts of radioactive waste in Germany. According to the latest inquiry, about 38,000 m^3 of radioactive residues and preconditioned waste and about 82,600 m^3 of conditioned waste with negligible heat generation had been accumulated in Germany by the end of 2004. The amount of unconditioned and conditioned heat-generating waste was 50 m^3 and 1,700 m^3, respectively (without spent fuel elements). Due to a forecast into waste amounts to be expected in future, approximately 290,000 m^3 of conditioned waste with negligible heat generation and approximately 24,000 m^3 of conditioned heat-generating waste are accumulated up to the year 2080.

SNF was either shipped to the French and British reprocessing facilities, stored on-site at the nuclear power plants or at central off-site interim storage facilities. HLW originating from reprocessing which is returned to Germany is stored at the hall of the Gorleben interim storage facility. According to the agreement between the federal government and the utilities and to the April 2002 amendment of the AtG, the management of SNF is now restricted to direct disposal. Up to 30 June 2005, transports for reprocessing have been permissible. In addition, the nuclear power plant operators must provide interim storage facilities on-site. From 1 July 2005 onwards SNF may only be transported if no licensed interim storage capacity exists at the respective nuclear power plant site and if the operator of this site is not responsible for this situation. As a consequence the utilities will construct and operate new engineered storage facilities at the sites of nuclear power plants.

4.3. On-site Interim Storage of Radioactive Waste

Starting at the end of 1998 until February 2002 the utilities filed 17 applications for dry on-site interim storage of SNF in decentralised facilities (12 interim storage facilities and five interim storage areas) to BfS, which is the competent licensing authority for such facilities. As to the interim storage areas the mass of heavy metal applied for varies between 120 Mg and 200 Mg and the activity between $7.6 \cdot 10^{18}$ Bq and $2.8 \cdot 10^{19}$ Bq. The respective figures for the interim storage facilities are 450 Mg to 2,250 Mg and $4.4 \cdot 10^{19}$ Bq to $2.7 \cdot 10^{20}$ Bq.

When filing the applications the applicants asked for a stepwise licensing of parts of an application in order to expedite the issuing of a license. The excluded parts of the applications remain to be pursued later on and are presently examined. Thus, BfS issued the licenses for the interim storage areas from April 2001 to June 2003 and the licenses for the interim storage facilities from November 2002 to December 2003 in the first licensing step. As part of the examinations performed within the licensing procedure BfS decided to include an assessment of a terrorist attack using an aircraft and to investigate if the necessary protection has been provided against disruptive action or other interference by third parties. The assessment of a forced aeroplane crash including big commercial aeroplanes was taken into account. As a result the required safety could clearly be demonstrated. As of November 2005 four interim storage areas and one interim storage facility are in operation.

4.4. Disposal of Radioactive Waste

Prior to 1980 the former iron ore mine Konrad was selected as a site for disposal of short-lived and long-lived radioactive waste with negligible heat generation and the salt dome at Gorleben as a site for the disposal of all types of radioactive waste. In the former German Democratic Republic short-lived low- and intermediate-level radioactive waste was disposed of in the Morsleben repository, a former rock salt and potash mine. Since German unity the Morsleben facility has the status of a federal repository. From 13 January 1994 on disposal of radioactive waste has been resumed. According to a 25 September 1998 court order BfS had to immediately stop further radioactive waste disposal in the so-called eastern emplacement field. Thus, last emplacement operations were carried out on 28 September 1998.

Pursuant to the 1998 coalition agreement and the 2000 agreement between the federal government and the utilities, the German radioactive waste management and disposal concept is being reviewed and will be adopted due to political decisions, new findings and specific evaluations. According to these agreements the most important issues are:

- The previous radioactive waste management concept has failed with regard to its content and has no longer a technical basis. A national waste management plan for the legacy of radioactive waste will be developed.
- A single repository in deep geological formations is sufficient for the disposal of all types of radioactive waste. The disposal of HLW by the year 2030 is the political aim for the disposal of all types of radioactive waste.
- There are doubts with regard to the suitability of the Gorleben site. Therefore, its exploration is interrupted and further sites in various host rocks shall be investigated for their suitability. The licensing procedure for the Konrad repository project shall be terminated. The Morsleben repository shall be decommissioned.

Pursuant to the 2005 coalition agreement CDU/CSU and SPD acknowledge the national responsibility for the safe disposal of radioactive waste and will work on this topic efficiently and result oriented to come to a solution in this legislative period, that is up until 2009.

A clarification of the doubts with regard to the suitability of the Gorleben site has been initiated. The respective investigations aim to the clarification of conceptual and safety related issues. Twelve crucial topics dealing with the definition of time frames, the role of the multiple barrier system, the application of reversibility and retrievability, scenario definition and safety assessment considering human activity and human intrusion, treatment of criticality, assessment of gas production and pressure build-up, treatment of non-radioactive toxic components of the waste packages and possibly of the backfill material, treatment of nature observations and safety indicators, the role of probabilistic safety assessments, the influence of geochemical processes, and safeguards have been identified. Work has been finished in Autumn 2005 and documented in twelve reports. These reports were reviewed by independent experts and the results were discussed by approx. 80 experts during a workshop organised by BfS in September 2005. Based on the reports, the reviews, and the results of the workshop BfS summarised the work in a synthesis report. All reports are available at http://www.bfs.de/Endlager/publikationen/Einzelfragen_Endlagerung.html.

4.4.1 Gorleben Repository Project

Though the federal government has expressed doubts with respect to the suitability of the Gorleben site, it is not considered to be unsuitable and will be included in the future site selection process. According to the agreement with the utilities further underground exploration of the salt dome can contribute nothing to clarify the doubts of the federal government. For this reason the underground exploration will remain interrupted at most 10 years (Gorleben moratorium). The moratorium became effective on 1 October 2000.

4.4.2 Konrad Repository

The licensing procedure for the Konrad repository is finished. On 22 May 2002, the competent licensing authority, i.e. the Ministry for the Environment of the federal State of Lower Saxony (NMU), issued the license. Subsequently, the license was handed over to the licensee BfS on 5 June 2002, and published in the Gazette of Lower Saxony on 12 June 2002. With this a licensing procedure came to an end that had lasted for nearly 20 years. Application was filed on 31 August 1982 by the then competent Federal Institute of Physics and Metrology (PTB).

According to the agreement between the federal government and the utilities BfS withdrew the application for immediate enforcement of the license on 17 July 2000. This withdrawal in particular means that the re-construction of the Konrad mine into a repository for all types of radioactive waste with negligible heat generation will only be possible after final court decision. The Lower Saxony administrative court decided on 8 March 2006 that the permission given for the Konrad repository was justified. Three local communities and a nearby farmer had requested an injunction, which was not granted. The judge ruled that communities do not have a right to speak for individuals in their population on these matters. The judge also ruled that legal action by the farmer was permissible, but observed that he would not be exposed to additional radiation by the repository. The judge was satisfied by the conclusion from the permission process completed in 2002 that likely exposures would be below current standards and that the infrastructure of the planned repository was sufficiently safe even in the face of catastrophic events such as a plane crash. He did not permit any contesting of the ruling. Based on this court decision further decisions on the Konrad project will have to be taken by BMU.

4.4.3 Morsleben Repository

The Morsleben repository will not resume radioactive waste emplacement operations. An application for the licensing procedure for decommissioning was already filed on 13 October 1992. The assessment of the safety in the post-closure phase is of special importance. At present BfS is concentrating its activities on the licensing procedure and the preparation of respective documents. The main licensing document, the so called Plan, has been provided to the licensing authority on 13 September 2005.

The latest important issue comprise backfilling measures in the central part of the mine. The backfilling of selected rooms of this part not previously used for waste emplacement is performed in order to maintain geomechanical stability and integrity. Thus, an important safety-related prerequisite with respect to the future backfilling and sealing of the Morsleben repository will be provided. The backfilling measures started on 8 October 2003. In total, 20 rooms will be backfilled up to the year 2009.

4.5. New Site Selection Procedure

According to the new approach to waste management and disposal, further sites in various host rocks shall be investigated for their suitability. The final site shall be selected upon a subsequent comparison of potential sites, including the Gorleben site. Thus, BMU set up an interdisciplinary expert group (AkEnd) to develop repository site selection criteria and respective procedures on a scientifically sound basis. The criteria and procedures aim at finding the relatively best suited site in different host rocks in Germany. The primary objective of the site selection procedure is to identify – with public participation – potential disposal sites in a comprehensible and reliable way. Step by step and based on criteria which have to be defined beforehand, those areas, site regions and sites shall be selected that offer particularly favourable conditions for the later suitability demonstration of the site and its confirmation in a future licensing procedure.

Public acceptance is considered to be of major importance for the success of a site selection procedure. Such a procedure needs a clear and transparent structure and must be based upon well founded criteria in order that progress, fairness and objectivity of the procedure can easily be followed and respective decisions can be understood. The evaluation basis and criteria associated with the selection procedure must be fixed beforehand to avoid decisions which the public may perceive as not sufficiently justified or even arbitrary. Finally, public participation is indispensable from the very beginning and in all phases of the selection procedure.

The selection procedure proposed by AkEnd is structured in five steps. In the first step, those areas are identified which meet geological minimum requirements. Within these areas, at least five regions are selected in the second step which, after weighing consideration of the geological situations, offer particularly favourable conditions for disposal. In the third step, with these regions at least three site regions are selected from above ground, based on geoscientific and mining aspects as well as on analyses of the regional socio-economic potential. Among site regions offering the same estimated level of safety those are preferred where public support of further investigations is higher. In the fourth step, the selected site regions are explored from above ground and, based on their results, two sites for underground exploration are determined by a federal law. In the fifth step, the underground exploration of these two sites is carried out and their results are evaluated. The selection procedure is terminated with the site decision by federal law as well. Subsequently, a licensing procedure for the disposal facility at this site has to be performed.

5. RECOMMENDATIONS BY MONA REGARDING THE SOCIO-ECONOMIC ASPECTS ASSOCIATED WITH THE INSTALLATION OF A NUCLEAR WASTE DISPOSAL IN MOL - H. CEULEMANS, B. MEUS, L. VANHOOF - MONA - BELGIUM

5.1. Introduction

In Belgium, the management of radioactive waste is taken care by ONDRAF/NIRAS, the Belgian Agency for radioactive Waste and Enriched Fissile Materials. In 1998, ONDRAF/NIRAS started a partnership approach to discuss the disposal of "category A" radioactive waste with local stakeholders. Four municipalities have been contacted : Dessel, Farciennes, Fleurus and Mol. The local partnership of Mol, called MONA[1], was set up in February 2000 (see organisational structure on Figure 1). All members of the working groups are volunteers, not paid for their participation. ONDRAF/NIRAS provides financing (around 250 000 €/year) mainly for the Secretariat, independent studies and some travel.

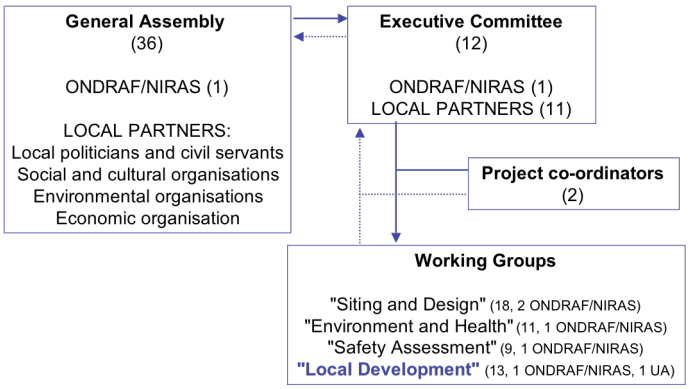


Figure 1. Organisational Structure of MONA

The working group on "local development" was set up in order to define what are the socio-economic conditions required for acceptance of a potential disposal of "category A" radioactive waste. The work was organised into three phases:

- Establishment of a list of priority projects;
- Presentation of this list to the Executive Committee and the General Assembly;
- Investigation of the possibility to create a fund.

The results of this working group were presented in the final report of MONA[2] around three themes :

- Socio-economic conditions for the acceptance of a disposal;
- Proposals for the creation of a fund;

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1 MEUS B., CEULEMANS H., "MONA, Public participation in the siting of a LLW repository in Mol, Belgium", Proceedings of ICEM'03, September 21-25, Oxford, England.

2 MONA Recommendation : "MONA, een weg naar de aanvaardaarheid van een berging van caterorie A-afval in MOL ?", january 2005

- Proposals for a participation entity.

The purpose of this paper, written within the framework of the work package on long term governance of the COWAM-2 project, is to summarize the proposals of MONA regarding local development associated with the installation of a nuclear waste disposal in Mol. An unofficial translation of an extract from the recommendations of MONA concerning these aspects is presented in Appendix 1.

5.2. Socio-economic conditions for the acceptance of a disposal

The recommendations of MONA regarding the socio-economic conditions contributing to the safety of the nuclear activities and to the protection of health and the environment are the following :

- **The nuclear expertise** in the region should be preserved, in particular regarding radiation protection and waste management.
- The existing **nuclear emergency planning** must be optimised and the population must be better informed about it.
- The existing **emergency services and the medical infrastructure** in MOL must be optimised.
- **Loss of ecological value** caused by the construction of a disposal must be limited to the maximum possible extent and, in the event, be compensated for.
- High quality **surveillance of radioactive contamination** for the area must be pursued.
- The **health surveillance**, which was performed for MONA by the Provincial Institute of Health, must be pursued and if possible improved.

5.3. Creation of a fund

The purpose of a fund is to **improve the quality of life of the inhabitants** of MOL and the wider region because they face up to the repository at a close range. It is also important that **not only the present generation** should benefit from the added value linked to the repository. Future generations would also have to share the additional burden and should thus also share the benefit of the added value.

A fund offers the possibility to **respond to the changing of societal needs** and makes for a **lasting and visible link with the repository** enhancing an integrated approach.

The fund's mission statement

- The fund **is created to improve the quality of life** of the inhabitants of MOL and the wider region;
- The fund is created to achieve this by implementing **a broad range of projects** (social, economic, cultural, on environment, health and education);
- There should be projects in the **short, medium and long term;**
- The projects must be **result-driven and sustainable** and must produce **long-lasting positive effects** in their own field. They must have a broad societal support;
- The fund must be **managed by an autonomous, independent entity;**

- The fund should **regularly investigate the social/societal needs** and then devise strategic goals;
- The fund advocates **a high-quality operation**. The final assignment of projects, the follow-up and the evaluation must occur with professionalism and high quality. To this end the fund will also **call upon external experts;**
- The fund will **communicate on a permanent basis** about the operation of the waste disposal and the concrete realisation of projects. The fund wants to emphasize constantly **the link between the repository and the projects.**

Some ideas for the financing of the fund
These ideas emerged from the discussion between MONA and the CEPN when preparing this paper. They do not reflect the position of all the participants of MONA and are not included in their final report.

- Financing could be **provided by the operators**, as the State cannot support directly such a fund. It could result from **accruing dues during approximately 50 years;**
- Specific legislation may be necessary for the **creation of financial reserves** by the operators;
- The structure should be **autonomous**, not depending on the government in order to avoid to being influenced by political changes;
- The **total amount of the fund** could be in the order of **50 to 100 million Euros** (construction cost for the surface repository is around 500 millions Euros);
- In order to ensure financing for the long term (i.e. after the initial financing period of 50 years), **only the interests of the capital** could be used to finance the projects;
- According to the time period, only **low-return investments** are envisaged

5.4. The participation entity

MONA considers that a permanent participation of the local stakeholders would be necessary first of all for a **follow-up of the MONA report** from its publication and submission to the communality council until the final decision of the federal authorities.

Furthermore, if the waste would be disposed of in MOL, MONA believes that the inhabitants must be given **the opportunity to check whether the boundary conditions** stipulated by MONA concerning site, safety, health and environment are being met, and whether the **socio-economic accompanying measures** are implemented.

In view of the presence of several nuclear activities in the region, MONA wants also **to broaden participation in the decision-making process**, and to involve the local stakeholders in the follow up of, for example, the remaining nuclear waste from the past, the transport of high level radioactive waste in the region, the activities of the underground research laboratory EURIDICE and the cleaning up of nuclear sites after termination of their activities.

Finally, the entity to be set up will have to take care of the **problem of communicating with the population of MOL**.

Proposal for a participation entity

The participation entity could be established by representatives of the different societal segments in the community of MOL (see Figure 2). If the repository will be located in MOL, the main task of the entity would be the following :

- **Keeping track of the MONA report** in co-operation with the communality and ONDRAF/NIRAS;
- Watching over the execution of the **technical and societal aspects** associated with the MONA report;
- **Managing** the fund;
- **Communicating** openly with the population.

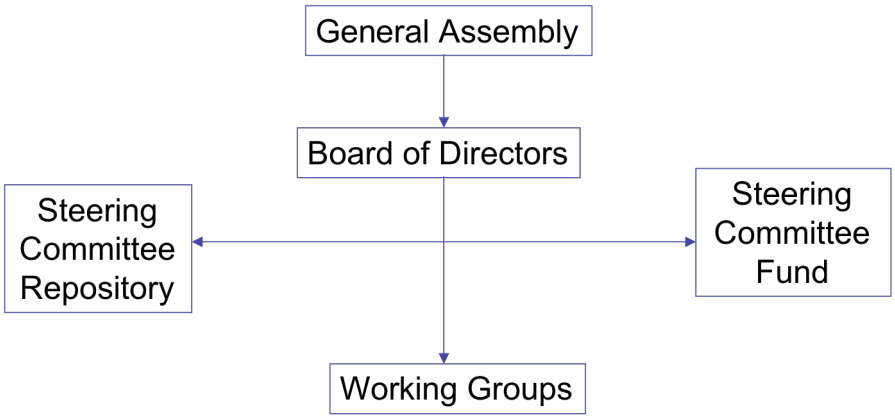

Figure 2. Organisation chart of the participation entity

5.5. Main conclusions of the MONA report

MONA delivered a favourable advice to the communality council of MOL about disposal in MOL of Belgian "category A" radioactive waste, provided all legal requirements are fulfilled and the conditions formulated by MONA are satisfied. These conditions relate to the measures for ensuring safety and protecting the health and the environment, the conditions for a disposal (in terms of location and concept), the creation of a specific fund for the local development, the participation of the local population through the creation of a participation entity and finally the necessity for an inter-communal co-operation with the Dessel communality.

APPENDIX 1 :

EXTRACT FROM THE MONA REPORT ON THE CONDITIONS FOR ACCEPTING A DISPOSAL OF CATEGORY-A NUCLEAR WASTE IN MOL (JANUARY 2005)

5.6. Local Development Working Group

5.6.1. Introduction

In this section we describe the task given to the "Local Development" (LD) working group and the way they have completed their task and reached a final proposal. This proposal stipulates that MONA will accept a storage facility on the territory of MOL, only if a set of well-defined provisos has been met.

5.6.2. Task

The task given to the LD working group consisted in determining the social pane of the integrated project. The members of the group devised an answer to the question how a potential repository of "category A" radioactive waste can be embedded in a global project benefiting the region. Whereas the other working groups devised requirements in the areas of design, health and environment, and safety, the LD working group investigated the socio-economic conditions required for acceptance of the repository.

5.6.3. Operation

In contrast to the technical working groups, the operation mode of LD was not based on a plan involving a sequence of steps, but started from the open questions: "What are our goals?" and "How can we best achieve our goals?" This mode of operation allowed flexibility and was well adapted to the variety of ideas circulating, and gradually taking shape, within the working group.

The working group members consulted with their respective constituencies and called upon external experts from different organisations involved in regional development such as "CAMPINE Regional Platform" and IOK (Inter-communal CAMPINE Organisation). Visits organised by MONA, among others, to similar repositories in different countries, also contributed to a better insight. The working group explored different lines of thinking and, in the end, arrived at a soundly structured socio-economic report, which is an integral part of the repository case.

From the beginning, the working group aimed at collaboration with STOLA-DESSEL. It was stressed that municipal borders are only administrative borders as far as the problems related to a repository of "category A" waste are concerned. However, the

decision by the LD group of STOLA to limit, for the time being, its exploration of popular sentiment to its own municipality, has been respected by the LD group.

Operation of LD can be split in three phases. During the first phase the working group concentrated on establishing a list of priority projects. In the second phase it went on to present the list to the Board of Directors and to the General Assembly and obtained feedback from the other working groups. Finally, in the third phase, the idea of a fund was taking shape and further pursued.

Phase 1: establishing a list of priority projects

The point of departure of LD was to arrive at a list of projects, which would represent an added social-economic value in case of acceptance of a repository of "category A" radioactive waste on the municipality's territory. In the course of about ten sessions, the path of a priorities list was pursued. Initially, the group brainstormed about possible projects that might yield an added value to a repository. The proposals were very diverse and ranged from small- to large-scale. The working group classified this extensive list into a number of social-interest topics:

- Economy / employment;
- Financial compensations;
- Health care;
- Information / communication / participation;
- Youth care;
- Environment;
- Mobility;
- Education;
- Sports;
- Tourism and recreation;
- Safety;
- Provisions for the elderly
- Transportation infrastructure.

The working group recognized, of course, that it is impossible to accomplish this entire list of projects. Therefore, selection criteria were set up to evaluate the projects:

- No financing of projects whose responsibility lies with society, companies or institutions (no projects which have to be implemented in any case by third parties);
- Selected projects should serve the general interest as much as possible;
- No projects to be completed in the short term (4 to 5 years);
- Projects should preferably be socially committed;
- Projects should preferably be environmentally friendly;
- Selected projects should be durable.

According to an internally agreed evaluation system, the working group came up with a list of priority projects. These constituted a first attempt to put forward socio-economic measures accompanying the repository construction. A survey of the list of priorities, ordered by topic is given in section 5.7.1.

In reviewing and evaluating the projects, the working group members estimated that a number of proposals would have to be implemented anyway. Those proposals are mainly to be found in areas like safety, health and providing information in connection with the presence of nuclear-related activities in the region. LD members did not perceive those proposals as representing an added value to a potential repository but rather as necessary prerequisites. As a result, they were altered later on into general provisos for accepting a repository. A survey of these general provisos is given in section 5.7.1.

Phase 2 : Feedback on the list of priority projects

The list of general provisos and the list of priority projects on which acceptance of a repository should depend, were presented to the Board of Directors and to the General Assembly.

Both bodies supported the idea to split up the provisos in two sets: on the one hand those which have to be met anyway and on the other hand the added value project proper, which should create truly extra value for the local people.
They also supported the selection criteria proposed by the working group. In general, they subscribed to the work that the working group had delivered thus far.

