Radioactive Waste Management

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Disposal of Radioactive Waste: Forming a New Approach in Germany

FSC Workshop Proceedings Hitzacker and Hamburg, Germany, 5–8 October 2004

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NUCLEAR ENERGY AGENCY
ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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FOREWORD

The fifth workshop of the OECD/NEA Forum on Stakeholder Confidence (FSC) was held in Hitzacker and Hamburg, Germany on 5-8 October 2004, and was hosted by the Federal Office for Radiation Protection (BfS) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU). The BfS is responsible for implementing, and the BMU for regulating, radioactive waste management in Germany. The central theme of the event was "forming a new approach to radioactive waste management in Germany". The three-day event started with a community visit to Hitzacker, which included a one-day meeting with community representatives and other stakeholders. This was followed by a tour of the radioactive waste management facilities in Gorleben, and then the workshop in national context, which took place in Hamburg.

During the workshop sessions invited speakers, representing different groups of stakeholders, commented on relevant aspects of the new German approach. The presentations were intended to stimulate subsequent discussion in round-table discussions. Each round table consisted of delegates from different countries and German stakeholders. A set of predefined questions related to the different topics of concern was provided. Facilitators structured the round-table discussions and provided summaries for the audience. The general historical background and present situation in Germany were first described to all stakeholders and debated. Later sessions addressed specific aspects of the policy under development. Two thematic rapporteurs external to the FSC followed the event and provided their observations from the point of view of their professional interest.

The aim was for all participants in the workshop to have the possibility to learn how to change their own approach and mindset in order to interact with other stakeholders in a way that enhances understanding and builds mutual trust. Meetings and discussions among the FSC delegates and different groups of German stakeholders took place using the well-proven, interactive format of the FSC workshops, which include facilitated round-table sessions.

Sixty-five registered participants, from 13 countries, attended the event. About 60% were German stakeholders; the remainder came from FSC member countries and international organisations. The German stakeholders included local actors, academics, and representatives of state and federal governments, NGOs, waste producers and other companies. The international audience consisted of FSC members, typically affiliated with national regulatory bodies, government, or implementing organisations, as well as other delegates and academics.

These proceedings provide a historical introduction to radioactive waste management in Germany, give a detailed summary of the workshop presentations and discussions that took place, and also provide the NEA Secretariat's reflections which help place the main lessons of the workshop into a wider perspective. Five presentations – the three keynote papers and the two thematic reports – are also reproduced herein.

Acknowledgements

The FSC gratefully acknowledges the work of the members of the programme committee:

Magnus Westerlind	SKI, Sweden
Yves Le Bars	Andra, France
Hans Riotte	OECD/NEA
Claudio Pescatore	OECD/NEA
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INTRODUCTION TO THE GERMAN CONTEXT[1] AND DESCRIPTION OF THE THREE DAY EVENT

Gorleben, as the historical centrepiece for the management of long-lived radioactive waste

The discussion about nuclear waste disposal in Germany has a historic record of more than 30 years. At present Germany has a deep repository for low-level waste (LLW) at Morsleben, which is being closed and sealed, as well as a deep repository for LLW at Konrad, which could be receiving waste relatively soon. The Gorleben site has been investigated for deep disposal of long-lived waste. From the beginning, the selection and potential suitability of the Gorleben site was an issue of heavy controversies.

Regarding the selection of the Gorleben salt domes, originally three other potential repository sites were selected in Lower Saxony as a result of a federal siting procedure in the early and mid seventies. However, heavy local protest arose against each site. These protests triggered the search for yet another site by Lower Saxony, which took 140 sites into account. Eventually, the Gorleben salt dome was designated in the year 1977.

Before investigations started, the Government of Lower Saxony organised the so-called "Gorleben hearing" in Hanover in 1979. In conclusion, the original plan that Gorleben would become part of a national integrated waste management centre designed to concentrate all major waste management facilities at one site was dismissed. Nevertheless, interim storage facilities, a pilot facility for conditioning and the disposal project remained.

After the site exploration had started, the first unexpected results triggered an intensive controversial discussion about the suitability of the site that, however, had no feedback on the decision making. As a result of continuous discussions and protests, through 1998, the projected start of operations of the Gorleben repository was moved to beyond 2010.

Current situation

In agreement with the agreement of 14 June 2000 between the utility companies and the government, the exploration of Gorleben was interrupted on 1 October 2000, for at least three and at most 10 years in order to clarify conceptual and safety-related questions to which continuing the exploration of the Gorleben salt dome cannot contribute. In an appendix of the above agreement, the federal government considers it necessary in the light of the international discussion to further develop the suitability criteria for disposal and to rework the disposal concept.

1. Focusing on long-lived radioactive waste.

New waste disposal strategy under discussion in Germany

The 2002 amendment to the *Atomic La*w regulates the abandoning of nuclear power for commercial electricity production in Germany. Phasing out allows for more accurate planning of the amounts of waste, but it does not make the waste disappear.

The Federal Ministry for the Environment considers a new safety philosophy (see Box 1), the revision of the over 20-year old German safety criteria, and a site selection procedure and criteria as decisive elements of the new disposal concept. Gorleben shall be included in the site selection process and shall participate in the competition. The advantages and disadvantages of Gorleben will be evaluated using the same yardstick that will be applied also to all other places in Germany.

In a first step, BMU set up an interdisciplinary expert group, the "AkEnd", in February 1999 to develop repository site selection criteria and a selection procedure on a scientifically sound basis. The criteria and the selection procedure aim at finding the relatively best-suited site in Germany. The principle 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, areas, site regions and sites shall be selected that offer particularly favourable conditions for the later suitability demonstration and licensing procedure. The AkEnd recommendations were handed over to BMU in December 2002. They are currently under review.

Financing and implementation of this procedure in a legal framework is currently under discussion. Experiences made by the public and particularly by stakeholders have to be considered to avoid the mistakes that have been made in the past. Therefore the BMU has a strong interest for involving the public in the discussion, particularly with respect to site selection and reorganisation of the responsibilities, hence the holding of the present FSC event in Germany.

Box 1. **Fundamental principles of waste management philosophy in Germany**

The policy of the federal government in the field of radioactive waste management is governed by the following fundamental principles:

Safety first: In the field of radioactive waste management, as in other nuclear areas, safety is the first priority and takes precedence over all other aspects.

Disposal: On the long term, disposal is the only radioactive waste management option that may provide for a permanent and sustainable solution to the waste management problem.

National responsibility: Radioactive Waste of German origin shall be disposed of in Germany. For the purpose of disposal, radioactive waste shall be neither exported nor imported.

Responsibility of today's generation: The present generation that uses nuclear power to help satisfy its energy demands is obliged to take care of the resulting waste. A disposal facility shall be established as soon as possible and must not be postponed nor left to future generations.

Based on these fundamental principles, the responsible Federal Ministry for the Environment (BMU) has formulated its radioactive waste disposal policy in the framework of phasing out in more specific terms:

- All types of radioactive waste shall be disposed of in deep geological formations within Germany.
- One single repository in deep geological formations is sufficient for all types of radioactive waste,
- In order to identify the repository's site, further sites in different host formations shall be explored; a decision on the repository's site shall be based upon a comparison of alternatives, and
- The repository shall be available around 2030.

Description of the event

The event lasted three days. The introductory session (Day 1 morning and early afternoon) took place in Hitzaker and explored the historical context and the current situation of radioactive waste management in Germany. It entailed plenary presentations by key actors of policy-making processes and discussions focusing on stakeholder concerns about trust and confidence. Three sessions took place in Hamburg and addressed the topics "The new proposed approach to site selection, with emphasis on basic premises" (Day 1 late afternoon), "The new proposed approach to site selection, with emphasis on stakeholder involvement" (Day 2 afternoon), and "The new approach to responsibilities and co-operation with emphasis on policy aspects" (Day 3 morning). Each of the sessions started with short plenary presentations by representatives of various stakeholders' interests and focusing on a pre-defined set of questions. Participants were then divided into round-table discussion groups that examined similar questions. Outcomes of each round-table discussion were reported in follow-up plenary sessions. The final two sessions (Day 3 afternoon) included two thematic reports by external rapporteurs, final feedback from participants and conclusions. The thematic reports addressed the topics "Long-term robustness of the proposed decision-making process" and "Roles and responsibilities of the various-institutional players: clarity and coherence".

All papers and group findings are integrated in the Summary of the workshop, which constitutes the central part of these proceedings, along with the International Perspective by the NEA Secretariat.

The programme of the event is presented in Appendix 1; the introductory papers are given in Appendix 2; the papers by the external rapporteurs are in Appendix 3, along with the final remarks of the FSC Chairman. The list of participants (Appendix 4) completes these proceedings.

SUMMARY OF THE EVENT

Community visit
Workshop

COMMUNITY VISIT

The opening session of the community visit took place in the morning and early afternoon of Day 1 in Hitzacker. Part I was devoted to explaining the historical context and the current situation of radioactive waste management in Germany. The objective of Part 2 was to meet local actors and hear their views about past decision-making processes and recent developments.

Part 1. Briefing of the FSC and Other Workshop Participants

Hans Riotte, Head of the Division of Radiation Protection and Radioactive Waste Management of OECD/NEA, opened the Hitzacker workshop. He briefly introduced the OECD/NEA and its Radioactive Waste Management Committee's (RWMC) goals and main activities. He emphasised the societal aspects of radioactive management and pointed out that a stepwise approach with broad participation and democratic inclusion appears highly promising in this field. It has been recognised that stakeholder confidence in policy makers and implementers are key factors for the successful implementation of radioactive waste management programmes. In recognition of this, the RWMC created the Forum on Stakeholder Confidence (FSC).

Dr. Riotte pointed out that the FSC focus is on decision-making processes. He recalled similar, earlier workshops in Finland, Canada, and Belgium and outlined the general structure of these meetings, where the role of FSC delegates is to participate in discussions, and provide observation and feedback for national stakeholders. Finally Dr. Riotte expressed his thanks to the Federal Office for Radiation Protection (BfS) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) for hosting the workshop.

George Arens from the Federal Office for Radiation Protection welcomed the participants on behalf of BfS. He briefly spoke about the roles and responsibilities of his office in radioactive waste management and recent developments in Germany, including a new "political wind", new nuclear energy policy, and new guiding principles for radioactive waste management. He expressed his Office's support for the AkEnd approach, and suggested that the workshop should focus on the feasibility of, and issues raised by, this approach. Mr. Arens also briefly outlined the program of the following day, when FSC delegates had the opportunity to visit the Gorleben site, including the underground facility and the above ground conditioning and pilot storage facility.

Detlef Appel from *PanGeo-Geowissenschaftliches Büro,* gave an overview of the institutional and historical background of repository projects in Germany, with special emphasis on the Gorleben site. He outlined the roles and responsibilities of key institutional actors in the field of radioactive waste management: the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) is the regulator and supervisor, the Ministries of the Environment in the states of Lower Saxony and Saxony-Anhalt are the licensing authorities, and the Federal Office for Radiation Protection (BfS) is the applicant and operator of the facilities.

By recounting the history of radioactive waste management, Mr. Appel distinguished between three periods, which can be characterised by different approaches to the selection of options and sites: (i) the 1950s-1960s, (ii) the period between 1970 and 1983, and (iii) the period between 1983 and 2000. In the 1950s-1960s, a combination of reprocessing, interim storage and geologic disposal was chosen as the preferred radioactive waste management option and salt domes in Lower Saxony became the main target area for siting. In this period merely technical and demographic criteria (e.g., population density and land use) formed the basis for choosing potential siting areas.

In the 1970s, a mix of technical and social criteria (e.g., seismic activities, farming and transportation issues) was considered in site selection. Focus shifted to three salt domes in Lower Saxony, but local populations were not involved in policy decisions, which created local resistance. In 1976 the government of Lower Saxony asked that site investigations be stopped until they could identify a site on their own. In 1977 the government of Lower Saxony identified the Gorleben salt dome and the federal government accepted this decision. Neither a systematic decision-making process nor a wide site investigation preceded the designation of the Gorleben site. The decision resulted in strong local and regional opposition to the project. In 1977 the PTB (the predecessor of BfS) filed an application to start the licensing procedure. Surface-based investigations started in 1979 and a decision on underground investigation was made in 1983, in spite of the fact that several non-institutional experts found the site unsuitable due to some unexpected hydrogeological findings (particularly the so-called "Gorleben channel"). In 1985 underground investigations started and an exploratory shaft was built by 1996. The first section of the underground area was studied until 2000, when investigations were interrupted[2] as part of an agreement between the federal government and the utilities about phasing out of nuclear power.

Mr. Appel identified several reasons for the failure of the German approach in implementing the Gorleben site. Namely, that (i) until 2002 there had been no attempt to involve the broader public in radioactive waste management decisions; (ii) since the late 1970s the Gorleben site has been heavily criticised by non-institutional experts for technical reasons, while institutional experts have continued defending it, and (iii) after the Chernobyl accident the issue of nuclear energy came to the fore and resulted in conflicts between political parties. Since then, the issue of radioactive waste has become increasingly politicised.

Heinz Jörg Haury from the GSF National Research Centre for Environment and Health introduced the AkEnd committee (Committee on a Site Selection Procedure for Repository Sites) – its mandate, its composition – and the proposed site selection process including technical and social criteria as well as the involvement of stakeholders.

A key milestone in the history of radioactive waste management in Germany was the 1998 decision of the federal government to phase out of nuclear energy and to establish a deep geological repository for all types of radioactive waste by 2030. In 1999 the AkEnd Committee was created by the BMU to develop a siting procedure based on a set of technical selection criteria that are independent of the rock characteristics. The Committee included a range of experts with different backgrounds and different views. They followed a new approach by sharing information with the public: they organised public workshops and fora, established a Web site, gave lectures, and published their decisions, including the minority opinions. AkEnd recommendations were published in 2002 (end of Stage 1), and a public discussion and review phase (Stage 2) was planned to take place in 2003-2004.

The procedure proposed by AkEnd consists of five consecutive steps. It starts with a "white map of Germany" and each step includes a set of criteria that help narrow down the number of potential

2. "Moratorium" on Gorleben for a minimum of three to a maximum of 10 years.

sites. In the first step, geoscientific criteria are used to exclude areas that are obviously not eligible for a repository. The objective of the second step is to limit the remaining areas to smaller partial areas with particularly favourable geological conditions (geoscientific weighing). In the third step, at least three siting regions are selected based on both geoscientific and socio-scientific criteria. Willingness to participate in the subsequent steps of site selection on behalf of the affected communities is a key exclusionary criterion. The main tasks in the fourth step are surface explorations and the selection of two sites for underground exploration. Willingness to participate is measured a second time. In the fifth step, one repository site – for all types of waste – is selected by the German Parliament, based on the geoscientific data found by underground site investigations and the results of public surveys/votes in the affected communities.

The AkEnd proposed various forms of public participation in the individual steps. These include a public information platform, a citizen forum, a centre of competent experts, a round table of stakeholders, preparation of regional development concepts, and votes by the citizens and the local councils. However, the communities that decide to participate in the process, do not have a right to veto in steps 4 or 5.

Peter Hocke-Bergler from the Institute for Technology Assessment and Systems Analysis at Karlsruhe Research Centre (ITAS) spoke of an independent evaluation of AkEnd activities by ITAS. Evaluation instruments included public opinion surveys, interviews with workshop participants, media analysis and participating observation. Results of the evaluation were predominantly positive, but several deficiencies were also found. For example, there was little media coverage, only the liberal segment of national press reported on AkEnd. The process did not manage to bring stakeholders together and decrease conflict or find a compromise. Similarly, interested public were not really involved, they saw limited chances for discussion, and they found it especially difficult to reflect on the social and political decisions and frameworks AkEnd was working within.

Mr. Hocke-Bergler concluded that there has been a generally positive view of AkEnd, although views are divided along pro- and anti-nuclear lines, since radioactive waste management is seen as a sub-topic of nuclear energy. Another important finding is that the public assigns a high importance to safety-related criteria. There is a need to mobilise and extend the interested public, but for this, professional PR work and significant resources will be needed in the future.

Claudio Pescatore from OECD/NEA Secretariat presented the review of the AkEnd recommendations by the International Commission on Nuclear Technology (ILK), an international standing expert committee set up by three German federal States (Baden-Württemberg, Bavaria, Hesse). The ILK disagreed with two of the preconditions that were set by BMU. First, it questioned that AkEnd should start with a "white map" of Germany and ignore existing and potential sites, i.e., the licensed final repository for low- and intermediate level waste in Konrad, and the comprehensively explored Gorleben site. Second, ILK questioned the objective of finding one single repository for all types of waste, because this would likely make site selection very difficult as different waste types raise different technical problems. To this effect they observed as well that a one-site policy is not in line with international practice.

According to the ILK review, important elements are missing from the AkEnd proposed public participation process. Accordingly, it suggested that responsibilities should be defined more clearly. For example, public participation does not guarantee that consensus will be achieved; therefore, final responsibility should rest with the federal government and Parliament. At the same time, the proposed independent "control committee", which is supposed to monitor the site selection procedure, was found to have a too diffused role, which would not allow it to build credibility and trust. ILK supported the AkEnd suggestion that licensing authorities accompany site selection from the very beginning and be

involved from the start of the information exchange. The Committee also supported the suggestion that clear role be attributed to a decision making body and an implementer. ILK is of the opinion that both the Konrad and Gorleben sites may satisfy the high safety requirements, in spite of the fact that they were not selected on the basis of contemporary site selection criteria. The Committee suggested that the AkEnd recommendations should be reviewed by both international and German experts and a more realistic timetable should be developed.

In later discussions, it became evident that the AkEnd itself had asked for its findings to be reviewed internationally, but that Government had not adhered to this recommendation.

Rolf Wernicke of BMU outlined a political roadmap towards developing and operating a deep geologic repository. Fundamental principles underlying the decision-making process include (1) safety first, (2) geological disposal as the only feasible option, (3) national responsibility (i.e., no export from or import to Germany), and (4) responsibility for today's generation. Accordingly, the proposed siting process will look at the whole of Germany, starting with geological criteria to identify potential sites. The siting process is designed to use a range of stakeholder involvement tools.

Mr. Wernicke recalled that public participation has been a high priority throughout the AkEnd process. In Stage 1, as part of the AkEnd work, three important annual workshops served as platforms to present and discuss the proposed procedure with stakeholders. For Stage 2 a national debate on the AkEnd results had also been planned, but several stakeholders, for example representatives of nuclear industry and the opposition coalition parties, refused to participate. BMU particularly endorses meetings with stakeholders and experts within the framework of international organisations, such as the OECD/NEA/FSC, EC/COWAM and the OECD/NEA Meeting of Advisory Bodies to the Government.

BMU is considering to change the existing institutional arrangements. Responsibility for siting, developing, operating and closing future radioactive waste management facilities would be transferred from the government to private waste producers, who would then establish a new association for these purposes. This would change the current situation, where the regulator and the implementer belong to the same government agency. Based on the AkEnd report and the proposals of BMU-BfS, a new piece of legislation is being drafted. BMU plans legal implementation by 2006, when the siting process should start. Conflicts with the nuclear industry in this matter are possible.

Part 2. Stocktaking from Meeting with Local Stakeholders from Gorleben and Konrad Areas

This session aimed at meeting local actors and learning about their concerns regarding trust, confidence and fairness in decision making for radioactive waste management in Germany. Five statements were made by representatives of local stakeholders from the Gorleben and Konrad areas. Based on these statements, the session Chair and Co-chair helped identify the major questions to be taken out for further discussion with the audience.

Ulrich Flöter, a farmer from Gartow, who has been involved in community policy for about 25 years, spoke of his experience regarding decisions on the Gorleben site. He pointed out that Gorleben was suggested for mining and resources reasons, and that, in the debates, party politics has received more weight than science. The community would be willing to accept the facility if science showed that it is safe, but local support can only be achieved through involving the local public. Unfortunately, the local community has not been actively involved in the AkEnd workshops. Presumably, the Stage 2 public debates will not take place either, which is very regrettable.

Mr. Flöter judged that 2030 is not a realistic date for a disposal facility to be operational. He suggested that Gorleben should be included in site investigations and be compared to other potential sites.

Ursula Schönberger representing *AG Schacht Konrad* recalled that the Konrad mine was proposed by the local community as a disposal facility. It was put forward as the regulator had given its view on its safety. It was originally planned for medical waste, but it has been expanded to hosting utility wastes as well: nowadays, only about 2% of the Konrad-designated waste would originate from hospitals and universities. The initiative against Konrad started already in 1979. The local opposition group took the proposals to court, but in order to do this, they had to raise a significant amount of money. Over the years, the Konrad site has become a political toy, whereby attitudes change with changing politicians.

Ms. Schönberger judged that AkEnd was a positive development, but she also expressed her concerns that many of AkEnd's recommendations will not be transferred to legislation. Finally, she warned that nothing should be done under time pressure.

Andreas Graf Bernstorff, a landowner from Gartow emphasised that Gorleben was not chosen in an open and transparent way and politics played a key role. He had refused selling his land for a reprocessing facility, and he did not sell his mining rights either. He lost trust in the process because Gorleben was chosen in spite of the fact that the geological conditions are insufficient: the channel that exists in the Gorleben salt dome calls safety into question.

Mr. Bernstorff said he supports AkEnd, and agrees that the site should be reconsidered in light of the new criteria. He also recognised that a radioactive waste management facility has to be established and decisions have to be made now. However, he expressed doubt whether the new law can achieve what it is aiming for.

Francis Althoff of *Bürgerinitiative Umweltschutz* confirmed that in past decisions, as well as in recent debates, politics has been more important than science, and science seems to be overpowered by "power". He judged that although large sums of money have been spent already, this does not justify pursuing Gorleben. He spoke about recent conflicts; even transporting the waste from France to Gorleben every November is very difficult and needs a large police presence.

Mr. Althoff expressed his support for a new siting process and the search for an alternative repository site. He emphasised that the public needs to be involved in the new process.

Eckhard Kruse, a church pastor from Gartow explained the main reasons for the public losing trust in the institutions and actors. He spoke of the lack of dialogue with the public, the mismatch between the words and the actions of the authorities, and the misuse of power during waste transports. He also claimed that radioactive waste management institutions have no trust in the citizens.

Mr. Kruse suggested that a new approach should be found, whereby the responsible authorities trust citizens and involve them in their decisions. He pointed out the importance of transparency, clear site selection criteria and dialogue, and emphasised that the AkEnd proposals are promising. In addition, AkEnd has opened an important discussion on ethics. Finally, Mr. Kruse suggested that waste transport to Gorleben should be stopped.

Discussion

Based on the above presentations, **Anna Vári**, Professor, Hungarian Academy of Sciences (session Chair) and **Peter Hocke-Bergler** from Karlsruhe Research Centre (session Co-chair) identified the following questions to be discussed with the audience:

- Should the sites selected earlier (Konrad and Gorleben) be kept among the alternatives to be investigated?
- How should geologic, economic, social, and political criteria be balanced?
- What should be the roles of the different actors, particularly of governments, authorities, experts, utilities, and the (local and broader) public? How should responsibilities be shared?
- How should transparency and an open dialogue be maintained? How to resolve the conflict between the need for a time-consuming public participation (e.g., exploring the decision criteria with the public) and the time pressure (radioactive waste management is the responsibility of the current generation)?
- What should be implemented? Nothing? The proposal of AkEnd? A compromise?
- Which political way of solution? Take a break? Find a solution? Do stakeholders want to go a new way?

The main outcomes of the discussion were summarised by the Chair and Co-Chair as follows:

- Local confidence in actors responsible for previous site selection processes has seriously been shaken in affected areas. The evaluation of the AkEnd approach is more or less positive, but this new attempt of site selection will take place in a context of negative earlier experience.
- Authorities and political actors have been strongly criticised for their top-down approach, which is unsuitable for conflict management. They are asked to be more open to local interests.
- Stakeholders express their wish for finding a safe site and would welcome a comparative approach. However, this could be problematic in the presence of the Gorleben moratorium.
- The role of expertise needs to be considered and the quality of expertise needs to be improved. The possible role of “counter-experts” is a controversial issue.
- The main reason for losing trust and confidence was that earlier decision making was not seen as being fair. There is a need to rebuild confidence while trying to find a solution.
- A process that is seen as being fair by stakeholders and affected public needs to be developed. A key factor of fairness and confidence is the management of the existing conflicts. AkEnd is seen as a good starting point for developing such an appropriate process.

