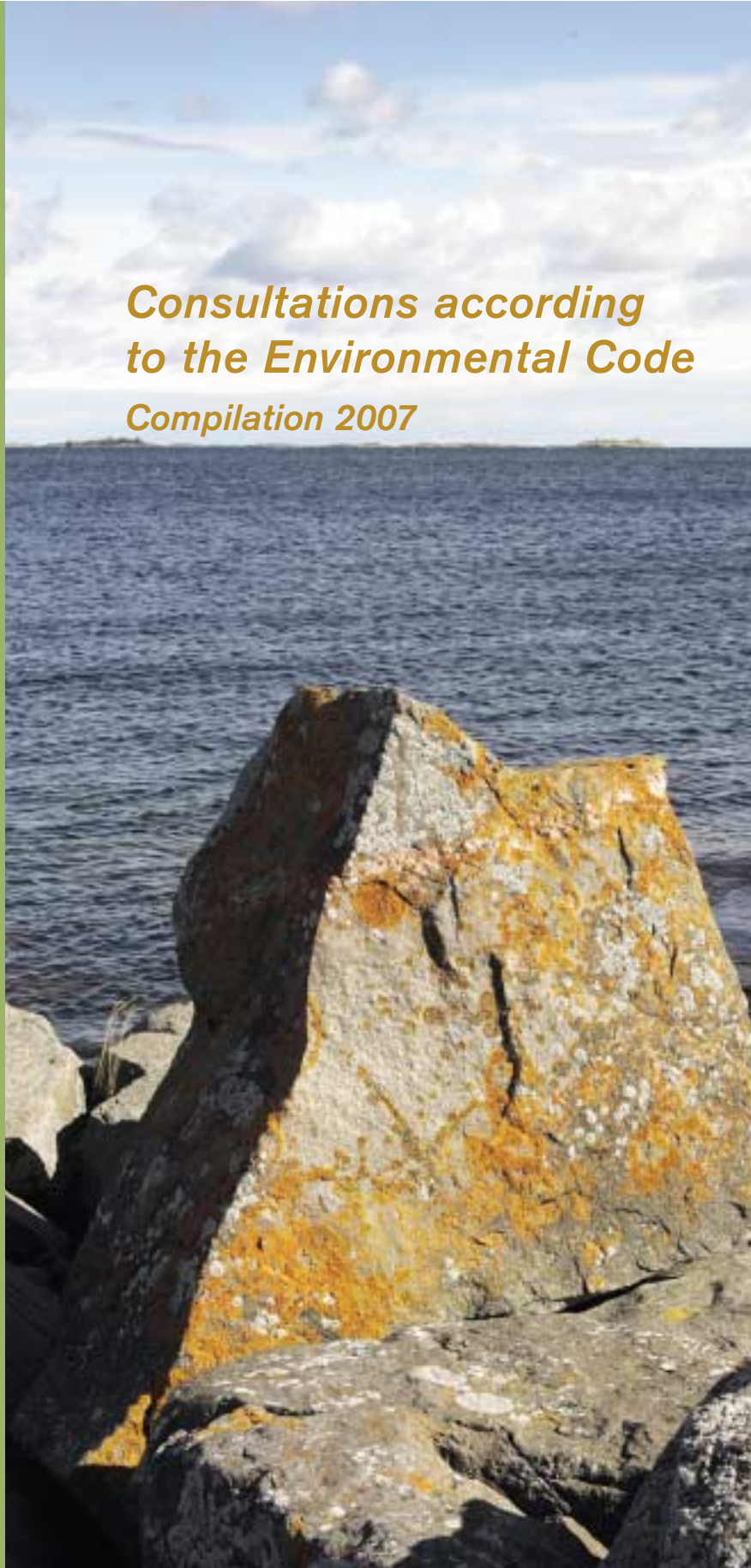


*Consultations according
to the Environmental Code
Compilation 2007*



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The consultations continue

Another year of consultations under the Environmental Code has been completed. Sights are now set on the EIS for the upcoming applications. During 2009, SKB will select the site where we propose that the final repository should be built. We will then prepare the applications under the Nuclear Activities Act and the Environmental Code. In order that the viewpoints that emerge from the consultations can be taken into account in the EIS, the consultations will be concluded about six months before the applications are submitted.