Additionally, they offered a number of suggestions:

- Social tendencies should be taken into account; it appeared that a number of projects from the list had already been implemented or were no longer opportune.
- A long-term vision should be kept in mind; therefore the projects should not be limited to the short and medium term.

The comments of the Board of Directors were discussed at length during working group meetings and taken into account in the proposals. The working group became ever more aware of the fact that projects which are deemed useful today may no longer be needed tomorrow. Moreover, social needs and requirements change. They are subject to many factors. These factors are not always clearly predictable. As the working group estimated that it is important to implement the right projects, it wanted to reflect further on these matters.

The working group was also of the opinion that it is important that not only the present generation should benefit from the added value linked to the repository but that the potential repository should also for future generations, be part of a overall project in which technical and socio-economic aspects are integrated. Indeed, future generations would also have to share the additional burden and should thus also share the benefit of the added value. As a result, it should be made possible to implement also long-term projects.

Phase 3 : A fund as socio-economic added value

These considerations lead the working group to depart from a specific list of priorities and to implement the added value by creating a fund. A fund has the possibility to

respond to the changing societal needs and offers future generations the possibility to derive benefit from the added value connected to the repository. A fund also makes for a lasting and visible link with the repository enhancing again the integrated approach.

To explore further the idea of a fund and draft its mission statement, the working group used a number of group brainstorming methodologies. An external expert assisted the process by means of a SWOT-analysis. This showed which elements were important and had to be included in the mission statement and the underlying vision on the fund. The results of the analysis are presented in appendix.

5.7. The socio-economic provisos for acceptance of the repository

In the previous section we described how the working group arrived at filling in the socio-economic added value by spelling out the general provisos as well as an added value project taking the form of a fund.

Here, the ideas behind the general provisos and the fund are further expanded and the requests are being explicitly specified.

5.7.1. The general provisos

In the areas of safety, health and environment

It is clear from the preconditions formulated by the technical working groups regarding "category A" waste disposal that MONA will accept a repository only if it is safe in the first place and has no detrimental impact on the environment and on public health. These conditions, however, apply not only to a repository but also to all nuclear activities present in the region. Finding social support as well for the repository as for the nuclear activities in general is only possible if, in the first place, these utmost important conditions have been satisfied.

Hence, LD is adding to the conditions imposed by the technical working groups a number of general provisos. They should contribute to the safety of the nuclear activities already present in the region. They also pay attention to health-related and environmental issues.

- The nuclear expertise in the region should be preserved, in particular regarding radiation protection and waste management. Continued presence of skilled personnel in order to manage nuclear activities safely is a first prerequisite towards this goal.
- The existing nuclear emergency planning must be optimised and the population must be better informed about it.
- The existing emergency services (fire department, police, medical services, etc.) and the medical infrastructure in MOL must be optimised taking the special situation into account.
- Loss of ecological value caused by the construction of a repository must be limited to the maximum possible extent and, in the event, be compensated for.
- High quality surveillance of radioactive contamination in the area must be pursued. This implies, among others, a correct functioning of the present TELERAD system and other surveillance programmes and their continuous adjustment to internationally accepted views.
- The health survey, which was performed for MONA by the Provincial Institute of Health (PIH) must be pursued and, if possible, improved.

Permanent (decision-making) participation

On top of the general provisos mentioned above, the working group added permanent participation as another necessary condition for accepting a repository.

Why is permanent (decision-making) participation necessary?

The inhabitants very much appreciated the opportunity, made possible via MONA, to participate in the decision-making. The participants in MONA could take part, from the very start, in determining the project, as opposed to being confronted with a finalised project. It would be a fundamental limitation if (decision-making) participation would stop once this report has been submitted.

First, MONA noticed that permanent (decision-making) participation is necessary for a follow-up of the MONA report. The itinerary of the report has to be tracked from the moment it is handed to the communality council up to the final decision by the federal authorities. Those at the basis of the report must be given the opportunity to properly explain its context to the policy makers involved. In this way MONA stays informed about what is happening to the report.

Second, MONA required that, if the federal government would decide to dispose of the "category A" waste in MOL, the inhabitants must be given the possibility to make sure that the integrated project is executed exactly as intended. In other words, they must be given the opportunity to check whether the boundary conditions stipulated by MONA concerning site, safety, health and environment are being met and whether the socio-economic accompanying measures are also duly taken into account.

Third, MONA wanted to apply more widely the useful experience of (decision-making) participation acquired during the exercise. The way MONA was set up, (decision-making) participation was limited to either accepting or not the "category A" waste disposal in the communality. In view of the presence of several other nuclear activities in the region, MONA wants to broaden participation in the decision-making process.

MONA in particular had the following in mind:

- The presence of the remaining nuclear waste from the past (the nuclear liabilities), its cleaning up and its financing;
- The occurrence of transports of high level radioactive waste in the region;
- The activities in the underground research laboratory EURIDICE;
- The cleaning up of nuclear sites after termination of their activities.

Here, we pointed at a few examples of themes the local population is interested in. Probably there are many more. MONA wants to counter silent decision-making by closely involving the population in these problems.

Setting up an entity taking part in the decision-making process must not be dependent on the decision whether "category A" waste is disposed of in MOL or not. In view of the importance of the nuclear industry in the region, such an entity has to exist in any case.

Fourth, the entity to be set up will have to take care of the problem of communicating with the population of MOL. The people need such information. This became evident from an opinion poll, which was organised on behalf of MONA among more than 800 inhabitants of the communality. Not every one of those polled wanted to get actively involved in the participative entity. More than 80%, however, indicated that they wanted to be kept informed about nuclear issues.

How can permanent (decision-making) participation be organised?

The basis and structure of this permanent participative entity can be founded on the experience obtained inside MONA, taking into account the specific tasks, their volume of work and their time frame. The entity's autonomous character and the principle of its representative composition should certainly be kept as well as the close commitment of the local population.

The package of goals and tasks of the participative entity will vary, dependent upon the decision of the federal authorities to have the "category A" waste disposed of in MOL or not.

5.7.2. The fund

The working group proposes as a prerequisite the creation of a fund. A fund can adapt to the changing needs of a society and provides for a lasting added value for future generations.

The results of the SWOT-analysis finally lead to a mission statement for the fund. The results of the analysis as well as the mission statement are presented underneath:

The fund: the ideas behind it

The purpose of a fund as an added value project is to improve the quality of life of the inhabitants of MOL and the wider region. To MONA, this means not only a material improvement of the conditions of life but also a general improvement (e.g. also psychological, social and physical well-being of the inhabitants).

This improvement of the conditions of life is aimed, in the first place, at the inhabitants of MOL and Dessel because they face up to the repository at close range. The projects could also influence neighbouring communalities and the wider region. The management of the fund must, however, be strongly locally rooted.

The projects must also be durable and produce long-lasting positive effects.

Furthermore, in the opinion of the working group, it is very important to establish a clear and permanent link between the repository and the fund. The aim is to make it clear to the inhabitants that the projects financed by the fund are accompaniment measures for the repository. Obviously, the societal support for a repository is strongly

dependent on the socio-economic accompaniment measures, which are associated with it.

Furthermore, it is intended that the projects financed by the fund be spread out in a balanced way over different sectors, to wit: well being, economy, culture, environment, health and competence development. This does not mean that there should necessarily be an equal percentage repartition of the budget over projects in different sectors. Each sector, however, should have his turn with some degree of regularity. It is not intended to finance projects that are the responsibility of society, companies or institutions.

To fulfil its mission, the working group estimated, the fund should regularly investigate the societal needs and subsequently formulate strategic goals for each sector. Nonetheless, it should be possible to introduce projects at all times even if they do not meet the needs articulated at that precise moment. These projects also should be judged on their merits. In this way it remains possible to react to acute (emergency) situations.

It is not intended that the fund itself should carry out projects. Individuals and organisations alike can introduce project proposals. If a project is accepted but needs further elaboration, or when the fund itself detects gaps which can be taken care of by a good project, the fund can act as a catalyst and have projects elaborated by a third party.

Ideally, the projects financed by the fund should have broad societal support. This does not mean that projects should target an as large as possible group of people but rather that they be supported by an as large as possible group of people.

Therefore, the working group estimated that it was extremely important that an autonomous, independent entity, which is representative and can have a constitution traversing borders, manage the fund. This autonomous, independent and representative character of the fund management is important because it is not intended that exclusively representatives of the nuclear sector or of the civic authorities decide which projects are earmarked for financing by the fund or not.

It is intended that the fund find its place next to and outside the regular communality budget in order to keep guaranteeing the true surplus value that the projects are meant to achieve. It will then be up to the management committee to determine which projects meet the necessary conditions.

According to the working group the fund would operate properly if:

- The projects are assigned, after consultation, by an autonomous entity;
- The added value brought about by the projects is perceived as such by the inhabitants;
- The results are indeed tangible;
- A variety of projects is available;
- Communication with the population is enduring;

The abovementioned thoughts have been summarised the fund's mission statement.

The fund's mission statement

The fund wants to improve the quality of life of the inhabitants of MOL and the wider region.

The fund wants to achieve this by implementing a broad range of projects, which may be in the social, economic and cultural domain as well as in the areas of environment, health and education.

The fund aims at a balanced distribution of the projects over the cited areas and wants them to have a clear surplus value. There should be projects in the short term, in the medium term and in the long term.

The projects must be result-driven and durable and must produce long-lasting positive effects in their own field. They must have a broad societal support.

The fund must be managed by an autonomous, independent entity, which is representative and can have a make-up traversing borders.

In order to accomplish its mission the fund should regularly investigate the societal needs and then devise strategic goals for each area. To achieve these goals, the fund uses different methods of work. It can call upon third parties; it can contract out projects or subsidise projects from other organisations. The fund itself can propose projects and stimulate ideas or, in other words, it can act as a catalyst. The concrete realization of the devised strategic goals, translated into observable critical indices of success, must always be the prime motive.

The fund advocates a high-quality operation. The final assignment of projects, the follow-up and the evaluation must occur with professionalism and high quality. To this end, the fund will also call upon external experts.

Within the framework of the overall communication scheme concerning the disposal of "category A" radioactive waste in the communality of MOL, the fund will communicate on a permanent basis about its operation and the concrete realizations of projects. In this way, the fund wants to emphasize constantly the link between the repository and the projects.

5.7.3. Integration of a permanent (decision-making) participative entity and the management of the fund into one comprehensive entity

According to the working group, the best possible way to establish a permanent link between the repository and the fund, in the frame of MONA's goal to create an integrated project, is to couple the management structure of the fund to the earlier described participative entity. The general follow-up of the MONA report was already entrusted to this participative entity. Managing the fund is now added to the task package of this entity.

Both proposals call for an autonomous entity with a representative composition, strongly rooted locally and allowing an extensive involvement and input of the inhabitants.

The task package of the participation entity

The permanent participation entity will be established when MONA ends. If the federal government then decides to dispose of the "category A" radioactive waste in MOL, this entity will also assume the management of the fund and the follow-up of the effective implementation of the MONA report. The amalgamated structure is now called: the participation entity.

The task package of the permanent participation entity includes the following items:

- Keeping a close watch on the MONA file (up to the government's decision);
- The task package related to the permanent participation regarding the general nuclear issues (a permanent package and independent from the government's decision);
    - Follow-up of the general nuclear issues in the region (issues stemming from the past as well as future issues);
    - Keeping the population informed on these general nuclear issues;
- Surveillance of the effective implementation of the MONA report, in technical as well as in socio-economic matters (if the federal government decides to dispose of the "category A" radioactive waste in MOL).
- Management of the fund (if the federal government decides to dispose of the "category A" radioactive waste in MOL).

Proposal for a participation entity

The participation entity is established by representatives of the different societal segments in the community of MOL, as was the case for MONA. The entity is responsible, from the beginning, for the tasks mentioned under points 1 and 2. If the federal government decides to dispose of the "category A" radioactive waste in MOL, two steering committees will be set up within this entity. One steering committee will be responsible for the follow-up of the effective implementation of the MONA report (task 3), the other will be in charge of the management of the fund (task 4). Both steering committees should be able to implement their tasks with a high degree of autonomy. An extensive proposal is listed in [1].

A general view of the structure of the participation entity could look as follows:

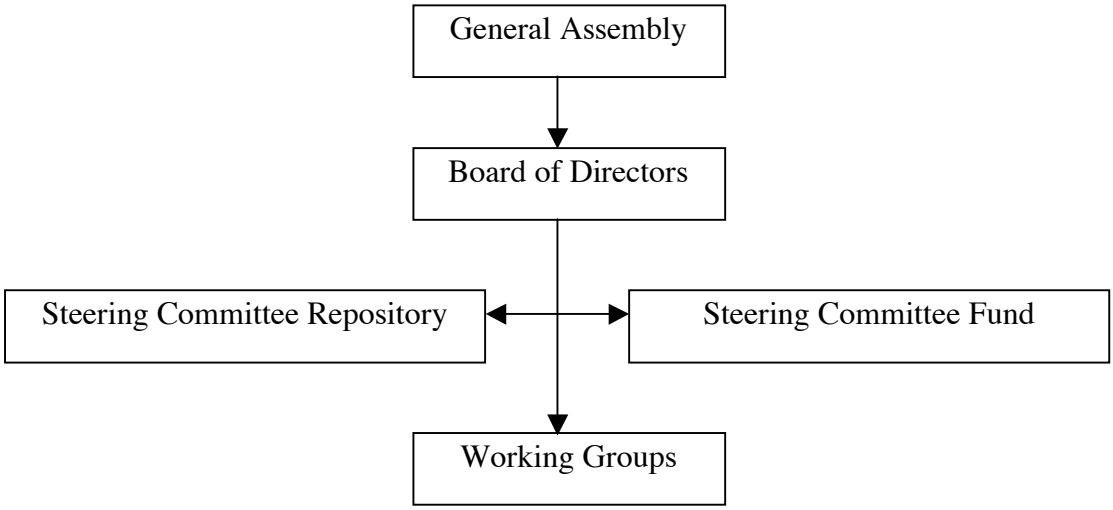

Figure 1: Chart of participation entity organisation

If, in the end, the decision is made to dispose of the "category A" radioactive waste in MOL, and as a result a fund is established, the functioning of the entity is from then on financed from the resources of the fund.

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[1] Working group LD, 2004, *structure of the participation entity*, internal note, MONA, MOL

7. Conclusion

MONA delivers a favourable advice to the communality council of MOL about the disposal in MOL of Belgian "category A" radioactive waste provided all legal requirements are fulfilled **and** the provisos formulated by MONA are satisfied. The MONA advice is an integrated project proposal, all parts of which are interrelated and indivisible.

In this last chapter we describe the conclusions of the MONA integrated project proposal. It includes the main technical and socio-economic aspects.

The provisos are:

7.1. Maximum safety – the highest priority proviso

A disposal on the territory of MOL is possible only and solely if done safely, without risk to the workers involved or the public. This is to MONA the proviso with the highest importance.

7.2. General provisos

The general provisos, which MONA links to a repository of "category A" radioactive waste relate to participation, safety, health and environment.

1. Regardless whether a repository of "category A" radioactive waste comes to MOL or not, MONA wants that the population of MOL be informed about, in Dutch, and be involved in, all matters of the radioactive waste and the general nuclear issues in the region.
2. As long as nuclear activities are going on in the region, the nuclear competence, especially on radiation protection and waste handling, must be preserved in the region. The permanent presence of expert personnel to safely manage nuclear matters in the region is a primary requirement to achieve this.
3. The existing emergency planning must be further optimised and become more widely known among the population. Moreover, the authorities must see to it that the local emergency services have sufficiently trained personnel and the appropriate equipment for efficient intervention in case of a nuclear incident. The existing emergency services (fire department, police department, medical services, etc.) and the medical infrastructure in MOL must be optimised in function of this.
4. Monitoring of radioactive contamination of the surroundings (air, water, soil, flora and fauna, etc.) must be first class and continue to be so. This implies among others the proper functioning of the existing TELERAD system and other monitoring programmes and their permanent adaptation to internationally evolving views. The local emergency services must be informed about the results, in Dutch.Construction of the disposal site must limit loss of ecological value as much as possible and compensate for it;
6. In case a repository is built, a suitable monitoring programme must be developed and established;

7. The health study, which MONA had performed by the Provincial Institute of Health, must be continued an refined, if possible;The study of the "radiological reference value" must be continued. In this way it can be ascertained during exploitation whether the repository has an impact on the background radiation;The study on transport options, which MONA had performed by the Centre for Policy Management, must be updated in detail during the project phase, in order to be part of an Environmental Impact Statement

7.3. Conditions for disposal

MONA had a Multi Criteria Analysis performed in order to compare surface disposal with deep disposal. It became apparent from this analysis that the choice is undecided. As a result there is no clear preference for either one of these two concepts.

7.3.1. The location

After a thorough study of different options, MONA has designated the location north of the canal (at lock 6, nearby BELGOPROCESS) as a suitable site as well for surface disposal as for deep disposal. The reasons are the following:

- The location is situated in the existing nuclear zone;
- The location satisfies the basic criteria as well for surface disposal as for deep disposal;
- The location is nearby the existing nuclear installations of BELGOPROCESS
- The location is well situated so far as supply options are concerned, both for the radioactive waste and for the construction materials. A quay allows supply of materials via the canal and thus limits hindrance caused by road transport. The supply of the waste stored at BELGOPROCESS can occur directly from that site;
- The location is not situated in an area with high natural value;
- There is ample space available, for surface disposal as well as for deep disposal;

7.3.2. The concept

The disposal concept (whether it is surface disposal or deep disposal) has to satisfy a number of basic criteria. According to MONA the disposal must:

- Be technically and radiologically safe during exploitation as well as afterwards;
- Be robust;
- Have a simple architecture so that the concept is easily controllable;
- Satisfy amply the norms in effect;
- Be designed and executed in a flexible manner so that reversing earlier decisions is possible;
- Be technically and economically feasible;
- Allow the waste to be retrieved quickly and simply should problems arise such as a conceptual error or should better alternatives be discovered;

MONA states that the maximum amount the surface disposal as well as the deep disposal is allowed to hold is 84,600-m^3 "category A" waste. This already takes care of

a 20% reserve capacity with respect to the estimated volume of "category A" waste according to the NIRAS inventory (70,500 m^3 on 31 December 2003).

MONA insists that the implementation of either concept must make use of the best available techniques. MONA takes into account that the proposed materials and techniques may evolve along the course of the project. The MONA concepts as described earlier are to be taken as a minimum.

During the project phase, a quality-assurance programme, a safety plan and an environmental impact report have yet to be established, at least. The author of these reports has to take into account the remarks, which MONA formulated. A detailed quality assurance programme guarantees a sound construction and operation of the repository such that the long-term safety remains assured.

MONA states as an explicit proviso that the participation entity be entitled to monitor further the proposed MONA concepts, the studies and the safety evaluations.

The surface disposal

The surface disposal concept has to satisfy the characteristics mentioned underneath:

The surface disposal is composed of four main components: the monoliths, the modules, the cover and the control gallery. A visual presentation of the main components can be found under section 5.5.2

MONA wants that only monoliths be stored in the repository. The monolith is a concrete container block packed with waste and further stuffed to the top with concrete. The repository holds in total about 30,500 monoliths. To store these, 34 modules are needed. Modules are pillboxes made of reinforced concrete. They are each 25 m long, 27 m wide and 10.5 m high. Each module holds 936 (12 x 13 x 6) monoliths. Filling of the modules occurs under a temporary roof. This protects the modules from adverse weather conditions during the filling period. Prior to the closing of the module the temporary roof is removed and the module gets a final cover plate. On top of the modules there will be a 4.3 m thick cover consisting of different materials and appropriate vegetation. In this way a tumulus is created. Two tumuli are needed for the repository. Each of them measures approximately 400 m in length, 150 m in width and 19 m in height at the highest point.

Sound management and appropriate vegetation should protect the cover. Vegetation should also already be provided during the filling of the modules and during the placing of the cover in the exploitation phase. A "green shield" or tree line should then deal with the scenery disruption.
To check the proper functioning of the surface disposal a well-developed monitoring programme is needed. One way to perform controls is the construction of a control gallery underneath the repository. Consequently, this was included in the MONA concept such that various measurements can be performed during operation.

If the authorities opt for surface disposal in MOL, MONA wants a pilot tumulus to be built by NIRAS forthwith. This tumulus should consist of a module packed with monoliths without radioactive content. The pilot tumulus has the same surroundings conditions as the tumuli of the repository. In this way the long-term behaviour of the monolith, the module and the covers, and the correct functioning of the monitoring and measuring instruments can be verified and further developed. This makes the pilot tumulus an essential part of the monitoring programme.

The development of additional monitoring programmes (to be used during as well as after the exploitation phase) is anticipated during the project phase. The participation entity should be enabled to survey the results of these programmes.

The deep disposal

The deep disposal concept has to satisfy the characteristics mentioned underneath:

The deep disposal is composed of the following main components: the monoliths and disposal gallery, the main galleries and the shafts. The disposal is anticipated to occur in the BOOM clay at a depth of about 230 m. A visual presentation of the different components can be found under section 5.5.2.

MONA wants only monoliths with “category A” waste to be stored in the repository. The monolith is a concrete container in the form of a cylindrical segment, packed with waste and afterwards stuffed with concrete. Due to its special shape the monolith is adapted to the cylindrical shape of the disposal gallery. The deep disposal contains about 41,000 monoliths. Six disposal galleries, each about 1,550 m long with a diameter of 5 m, suffice to store the “category A” waste. Two access shafts lead to a single main gallery giving access to the disposal galleries. Following the filling up of the disposal galleries the main gallery and the shafts are plugged.

During the exploitation phase the sound functioning of the concept has to be checked by means of various monitoring programmes. MONA estimates a monitoring programme after closure of the shafts to be less important as studies show that with deep disposal the radioactive materials have completely decayed before they could escape.

7.4. Socio-economic provisos

MONA clearly postulates that a repository must be embedded in a broader project in order to represent an added value for the local population. Only if this is the case there can be societal support. Consequently, the socio-economic provisos are one and indivisible with the technical side of the project described earlier. There can only be a repository of “category A” radioactive waste in MOL if these provisos are met.

A fund

MONA estimates that a fund should be linked to a repository of "category A" radioactive waste in MOL. A fund can adapt to the changing needs of the society and also provides the opportunity for the future generations to take advantage of the added value the repository brings with it. A fund also creates a clear and lasting link with the repository so that the integrated approach is emphasised yet again and the project remains better engraved in memory.
Before any disposal can start, the financing of the fund must be laid down in legally binding agreements, signed by authorized officials.