Session 1

THE NEW PROPOSED APPROACH TO SITE SELECTION WITH EMPHASIS ON BASIC PREMISES

Session 1 of the workshop took place in late afternoon of Day 1 in Hitzacker. First, short presentations by national, regional and local actors and representatives of industry and NGOs addressed the basic premises of the German approach. These were followed by round-table discussions. Presentations and debates were structured by the following questions:

- Is there shared understanding that the status quo needs to be changed?
- Is there shared understanding that disposal in deep geological formations is the only option for all waste types?
- Is there shared understanding that one disposal facility is sufficient and operable for all types of waste?
- Is there awareness that emphasis is placed on geology and not so much on engineered barriers?
- Is there agreement on a hierarchy of values to be implemented?
- Is there agreement and shared understanding of what a "relatively best" site is?

According to **Ursula Schönberger** (AG Schacht Konrad), it has been widely recognised that the status quo is not acceptable, but there is no common understanding as to how the status quo must be changed. In any case, terminating the use of nuclear energy in the foreseeable future is, in her view, a precondition for developing a radioactive waste management process.

In principle, the option of deep geological disposal is accepted, but the issue of retrievability has been discussed. Regarding the desirable number of disposal facilities, Ms. Schönberger indicated that her group does not have the scientific background to respond this question, although it seems that one repository site with two shafts and two concepts could be sufficient for all types of waste. She felt that unless a single site for all waste was developed, some would be inclined to export certain waste types to international facilities, if such facilities became available.

Ms. Schönberger stated that the importance of geology relative to other barriers is accepted in Germany, but it is recognised that technical barriers are to provide additional safety. There is no general agreement on the hierarchy of values. Safety should be the first priority, but it should not be used to exclude public involvement. German experience shows that when "safety first" is said, it may mean "economy first" in reality. It is very hard to define the meaning of the "relatively best" site.

Renate Backhaus representing the Association for Environmental Protection (BUND) viewed that safety, scientific clarity and sustainability are key aspects for changing the status quo. She welcomed the AkEnd process and felt that AkEnd proposals, i.e., openness, polluter pays principle and a new siting

process were feasible. However, phase-out of nuclear power needs to be completed before BUND will engage in the site selection process.

The concept of deep geological disposal is accepted, and there is no support for export or import of waste. One facility for all waste types is considered to be sufficient, but volumes of waste need to be defined carefully and safety should be assured for 1 million years.

Ms. Backhaus suggested that the siting process needs public involvement, and site selection criteria should be finalised by legislation. Finally, she expressed her concerns about the loss of trust, but also her hope that a new process would lead in the right direction.

Dorothea Steiner, member of the Green Party of Lower Saxony recognised that the *status quo* of decision making needs changing. She welcomed the AkEnd recommendations because the proposed approach is aimed at defining transparent criteria for a new siting process. All stakeholders should participate in defining siting criteria, including the industry. She emphasised that the fact that large sums of money have been spent on one site does not automatically imply that no more work is needed.

According to Ms. Steiner, there is a basic consensus that deep geological disposal should be implemented and there is no need to investigate the option of storage or retrievability. A single repository would be sufficient and geological formations are of key importance. She suggested that Stage 2 discussions on the AkEnd approach should still be undertaken and the law should reflect these debates.

Karin Bertholdes-Sandrock, Christian-Democrat Member of Parliament of Lower Saxony, pointed to the need for mutual respect to move forward. There is a broad understanding that an essential change has to be brought about. There is a national responsibility for the radioactive waste management problem, and a generation's worth of time has already been wasted.

According to Ms. Bertholdes-Sandrock, it is widely agreed that deep geological disposal is a good solution. She recommended establishing two repositories because this solution would allow disentangling and simplifying the radioactive waste management problem. Safety – and related "scientific" criteria – should be in the foreground and acceptance should be of less importance.

Ms. Bertholdes-Sandrock viewed that AkEnd has been disappointing so far as its recommendations do not seem to lead anywhere. Gorleben should continue to be investigated. Criteria need to be developed on the basis of available science. Sound science will build public confidence.

Enrique Biurrun, representing Deutsche *Gesellschaft zum Bau und Betrieb von Endlagern für Abfallstoffe* (DBE, the BfS contractor that operates the Gorleben exploratory mine) agreed that the situation in Germany needs to be changed, but he warned that real change will not occur any time soon. There is shared understanding in the German society that deep geological disposal is the best option for all types of radioactive waste. Although, the reality of Germany is that large volumes of waste from uranium mining are disposed of at the surface.

Mr. Biurrun pointed out that the disposal of all types of waste in a single facility is a political objective that contradicts safety goals and technical considerations. There is no other country that follows such a policy. On the other hand, the focus on geology or engineered barriers depends on the geology of the country. In Germany good salt rock can be found, therefore, engineered barriers are of minor importance. However, if we move to other host rock formations, e.g., clay or granite, engineered barriers will become very important.

Mr. Biurrun claimed that in principle there is a general agreement at the federal level that safety is the primary criterion, however, as radioactive waste is piling up at interim storage facilities all over the country this goal is not being fulfilled. The concept of a "best site" is ambiguous, because it reflects subjective evaluation criteria and incomplete scientific knowledge. Therefore, a suitable rather than a best site should be sought.

Round-table discussions

Moderator: *Claudio Pescatore, OECD/NEA Secretariat*

Is there shared understanding that the* status quo *needs to be changed?

Most round tables referred to Germany as being in a stalemate situation, where many people prefer doing nothing because this is the cheapest solution. Some of the round tables felt that more public involvement is needed and more chances for the public to influence the process need to be assured in order to take the process forward. The siting process needs to be more open and transparent and clear criteria should be developed and applied. An appropriate balance between science and politics should be re-established. A "neutral" body is needed to rebuild confidence in way forward.

One round table suggested that in addition to changing the procedure and style, substantial changes are also needed, including the cancellation of the Gorleben moratorium. It was felt that legislation could offer an incentive to all stakeholders to come together and reach consensus. Konrad could be an issue for negotiation as well.

Is there shared understanding that disposal in deep geological formations is the only option for all waste types?

All round tables agreed that deep geological disposal is a widely accepted option in Germany. Some pointed out, however, that this consensus is political rather than technical. Several groups felt that issues of monitoring, controllability, retrievability, and adaptability of deep geological disposal need to be widely discussed. Also, there are several safety and technical issues to be debated because of the long time it will take to develop a repository.

Is there a shared understanding that a disposal facility is sufficient and operable for all types of waste?

Reports by individual round tables indicated lack of agreement on the desirable number of repositories. Some felt that one facility would be sufficient. Others suggested the development of two repositories for scientific and technical reasons, since different waste types have different requirements. The two-repository option was also supported by the argument that Konrad has already been licensed. Some viewed that having one facility is a political objective (one repository is easier to defend on political ground), and there have not been any investigations about the practical implications of this solution. Such implications would include, for example, a demand for interim storage for low- and intermediate level waste for about 30 years, which would be costly.

One round table suggested that, although one facility for all waste types appears to be only a political requirement, the advantages of multiple sites still need to be documented. They added that for many stakeholders two repositories would mean putting the Konrad facility into operation and this would not be acceptable for them.

Another round table emphasised the advantages of the multiple-facility option. They reminded the audience of the safety disadvantages of the one-facility option and stressed that ongoing waste disposal will be needed in the future, even after the phase-out, because of continuing generation of medical and other non-utility waste. Finally, participants concluded that "you can go forward agreeing to disagree".

Is there awareness that emphasis is placed on geology and not so much on engineered barriers?

There appears to be a predominant view that geology is more reliable than engineering. Engineering relies on humans and there is always a chance for error, while there is historical evidence for geological stability over time. Most of the groups concluded that multi-barrier systems are needed where both geology and technical barriers play a role, although more reliance should be placed on geology.

One round table argued that a focus on geology may be inherited from the past, when a number of geologists were involved in siting processes. Others pointed out that an emphasis on geology could strongly limit the number of potential sites and that focus should be on the protection of humans and the environment rather than geology. This means that investigations should not be limited to salt domes, but that granite and clay formations should also be considered according to a multi-barrier concept.

Some of the round tables felt that engineered barriers are questionable if we plan for millions of years, but on the other hand, geology provides little flexibility. Some expressed the view that a balanced approach is needed. For example, retrievable disposal, which is also an engineered solution, should be examined, but at this point it is not considered as an option at federal level.

Is there agreement on a hierarchy of values to be implemented?

All round tables emphasised the priority of the "safety-first" principle. Once a certain, high level of safety has been achieved other aspects, such as regional development may also become important. If it can be shown that one option is safer than another, then the safer one should be chosen.

One round table reminded that due to the strong emphasis on safety, retrievability is not a major issue in Germany. However, monitoring and observation of the facility should be assured for up to 50 years after closure. They also warned that the hierarchy of values may change over time, and financial aspects may come to the fore.

Some round tables argued that safety should be interpreted more broadly. For example, transportation risks should also be considered. Another issue that emerged was related to expertise: how do we know which option is safer? We should rely on experts' opinion, but can we believe them?

One round table defined safety and sustainable development as the key guiding principles, but added that other values, including fairness, openness and transparency should also be considered. They reminded that the needs of both present and future generations should be taken into account.

Is there agreement and shared understanding of what a "relatively best" site is?

The concept of the "relatively best site" appears to be highly debated. Some of the round tables were of the opinion that all sites for which safety can be demonstrated, should be viewed as "good" sites, and that one important aspect of site selection is the trust in the people who are responsible for selecting a site. Other round tables emphasised the importance of trust in the site selection process itself. Procedural justice was suggested as a key factor of confidence. Regarding the outcome of the process they too argued that a safe, licensable and suitable site should be sought, rather than trying to find a "best" site.

Several round tables, however, felt that the "relatively best" site is a reasonable target, which could be identified through a systematic assessment and comparison of alternative locations in terms of a pre-defined set of criteria. Supporters of this view tend to interpret the notion of a "relatively best" site as the best among the alternatives considered. However, it was acknowledged that the concept of "relatively best" is about values, therefore a process aimed at finding such a solution will inevitably lead to conflicts.

Social dinner and visit to the facilities of Gorleben

Day 1 ended with a social dinner in Hitzacker where FSC members and German stakeholders met in an informal atmosphere. Next morning FSC delegates had the opportunity to visit some facilities in Gorleben. They could choose to visit either the transport-container storage facility plus the pilot-conditioning plant operated by the *Brennelementlager Gorleben* (BLG) or the exploratory mine developed by the *Deutsche Gesellschaft zum Bau und Betrieb von Endlagern für Abfallstoffe* (DBE). Delegates visiting the BLG site were first briefed about the tasks of the company, then took part in a guided tour of the above facilities and a related exhibition. Delegates choosing the exploratory mine heard a presentation on the geology of the Gorleben salt dome and then visited the mine. Both groups were invited to a lunch by DBE where they had a chance to converse with local stakeholders from Gorleben.

Session 2

THE NEW PROPOSED APPROACH TO SITE SELECTION WITH EMPHASIS ON STAKEHOLDER INVOLVEMENT

Session 2 was organised in the afternoon of Day 2 in Hamburg. In Part 1, feedback on the earlier community visit was provided, while Part II included stakeholder presentations and round-table discussions.

Part 1. Feedback on the Community Visit

Janet Kotra from the U.S. Nuclear Regulatory Commission provided feedback on the Hitzacker community visit. She structured her presentation around four major observations:

- Trust and confidence have been seriously damaged by previous actions.
- National policy is in transition.
- AkEnd offers a new approach.
- Parties can choose to adopt the behaviour that can help the process.

Ms. Kotra identified several reasons for damaged trust. The basis for selecting the Gorleben site remains unclear and local stakeholders have not been engaged in the decisions. In addition, heavy-handed police actions have taken place in the community. The inventory for disposal at Konrad has been changed without any public discussion on this issue. Absence of two-way communication and the discrepancy between official words and actions have further aggravated the situation.

Ms. Kotra reminded that important changes in national policy have taken place recently to rebuild public confidence. Decision on phasing out of nuclear power has proved necessary for engaging the broader public. The operation of the Konrad facility – although licensed earlier – has been on hold and a moratorium on the Gorleben site investigations has been put in place. The AkEnd Committee was established, which has set out fundamental principles and a process to be developed into law.

AkEnd offers a new approach on which most stakeholders are cautiously optimistic. Although they want to believe in the new process many are also sceptical about its implementation. It is key to bring all stakeholders to the table and enable them to participate. Stakeholders have the desire to change the status quo. There is little evidence of stakeholders waiting to change themselves, but they are clear on the changes needed in others.

Ms. Kotra put forward potential ways to proceed, such as:

- to work with potentially affected communities as partners;
- to create open process for establishing site selection and regulatory criteria;
- to replace propaganda with two-way communication;

- to establish a funding mechanism, which includes the polluter-pays principle and provision for oversight and opportunities for research by the affected government;
- to select and to develop a safe site will require safe transport of the waste – allow this to happen;
- to act with the same level of integrity and respect to all members of the process that you expect to be treated with;
- to set and to abide by agreed upon ground rules.

Finally, Ms. Kotra listed some reasons for optimism. There is a strong desire for changing the status quo and the government has made significant changes and appears willing to make more. AkEnd offers a vision and the outline of a new approach. Finally, she assured German stakeholders that many other countries face similar issues.

Part 2. Eliciting and discussing opinions of stakeholders on the approaches to public participation, regional development and implementation of the proposal

Presentations and round-table discussions focused on the following questions:

- Who are the recognised stakeholders?
- Does the role of actors (e.g., Parliament, authorities, regulators, implementer, waste generators, local communities, NGO's experts) need to be made clearer?
- What are the objectives for the dialogue, and how should the public be involved in various decisions (e.g., site selection, reorganisation of institutional arrangements) and implementation?
- In what way can a disposal site be good for a community or region?
- What kind of flexibility does the process need to implement?
- What are the stakeholder involvement aspects that make the process more robust and sustainable in the long term?
- Does an informal or formal right of veto help communities deliberate and make the process smoother – albeit more uncertain to run?

Ursula Schönberger from *AG Schacht Konrad* described the industry, environmental organisations and church groups as recognised stakeholders. In terms of who has to participate, local stakeholders who are near the facility should also be included. Trade Unions at all levels of Germany need to be involved: local, regional and national.

The roles of the actors need to be defined before the decision-making process starts, so people can debate about their own roles and how they can be involved. A facility is a burden for a community, so they need a role in the process and compensation needs to be discussed.

Concerning the objectives for the dialogue and the method of public involvement, Ms. Schönberger explained that not only the representatives of a community, but the population itself should be included. It needs to be two-way communication and the population has to be engaged directly in the decision-making process.

In terms of a community power of veto, a community should have the opportunity to say no at different stages of the process. If not, it would not be a good idea for a community to participate. At the moment there are limits for a community involvement, which does not build confidence in the process.

Klaus-Jürgen Brammer from *GNS Gesellschaft für Nuklear Service* described the German situation as rather complicated – the country has a licensed low-level waste site (Konrad) and a potential facility for high-level waste and spent fuel (Gorleben). The energy industry defends the Konrad site and hopes the facility will be operated. Germany does not have interim storage capacity for low-level waste beyond 2012. Therefore the industry needs Konrad, otherwise new storage facilities will have to be built. Gorleben investigations need to be completed to confirm the suitability of the site, in line with the views of the federal government. Other sites should only be investigated if Gorleben is proved unsuitable.

The industry rejects the AkEnd process because:

- The best possible site is being sought, and it can never be proved that another site is not better, so the process would never end.
- The process will result in a significant time delay. If the time for the licensing procedure and all the investigations were added up, the total timescale would be unacceptable. It is also at odds with the 2030 timeline mentioned by AkEnd. Most likely, the burden will be passed to future generations.
- Money is an issue. The new process would mean that previous expenditure is wasted and made in vain. It is doubtful whether new sites could be investigated to the level of Gorleben without extensive further costs. It is an important issue for the German economy as the bill may come to several billion Euros.

Concerning the ways of stakeholder involvement, Mr. Brammer emphasised the institutions of representative democracy. Opinion polls and public surveys should not be used instead of the democratic process; otherwise the Government would lose its power. Citizens can take part in the community council meetings and exercise their rights by vote. Communities have control of the planning process in their area and citizens also have an opportunity to participate in the decision-making process.

Objections raised by stakeholders have to be considered in the licensing process, so they can influence the procedure. If an objection is ignored they can go to court. Mr. Brammer viewed that this process provides sufficient opportunity for people to input into the process.

Petra Wassmann from the Association for Environmental Protection (NABU) reminded that radioactive waste management is a very complicated issue and has associated risks. It cannot be compared to the building of a motorway, therefore new decision-making processes are needed to address this important issue. A range of environmental groups should be involved as stakeholders because they do not have a special interest.

In terms of the roles of the actors, the tasks that need to be taken, the sequence of the process and who is to do it, clarity is needed. People want to see their views reflected; there will need to be communication with those representing stakeholders' views in the process. Opinions will develop over time and time needs to be available to enable this.

In terms of whether a disposal site can be good for a community or region, a community could benefit from infrastructure and compensation. Having a waste management facility could give

financial opportunities. It is difficult to estimate perceived or real disadvantages and this would need to be done to be able to work out what compensation should be given to a community.

The decision-making process needs to be flexible and a dialogue needs to be undertaken to identify the flexibility needed in the process and to develop ways to achieve this. To develop a more robust and sustainable process in the long term, finances need to be available to enable stakeholders to be involved in the long term and to involve a wide range of stakeholders. Technical and social competence needs to be demonstrated.

In Germany confidence has been destroyed, and much needs to be done to rebuild it. The right of veto should be available to communities; freewill must be the rule throughout the process. There is no alternative to dialogue and participation.

Round-table discussions

Moderator: *Elisabeth Atherton***,** Nirex

Who are the recognised stakeholders?

Several of the round tables were unclear about what the word "recognised" means. It was also unclear how people could become "recognised" stakeholders. Some of the participants felt that there is a lack of respect between some of the stakeholder groups in Germany and that some people who are stakeholders are not recognised as such by other stakeholders. One of the round tables felt that some of the stakeholders are not clearly defined, although they are grouped together under one stakeholder heading. For example the "government" is not a monolith, it is made up of various ministries and five to eight Federal States all with potentially different views.

Some of the round tables wondered who should be recognised as stakeholders in the area of radioactive waste management. Some groups felt that all stakeholder interests need to be taken into account. Suggested stakeholders included:

- government and political parties;
- industry;
- scientists;
- campaign Groups at the local level;
- local people and groups.

Some of the round tables felt it is very important that local people have a voice in the process, especially at the beginning of the process before "representative" groups are set up. It was felt important to give local stakeholders the power to influence the decision-making process. It was recognised that some campaign groups will not participate in the debate until the phase-out of nuclear power happens in Germany. Some of the groups felt that academics do not appear to be playing a role in the process, for example, in providing independent reviews of results. However, it was questioned whether they are being missed.

It was felt important to have a flexible process to allow "future" stakeholders to enter the process. Some of the groups felt that some stakeholders who will be affected by long-term radioactive

waste management had not realised that they are stakeholders or had not found their voice yet. It was felt that pro-active efforts are needed to reach out to these groups.

Does the role of actors (e.g., Parliament, authorities, regulators, implementer, waste generators, local communities, NGO's experts) need to be made clearer?

All the round tables that answered this question agreed that clarification of roles is needed, although some stakeholders felt they do understand the roles at the moment. It was felt important to clearly define the decision-making process and to articulate it to all stakeholders. Then it would be possible to clearly define the roles of the actors and make people aware of them, including what people do, how they do it and who they are. It was recognised that implementing a radioactive waste disposal facility will take a long time and therefore actors' roles may change over time and may need to be clarified.

The distribution of responsibilities within the BMU was a particular area that people highlighted needs clarification. It was felt that there is lots of overlap and possible conflicts of interest because their roles include:

- regulation;
- research;
- instructing the proponent;
- instructing the licensing authority;
- BfS, being in the portfolio of BMU.

Some of the participants felt that the decision-making process and the distribution of roles need to be changed (possibly via legislation) and then the outcome needs to be disseminated so that it is understood by the widest range of stakeholders. It was felt that improvements could be made.

One of the round tables felt that the role of the industry must be more than just "paying the bill". It was questioned whether they should become the developer as this could bring positive and negative outcomes. The groups suggested that incentives should be considered to bring the industry into the process and encourage them to fulfil their role. It was recognised that it will be difficult to go forward if the industry paying for the process will not commit itself.

It was felt important to give a clear role in the decision-making process to local people whose daily lives will be profoundly affected by the decisions about radioactive waste management, especially those communities that currently have the waste. They were affectionately called "stockholders" and it was felt that they should have a special place of honour at the negotiating table. Although engaging local political representatives was recognised as being important it was felt that processes that go over and above the democratic process are needed. This will enable the involvement of opinion leaders and concerned citizens.

What are the objectives for the dialogue, and how should the public be involved in various decisions (e.g., site selection, reorganisation of institutional arrangements) and implementation?

It was felt that the objectives would be the same as those for the decision-making process to find a "better", legitimate solution to the long-term management of radioactive waste in Germany. The dialogue should enable the use of the best quality science and scrutiny of the science and that it should build confidence in the decisions made. It was felt important to have a stepwise process with a legal

status that is transparent and open to all, fair to the implementer and stakeholders and highlights any hidden agendas. Fairness was seen to be very important.

It was felt important that the dialogue enables two-way communication, unlike the past where there was very little of this type of communication. The dialogue should also encourage mutual respect, trust and hopefully reach a compromise or consensus about the way forward.

One of the round tables identified some issues that should be discussed:

- What the public think the burdens of radioactive waste management are, including the burdens of getting involved.
- What type of process the public want, linked to how they think a legitimate solution can be developed.
- What the public think the problem is.
- What solutions the public think can be used (it was recognised that the public often suggest good solutions).

It was felt important to be honest with people about the limitations of public involvement and their ability to influence the decision-making process or the stage beyond which they cannot have an influence.

In what way can a disposal site be good for a community or region?

It was pointed out by several groups that the AkEnd proposal contains suggestions about how the project could enhance the regional development of the site chosen. One group suggested looking at non-materialistic benefits, for example, not having national service. Examples of benefits in other countries – Sweden and Finland – include improved regional development, improved infrastructure, jobs and reduced taxes. The benefits and disadvantages will depend on the local community, how they perceive the facility and their fears. It was felt that the facility could be seen as an opportunity to look to the future and that some communities in Germany may see benefits from hosting the facility.

It was felt very important to have a fair, open, stepwise process in which "benefits" are discussed. This will enable communities to consider the pros and cons and help to ensure any benefits are not perceived as bribes. One group felt it was important to consider the fact that communities at nuclear power plants are being forced to accept interim storage facilities because a long-term solution has not been developed.

What kind of flexibility does the process need to implement?

Some of the groups felt that more flexibility needed to be built into the decision-making process, especially in terms of time. It was felt that time needed to be available to enable interaction between stakeholders and their participation so they can influence the process. Time to have open reviews was also suggested. A stepwise approach to decision making was suggested as this enables flexibility to be built into the process.

One of the groups noted the German bias towards "what is planned must be done". They felt it was important that plans and processes build in the ability to adapt to new facts and realities. However, they recognised that Germany cannot start from square one again. It is important not to throw out the good work and effort that has been invested in existing sites and a way to build on this work needs to be found.

One group felt there needs to be flexibility in relation to the different types of wastes. Each waste type has different issues that need to be addressed and they could also have different timetables and solutions. It may not be possible to deal with all the wastes together in one facility in one process.

What are the stakeholder involvement aspects that make the process more robust and sustainable in the long term?