It has now been six years since we at SKB, after many years of preparations, started the site investigations and the formal consultations. The drilling activities in Forsmark and Simpevarp/Laxemar were concluded in 2007, but some monitoring and sampling is still taking place. Efforts are now being concentrated on compiling and analyzing the large quantity of information from the site investigations which will be used in safety assessments, facility layout and design, environmental impact assessments etc.

As in previous years, we held a number of meetings and activities in the two site investigation municipalities and the two concerned counties during 2007. Nearby residents, organizations and decision-makers in the concerned municipalities,

county administrative boards, regional associations, SKI, SSI and the Swedish National Council for Nuclear Waste, as well as the environmental organizations that receive funding from the Nuclear Waste Fund, continue to follow our work with interest.

Viewpoints and questions from the 2007 consultations are presented in this compilation. The public consultation meetings that were held in Oskarshamn and Forsmark in May were preceded by presentations on the theme "Safety and radiation protection". Much of what was said at or in connection with the consultation meetings therefore had to do with those subjects, safety and radiation protection. SKB publishes several different types of assessments and reports regarding safety and radiation protection for Clab, the encapsulation plant, the final repository and the transportation system. They deal with different phases and time scales and have different purposes. An example is the preliminary safety analysis report for a facility, where the focus is on describing safety and radiation protection during operation, in contrast to SR-Site, which deals with the safety of the final repository on a timescale of many thousands of years.

The annual nearby resident meeting was held in Forsmark on 8 September. In the light of our experience from the public consultation meetings, a much-appreciated formal consultation meeting was held in connection with this. The purpose was to give nearby residents an opportunity to ask questions about a possible final repository for spent nuclear fuel in Forsmark. Since the event was positively received and resulted in valuable questions and viewpoints, we intend to continue to hold formal consultations in connection with the nearby resident meetings in both Oskarshamn and Forsmark, in addition to the public consultation meetings.

During 2008 we further plan to begin the special consultations via the Swedish Environmental Protection Agency on possible transboundary environmental impact in accordance with the Espoo Convention. The consultations will be carried out with the Baltic Sea countries that declared their interest to participate during 2006.

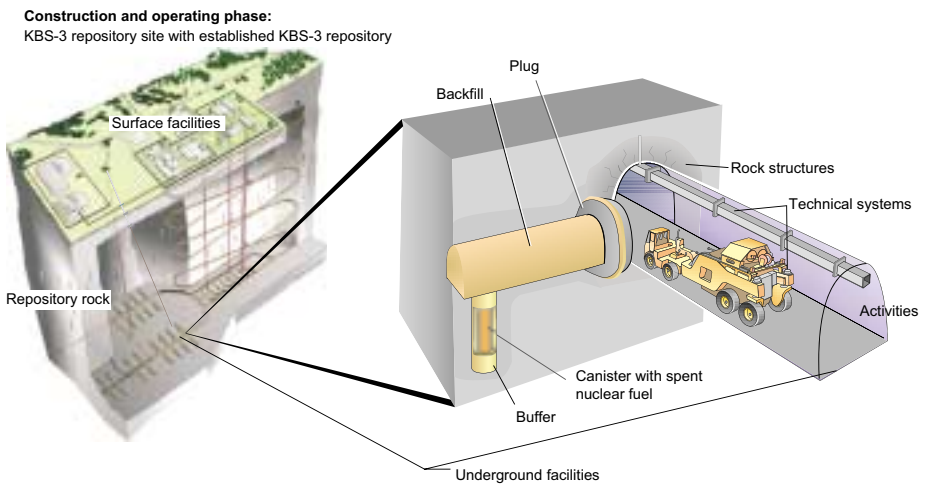
It is my firm belief that all the contacts we make and all the questions that are brought up within the framework of the consultations will together contribute to finding a long-term safe solution and to minimizing any damage and detriment on the sites where the encapsulation plant and the final repository are built.



Erik Setzman
Head of the EIA Unit

The nuclear fuel project

The nuclear power utilities in Sweden merged in the 1970s to form Svensk Kärnbränslehantering AB (SKB, the Swedish Nuclear Fuel and Waste Management Co). Our mission is to manage and dispose of the spent nuclear fuel and radioactive waste from the Swedish nuclear power plants. This mission entails protecting man and the environment in both the short and the long term.