What MONA intends to achieve with the fund is clearly described in the fund's mission statement (5.7.2).

7.5. The participation entity

To guarantee continuity and further participation an independent entity must be established. As mentioned in (5.7.1.) MONA estimates that a representative constitution of this entity is important. This also holds true in case of co-operation at the inter-communal level. The structure can be based on that of MONA as this entity has proved its operative capability.

The participation entity covers the technical and societal aspects of a repository project.

The set of tasks can be separated in two periods:
- The phase after the delivery of the MONA file till the governmental decision;
- The phase after the governmental decision;

The phase after the delivery of the MONA file till the governmental decision

The participation entity has to accomplish the following tasks:
- It keeps track of the MONA file (negotiations between communality and authority, NIRAS, etc.),
- It takes care of permanent participation in the MONA file;
- It keeps track of the nuclear activities in the region;
- It informs about the radioactive waste management in the region (transport, conditioning, etc.), the anticipated safety measures, etc.;

The phase after the governmental decision

When the government has reached a decision there are two options: either the repository will be located in MOL or it will not.

The repository will be located in MOL

The participation entity has additional tasks to accomplish:

- It keeps track of the MONA file in co-operation with the communality and NIRAS;
- It watches over the execution of the technical and societal aspects associated with the MONA file;
- It manages the fund;
- It communicates openly with the population (state of affairs, visits to the construction site, etc.).

The repository will not be located in MOL

The participation entity still has some tasks to accomplish:

- It investigates the impact of the decision if the repository would be located in DESSEL or FLEURUS-FARCIENNES;
- It keeps tracking the nuclear activities in the region;
- It informs about the nuclear activities and the radioactive waste management in the region (transport, conditioning, etc.).

7.6. Inter-communal co-operation

MONA has always marked its preference for a close co-operation with DESSEL. All along the course of the project and especially after STOLA announced its choice of location this stance was strengthened. A co-operation with DESSEL is desirable and useful to bring to a successful end the societal and technical aspects of a “category A” radioactive waste repository.

Consequently, MONA advises the communality council to insistently ask the federal government to read the MONA and STOLA reports as one single report.

During the several years of work it has turned out that co-operation between MOL and DESSEL is an absolute necessity to bring the “category A” radioactive waste repository file to a successful end in all its technical and societal aspects.

6. ESDRED & TECHNOLOGY DEVELOPMENT - CONTRIBUTION TO FINAL COWAM2 REPORT - WOLF SEIDLER - ANDRA - FRANCE

6.1. Introduction

Geological disposal of high-level long-lived radioactive waste has been studied by various organisations, notably radioactive waste management agencies and major research organisations, for the last 30 years. The feasibility of such geological disposal, from a scientific viewpoint, has reached a very mature level. European research works have generally been carried out in the framework of international cooperation programs. Most of the outcomes resulting from these research works are shared by the scientific community of the concerned countries.

On the other hand the technological aspects of geological disposal have not yet been addressed with the same degree of shared international effort. However the feasibility of deep geological disposal depends not only on scientific studies but also on engineering ones. As a matter of fact the scientific component is mainly linked to the long term nuclear safety performance assessment whereas the technological one is linked to the industrial feasibility and the operational safety. Thus the existing body of knowledge must now be complemented with engineering and technological developments

When developing the ESDRED project proposal a review of the various activities involved in the construction and closure of a repository was performed in order to identify the key technological issues. Although disposal concepts vary from country to country depending, for instance, on the type of waste to be disposed and the nature of the receiving medium or host rock, this review exercise highlighted a number of common elements that are of importance to the various European waste management agencies. These include, among others, heavy load transportation technology, waste canister emplacement technology, buffer design and construction, monitoring activity and temporary sealing using specific types of cements. These now constitute the main technical themes within EDRED

6.2. Nature and scope of the project

The ESDRED (***Engineering Studies and Demonstrations of Repository Design***) Integrated Project is a joint research effort by major national radioactive waste management agencies (or subsidiaries of agencies) and by research and development organisations. The project is born from the initiative of 9 European countries (13 Partners in all) which decided to work together on engineering and technology.

ESDRED is co-ordinated by the French national radioactive waste management agency (ANDRA) and is part of the European Union's 6th EURATOM Framework Programme for Nuclear Research and Training (Contract nº FI6W-CT-2004-508851). The five year project has a total budget of EURO 18.7 million, of which 7.3 million is a grant from the EU's Framework Programme.

ESDRED is focused on technology and has three main objectives.

- To fabricate full scale technological demonstrators and to demonstrate their feasibility.
- To promote a shared European vision in the field of technology.
- To disseminate widely the objectives and the knowledge developed within ESDRED.

First Objective

The first objective is to demonstrate, at an industrial scale, the technical feasibility of some very specific activities related to the construction, operation and closure of a deep geological repository for high level radioactive waste. The work is organised inside four (4) Technical Modules and essentially involves the conception, design, fabrication and demonstration of equipment or products for which relevant proven industrial counterparts (mainly in the nuclear or mining industry) do not exist today. This work is to be carried out within the framework of compliance regarding the requirements for operational safety, long term safety, retrievability and monitoring. Each of the four technical Modules involves from 3 to 7 Partners and a total of 7 different national disposal concepts are represented within ESDRED.

Second Objective

A second and equally important objective is to promote a shared European vision in the field of radioactive waste disposal technology. This is accomplished through the INTEGRATION process, which is one of the key objectives that identify Euratom's 6th Framework Programme. Among other things integration involves working together within Work Packages and/or Modules; sharing information; comparing one another's input data and functional requirements for consistency; ensuring that, where possible, fabricated components are compatible; and coordination of demonstration activities.

Third Objective

The third objective involves communication and training and is deemed to be sufficiently important to merit a separate Module. Among other things it involves the dissemination of knowledge by way of press releases, pamphlets, technical articles and presentations, videos and eventually an international event. Training, with a focus on New Member States, is to be accomplished via workshops, courses and possibly some secondments. Activities in this Module are primarily the responsibility of the 4 Technical Module Leaders, the Project Coordinator and NAGRA.

ESDRED Consortium
The 13 Partners included in the ESDRED consortium are:

Radioactive Waste Management Agencies	Technological R&D Organisations
ANDRA, France	AITEMIN, Spain
ENRESA, Spain	CSIC, Spain
NAGRA, Switzerland	DBE TECHNOLOGY, Germany
NIREX, United Kingdom	ESV EURIDICE GIE, Belgium
ONDRAF/NIRAS, Belgium	GRS, Germany
POSIVA, Finland	NRG, The Netherlands
SKB, Sweden	

6.3. Project activities

Module # 1 - Buffer Construction Technology for Horizontal Disposal Concepts

The Module Leader is Ondraf/Niras from Belgium. In this work the buffer is an engineered barrier, usually made of material such as cement or bentonite (possibly mixed with sand), which is placed between the radioactive waste container and the geological formation surrounding the disposal drift.

Within ESDRED, 3 engineering options for waste/buffer emplacement are considered leading to 3 designs and therefore 3 prototypes:

1. the buffer is prefabricated in a surface facility, then transported to the underground repository and positioned in the disposal drift ; then the waste canister can be emplaced,
2. the waste canister is inserted into a large container, (so-called “super-container”) which includes part of the buffer; once the super-container is emplaced in the disposal drift, the annular space between the super-container and the drift is filled with a granular buffer,
3. the waste canister is placed on a prefabricated solid buffer cradle and then a granular buffer material is used to fill (backfill) the disposal drift.

The 2 last options look rather similar, but the volume of granular buffer material required and the emplacement technology used (including the possible compaction) are quite different.

Module # 2 - Waste Canister Transfer and Emplacement Technology for Horizontal and Vertical Disposal Concepts. (Module Leader is DBE-Technology; Germany)

Although surface transportation of radioactive waste is a routine activity, transport and emplacement in an underground environment presents unique challenges. Among other things:

- spaces are more confined and a shielding cask is required for transportation in order to ensure the radiological protection of workers
- in addition to the shielding cask, remote control operating techniques may have to be used

- during transportation of the waste container and while docking at the disposal location
- during the transfer operations into the disposal location (drifts or boreholes)
- and finally during closure of the disposal drift or borehole

Within ESDRED emplacement equipment for both the horizontal and vertical options will be designed, fabricated and demonstrated. Loads are in the 2 to 5 ton range.

Module # 3 - Heavy Load (15 to 50 metric tons) Emplacement Technology for Horizontal Disposal Concepts. (Module Leader is SKB; Sweden)

Horizontal emplacement of very heavy spent fuel canisters, of super-containers (including buffer material and the waste canister) or of a large assembly of prefabricated bentonite buffer rings (see Module # 1) is required in some disposal concepts.

In order to minimize friction, which must be overcome when moving such heavy cargoes, the option of using air or water cushion technology is considered. This technology is widely used in civil engineering when pressurised air or water is injected between two flat horizontal surfaces.

The challenge is to demonstrate the feasibility of this technology, for heavy cargo emplacement, when pressurised air or water is injected between two cylindrical surfaces. It is already known that the cylindrical shape of the surfaces will reduce the uplift force which can otherwise be obtained between two horizontal surfaces in the classical application of this technology.

The type and flow-rate of the fluid must also be compatible with the repository environment so that, for example, the use of water in a clay host rock is not practical whereas it is perfectly acceptable in granite.

Within ESDRED both the air cushion and the water cushion technology will be demonstrated as a means of moving loads up to 50 tonnes within relatively small diameter disposal cells/drifts.

Module # 4 - Low pH Cement for Shotcrete and Sealing Plug Construction Technology

Cementitious materials are widely used in underground engineering. For radioactive waste disposal, specific consideration is given to the applicable geochemical phenomena in the long term safety analysis, including for instance the possible interaction of the cement with the vitrified waste matrix, with the bentonite or other barrier, or with the surrounding geological medium via a so-called plume effect.

In order to reduce these interactions, new cement formulations are considered, which are more neutral with respect to the waste matrix or underground environment, while retaining the necessary mechanical and sealing properties.

Within ESDRED the development of low pH cements is complemented by the formulation of concrete mixes which may be placed at an industrial scale, using the

shotcrete technique, for the construction of disposal drift sealing plugs and for ground support, i.e. rock-wall lining.

A full-scale demonstration test is planned at the Äspö underground research laboratory (Sweden).

6.4. Major technical work accomplished to date includes

Module 1: *Buffer Construction Technology*

- 120 ton mould fabricated and four 2.30m diameter bentonite/sand rings fabricated
- 2 tunnel/canister mockups fabricated and annular void filling with grout, sand, bentonite, etc; demonstrated
- another tunnel/canister mockup fabricated and annular void filling with bentonite pellets using a double auger placement system; demonstrated
- non-intrusive monitoring tests on-going at the Mont Terri URL in Switzerland
- Bentonite/sand seal installed in borehole at Mont Terri URL for long term testing of water & gas permeability

Module 2: *Waste Canister Transfer and Emplacement Technology*

- Prototype Pushing Robot for emplacement of 2 ton vitrified waste canisters in 40m long horizontal disposal tunnels; fabricated & demonstrated
- Basic design completed for equipment to emplace vitrified waste & spent fuel canisters in 300m deep vertical boreholes in salt
- Internal document "Review of Current Disposal Concepts Concerning Measures for Retrievability" completed and placed on ESDRED web site (www.esdred.info).

Module 3: *Heavy Load Emplacement Technology*

- Equipment based on the air cushion principle for the emplacement of 43 ton spent fuel canisters in circular disposal tunnels, approximately 1.3m in diameter; fabricated and demonstrated in a surface workshop
- Equipment based on the water cushion principle for the emplacement of 45 ton spent fuel canisters in circular disposal tunnels, approximately 1.8m in diameter; fabricated and installed underground at the Äspö URL in Sweden ready for testing and demonstration
- Equipment based on the air cushion principle for the emplacement of 17 ton buffer ring packages in circular disposal tunnels, approximately 2.45m in diameter; fabricated and will be tested and demonstrated before the end of 2006.

Module 4: (Temporary Sealing)

- Appropriate formulations have been developed for low pH cement and low pH concrete which meet the functional requirements for plugs and rock support in underground repositories
- A 1m long low pH plug has been constructed underground at the Äspö URL in Sweden and loaded to failure (slippage)

- Work is in progress for constructing a similar 4m long plug at the Grimsel underground research facility in Switzerland where it will be subject to much slower loading and long term accumulation of data.

6.5. Expected results & outlook

The ultimate objective of the ESDRED demonstration activities is the fabrication, testing and working demonstration of full scale first generation prototype equipment and/or systems. The demonstrations will be performed in surface facilities simulating underground geometries as well as in three or four different Underground Research Laboratories (URLs). The technologies developed and the operational experience obtained will contribute directly and indirectly to the evolution of the various European national waste disposal concepts. It will also contribute specifically to the ongoing development and improvement of industrial equipment/systems which will be incorporated at sites selected to become final repositories.

ESDRED aims to demonstrate that feasible techniques are available for the implementation of deep geological disposal thereby contributing to an increase in stakeholder confidence particularly where the public at large is concerned. The ESDRED website (www.esdred.info) is adapted to a variety of audiences providing information at several levels of detail, notably from short abstracts to more complete descriptions of the technical activities as described in the Contract between the European Commission and the Project Participants.

ADDITIONAL PAPERS FROM WP4 EXPERT RESOURCE PERSONS

7. COMMISSION PARTICULIERE DU DEBAT PUBLIC SUR LA GESTION DES DECHETS RADIOACTIFS - EXTRACT FROM THE SUMMARY OF THE FINAL MINUTES - JANUARY 2006

This is an English translation of the summary of the final minutes of the specific commission of public debate created to discuss the issue of radioactive waste management in France, from September 2005 to January 2006.

Time and ethics, inseparable and unavoidable criteria in a management solution

Deadlines for producing less waste or none at all.

> Other more ambitious research is being evoked to produce less waste if nuclear power were to continue: research for example into new types of reactors and, even more ambitious, into a new solution based on thorium.

> But also the links between energy policy and waste must be taken into account. These links were highlighted by a scenario method which had already been used in the Charpin-Dessus-Pellat report, and which the debate refined and confirmed. The method should be chosen to take account of the waste factor in forthcoming debates on energy policy.

> A few key dates arise from these factors:

- 2020: both the decision date to renew or shutdown the nuclear base, and deadline for the experimental confirmation phase for research from 1991.

- 2040: earliest (and latest?, as asked once again by a speaker in Lyon) date to implement transmutation if decided in 2020. Also, date for complete shutdown of power plants in the event of the decision to abandon nuclear power in 2020.

- 2140: date for the possible shutdown of nuclear power with HL-LL waste identical to that of 2040, at the price of 75% ML-LL more, if transmutation started in 2040, and If the decision to shutdown is made in 2100.

Ethical considerations inevitably enter into very long-range decisions, of which both scientists and economists are aware. But ethics divides more than it unites.

There are three positions:

> First position: ethics forbids harming the Earth and the future, If we did so, "*the Earth would seek revenge*", the engineer has a duty to recognize his limitations: these statements all lead to a categorical refusal of burial, or even nuclear power itself, as no satisfactory solution can be found for radioactive waste outside Promethean solutions.

These conclusions go along with those who have not wished to participate in the debate, "*stop producing waste first and then we'll talk about it*".

> Second position: ethics requires that we bear our responsibilities here and now and that we do not put off difficult choices to later. Responsibility to meet the world's energy needs meaning that we maintain nuclear power, and responsibility to future generations meaning that a rapid decision is made regarding a sustainable waste management solution. They are wary of the company, but also believe, it would seem, that sustainable storage would be a non-decision. They are in favour of geology, the only possible way of holding waste with such a duration of harmfulness. The surest among them recommend a decision in 2006, and even sometimes oppose progressive closure over 200 to 300 years ("*reversibility*").

> Third position: trust should be placed in the company, and hence in storage which obliges and makes possible, on the one hand surveillance thanks to measurement of waste package and storage evolution, and on the other, reversibility thanks to retrieval. Whereas geological storage supposes closure, allows no package evolution measurement, makes forgetting likely; and its "*reversibility*" - managed "*like storage*" for 300 years - would be a costly remedy, which shows the reticence to fully dispense with monitoring by the company.

> Partner territories to prepare shared decisions, whatever the solution.

"*There is a problem of territorial acceptability*", recognises one politician in favour of the Bure laboratory. The petition for a referendum in Meuse and Haute-Marne, with several tens of thousands of signatures (40 000 according to the promoters), and public interventions confirm this. In Lyon, it is reported that during a recent meeting, the Bure CLIS vote was divided, 20 for and 20 against or abstained, on the issue of whether the laboratory experiment should be continued. The debate enables the components to be analysed and elements of response to be formulated:

Refusal of an incomplete decision process.

> Unanimous refusal of storage without full safety demonstration. To "*be sure*", at least 10 years of work are necessary, others say 20, to conduct real-scale trials over a more convincing duration, to share knowledge by evaluating, discussing the results in the scientific community and the plural debate with the public in the contexts and according to the methods mentioned above.

> Refusal to be "backed" into a decision without alternative. "*We have the choice between Bure, Bure and Bure*", this trap is not tolerable in particular by those who supported the laboratory from the start.

> Two responses emerge from the debate, which both advance step by step, but which are probably not equivalent seen from the territories:
- Progress on the project for reversible geological storage, closed over stages in 300 years, in the Bure zone, and stop if safety is not proven;

- Create another site and open up the choice. A second laboratory in the clay? No scientific advantage has appeared, this was confirmed in Lyon. And granite has been excluded, as has salt. So, a sustainable storage prototype, built in a defined site, in parallel to a real-scale phase of storage trials, leading to a decision between the two solutions in fifteen or so years, as proposed by the experts?

The requirement for enhanced territorial identity, and the concern regarding demographic decline.

> The public are strongly opposed to those who claim that the attachment to identity is only a manifestation of irrationality. It is a measure of the human factor in the decision. To deny it, and worse still scorn it, would be heading down a blind alley, as the success of the petition in favour of the referendum would lead to believe. And an answer in terms of financial compensation alone is insufficient, or even morally intolerable.

> Only setting up a territorial project would enable this attachment to territorial identity to be overcome, if long-life waste management equipment is to be created: development project in Meuse Haute-Marne, conversion project elsewhere if a storage site were chosen in an already developed zone (Marcoule was mentioned in Marseille), credible representation of a new identity. Yet, "*the condition is necessary, although perhaps not sufficient*". It suffers from a handicap however: that of scepticism regarding State promises on the issue of the second laboratory. The only way to overcome this is to make the setting up of such a project a process that is fully open to all forces involved, as strongly recommended by the experts in Joinville and Nancy. In addition, such a project, by developing "*life around it*" and demographic stabilization, would enable better sustainability of the repository, by allowing territorial society to play a role in this function, a proposal repeated in Lyon.

Such a level of ambition would seem possible in Meuse Haute-Marne, the potentialities were presented and the legitimacy solemnly recognised by industrialists in Lyon, as an expression "*of mutual solidarity*" between the nuclear sector and these territories. Based on the development of the biomass, this project illustrates the effectiveness of the provisions of the 2004 law on energy policy, which requires both the CEA and EDF to diversify. However, in the eyes of the inhabitants, everything depends on the way essential national political willingness and its long-term nature is ensured. The question is asked directly of the legislator and operators in the nuclear sector, by the General Councils concerned. If this long-term commitment were obtained by a "*pact enshrined in law*" as suggested by one expert, we could consider that it has answered the wish of those who support the laboratory and storage, if its safety is demonstrated as an opportunity.

A pressing demand for a local referendum.

> This demand, supported by the petition circulating, is repeated in all the meetings in Haute-Marne and Meuse: "*We live in Meuse and Haute-Marne, we work here, we love our departments… You do not have the right to refuse us the right to express ourselves*". And this demand even concerns the decision to continue the laboratory. The answer is given first by a legal analysis according to which a local authority cannot organise a

referendum on a subject outside its domain of competence. Yet, the subject in question is national.

> Several parliamentarians have stated that the demand of the local population to be consulted is legitimate. Directly or via the elected representatives? Parliamentarians and elected representatives present are opting for this second solution. The issue is political, "*it will be put before Parliament during the 2006 debate*" indicates the Ministry for Industry.

> Finally, several countries, without holding a referendum - the Swedish representative denounced its disadvantages -, give a right of veto to the hosting authorities.

9. WHAT IS "LONG TERM"? DEFINITIONS AND IMPLICATIONS - THOMAS FLÜELER - ETH - SWITZERLAND

To come to the point: There is not "absolute" definition of the long term. What "long-term" means depends on the chosen perspectives – who defines, what the context is, what it is defined for. In actual fact we talk about different views on what time frames to look at.

We may distinguish among the following sensibilities:

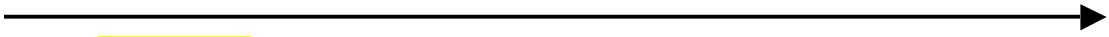
Technical (waste disposal) perspective

Complete containment (ILW[3]) **100 y**

Complete technical isolation (HLW/SF[4] Switzerland/Nagra) **10,000 y**

Complete technical isolation (SF Sweden) **1,000,000 y**

Geological retention (HLW/SF Switzerland/Nagra)



1,000,000 y

Comment: Depending on waste characteristics, disposal objectives and disposal design even technical time frames span over orders of magnitude. It is implied that "technical" also means environmental since the protection of the (long-term) environment is aimed at.

Technology (policy) perspective

Military utilisation **- 60 y (1940s)**

Civil use of nuclear energy **- 50 y (1950s)**

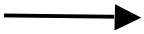
Operation of NPPs[5] **50 y**

[3] ILW: Intermediate-level waste

[4] HLW: High-level waste, SP: Spent fuel

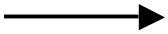
[5] NPP: Nuclear power plant

Decommissioning of NPPs **70 y (50+20 y)**



New generation of NPPs **70 y** (existing NPPs+20 y)

"Closing" the nuclear cycle **100+ y** (breeder reactors, transmutation)



Comment: Energy policy plays an important (and driving) part in the issue. Nuclear history has to be taken into account. Whether or not the nuclear path is perpetuated, "long-term" assumes another slant and responsibility is passed on to a greater or lesser degree to future generations (continuation or phase-out, respectively).