Several groups identified principles or characteristics that the process should embrace including:

- A stepwise approach with clear decision points that will continue over time.
- Clear and stable procedures that are developed through dialogue.
- Democratic legitimacy, the democratically elected representatives need a role in the process and they may have to make decisions, rather than leaving decisions to self appointed public groups.
- Financial support to enable public involvement over time (to pay expenses to hire experts, to compensate for time given up).
- Clarity about the opportunities to influence the process.
- Clear evidence that stakeholders have influenced the process.
- Transparency so people can see what is happening.
- Openness.
- Clear presentation of information to avoid misunderstanding.
- Access to the facilities being developed.
- Clear links to the legal and political process to ensure that things happen.
- Clear definition of the waste to be managed in the facilities, i.e., currently predicted arisings.

One of the groups identified that there is a lack of confidence in the decision-making process and those involved because of events that happened in the past. They recognised that confidence needs to be restored and maintained to enable a sustainable process. They felt that this could be helped by:

- Having an international review of the process as it goes forward, including the scientific results and issues raised by stakeholders.
- Bringing new people into the organisations involved who can give answers to people's questions and mediate between different stakeholder groups.
- Gathering stakeholders to develop joint objectives to move forward and work together.

Does an informal or formal right of veto help communities deliberate and make the process smoother – albeit more uncertain to run?

The round tables that discussed this question felt a veto right was important. They felt voluntary entry into the process should also mean voluntary exit. However, it was recognised that the question about who should have a veto right (local or regional) is a difficult issue to resolve.

It was also pointed out that a veto right should not give the right to leave the process at any stage for any reason. There would need to be a clear description of what the right of veto entailed. A stepwise approach to a veto power was suggested by two groups and it was recognised that the right of veto could change over time both in terms of the issue it related to and the amount of commitment it entailed. It was also recognised that the veto may have a deadline, for example, in Sweden and Finland the local communities can only exercise their veto power up to the point that the decision is made to carry out detailed investigations at one site. One group felt that the veto power needed to be built into a binding agreement or law to make it clear and give it legitimacy.

Session 3

THE NEW APPROACH TO RESPONSIBILITIES AND CO-OPERATION WITH EMPHASIS ON POLICY ASPECTS

Session 3 was organised in the morning of Day 3 in Hamburg. Whereas Session 1 and Session 2 focussed on specific recommendations of the AkEnd Committee on decision-making processes and site selection criteria, Session 3 was to focus on broad policy aspects, particularly on the respective responsibilities of the general stakeholders, i.e., the industry, the government and the public.

The AkEnd Committee made the general recommendation that a new approach was needed for making progress on the disposal of radioactive waste in Germany. It recommended that the nuclear industry should be first responsible for implementing and paying for all waste management activities and operations, taking care to specify at the same time that industry activities should fall under sufficient state control. The government should ensure that a public discourse on the procedure for selecting a repository site is carried out fairly, and that the developed procedure be enshrined in legislation for maximum legitimacy.

Session 3 objective was to focus on the justification of the new approach with respect to responsibilities and co-operation among stakeholders, and how the proposed approach responds to the values of efficiency, transparency and credibility in this regard. Questions addressed in Session 3 included the following:

- Does the new distribution of responsibilities contribute to increase credibility and transparency of decisions related to disposal?
- Does the new distribution of responsibilities provide for less lengthy decision procedures?
- Are financing arrangements available, clear and transparent?
- Which arrangements/actors will keep the process going ("engine") and which ones will help it stay focused ("driver")?
- Is the State control and steering of the process sufficient in the new system?
- Is the new system with a federal authority and a group of consulting experts sufficient to meet the required public control of the process?

Heinz Jörg Haury from GSF National Research Centre for Environment and Health outlined the AkEnd recommendations for community involvement. The AkEnd Committee made policy recommendations on independent decision-making processes for local communities. They recommend support (with government or industry funding) for the formation of a citizen forum including a centre of competence with experts of their choice so that communities may be able to make decisions based on information they had gathered themselves. They also recommend (a) establishing an independent control committee including media representatives to monitor the progress of the procedure, (b) setting

up a round table on regional development followed by a multipartite negotiation group, and (c) carrying out a final vote, which may serve the Parliament as an orientation guide for its decision.

AkEnd also asked for a sociological investigation to be made in the affected region. The data would serve as a baseline to be identified before the facility makes an impact on the region. Also, they would elicit stakeholder views on how they see their area developing and how the facility could help them.

Alexander Nies from the Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) introduced the current plans of the Ministry. The BMU plan supports many of the AkEnd Committee recommendations and promotes a legislated decision-making process with the industry as the operational and financial implementer under federal control. In contrast to the past, when the industry only had to pay, the new approach would bring together payment and undertaking the work. Economic rationality would be the primary driver for the waste producers since they want efficient, quick progress, while throughout the process, legislation and supervision by authorities would prevent unjustified cost cutting. In Phase 1 (site selection), federal authorities would determine the siting process and criteria, as well as oversee the site selection process. In Phase 2 (licensing), the licensing authority would be the Federal Office for Radiation Protection.

Mr. Nies explained that although the proposed concept is striving for regional willingness to be involved in the process, this is not a veto right. Deep disposal is the only option and this needs to be done in Germany, so there can be no veto. Also, it is not a voluntary process for which the government is striving to gain approval. The degree of regional acceptance would be asked, but it would be the Federal Parliament that will make the final decision.

Susanne Ochse representing Greenpeace, reflected that credibility of the process will not increase because the industry is against the new process, and transparency will depend on the final form of legislation. The process would be more robust, if it were more cooperative.

Ms. Ochse viewed that the law and the need for a solution for radioactive waste will be an “engine” for the process. BMU, BfS and the Parliament will be the “drivers” through oversight of the process.

Renate Backhaus representing the Association for Environmental Protection (BUND), repeated that BUND will not engage with siting until phase-out of nuclear power starts, because they believe that further production of nuclear waste is irresponsible. They support the AkEnd process and agree that the polluter pays principle should apply. They believe that more campaign groups need to be involved in the debate. They see themselves as watchdogs, and the public has confidence in them.

Safety is their first priority and this needs to be established in the law. Economics should not be put before safety. They are suspicious, but will give the law a chance: a sustainable process must be developed and everyone should be aiming for a safe repository.

Christoph Ewen from Team Ewen reminded that local resistance to certain land-uses is always linked to a history and previous experiences. The dialogue is often unbalanced as local people have fewer resources than the institutional counterparts. To move forward, internal papers from the past need to be published. New studies could be undertaken to address sensitive issues. It is important to deal with the history and people’s concerns. There needs to be clear roles, and those of the producer, controller and communicator should be separated. It must also be made clear what is compulsory and what are the issues where choices are to be made.

Mr. Ewen emphasised that public perception of the new roles will be important. Public perceptions can change quickly, since emotions, feelings and rumours may influence views. Rumours can be decreased by openness, transparency and scientific review.

Round-table discussions

(Moderator: *Carmel Létourneau,* Natural Resources Canada)

Does the distribution of responsibilities contribute to increase credibility and transparency of decisions related to disposal? Is the State control and steering of the process sufficient in the new system? Is the new system with a Federal Authority and a group of consulting experts sufficient to meet the required public control of the process?

Although most of the participants agreed that the new approach would likely result in greater transparency of the next steps towards waste disposal, it was difficult to be certain about that since the specifics of the government approach were not yet known. Two points were highlighted and made more transparent: who makes the final decision? And, do communities have a veto right? BMU explained that although voluntarism was encouraged and sought, and that extensive efforts would be spent to find a community that is ready to accept the waste, the community would have no official veto rights. Nevertheless, in lieu of such rights, some participants expressed that more informal agreements between the government and local communities could be considered.

It was emphasised that transparency was not as easy as it could first appear since it often involves difficult cultural changes in organisations. Some participants thought that the 2030 deadline was not credible if the role of government and the public were meant to be carried out thoroughly. Participants worried whether state controls would be sufficient and supported the establishment of independent controls either at the local level (e.g., centres of competence including monitoring and research activities), the national level (e.g., greater participation of non-governmental organisations), or, at the international level, through peer reviews.

Although some participants remained sceptical that industry should be primarily responsible for the implementation of next steps towards the disposal of radioactive waste, most tended to acknowledge that if sufficient controls were put into place, and if the necessary resources were given to local communities to be able to make independent assessments, then legislative changes proposed by the government could be a good step. However, since the specifics of the proposed legislative changes were not yet known, participants could not conclude on whether the new policy approach of the government would stimulate greater confidence.

Is the new distribution of responsibilities appropriate to provide for less lengthy decision procedures? Which arrangements/actors will keep the process going ("engine") and which ones will help it stay focused ("driver")

Some participants at the round-table discussions thought that the new approach would increase efficiency in moving ahead on the issue of disposal of radioactive waste since the "driver" or prime mover would be the government backed by legislation, with the industry acting as the "engine" for implementing operations and the source of financial resources. It was hoped that legislation would help the stability of decisions by surviving political changes.

Others believed that placing the main responsibility for implementing the process with industry involved conflict of interests and was tantamount to dereliction of duty by the government. Although

most participants applauded the greater participation of the public formalised in the proposed legislation, some worried that greater participation by the public would result in a longer time frame for site selection, which could potentially lead to passing the burden to future generations.

Are financing arrangements available, clear and transparent?

Participants were of the view that the financing arrangements are clear, but not transparent. The oversight of fund and its regulation still needs to be developed. It is not clear where the money is or whether it will be available when needed. The fund is tax free and it is expected to be sufficient. It is clear that the utilities will have to pay, but there seems to be a lack of accountability to ensure this happens.

Some expressed concerns that the industry will have to pay extra costs to cover the new site selection process. If costs are higher than expected, industry will just increase the levy on the energy users. Others suggested that money should be refunded to the industry to cover costs already spent, and similar guarantees should be given for future processes.

Session 4

THEMATIC REPORTS

Session 4 was held in the early afternoon of Day 3. It comprised two thematic reports.

Eric van Hove, Professor, University of Antwerp (Belgium) focused on the factors of long-term robustness. First, he analysed the term "stakeholder" and differentiated between two main groups: those who are stakeholders through a (presumably mutually beneficial) contractual arrangement, and those who are only affected by the activities of a firm without agreeing to it ("stockholders"). Not all such groups are affected to the same degree ("not all stakeholders are born equal"), therefore, special attention needs to be paid to local residents living in the neighbourhood of a facility.

Professor van Hove argued that prominence should be given to economic costs and benefits because these are the best indicators of the negative and positive effects (externalities) that stakeholders experience. He suggested that stakeholder involvement should include: (i) the involvement of those stakeholders clearly experiencing an economic cost or benefit, (ii) integration of those stakeholders into the core processes of the corporation, and (iii) honest brokerage to ensure benefits to all.

Regarding the German case, Professor van Hove praised the AkEnd procedure for being both comprehensive and balanced. He pointed out, however, that – although former decision processes have been criticised legitimately – the existence of the Gorleben mine and the vast efforts paid to develop it should not be ignored and the suitability of the site should be further investigated. He proposed that local stakeholders should be provided time and funding to become strong and independent partners, then a thorough and independent safety review should be prepared and its recommendations should be followed. He concluded that Gorleben should be given a chance before opening up again the site selection process.

Sybille van den Hove, Professor, Autonomous University of Barcelona (Spain) discussed the roles and responsibilities of the authorities, science and industry, with special attention to the clarity and coherence of these roles. She reminded that authorities are responsible not only for finding and implementing a socially and scientifically satisfying solution to radioactive waste management, but also for doing this in a democratic way. Government is also responsible for providing clarity and continuity on nuclear energy policy, and assuring coherence between it and its radioactive waste management policy.

Due to the complexity of the radioactive waste management problem, scientific research in this field has to deal with uncertainty, indeterminacy, ambiguity and ignorance. In addition, science is not neutral: values, interests, and beliefs play a key role in formulating and resolving problems to address the above difficulties, quality assurance processes should be reinforced, by carrying out inter-disciplinary and international peer reviews, and by involving stakeholders, non-institutional experts and the public (the so-called "extended peer community") in scientific discourses. The interface between science and policy is another important issue. Due to the dynamic development of knowledge, a continuous interaction is needed between scientists, policy makers and stakeholders.

Concerning the role of industry, Professor van den Hove emphasised that if the responsibility for waste disposal is transferred to waste producers, a new dilemma will emerge. In this new role industry has to face a conflict between economic rationality (profit maximisation) and ethical rationality (implementing a safe solution). Another question is if liability is also transferred to industry, because liability for very long time periods would be problematic in the private sector. In any case, corporate social responsibility built on transparency, accountability, and participation should be considered by industry as a key element of their policy.

Professor van den Hove concluded that in radioactive waste management processes the irreconcilability of certain values should be recognised and compromise solutions rather than a consensus should be sought. To find a compromise, interests, values, and hidden agendas have to be revealed. A change of attitude by key actors is also needed: they should focus less on specific solutions and more on problems and uncertainties, in an atmosphere of mutual trust and respect.

Session 5

CONCLUSIONS

Session 5, taking place in the afternoon of Day 3, included final addresses by FSC Chairman and workshop organisers.

Yves Le Bars, Chairman of the FSC evaluated the workshop as a very stimulating meeting. Local and national stakeholders and FSC members were involved in interesting discussions, and participants were open to each other's arguments. The FSC workshop methodology was demonstrated, once again as adaptable to various situations and cultures.

Mr. Le Bars observed that a significant amount of new information has been collected. It is especially interesting how history and past trauma have to be taken into account in developing a new process, in shaping the role of industry and scientific experts, in defining the role of the "driver" and the "engine" of the process, in addressing the requirements of robustness and flexibility, and in elaborating a robust financial scheme. He expressed his hope that German stakeholders would find the workshop also useful. Finally, Mr. Le Bars expressed his thanks to the NEA, BMU and BfS for their organisational efforts.

Alexander Nies from BMU reflected that he was proud and grateful that FSC came to Germany. The meeting was very fruitful and it was especially important to hear the recommendations of FSC before the new law is drafted. He also expressed his gratitude to German stakeholders for their ideas and suggestions.

Gerhard Stier-Friedland from BfS expressed his thanks for the good presentations and the stimulating discussions over the past few days. He also thanked the organisers and the staff for their efforts.

Claudio Pescatore from OECD/NEA Secretariat outlined future steps related to the publication and dissemination of workshop materials. He expressed his gratitude to German organisers, the interpreters, the presenters and the audience and closed the workshop.

INTERNATIONAL PERSPECTIVE

NEA Secretariat

Similarly to the Canadian workshop, the Hitzacker-Hamburg meeting took place at a time when the country's radioactive waste management policy has come to a critical point. German government authorities invited the delegates of the international community to participate in the discussions of a new, proposed approach. Stakeholders were willing to share their views and concerns with the international community, and – similarly to previous FSC local workshops – this resulted in important lessons for all sides.

Lessons from the German "stalemate" situation

In Germany there is strong agreement amongst the industry, NGOs, and the institutional actors that radioactive waste of all kind should be disposed of, permanently, deep underground. Germany has also a licensed repository (Konrad) for disposal of non-heat emitting waste.[1] The Gorleben salt dome is in an advanced state of underground investigation and important infrastructure to store, condition and dispose the heat-emitting waste is ready.[2] A central storage facility at Gorleben is licensed and already in use, and a pilot waste conditioning facility has been licensed. Also, the industry and government agree that the so far obtained geological findings "do not contradict the thesis that the Gorleben salt dome is a suitable site".

On paper, Germany has thus progressed significantly in resolving the waste disposal issue for all types of radioactive waste. Furthermore, the country has a successful history of dealing with hazardous, and inherently very-long-lived, waste through disposal in geologic formations and the country energy policy of gradual phase-out of nuclear energy would seem to favour progress moving to an end-point in radioactive waste management. Finally, the amended Atomic Energy Act, based on an agreement between the industry and government, addresses most of the contentious points of current German waste management policy: reprocessing, waste transports and the Konrad and Gorleben facilities.

Yet, radioactive waste disposal has reached a stalemate situation in Germany. Current laws appear to enshrine an "armistice" more than provide for a sustainable solution: at-the-reactor storage will temporarily ease the need for transportation of the spent fuel and reduce the number of necessary transports, but transportation will be needed once a repository is in operation; Konrad has a valid license, but will not operate until legal charges have been resolved, and its operation would be in contradiction to the one-repository policy of the current government; the Gorleben investigation is subject to a moratorium due to conceptual and safety related issues but without a clear process for finishing the moratorium. The necessity to select the relatively best site for the disposal of radioactive waste is in discussion.

1. Basically VLLW, LLW and some ILW.
2. HLW and spent fuel.

In this context, public and institutional dialogue to overcome the stalemate is hindered in Germany by:

1. A decision-making process that is very much at the mercy of current political agendas. It seems to be paying for one or another camp to wait for change in the political leadership and have previous decisions reversed;
2. The very advanced state of the national waste management programme. Any change means renewing efforts and negotiations that have lasted many years already, as well as reopening previous "wounds", and it is understandable that there is resistance to change, when the reasons for change are not clearly spelled out and there is no shared understanding of them.

Some lessons to be drawn vis-à-vis the principles and action goals described in the FSC previous work on stepwise decision making[3] are as follows:

1. In a democracy all stakeholders count, and these include the industry. Also, for a decision-making process to be seen as legitimate, there is a need for all to keep to the spirit and letter of agreements. This includes government;
2. In order to be robust, a modern decision-making process can no longer rely only – or mostly – on the political agendas of national parties and on a centralised decision making. The local sphere should be given an important role in decision making. If local municipalities and siting regions do not feel threatened and feel that their interests are safeguarded, they are likely to temper potential swings in national sentiments;
3. A programme's history creates trust or mistrust within stakeholder groups. It has been observed that, once lost, trust can be regained only slowly and by giving stakeholders increased levels of control. In Germany examples of mistrust are evident, but also evident is a strong desire to solve a national problem and to benefit from dialogues on a neutral ground – like the one offered by the FSC. The international community may play a useful role to help the German stakeholders achieve a greater shared understanding and consensus on the real issues. Many voices were heard during the workshop on the wish for international peer reviews, e.g., of the "Gorleben channel" issue and of the potential impact of policy decisions based on the AkEnd recommendations.

A white map of Germany?

The predominant view amongst the German stakeholders appears to be that geology is the main and ultimate barrier for waste disposal. This is also the view emerging from the AkEnd considerations and recommendations.

The internationally-debated multi-barrier concept, whereby a role is also given to engineered features, does not seem to have had as wide repercussion in Germany as in other countries. Yet, issues of monitoring, controllability, retrievability, and adaptability of deep geological disposal would also benefit from a discussion of the role of man-made provisions in assuring long-term safety. This is especially so, if one considers that retrievability is one of the stated study items in the 2000 agreement between the German government and the nuclear industry.

Finally, it may be observed that an approach based on the pre-eminence of geology for the disposal safety case would not allow a "white map" of Germany to be investigated, as suggested by the AkEnd, but only nominally un-fractured geologic formations such as salt and clays.

3. NEA (2004) *Stepwise Approach to Decision Making for Long-term Radioactive Waste Management*, Chapter 4, OECD, Paris, France.

Is safety first, the only policy principle?

Safety is certainly the universal principle that unites all waste management decision-making processes worldwide. On the other hand, safety is established step-wise in a decision-making process that may last decades, and it is well known that other values will intervene in making decisions. Important value choices are (a) not to cause undue burden to future generations as well to our generation, and (b) to allow for acceptance of management solutions to become firmly established. The process needs also to be flexible enough to accommodate political change as well as changes in main stakeholders and their values.

It would appear important for a decision-making process to identify the other main values ancillary to safety that will need to be adhered to, and to establish a hierarchy amongst them. As an example, the following hierarchy of values is at the basis of the Swiss waste management policy:[4]

1. *Safety of man and the environment.* Safety is necessary for an individual to be able to act, take decisions and make use of his/her freedom. Safety during the whole lifetime of the waste is paramount and should be addressed from today. Assuring safety should constitute as small a burden as possible on future generations.

2. *Fairness across generations.* There must be intra- and inter-generational equivalence of opportunities and protection. However, the timescales for radioactive waste management are so long that they exceed the possibilities of our society in terms of passing-on know-how and in terms of stability of political and social institutions. When considering management concepts, a distinction has to be drawn amongst time periods, namely the period that is within grasp of current society and the period during which safety cannot be assured through human presence or intervention.

3. *Individual and social acceptance.* At the time of construction and operation, the facility must be acceptable by the majority of the people, especially those in the siting zone. The facility should be designed in a way that it may be acceptable also to future generations. Individual and social acceptance plays a third role because by favouring, within decision making, the present or the immediate following generations, it infringes to some extent the principle of fairness across generations.[5]

Application of these principles, if widely agreed upon amongst stakeholders, would lead to a more consistent choice of management solutions. For instance, is it safer, and less burdensome, to coming generations to store spent fuel at interim sites near existing nuclear power stations or rather to interim-store the fuel at one or two centralised facilities in the country?

4. W. Wildi, D. Appel, M. Buser, F. Dermange, A. Eckhardt, P. Hufschmied, H.-R. Keusen, and M. Aebersold, (2000), *Disposal Concepts for Radioactive Waste,* Final Report, Federal Office of Energy, Bern, Switzerland.
5. Indeed, it is accepted that balancing fairly the risks, costs, and benefits across generations requires keeping to principles that are, to some extent, competing with one another. See *Deciding for the Future: Balancing Risks, Costs, and Benefits Fairly Across Generations,* National Academy of Public Administration, Washington D.C.

Finding a widely supported policy

Three prototypical and contending policies emerged from the discussions of the Hitzacker-Hamburg meeting: (i) the continuation of the former radioactive waste management policy, (ii) opening up the radioactive waste management process, and (iii) a holistic approach.

*(i) Continuation of the former radioactive waste management polic*y. This policy builds on former government decisions on deep geological disposal and the development of two repositories. The Konrad site would be opened to host low- and intermediate level waste, and the investigations in the Gorleben mine would be completed to confirm the suitability of the site for high-level waste disposal. Other sites would be investigated only if Gorleben were proved unsuitable. The main argument supporting this policy is that important resources in terms of money and time have been spent already for selecting and investigating the Konrad and Gorleben sites. This policy would maintain the current institutional arrangement where radioactive waste management is a task of the federal government while the waste generators' role is confined to the reimbursement of necessary expenses. It would follow the former top-down approach and would exclude direct public participation, using the argument that opportunities provided by institutions of representative democracy are sufficient for stakeholder involvement. Main supporters of this policy include waste producers and organisations involved in former site investigations (e.g., DBE, GNS, some government ministries, etc.).

(ii) Opening-up of the radioactive waste management process. The second policy has emerged from strong criticisms of (i) the multiple (and conflicting) responsibilities of the federal government, (ii) the former decision processes, and (iii) the safety of the Gorleben site. This policy would transfer the responsibility for radioactive waste management to waste producers and confine the role of the federal government to licensing and supervision. It would provide for public involvement, but affected communities would not have a right to veto. Final decision on site selection would rest with the Parliament. This policy is aimed at re-starting site selection processes on the basis of several premises. First, since the present generation is obliged to take care of the waste, development of a disposal facility shall be started as soon as possible. Second, all kinds of radioactive waste shall be disposed of in deep geological formations within the territory of Germany. Third, one single repository is sufficient for all kinds of radioactive waste. Fourth, in order to identify the repository's location, several sites in different host formations shall be explored. The final decision will be based on the comparison of alternatives in order to make sure that the "relatively best" site is chosen. Fifth, safety is the first priority in radioactive waste management, but at the same time, local acceptance will also be sought. Support will be offered to affected communities to elaborate and implement regional development concepts. The main proponent of this policy is the Federal Ministry for the Environment.

(iii) A holistic approach. The third prototypical policy is based on the view that the production of nuclear energy is unsustainable and it should be stopped. Supporters of this view would not engage in radioactive waste management processes until the phase-out of nuclear power is completed. According to this policy safety, scientific clarity and sustainability, as well as the polluter pays principle should be key aspects for changing the status quo. The concept of deep geological disposal is accepted and there is no support either for export or import. One facility for all waste types is considered to be sufficient, but there is no strongly held view on this. However, there is a concern that safety cannot be assured for 1 million years. According to this policy, the siting process would need strong public involvement. The right of veto should be available for the communities and voluntariness must be assured throughout the process. Opportunities for sustainable development should be provided for host

communities. Proponents of this policy strongly reject the Konrad and Gorleben sites because these were not selected on a sound basis and their safety is questioned. Main supporters of a holistic approach include environmental organisations (e.g., BUND).