SKB's proposal is that the spent nuclear fuel be disposed of according to the KBS-3 method. This involves encapsulating the fuel in copper canisters with cast iron inserts and depositing the canisters at a depth of 400–700 metres in the bedrock, where stable mechanical and chemical conditions prevail. The canisters are surrounded by bentonite clay, which constitutes a buffer against minor rock movements and prevents corrosive substances from getting in to the canister. The clay also effectively absorbs radionuclides that are released if the canister is damaged.

The key components for disposal according to the KBS-3 method are the encapsulation plant, where the spent nuclear fuel is encapsulated, and a hard rock facility (a final repository) where the canisters are deposited.

The scientific and technical basis for the method has been further developed and presented to the regulatory authorities and the Government every third year in the RD&D programmes. The strategy of geological final disposal according to the KBS-3 method has been approved repeatedly.

Purpose of the nuclear fuel project

The general requirements and premises for management and disposal of spent nuclear fuel are set forth in Swedish legislation and in international agreements and conventions which Sweden has pledged to abide by. The most important requirements in Swedish legislation are the *environmental requirements* in the Environmental Code, the *safety requirements* in the Nuclear Activities Act with associated regulations, and the *radiation protection requirements* in the Radiation Protection Act with associated regulations.

Primarily based on these requirements and points of departure, SKB has defined the purpose of the work for the disposal of the spent nuclear fuel:

SKB's purpose is to build, operate and close a final repository with a focus on safety, radiation protection and environmental considerations. The final repository is being designed to prevent illicit tampering with nuclear fuel both before and after closure. Long-term safety will be based on a system of passive barriers.

The final repository is intended for spent nuclear fuel from the Swedish nuclear reactors and will be created within Sweden's boundaries with the voluntary participation of the concerned municipalities.

The final repository will be established by those generations that have derived benefit from the Swedish nuclear reactors and designed so that it will remain safe after closure without maintenance or monitoring.

Applications

Today the spent nuclear fuel is being temporarily stored today in Clab (central interim storage facility for spent nuclear fuel) in Oskarshamn Municipality. In November 2006, SKB submitted an application under the Nuclear Activities Act for a permit to build and own an encapsulation plant for spent nuclear fuel and to operate it integrated with Clab. This entails that the permits for Clab are also being reviewed. An environmental impact statement (EIS) was appended to the application.

Site Investigations in preparation for siting of the final repository have largely been concluded in both Oskarshamn and Östhammar municipalities. SKB plans to select one of these sites in 2009 and then prepare an application under the Nuclear Activities Act for the final repository. At the same time, SKB will apply for permits under the Environmental Code for the interim storage facility, the encapsulation plant and the final repository. A joint EIS must be appended to the applications.

Consultations according to the Environmental Code

The consultation procedure for applications under both the Environmental Code and the Nuclear Activities Act is regulated by Chapter 6 of the Environmental Code. The consultations are supposed to deal with the siting and design of the activities as well as the form and content of the EIS. Consultations are held with the County Administrative Board, the concerned national authorities, the municipalities, the public and the organizations that can be expected to be affected. If an activity is likely to have a significant environmental impact in another country, the Swedish Environmental Protection Agency is required by the Espoo Convention to inform that country and hold a consultation with that country regarding any transboundary environmental impact.

The consultation process was initiated in 2002 and will be concluded about six months before the permit applications are submitted. Since the interim storage facility, the encapsulation plant and the final repository are parts of the system for final disposal of spent nuclear fuel, SKB has chosen to coordinate the consultations. An account of how the consultations have proceeded and what questions have been raised will be provided in the consultation report, which is an appendix to the EIS.

Previously held consultations are compiled in *Consultations according to the Environmental Code, Compilation 2003, 2004, 2005 and 2006*. This is the compilation of the 2007 consultations.

SKB's consultations

SKB's goal with the consultations is that everyone who wants to get involved should be given an opportunity to do so. This applies to both private citizens and organizations as well as local and national authorities. The consultations also give SKB an opportunity to benefit from the knowledge and viewpoints of the participants.



Extensive work has preceded the final disposal of the spent nuclear fuel, including many years of research, studies, site investigations, design work etc. It is not possible to consult about everything involved in the project on a few isolated occasions. SKB has therefore tried to arrange consultations on different themes as the research results have become available. The discussions at a consultation meeting are not limited to one particular theme, but focus on the participants' questions and viewpoints. All aspects of the final disposal of spent nuclear fuel can be brought up.