Institutional perspective

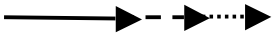
Short-level waste[6] **30 y**

Operation of waste storage[7] **50 y**

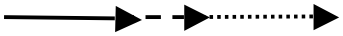
Operation of waste disposal[8] **60 – 70 y**

Post-closure of waste disposal: Active safety measures[9] **+70 – 300 – 500 y**

Post-closure of waste disposal: Passive safety measures[10] **+300 – +500 y**



Post-closure of waste disposal: Memory **+500 y**



Comment: What is "short-lived" was defined by a technical nuclear institution (International Atomic Energy Agency, IAEA). There are diffuse transitions between different phases, again depending on waste characteristics, disposal objectives and disposal design. Specifications, e. g., for monitoring, have to be given with regards to purpose (why, what for), locations (where), parameters (what), and methods (how).

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[6] As defined by the technical nuclear community (half-life period)

[7] Storage denotes (intermediary) and controlled disposition of waste (with the intention of retrieval)

[8] Disposal denotes (final) and, ultimately, uncontrolled disposition of waste (without the intention of retrieval)

[9] *in situ* monitoring, environmental surveillance, *etc*.

[10] Land-use restrictions, land register

Societal perspective

One generation **30 y**

→

Working population (responsible for business decisions, generation[s] "n-1, n") **50 – 60 y**

→

Contemporaries

(filial generation, parental generation II [working population], parental generation I [pensioners]) **100 y**

(n+1) (n-1, n) (n-2)

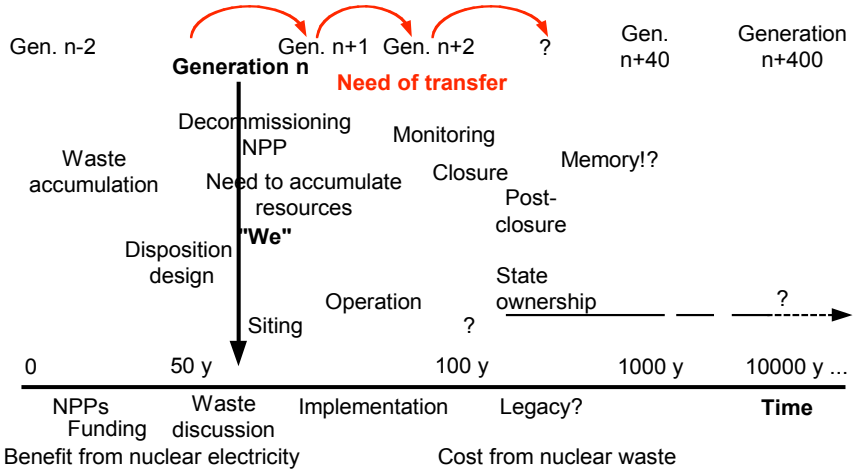
→

Yardstick of the "seven generations"

(Canadian first nations' target for assessment or evaluation of consequences of current issues) **175 y**

→

Comment: In general, societal perspectives depend on the societies they apply to – contemporary Western European notions are different from Canadian first nations or from Chinese or from Middle Age European notions. The history of nuclear activities denotes that the n-2/n-3 generation (-50 to 60 y) started the nuclear enterprise. The waste programme setbacks and the waste longevity make the issue a "long-term" problem and require a transfer to future generations (see Figure): a transfer of disposition rationale (and options), of know-how, of resources, of procedure, of institutional constancy.



Political perspective

Term of office (**politics**), legislation **4 – 5 y**

Scope of the radioactive waste management **policy** **300 – 500 y**

Guardian of the process (programme policy) (*e. g.,* 10x Term of office) **40 – 50 y**

Comment: Decade-long programmes are prone to political volatility and arbitrariness: Not In My Term Of Office (NIMTOO). Consequently it suggests itself to establish a kind of a "guardian" of the radioactive waste management policy to overcome discretionary politics and to see to it that the programme is on target. In view of the "trans" character of the issue (beyond party politics: "transpolitical", and more than an interdisciplinary scientific issue: "transscientific"), it is suggested that the body be pluralistically composed of knowledgeable, trustworthy personalities, highly respected by society, and not driven by daily politics. This demonstrates the interconnection of institutional, societal and political perspectives.

Individual perspective

Attitude and worldview **0 – n y**

Comment: Individuals' worldviews nowadays are very heterogeneous. Usually one encounters a preference for the present, at least a high discount rate, *i. e.,* time periods beyond close future (and thus future generations) are not relevant to the majority of people.

Economic perspective

Quarterly to decennial **0.25 – 30 y**

Comment: The perception of time frames in companies ranges from three-month calculations (and related pay-back periods) to 30-year scenarios as a basis for investment decisions. Economic growth (and thus decisive interest rates) cannot be calculated beyond 3 to 5 years.

9. ETHICS OF COMPENSATION AND FUNDING: WHICH GOVERNANCE FOR THE LONG TERM?, M. BOVY - SCK-CEN - BELGIUM

"*Surprises are not possible in logic*"
(Wittgenstein, Tractacus logico-philosophicus, 1922)

9.1. Introduction

The question of long term governance for the nuclear waste manager has to deal with some concepts and questions of moral responsibility. Ethics might be part of the nuclear waste manager because it refers to a larger scope of interests than restricted field of nuclear waste research and the close interests of industries. Clear interactions with society most often are stressed by researchers in ethics, philosophy and governance or decision-making process. Experts in nuclear research and nuclear waste management need ethical guidance because their aim at giving society some stable answers on safety and efficiency of technical solutions.

But today, not only topics with regard to the physical characteristics of geology and conditions storage need answers from ethical works. The whole society asks for objective criteria within a discussion on compensation and incentives. Are experts prepared to such an approach and doesn't it considerably change their mind and usual professional context?

Many stakeholders may learn from different historical experiences, like from the Enron case study and the local experience of the local population. From their own lesson, we can get some results that may help us to analyse the source of legitimacy and the efficiency of the democratisation of debates between different types of social actors. Managing the funding and i.e. the conditions of giving some compensation for a risky situation that the neighbouring population has to support near nuclear sites may present similar arguments for convincing people and giving some support to industrial activities. Further more, we could investigate the conditions for dealing the representation mechanisms in a democratic process.

There is no needed separation between the management of the funding and the democratisation of the decision-making with regard to nuclear waste management. Ethics has to refer to long term governance also with the question of funding management and register ethical guidance in some principles that will help governments to organise a control on the fund and its uses in the hands of nuclear operators or local mayors for their own arena.

9.2. Expertise in NWM

9.2.1. Classical role and expectations towards experts

Does nuclear waste management need experts? This question raises many different angles of view. It's impossible to give any clear answer without framing the context and the sense of this question from the spokesperson's point of view. The role of expert, and

especially with regard to ethical guidance on the long term, differs from the vision of citizens to the one from other experts and decision-makers. The reference to established methodology is a basis for scientific work but let some experts empty of any stable criteria to assess the social values and political guideline that could be relevant to sustain their scientific options.

This creates a gape into the definition of experts between their scientific responsibility and the "social" responsibility that comes from the citizens. Experts cannot stay in their legitimated work of "neutral" reporter of the naked truth and being at the same time the new gurus of our "post-modern" society. Some choices must be done in order to attribute clear roles to different partners or different contexts within each partner could hold a part of his attributions.

Moreover it seems difficult to ask scientists to address to the citizens some recommendations on the right solution for their well-being and being neutral at the same time. Expert methodology shows the famous traceability which is asked for control and common knowledge basis. But values and political preferences tied to a certain option of depository may be put at stake with other projects that influence the shape of new generations. Local context, national policies and cultural vision of the role of citizens may change the rational choice coming from the expert side.

Public debates and interaction between experts, local population and decision-makers do necessary call for a protection of the quality of the work, coming from experts. Indeed, interventions of experts need to get some guarantees for their own independence to create personal involvement and automatically avoiding the transformation of most of experts in customers.

Therefore we face the question of ethical guidance for the long term with implicit questions, like the definition of acceptable risks, the role of "nuclear" experts in this, and how to make feasible the "good" conditions for communication between specialised scientists and laymen, and simultaneously the link between science and ethics, in a context of nuclear waste management that deals with long term issues.

9.2.2. Between scientific concept and communication ?

The communication process, dealing with risk and industrial activities may not be separated from the question of public acceptance with regard to the depository and the correlated questions of compensations.

Indeed, we can clearly see into that question the disturbances created by the lack of communication culture before any implementation of any nuclear site, i.e., any depository. There is a general failure into the responsibilities of supporting such a goal from the public authorities, and from the industries, to prepare the complexity of the response from the public about the right location of a depository... especially on the long term. We have to stress the antagonistic effects when coming from one hand, with "rational" arguments on the safety level, and health for the public on the long term on the other hand, when the issues are defined on the short term. The need to get acceptance on the short term from the public and, on the other hand, still being able to

talk on behalf of the future generations, seems a challenge for decision-makers with their short term mandate. The population needs to build its trust on a long term experience to be able to believe in long term communication realities, like nuclear risks. These factors have framed a complicated picture for those charged with resolving the nuclear waste disposal crisis.

9.2.3. Why do NWM experts need ethics ?

The question of deciding a site for low level radioactive waste means there a set of criteria that experts have to select as relevant and most of time the technical and scientific approach refers to physical characteristics to assure decision-maker of the safety levels.

The classic role given to experts and expected from most of citizens is first of all, to give society certitudes about facts and its precise limits. People are waiting for rooms of manoeuvre in which policy might be taken in terms of acceptable costs and risks for health. Economic developments and needs of industrials, for increase energy supply, therefore are necessarily paired up with some expectations addressed to the societal role of some experts as the new "warrants" of some objective process, facing the subjectivity of financial trade-off.

More and more, recommendations are given to politicians and nuclear waste manager in terms of governance, defined as the quality of the decision. The involvement of stakeholders must be enlarged to other features than a group of specialists. The "concerned stakeholders" must be associated with a large group of interested people from different angles in a large association with decision-makers. This creates a context that ought to create "a necessary condition for a successful process (within) institutions and decision makers gain and merit recognition as trustworthy an accountable." (OECD, 2003, p. 16).

This favourable context of interactions is seen as the end of the previous system used by experts facing the laymen capacity of citizens of NGO's criticising their position. The traditional "decide, announce and defend" attitude is not welcome any more because of the increased complexity of the systems and, may be too, because the need to get more societal acceptance for projects where scientific uncertainties reveal the lack of coherence between different policies.

Some authors (like Carlsson, 2000) see the role of municipalities as "*the independent expert of the public*", but we could enlarge the scope of such a mandate and address the question to experts themselves. There is no need to separate experts from citizen rationalities in nuclear waste management, especially about decision-process that must integrate a larger spectrum of social speakers. Mutual interactions, when well structured, offer confidence for the public and it doesn't mean expert rationality has to disappear from this process.

Other contributors suggest the regulator has received the mandate for the control of the democratic process, and therefore, some would like to institutionalise the cut of the system from expert advice and specialised knowledge. We see in this suggestion a clear

suggestion for giving a mandate to some specialised function in the role of public administration and public regulator, like OECD suggests it. In a way, this reassures all worries about the stability of the politic decisions and the foreseability of the action of public empowered bodies.

The European Commission describes the role of experts in different documents and what they define as the good governance. Many concepts are common with some ethical guidelines written by OECD for nuclear waste management: (OECD, 2003), like openness, clarity, accountability, independence and competence. We could ask ourselves towards which social actors these recommendations are addressed. We may suggest expert culture may deal with the whole society at large, instead of only giving the official (and prior) role to the state and waiting for an improvement of the process from a top-down approach. Independence, openness and accountability in nuclear waste management must be dealt among a group composed by experts and other features, in order to register their interactions in the network which sustains the project to keep the waste in a safe depository. Especially accountability must be observed by stakeholders and so, clear information and transparency must prevail in the main lines of long term governance. The recommended flexibility of the decision-making process that "*allows the accommodation of public and stakeholders needs by smaller steps in implementation and retrievability*" (OECD, 2003), will than be possible.

	Classical role and expectations towards experts	**Between scientific concepts and communication?**	**Why do NWM experts need ethics ?**
Rationales	• Methodology (data...) • Peer review • Guardian of...science, not of the future of the society.	Process where "science" might have its own place among other approach for long term governance	Science is not "given", a result of a long process of interactions.
Trust	Trust, but towards which stakeholders ?	Make it "readable" will help to increase trust	Asked from the public!
Involvement	Among experts	Expert may show their results themselves instead of PR expert	Stretcher of expert's results needed for democracy
Common good	Not their concern	Neutrality is a screen	Share speeches
Fairness	Politics, society	Which frame?	Legitimacy process or balance between burdens and benefits?
Democracy	For government (legitimation basis) or more ? (participation of population)	Enlarge the scope	To avoid technocracy

From: M. Bovy, "*Why do expert culture need ethical guidance for a long term governance: decommissioning fund as case study for compensation management?*", Presentation given at Gartow (Germany), 2005-02-19, COWAM, WP 4 Long term governance.

9.3. Ethics in funding for nuclear activities: which signal for nuclear waste managers on the long term?

9.3.1. Transgenerational ethics

Enlarging the scope of ethics

Some authors, specialised in ethics on future generations, have underlined the importance of having a global approach for policies dealing with public interest, the environment and the control of public authorities (Flüeler, 2005). Among other principles, B. Weiss (Weiss, 1989) puts forward an ethical attitude that takes into account future generations in order to allow equal access to their own resources and make sure that these are available for next generations.

Also about decommissioning processes (Bovy, 2005), we tried to stress the importance of the balance between the burdens of the past and the present extends to requiring managers capable of enlarging the scope of the stakeholders who have only seen their short-term interests defined by financial profits. Constituting these funds for nuclear waste management implies the ability of a political decider to shift from industrial interest to public interests (NEA, 2004).

The long-term guarantee of these funds encompasses the certainty to have institutions whose legitimacy is broader than that of the nuclear waste operator that is only defined on a short-term basis. A legal access to resources implies that past generations should have planned financial savings for present generations. In order to preserve the ability of future generations to resolve their problems of nuclear waste management, the present generation must make sure that a control and distribution procedure is present for long-term funding. This automatically implies the weight of public entities in official administration that will settle long-term funding. Ethics in nuclear waste funding raises the question of an existing borderline between private property ethics with the entrepreneurship freedom and ethics in public decision-making. But when common good is put forward it is currently only debated on the short-term basis.

Each authority aiming at that common good, that represents the interests of the whole society, would be a basic principle for sustaining nuclear waste funds on the long term, instead of leaving the drive of managing our health and public taxes to the industry. Another question is how to recognize common good and define it when other partners feel free to justify their own assessment procedure and their own rights on a long term basis.

The common good must represent the stakeholders' agreements in a sector-based policy, but it also has to go beyond their momentary needs. Whether it deals with the market or public authorities, the common good allows the aggregation of preferences and the opportunity to present results “as a whole”. The ethical basis, however, is drastically different because talking in a market context, common good, in a certain policy, can be reduced to the cost of kilowatt/hour or to questioning the protection of acceptable health

levels in the case of State intervention in the management of interests which are external to nuclear waste management.

It would, however, be overemphasized to equalize the market with the regulation mechanism of the common good. Could we then easily assimilate sustainable economic development with "the" common good? Moreover, even if we wanted to stay in an ethical economical development approach, maintaining environmental protection could then be used as a "resource" in a long-term economic development. Seen from this point of view, financing decommissioning is not just an external cost to be internalized but becomes a corollary of sustainable development. The Nuclear Energy Agency recognizes (NEA, 2004-B) the necessity to evaluate the external costs, in a variety of examples of countries and the long-term effect on environment and health: "Externalities of energy are of course not limited to environmental and health related impacts, but may result also from macro-economic, policy or strategic factors not reflected in market prices, such as security of supply, cost stability and broad economic impacts on employment and balance of trade."

Accepting, however, such a basis to elaborate financial ethics shared on an international level assumes that efforts have already been made for an ethics of fairness. This supposes some values have already been shared by the majority of the stakeholders who aim at building up a common framework of debates.

Long term deals with definition of transfer of burdens

Indeed, certain tension may exist between the Western Philosophy of Equity and the economic market. The definition of equity in common property asks for a particular philosophical approach. As maintained, the use of the concept of equity in the concept of the common good seems to be quite risky for a correct comprehension of the concept of equity in funding management.

An equal approach between the generations implies that the growth rate of this generation and future generations may not suffer any longer from the former generations' attitude which consisted of externalising production costs on successive generations. We then come to a paradox. A more equal distribution of burdens between the current and the next generations leads to a diminution of financial resources for the current generation. We tend to put the burdens on the future generations by making a comparison with the current generation to the one contemporary with the first nuclear power station. The consequence is that when we talk about protecting the current generation – which is also the most financially exposed – we decrease available resources for future generations, just by starting to think about the safety for the next generations. In other words, the future generations will have a low savings rate because of our including them in the scope of our ethical guidelines to support the costs of the past.

Another paradox would consist in believing that an ethical approach amongst generations, based on the attitude of past generations, would lead the present generation to take fewer measures to assure the financial feasibility of nuclear waste management projects. The question is to know what would be the "ideal" financial burden to pass

over and also what would be the ideal benefits and whether it would be necessary to link the benefits to the nuclear energy production span. The ones who get the benefits would then also be the ones who have to pay for it.

We have to be more cautious when identifying the generations that have taken all benefits from the sale of nuclear energy and from all kinds of nuclear activities. We have to keep in mind the clear link between these services and the costs of nuclear waste activities. Maybe, this would be clever, but useless, to find the current responsible of financial safety by looking at the beneficiaries: the previous generations are gone. The ones who might be seen as financially capable are the present and the future generations. This is quite easy to find the money in the generations that have to pay, without regard to the benefits of energy use. But only the past and present generations have benefited from previous usage of past nuclear energy production. Above all, the following generations will have to face the risk of exposure to radiation when decommissioning operations, in case of wrong dismantling or weak counter-measures.

The stage of development of each generation may then be used as a reference to know the standard necessary to help the future generations. The long run in the management of nuclear waste, but short term for depository issues, imposes the necessity to revisit the modes of managing resources of several generations. Putting this model at stake leaves room for a distributive justice, that is decided for future generations by the present generations. Each generation concerned can find itself in a crisis situation, such as, deciding what is the right to sacrifice their resources generated by past generations. For example, each generation has to decide whether they have to pay the pension with decommissioning funds or with benefits from the present company that manage the waste. Decision-makers have to decide who will have to make the effort of financing and to continue allocating resources for nuclear waste disposal. And on which base is it ethically acceptable to impose such an effort on the following generations: utility of the present generations or egalitarian approach between the past, present and future generation?

Long term budget and equal generations

An equal approach between the generations implies that the growth rate of this generation and future generations may not suffer any longer from the former generations' attitude which consisted of externalising production costs on successive generations. We then come to a paradox. A more equal distribution of burdens between the current and the next generations leads to a diminution of financial resources for the current generation. We tend to put the burdens on the future generations by making a comparison with the current generation to the one contemporary with the first nuclear power station. The consequence is that when we talk about protecting the current generation – which is also the most financially exposed – we decrease available resources for future generations, just by starting to think about the safety for the next generations. In other words, the future generations will have a low savings rate because of our including them in the scope of our ethical guidelines to support the costs of the past.

Another paradox would consist in believing that an ethical approach amongst generations, based on the attitude of past generations, would lead the present generation to take fewer measures to assure the financial feasibility of decommissioning. The question is to know what would be the "ideal" financial burden to pass over and also what would be the ideal benefits and whether it would be necessary to link the benefits to the nuclear energy production span. The ones who get the benefits would then also be the ones who have to pay for it.

We have to be more cautious when identifying the generations that have taken all benefits from the sale of nuclear energy and from all kinds of nuclear activities. We have to keep in mind the clear link between these services and the costs. Maybe, this would be clever, but useless, to find the current responsible of financial safety by looking at the beneficiaries: the previous generations are gone. The ones who might be seen as financially capable are the present and the future generations. This is quite easy to find the money in the generations that have to pay, without regard to the benefits of energy use. But only the past and present generations have benefited from previous usage of past nuclear energy production. Above all, the following generations will have to face the risk of exposure to radiation when disposal or depository operations or transport activities for nuclear waste.

The stage of development of each generation may then be used as a reference to know the standard necessary to help the future generations. The long run in the management of nuclear waste, imposes the necessity to revisit the modes of managing resources of several generations. Each generation concerned can find itself in a crisis situation, such as deciding that it gives themselves the right to sacrifice their resources generated by past generations for the benefit of future ones, who will then have to make the effort of financing and to continue allocating resources for the safety on the long term. But on which base is it ethically acceptable to impose such an effort on the following generations: utility of the present generations or egalitarian approach between the past, present and future generation?

Today, the expert must meet the decision-makers to set hierarchies between different types of utilities, not by taking the responsibility of the political mandates, but using their knowledge to give clear assessments of the costs. This helps politicians to see the consequences of each option for the present generation (depository or disposal). The utility must not only be defined by the nuclear energy producer but must result from a network that produces public information. Utilitarianism does not mean only favoring the companies that have sold the nuclear energy or are in charge of managing the funds: speaking about utility may also open ethics to the precaution of the future generations. .
In order to assure an effective application of an egalitarian approach to the fundamental rules and management of funding, we simultaneously have to think what the consequences are on the different actors involved in the decision-making network. We then can examine the different technical steps from the different operations to manage the waste up to the questions of the different types of risks that may be taken in stock exchange and how accumulated interests might be used.

An egalitarian approach to future generations will be possible when a precautionary approach to funding management is applied. We could also add that an egalitarian

approach would enable equivalence between local populations which live in richer countries and poorer ones. Within this approach, preventive measures against bankruptcy, planned by operators of nuclear waste disposals, or by authorities in charge of the management of the public acceptance, will then be put into balance with regard to other financial mechanisms that have a larger scope at an international level.

Another way to apply an egalitarian approach would then consist of distributing the financial burdens on a large number of generations (only on those who benefit from nuclear) in order to compensate the lack of provisions from the past, but from the very start of the nuclear power plant building. Then, benefits must also be dealt equally among the generations, and this which raises the issue of the rationales for the distribution: do the next generations have to adopt the same standard of life as the previous ones? The egalitarian approach must therefore be applied in order to make the transfer of the burdens feasible and therefore also keep in mind the importance of passing on knowledge. Indeed, the evaluation of the costs and of the funding could then regularly be revised to take into account the current progress in costs assessments.