By analysing the workshop discussions, it appears that there is in Germany a *broad agreement on all fundamental principles for a safe waste management*, including the responsibility of today's generation, the national responsibility, the preference for deep geological disposal, the priority to safety, and the importance of offering a perspective compensation to affected regions. On the other hand, there are also strong disagreements among stakeholders, e.g., on the desirable number of facilities, the host rock formations to be investigated, the site selection criteria, the desirable degree of public involvement, and the desirability of a veto right. Some of the disagreements are not substantial, as they are generated or reinforced by a mutual lack of trust, e.g., the government is hesitating to provide a veto right because it fears that eventually no local community would accept a facility; some environmental groups are not willing to participate in radioactive waste management processes because they do not trust that decisions on nuclear phase-out are not going to be reversed; the electricity generators object to the AkEnd process because they do not believe that the process will lead anywhere.

How could then a widely supported policy be agreed upon? The large number of divergent stakeholder views in the German case clearly indicates the need for a participatory, deliberative process that respects and builds upon the conflicting perspectives. The challenge is *to identify an intersection of these policy directions that could command a wide base of support.* The AkEnd Committee made a first attempt to finding a solution. It appears that the vast majority of AkEnd recommendations are supported by the federal government and most environmental organisations. However, waste producers – and others, which include Land and national government ministries – reject the AkEnd process for several reasons, but primarily for economic reasons. The Secretariat views that *the most important precondition for finding a mutually acceptable policy would be the rebuilding of trust* between the key players. As concluded in FSC Phase-1, key components of building trust are the strong involvement of stakeholders, clearly identified roles and responsibilities, and sustained institutional commitment.[6]

Another observation is that since no agreement on key values can be expected, a *robust policy* needs to be sought that can be agreed by key stakeholders, *not necessarily for the same reasons.* Such robust policy element is, for example, the transfer of responsibility for siting and operating a radioactive waste management facility to the industry. This policy element is supported by government because it eliminates potential conflicts of interests, while environmentalists welcome it because it strengthens the polluter pays principle. Another robust policy element is offering means for regional development, which is promoted by the government for fairness reasons, while it is supported by industry as a means for helping gain local acceptance. These examples also confirm an FSC Phase-1 finding, e.g., that defining a robust policy is *much more than ensuring that, for each stakeholder, economic benefits are higher than costs,* since for several stakeholders economic benefits cannot balance environmental, health, social, etc. risks. Negotiations should, therefore, cover *all dimensions (e.g., safety, cost-benefit, fairness), which are of importance for any of the key stakeholders,* rather than focusing only on certain (e.g., economic) aspects.

6. NEA (2004) *Learning and Adapting to Societal Requirements for Radioactive Waste Management*, OECD, Paris, France.

Appendix 1

PROGRAMME OF THE EVENT

6 October

Community Visit to Hitzacker

To set the scene by introducing the German context and create a working environment for the next few days by having local stakeholders recount their experience and allowing them to meet with the FSC delegates and the external rapporteurs both in formal and informal settings

Part 1. Briefing of the FSC and Other Workshop Participants (Local Stakeholders from Gorleben, Konrad, Asse and Other Sites in Germany)

Objective: To explain historical context and current situation in Germany

9:00 Welcome addresses by NEA and BfS

Historical Background on Decision Making for Repository Projects in Germany (from the Beginning to AkEnd)

D. Appel: Availability of expertise to stakeholders and the role of experts, institutional and non-institutional, in the debate: Relevance of societal, technical and scientific arguments in the decision-making process.

10:00 Break (30 minutes)

The AkEnd, Its Proposals, and External Evaluation(s)

H.J. Haury: The mandate; the composition of AkEnd, the technical aspects; the societal aspects; the involvement of stakeholders

P. Hocke-Bergler: Evaluation of the AkEnd process

C. Pescatore: Concept of ILK[1]

11:30 Political Roadmap Towards an Operating Geologic Repository. Proposals, Implementation and Outlook (30 min + 15 min questions)

*R. Werni*cke: Negotiations with stakeholders following AkEnd (failures and achievements) – Fundamentals of the Federal radioactive waste disposal policy – Need for a selection of the "relatively best" site – Steps towards an operating repository – Consultations within the government – Legal implementation – Timetable – Public participation – Potential conflict areas, etc.

12:15 Lunch

1. ILK's evaluation may be found at the web address http://www.ilk-online.org/download/en/ilk-14_en.pdf (English version) or http://www.ilk-online.org/download/de/ilk-14_de.pdf (German version).

Part 2. Stocktaking from Interaction with Local Stakeholders

Objective: To meet the local actors and hear, from their experience in past decision making, which are major questions arising vis-à-vis trust and confidence in decision making.

13:15 Open discussion

Chair: A. Vàri
Co-chair: P. Hocke-Bergler

Statements by Representative, Local Stakeholders from Gorleben and Konrad

Whatever the position pro or con, they may want to declare, and reflecting on their past experience as stakeholders, a panel of eight to ten speakers will identify: " From your past experience, what are the major questions arising vis-à-vis trust and confidence and fairness in decision making".[2]

U. Schönberger

Flöter

Graf Bernstorff

Althoff

Kruse

Discussion

The Chair and Co-chair will help identify the major questions to take out further for discussion with the audience. The latter will include additional stakeholders plus FSC delegates. A discussion will take place amongst these different perspectives.

15:30 Break

2. Examples are reasons for trust/distrust in responsible actors/institutions; what changes are desirable to improve confidence in the waste management strategy? in the siting process?; What measures are needed to establish a legitimate decision process?; Does the inclusion of your community in a new siting process raise specific issues?; Does the phase-out decision of nuclear power help accept disposal decisions?; How important is the access to expertise and advice from external sources and non-local stakeholders? ; How to balance the interests of local, regional, and non-local stakeholders?

WORKSHOP

Location: Hitzacker

6 October (continued)

16:00 Opening session

Welcome addresses by FSC Chairman, Yves Le Bars

16:10 ***Session 1.*** **The New Proposed Approach to Site Selection with Emphasis on Basic Premises**

Chair: Claudio Pescatore

Objective: Elicit and discuss the opinions of stakeholders on the basic premises

Short presentations on the understanding that exists of the basic premises based on agenda supporting documents and earlier briefings:

- Institutional/national actors
- Regional/local actors/nuclear host communities
- Industry
- NGOs

U. Schönberger

R. Backhaus

D. Steiner

K. Bertholdes-Sandrock

E. Biurrun

17:00 Round-table discussions

- Is there sufficient shared understanding that the status quo needs to be changed?
- Is there shared understanding that disposal deep underground is the only option for all types of waste?
- Is there shared understanding that one disposal facility is sufficient and operable for all types of waste?
- Is there awareness that emphasis is placed on geology and not so much on engineered barriers?
- Is there agreement on a hierarchy of values to be implemented?
- Is there agreement and shared understanding of what a "relatively best" site is?

18:00 Stocktaking from Round tables

19:00 Dinner

A dinner for all participants in the first day meetings will be held in order to allow further ties to be made and further clarifications to be provided in a less formal atmosphere.

7 October

09:00 Bus tour of the Gorleben area followed by lunch and transfer to hotel in Hamburg

15:30

Continuation of Workshop
Hotel Holiday Inn, Hamburg

16:00 ***Session 2.*** **The New Proposed Approach to Site Selection with Emphasis on Stakeholder Involvement**

Chair: Elizabeth Atherton

Objective: Elicit and discuss opinions of stakeholders on the approaches to public participation, regional development and implementation of the proposal

- **Feedback on the community visit**

Short presentations by: – Institutional local actors/nuclear host communities;

− Industry:

− NGOs:

− Academics.

U. Schönberger

Brammer

Wassmann

17:00 Round-table discussions:

- Who are the recognised stakeholders in the German case?
- Does the role of actors (e.g., Parliament, authorities, regulator, implementer, wastes generators, local communities, NGOs, experts) need to be made clearer?
- What are the objectives for the dialogue, and how should the public be involved in various decisions (e.g., site selection, reorganisation of institutional arrangements) and implementation
- In what way can a disposal site be good for a community or region?
- What kind of flexibility does the process need to implement?
- What are stakeholder involvement aspects that make the process more robust and sustainable in the long-term?
- Does an informal or formal right of veto help communities deliberate and make the process smoother – albeit more uncertain to run?

18:00 Stocktaking from Round-table discussions

19:00 Dinner

8 October

Continuation of Workshop
Hotel Holiday Inn, Hamburg

09:00 ***Session 3.*** **The New Approach to Responsibilities and Co-operation with Emphasis on Policy Aspects**

Chair: Carmel Létourneau

Objective: Opinions of stakeholders on justification, efficiency, transparency and credibility of the elements of the new policy under consideration.

Short presentations:

- AkEnd analysis of deficiencies of the present organisation and responsibilities;
- BMU analysis of present arrangements and proposal for a new distribution of roles and responsibilities;
- Industry and NGOs positions on whether the new approach is justified and appropriate.

H.J. Haury

Nies

Ochse

R. Backhaus

Ewen

10:00 **Break**

10:30 **Round-table discussions**

- Does the new distribution of responsibilities contribute to increase credibility and transparency of decisions related to disposal?
- Is the new distribution of responsibilities appropriate to provide for less lengthy decision procedures?
- Are financing arrangements available, clear and transparent?
- Which arrangements/actors will keep the process going ("engine") and which ones will help it stay focused ("driver")?
- Is the State control and steering of the process sufficient in the new system?
- Is the new system with a Federal Authority and a group of consulting experts sufficient to meet the required public control of the process?

11:30 **Stocktaking from Round-table discussions**

12:15 **Lunch**

12:45 ***Session 4.*** **Thematic Reports**

- **Long-term Robustness of the Proposed Decision-making process**

  Rapporteur 1: Prof. Erik Van Hove, Antwerp University, Belgium

- **Roles and Responsibilities of the Various Institutional Players: Clarity and Coherence**

  Rapporteur 2: Prof. Sybille van den Hove, Universtitat Autònoma de Barcelona, Spain

14:00 **Plenary Discussion**

14:30 ***Session 5.*** **Conclusions and Additional feedback From Participants**

Chair: Yves Le Bars

Discussion and final addresses by FSC Chairman and NEA Secretariat

15:00 **Adjournment**

Appendix 2

OVERVIEW PAPERS ON THE GERMAN CONTEXT

Introduction

The discussion about nuclear waste disposal in Germany has a historic record of more than 30 years. At present Germany has a deep repository for low-level waste (LLW) at Morsleben, which is being closed and sealed, as well as a deep repository for LLW at Konrad, which could be receiving waste relatively soon. A pilot demonstration facility in the Asse mine has also operated for many years.

It was important in order to start the workshop for all the participants to have an overview of the history of waste management in Germany that led to the formulation of the present policy principles. The focus was inevitably on Gorleben, given its predominance in the German debate on waste management concepts for long-lived waste.

- D. Appel gave an overview of repository development in Germany
- H.J. Haury gave an overview of the work and recommendations of the recent AkEnd committee
- P. Hocke-Bergler and F. Goede provide an evaluation study of the AkEnd committee outreach to the public
- C. Pescatore summarised the main points of the technical review of the AkEnd recommendations that were provide by an international review group set up by some German Länder (ILK)
- R. Wernicke presented the BMU's current views for a roadmap to arrive to an operating repository for all types of waste in Germany.

Historical Background of Decision Making for Repository Projects in Germany: The Gorleben Case: Example for Missing Participation of Stakeholders

Detlef Appel
PanGeo-Geowissenschaftliches Büro

The presentation deals with the following topics:

- Introduction, including a brief mentioning of all the German disposal site for radioactive waste actually under debate;
- Responsibilities in final disposal in Germany;
- Presentation of the Gorleben case by means of a chronological description of the decision-making process, distinguished by several phases;
- Relevance of societal, technical and scientific arguments in the decision-making process;
- Availability and role of institutional and non-institutional expertise to stakeholders.

1. Introduction

In Germany, there are four sites that were used for radioactive waste disposal in the past (Asse II, Morsleben) or are under discussion for disposal in the future (Konrad, Gorleben). The following sections will preliminarily deal with the decision making related to the Gorleben project, because it can be interpreted as an example for the long lasting influence of inconsistent decision making on the public debate about final disposal and the acceptance of a selected repository site. Some information about the other sites is briefly summarised in Box 2. It has to be pointed out that all sites were chosen by other or at least additional reasons rather than disposal related safety reasons. This is particularly true for Asse II and Konrad. Both of them were producing mines that had become unprofitable and were offered for purchase to the federal government by the owners for follow-up use. Economical reasons were probably also part of the background for the selection of Morsleben by the government of the former German Democratic Republic.

The Gorleben case will be presented by means of the historical record of the decision-making process mainly, which is summarised in Box 3. This is done to avoid a too much biased presentation that might be expected, because the author was and is involved as a non-institutional expert in the discussion about final disposal in Germany, and thus has a specific view of this process. He was not involved in decision making itself but in the debate about the different steps of this process. However, the historical record alone will demonstrate the incoherence of the process.

The additional topics, relevance of different types of arguments in the decision-making process and availability of expertise to stakeholders during decision making, will not be dealt with in depth, because at least at the beginning of the Gorleben decision-making process there was no systematic approach for stakeholder involvement.

Not addressed are the political framework and constraints of the decision making, although they surely had a major effect, at least on the behaviour of the actors. It should be mentioned, however, that during siting and investigation of the Gorleben salt dome, the federal government and the government of Lower Saxony were formed by representatives of opposing political sides – despite political changes on the federal and the state level.

Box 2. **Radioactive Waste Disposal Sites in Germany**

Asse II	
Type	Underground laboratory: "test-disposal" of 124 000 m^3 LLW and 1 300 containers of ILW, disposed irretrievably (1967-1978)
Host rock:	Rock salt (abandoned salt mine)
Status	Licensed prior to Federal *Atomic Act*, to be decommissioned (due to stability problems)
State	Lower Saxony
Morsleben	
Type	Repository of the former German Democratic Republic for final disposal of LLW and ILW (in operation after German reunification until 1998)
Host rock	Rock salt (abandoned salt mine)
Status	Licensed under the *Atomic Law* of the German Democratic Republic, to be decommissioned (due to stability problems)
State	Saxony-Anhalt
Konrad	
Type	Planned repository for negligibly heat producing radioactive wastes (LLW and ILW)
Host rock	Iron ore and accompanying carbonaceous formations (abandoned iron ore mine)
Status	Licensed in 2002
State	Lower Saxony
Gorleben	
Type	Planned repository for heat producing radioactive waste
Host rock	Rock salt (unmined salt dome)
Status	Underground investigation interrupted (moratorium as of 2000)
State	Lower Saxony

2. Responsibilities in final disposal

The distribution of tasks and responsibilities in the field of radioactive waste disposal is somewhat different from that in other countries, due to the federal political and administrative organisation of Germany:

- Federal government (Ministry in charge: Federal Ministry of Environment, Nature Protection and Reactor Safety): regulator, supervisory authority;
- State Government (Ministry in charge in Lower Saxony [Asse II, Konrad, Gorleben] and Saxony-Anhalt [Morsleben]: Ministry of the Environment): licensing authority on behalf of the federal government;
- Federal Agency for Radiation Protection (BfS, formerly *Physikalisch-Technische Bundesanstalt* – PTB): applicant, operator; the BfS calls on a third party for "operational activities

(site investigation, construction and operation of the repository): *Deutsche Gesellschaft zum Bau- und Betrieb von Endlagern* – DBE.

At the moment, a re-distribution of responsibilities is under discussion. It is intended by the federal government to establish a federation (*Verband*) with compulsory membership of the industrial waste producers that will be responsible for site selection and repository construction and operation.

3. The Gorleben case

Phases of the decision-making process

Within the decision-making process related to the Gorleben site the following phases may be distinguished:

- Development of the German waste management strategy, including the selection of host rock formation (mainly during the 1960s).
- Site selection, including the decision on surface-bound site investigation of the site (during the 1970s, until 1979), and the investigations themselves.
- Decision on underground site investigation, based on the results of surface-bound investigations and preliminary safety assessments (1985) and underground investigation, other activities directed to safety assessment and licensing (since 1985).

Waste management strategy and host rock formation

Important decisions about the German radioactive waste management strategy were "informally" taken during the late 1950s and 1960s already. It was intended to establish a closed waste management cycle in Germany, including reprocessing of spent fuel. Regarding the "end" of this cycle, there was a kind of consensus, that final disposal in deep geological formations should be the priority waste management option, because of the population density and the intensive land and water use in Germany. Additionally, in line with the international and particularly US-American debate about potential types of host-rocks, rock salt in a salt dome was seen as the best option. The main advantages were seen in the "impermeability" and the dryness, as well as the plastic mechanical behaviour (creep, convergence) of rock salt, excluding the existence and flow of groundwater and preventing the formation and long-term existence of open fractures. Rock salt in salt domes was preferred, because in salt domes the spatial extension of salt bodies may be increased due to the accumulation of salt during the salt-dome formation by halokinesis. Because there are many salt domes in Germany, it could be expected to find a suitable site for a repository. However, due to possibly insufficient isolation properties salt structures composed of rock-salt formations of different age and composition were excluded.

These assessments and decisions had a direct geographical and political impact: Because salt domes and similar salt structures in Germany are to be found in the northern German lowlands and its border regions only and because in a major area structures with different rock-salt formations are dominating, the State of Lower Saxony became the main target area for siting.

Box 3. **Historical Record of the Gorleben Case**

1960s – early 1970s	Selection of host rock: Rock-salt in salt-domes/Development of waste management strategy: *Nukleares Entsorgungszentrum* – NEZ (nuclear waste management centre).
1973	Start of siting process for NEZ.
1975	Report on siting process; highest ranking salt-domes: Wahn, Lutterloh, Lichtenhorst (all in the State of Lower Saxony).
1976	June: Start of investigations at three sites causes immediate local opposition/interruption of investigations (August)/government of Lower Saxony asks for stop of investigations to present its own site (November).
1977	Lower Saxony presents Gorleben salt-dome (February)/federal government accepts (July)/Waste management report of the federal government (November): Gorleben at least suitable for LLW and ILW.
1979	"Gorleben Hearing" about NEZ and final disposal in the Gorleben salt-dome (March/April)/Start of Gorleben investigation (April).
1981	First information meeting of the federal government (interim results of the Gorleben investigation) with presentations of "critical" experts.
1982	Second information meeting of the federal government (interim results of the development of the methodological approach to long-term safety assessment of the planned repository) with presentations of "critical" experts.
1983	Report of PTB suggesting the underground investigation of the Gorleben salt-dome/Third information meeting of the federal government (results of the surface bound investigations, preliminary safety assessment and their relevance for the decision on underground investigation (Mai)/Decision of federal government on underground investigation (July).
1985	Start of shaft sinking.
1996	Start of underground investigation.
2000	Gorleben Moratorium.

Site selection

Site selection for the repository of all types of radioactive waste started in the early 1970s. At that time it was intended, to concentrate all major waste management facilities of the nuclear cycle at the site of a so-called nuclear waste management centre (*Nukleares Entsorgungszentrum* – NEZ), comprising facilities for interim storage, waste conditioning, reprocessing of spent fuel and disposal of all types of radioactive waste. Emissions from the above ground installations were seen as the main safety concern. Consequently, the criteria for the identification of a suitable salt dome were developed with regard to the safety and operational requirements of the surface installations of the NEZ rather than of the repository. They refer, for example, to population density, concentration of cattle raising farms, meteorological situation, seismic hazard, transport and energy and water supply and to some extent to safety related geological aspects.

The site selection process for the NEZ started in 1973. In the report on the siting process as of February 1975, three salt domes in Lower Saxony (Wahn, Lutterloh, Lichtenhorst) were presented as highest ranking. In June 1976, surface-bound investigations at the three selected salt domes started. The final selection of the NEZ site was intended to be based on the comparison of the results. The start of the investigations immediately caused strong local opposition, because the local people and particularly landowners felt misinformed or even cheated. Therefore, in August 1976 the investigations were stopped and in November 1976 the government of Lower Saxony asked the federal government for interruption of any site investigation until the state has designated an own site.

The government of Lower Saxony established its own working group for site selection and in February 1977 the Minister President of Lower Saxony designated the Gorleben salt dome as the potential NEZ site. In July 1977, the federal government accepted this decision claiming that Gorleben was chosen by application of four criteria of safety relevance with respect to final disposal:

- no former mining activity or deep drillings in the salt-dome;
- sufficient size of the salt-dome (sufficient volume of pure rock salt to be expected);
- surface of the salt body less than 400 m below surface, but not too much reaching into near-surface groundwater;
- no usable resources (including groundwater).

In July 1977, the responsible federal administrative body in the field of radioactive waste management, the *Physikalisch-Technische Bundesanstalt* – PTB (predecessor of today's Federal Office for Radiation Protection – BfS), presented an application for the start of the NEZ licensing procedure at the Gorleben salt dome. Already in November 1977, without any site investigation, the federal government stated in its waste management report, that the Gorleben site is suitable for LLW and ILW (at least). This was the end of the siting process and of the comparative approach followed so far.

The background and the reasons of the states designation of the Gorleben salt dome were somewhat obscure and, therefore, from the beginning not only a matter of rumours and anecdotes but also the reason for the formation of strong opposition against this decision. Even today, the intention of the Gorleben designation and the decisive criteria are not publicly known. Anyway, the fulfilment of some of the mentioned criteria was instantaneously disputed, while during later site investigation other appeared not to be totally fulfilled. Additionally, it was obvious, that several other salt domes might fulfil these criteria also, leading to the question "Why Gorleben?" This lack of clarity is – until today – a major reason for the distrust of many people in political decision making in the field of radioactive waste management in Germany.

The reactions to the Gorleben decision were of course different according to the values, interests and political orientation of individuals and the composition of political and administrative institutions, such as councils of the Lüchow-Dannenberg County and of the municipalities in the area. In any case, the decision resulted in strong local and regional opposition to the project. The Minister President of Lower Saxony, Ernst Albrecht, reacted with the organisation of the "Gorleben Hearing" (March/April 1979) on the "feasibility" of the planned NEZ and final disposal in salt, particularly in the Gorleben salt dome. During the hearing pro and contra positions were presented to a "selected" scientific and political public. Besides final disposal, interim storage and reprocessing of spent fuel were important topics of the hearing, the discussion about which demonstrated that the technical concepts were somewhat controversial even among proponents of the NEZ.

As a result of the hearing and of the public debate about the NEZ and the Gorleben site the Minister President of Lower Saxony stated in May 1979, that "a reprocessing plant for spent fuel in Gorleben will politically not be accepted", but that Gorleben is a potential repository site. This decision was the end of the idea of a German NEZ. Later the attempt to build a reprocessing plant in Bavaria failed as well and resulted in the giving up of any reprocessing in Germany. The remaining installations to be built at the Gorleben site comprised interim storage and conditioning facilities and the repository for all types of radioactive waste.

Decision on underground site investigation

Immediately after the hearing, in April 1979, the surface-bound investigations of the Gorleben salt dome started accompanied by intensive protests. The main phase of investigations lasted from 1979 until 1983 and comprised (hydro-)geological investigations, seismic surveys, drillings for the investigation of the salt-table, four deep drillings for the investigation of the salt body, and two deep drillings at the locations of planned shafts.

Considering the failure of the first siting attempt due to insufficient information and participation of the public, the federal government arranged a series of public information meetings in the Gorleben area to present and discuss the results of the investigations. At the beginning, these meetings were widely interpreted as an approach to improve the information and participation of the public in decision making in radioactive waste management: According to the regulations in this field, "formal" public participation was (and still is) restricted to the end of the decision-making process only, particularly to the public hearing about the license application.