Consultations

Over the years, two main different types of consultations have evolved. The one type, called public consultations, are held as meetings in the two concerned municipalities. These meetings are advertised in the local and regional press. The last two meetings have also been announced in the national press. Prior to each public consultation meeting, SKB prepares background material with a given theme. Presentations are made on the theme before the actual consultation meeting. Participants have an opportunity to present both oral and written viewpoints up to two weeks after the meeting.



Written invitations to participate at the consultation meetings and/or to submit written viewpoints are sent to the organizations that obtain funds from the Nuclear Waste Fund to follow the consultations, concerned government authorities and agencies and concerned municipalities. The background material for the meeting is available via SKB's website or can be requested from SKB. The material is also enclosed with the written invitations.

The second type of consultation meetings are those held with the Oskarshamn EIA forum and the Forsmark Consultation and EIA Group. At these meetings, representatives of the relevant county administrative board and municipality meet with representatives of the Swedish Nuclear Power Inspectorate (SKI), the Swedish Radiation Protection Authority (SSI) and SKB. Up to and including 2007, the County Administrative Board has chaired the meetings. These meetings were not public in the beginning. But since the autumn of 2005, private citizens and various organizations can participate as observers.

Furthermore, consultations are held in connection with nearby resident meetings and with countries around the Baltic Sea in accordance with the Espoo Convention.

Site investigations, consultations, and environmental impact statement

The site investigations have been under way for six years and have now been more or less concluded. The purpose is to gather the data needed for the evaluation of the suitability of the investigated sites for a final repository for spent nuclear fuel. Does the site satisfy the fundamental safety requirements? Are the construction-related conditions fulfilled?

The work of surveying the sites and of identifying the disturbances which the final repository system can give rise to, what consequences they would entail and suitable preventive measures continued in 2007. Both the structure and content of the application documents and the EIS will be progressively defined and adjusted in response to what has emerged in the consultations, as well as in design, investigations and studies for the planned facilities.

Consultation reports

An EIS was appended to the applications under the Nuclear Activities Act for the encapsulation plant and Clab. An appendix to the EIS contained an account of the consultation activities related to the encapsulation plant that had been conducted up to and including November 2005.

The ongoing consultations relate to the interim storage facility, the encapsulation plant and the final repository for spent nuclear fuel. The consultation report will present all viewpoints that have emerged in the consultations.

Planned consultations

From now on we plan to hold public consultation meetings in Oskarshamn and Forsmark, as well as meetings with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group.

At the beginning of 2008, the Swedish Environmental Protection Agency sent a draft table of contents for the coming environmental impact statement (EIS) for the final repository system, as well as excerpts from the SR-Can safety assessment, to those countries around the Baltic Sea that have declared their interest in participating in consultations in accordance with the Espoo Convention. These countries are expected to respond before the summer.

SKB plans to select a site for the final repository in 2009 and then prepare the applications under the Nuclear Activities Act and the Environmental Code. In order that the viewpoints that emerge from the consultations can be taken into account in the EIS, the consultations will be concluded about six months before the applications are submitted.

General planning of upcoming consultation activities

Autumn 2008

Public consultations in Oskarshamn and Forsmark.

The background material is about "Siting – Aesthetics – Logistics".

After site selection

Public consultations on preliminary EIS and water activities.

Three meetings will be held if Forsmark is selected

Preliminary EIS – Forsmark

Preliminary EIS – Oskarshamn (interim storage facility and encapsulation plant)

Water activities – Forsmark

Two meetings will be held if Oskarshamn is selected

Preliminary EIS – Oskarshamn

Water activities – Oskarshamn

Meetings with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group 3–4 times a year.

A second written consultation according to the Espoo Convention when SKB submits the applications for the final repository system. The focus will be on the SR-Site safety assessment and a summary of the EIS.

Local information

In addition to the formal consultations under the provisions of the Environmental Code, extensive information activities are taking place in both Oskarshamn and Östhammar. The personal meeting has contributed to people's confidence in SKB in both municipalities.



Planning for the final repository requires a close dialogue with everyone who is in any way affected by our activities. SKB has regular contact with the owners of the land that is affected by or borders on the planned facilities. In addition, we arrange different types of meetings for information and goodwill, along with field visits to present and obtain viewpoints on suggested locations of the final repository's above-ground facilities. A newsletter is sent regularly (four times during 2007) to everyone living in Misterhult parish in Oskarshamn, as well as to nearby and part-time residents in the Forsmark area. The newsletter provides information about the site investigation, our activities in the field and current events.