The accumulation of knowledge therefore has a huge impact in an egalitarian approach on the burden of the funds needed to manage the waste. In the same way, the capitalisation of interests may also influence an egalitarian approach between generations for all stakeholders who are seen as responsible for the management of these funds. One of their responsibilities will consist of bringing to debate essential needs that must be satisfied by the present generations. We then have to re-consider the egalitarian approach by taking into account the evolution of the social needs in a progressive manner and not to rule out the definitive definition of what is equal among the generations.

9.3.2. From industrial costs to common good

Different scenarios are possible for nuclear waste sites and this induces different scales of time and expectations to make provisions and to make the available at needed periods of time. The well-being of the local communities is defined in function of the previsions from the government and its capacity to take decision to protect the budget that has to be used. The choice of different technologies is therefore a sign of a "given" policy which has some effects on other fields but these interactions sometimes are hidden by technical aspects of a dismantling scenario (delay for decommissioning might be justified because of "safety culture reasons", for the workers, while sufficient public provision are not available when needed).

Some countries give their preference to a delay of more than one hundred and fifty years and put forward some criteria like the safety of the workers when taking the risk to get some radioactivity when dismantling activities. But the reason of such a decision also might be there is no sufficient budget to provide sufficient protection and to finance the safety levels with regard to the protection of health of the population.

Trying to give some ethical guidelines to the nuclear waste manager is therefore very risky in terms of social controversies and national policy with regard to the balance between i.e. social care, education, payment of pension and the need to secure the

availability of the funding and to preserve them from the stock exchange regulation. But the question of ethics in funding stays and need some urgent answers even in case of temporary storage before definitive storage. Indeed "*in all cases, responsibility for funding of decommissioning and dismantling of nuclear facilities lies with the owner of the facility*" (OECD, 2002, p. 27). The rules of funding management today still are depending on the creation of national administration and need more efforts from the different regulators to make coherent the justification of the system structured by national policies without any preliminary agreements on European ethical consideration for funding management.

The "*technical*" specification of the elements that must be taken into account for dismantling scenario shows direct links with the choice of a.o. post-operational site and follow-up options. Different land use might be chosen when clean-out operation is finished but the social preferences also may show some ethical assumptions on the role of citizens in the follow-up of the site and the expected interactions with experts. The costs of different options have to deal with the role of the population and the capacity of the national government to sustain such a citizenship with specific budgets that overshoot the limits of industrial funding and liabilities.

The lack of standardization of decommissioning activities have some consequences in nuclear waste management and its costs, not only with regard to the varieties of techniques and the public policy chosen by each government to manage the funding, but also with regard to the place given to the participatory process and the period of time it would be integrated into the process. Ethics and how citizens may ask their government and nuclear waste manager to give them the word into the decision-making process is of high importance to assess the amount of the needed funding and the structure of social values that will prevail in some debates with experts and politicians. Democracy has a cost and asks for a sustainable scenario of dialogue, not only at the time of the use of the decommissioning fund but also when the follow-up by the local population must start.

The OECD approach stresses the many reasons that could create reluctance from the population and hope to meet them in order to reduce them. They see the role of local authorities in their "*role to protect the interests of the local community and will be best placed to ensure that the community is accurately informed in order to prevent rumours, perverse manipulation of public opinion and loss of morale*". (OECD, 2002, p.33). But the question of enhancing more substantial dialogue with local communities raises some questions on the scale of the topic and the frame where it must be worked on. Indeed not only the interest of the local population is of high importance and must be "accommodated" in this topic.

Ethics guidance could be given on the scale of the topic of nuclear waste and the social scope of the interested parties involved in communication process. The most geographically interested people around nuclear site might be concerned with employment and the distribution of revenues that come from nuclear activities. They do not represent the elected people at national level and even worst, there is no democratic mechanism that gives them the mandate of being the spokesperson for the whole population when being involved in participatory process.

The conclusion is very simple to stress: the scale of the participatory process itself is a question of ethics moral values. We seek for criteria that contribute to moral judgments for the whole collectivity when dealing about nuclear risks at large and balance the bias of local visions against the sum of interest of the whole population at national or at European level. The recommendation of adopting a step-wise approach is not the only way to frame local interactions. Progressive consensus building might be found at national level but this asks, of course, to face the risk of enlarging the social debates to other policies than nuclear waste management.

The local framework is then seen by operators and their representative, as the rational way to reduce time for dialogue and to limit the means for giving democracy large spectrum of interactions. But ethics guidance on the long term may not be defined only by giving priorities to efficiency of the choice for a depository. The operators and nuclear waste manager want to know the expectancy of each host community in order to prepare into the dialogue the "good" conditions that will favor their project of storage.

9.3.3 Ethics and compensation: short term or long term governance ?

The State of Ohio offers a good example of the kind of set of criteria (Fentiman A., 2003) that can be offered to a large negotiation process within the scope of a compensation mechanism. Those compensation criteria do not only deal with the budget of the municipalities and some financial return on the local goods like a swimming pool or a new central road paid by the nuclear companies. Compensation mean something more "social" and in a word more political than just a question a bargaining and trade-off with laymen.

- *"availability of the results of all environmental monitoring,*
- *payments to the host community in an amount equal to the property taxes which would otherwise have been collected for the site property if it were privately owned,*
- *payment to the host community for the loss of tax revenue from adjacent property, if the property is shown to have decreased in value as a direct result of building the facility,*
- *payment to the owner of adjacent property for the property value loss, if the property is shown to have decreased in value as a direct result of building the facility,*
- *a gross receipts tax assessed on the facility to generate revenue for the local host government,*
- *an annual privilege license tax paid by the operators to the local host government to pay for expenses not covered by other compensation,*
- *establishment of a long-term care fund for use after the site closes,*

- *payment for increased emergency response units which could be activated during site operation,*

- *establishment of funds for the host community to perform independent environmental monitoring, and*

- *authority for the local community to close the facility if there is any threat to public health or safety.*

- *The protections and incentives offered in Ohio will depend on the enabling legislation passed by the Ohio General Assembly."*

The certitude of having the benefits on the long term has something to see with compensation. We have to address such a message to the authorities which are in charge of organizing the local debate with the population: the guarantee to benefit from the nuclear site by taxes is part of the ethical debate. Not only the question of distributive justice and the allowances of such a levy must be discussed but also the *stability* of the incomes for the local government and its population! The incomes must be protected in a long term regulation and not only written in short term agreements.

Beside the question of giving guarantees on the long term to the local government we could also explore the topic of the form of the compensation mechanism. Again we can take the example of the Ohio State, trying to make the link between compensation mechanisms and some forms of public intervention or citizenship control. It shows the importance of guarantee for citizens to be sufficiently protected by the organization by an emergency plan or providing a budget for having the capacity to perform independent environmental monitoring. Therefore, the question of compensation is not only explored as mean to "repair" the loss of value (buildings, property), but as the acknowledgement of the right for citizens and local community to perform independently reports and control mechanism on the long term. The time of asking local population to give their consent to the industrial project on the short term is over because it is the interaction with the whole local community that comes into the concept of compensation mechanisms (Taylor D., 1992).

Motivations of the local population are varied and offer different forms of requests towards both the public authorities and experts. A communication process has to give response to the standard of an acceptable way of life and fair resource management procedures. Controversial attitudes are not necessarily a sign of incoherence and disorders. Balanced powered institutions may have their own place into a public debate. Transparency into communication about nuclear risks mean than giving the right, *as a resource*, to the local community to ask experts on complicated topics that shows the balance between costs and burdens. With other words, the population asks for a better transparency into the links between the well-being and the perceived risks (Albrecht S.L., 1998). All this pushes us to a policy on the long run and not on the only acceptability of the local population on the sort term.

9.3.4. Participation process and incentives

The most important criteria about the compensation mechanism is about the *participation* process, in order to get legitimacy and support from the population. Instead of favouring the technical approach, based on a strict hierarchical attitude and the prominent of the rational criteria defined by scientific explanation, cooperation and participation are targeted. The participation process clearly competes the authority of federal and local governments. But then, the distributive justice criteria may allow the return to the most demanding communities and make from poor populations ready-made communities that seek for any form of financial advantages.

Linking the involvement process of the local population into the global process of the political decision with compensation means at first that the hosted communities may express their preferences and define a new type of balance between the global benefit of the activity generating the global benefits and, from another point of view, the need to be taken into account into the global process, but not necessarily because of the cause of the global process itself. Indeed we could make some distinctions between different types of justification (Gregory R., 1991) underlying the participation process (respect of individual rights, egalitarian approach, right to take part to the benefits, remedial nature because of damages, restoration for the quality of environment on the long term...).It is all far well known the selection of any of these criteria changes the psychometric attitude of individual reaction towards risks (Fischoff, 1978).

9.4. Ethics and funds

9.4.1. Enron: a bad example, a good lesson

Enron, among industrials

In a way, a lot of external auditors could say from Enron they were originally part of traditional risky business of energy delivering. The methodology to assess the risk is not at all unknown, and without any experience. Being part of the process that generates cogeneration shows us the ability of Enron to be part of the stakeholders whose concerns deal with energy policy, technological assessment and environmental performance. Because of the size of the company, we could say Enron face the ethical issues of the long term and ethical issues about the next generations.
(Source : Enron corporate responsibility annual report 2000)

"Enron is a world leader in delivering low-emissions energy resources, and we strive to minimize the environmental impacts of our assets through the best management practices and innovative technology. We deliver in low-to-zero emissions technologies and projects, such as cogeneration plants and renewable energy generation.
Delivering Natural Gas and Low-Emission Energy: Enron buys and sells both physical and financial risk management tools that provide customized energy products for both producers and end-users. We are the largest wholesaler of natural gas in North America–the cleanest burning fossil fuel.

Enron Energy Services (EES) is building a business to transform the energy marketplace by providing integrated energy and facility management solutions that lower energy costs, improve operational efficiencies, and enhance environmental performance".

The comparison with the local partnership to enhance the participative democracy is quite easy to do. Both are confronted with public acceptability, the need to get support from the public for long term governance. They also take decision for the "design" of the future of our society and also deal with technological assessment. Both also have to answer ethical issues on the governance (see next division).

So, we have to raise some questions on the difference between local involvement and corporate governance. How far can we situate a company from the responsibility to involve the representative of the population in a participative local democracy? Which differences between the board and the local government? Does ethic refer to stakeholders for the return when the company has to deal with the benefits or does equity also deal with democracy and the concept of the common good?

Enron: corporate governance was not sufficient

Numerous codes of conduct were written in the Enron networking. Their corporate governance was seen as the good example in the equity of stock exchange business. Enron could be transparent on the stock exchange in order to reassure investors.

The partnership round the nuclear sites in Belgium may also use the same process and showing their aim at reaching the respect of the local population. The local involvement and general principles about the representativeness of direct interactions with "real" citizens" also may be used to sell the project of depository while the local reluctance to the project in a decision-making phase may be a danger to the success of the whole project that profit prior to the nuclear waste manager.

Enron needed to show their ability to understand the importance of some principles while acting differently. The coherence between the marketing system using principles of integrity and honesty could let us think about some considerations on the guidance of working groups round nuclear waste depositories. Customers of Enron and citizens around a project of disposal may be red in the same way: acceptance is part of the expectations from the leaders.

The function of control is of high importance!

- «*Integrity: We work with customers and prospects openly, honestly and sincerely. When we say we will do something, we will do it; when we say we cannot or will not do something, then we won't do it.*»

(Source: Enron's code of ethics, Statement of Human Rights Principles, « values 1 »)

This is a proof the formal text and known ethics are note sufficient to protect the stakeholders. Interactive processes have to feed processes within the results and its processes are available for all in terms of comprehension and acceptability.

Corporate Responsibility of ENRON was formally written:

- Statement of Environmental, Health, and Safety Principles
- Statement of Human Rights Principles
- 1999 Environmental, Health and Safety Annual Report
- 2000 Corporate Responsibility Annual Report
- Statement on Global Climate Change
- Contact Corporate Responsibility

The comparison with the Belgian situation about the NIMBY effect and the need to get public acceptance round the nuclear depositories show us the uselessness of claiming (through the COWAM network or another one else) "we act ethically", following nice (but empty) principles of democracy and governance. We may try to give content to these principles by numerous interactions with the population like evening session and folders or plate-form of debates with heterogeneous types of social actors.
The link between official aims and practices must appear!

- «*We are dedicated to conducting business according to all applicable local and international laws and regulations, including but not limited to, the U.S. Foreign Corrupt Practices Act, and with the highest professional and ethical standards.*»

(Source: Enron's code of ethics, Statement of Human Rights Principles)

But the use of written codes and the development of practical ethical guidance require a kind of external controller of the system. If not, the involvement of all actors comes into the process of the one who pays the budget. In this situation give prior influence to the one who organises the process of interactions, the use of ethical guidance may look like pseudo-ethics, whose process is clear at the opposite of the content of most of its claimed values.

ENRON case study: ethical guidelines are not enough !

"*Ethics - Anti-Corruption and Bribery*

Our Policy:

- *Enron maintains and disseminates a clear anticorruption policy prohibiting the payment, solicitation, and receipt of bribes in any form.*
- *We strictly adhere to the Foreign Corrupt Practices Act in our business dealings and operations worldwide. All employees are expected to comply*

with our policy; non-compliance can result in dismissal.

- *Officers, employees and other company agents are encouraged to report possible violations either in writing or by calling a confidential hotline.*"

Source : Enron corporate responsibility annual report 2000

A solution for local democracy about the decision to get a nuclear waste disposal is to apply the nice principles Enron presented in their annual reports.

Enron could understand the need to offer their customers some tools to be better protected. One example consists of offering them the opportunity to report violation of these principles to authorities. In terms of local governance with citizens in the case of depository, it means citizens have to get some support from external parties. Citizens have to get a way to report the manner their opinion has been taken into account and whether the population's fears have been sufficiently answered by experts.

Ethical guidelines must give clear limits between compensation criteria and personal enrichment. Therefore, cultural and subjective criteria for compensation must appear in a document and discussed in a public community to assess the balance between interests of the community and the social or political benefits of some citizens involved into the working groups for their own aims. The intermediaries between the internal side of the working groups and their translators to external bodies are then a sensitive aspect of long term governance.

The culture of anti-corruption and the possibility for employees to denounce the violation of the rules shows the importance of creating a common culture that would not only consist of clever and deep philosophical references but also capitalised exercises of communication where real case studies should have been scrutinise. The participation of the population therefore has to be supported in a way that favors habilitation to some external controllers to show the bad spots.

8.4.2. Control and transparency

Transparency about the type of activity

It is not possible for laymen to understand the main stakes and social values without any help of internal experts. Like with the Enron case study, we can suggest nuclear experts to improve the transparency of their reports in term of understandable information for the whole community and not only for the main beneficiaries of the project.

"*The company suddenly went from pipelines to providing services, and that makes it much more difficult for an accounting firm, not to mention the average investor, to evaluate what numbers really are relevant in assessing its performance. They were dealing in very sophisticated trading transactions built around an instrument that only exists on a computer screen. So it was very difficult for auditors to figure out whether the transactions had the effect that Enron was saying they had.*" (James D. Cox, 2002).

The need for democracy to control the process of involvement does not only refer to the abilities of the main managers and politicians, their affiliation or any hidden agenda. It also refers to the access of information by others. In a few words: it shows to us the importance of making efficient external access and control.

"I have looked at some parts of its financial statements, and they're absolutely impenetrable. The description of the special-purpose entities and the role they played in Enron was not decipherable even to a rather skilled law professor. And the fact that this collapse caught markets by surprise indicates that even the best-advised funds were caught flat-footed on this one." (James D. Cox, 2002).

Control is easily linked with the main activities of a company. Nuclear activities and its control do not suffer numerous interrogations on the limits of such an activity. Only the capacity of citizens to do the follow-up of such a control on the long term may be put at stake because of the complexity of the matters.

The Enron case study makes us understand that the link between control activities and the definition of these activities themselves may also be more complicated. Indeed we see a shift in Enron's activities, from industrial activities to financial transactions whose reality were only existing "on screen", like D. Cox explains to us. Therefore, the control and the need of transparency also knew a shift from low risk activities (industries) towards stock-exchange risks. This creates a gap between trust in a domain of activities and another field of risky activities. The rules and ethical guidelines should have been adapted into the new situation.

Another clear example will help us understanding the social scope of the **shift of risky activities within Enron's stock development.** Half of employee's shares were invested in risky activities of stock exchange without any major changes in the ethical rules for the protection of the staff. Investments in retirement plans could be an example of protection and enabling the board to constitute dedicated funds.

Enron tried to mix different cultures

Industrial	**Financial business**
• gas	• market, investments
• energy delivery	• stock exchanges
• low-emission energy	• corporate ethics
• cogeneration plants	• financial auditors create trust because US accountability had no standard regulation
• best practices	
• innovative technologies	• stock exchanges strategies
• technology risk assessment	• experts in finances

Now, the comparison with local involvement of the population seems rather far from such an example. But we see again some useful lessons can be taken and apply for

nuclear acceptance, achieved by nuclear waste managers. The population is of course involved into risky activities from depository's activities. People are involved into the benefits from the compensation package which is foreseen in case of local acceptance. In a way, the process also gives social advantages to mayors or locales deputies who want to use that framework to legitimate their position into the community. Politicians or citizens are not directly paid by the process. But we see they get advantages directly for their political function in local structures of decision or for the common good of a given community. Again we could make the reasoning about the rules of protection for the rest of the Belgian community which is not protected from the decision of a local community focusing on their own interests. The local community is like the little group of executives of the company who could take some decisions without feed-back to the large group of the community. They see their own advantage and want to take some risks for themselves while this decision concerns the waste of production which from the whole Belgian population took advantages for decades.

The rules of participation are too much divided between the group of involved parties and the rest of the community.

Transparency about the control process

We stress the lack of transparency also about the process of control. When the accountancy is not readable for external auditors, then we may not speak about control, because the transparency principle, in an ethical governance attitude, requires something else than formal understanding. The links with other companies, the possibilities for Enron to evaluate and the numerous filiations must appear in a clear report that shows the health of the company. Instead we were informed about another situation where the dirty spots of economy were hiding robust briberies and unsane financial dependence between partners and controllers. In a word: Enron was organizing the lack of liability using formal rules of transparency!
Source : The American College of Forensic Examiners International (ACFEI), 2001

- Under a note titled “Related Party Transactions,” the reader learns that Enron entered into transactions with limited partnerships and that the managing general partner is a senior officer of Enron. What was that all about? In a complicated transaction, Enron contributed cash and common stock to these entities in exchange for a receivable note. Whether this transaction was appropriately recorded is impossible to determine from the description in the note.

- Under a note titled “Commitments,” the reader learns that Enron guaranteed the performance of certain of its unconsolidated equity affiliates in connection with letters of credit issued on behalf of those entities and other liabilities. Enron claimed “it does not consider it likely that Enron would be required to perform or otherwise incur any losses associated with the above guarantees.”

The lesson to get for the nuclear world and its need to get involvement from the public to support the decision for a nuclear waste depository (or disposal) is there is a possibility to use formal communication and official rules of transparency and control to hide the real problems. It is possible for experts in accountancy or experts in nuclear

energy to hide the importance of some industrial risks, with regard to the health for the next generations. Uncertainties in science may be used to hide the real debate about the stakes and their importance in terms of public finance or environmental issues for the future.

The Belgian context of involvement with the local population let himself defined as structured by expert culture and ethical debates: (source: WM'02)

"The working method that ONDRAF/NIRAS applied in the past, aimed to select the future disposal site for short-lived low-level waste on the basis of a scientific approach that had been carefully worked out by its experts. At that time, ONDRAF/NIRAS thought – maybe rather naively – that the actual implantation of a repository would cause no problems once it had been proven that the chosen site was, from a technical point of view, one of the best possible choices. ONDRAF/NIRAS looked for a solution for the radioactive waste problem in an objective and rational manner. Gradually, ONDRAF/NIRAS realized that important parameters were missing in its mathematical model. The implantation of a disposal infrastructure would inevitably have economic, social and ecological consequences. Also, the public's reactions were confirming the validity of the committee's recommendations regarding the necessity to take into account the socio-economic aspects of the implantation of a final repository on the national territory. So ONDRAF/NIRAS progressively started to develop an adequate methodology to select, according to objective criteria, the best surface disposal sites among the 98 already identified zones. In addition the expected geological, hydrogeological, and radiological aspects, this methodology included environmental and socio-economic factors. Unfortunately, these last parameters were impossible to model in a satisfactory way. In 1995, in an attempt to break the stalemate, the government commissioned a study by ONDRAF/NIRAS on the possible alternatives to surface disposal. The final report, the NIROND 97–04 report, published in 1997, compared surface disposal with deep disposal and prolonged interim storage. It recommended that the government should base its decision on ethical considerations. Indeed, ONDRAF/NIRAS supports the view that the current generations are responsible for ensuring that future generations will not have to actively take care of the management of the radioactive waste they will have inherited."

This situation presents a mix of governance that deals with social values and technical issues. Democracy does not give any guarantees about the subordination of experts to the political powers. The practical reason is sometimes presented as autonomous. When the cross between ethics and technical arguments is open to both influences, then there must be an ethical culture which sustains interactive dialogues with the rest of the society.

Transparency and affiliation

A lot of contribution enhances involvement principles in order to get easily public acceptance and weaken any resistance based on unexpected expression of public interested from social actors who refused to be part of the decision-process from the very beginning. But this question of involvement endorses also some dangers like the lack of neutral observance and decision when interests are personal.

The Enron case study made us understand the close interests of some politicians to the interests of the private company. There are common crosses between the roads of politicians and decision-makers. In order to get some authorisations to build a depository or to get trust from investors, the manager of any project with regard to nuclear waste activities has to work and make trade-off with politicians. There is some paradoxes between the aim of working in a common network and asking democracy to be better protected from unacceptable affiliations from both the experts and the decision-makers.

Deep involvement between politics and corporate culture is not necessarily is a sign of good representation mechanisms.

- *Num. of seated U.S. Senators took Enron campaign contributions: 71*
- *Amount of Enron political contributions 1990-2002: $5.9 mill.*

(Source : From the Christian science monitor, 2002, By Ron Scherer and David R. Francis)

- *Wendy Gramm, a former high-level political appointee and wife of a US Senator, was on the Enron board of directors:*

(Source: from Kenneth W. Johnson, Reflections on Ethics & Values in Policy , July 2002)

The local partnership in Belgium, like in France, Germany or Sweden, let us learn the need from the local population to get support, information and sometimes, even local or federal budget to organise the focus groups, the public meeting, the travels for citizens, etc. Mona, Paloff and Stola (see respective bibliography) were three forms of partnerships within the local mayor and several representatives were deeply involved. Local and/or federal intervention are frequent directly or through consultants and reflection groups paid by the State or paid but the public administration that received from the State the mandate to organise local democracy (which is the case with NIRAS-ONDRAF in Belgium, see bibliography at Niras). Therefore, some protection towards the citizens must be organised to help objectivity and balance into reflection groups.