On the occasion of the first of these meetings, in Lüchow in May 1981, the preliminary results of the Gorleben investigation were presented and interpreted by representatives of the involved institutions and additionally evaluated by "critical" experts. Topics of major concern with regard to long-term safety of a potential repository were the occurrence of salt solution by flowing groundwater ("subrosion") at the top of the salt body and the existence of the so-called "Gorleben channel". This erosion channel of quaternary age crosses the salt dome, cuts locally into the salt body, and is – partly – filled with sediments of increased permeability. If radionuclides from the waste would reach the interface between the salt body and the overlying beds, this channel would cause accelerated radionuclide transport into the biosphere. Additionally, at the basis of the channel increased intensity of subrosion might be expected. Therefore, it was (and still is) seen as a potential threat to the long-term safety of a repository by several participating scientists – despite their role in the investigation campaign and/or decision-making process.

During the second information meeting, October 1982 in Hitzacker, the methodological approach for long-term safety assessment of the planned repository – based on additional results of the Gorleben site investigations – was presented and discussed. Again, "critical" scientists were invited to present their interpretation and evaluation of the results and the approach of the assessment. As in 1981, the relevance of the Gorleben channel was a topic of controversial debate. Additionally, there was a controversy about the uncertainties related to modelling of radionuclide transport in general and at the Gorleben site in particular.

In May 1983, PTB published its report on the results of the Gorleben investigations obtained by surface-bound investigations. This report was a key element of the political decision on the underground investigation of the salt dome. The safety relevance of the Gorleben channel was pointed out, reflecting that it will result in a significant shortening of travel-times of radionuclides through the cover beds above the salt body into the biosphere. On the other hand, however, PTB claimed the site to be potentially suitable. To describe this, the term *Eignungshöffigkeit* was created, meaning in ironic translation something like "hope, that the site will become suitable" and – for many people – expressing the uncertainty related to PTB's statement of potential suitability. Based on this evaluation, PTB suggested starting the underground investigation.

The results of the investigations were also presented and discussed during the third of the public information meetings, held in May 1983 in Hitzacker ("Before shaft sinking"). On this occasion, only speakers from institutions responsible for final disposal and/or involved in the investigations presented the approach for safety assessment and their evaluation of the results of the investigations with regard

to the necessity or sense of underground investigations. Being concerned about the potential long-term effects of subrosion and the Gorleben channel, the senior investigator of these processes and features at the Gorleben salt dome in his presentation suggested the investigation of other salt structures. "Critical" scientist could express their concerns about the suitability of the Gorleben site and the approach to safety assessment only during the discussion about the presentations.

Despite these concerns were not really rejected during the meeting and the following public debate, the federal government in July 1983 agreed to the underground investigation. Sinking of the shafts started in 1985 and lasted until 1996. Afterwards the first section of the underground area to be explored was investigated until 2000, when the agreement between the federal government and major nuclear utilities about phasing out nuclear power production resulted in the interruption of the investigations ("Gorleben Moratorium"). During these approximately 15 years, there was no attempt to a broader information or even participation of the public.[3]

4. Relevance of societal, technical and scientific arguments during the Gorleben decision-making process

During the first phase of the siting process, particularly during the early 1970s, the responsible institutions saw siting of the NEZ and its repository as a pure technical-scientific process based on technical criteria and with main emphasis on the requirements related to the planned reprocessing plant. Comprehensive information or even participation of the public in the decision-making process and the consideration of other aspects than technical ones were not generally claimed at that time. This was and is in accordance with the regulations under the *Atomic Act* as of 1976 that require involvement of the concerned public in the final phase of the process only, during the hearing about the license application. Prior to that there is no formal public participation in the decision-making process at all.

This means, that during the decision-making process resulting in Gorleben non-technical, e.g., societal arguments were of no or at least minor relevance. However, the intervention of the State of Lower Saxony after the opposition against investigation of the first three identified salt domes (Wahn, Lutterloh, Lichtenhorst) and the designation of Gorleben by the government of Lower Saxony were obviously based on political and perhaps other considerations. These considerations, related criteria and their relevance for the decision, however, are widely unknown. Safety related siting criteria afterwards repeatedly presented by federal government do not sufficiently answer the question "Why Gorleben?"

5. Availability and role of institutional and non-institutional expertise to stakeholders

At the time of NEZ siting, there was no systematic approach to the involvement of the public (or specific sectors of the public) in decision making and there were no provisions for the involvement of non-institutional expertise into the related debate. The term "stakeholder" was still widely unknown, as was the need of stakeholder involvement in decision making. Regarding stakeholder information, this changed somewhat and for some years under the impression of the immediate and strong opposition to the investigation of the first three NEZ sites and the following designation of the Gorleben salt dome by the State of Lower Saxony.

3. The German Committee on Site Selection Procedure started its work in 1999 and presented its results in December 2002.

The participation of the Gorleben International Review at the Gorleben Hearing in 1979 was the first time in Germany, that "critical" experts were formally involved in such a discussion. This participation was "officially" financed. The group of invited "critical" scientists presented its considerations about the NEZ and the final disposal in salt, particularly in salt domes during the hearing. The report of the group was not comprehensively published but was (and is still) available to the public.

During the first of the three public meetings in the Gorleben area (1981 in Lüchow), official and "critical" speakers were debating the preliminary results of surface-bound investigations and their relevance with respect to (long-term) safety of the planned repository. The "critical" speakers were invited at the suggestion of individuals and groups that – today – are designated as stakeholders. All presentations and contributions to discussion were published and were thus available to all stakeholders.

At the second meeting in Hitzacker (1982) on the methodological approach for long-term safety assessment of repositories and additional results of the Gorleben investigation (1982) institutional and invited "critical" non-institutional speakers were discussing available results and the assessment approach. These presentations and the contributions to discussion were also published.

Although there was a participation of invited "critical" speakers at these first two meetings, this must not be misinterpreted as a systematic provision of non-institutional expertise to stakeholders: There was neither funding for a comprehensive evaluation of the available results of site investigation nor a "systematic" involvement of non-institutional experts into the decision-making process and its presentation to the public.

For the third meeting, "Before shaft sinking" (in Hitzacker, 1983), non-institutional "critical" speakers were not invited. Only institutional speakers presented the results of the surface-bound investigations and their official interpretation with respect to repository safety. These presentations and the contributions to the discussion about them were published. However, as a result of the missing participation of non-institutional scientists and lacking consequences of the unfavourable results of the investigation (subrosion, Gorleben channel) for the decision about the underground investigation, this meeting was widely interpreted as a trial of the federal government for justification or legitimisation of a pre-made decision.

After these meetings, non-institutional expertise was no more asked for by the responsible institutions for the discussion about actual results of further investigations of the Gorleben site and their interpretation. However, the presentation of non-institutional expertise to stakeholders was organised and financed by the respective stakeholders themselves, such as the political opposition to the actual federal or State government, national NGOs, local and regional citizen action groups, etc. Additionally, stakeholders requested non-institutional expertise for specific purposes, such as meetings of the councils on the regional, State and federal level (*Kreistag, Landtag, Bundestag*), where preliminary results of the Gorleben investigation were presented and interpreted.

OVERVIEW OF THE WORK AND RECOMMENDATIONS OF THE RECENT AKEND COMMITTEE

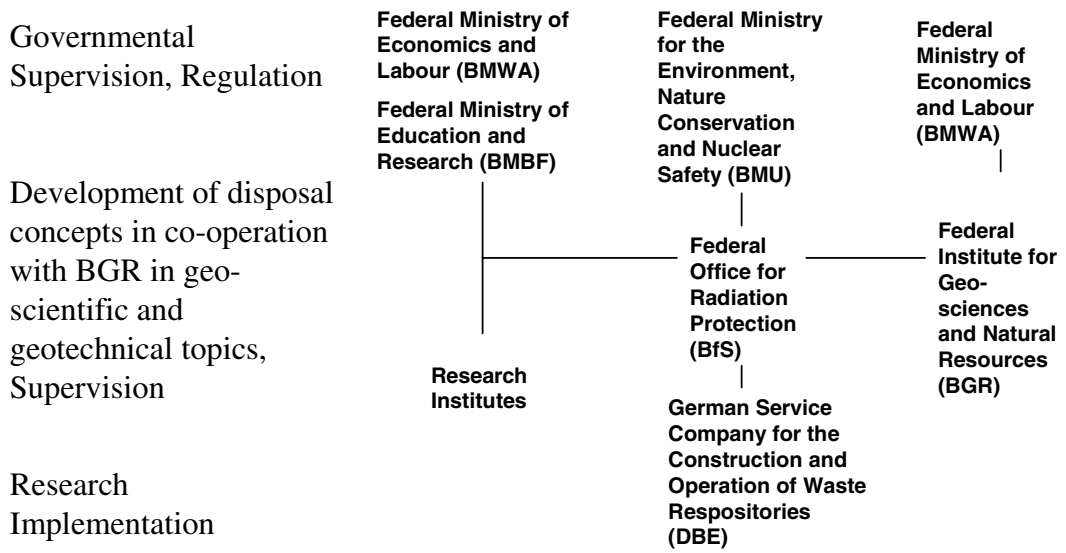
Heinz Jörg Haury

1. Radioactive waste disposal

Protection objectives:

- **Permanent isolation** from the biosphere
- **Safety** for the next 50 000 generations
- **Prevention** of undue burdens and obligations for **future generations**

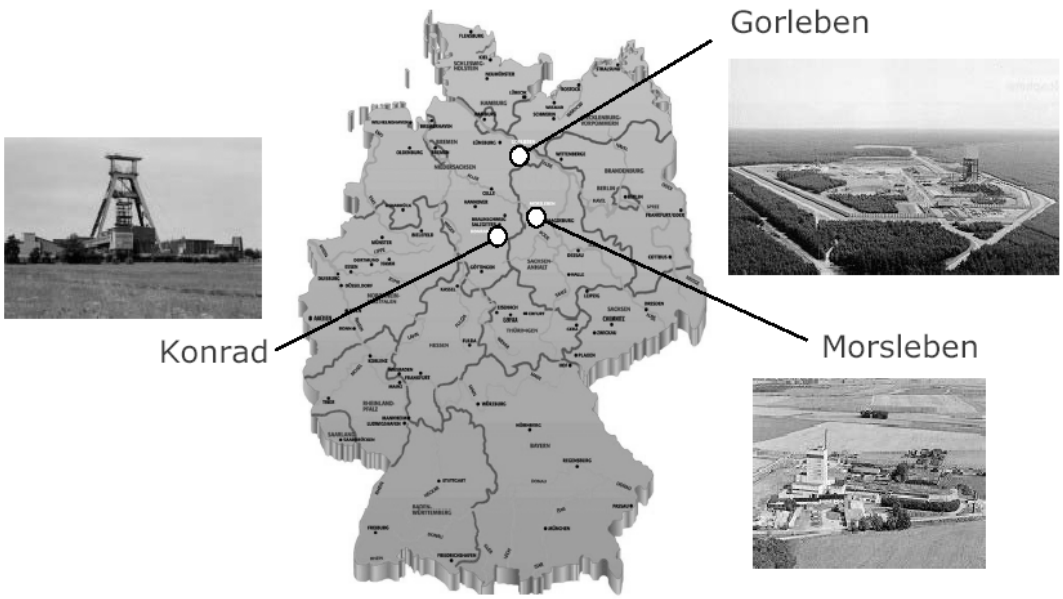
2. Responsibilities for radioactive waste disposal in Germany



3. History of the disposal sites in Germany

1965	Mine “Asse” is established as a URL for fundamental research of disposal in rock salt.
1971-1991 1994-1998	The former potash and rock salt mine “Morsleben” was operated in the former GDR as a repository for radioactive waste (ERAM); afterwards operated by the German government
1975-1982	Suitability of the former iron ore mine “Schachtanlage Konrad”, located in Salzgitter, was investigated for hosting a repository for radioactive waste with negligible heat production.
1979-2000	Suitability of the “Gorleben” Salt Dome was investigated for hosting a repository for all types of radioactive waste.

4. Geological disposal sites in Germany



5. Status of disposal sites in Germany

Salt	Morsleben Repository	LAW MAW	In Preparation for Closure
	Gorleben Mine	LAW MAW HAW	Exploration until 2000 interrupted (Moratorium)
	Research Mine Asse	LAW MAW	Closure completed 2013
Ore/Clay	Shaft Konrad	LAW MAW	Approval of the License 2002; Request for directly execution is retracted

6. New repository concept in Germany

- **Coalition Agreement 1998**
  - **Doubt in the Suitability of Gorleben Salt dome**
  - **Definition of a new national Waste Management Concept**

- **Agreement between Government/Power Utilities 2000**
  - **Moratorium to the Gorleben site (max. 3-10 years)**
  - **Minimisation of the atomic transports**
    - **last transport for reprocessing 2005**
    - **Licensing of local interim storage facilities at the site of the German nuclear power plants**
  - **Controlled and limited operation in time of the exiting nuclear power plants**
  - **Amendment to the Atomic Energy Act (AtG)**

AkEnd
1999 - 2002

Process development

Selection procedure for repository sites in deep geological formations

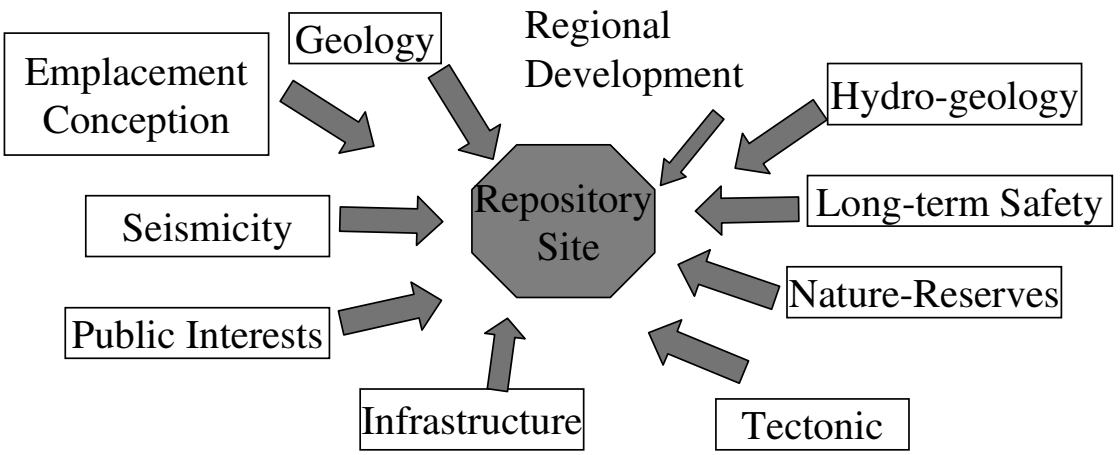
Process of Application

start of site selection planned in 2005

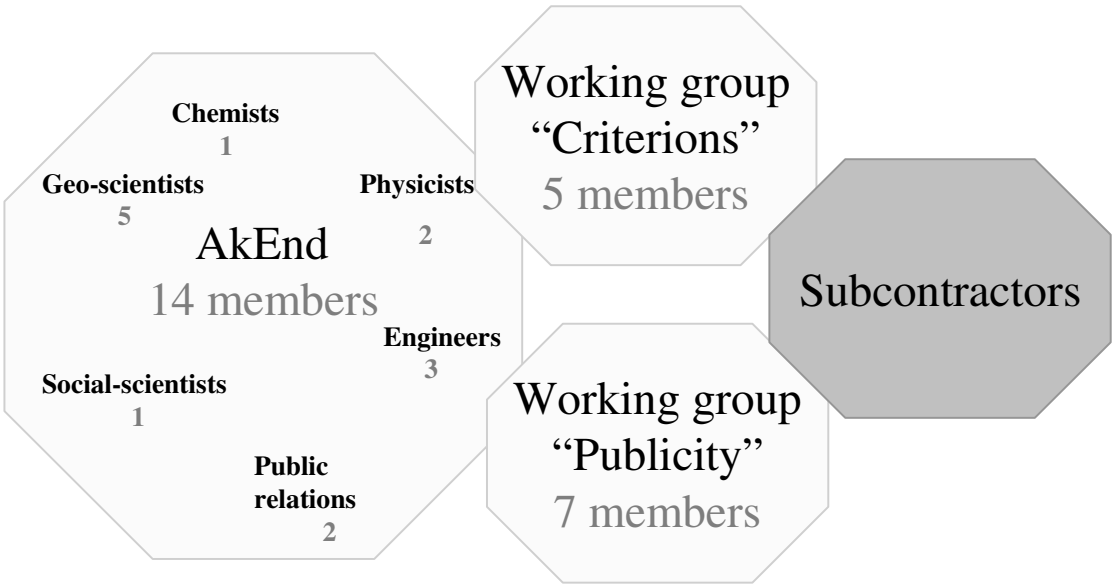
7. Why did the BMU institute the Committee on a Site Selection Procedure for Repository Sites (AkEnd)?

- The BMU has doubts to the Suitability of the Gorleben salt dome.
- Other sites in different rock formations are to be investigated for their suitability as a repository.
- Developing a traceable procedure on scientific basis criterion for the search and selection of the relatively best site for all types of radioactive waste in Germany.
- Comparison of the different sites explored.

8. Influence on the site selection



9. Professions and Working Groups within the AkEnd



10. Work scope of the AkEnd

- AkEnd works independently and free of directives
- Political objectives of the BMU as a demand to the AkEnd:
  - deep geological formations;
  - one repository;
  - operation of the repository until 2030 at the latest.
- AkEnd has a "pluralistic" constitution (professional, individual attitude).
  But: All Members accept the imperative of disposal!
- External consultation in special questions.

11. Basic parameters for the site-selection procedure

- Public participation
- Protection objectives and safety acts (national/international)
- Properties and amount of radioactive waste
- Establishment of a repository until 2030
- Disposal in deep geological formations
- Isolation period of one million years
- Retrievability is not considered
- Judgement by criteria and their weighing
- Treatment of data uncertainties

12. Elements of the site-selection procedure

- Structure of the procedure:
  - stepwise approach;
  - systematic constriction;
  - criterion-based.
- Criteria processing:
  - geoscientific criteria (safety);
  - socio-scientific criteria (social acceptance).
- Public participation:
  - extensive information (Internet, workshops, discussions);
  - forms of participation.

13. Communication of the AkEnd with the public

- 3 public workshops;
- 27 Committee meetings;
- 5 special sessions for topics in particular;
- 40 working-group meetings “Criteria”;
- 27 working-group meetings “Publicity”;
- 2 information visits to Sweden and Switzerland;
- 15 rounds of talks:
  - with members of the German “Bundestag” and different Land Parliaments;
  - with industry associations, trade union, environmental associations
  - with representatives of churches, of schools, citizens’ initiative.
- Lectures and personal discussions.

14. Accumulation of heat-generating waste up to 2040 [m^3]

	Volume end of 2000	Prognosis 2001 – 2010	Prognosis 2011 – 2020	Prognosis 2021 – 2030	Prognosis 2031 – 2040	Total	Total volume
	Number						[m^3]
HAW canisters	84	4,582	112	0	0	4,778	908
MAW (Q) packages	0	840	7,576	2,400	0	10,816	2,814
Spherical AVR + THTR fuel elements	908,705	0	0	0	0	908,705	1,920
	Mass [Mg]**						
LWR fuel elements	3,142	3,962	1,819	24	0	8,947	18,258
VKTA fuel elements	2.3	0	0	0	0	2.3	49
FRM-II fuel elements	0	0.35	0.35	0.35	0.35	1.4	108
						Total	24,000

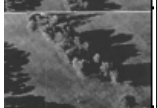
15. Accumulation of waste with negligible heat generation up to 2040 [m^3]

	Volume end of 2000	Prognosis 2001 – 2010	Prognosis 2011 – 2020	Prognosis 2021 – 2030	Prognosis 2031 – 2040	Total
Electric power utilities	23,000	31,000	46,000	73,000	22,000	195,000
Public sector	53,000	27,000	8,000	3,000	11,000	102,000
Total	76,000	58,000	54,000	76,000	33,000	297,000

16. Procedure steps

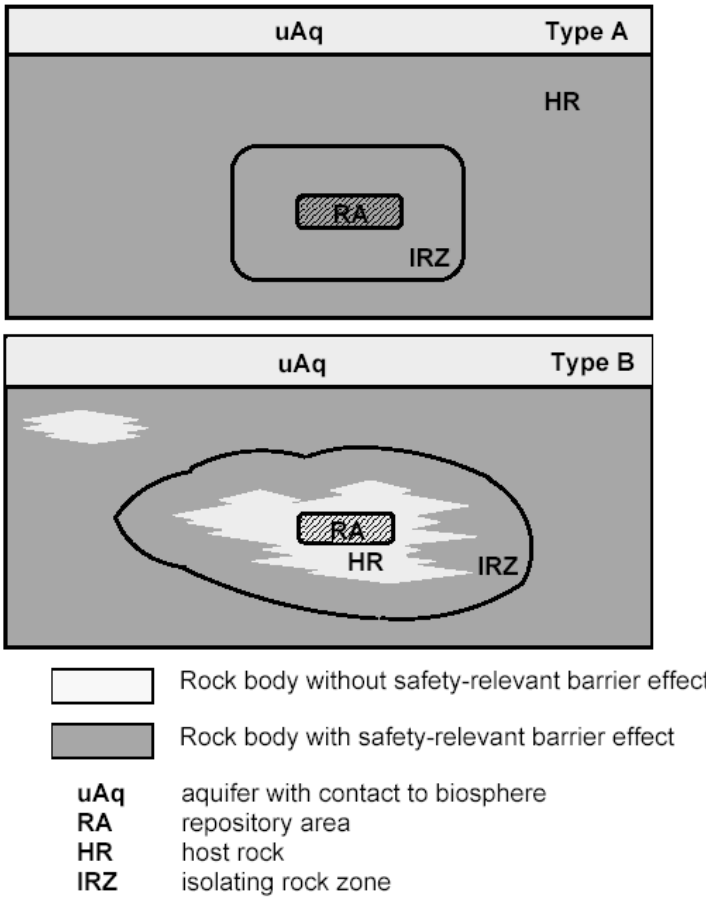
Steps of the Procedure

for the Selection of Repository Sites

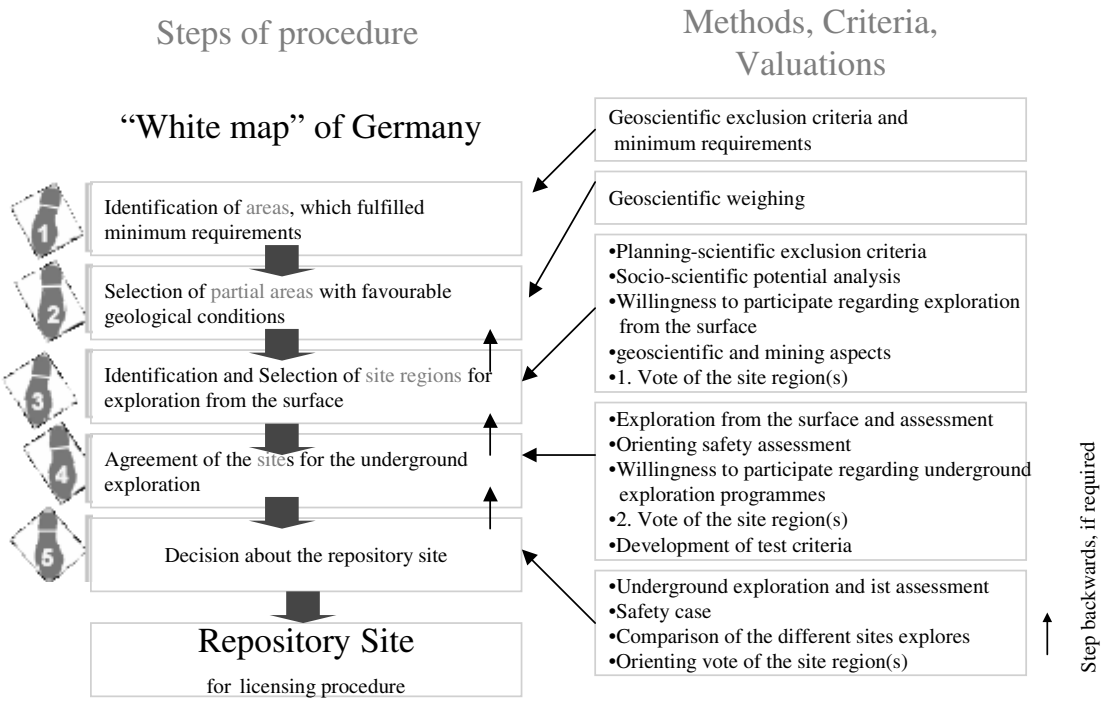
Procedure steps	
	In the **first step**, areas are identified that are obviously not eligible for a repository.
	The objective of the **second step** is to limit the areas remaining after the first step to smaller partial areas with particularly favourable geological conditions for disposal.
	In the **third step**, site regions are identified in the partial areas with particularly favourable geological conditions; if possible, five, but at least three site regions for exploration from the surface.
	The **fourth step** is the exploration from the surface and the agreement on at least two sites for the underground exploration.
	In the **fifth step**, the decision about the repository site is made for which the subsequent licensing procedure is to be performed.
	**Repository Site** for licensing procedure