The contact with nearby residents is particularly important. We therefore regularly invite them to our facilities or arrange get-togethers out in the field. There they have an opportunity to ask questions about our work and register any complaints they may have. We are happy that our nearby resident get-togethers are well-attended, since it makes our work easier if our neighbours feel their concerns are being addressed.

A formal consultation was held in Forsmark during the autumn in connection with the annual meeting with nearby residents. This was occasioned by the generally cool interest shown by nearby residents in participating in the public meetings. The opinion has also been expressed that the public consultation meetings are dominated by the environmental organizations and that the nearby residents are not given enough opportunity to voice their questions.

Publications and the Web

Four issues of our information magazine Lagerbladet were published during the year. It is distributed to all households in each of the site investigation municipalities. In this magazine we discuss our activities and subjects that have a direct bearing on us, particularly on the local level.

The websites for Oskarshamn and Forsmark can be accessed via SKB's website. They are updated regularly with information on SKB's activities and on past and planned events in each municipality.

Visitor service

Our visitors to the facilities in Forsmark and Oskarshamn come from both near and far. Foreign delegations alternate with schoolchildren, local businessmen and university students.

Documentation of the consultations

The final documentation of completed consultations is the consultation report that will be appended to the EIS for the permit applications. The compilations are published to provide an overview of questions and answers from the previous year's consultations.



All consultations, whether in the form of meetings or correspondence, are documented. All minutes, notes and received viewpoints are available on SKB's website.

Meetings

Minutes are kept of meetings with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group, which the participants check and sign. Minutes are now also kept of public consultation meetings. The minutes are checked and signed by persons appointed by the meeting. After the public consultation meetings it is possible to submit questions and viewpoints related to the meeting for another two weeks. They are then included in the documentation from the meeting.

The questions and viewpoints discussed during a consultation meeting and received within the appointed period after the meeting are included in the notes of the meeting. There SKB also answers those questions that can be answered immediately. Some questions may lead to supplementary studies and further discussion. Some questions are judged to lie beyond the scope of the nuclear fuel project and the EIA work and are dismissed from the consultations. Reasons are given for this.

Written viewpoints

The viewpoints that are received between consultation meetings and in the written consultations are made available on SKB's website and in the annual compilations. Whenever possible, SKB responds to questions and viewpoints.

Annual compilation

The consultations for the interim storage facility, the encapsulation plant and the final repository have been coordinated. This year's compilation contains excerpts from the minutes from 2007 grouped in the following categories:

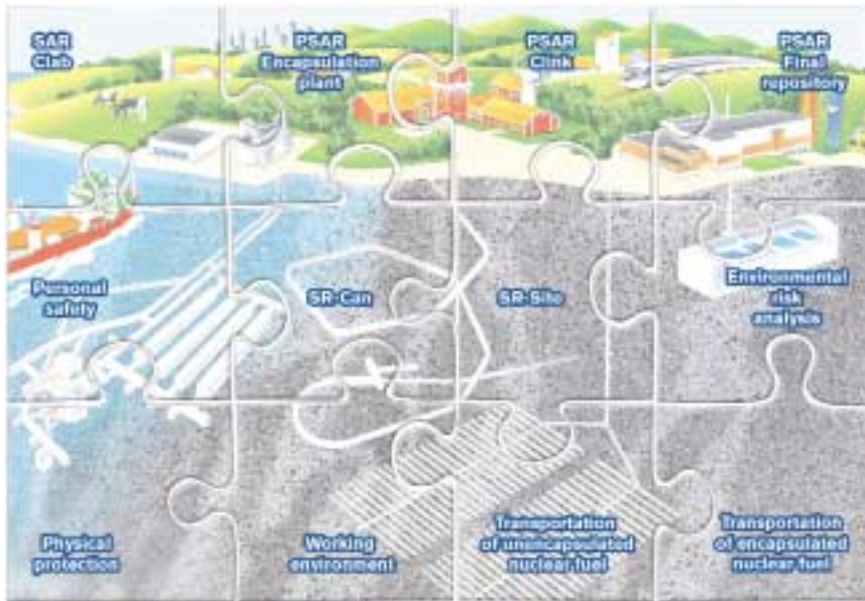
- Interim storage facility and encapsulation plant
- Final repository
- Common issues

The excerpts focus on the questions and viewpoints that have come up in connection with the consultation meetings, as well as SKB's replies and comments.