- *Belgian Nuclear Waste Institute (NIRAS-ONDRAF) entirely financed the budget of the functioning of Mona, Stola, Paloff: about 250 K€ annual budget each: (Febr. 2000-2005) for 4 working groups (WG : technical concept and implementation, local development, safety, environment and health) + the board + communication activities…*

- *+ studies: once 150 K€ divided in:*
  74 K€ for socio-economical studies and Belgian Nuclear Waste Manager paid the technical studies (with a.o. SCK-CEN= group of nuclear experts.
  74 K€ for the development of the "integrated pilot-study of depository"
  (source: personal interviews with members of Mona, Stola, Paloff)

Because the settlement of the local partnership into semi-official representatives of the local population creates a asymmetry between the number of the present actors into the discussion in public forum and the involvement of certain citizens or members of the local government some balance must be supported and restore by a better protection of the general interest.

All local partnership needed their members being trusted by their own organization. The representation is based on "positive quotation", not on law and standard procedure. Therefore, the acknowledgment of members is also partly based on trust and mutual acknowledgment within the local culture. The process of mutual support is similar to some failure mechanism with the process of trust support with Enron.

It doesn't mean we have to discriminate the process of mutual acknowledgment per se, but when claiming we want to act with ethical guidance into nuclear waste management for the long term, it is useful to seek for external weight, out of the network in order to offer some guarantees we live another experience than the Enron case study.

Asymmetry between Belgian local government, local partnership AND Belgian population (nuclear energy users).

- 2 locations for depository, 3 local associations, 4 mayors.
  - MONA: 1 local community (Mol)
  - STOLA: 1 local community (Dessel)
  - PALOFF: 2 local communities (Fleurus/Farciennes)
- 1 Nuclear Waste Manager: NIRAS-ONDRAF
- 1 Nuclear Control Agency (FANC-AFCN)
- 1 Nuclear Research Centre (SCK•CEN)
- **10 millions energy users !!**

9.4.3 Some recommendations based on Enron case study

Separate the role of auditing and consultant

A close look at the process of ethical recommendations is needed because the formal text doesn't give any guarantees for the right observation of such principles into day-to-day practices. Reforms in accounting and corporate governance mean there is need for more transparency into the process of auditing. With Enron, the private company that played the role of auditor also was paid as consultant.

Today, through the COWAM network, we see a lot of consultants work, close to the nuclear agencies, and at the same time, are acknowledged as the guardian of the participative process with the population. This situation necessary calls for the separation of interests and asks for a clarification of the role played by each stakeholder with regards to his own affiliation. For the future, we might recommend to the decision-makers that "neutrality" into the clarification of interests is worked on by other companies than their usual pre-paid consultants.

The culture of the top and transparency

But at the same time, promoting transparency and using corporate governance, establishing Enron as the top company into the US, also raises some risks, like the need to hide some difficulties. It favours the use of-books for accountancy in order to keep the best possible images of the company. Transparency therefore might not be linked all the time with the best images for trade. This means leaders of companies must face the right for external observers to have a look on their dirty spots. Most of time, we have to admit culture of transparency is used to give the best presentation of results and is developed as a tool of public relation in order to increase trust for investors.

The needs of Enron to create market acceptance

- positive quotation from auditors
- complexity of transactions
- commitments of affiliates
- consolidated liabilities to suggest results
- to hide conflicts of interests
- powerful communication strategy

The comparison with the local population is quite easy to do. Showing the participatory process in order to reassure people on the technical conditions for a depository is a goal. Even in Belgium, the Belgian Nuclear Energy Research Center benefits from the nuclear waste manager, one of their most important customers. In a way, there are clear mixes of interests when the local partnership (representing the local population interests) asks the Belgian Center to play the role of external auditing for the work and research of the Belgian nuclear waste manager. Commercial trade-off between the Center and the national nuclear waste manager pushes both partners into a speech that will show the good aspects of their governance. They are depending on each other to develop long term contracts and expertise on nuclear waste. It is rather doubtful to imagine a temporary contract of auditing will produce such a stretching attitude from one to the other that critical points will be immediately put forward.
In conclusion, we can summarize the link between the culture of transparency and auditing by the need to preserve the independence between the companies that will work as auditors and others that will interact as consultant. The source of finances for

the auditors must come from an independent origin and not being considered as the corollary of consultancy!

More practice with ethics is needed

Corporate ethics	**Democratic Nuclear Waste Management**
• corporate ethics needs to protect: **current/future** stakeholders	• = future generations?
• ethics is defined by "period of time" strategy: to maximize the short term profit/sustainable development?	• = public acceptance for short term or trust on the long term?
• code of ethics are not wallpaper	• = code of ethics is not a guarantee !
• ethics requests regulation and control	• = need for follow-up

We stress the rules of conduct in Enron's codes do not have to be changed. It's the way to behave from the managers and their consultants. With other words, the philosophy of corporate governance could stay the same but some changes were needed in the manner the protection of neutrality has been performed through consultancy services.

Compensation or incentives?

The Enron case study show a. o. the need to suggest compensation for partners in a moderate way. Excessive compensation to the main beneficiaries of the project may be regarded as a tool for briberies. In a way excessive compensation for executives of Enron will create a situation of lack of respect towards the regular employees of the company.

In a similar way, the board of the local partnership may be seduced by the internal play for themselves and creating a cut from the interests from the basis. Numerous advantages, like travels abroad in tourist places, when visits were organized to show other nuclear depositories, and also hotels, restaurants, paid by the nuclear waste manager to the local mandates or in favor of some known citizens engaged into the process, may have as consequence incentives, support and compensations are confused to get public acceptance.

Again, the amounts engaged into the process are not at stake because we see the financial support as unavoidable way to build local democracy. But we care for its purpose and the role of the main beneficiaries into the local partnership and into the civil society.

Different approaches are possible about compensation mechanisms. "There are many facets to the application of the principle of environmental justice (with its components of distributive justice and retributive justice) and the principle of human dignity. Some of these facets can be illustrated by considering a few examples. Note that the discussion here is certainly not comprehensive and is not intended to be in any way prescriptive. If a situation arises when some biota have been harmed, then the principle of environmental justice could lead to a consideration of 'compensation' for environmental damage. This situation might arise, for example, after an accident or in some other circumstances where ionizing radiation is having a deleterious effect on biota or a habitat. Compensation could involve restoration of a habitat or ecosystem, or provision of an alternative habitat, both of which would be reflecting what is seen as amelioration of the interests of biota. Another compensatory approach could be a retributive penalty on those humans responsible. Harm in terms of effects on biodiversity, conservation and sustainability is not constrained by national boundaries. Hence - and this is an example of the application of the principle of distributive justice - it would be inappropriate to artificially constrain assessment of impact and such assessments need to take account of harm to all parts of the environment (or biota) that could potentially be affected. The principle of human dignity can inform judgements made between the interests of humans and biota, providing some support for preference to be given to human interests relative to those of biota. The same principle can help to resolve issues that arise with different human interests. Humans who are affected in some way by the actual or potential for environmental harm from radiation may have differing views on the significance of such harm, depending on their cultural background and ethical beliefs. Although decisions may be being made within a clear framework built around the principles of biodiversity, conservation and sustainability, the principle of human dignity lends support to the idea that those affected should be involved in making the decision — there should be what is often called informed consent". (IAEA, 2002).

Ethics of compensation: corporate governance (Enron) or common good?

	Enron case study: corporate governance was not sufficient	**Compensation: corporate governance or common good?**
Rationales	Maximum financial profits	Bribery or acceptable risks?
Trust	Good quotation on the market	Still possible when compensation mechanisms?
Involvement	Make the control system and the board dependant of you	Local budget to manage by mayor or structured groups of citizens on the short term
Common good	Same as "rationales" (upon)	Public deliberation needed, at national level
Fairness	Corporate governance clearly stipulated, not applied	Distribution of risks or distributions of (social ?) benefits
Democracy	Replaced by the market rules	How to cope with compensation without liability regime and courts?

From: M. Bovy, "*Why do expert culture need ethical guidance for a long term governance: decommissioning fund as case study for compensation management?*", Presentation given at Gartow (Germany), 2005-02-19, COWAM, WP 4 Long term governance.

9.5. Some comparison with decommissioning policy and funding

9.5.1. From industrial costs to common good

The main opposition in ethics about decommissioning is about the operational use of the scenario and its acceptability with regard to the public approach for health, environment, involvement and trust process when interacting between experts and citizens and also the balance between compensation costs, restoration site and efficiency of the process in the global process of energy management.

With other words, in more "social values", we might translate into some main debates, structuring the classic dual approach between egalitarian approaches (some equality or equity is needed) and utilitarianism vision (the utility is defined in terms practical aspects for restoration and dismantling activities of costs-benefits or by the interests of the decommissioning project leader, with lower interests for public debates and the next generations).

This may be applied to the regulation of the stranded costs and the rules for the management of the funding (how funds are raised, how to manage (public/ private) and how to allow the payment (delay, use of the capitalised interests), even who has to pay (industries/ consumers/states). Therefore, all questions concerning transparency of the funding and its control with regard to some public interests are largely parts of ethical debates about decommissioning activities and this enlarges the debates to other aspects, than only deontological rules for technicians.

Long term governance can no longer sustain in situations when financial stakes enter into competition with market rules for operators and private investors. The management of decommissioning funds needs guidelines that might be approved by all stakeholders and – why not – discussed openly in order to share a common approach that will undoubtedly make different opinions more acceptable. It is needed to allow a large scope for an ethical debate to know what is acceptable or not in a period of time that will largely outrun the energy production period. All advantages of courses cannot be situated only in the period of time of energy production. Advantages from the nuclear sites will stay beyond the decommissioning period. As will the costs.

9.5.2. Ethics and strategies for decommissioning

The balance between the burdens of the past and the present extends to requiring managers capable of enlarging the scope of the stakeholders who have only seen their short-term interests defined by financial profits. Constituting these funds for decommissioning implies the ability of a political decider to shift from industrial interest to public interests.

Different scenarios are possible for decommissioning site and this induces different scales of time and expectations to make provisions and to make the available at needed periods of time. The well-being of the local communities is defined in function of the previsions from the government and its capacity to take decision to protect the budget

that has to be used. The choice of different technologies is therefore a sign of a "given" policy which has some effects on other fields but these interactions sometimes are hidden by technical aspects of a dismantling scenario (delay for decommissioning might be justified because of "safety culture reasons", for the workers, while sufficient public provision are not available when needed).

Some countries give their preference to a delay of more than one hundred and fifty years and put forward some criteria like the safety of the workers when taking the risk to get some radioactivity when dismantling activities. But the reason of such a decision also might be there is no sufficient budget to provide sufficient protection and to finance the safety levels with regard to the protection of health of the population.

Trying to give some ethical guidelines to the nuclear waste manager is therefore very risky in terms of social controversies and national policy with regard to the balance between i.e. social care, education, payment of pension and the need to secure the availability of the funding and to preserve them from the stock exchange regulation. But the question of ethics in funding stays and need some urgent answers even in case of temporary storage before definitive storage. Indeed "in all cases, responsibility for funding of Decommissioning and Dismantling of nuclear facilities lies with the owner of the facility" (OECD, 2002, p. 27). The rules of funding management today still are depending on the creation of national administration and need more efforts from the different regulators to make coherent the justification of the system structured by national policies without any preliminary agreements on European ethical consideration for funding management.

The "technical" specification of the elements that must be taken into account for dismantling scenario shows direct links with the choice of, a.o., post-operational site and follow-up options. Different land use might be chosen when clean-out operation is finished but the social preferences also may show some ethical assumptions on the role of citizens in the follow-up of the site and the expected interactions with experts. The costs of different options have to deal with the role of the population and the capacity of the national government to sustain such a citizenship with specific budgets that overshoot the limits of industrial funding and liabilities.

The lack of standardization of decommissioning activities have some consequences in nuclear waste management and its costs, not only with regard to the varieties of techniques and the public policy chosen by each government to manage the funding, but also with regard to the place given to the participatory process and the period of time it would be integrated into the process. Ethics and how citizens may ask their government and nuclear waste manager to give them the word into the decision-making process is of high importance to assess the amount of the needed funding and the structure of social values that will prevail in some debates with experts and politicians. Democracy has a cost and asks for a sustainable scenario of dialogue, not only at the time of the use of the decommissioning fund but also when the follow-up by the local population must start.

The OECD approach stresses on the many reasons that could create reluctance from the population and hope to meet them in order to reduce them. They see the role of local

authorities in their "role to protect the interests of the local community and will be best placed to ensure that the community is accurately informed in order to prevent rumors, perverse manipulation of public opinion and loss of morale". (OECD, 2002, p.33). But the question of enhancing more substantial dialogue with local communities raises some questions on the scale of the topic and the frame where it must be worked on. Indeed not only the interest of the local population is of high importance and must be "accommodated" in this topic.

Ethics guidance could be given on the scale of the topic of nuclear waste and the social scope of the interested parties involved in communication process. The most geographically interested people around nuclear site might be concerned with employment and the distribution of revenues that come from nuclear activities. They do not represent the elected people at national level and even worst, there is no democratic mechanism that gives them the mandate of being the spokesperson for the whole population when being involved in participatory process.

The conclusion is very simple to stress: the scale of the participatory process itself is a question of ethics moral values. We seek for criteria that contribute to moral judgments for the whole collectivity when dealing about nuclear risks at large and balance the bias of local visions against the sum of interest of the whole population at national or at European level. The recommendation of adopting a step-wise approach is not the only way to frame local interactions. Progressive consensus building might be found at national level but this asks, of course, to face the risk of enlarging the social debates to other policies than nuclear waste management.

The local framework is then seen by operators and their representative, as the rational way to reduce time for dialogue and to limit the means for giving democracy large spectrum of interactions. But ethics guidance on the long term may not be defined only by giving priorities to efficiency of the choice for a depository. The operators and nuclear waste manager want to know the expectancy of each host community in order to prepare into the dialogue the "good" conditions that will favor their project of storage.

9.5.3. Finals remarks on ethics for decommissioning

One of the ways to measure the common good would be to take into consideration solutions proposed by experts and technicians leaving aside the possibility of debating other views. Their solution would be a deal for other partners who would be forced to adopt their beliefs making the needed sacrifices in regards to the social good.

This would imply ignoring immediate possible investments with regards to other priorities. Nevertheless, a technocratic policy would not be relevant for a starting point without implication on organizational principles for decommissioning funds.

No scientific standard can hold any definition of an acceptable frontier enabling the passage of decommissioning operations of a nuclear plant to further consideration on the needs of the population in the long term. Conversely, social and political debates in governmental bodies are not framed to reverse priorities defined by experts, once they have adopted their decision on methods of the decommissioning.

Intergenerational ethics focuses on a long-term strategy, on solidarity with future generations. Such an ethics favors transparency in the cost structure, a stable regulatory framework and a system of control that will be open for justification principles. Ethics in the long term for decommissioning funds would not confuse the needs for a stable framework with the use and the availability of funds and stability in long-term governance institutions that would escape any social criticism.

In summary, intergenerational ethics pleads for a kind of accountancy, not the one which is given by experts or financiers only, but mainly by more transparency in the decision-making process and involvement of stakeholders at an early stage. Maybe international agencies could at least help in the process of "stretching", i. e., scrutinizing, the expert reports and cost assessments.

More tasks could also be conveyed to international agencies with regard to international ethics, not only as stretchers of the process, but as the guardians and, in a word, promoters of forums for ethical debates.

	Long term for impacts, costs and management	**From industrial costs to common good**
Rationales	Anticipation and balance with future generations	Shift from the polluter-payer towards tax payers principle
Trust	Trust needed for the long term and built on the long term	Easier when taken in charge by the community
Involvement	Condition for long term agreements	Forwarded to democracy process i.e.: national debates about local depository
Common good	Public agenda of politicians	Forwarded to democracy process i.e.: health or competitiveness?
Fairness	Which balance between short term needs and long term needs? Which balance among present benefits among numerous stakeholders ?	Forwarded to democracy process: i.e.: which acceptable risk, nimby...
Democracy	Transparency needed	More present in the black box of industries

From: M. Bovy, "Why do expert culture need ethical guidance for a long term governance: decommissioning fund as case study for compensation management?", Presentation given at Gartow (Germany), 2005-02-19, COWAM, WP 4 Long term governance.

9.6. Some strategic steps for long term governance

9.6.1. Official mandate and public interest

The idea of giving to the regulator the official role of informing citizens is too much restricted to the acknowledgment of public bodies towards citizens. Regulators are not always the "best situated" body to get sufficient confidence from the citizens. Its capacity to organize a dialogue with a large public might be weakened by the scope of his official mandate: the large scope of some questions on compensations, risks and health is open to too various interests. We then raise the question of the "right" territory

of such a question of long term governance, and ethics which deals with participatory processes and dialogue with laymen.

At European level, cross-cultural rationalities are, of course, preferred to the "fold attitude" that preserves national identities. But in terms of compensation and ethical guidelines for funding the cultural criteria might not be put aside. The issue to write a European criterion for sharing common long term governance in nuclear waste management, especially for compensation, stresses the difficulty to build up an agreement on the rightness of the balance between risks and its acceptability by the population. It also shows to us the need to improve the social accountability for funding in order to identify the level of risk that authorities see as acceptable, compared to other issues in similar fields like chemical industries. Statistics and mathematical approach of the standards do no refer to national goals and values but might preserve the corporate values of sub-groups of experts in radiation protection or private funding.

Therefore we give the recommendation to public managers to make their cultural approach more explicit and to favour a clear comparison between risk in nuclear waste management and national acceptance in terms of values and cultural values.

9.6.2. Democracy by dialogue, not only incentives

Of course, in a way, the main lesson of the local democracy process might be we need a sufficient financial support to give the stakeholders time and information to take part to the process. Democracy needs dedicated budget for interactions with peer, especially about such a complex process of interactions.

But incentives may not replace the engine of the process of democracy itself, which stays the distribution of the capacity to influence the public sphere of dialogue. The value of incentives does not give the importance of democracy at local level. Only the possible confrontation in a public place may show the efforts to explain the "black boxes" of science and from politicians too.

For a better comprehension of the decision-making in NWM: the right question is how to give the word to the citizens, instead of formal communication?

- ***Education and Communication***. *Because we take our responsibilities to our fellow citizens seriously, we act decisively to ensure that all those with whom we do business understand our policies and standards.*" (Source: Enron's code of ethics, Statement of Human Rights Principles)

A good corporate strategy needs financial supports but may not be defined in terms of incentives for getting local acceptance. We can conclude from this culture of compensations, presented as the most successful way to translate democracy into practical terms and final solutions, mean local partnerships are in presence of red signals with regard to ethical guidelines. The beneficiaries of compensation do not automatically receive briberies. All depends of the amounts at stake and the use of it. For example, the local community may benefit from the compensations given by the

nuclear waste manager but these incentives are advantages given for all and not compensation given as substantial benefits for the board of the local partnership.

What must be avoided in finance for the improvement of an ethical NWM ?

- *To create appearances of conflict of interests*
- *To make auditors financially dependant for objective screenings*
- *To get acceptance as "the" sign of the validity of the system*
- *To separate totally information towards the public from decision-making process*

The control of the amount and its destination also has for corollary that the process needs the intervention of a kind of neutral guardian. Because of the difficulty to delegate this function to a guardian that would be acceptable for all, a solution may be suggested by the obligation for each to let others discover and examine their goals and the legitimacy which is at stake about compensation criteria. The guardianship consists of the process of interaction itself and is not restricted to the power of some members of a board that will take the decisions for all.

"*The more independent corporate boards are, the better they are at scrutinizing the companies they oversee. The kinds of things that compromise that independence are consulting contracts with the company, common bonds to charities and memberships on other boards doing big business with the company.*" (Babineck M., 2002).

"*Various regulators should tighten requirements for directors to be vigilant and provide protections for whistleblowers who bring improper behavior to public attention. But, in the final analysis, the solution to an Enron-type scandal lies in the attentiveness of directors and in the truthfulness and integrity of executives. Clever individuals will always find ways to conceal information or to engage in fraud.*" (Hanson Kirk, 2002)
The social scope of whistler-blowers to scrutinise the process to justify compensation make us aware about the public sphere of the control process that enlarge the logic of corporate ethics.

Lessons from Enron to all local and federal partnership processes?

• Long Term uncertainties about budget and compensation	• needs for legal protection and transparency
• lack of applied code of conduct	• codes are not sufficient
• negotiation mechanisms for compensation without clear defined criteria	• objective criteria needed
• conflict of interests	• show all affiliations
• network building with authorities to create trust	• organise balanced representation mechanisms
	• is local acceptance translated into federal

• short term strategy for social acceptance • involved parties decide about their interests, not common good. • Consequences lack of common good definition ? • lack of counter-party in auditing • no robustness of system on LT	legitimacy? • large scope needed (which definition of common good?) • public/ private budget concerned ? • is the silent majority acceptance ? • protect robustness

(From: M. Bovy, "Why do expert culture need ethical guidance for a long term governance: decommissioning fund as case study for compensation management?", Presentation given at Gartow (Germany), 2005-02-19, COWAM, WP 4 Long term governance.)

9.6.3. Do not confuse corporate ethics and dialogue into involvement process with the population

The participation and the question of involvement are connected. All stakeholders do not necessary deal with personal involvement for the common good. They do not all care for the respect of each other's right to express his own words and ideas.

With M. Walzer (Walzer, 1997) we consider different spheres of justice that may interact into the structuration of the society. Compensation mechanisms do not easily refer to the public debates about the way social justice may remunerate local population for their new risky situation. In our culture, some authors (like M. Moore) have stressed in numerous reality reports against the monopolistic situation of trusting companies we needed to make clear separation between the share of the benefits within a private company and the logic of confronting different philosophical thoughts on a public place.

Moreover we have decided to separate the sphere of official mandate for elected politicians from participative democracy. Since there is no unique definition of democracy, it seems we have to admit a kind of interpretative reason, with J. Habermas, which implicitly gives content to the practice of democracy and i.e. into the distribution of the right for people to ask questions that confront the rationality of some experts to laymen approaches. When giving the word to laymen, the process of participative democracy enlarges the scope of the debates and the right to get compensation may vary from a context to another, from a certain way to understand the same radioactivity level. The public acceptance of exposure and its deliberative process in a community will create another kind of network than the official representatives elected for a short term period.