17. Favourable geological situation

Favourable geological Situation



18. Site selection procedure for repository sites



19. Step 1

Step 1

Identification of areas fulfilling specific minimum requirements

areas

gebiete

Geoscientific exclusion criteria

Large-area uplifts

active fault zones

seismic activity

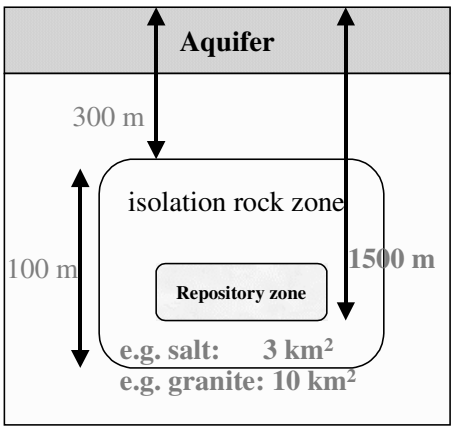
volcanic activity

groundwater age

20. Step 1 (con't)

Procedure step 1

Minimum requirements geoscientific



hydraulic conductivity: < 10^{-10} m/s

thickness of isolating rock zone: ≥ 100 m

depth of top of the isolating rock zone: > 300 m

spatial extension:
e.g. salt: > 3 km²
e.g. clay/granite: >10 km ²

depth of the repository: < 1500 m

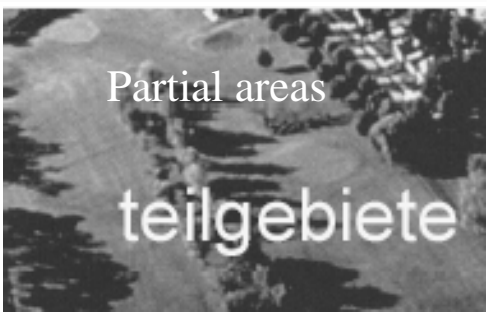
no risk for rock burst

no doubts about conservation of minimum requirements for 1 million years

21. Step 2

Step 2

Selection of partial areas with particularly favourable geological conditions



Proceeding, criteria, assessment

Geoscientific weighing

Classification:

I: Higher reliability with regard to the assessment of the isolation capacity,

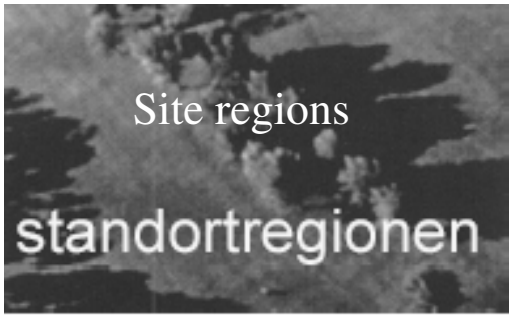
II: less uncertainty in the assessment of the properties required,

III: presence of major safety reserves.

22. Step 3

Step 3

Identification and selection of min. 3 site regions for exploration from the surface



Proceeding, criteria, assessment

Socio-scientific criteria

geoscientific and mining aspects

Specification of programmes for exploration from the surface

1. Vote by the citizens' forum

23. Step 4

Step 4

Determination of min. 2 sites for underground exploration

Proceeding, criteria, assessment

Exploration from the surface

Orienting safety assessment

Willingness to participate regarding underground exploration programmes

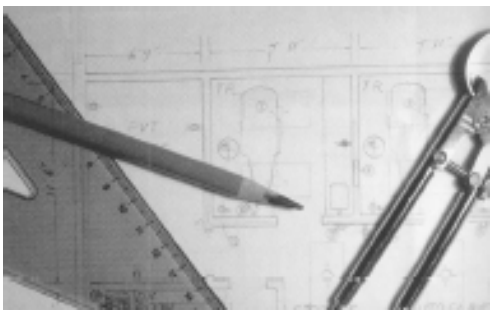
Development of test criteria for the underground exploration

2. Vote by the citizens' forum

24. Step 5

Step 5

Decision on a site



Proceeding, criteria, assessment

Underground exploration

Safety case

Comparison of the different sites explored

Oriented vote of the public and local councils at the end of step 5

25. Licensing procedure

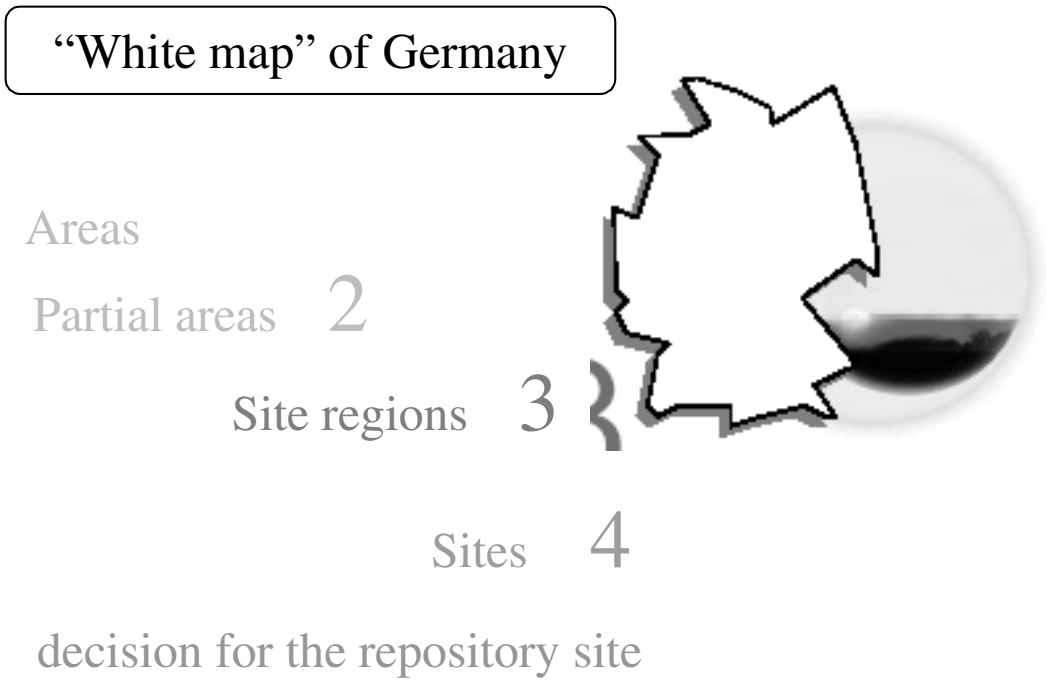
Licensing procedure

1 repository site remains for the licensing procedure

Selection of repository sites in Germany

A Procedure with stepwise proceeding

27. White map of Germany



28. Procedure – Step 1

Procedure step 1

Selection of sites with particularly favourable conditions

areas

Scenarios for the derivation of exclusion criteria

- **Erosion of the geological formations with denudation of the repository**
- **Reduction of the geological barrier**
- **Changing of groundwater conditions**
- **Creation of flow paths by geological faults and fractures**
- **Gas/brine entering the repository**
- **Magmas entering the repository**
- **Covering by surface water**

29. Procedure – Step 1 (con't)

Procedure step 1

Selection of sites with particularly favourable conditions

areas

exclusion criteria

geoscientific

Large-area uplifts

active fault zones

seismic activity

volcanic activity

groundwater age

30. Procedure – Step 1 (con't)

Minimum requirements

geoscientific

Procedure step 1

Selection of sites with particularly favourable conditions

areas

The isolation rock zone must consist of rock types to which a field hydraulic conductivity of less than 10^{-10} m/s can be assigned.
The thickness of the isolating rock zone must be at least 100 m.
The depth of the top of the required isolating rock zone must be at least 300 m.
The isolating rock zone must have an area extension that permits the realisation of a repository (e.g. approximately 3 km^2 in salt or 10 km^2 in clay or granite).
Neither the isolating rock zone nor the host rock must be at risk from rock burst.
There must be no findings or data which give rise to doubts whether the geoscientific minimum requirements regarding field hydraulic conductivity, thickness and extent of the isolating rock zone can be fulfilled over a period of time in the order of magnitude of one million years.

31. Conclusion of Step 1

Conclusion of Step 1

Some areas will stay for more tests

1

areas

32. Procedure – Step 2

Procedure step 2

Selection of min. 5 partial sites with particularly favourable conditions

Partial sites

Geoscientific weighing

Classification:

1. Higher reliability with regard to the assessment of the isolation capacity,
2. less uncertainty in the assessment of the properties required,
3. presence of major safety reserves.

33. Procedure – Step 2 (con't)

Geoscientific weighing

Procedure step 2

Selection of min. 5 partial sites with particularly favourable conditions

Partial sites

1. Weighing group:

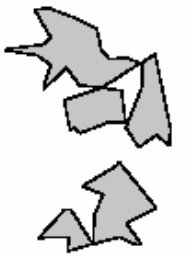
- **no or slow transport with groundwater at repository level**
- **favourable configuration of the rock formations, in particular of the host rock and the isolating rock zone**
- **good spatial characterisability regarding the properties searched for**
- **good predictability of the long-term stability of the favourable conditions**

34. Procedure – Step 2 (con't)

Geoscientific weighing

Procedure step 2

Selection of min. 5 partial sites with particularly favourable conditions



2. Weighing group:

- **favourable rock-mechanic conditions**
- **low tendency of the formation of water flow paths**

Partial sites

35. Procedure – Step 2 (con't)

Geoscientific weighing

Procedure step 2

Selection of min. 5 partial sites with particularly favourable conditions

3. Weighing group:

- **good gas compatibility**
- **good temperature compatibility**
- **high radionuclide retention capacity of the rocks**
- **favourable hydrochemical conditions**

Partial sites

36. Conclusion of Step 2

Conclusion of Step 2

Mind. 5 partial sites will be staying with particularly favourable geological conditions

2

Partial sites

37. Procedure – Step 3

Proceeding, criteria, assessment

Procedure step 3

Identification and selection of site regions for exploration from the surface

Planning-scientific exclusion criteria
Socio-scientific potential analysis
Willingness to participate regarding exploration from the surface
geoscientific and mining aspects
1. Vote of the site region(s)

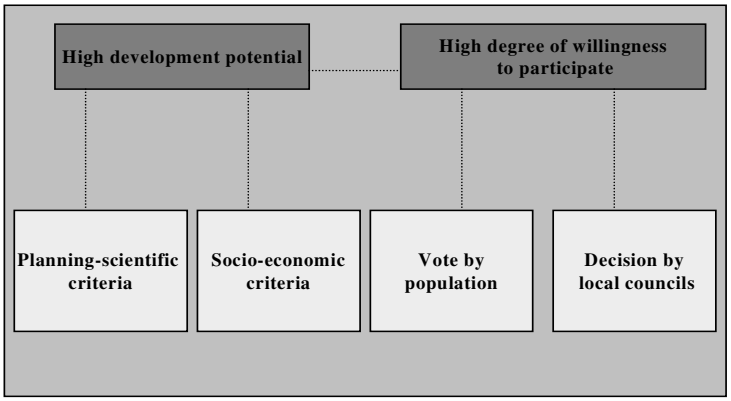
Site regions

38. Procedure – Step 3 (con't)

Requirements
socio-scientific

Procedure step 3

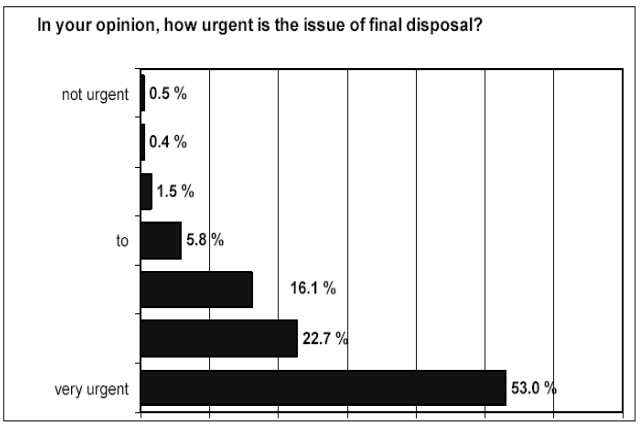
Identification and selection of site regions for exploration from the surface

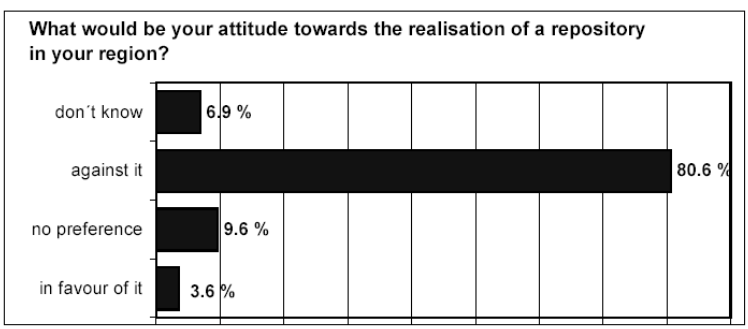


Site regions

39. Public opinion poll and answers

Public opinion poll ...

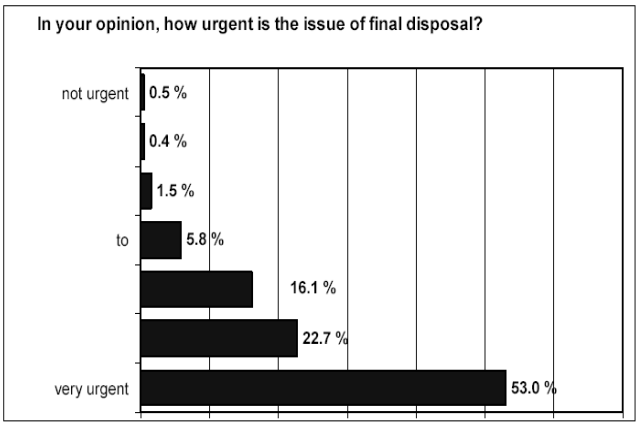


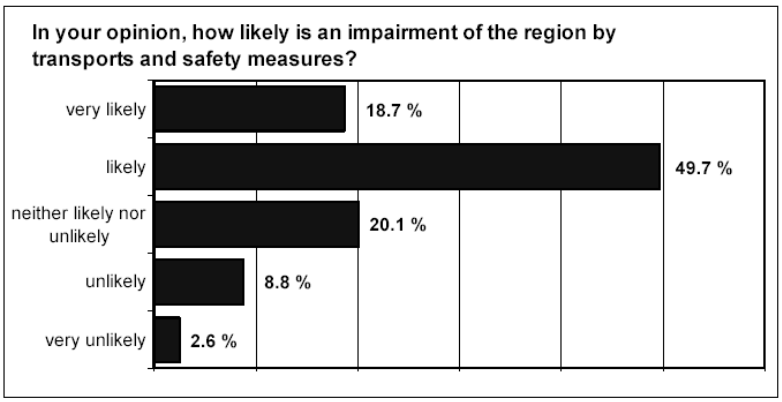


... and answers

40. Public opinion poll and answers (con't)

Public opinion poll ...





.. and answers

41. Procedure – Step 3: Socio-scientific criteria I

Socio-scientific Criteria I 3

Planning-scientific exclusion criteria

Nature and countryside protection

Farming and forestry

Water use

Flood areas

Planning-scientific weighing criteria

Nature and countryside protection

Farming and forestry

Recreation

Architectural Conservation

Water use

Exploitation of resources

Competing use of the underground

Infrastructure

Housing and settlement

42. Procedure – Step 3: Socio-scientific criteria II

Socio-scientific Criteria II 3

Socio-economic criteria

Regional Development

Potential analysis

Labour market

Investments

Housing market

Criterion of the willingness to participate

Citizens' forum

Centre of competent

Round table

Local councils

Population

Vote

43. Conclusion of Step 3

Conclusion of Step 3

Mind. 3 partial sites will
be staying for exploration
from the surface

Site regions 3

44. Procedure – Step 4

Proceeding,
criteria, assessment

Procedure step 4

Determination of 2 sites
for underground
exploration

Exploration from the surface and assessment

Orienting safety assessment

Willingness to participate regarding underground exploration programs

Development of test criteria

Sites

45. Conclusion of Step 4

Conclusion of Step 4

Mind. 2 sites will be
staying for underground
exploration

Sites

46. Procedure – Step 5

Proceeding,
criteria, assessment

Procedure step 5

Decision on a site

Underground exploration and ist assessment

Safety case

Comparison of the different sites explores

Orienting vote of the public and local councils at the end of step 5

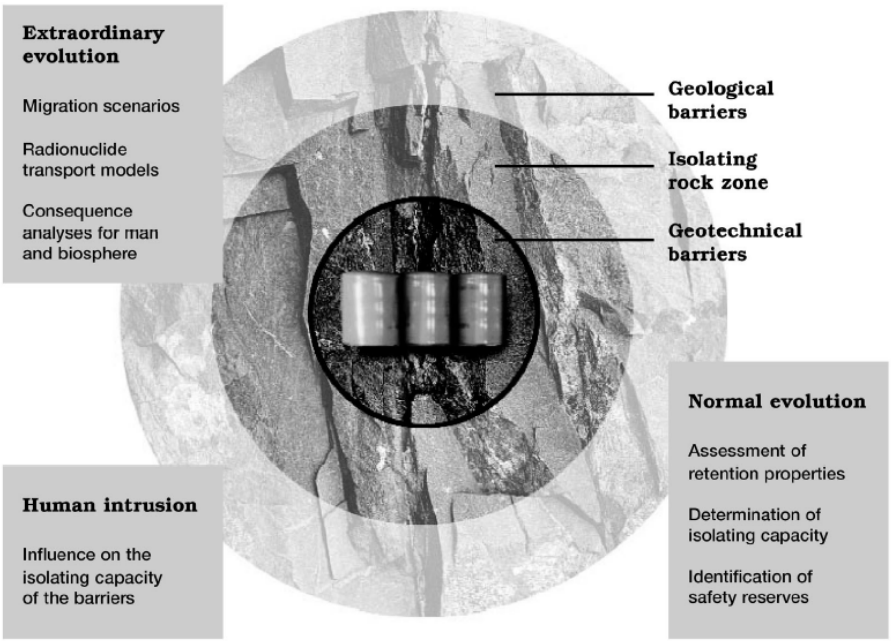
47. Conclusion of Step 5

Conclusion of Step 5

It will be staying one repository site for the licensing procedure

48. Long-term safety of the multi-barrier repository system

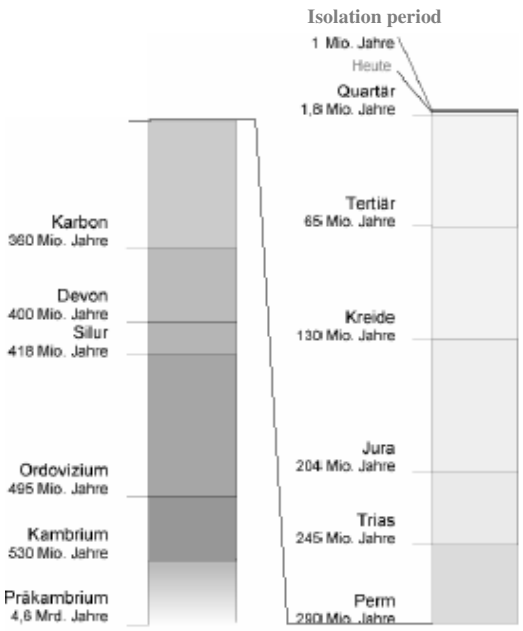
Scheme of the long-term safety of the multi-barrier repository system