The mutual involvement which is recommended in all "good books" of resource management sometimes forget the enrichment of people do not automatically cope with benefits and compensation. The enrichment is complex in our modern society.

Motivations of people depend on the manner their visions have been registered into the official network of representatives (all levels included).

The process of involvement is sometimes reduced to the idea people may express their opinion, like customers may express their preferences into the framework of the market regulation, which means only armed with their capacity to pay. Such reasoning may not be kept any longer in a participative process of democracy where people must receive some help to become interesting stakeholders among others. Opposite to the logic of the market the logic of compensation here may not directly come from the need to get maximum benefits for themselves of for the community they will represent. Here the process of interaction is a part of the acceptability of the compensation itself. There is reflexivity of the complexity process that acknowledges representatives who will themselves elect other representatives. This implies the process stay open on the question of representativeness and the endless discussion about the limits and the evolution of the common good.

The reflexivity of the process makes impossible the link between the good reasons to address to the government a list of compensation criteria. There is only contextual right to get compensation when local or federal population react against the will of industrials to take them in hostage at the end of the process when producers of energy may disappear and pay the bill the community.

The participative democracy divers from the standard of regulation that theoretically make the representative democracy turn in an effective way. The only way to defend democracy in compensation mechanisms will then be only done by giving the right to the population to recreate the conditions of dialogue with authorities and with the experts. Asking compensation therefore may not be translated from a country to another: each context will claim his right to interact with their representatives.

This should be kept in mind in the list of recommendations that could be addressed to the authorities. Indeed, we do not believe into the writing of common criteria for all that will be valuable without any fluctuation between all countries, type of depository and "cultural" damages. Somewhere, the official decision-makers have to open their system to the procedure of innovative democracy. The manner the population will defend their opinions and ask compensation is of fewer importance, compared to the right to the population to come into the process.

With a few words, we could say participative democracy will raises many arguments to be reluctant to the implementation of a depository. People will readjust their demand and be more demanding than what they could ask and do when staying into the anonymity of their usual role: silent majority out of the election period. Sharing the dialogue is part of the resource of democracy and also part of the compensation itself ! People want to play their role of citizens and we may suppose most of the reluctances are fed with their need to be reconsidered into their first role: members of "the City". The content of the compensation, the developed arguments and the limits of them may be are to be thought in another scope than briberies and compensation package: the major salary citizens want to get deals with the mutual acknowledgement to recreate conditions of dialogues that they expect to influence!

9.6.4. Democracy needs to get support on the long term.

For long term governance, we may define expertise as a democratic and open process in which data are used to answer the common good defined by the community. This definition integrates the involvement of experts into a process that goes beyond the mandate of scientists given a certain context and pre-defined task by the "sleeping partner".

Technocracy on the long term has been challenged in a risk based society where acceptable risks do not mean lack of protection for individuals. Trust requires more transparency: time and mutual acknowledgment is needed and only possible with the proof social values have been influencing the design of technical issues. The aim supporting involvement does not only refer to democratic principles as justification references. It helps the process of interaction and the integration of compensation mechanisms gives feed back to the local community: it testifies they were taken into account into the final decision.

The mutual process of acknowledgment that the retrievability option for disposal may offer, gives more chance for sustainable social debates on the acceptability or risk, but most of solutions, suggested by nuclear waste managers, seem to define another kind of common good: the one which is directly monitored by their goal. The option of retrievability does not consist of reliable solution to guarantee long term democracy. Only its use in a pluralistic context will help integrating the conflicts among diverse interests from numerous stakeholders.

Therefore, some reference principles like fairness and democracy must be defined into practises that involve stakeholders. The limits of time and the scope of distribution between burdens and costs (into distributive justice procedure) will help clarify the content of the debates and the needed tools to organise them in real conditions.

	Long term governance
Rationales	Expertise as a democratic and open process in which data are used to answer the common good defined by the community
Trust	Technocracy on the long term has been challenged in a risk based society where acceptable risks do not mean lack of protection for individuals. Trust requires more transparency.
Involvement	Needed for trust and social consensus building
Common good	Retrievability offers more chance for sustainable social debates on the acceptability or risk, but most of solutions, suggested by NWM managers, seem to define another kind of common good.
Fairness	Distribution of burdens and benefits depend on the definition of common good
Democracy	Has to face the limits of its process when decision must be taken for several centuries (low activities) or millenniums (high activities)

From: M. Bovy, "Why do expert culture need ethical guidance for a long term governance: decommissioning fund as case study for compensation management?", Presentation given at Gartow (Germany), 2005-02-19, COWAM, WP 4 Long term governance.

Different approaches of long term issues about ethical guidance for the long term

- Trust on the long term
  - budget is needed to sustain social trust
  - budget to pay independent experts
  - budget for comparison of different types or risks
  - budget for communication before and after depository
- Involvement
  - process of dialogue instead of Decide Announce Defend or only compensation ?
- Common good
  - democracy is more than technocracy = financial mechanisms must protect citizens on local and national level
- Fairness
  - involvement sustains the social scope, but…
  - involvement from the very beginning (public interest is not just for the bill at the end, after getting the local acceptance)

From: M. Bovy, "*Why do expert culture need ethical guidance for a long term governance: decommissioning fund as case study for compensation management?*", Presentation given at Gartow (Germany), 2005-02-19, COWAM, WP 4 Long term governance

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9.8. Annex 1: The Belgian local partnerships (Mona, Stola, PaLoFF)

(source: http://www.cowam.com/article.php3?id_article=35)
In 1990 ONDRAF/NIRAS, the public agency responsible for nuclear waste management in Belgium, issued a report concluding in favour of surface disposal for the long term management of low level waste after examination of three options. In 1994 98 potentially suitable zones were identified on the base of technical criteria. All concerned municipalities wrote motions to reject the proposal. In 1995 the Government made a national policy statement and prompted ONDRAF/NIRAS to study alternatives to surface disposal. Following a 1997 report from the Agency, the Government opted for a disposal that would be reversible, progressive and flexible. The technical decision between deep and surface disposal was not yet made but the disposal option was chosen with regard to long term storage. It was agreed that the selection process would focus on existing nuclear sites or on candidate sites, and develop in close cooperation with the local people to integrate the disposal in the socio-economic structure. ONDRAF/NIRAS worked out a new methodology with the Universities of Antwerp and Arlon to meet this latter request. The Agency contacted the existing nuclear sites and presented the methodology. The nuclear power plants sites (Doel, Tihange) declined the proposal, but three partnerships were established in Dessel (September 1999), Mol (February 2000) and more recently Fleurus-Farciennes (February 2003). The three communities already host nuclear research laboratories, waste management facilities, or isotope production units.

The methodology is aiming at a better integration of technical and social aspects to find a safe solution. It relies on a continuous interaction with the public through a partnership. Before the partnerships were formally set up, a consultation process was carried out by a team from the Universities : the various actors in each community were met to get feedback on the proposed methodology, and to reach a common definition of the problem at the local level. This process equally ended up with a specific structure for the partnership as regards management, and composition.

The structure and operation of the partnerships in Dessel (Stola - "Study and Consultation Group Low Level Waste") and in Mol (Mona - "Consultation on Nuclear Waste Category A") is quite similar. The partners work out a disposal project on the one hand, a social project on the other hand. These two projects will be evaluated separately. If one of the two is considered unfeasible the whole project will end. If both

of them are considered feasible they will be integrated in a global project. This integrated project will be submitted first to the general assembly of the partnership, then to the municipal council, and eventually to the Federal government. At any of these steps, if the project is disapproved the project will be stopped. These clear rules were viewed essential to provide clarity on the implications of each step and on the overall direction of the process. What remains unclear at this stage is the possible position of the Federal Government if the project is approved locally.

The partnerships are independent decision-making bodies. Their independence stems from the diverse background of their members. Both organisations dispose of a 250000 € yearly budget, which they use according to their convenience. The partnerships consist of a general assembly (30 members) with a broad representation of the local community (political actors, delegates from socio-economic, environmental, cultural and other locally based organisations) and a representative of ONDRAF/NIRAS; a management committee (10 members), appointed by the general assembly; two full-time project coordinators; and four working groups (15 members each) : “siting and design”, “environment and health”, “safety”, “local development”. Each working group comprises representatives of the political, economical and social organisations that founded the partnership and individual citizens who took an interest in the debate. All participate on a voluntary basis. The technical project is worked out by the first three working groups. They build on the reference repository concept of ONDRAF/NIRAS as a starting point. The technical project is then progressively specified according to the request of the partnership members and the local setting. The social project is prepared by the “local development” working group which develops social conditions for the integration of the technical project in the community. In the four working groups, all relevant research is given consideration. Interested parties are invited to express their interests and concerns through dialogue. The need for additional studies is evaluated. Independent experts are introduced in the debate. There is a positive attendance in the working groups, but the wider public has a limited knowledge on Mona and Stola. In this respect, the partnerships have made significant communication efforts to make the broader population aware of their activities. The decision by the municipalities will be made in 2004.

The Fleurus and Farciennes municipalities first refused to establish a partnership in 1999, and requested proofs of technical feasibility to ONDRAF/NIRAS. They however accepted the setting up of an information forum to convey information to the people. This forum was led by a University team with ONDRAF engineers. PaLoFF partnership (Partenariat Local Fleurus-Farciennes) is a result of this three year open forum. Specific factors have contributed to this new development. In the forum ONDRAF/NIRAS experts were open in sharing uncertainties and doubts which made it possible to integrate in the concept definition all questions, doubts and concerns also expressed by the local population. Moreover the population had valuable information about past mining activities, soil and water courses which were relevant as regards the technical conditions for the project. Little by little interests converged, technical concepts and local concerns integrated in a shared understanding of the problem. A new concept emerged : the facility would be a more open structure which can be accessed, controlled and monitored. This concept could address the initially opposed visions of safety : one based on technical uncertainties, the other on uncertainties stemming from a potential

interaction between the waste and the social environment. In a new framework technical uncertainties would be acceptable if social uncertainties can be dealt with. **The creation of the partnership was also dependent on the capacity of the forum to encourage the expression of a diversity of interests and views in the discussion over the project, while fostering social cohesion and mitigating internal divisions.**

9.9. Annex 2: French summary article

Introduction

Les gestionnaires de déchets nucléaires peuvent utilement intégrer des perspectives éthiques dans leur travail car la logique industrielle de production de l'énergie tend à s'étendre à la dynamique sociale elle-même. L'implication d'une diversité d'acteurs permet de créer une plate-forme où le dialogue prend une plus grande place par rapport aux outils de communication unilatérale. Dès lors, l'information concernant le stockage renvoie les interlocuteurs à un questionnement sur une vision commune qui serait acceptée pour le long terme.

Il pourrait paraître curieux d'en exclure les aspects financiers. Ceux-ci, qu'ils soient liés aux compensations d'un site de stockage, ou encore, au développement socio-économique de la population riveraine, émergent comme l'un des critères de poids à prendre en compte dans l'argumentation d'une justice sociale fondant l'acceptation du risque technologique. Une réflexion doit alors s'organiser autour d'une tension entre la période du court terme, durant laquelle doit se prendre la décision d'organiser le financement des compensations, et d'autre part, les perspectives imaginaires de long terme, touchant aux intérêts des générations futures.

L'éthique dans la culture des experts du nucléaire.

Le besoin des experts de baser leurs conclusions sur des méthodologies scientifiques laisse peu de marge à une dimension éthique proposée par une démarche citoyenne. A moins de faire du raisonnement scientifique un moyen de soutenir un projet économique, les questions techniques relatives aux matériaux d'emballage ou au type de sol ne peuvent pas facilement trouver de correspondance dans le besoin d'assurer une répartition équitable des avantages économiques entre les différents interlocuteurs. Les préoccupations professionnelles des experts doivent faire l'objet d'une traduction dans d'autres langages afin d'apporter leurs contributions aux critères éthiques de compensation du risque. Un choc culturel se produit en effet à plusieurs niveaux.

La question du financement des avantages économiques en faveur de la population est nourrie principalement par des prétentions politiques à définir une société modèle et son évolution à long terme. Elle oblige l'expert à sortir de son image de partenaire neutre, dépourvu de toute valeur, et extérieur au processus qui financerait sa propre participation. L'objectivité est au coeur d'une norme sociale légitimant l'autonomie de sa méthodologie. L'expert peut ainsi expliquer le besoin de se distancier des tourbillons sociaux et invoquer cette attitude comme une garantie de la qualité du travail scientifique. L'image de la corruption et le besoin de minimiser des risques pour le long

terme, lors de la distribution de compensations, accompagnent donc mal l'éthique que les experts veulent se donner pour positionner la validité de leurs travaux parmi d'autres types d'argumentation.

En outre, il devient parfois difficile de trouver les connections entre le jeu des politiques locales et le besoin de trouver sur le territoire national une solution de stockage des déchets générés à la suite de production d'énergie utile à l'ensemble de la collectivité. Faut-il demander à l'expert d'en rester à des considérations s'appliquant à l'ensemble des cas d'espèce, un peu comme dans la construction d'une norme scientifique, ou au contraire, se concentrer sur l'information scientifique du seul site retenu à la suite d'une procédure où intervient l'acceptabilité sociale? En d'autres termes, comment l'expert peut-il rentrer dans la construction de cette acceptabilité sociale lorsque la distribution des compensations et son financement ne peuvent déontologiquement pas dépendre d'une vérité scientifique par rapport aux précautions à prendre pour la santé humaine. La conclusion d'un expert ne peut donc pas s'appuyer sur le besoin d'un bourgmestre de représenter l'intérêt économique local dans le court terme, ni sur la faiblesse du partenaire industriel, à trouver dans les rapports qu'il est seul à commanditer, les seules vérités à fournir au public.

La communication entre ces différentes zones et leur degré d'autonomie devient donc une ligne rouge dans la hiérarchisation des critères éthiques pour aborder le financement du risque nucléaire dans le long terme. La gouvernance ne peut épargner les efforts de montrer la traçabilité des différents réseaux qui portent l'acceptabilité d'un mode de financement et l'équilibre qui en découle.

Une gouvernance de long terme doit donc à la fois aborder la question de la compréhension mutuelle, mais aussi des conditions d'influence. Les moments d'intervention et les mandats des intervenants conditionnent l'acceptabilité des modes de financement. Le rôle de l'expert devient donc une pièce du puzzle, même si celui-ci veut s'en préserver. D'autres peuvent s'approprier les conclusions de ses travaux dans une perspective stratégique, en s'éloignant de la préoccupation d'établir les faits avec précision. La culture de l'expert ne peut rester étanche à de telles pressions. Il semble alors plus judicieux de recommander que la gouvernance de long terme favorise l'organisation d'une communication entre l'éthique de l'expert et une justice sociale réclamant des compensations pour la population riveraine d'un site de stockage.

La complexité d'un dossier technique ne pourra plus alors être invoquée pour justifier l'absence de dialogue social. Simultanément, on devra accepter qu'apparaisse plus fortement le manque de cohérence rationnelle entre la précision scientifique et le besoin de soutenir le développement économique des régions où vivent les groupes de riverains. Ces difficultés d'établir les ponts entre différents types de justification feront apparaître les trous structuraux dans la prise de décision politique et sortiront les experts du rôle de bouc émissaire qu'ils occupaient assez facilement dans le fait de vouloir exposer le public au risque industriel. La construction progressive d'accords, par implication progressive des interlocuteurs dans un processus de communication itératif, ne devra donc pas conduire à une confusion des rôles, et encore moins à une dissolution des responsabilités.

Un cadre éthique pour le long terme?

Elargir le cercle des gestionnaires, à ceux qui prennent en charge la représentation des générations futures, passe par le brassage des visions de l'ensemble des partenaires voulant s'associer à la prise de décision de financer les compensations d'un risque industriel. Simultanément, ces gestionnaires, lorsqu'ils sont portés par l'économie privée, tendent à faire prendre en charge par les contribuables la facture de cet élargissement. Vouloir préserver une qualité de l'environnement, ou encore, assurer aux générations futures une contribution raisonnable à la charge de la gestion des déchets, constituent une justification aisée, pour faire passer le financement de telles opérations du processus industriel vers des structures publiques.

Le financement de compensations ne peut donc se construire sur seule base des préoccupations de rentabilité à court terme, définissant les étapes de production de l'énergie. Cependant, il s'agit bien de construire un accord dans le court terme sur les modalités de financement des moments du dialogue favorisant cet accord, et encore, d'établir les montants des compensations et les règles de leur gestion à long terme.

Seul un acteur recevant le soutien de l'ensemble des différents interlocuteurs concernés peut légitimement veiller à l'application des accords à construire dans le court terme et non s'assurer de l'orientation que prendra cette négociation. La pérennité de la question éthique du financement à long terme colle à la durée du risque des déchets et à celle de l'institution qui sera chargée de surveiller le respect des conditions éthiques du financement des compensations. La gouvernance des déchets nucléaires passe donc par un questionnement sur les conditions financières d'une forme acceptable de "bien commun". En s'interrogeant sur le nombre des invités à la table de la conversation portant sur le bien être général de la collectivité, leur profil respectif, et le rythme de leur intervention, on accepte que le gestionnaire du débat soit nécessairement une institution publique ou, à tout le moins, qu'un tel gestionnaire travaille sous le couvert de la responsabilité publique. La gouvernance des déchets nucléaires extrait la logique de production de l'énergie des sphères privées. Elle souligne l'impact sur l'ensemble de la société, des décisions prises pour soutenir la rentabilité et le développement économique d'un partenaire industriel parmi d'autres.

Le cadre éthique d'une gouvernance des déchets s'inscrit clairement dans une réflexion portant sur le transfert des charges, non seulement du secteur privé vers le secteur public, mais aussi, dans le temps, entre les générations. Le gestionnaire du dossier doit donc s'attaquer à des questions éthiques qui s'ouvrent à la fois sur la comparaison avec d'autres types de risque, la finalité des compensations économiques, les règles de gestion de ces compensations, ou encore, l'équilibre de l'effort économique entre les générations. Cet équilibre pourra lui-même être l'objet de nombreux débats en éthique, que ce soit en mettant l'accent sur une vision égalitariste à intégrer entre générations actuelles, ou même, entre la génération actuelle et les futures générations. De même, on restera dans un questionnement éthique en proposant une approche utilitariste favorisant, par exemple, les besoins actuels d'une population riveraine désireuse de profiter des bénéfices du secteur nucléaire.

Comme ces perspectives dépassent de loin l'objectif de rendre acceptable le risque nucléaire pour une population locale, la gouvernance de long terme devra nécessairement accepter le "gaspillage" d'une négociation sociale sur des sujets plus lointains. Le risque est assez grand de voir la cohérence d'une procédure d'interaction se briser, sous l'effet d'une curiosité non contrôlée, ou à la suite des réactions de blocage liées à certains constats. Ce type d'implosion sociale est donc inhérent à une gouvernance de long terme. S'ouvrir à un débat public sur la gestion du risque implique en effet de prendre un peu de distance par rapport à une ingénierie sociale hiérarchisant l'action des politiques locales à un objectif industriel, contre profit financier. On peut alors suggérer de restituer au service public ses lettres de noblesse en donnant plus d'importance aux débats d'idées. Evidemment, cette ouverture au jeu politique se fera au détriment de la garantie de succès que permet d'espérer une opération de marketing qu'un opérateur industriel chercherait à élaborer pour obtenir de façon certaine l'acceptabilité du risque par les riverains.

On comprend alors aisément que l'ouverture du cadre éthique dans la gestion des aspects financiers des déchets nucléaires passe plus facilement par la restauration de l'intervention de l'autorité publique comme gestionnaire d'un modèle social. En répondant à un besoin de trouver les fondements éthiques de choix globaux, l'Etat ne peut se contenter d'être le chaperon du besoin industriel de transformer les rouages politiques locaux en nouvelle agora à coloration citoyenne. Il doit lui-même prendre ses responsabilités en matière éthique.

Le travail politique devient alors plus transparent pour la collectivité, puisque les experts et les producteurs de l'énergie nucléaire ne peuvent plus servir de paravent à l'intervention anonyme de l'Etat. Or, l'Etat lui-même est déjà impliqué dans ces questions, en ayant délégué à des administrations qu'il contrôle des fonctions spécialisées dans la gestion des déchets. Ouvrir l'ensemble de ces tâches à une vision éthique favorisera la transparence entre les différentes rationalités des entités qui composent la figure de l'Etat et les liens parfois étroits qui se sont tissés avec des industries diverses ou des fonds monétaires de grande importance.

On est donc loin, dans l'élaboration du cadre éthique portant sur les conditions financières de la gestion des déchets nucléaires, de la seule préoccupation des critères de choix pour dépasser certaines alternatives de court terme. Peut-on en effet réduire le débat éthique à l'examen des critères permettant d'opter pour le financement d'une bibliothèque publique reprenant des rapports portant sur la bonne conduite des experts en matière de méthodologie de l'analyse du risque? Est-il raisonnable d'attirer l'attention des citoyens sur la justification de la construction d'une nouvelle salle de sport portant le nom du bourgmestre local qui s'est investit auprès du gestionnaire des déchets depuis plusieurs années? La gouvernance doit bien s'occuper, à court terme, de l'interrogation politique portant sur la nature des interlocuteurs à retenir pour constituer des focus groups, gérés par des chercheurs en science humaine, désireux de faire carrière à l'université. Mais elle ne peut se réduire à ces aspects qui sont nécessairement présentés comme l'aboutissement local de nombreuses et intéressantes questions, posées localement par les acteurs impliqués dans le débat, sans avoir pu recevoir un début de réponse satisfaisante. Ce fossé, entre pragmatique du réseau local et rationalité globale,

se creuse dès que l'envergure du questionnement nécessite des rapprochements avec d'autres groupes sociaux, porteurs d'autres thèmes connexes.

En touchant aux conditions de financement de l'acceptabilité des déchets nucléaires, la gouvernance de long terme doit bien mettre entre parenthèses, à un moment donné, la nécessité de réduire les débats à la polarité d'une acceptation ou du rejet du site de stockage. Elle doit reconnaître sa fragilité, face à des questionnements plus fins. C'est seulement en ayant pris des chemins innovant des croisements entre des discours et des pratiques que les acteurs pourront découvrir la portée de leurs apprentissages respectifs. Sans ces déplacements mutuels par rapport à leur position de départ, le rôle des acteurs sociaux sera programmé à l'avance au sein d'un processus de participation, dès les premiers stades de construction de l'accord social. Celui-ci, portant sur la distribution des avantages économiques, restera essentiellement un savant travail de conviction, par implication progressive des porte-parole les plus faibles au niveau économique et scientifique. Lorsque la participation au processus d'avis devient elle-même l'enjeu majeur de certains participants, on peut espérer que les pouvoirs publics auront comme souci de développer un travail de fond, plutôt que d'entériner des accords passifs sur base d'une présence silencieuse.

Cette restauration d'un cadre éthique élargi n'affaiblira pas forcément l'intervention des experts, puisque ceux-ci peuvent être mainte fois appelés à fournir les éléments-clés, permettant de cadrer de façon plus solide les critères justifiant la demande de compensations. Le rôle de l'Etat, lui non plus, ne devrait pas souffrir d'une multiplicité des questions éthiques. Mais cela suppose que l'on accepte de considérer que le rôle de l'Etat ne devrait pas se réduire, comme cela semble parfois être le cas de figure dans certains pays scandinaves, à apposer un label rassurant sur l'acceptation citoyenne du travail des scientifiques et des gestionnaires publics ayant favorisé l'accord local. Il s'agit d'ouvrir à nouveau des portes éthiques sur le bien être social et la façon dont la politique veut y apporter des réponses, sur un plan global.

Les compensations financières, une motivation pour une action citoyenne?

En posant sur la table, la possibilité de demander des compensations financières au secteur nucléaire, l'Etat s'expose lui-même à l'instauration d'un circuit démocratique parallèle à celui qu'il reconnaît officiellement comme porteur des décisions légitimes. La motivation citoyenne peut donc effectivement s'exprimer par le biais d'une demande rationnelle sur base, par exemple, d'une analyse multi-critères et dépasser une vision pessimiste de corruption sociale organisée. De nombreux citoyens manifestent le besoin d'utiliser les fonds de compensation pour permettre le soutien, à long terme, de la participation citoyenne, le dialogue avec le gestionnaire des déchets, et le droit de regard sur les rapports établissant les conditions de sécurité et les normes de santé à long terme. L'idée pour ces citoyens de monnayer un profit personnel contre le bien être collectif est insupportable, tant l'investissement dans les groupes de travail les oblige à s'ouvrir à des intérêts plus complexes.

Le gestionnaire des déchets peut, lui-même, se retrouver piégé, face à cette détermination de nombreux citoyens. Ceux-ci se sont investis au-delà de toute attente, malgré l'absence de formation ad hoc au départ et l'absence de revenus pour une telle

présence dans les débats. Pourtant, ils ont fait face à des professionnels formés et rémunérés pour les aider à élaborer leurs questions et... pour y répondre !

La concurrence entre la démocratie participative et la démocratie représentative est assez présente dans le financement de l'action des citoyens organisés pour influencer les choix technologiques que l'Etat peut approuver, sur base de proposition des gestionnaires des déchets. La constitution d'un fond autonome et indépendant d'une décision officielle souligne donc la difficulté pour la démocratie élective de s'ouvrir à d'autres formes de consultation de l'électorat. En effet, l'usage politique et citoyen de ces fonds montre que la politique locale, non cadrée par des règles officielles, ne peut se suffire à elle-même. Mais en recevant un soutien à long terme, la démocratie participative peut aussi commencer à manifester ses ambitions de répondre aux décisions prises par le circuit officiel pour le long terme.

Les compensations économiques peuvent donc aider les groupes locaux, malgré leur faiblesse théorique au niveau institutionnel. Les citoyens ayant participé à des groupes de travail ne veulent pas se contenter d'avoir servi, à un moment très limité dans le temps, au soutien d'un projet industriel et disparaître ensuite, une fois que ce soutien aura pu accompagner le dossier dans les négociations entre le gouvernement et le gestionnaire des déchets. La possibilité existe qu'un conflit éclate entre les demandes d'un groupe de citoyens au niveau local et ce que le gouvernement peut accorder directement au gestionnaire des déchets. Une frustration peut donc naître de cette différence lorsqu'on se rappelle que le rôle de la population locale dans une demande de compensation reste extérieur à la prise de décision du gouvernement et au cadre des négociations directes entre le gestionnaire des déchets et le gouvernement.

Le choix d'un site local, en partant des besoins d'un gouvernement de trouver sur son territoire une solution de long terme, n'est pas forcément compatible avec les conditions d'acceptabilité sociale exprimées la population locale. Le gouvernement et le gestionnaire des déchets peuvent donc être tentés de s'entendre pour cadrer la motivation des groupes locaux et conditionner l'octroi des compensations à un usage bien orienté qui soutienne le calendrier de décisions répondant à leurs souhaits. Jouant en dehors des règles légales organisant le détail de la procédure de concertation avec les différents interlocuteurs, le gestionnaire des déchets reçoit de la part du gouvernement des fonds dont les conditions d'octroi peuvent répondre exclusivement à ses propres besoins.

La motivation des citoyens et la destination finale des fonds, sans devoir faire l'objet d'une description a priori dans un texte légal, pourraient néanmoins être prises en compte comme moteur d'action à respecter. Le projet démocratique, qu'il soit soutenu par une initiative locale ou qu'il provienne d'une programmation des politiques officielles, doit nourrir l'expression citoyenne, et pas le soutien aveugle d'activités technologiques rapportant certains profits. Néanmoins, envisager de cette manière le droit à la mise en cause des politiques de l'énergie, c'est ouvrir la porte à la possibilité d'une collision entre une gouvernance déjà établie pour le long terme, qui tiendrait compte des unités de production existantes, et une autre vision, portée par ceux qui, localement, vivent directement l'expérience du risque nucléaire.

Les compensations peuvent donc prendre la forme de la restitution d'une parole trop souvent ignorée: celle des riverains, lors de la décision d'implanter un site nucléaire. Une ambiguïté majeure peut donc naître pour ces mêmes citoyens, tout à coup invités à prendre part à une dynamique dont ils étaient auparavant exclus. Leur intervention ne leur permettra certainement pas de supplanter les instances officielles au niveau de la responsabilité et du droit de trancher en dernier ressort. Les groupes de travail s'attendront cependant à ce que leurs revendications soient satisfaites et veilleront à la cohérence de leurs attentes, par rapport aux décisions prises par les autorités officielles. La prise de parole au niveau local peut donc devenir un moyen de pression non négligeable et enliser l'ensemble des mesures que le gouvernement et le gestionnaire des déchets ont entrepris de concert afin d'assurer à l'ensemble de la collectivité une réponse au problème technique du traitement des déchets.

Le choix de reconnaître exclusivement le droit à la parole au niveau local est aussi une composante du cadre éthique à prendre en compte dans la forme des compensations financières. Si celle-ci est sous-tendue par une logique de réparation du risque nucléaire, on ouvre la question de savoir combien de personnes sont touchées et le sentiment de la population locale, d'être particulièrement exposée par rapport à d'autres villes, peut facilement vaciller, face à certains rapport scientifiques. La réparation ne peut pas éthiquement répondre au seul sentiment subjectif d'être exposé au risque, à moins d'accepter tout imaginaire comme contrepoids du risque technologique. La justification d'une prise de risque doit devenir plus transparente et montrer les liens entre revendications sociales et critères objectifs, à moins de tomber dans un jeu de distribution des bénéfices pour diminuer les résistances rhétoriques.

Cette prise de position permet d'organiser une concertation en étendant le territoire de la concertation à l'ensemble de ceux qui ont bénéficié de l'énergie nucléaire, à moins de considérer les compensations comme une moyen de motiver ceux qui seraient dans une position économiquement faible; c'est-à-dire, favorables a priori à la réception des déchets sur leur territoire. Le lien entre le bénéficiaire de la distribution de l'énergie nucléaire et le penchant à recevoir une aide financière peut très bien souffrir d'un manque de culture éthique. Certaines villes, voire, sur un plan international, certains pays, pourraient ainsi devenir spontanément candidats à la réception d'un site de stockage, en fonction de l'importance des montants compensatoires et des règles de leur affectation.

Cet intéressement purement lucratif, de recevoir des compensations, peut aussi expliquer en bonne partie la lutte entre institutions nationales, chargées de gérer les fonds de démantèlement nucléaire par rapport à la constitution d'un gestionnaire unique au niveau européen. Les compensations, tout comme les fonds destinés à assurer le démantèlement nucléaire suscitent l'intérêt de tous ceux qui y voient, soit un nouvel espace de jeu financier, ou encore, de nouvelles possibilités de renforcer une légitimité politique sans affecter ses fonds propres.

L'organisation d'une consultation nationale pose bien des difficultés en ce qui concerne l'aspect pratique de la négociation des critères de compensations. Comment en effet peut-on écouter des millions de personnes et dégager d'un lent processus de concertation

des critères établissant la validité des propositions de compenser financièrement le risque nucléaire?

Plusieurs directions peuvent être prises, en parlant d'équilibre, entre l'implantation d'un site à risque, et le développement socio-économique. Une argumentation inverse pourrait se développer au niveau national, en soulignant qu'il s'agit de trouver une réponse à un problème concernant l'ensemble de la collectivité, et non d'acheter l'acceptabilité locale pour le choix "subjectif" d'un lieu précis de stockage. Dans ce cas, l'idée d'une compensation au niveau local deviendrait éthiquement inacceptable, puisqu'elle reposerait en priorité sur l'idée d'une réparation entre l'objectivité d'un cadre national de concertation et la localisation géographique définitive, concernant une ville en particulier. Imposer un risque à une population ne peut provenir d'une compensation financière, car on ouvrirait alors la porte à une négociation avec le critère du niveau économique de la ville en question, alors qu'il s'agit avant tout de protéger la santé publique à long terme.

Qu'elle soit organisée au plan national ou local, la distribution des compensations financières ne peut devenir acceptable sur un plan éthique, que si elle soutient le travail citoyen de participer avec les pouvoirs publics à l'établissement d'une plus grande transparence sur les niveaux acceptables de risque. Cette concertation entre la parole officieuse et la parole institutionnelle devrait permettre de montrer ce que les risques industriels signifient, et désigner qui sont les plus exposés, aussi bien dans le court terme, qu'à long terme, pour les générations futures. On peut d'ailleurs se demander, même sur le plan éthique, si des compensations ne doivent pas être prévues pour les générations futures qui auront à subir un risque pour une production d'énergie dont elles ne sont qu'indirectement bénéficiaires.

On voit alors clairement apparaître que la motivation des citoyens à demander des compensations financières pour eux-mêmes dans le court terme et pour des projets dont ils pourront bénéficier directement ne se prolonge pas tellement dans une éthique de réparation du risque, définie dans une conception large. Une telle ouverture, dans la définition du risque à compenser par de l'argent, englobe les risques que d'autres devraient subir dans le futur. Cette réflexion devrait pousser les pouvoirs publics à dépasser le seul cadre des compensations financières en faveur des riverains pour proposer une sorte d'épargne pour un risque calculable, mais encore plus fortement soumis à conditions puisqu'il faut alors intégrer des scénarios d'avenir. Or, les modalités de distribution des compensations, en Europe, montrent les efforts du gestionnaire des déchets à concentrer tous les moyens financiers sur le seuil de l'acceptation de la construction du site de stockage, dans le court terme. On se concentre principalement sur ceux qui, géographiquement, pourraient se sentir plus fortement concernés que d'autres.

Le financement des mesures nécessaires pour assurer la sécurité de la population par rapport au risque nucléaire provient pourtant des taxes payées par l'ensemble des contribuables et ne suffit pas à assurer le coût des opérations de démantèlement des installations, sans la constitution de fonds spécifiques grevant le pouvoir d'achat des générations actuelles. Le manque de réalisme politique des élus, lors des dernières décennies, vient donc faciliter la position des mandataires actuels. Ces derniers

permettent aux gestionnaires des déchets de créer un espace de négociation avec la population locale, dans le but de rendre plus facilement acceptable la solution à un problème qui n'a pas été soulevé au moment du début de la production de l'énergie nucléaire.

Proposer un cadre d'intervention avec des moyens financiers pour rendre opérationnelle l'implantation d'un site de stockage ne peut se faire, dans la perspective d'une réflexion éthique, qu'en permettant aux interlocuteurs de revenir sur la question même des seuils acceptables de risque, et donc, sur la comparaison avec d'autres alternatives, en termes de politique énergétique. Cette façon d'allouer des compensations financières aux citoyens participant à la négociation d'un site de stockage prolonge l'effort démocratique d'un devenir commun. Sans ce retour sur la dimension d'un modèle social, les compensations ne pourront pas motiver l'effort citoyen.

L'éthique de la gestion des compensations à travers un cas d'étude.

La littérature américaine de l'éthique de la gestion des fonds abonde en commentaires sur les règles de bonne conduite à suivre et les leçons à tirer de certains exemples, devenus célèbres par le scandale qu'ils ont provoqué. Ainsi, la faillite de l'entreprise Enron, aux USA, a mis l'accent sur l'adéquation entre les règles organisant l'apparence de la gestion des fonds et la capacité de divers opérateurs spécialisés à comprendre la logique financière exposée au public. La place des compensations financières dans l'acceptabilité du risque financier est au centre de l'opacité organisée de la gestion des fonds de cette multinationale, ayant des ramifications dans le secteur de la production de l'énergie.

La faculté, pour une entreprise ou un groupe de riverains d'un site nucléaire, de proclamer que les règles éthiques, en matière de compensations financières, sont correctement respectées, ne suffit pas à en garantir l'effectivité. La publication de code de bonnes pratiques et de codes éthiques n'est pas d'une grande utilité pour assurer la lisibilité de la gestion des finances, sans la mise en place de contre-pouvoirs chargés de mettre en lumière la véracité de leur application.

Le cas d'Enron montre que l'éthique des compensations doit être gérée par l'organisation du recoupement des pratiques pour montrer à l'extérieur les dynamiques organisant les flux financiers en interne. La possibilité, pour des riverains d'un site de déchets, de construire avec d'autres partenaires une liste de critères devant être pris en compte pour justifier d'une compensation, oblige simultanément tous les acteurs en présence à communiquer ouvertement leurs intentions respectives et diminue les risques de stratégies cachées. De cette manière, des lignes de démarcation, entre enrichissement personnel et compensations pour l'ensemble de la collectivité considérée, pourront être connues des différents partenaires, à la suite de multiples apprentissages mutuels.

Lorsque Enron passe d'une gestion des risques industriels classiques à une gestion boursière, les porteurs d'action subissent un changement dans la prise de risque qu'ils ne peuvent clairement évaluer. De même, lorsque les gestionnaires des déchets nucléaires commencent à élaborer une stratégie d'intéressement financier avec la population riveraine, ils se donnent la capacité de rentrer dans des négociations de valeurs qui

étaient dans les mains des politiques habituelles. En changeant de type de risque dans la négociation ou de logique d'intéressement, un travail de communication est nécessaire pour éviter certains abus.

Un des points essentiels que le cas d'étude Enron nous permet d'apprendre, est la nécessité de montrer les points de rattachement des interlocuteurs par rapport aux institutions qui les rémunèrent et auxquelles ils contribuent à assurer le succès. Lorsque ces liens, tissant le réseau social qui les porte, sont mieux connus des autres interlocuteurs, de nombreux filtres se mettent en place et obligent les intervenants à aller plus en profondeur dans leur argumentation. Cet investissement dans l'organisation de l'échange d'information avec d'autres partenaires permet de faire connaître aux autres la différence entre la tâche de représentation de l'institution qui les mandate, lors de la participation aux groupes de travail, et d'autre part, la logique de communication propre au projet de dialogue social. Il faut donc montrer l'autonomie du travail de dialogue; c'est-à-dire la dynamique d'apprentissage propre aux partenaires, et non la confirmation des rapports de force que l'on trouve au départ entre institutions respectives, avant la constitution des groupes de travail.

En Belgique, on notera que le gestionnaire des déchets a octroyé exactement le même montant pour financer les trois groupes de travail qui ont élaboré les critères d'acceptabilité des montants alloués pour le développement socio-économique de la ville riveraine du site de stockage. On peut donc se demander comment les différences culturelles entre régions belges reçoivent les moyens appropriés au développement des questions qui leur sont propres. Quels sont les moyens ayant permis de construire des accords à géométrie variable, selon des rythmes différents et un partenariat composé selon l'inspiration locale? Comment comprendre que l'Etat belge puisse suffisamment assurer le développement des besoins en communication en permettant que le gestionnaire des déchets soit en charge de la question de l'acceptabilité sociale et que les montants octroyés pour soutenir la transparence au niveau local ne connaissent aucune variation entre les différents partenariats? Cette situation permet un certain marketing public qui rappelle les amalgames d'images que Enron a fait subir à ses porteurs d'action. Pour sortir d'une éthique de vente de produit, il faut accepter que le projet de concertation puisse acquérir plus d'autonomie, au risque de remettre en cause la satisfaction des besoins des gestionnaires de déchets à trouver un calendrier satisfaisant des étapes leur assurant la légitimité citoyenne des populations riveraines.

Recommandations pour une gouvernance de long terme.

Plusieurs points peuvent être mis en évidence pour une gouvernance de long terme des compensations financières liées à l'implantation d'un site de déchets.

- Etayer des pratiques d'échange d'information qui obligent le gestionnaire des déchets à sortir de sa logique industrielle de court terme,

- Montrer les liens financiers entre les intervenants dans la concertation et les institutions qui les mandatent,

- Définir les compensations avec la perspective de définir le seuil d'acceptabilité du risque pour la santé, plutôt que sur base du bénéfice à court terme d'une

population économiquement fragile ou subjectivement touchée par la présence géographique d'un site.

- Permettre l'ouverture à des critères de négociation qui ouvrent la question de l'acceptabilité du risque à d'autres points de comparaison, y compris la remise en cause de l'option de l'énergie nucléaire,

- Permettre aux experts de contribuer à la rationalisation des critères de compensation, plutôt que de laisser à la population riveraine la responsabilité de la justification de ces montants,

- Proposer des compensations qui répondent à l'élaboration de la dynamique de concertation plutôt qu'un plafond maximum fixé au départ qu'il s'agit d'épuiser par une série d'arguments variés,

- Etablir des lois pour la constitution à long terme, de fonds finançant la négociation des critères de compensation, plutôt que de viser une stratégie de compensation ponctuelle, liée à au seul moment de l'approbation du dossier par les autorités publiques,

- Favoriser la pénétration de la diversité culturelle dans l'établissement des critères d'acceptabilité du risque, plutôt de croire à la standardisation des critères sur un même territoire par rapport à un même risque calculé,

- Donner des réponses aux citoyens désireux d'entrer dans des pratiques servant l'intérêt collectif à long terme, plutôt que la valorisation de leurs mandataires locaux à court terme.

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10. STRENGTHS AND WEAKNESSES OF ETHICAL VALUES AND PRINCIPLES - GUNTER BOMBAERTS - SCK-CEN - BELGIUM

Summary prepared for COWAM2 WP4 'Long Term Governance', 21 December 2006

This summary of the research on transgenerational ethics in long term governance, as it was carried out in the frame of COWAM2 WP4 reflects on the limitations of 'transgenerational ethics' but stresses - at the same time - on the need for 'robust' long term nuclear waste management.

In any discussion on ethical guidelines, the way the ethical principles are used, how they gain their strength in actual situations and what can be seen as their limitations can be seen as key starting questions. One way to answer them could start from the insight that in any specific case and/or context, there is a certain moral pressure, a 'belly feeling', the "ought to".

This "ought to", with respect to the phenomenon of 'pressure', is a deliberately imposed alternative behavioural limitation on oneself, and this in function of the ideological world view that, as a 'reference system', gives meaning for the individual, the group, the collectivity, and the society. This limitation can be seen as behaviour-oriënting, and can be established as the norm and controlled as such. It is the human drive that decides which of the (contradicting?) principles in an actual situation will be followed.

This 'ought to' is determined in interacting with many social fields: legal rules, scientific facts, attitudes, economical principles, politics and ethical principles all interact and codetermine each other. Because of the 'ought to' of morality, the criteria of vigilance, applied questions and ethical principles are important and influential in so far as they steer these broad societal discussions in actual situations.

Ethics is thus but one of the interactions. It is both result and origin of this dynamic interaction in broad societal discussions. Because of the belly feeling, there is no ethics without the interaction with the other fields. Ethical principles without a link to scientific facts, economic principles, political practices are empty. Ethical principles differ if the links to scientific facts, legal norms, … differ. Take for example the dial painters almost 100 years ago. Women wetted the paint brushes with their tongues before painting the pointers with fluorescent radium. Many of them received tongue cancer. The scientific facts at that moment did not show any danger in these actions. It was considered ethical, economical feasible, political correct to have these women paint the pointers. When science discovered the danger connected with these actions, the ethical, economical and political principles changed as well.

Because of the link with other aspects as described above, and the inherent character of unpredictability, it is *by definition* impossible to speak or act in terms of 'intergenerational ethics'. The future economics, sciences, politics do not yet exist. Looking to scientific progress, we can expect that the radioactive waste management facts will change and the connected ethical, economic and political principles with them.

However, this link can also be seen as a positive point in the search for robust decision making *including* ethical principles. The design and used materials of the waste repository can be robust over years. As a result, the ethics linked with this materials gain 'robustness' as well. In this way, we see that ethical robustness can be found outside morality. (1) A fund or another way of (robust) compensation can provide a context or argument for 'risk acceptance' in the future as well. (2) Using 'best available technologies' is generally seen as an acceptable 'precautionary' approach in a context of uncertainty, and this approach can in this way 'connect' the ethics of today with these of the future. (3) A broad risk framing should also make the ethical consequences of the decision making more robust.

A last remark focuses on the length of the long term. Psychological needs will not change too dramatically within 300 years. Together with the material robustness of a repository, there is a reasonable chance that the repository will still be considered ethical within 300 years.

But does this argumentation hold for 10.000 years? Will our current intragenerational principles still be valid in the year 12006? We don't think so. And those who pretend that they know must be listened to with a certain restraint. Indeed, the economical, material, political, societal aspects that codetermine ethics will have changed tremendously. The ethical principles of that time cannot be predicted. This means that an intragenerational ethical reflection on the long term can only partly contribute to the robust decision-making on this long term. In line with the trans-science concept, we can introduce here the notion of trans-ethics. The decision making requirements for such a long term can only connect in a limited and pragmatic way with our ethical thinking. However, some caution is needed. As stated in this research, every very long term has its short term. Long term governance must use the criteria mentioned above àn must have the awareness that these criteria are limited for a much shorter period that the period that the waste must be protected from the biosphere.