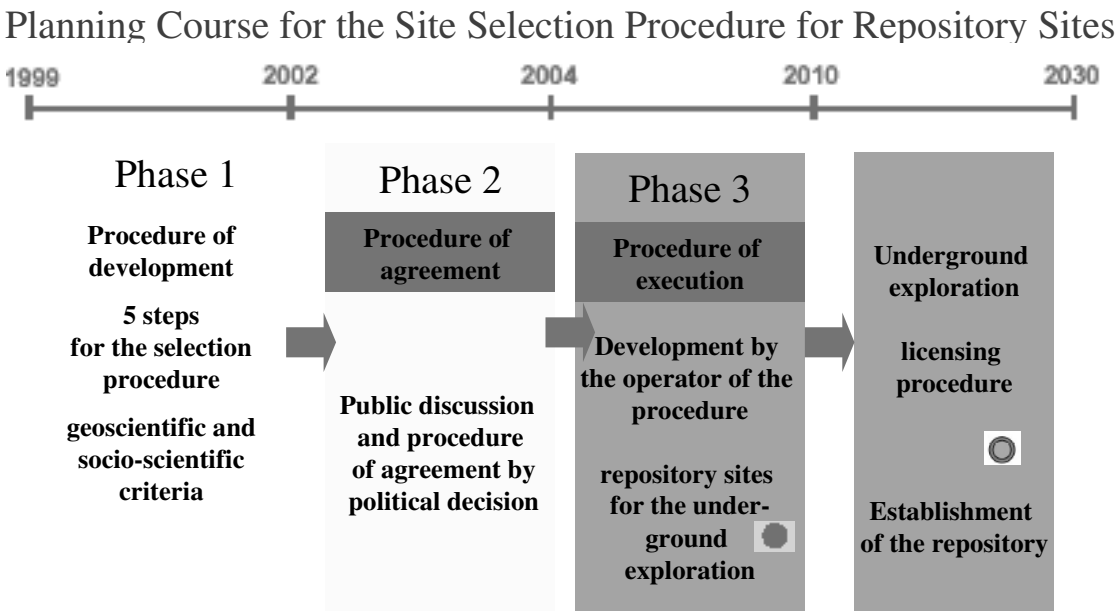
49. Isolation period for a repository

One million years

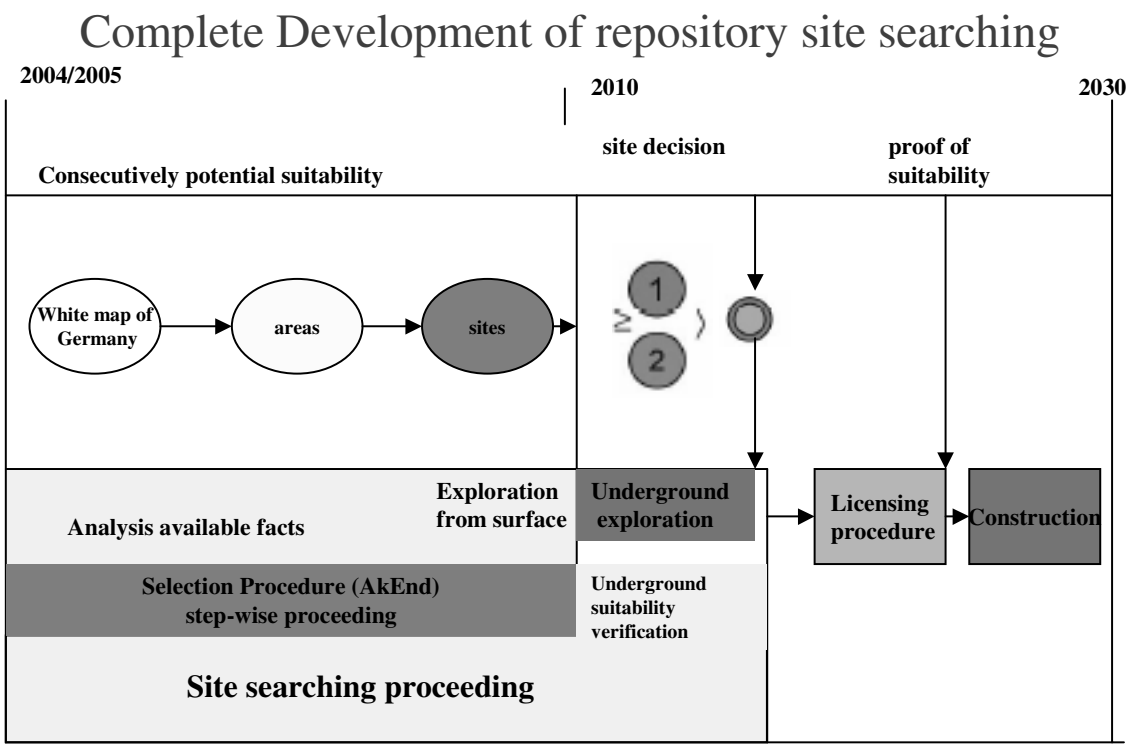
Isolation period for a repository



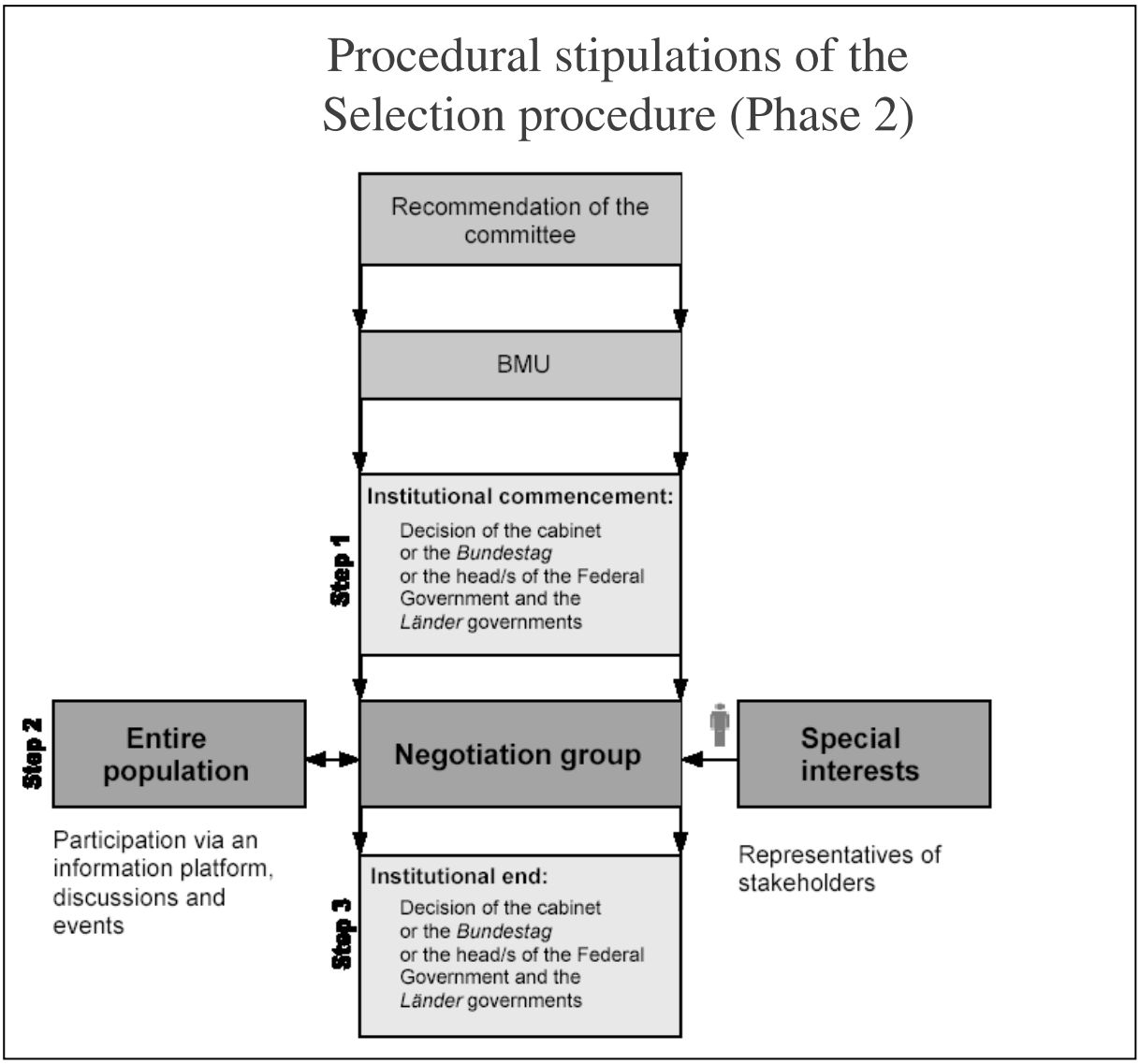
50. Planning course for the site-selection procedure for repository sites



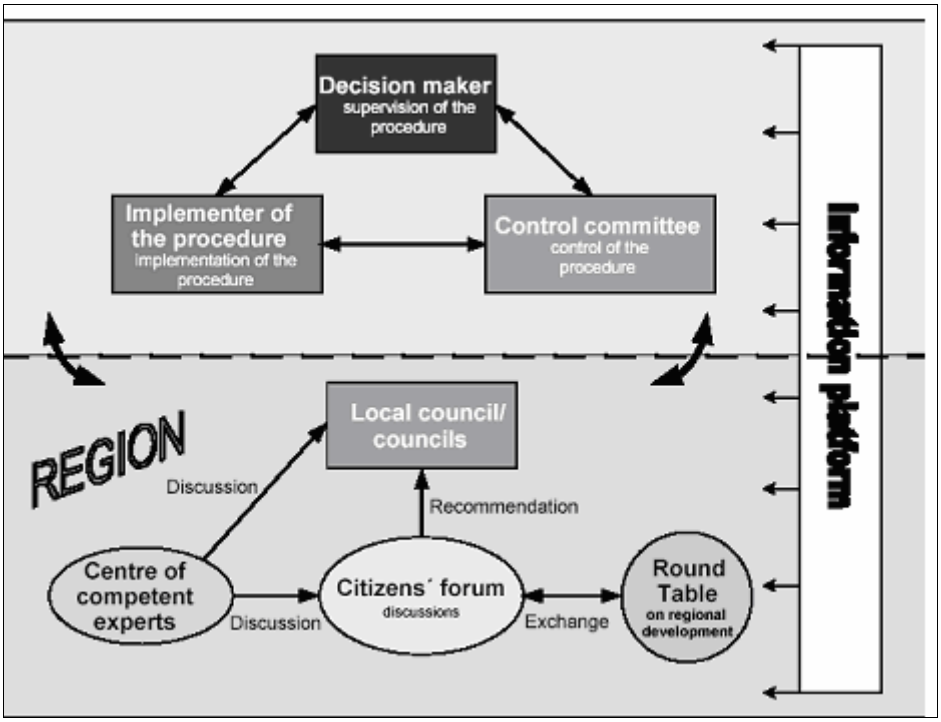
51. Complete development of repository site searching



52. Procedural stipulations of the selection procedure (Phase 2)



53. Organisational structure and instruments of participation of the public in the selection procedure (Phase 3)



Collective Action of Experts in a Stalemate Situation: Central Results of Evaluative Research on the Work of "AkEnd" in Germany

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1. Introduction

Nuclear waste management is a current topic of German public policy-making. Experts, politicians and authorities try to reduce the specific risk arising from nuclear power and its high-level radioactive waste. This happens in the context of a nearly thirty years old societal conflict about the use of nuclear power and doubts about the suitability of the existing final disposal projects. The coalition parties of Germany's Red-Green government have concluded at the end of the year 1998 that the basic elements of the previous waste management concept have failed (Committee 2001: 56). They intended to develop a new national waste management plan.

Against the background that large parts of the public were opposed to the final disposal sites already considered or approved, and that also some experts and decision-makers had doubts about the suitability and/or enforceability of the final disposal projects Gorleben and Schacht Konrad, the Federal Ministry for the Environment established the commission of experts "AkEnd" ("Committee on a Site Selection Procedure for Repository Sites" or in German, *Arbeitskreis Auswahlverfahren Endlagerstandort*") in February 1999. Main task of AkEnd was to develop an unbiased and fair approach as well as suitable criteria for the search and selection of the best possible site for safe final disposal of nuclear waste in Germany.[2] According to AkEnd's guidelines, the interested public, but also the national and international community of experts should be integrated into this new attempt for a German search for a final disposal site already during the development of AkEnd's proposal. ITAS had the task to critically accompany and evaluate this process of elaborating a procedural proposal and developing criteria, which lasted for more than three years. AkEnd presented its final report (AkEnd 2002) in December 2002. The final ITAS report was completed in the following year (Hocke-Bergler/Stolle/Gloede 2003). Before summarising the main results of this evaluation study, the empirical basis and the assumptions used as starting points will be outlined.

2. Data and methods

Subject of analysis from the conceptual perspective was the examination of expert communication in the conflict of nuclear waste disposal. A central framework condition for the expert communication to be analysed was the stalemate process of decision making the national disposal policy was in,

1. Comments on this paper are welcome: hocke@itas.fzk.de, gloede@itas.fzk.de. – We are grateful to Sylke Wintzer (Karlsruhe) for her translation of this paper.
2. Here, individual procedures developed in other countries as well as the experiences gained with them should also be taken into consideration. For details on these considerations from the view of a governmental organisation see Rösel 2003.

particularly in the search for a final disposal site for high-level nuclear waste. Besides the concrete advisory services ITAS provided for AkEnd, it was examined on a further level how far AkEnd actually succeeded in developing a constructive and promising proposal for a new beginning in the German search for a final disposal site and thus in creating the required conditions for overcoming this stalemate situation in decision making (see Hocke-Bergler *et al.* 2003: 205-211). Within the framework of the ITAS study, various established methods of empirical social research were used in combination. Of special importance were:

- Two standardised representative surveys (2001 and 2002) conceptually developed and empirically analysed by ITAS;
- Interviews with participants of the Workshops held by AkEnd in 2000, 2001 and 2002;
- Participating observations in stakeholder discussions performed by AkEnd parallel to its work;
- Quantitative and qualitative content analyses of media data collected by ITAS.

The analytical focus was on the effects achieved by AkEnd in view of the "general public", the "media public" and the "interested public". Central results of these analyses are presented and discussed in the following chapter.

3. Basic results

The evaluation of AkEnd's work by ITAS is predominantly positive. However, regarding some important points our results are ambivalent. To be positively noted is the fact that AkEnd has reached several of its central objectives. The Committee presented both a set of geo-scientific and a set of socio-scientific criteria for the suitability of a final disposal site. Moreover, it submitted a procedural proposal for the search and selection of a final disposal site for radioactive waste in Germany.

However, some specific sub-goals which were supposed to create the conditions for a dialogue-oriented procedure for a comparative and criteria-based selection with broad public participation were not achieved by AkEnd. First to be mentioned here is the insufficient mobilisation of the interested public whose attention has already been focused on "nuclear waste disposal" and specifically on final disposal sites, and who should have been won over to the new beginning in the search for a final disposal site under conditions of dialogue. Second, certain deficits in view of addressing the media were also identified.

All in all, AkEnd's work is an important effort to restart the search for a final disposal site. In order to successfully manage this new attempt, it would have been necessary to break up the confrontation between supporters and opponents of nuclear energy in this question and thus to create the conditions for a dialogue and subsequent negotiations on the modalities of a new search for a final disposal site. AkEnd did have quite a number of discussions with representatives of various interest groups. However, nothing indicates that the confrontation in this arena could be substantially reduced.

3.1 Public opinion

According to the results of the two representative surveys, opinions are already divided with regard to the urgency of the disposal problem. While the supporters of nuclear energy did not see the disposal problem as very urgent and classified the existing final disposal projects as suitable, the

assessments of the opponents of nuclear energy were different. They considered the disposal problem to be particularly urgent and classified the present final disposal alternatives as absolutely unsuitable.

Generally very high importance was attached to the specified criteria for a safe final disposal of nuclear waste (particularly strict safety standards, protection of the environment and health, removability, consideration of the interests of residents, voluntariness of the region, etc.) that were to be evaluated in the representative surveys. Medium or low importance was attributed to these criteria only by a small percentage of the respondents. Extreme differences were recorded regarding the question about the credibility of information provided by different actors on the subject of nuclear energy use. Particularly some of the central actors in the search for a final disposal site were seen very differently. While the information provided by environmental research institutes and environmental associations was regarded as reliable by more than half of the population, such confidence was placed in information from the nuclear industry only by less than a fifth of the respondents. In recent years, Neidhardt (2002: 17) and Weingart (2001: 234) have come to similar results; the structural fact itself, however, has already been known much longer (Gloede/Bücker-Gärtner 1989: 346, 416; cf. also Gloede 1990).

Survey results further showed that the problem of nuclear waste disposal is not perceived as an independent topic but always as a sub-topic of the use of nuclear energy – this was largely confirmed by the media analysis.

3.2 Media resonance

The media resonance to expert action of AkEnd can be assessed as being relatively limited. On the one hand, this has to do with the fact that the subject of nuclear waste disposal was no outstanding topic in the media reporting in 2001 and 2002. This was shown by the quantitative content analysis of mass media coverage carried out by ITAS (see Hocke-Bergler/Stolle/Gloede 2003: 115-134). On the other hand, the reporting on scientists and experts in general was very limited, while political decision-makers in this subject area received much more attention.[3]

Only in the fourth year of its work AkEnd was given greater attention in the mass media. However, only certain segments of the media landscape reported more detailed. These included *Frankfurter Rundschau, Süddeutsche Zeitung,* "*tageszeitung*", and *Das Neue Deutschland* as national print media, as well as the *Elbe-Jeetzel-Zeitung* as a local newspaper of the region of Gorleben. In politically rather conservative media, like *Frankfurter Allgemeine Zeitung* and the news magazine "Focus", AkEnd did not receive attention.

For a future process of selecting a final disposal site, we consider it necessary to develop target-group-specific argumentation strategies addressing the different assessments of opponents and supporters of nuclear energy. At the same time, professional public relation has to be established with the aim to more continuously attend to the media. Here, it is particularly important also to consider politically more conservative media as well as the economic press.

For this purpose, however, far more extensive personnel and material resources would have to be made available. Such engagement in public relations (and not only this) also requires that the final disposal experts manage to win a larger number of politicians as advocates in a new search for a final disposal site, since these will be important multipliers in the public debate on a new final disposal site.

3. Similar results which underline this observation have been found e.g., by Schütz/Peters 2002.

3.3 The interested public

Also from another perspective our analysis of the communication of AkEnd led to similar results: AkEnd's communication with representatives of the interested public, as to be mainly observed during the three workshops carried out by the Committee but also in specific stakeholder discussions, has shown that the adopted course of a dialogue- and discourse-oriented procedure has had only limited effect.

In order to structure the search for a final disposal site, AkEnd had proposed a procedure in three phases: Phase 1 consists of the elaboration of proposals for procedures and criteria. Phase 2 includes societal discussions as well as negotiation processes on the proposals put forward in the previous phase which finally are to be concluded by political decisions. Phase 3, finally, is determined by the implementation of the decisions taken in phase 2. Taking AkEnd's subdivision into phases as a basis, Phase 1 can be regarded under a process-related aspect as *discourse-oriented*, phase 2 as *negotiation-oriented*, and phase 3 as *participation-oriented*. In this perspective, AkEnd's work was to be mainly assessed by whether and how far the Committee succeeded in promoting the societal discourse on locating a site for final nuclear waste disposal through its activities during the observation period.

Although the three mentioned workshops were predominantly evaluated very positively also by their participants, it should be noted that, on the other hand, the limited chances for discussion were repeatedly criticised. The final report presented at the Berlin Workshop and the recommendations included did reply to some of the previously unanswered questions, but they also showed the need for further specification or controversial discussion. Therefore, such problems could and should be subject of the second phase of the overall process recommended by AkEnd, in which relevant societal actors are to enter into closer dispute and negotiation on the report in question (see Hocke-Bergler/Stolle/Gloede 2003: 212-244).

During the whole observation period, AkEnd found it relatively difficult to (publicly) reflect upon the given political and social conditions, even though the problem of its "embedding" in a long and partly sharp conflict about the use of nuclear energy in general and on the final disposal problem in particular has accompanied the Committee since the beginning of its work and though it owed its existence not at least to this conflict.

However, this restriction in a generally rather positive perception of its activity by the interested public did not obviously do much harm. In the end, accusations by the representatives of this public were mainly addressed to politics.

4. Conclusion

Based on our evaluation study which includes the observation of AkEnd's public activities as well as a comprehensive media analysis and representative surveys, it is essential for a final evaluation to interpret the overall site selection process in the context of the cross-cutting field of conflict on the use of nuclear energy. Our final assessment is accordingly: For an expert group such as AkEnd it would have been possible and necessary to stronger mobilise and extend the interested public already formed around the issue of "final disposal". "To stronger mobilise" means to possibly win all existing and identifiable stakeholders as clear supporters for the new beginning in the German search for a final disposal site. "To extend" means that the circle of people to be won would have had to exceed the circle of people addressed in the AkEnd Workshops and in direct discussions. AkEnd probably aimed at such a target. However, it has to be stated that such a goal of "addressing an extended issue-oriented community", as we call it, has not been achieved to the necessary extent.

Whether this would have led to the targeted goal of initiating a real new beginning in the search for a final disposal site, is certainly questionable. However, a more offensive and inclusive expert communication with the interested public would have made it possible to identify the required intermediate steps for conflict handling and to discuss if and – if yes – what win-win situations might be realistic. Instead, the dispute on the final disposal of radioactive waste stagnated again in the last two years, as shown by the refusal of individual parties and German Länder to participate in a negotiation group for a consensus-oriented further development of AkEnd's proposal (see e.g., Vorholz 2003 and FAZ 2004). It is feared that the policy of non-decision making in dealing with German nuclear waste will continue and that in case of concrete site-related activities a revival of the conflict about nuclear energy might set in. Under this perspective, further losses of confidence are to be expected for politics, business and experts.

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ILK[1] on AkEnd: Short Report to FSC Workshop

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OECD/NEA

ILK observations on the basic premises of the AkEnd work

- AkEnd had the mandate from BMU:
  - To start from white map of Germany;
  - To consider one single repository for all waste types.
- ILK disagrees on the BMU basic premises:
  - Konrad exists and is licensed already;
  - Gorleben exists and is a well-characterised site. It ought to be given a chance;
  - One-site policy limits selection procedure;
  - One-site policy is not in line with international practice.

ILK observations on the AkEnd's proposed procedures – Clear responsibilities

- Successful public participation does not imply that consensus will be achieved. Agree that final responsibility rests with government and parliament.
- Trust needs to be earned by all participating parties. The proposed "control committee" has a too diffused a role. This will not allow it to build credibility and trust.
- Support for the suggestion that licensing authorities accompany site selection from the beginning and be involved from the start in the information exchange.
- Support for the suggestion that a clear role be attributed to a decision making body and an implementer. More effort should be place on this, however.
- The geo-scientific site selection criteria are to be reviewed and revised, so that they are applied in a prudent manner.

1. *Internationale Länderkommission Kernetechnik.*

ILK observations on AkEnd's proposed procedures – Konrad and Gorleben

- The fact that Konrad and Gorleben were not chosen according to the proposed AkEnd procedure does NOT mean that these sites do not meet the necessary safety requirements

- "2 or more sites named for underground exploration by 2010" is a too ambitious a schedule if Konrad and Gorleben are excluded. A timetable that allows for periodic reviews should be developed.

ILK observations on AkEnd's proposed procedures – Further reviews

- Agree with the AkEnd's recommendation that its own proposals be reviewed internationally.

- There may be constitutional and legal issues in implementing the AkEnd's proposals. A separate review of those aspects would also be warranted.

- ILK report is available at http://www.ilk-online.org/

ILK Composition

- Prof. G. Apostolakis, MIT
- Prof. A. Birkhofer, TU Munich
- Ms. A. Carnino, France (formerly with IAEA)
- Prof. J. Eibl, TU Karlsruhe
- Prof. H.D. Fischer, Ruhr Un.-Bochum
- Ing B. Gustafsson, SKB, Sweden
- Prof. W. Hacker, TU Dresden
- Prof. W. Kröger, ETH, Zürich
- Ing M. Lallier, France (EPR project)
- Dr.-Ing E. Lindauer, GfS
- Dr. S. Prêtre, HSK, Switzerland (Chair)
- Prof. E. Roos, Un. Stuttgart
- Prof. F-P Wiss, Kfz Rossendorf

POLITICAL ROADMAP TOWARDS AN OPERATING REPOSITORY IN GERMANY

Rolf Wernicke
Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU)

Ladies and Gentlemen,

Before I start my presentation on walking the road towards an operating repository, I want to say a few words on fundamentals. The federal radioactive waste disposal policy is governed by the following fundamental principles:

- **Safety first**: In the field of radioactive waste management, as in other nuclear fields, safety is the first priority and takes precedence over all other aspects;
- **Disposal**: On the long term, disposal is the only radioactive waste management option that can provide for a permanent and sustainable solution to the waste problem;
- **National responsibility**: Radioactive waste of German origin shall be disposed of in Germany. For the purpose of disposal, radioactive waste shall be neither exported to nor imported from other countries;
- **Responsibility of today's generation**: The present generation that uses nuclear power to satisfy its energy demands is obliged to take care of the resulting waste. Installation of a disposal facility shall be promoted as soon as possible and must not be postponed nor left to future generations.

Before I give you an update on the latest developments about the implementation of the AkEnd process in Germany, please let me recall the recent past, in which only the Gorleben salt mine had been explored as a potential site for all types of radioactive waste.

As you know, with time, accusations were raised against the site's suitability and the salt option in general. Furthermore, the government was reproached for not having carried out a comprehensive site selection procedure. In the year 1998, the coalition parties decided to investigate additional sites in different host rock formations. Subsequently the federal government made an agreement with the utility companies to interrupt the exploration of the Gorleben salt mine for at least three, but not more than 10 years. The moratorium on Gorleben began in 2000.

In December 2002, a site selection committee that was appointed by the federal Environmental Minister handed over its recommendations for a "*comprehensive and systematic approach to a selection of disposal sites including societal criteria and stakeholder involvement"*. The recommendations were published and presented on a number of international meetings.

The starting point of the procedure will be a so-called "white map of Germany". For reasons of public acceptance and procedural fairness, the procedure is designed to include the entire territory of Germany. No area will be selected or precluded prior to the start of the procedure. All areas are to be evaluated using the same criteria.

The selection procedure is structured in five steps. In the first step, those *areas* are identified which meet geoscientific minimum requirements. In the next step, within these areas at least five *partial areas* exhibiting particularly favourable conditions for disposal are selected with the help of a weighting process. In the third step, within these partial areas at least three *site regions* are selected for surface exploration, based on geo-scientific and mining aspects as well as on analyses of their regional socio-economic potentials. Among the site regions offering the same estimated safety level those are preferred for *surface exploration* where public support 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. In the fifth step, the underground exploration, assessment and comparison of the two sites are carried out. The selection procedure is terminated with the choice and decision on only one site. Subsequently, a licensing procedure for the disposal facility at this site has to be performed.

All three stages of the site selection procedure, the stage of development, the stage of implementation and the stage of application are characterised by strong elements of public participation.

The participation of the public from the very beginning of the development had high priority. Three big annual workshops served as platforms to present and critically discuss the procedure with the public and with the stakeholders. The workshops also served as input for constructive ideas on the procedure from the participants. The workshops also received extensive media coverage.

A big emphasis was put also on regular talks with members of state parliaments from different political parties with good results.

For the public participation during stage 2, the stage of implementation of the site selection procedure, on a national level parliamentary secretary of state of the BMU, Simone Probst, had invited in the years 2003 a wide scope of stakeholders from industry, church, non-government organisations, state authorities, representatives of the ruling and opposition parties with the objective to form a negotiation group. It was the intention to negotiate the AkEnd proposal. Unfortunately, a number of stakeholders refused to participate. Consequently, BMU had to deal with this unexpected situation and began to focus on meetings that contribute to public participation on a national and international level such as this Forum on Stakeholder Confidence-Workshop and the Meeting of Advisory Bodies to the Government both under the auspices of OECD/NEA. The siting process and public participation were presented to the International Conference on Radioactive Waste Disposal (DisTec) in Berlin, to OECD/NEA-RWMC in Paris, the EurRadWaste in Luxemburg, a workshop of Nuclear Regulators in Ottawa, and to the European Community Waste Management Project (CoWam).

On an *international level* it could be very useful to have a peer review of the implementation plans by OECD/NEA.

As already mentioned by Mr. Haury, the site selection procedure itself comprises a number of integral elements of public participation, for example:

- citizen forum supported by competent experts;
- public votes on site exploration activities; and
- as an outreach scheme for involved regions:
  - the preparation of regional development concepts to offer a perspective compensation instead of short-term financial compensation;
  - all measures of public participation are to be financed by the waste producers;

- criteria, which have been determined by the public in advance, will be used to evaluate site exploration results.

After implementation on the basis of the AkEnd proposal, one of the major implications of the selection procedure will be, that the federal disposal task is going to be transferred to the private waste producers.

The waste producers in turn form an association that:

- carries out the site selection procedure;
- proposes the final site;
- applies for the license;
- operates and closes the repository;
- draws the fees from its members.

This measure would strengthen the “polluter pays principle”, and disposal will no longer be a federal task.

Another very important reason is to lay down the double role of being a regulator and an operator at the same time. This double role found little acceptance and it was always very difficult to communicate to the public.

With respect to planned legislation, the legal implementation of the selection procedure in the current legislative period is planned including fixing detailed features such as:

- five-step selection process and objectives of each step;
- the geoscientific and socio-scientific criteria and measures for public participation.

Furthermore, during application of the procedure, the decision on the two sites identified for underground exploration in step 4 as well as the decision on the final site at the end of step 5 shall be taken by the Deutsche Bundestag.

Subsequently, the licensing procedure for the repository site will be carried out.

It is the objective of BMU to complete the legal implementation by 2006, and to begin the site selection procedure thereafter. The start of repository operations is scheduled approximately for 2030.

Appendix 3

OVERVIEW PAPERS BY EXTERNAL RAPPORTEURS AND CONCLUDING REMARKS

ROLES AND RESPONSIBILITIES OF AUTHORITIES, SCIENCE AND INDUSTRY: CLARITY AND COHERENCE

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Introduction

As an observer to the animate, high quality and often contradictory debates on the situation for radioactive waste management in Germany during the three days of the *FSC Community Visit and National workshop in Germany*, I was asked to prepare and present a thematic report on "Roles and responsibilities of the various institutional players: clarity and coherence". The workshop revolved much about some key questions as regards roles and responsibilities of the different actors; in particular it appeared that clarification is needed on the roles and responsibilities of authorities, science and industry. Those three categories of actors are addressed hereafter and, in each case, a reflection on clarity and coherence is proposed. All the comments made stem from my understanding of the state of affairs in Germany today. However, my objective is also to offer some framing thoughts beyond the specific German case.

Roles and responsibilities of authorities

A key element of the German debate on nuclear waste management is that it is predicated on the phase out of nuclear power as committed to by the present government in the Atomic Energy Act.[1] Nevertheless some actors fear that this decision could be reversed if there is a shift in political power in the future. Stakeholders who oppose the continued use of nuclear power clearly stress that the debate on waste – and their particular position – will be totally different if the phase out is actually maintained (hence only a stock of waste needs to be dealt with) than if the phase-out is called off (meaning that not only the past stock but also an unknown future flow of waste needs to be managed). This situation highlights the fact that long-term radioactive waste cannot be considered and managed as a purely scientific-technological problem and not even as a scientific-technological and environmental problem. Rather it needs to be replaced into its wider societal context, most particularly into the energy policy debate, and its inherently social dimensions must be recognised and respected. This provides a good illustration of the pertinence of the first action goal in the *"Set of action goals for radioactive waste management"* as proposed by the FSC, which calls for "[having] an open debate on the national policy regarding energy production and the future of nuclear energy". (NEA 2004, p. 42)

1. English version of the Act available at: http://www.bmu.de/files/atg_english.pdf.

It follows that political authorities, beyond their direct roles of warranting that a socially and scientifically satisfying solution be found and implemented for the management of radioactive waste, also have an important responsibility for ensuring that this is done in a democratic way and for providing both clarity on the nuclear energy policy and coherence in the sense that strategic policy decisions, which frame the issue are not contingent to changes in the leading political coalition.

As we shall see below, authorities also have a role to play in the framing of the responsibilities of science and industry.

Roles and responsibilities of science

The science involved in radioactive waste management is not *fundamental* science of the kind that is driven mainly by our curiosity to understand the world around us and ourselves, it is *issue-oriented* science, as its primary objective is to solve a societal problem (Funtowicz and Ravetz 1993). And the issue at hand is obviously complex. It combines the complexity of the geophysical systems under consideration and the complexity of the societal framework in which radioactive waste is produced and managed. This complexity implies that science has to deal with – and live with – uncertainty, indeterminacy, ambiguity and even ignorance. (Stirling 1999) Some of the uncertainties at hand are reducible through more research but others are inherent to the systems and are here to stay. Indeterminacy is not only a trait of social systems (Wynne 1992) but also stems from the very nature of physical systems (see e.g., Prigogine 1996) Moreover ignorance is an unavoidable part of science, as sometimes we do not even know what we do not know.

Another important feature of science – and even more so for issue-oriented science – is that it is not a value-neutral exercise: the very definition of the problem includes value choices. And so do the choices of boundaries, of important variables, parameters and criteria. As for scientists themselves, they are not "neutral", they have their values, their culture, their beliefs, and their interests. This is the case not only for private sector funded scientists but for all scientists. And many researchers who invest a lot of energy and dedication to develop a solution will find it hard to accept that their solution is contested or not chosen. Witness a geologist during the German workshop pleading for respect from other stakeholders on the basis that he spent his entire professional carrier on the topic of geological disposal.

Notwithstanding all this, and as illustrated by the debates during the German workshop, many "official" scientific discourses around the topic of nuclear waste management and nuclear power generation are framed in terms of certainty and neutrality. Solutions are presented as sound and safe, and value-free, while the areas of uncertainty, indeterminacy and ignorance are not addressed publicly, as if it would weaken the credibility of science and scientists. Seen from the point of view of discursive democracy[2], this approach is counterproductive, as "certainty discourses" from science might erode trust. Today there is increasing public distrust in science and technology, which built up as a result of a series of significant failures to deal with environmental and health risks (e.g., the cases of BSE, asbestos, ozone layer destruction and many more[3]). In terms of clarity, the existence of irreducible uncertainties and indeterminacy and the non-neutrality of science point to an important responsibility of scientists to communicate about assumptions, choices, uncertainties, and about the limits of scientific knowledge.

In terms of coherence, another important implication from the complexity of the issues at hand and the corresponding uncertainties and indeterminacy is that the scientific quality assurance process must be strengthened. This could be done in the German case by carrying out interdisciplinary reviews and international reviews of the scientific analysis of sites and waste management strategies. This could

2. On discursive democracy see e.g., Dryzek 1990 and Bohman & Rehg 1997.
3. See e.g., Harremoës et al. (2001).

provide for input from non-German scientists and non-geologists,[4] which are likely to have less direct stakes in the decision, although one should not neglect that even them will have their own values and interests which would need to be made explicit during the review process. The scientific quality could also be enhanced by opening up the peer community to other forms of knowledge and critiques from the public, non-institutional experts, stakeholders, etc. Hence providing for what Funtowicz and Ravetz (1993) have called an "extended peer community" which corresponds to an opening-up of the scientific process in the case of issue-driven research where transparency becomes a crucial element to re-build public trust and to allow for democratic societal debates on issues of risks and technology. In this way, the coherence between different disciplines, different scientific discourses, and different partners in the production of knowledge and in the related decision-making processes would be reinforced.

All these remarks relate to the general question of how to build a satisfactory interface between science and policy for the issue of radioactive waste management. Science/policy interfaces can be defined as social processes that encompass relations, exchanges of knowledge and joint construction of knowledge between scientists and other actors in the policy process. The characteristics of the radioactive waste issue – complexity, uncertainty, indeterminacy, large temporal and spatial scales, and irreversibility[5] – imply that knowledge to inform decision making must continually and dynamically be developed, translated and exchanged between scientists and decision makers. Hence the need to build a dynamic interface between science and the decision-making process. Moreover, because they constitute an important component of policy processes dealing with complex issues and because they pertain to both the scientific and the policy process, these interfaces should be participatory as only through participatory settings can the various and often irreconcilable values underlying problem definition and social choices be explicitly introduced and accounted for both in the scientific quality process (O'Connor 1999, Funtowicz 2001) and in the wider societal debate (van den Hove 2000, 2004; O'Connor & van den Hove 2001) Science and policy are not isolated social processes and are better understood as intersecting domains of human activities which are in co-evolution. Although both types of processes have their specific methodologies and operational ways, these are not independent. Scientific methods and normative choices are influenced by the socio-political agendas of the scientists themselves, of the funding agencies and of society at large. Similarly, and probably more immediately recognised, political agendas are influenced by scientific methods, norms and results. Considerations stressed above on the fact that science is not value free imply that the science-policy interface should not be understood as a process with clearly defined limits which would isolate it from both science and policy. The coherence of science as an element of decision-making processes for complex issues is dependent on the quality of processes in the science-policy interface, in particular in terms of dynamism, participation, transparency, fairness, and competence.

These reflections on the roles and nature of the science involved in the radioactive waste issue highlight a triple set of responsibilities. Scientists are responsible for communicating not only about solutions but also and primarily about problems. They are responsible for communicating on the limits of the knowledge they provide. Their communication should be transparent as regards the underlying assumptions of the models and about where uncertainties and indeterminacies lie. In the interface between science and policy, scientists should be humble and open to fair debates in the face of ignorance, they should also respect and confront knowledge coming from alternative sources, scientific or not.[6] Authorities are responsible for providing an adequate framework for such interface in order to ensure coherence. Finally all actors – scientists, decision-makers and stakeholders – have the responsibility to implement the interface and to strive for clarity of their roles and values in the process.

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4. As stressed by Yves Le Bars during the German Workshop, it is obvious that in the German case, geologists have dominated the scientific debate.
5. See van den Hove (2003).
6. It was interesting to observe that during the first day of the workshop in Hitzacker, stakeholders appeared to be more disposed to discuss technical issues than experts.

Roles and responsibilities of industry

In the draft law under preparation in Germany, as described during the workshop by the representative of the Federal Ministry for the Environment (BMU), there is a proposal to transfer the responsibility for disposal to the waste producers and to confine the role of BfS (the Federal Agency for Radiation Protection, which is now also the operator of waste facilities) to licensing and supervision. This is presented as a way to enforce the polluter pays principle more strongly than before. In this context, the responsibility of industry would take a new dimension: beyond merely being responsible for the costs of it, it would have to find and implement a satisfactory solution for the management of its radioactive waste. But in the case of the transfer of a responsibility that involves extremely high risks, huge time-scales and irreversibility, questions arise which relate to clarity of the roles and responsibilities of business in society and coherence between different business objectives and constraints.

Regarding the role and responsibility of business, an anecdote from the German workshop illustrates the problem. A stakeholder from a trade union reported a conversation he had with the director of a nuclear utility who, when asked whether he felt a responsibility towards humanity, replied that his sole responsibility was towards his shareholders. This reflects a vision in which any corporate social or environmental responsibility beyond profit maximisation for the sake of shareholder satisfaction is denied. Nevertheless this vision has its limits as it fails to acknowledge the existence of business ethical dilemmas in which economic rationality confronts ethical rationality. (Le Menestrel, 2002) Today there is an increasing societal demand for business to be more socially and environmentally responsible, to the extent that we might soon reach a point where those businesses who do not endorse their corporate social responsibility (CSR) would lose their social license to operate. Hence the primary goal of business is increasingly (re-)understood as being to deliver some useful good or service to society. This builds on the argument that business is a social activity and, as such, its primary justification should be to serve the society of which it is part. In this context, putting profit as the most important goal of business corresponds to an inversion between means and ends. Profit is a means for business to produce its end which is the provision of goods and services to society. This is not to deny however that profit is a *necessary* means for private enterprises, but it points to the need to clarify the role of business. Moreover, when the inversion is operated, many ethical questions arise, in particular as regards priorities, liability, and good faith.[7]

Concerning priorities, the question for radioactive waste management is how will industry manage conflicting objectives and responsibilities. On the one hand, waste management is a cost that industry will want to minimise in order to maximise profit, and on the other hand there is a social responsibility for implementing a safe solution. In other words, is the first item on the nuclear industry's hierarchy of values safety or profit? And how can industry effectively balance the "safety first" principle claimed by all actors in the German debate with an objective of short-term profits? Again we are facing an issue of coherence, this time between potentially conflicting goals of industry. The second ethical question relates to what exactly is transferred with the responsibility. Is the liability also transferred? But then what does liability mean when the risk of something going wrong spreads over thousands of year? In a more standard situation, the transfer of liability would act as an incentive for industry to focus on safety, but which industry, which insurance company, would take into account a possible risk in 300 or 300 000 years? Clarity on what exactly the transfer of responsibility encompasses is needed, both on the part of authorities and of industry.

7. More ethical questions arise when this inverted logics is pushed to the point where society at large is instrumentalised by an industry in its search for profit, as was the case with the tobacco industry for instance (see, Zeltner et al. 2000).

The third ethical issue relates to the question of good faith of business actors. Recent events in the business world provide numerous examples of businesses acting in bad faith in the pursuit of extra profit.[8] This has contributed to a general climate of eroding trust between the public and civil society on one hand, and business on the other hand. In the case of the nuclear industry, if it is responsible for carrying the burden of proof on the health and environmental safety of its products or of its waste management procedures, then it bears some responsibility for producing the scientific justification to ground that "proof". However, if the good faith of the industry is not clear for other stakeholders, there is a need to implement a reliable process to guarantee the quality of this justification. This calls for very strict procedures of openness and debate around the scientific and technological discourses emanating from the industry.

In this context, some comments can be made on the responsibilities of authorities and of the industry in the German nuclear waste management issue, keeping in mind that three important pillars of corporate social responsibility are transparency, accountability, and participation. (Le Menestrel *et al.* 2002) First, whatever the future legal distribution of responsibilities, there will remain an important responsibility for the authorities to ensure that decisions on waste management pertaining to industry are open to public scrutiny and debated by authorities, stakeholders and the public through a transparent and participatory process. Second, this process should also provide the necessary incentives for industry to (i) endorse its corporate social responsibility in its actions, (ii) be transparent, and (iii) communicate and act in good faith. Finally, a reflection on how to ensure accountability of the industry and on the meaning of liability in such long-term cases is needed.

Conclusion: Participation, complexity and co-existence

As the German workshop revolved much around issues of participation, trust and consensus, to conclude this thematic report, I start by recalling two points already stressed during the topical session of the 4th meeting of the NEA Forum on Stakeholder Confidence in May 2003. A first element to be kept in mind when aiming at participatory processes is that participation as a normative stance for more democratic decisions emerges as a consequence of the acknowledgement of an irreducible plurality of standpoints stemming from the complex nature of the issues at hand and the necessity of living together on the same planet. (van den Hove in: NEA 2003) The second element is that many idealistic discourses on participation focus on consensus and occult conflicts. But ignoring these conflicts and the negotiation dimension of participatory approaches opens the door to manipulation of the process by the most powerful actor(s) and impede the legitimacy of the process. (van den Hove 2004) This calls for recognition of the necessity of compromises as, even if values are irreconcilable, compromises are potentially possible. In practical terms, it comes down to designing participatory procedures in a way that will force the bringing to the fore of hidden agendas and the clear statement of interests and values as part of the discursive process itself.

Stepping back from the extremely rich discussions during the German workshop, the above reflections on responsibilities of authorities, science and industry suggest that a change of attitude towards decision making is needed, whereby all actors communicate on solutions but also – and primarily – on uncertainties and problems, in an atmosphere of trust and respect, and with a lot of humility on all parts. It further suggests that there is still a lot to do to clarify the roles and responsibilities of different actors. In particular, if authorities are to act as the regulator and guardian of people's safety and health, the questions of their competencies and power, and of their relationship to other actors need to be further explored. Moreover, processes need to be designed with the objective of increased coherence in the way roles are performed and responsibilities are endorsed, as well as increased coherence between the roles

8. See for instance the case of tobacco companies (Zeltner et al. 2000), the case of the oil industry and climate change Le Menestrel *et al*. (2002) or the case of Enron (Watkins 2003)

and responsibilities of different players. This leads to the important question of who keeps dialogue and decision-making processes on track over changing political cycles.

One final point deserves to be mentioned which contributes to elucidating the general tension around the issue of radioactive waste management. A major concern expressed by some stakeholders during the German workshop was the fact that we (as a society) started producing radioactive wastes without knowing how to manage them (hence in a context loaded with uncertainties and ignorance) and that we still continue to do so while, in their opinion, we still have not found a satisfactory solution to contain the huge potential risks to health and the environment. Hence these actors call for a more precautionary approach to the management of radioactive waste in particular, and to energy choices in general. What this reflects is the fact that all we (probably) have today is a "best available" solution rather than a satisfactory one. Endorsing such solution in the context of a societal commitment to stop waste production is not at all the same thing as endorsing it in the context of continued waste production. In the latter case, the risk is that the solution "by default" be turned into an unjustified argument for producing more waste, hence hiding the persistence of the waste management issue and reinforcing the vicious circle of having to deal with waste without knowing how to do it well.

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ENGAGING STAKEHOLDERS IN NUCLEAR WASTE DISPOSAL PROJECTS: GIVE GORLEBEN A CHANCE

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1. Robust stakeholders

The term stakeholder has humble origins in the worlds of gambling and greed and was gentrified in the seventies to denote the fact that a firm is not only accountable to its shareholders but to a host of other actors as well: its employees, its clients and suppliers and the community within which it operates.

It could be argued that the term has a clear meaning when applied to a firm and when limited to economic relations (capital, labour, supplies, income, space) but even the first most widely used definition by Freeman from 1984 allows for a much wider usage:

> *A stakeholder is any group or individual who can affect, or is affected by, the achievement of a corporation's purpose. Stakeholders include employees, customers, suppliers, stockholder, banks, environmentalists, government and other groups who can help or hurt the corporation.*

Most parties mentioned in this definition become stakeholders through a contractual arrangement presumably beneficial to them, well defined and freely engaged in. As the definition indicates, however, some other parties like "environmentalists or other groups" can also affect or be affected by the outputs of a firm and therefore should be considered as stakeholders. Perhaps a better expression would be that they are entitled to become stakeholders. Willingly or not, they are stuck with the effects of the corporation, are "stockholders" who are entitled to become stakeholders. Rather than just having to suffer the externalities of an endeavour those "stockholders" should be given the opportunity to negotiate conditions and effects that result in full stakeholdership: beneficial to all parties involved and freely engaged in.

A firm's or any corporation's pursuit of its business not only affects someone at the economic level, but equally well at a social or cultural level, one's psychological well-being or sense of values. Modern management acknowledges this and talks about HRM, business ethics and the like. This is all very worthwhile and should receive proper attention, but not at the detriment of correct economic arrangements. If an employer gets away with paying a substandard wage by appealing to an employee's sense of belonging or idealism, he is not applying good HRM-techniques but exploiting his subordinates. Equally, when a nuclear waste management agency appeals to civic duty and castigates NIMBY-supporters it is trying to get away with immoral exploitation.

Another advantage of avoiding some fuzziness in the term "stakeholder" by giving prominence to its economic dimension is the fact that this provides us with some criteria to determine if someone or some group is indeed a potential stakeholder or not: there should be an economic cost or benefit or loss

involved. It also makes clear that those parties are at the core of the endeavour like all other stakeholders and not at the fringe: as targets of public relations exercises or latecomers to the decision making.

It is not easy for agencies steeped in a tradition of rational scientific discourse and used to expert self-sufficiency to make proper place for those newcomers in the decision making, planning and operations of the agency. Often the explicit or implicit decisions already made need to be retraced to allow those new stakeholders to catch up. This is then seen as an awful waste of time attributable to those new stakeholders rather than to the fact that their participation was neglected before.

Robust stakeholder involvement entails:

- involvement of those stakeholders clearly experiencing an economic cost or benefit;
- integration of those stakeholders into the core processes of the corporation;
- honest brokerage to ensure benefits to all.

Once these basics are provided for it is indeed nice to be bonded by a sense of common purpose, a sharing of values and good spirits all around.

2. The German experience

One cannot but admire the balanced and comprehensive procedures elaborated in the AkEnd report. They do indeed involve all potential stakeholders on an equal footing. They acknowledge that a repository should not be a burden to be imposed on some in a spirit of sacrifice or accepted in ignorant bliss, but that it should be a well thought out chance at regional development.

There is only one thing wrong with it: it ignores the fact that industry at great cost and mustering the best in engineering and science Germany can provide has build an underground repository ready to accept all the nuclear waste. It is of course true that industry forged ahead with this project even when it was already clear that such things are no longer feasible without involving the public. Probably some are quite prepared to "punish" industry for that and would like to see Gorleben as a monument to industrial folly and the power of the people. At present the type of stakeholder involved and the agendas they bring to the table have more to do with such epic battles and morality plays. Few parties represent local stakeholders who would experience direct effects of the project in their daily lives.

So, one is inclined to say: let us talk money. Look at the economics of this project: what costs there are, to whom, who benefits at present and who should benefit in the future. Bring into the project strong local partners that truly represent local interests. Take the time and provide the resources so that they can develop into credible and independent stakeholders. Submit the project to a thorough and independent safety review and be prepared to follow its recommendations. Once those conditions are fulfilled, there really is no reason not to give the project a chance, before turning it wide open again.

CONCLUDING REMARKS

Yves Le Bars
Chairman of the FSC

1. It has been a very stimulating workshop, with open-minded participants: local and national stakeholders were together with international members of the FSC, each of them involved in a "two ways" communication. Symbol of this attitude: when a NGO member had to translate in English what an industry representative said in German, having the role of an industry spokes-person for the round table!

2. FSC workshop methodology is demonstrated, once again as very robust, adapting to various situations and cultures.

3. We have collected a lot of new materials:
   - on the "driver" and "engine" of the process, with a very specific situation in Germany;
   - how history, and past trauma have to be taken into account in the new process?
   - the robustness of the process is a real concern, and has not to be opposed to flexibility (see the fable of "the oak and the reed"); the role of stepwise and reversible approaches could help; I have been impressed by the conditioning plant of Gorleben, able to start within 15 days, but which is not likely to be used before 30 years;
   - a robust financial scheme is part of the confidence in the process;
   - the role of industry has been addressed for the first time in the FSC (see however our past discussions on the driver, and the engine of the process,[1] etc.);
   - independent or clearness of the dependency?

4. I hope the German side to have got as much as we collected! You are encouraged, I hope, to go on in this international involvement.

5. I would thank the organisers, Claudio Pescatore and Hans Riotte, BMU, and BfS.

1. NEA (2004) *Learning and Adapting to Societal Requirements for Radioactive Waste Management*. OECD NEA, Paris, France.

Appendix 4

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Disposal of Radioactive Waste: Forming a New Approach in Germany

Germany is exploring a new approach towards the final management of its radioactive waste. This international workshop, held in Germany, attracted 65 participants from 13 countries. A little more than half of the participants were German stakeholders.

During the workshop invited speakers, representing different groups of stakeholders, commented on relevant aspects of the new German approach being proposed. This served as a basis for subsequent round-table discussions.

These proceedings provide a historical introduction to radioactive waste management in Germany, give a detailed summary of the workshop presentations and discussions that took place, and also provide the NEA Secretariat's reflections which help place the main lessons of the workshop into a wider perspective. Five presentations – the three keynote papers and the two thematic reports – are also reproduced herein.

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