The consultation report should explain how SKB has taken submitted viewpoints into account. The consultation report appended to the EIS for the encapsulation plant in 2006 contained the questions and viewpoints that concerned the encapsulation plant and common issues, along with SKB's replies and comments on them. The consultation report for future applications will present all questions and viewpoints received.

Completed consultations

The consultation process has been going on for six years. The early consultations were conducted in separate meetings for the encapsulation plant and the final repository. In the continued consultations, joint meetings have been held for both facilities as well as the interim storage facility.



Early consultations

Early consultations regarding the final repository and the encapsulation plant in Oskarshamn and Forsmark were held during the period 2002–2003. Invitations were sent out to more households than just those who belonged to the category “likely to be affected”. The invitation included specially produced background material describing the project and the purpose of the meeting.

Early consultation	Date	Place
Final repository	10 January 2002	Oskarshamn
Encapsulation plant	8 March 2003	Oskarshamn
Final repository	15 June 2002	Forsmark
Encapsulation plant	29 October 2003	Forsmark

The background materials compiled for the early consultations, the consultation reports and the County Administrative Board’s decisions are available via www.skb.se.

Continuation of the consultations

The extended consultations began in 2003. The consultations for the interim storage facility, the encapsulation plant and the final repository are coordinated in both Oskarshamn and Forsmark.

Changes were made in the Environmental Code in 2005. The terms “early” and “extended” consultations were removed. Now only the concept “consultations” remains.

SKB’s consultation meetings consist of public meetings mainly intended for private citizens and concerned organizations and meetings with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group.

Completed consultations 2007

Two public consultation meetings were held during 2007. The consultation meetings were preceded by presentations dealing with:

- overview of the work with safety and radiation protection
- long-term safety

The discussions at the meetings and submitted written viewpoints mainly had to do with the long-term safety of the final repository.

One meeting each was held with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group. In addition there was one joint meeting for both groups. All meetings were open to the public.

One consultation meeting was held in conjunction with the nearby resident meeting in Forsmark.

Road consultations on connecting roads to a final repository in Laxemar were also held during the year. These are also included in this compilation.

Altogether, eight consultation meetings were held during 2007 in accordance with the provisions of the Environmental Code

28 May	Public meeting in Oskarshamn Municipality
31 May	Public meeting in Östhammar Municipality
8 September	Nearby resident meeting in Forsmark
12 September	Oskarshamn EIA Forum
13 September	Forsmark Consultation and EIA Group
13 September	Road consultation with authorities
8 October	Road consultation with private citizens
5 December	Joint meeting with Oskarshamn EIA Forum and Forsmark Consultation and EIA Group

In conjunction with the public meetings of 28 May and 31 May, written consultations were held with concerned government agencies.

Previously held consultations 2004

19 January	Forsmark Consultation and EIA Group
5 February	Public meeting in Östhammar Municipality
24 March	Oskarshamn EIA Forum
22 April	Local conservation and environmental organizations in Oskarshamn Municipality
4 May	National conservation and environmental organizations
13 May	Local conservation and environmental organizations in Östhammar Municipality
14 May	Forsmark Consultation and EIA Group
26 May	Oskarshamn EIA Forum
1 October	Forsmark Consultation and EIA Group
6 October	Public meeting with Oskarshamn EIA Forum
25 November	Public meeting in Östhammar Municipality
8 December	Oskarshamn EIA Forum
10 December	Forsmark Consultation and EIA Group

Written consultations were held during the first quarter of 2004 with regional actors in Kalmar and Uppsala counties.

Previously held consultations

2005

10 March	Forsmark Consultation and EIA Group
11 March	Oskarshamn EIA Forum
5 April	Public meeting in Oskarshamn Municipality
1 June	Oskarshamn EIA Forum
4 June	Public meeting in Östhammar Municipality
3 July	Public meeting in Oskarshamn Municipality
24 August	Joint meeting with Oskarshamn EIA Forum and Forsmark Consultation and EIA Group
14 November	Public meeting in Östhammar Municipality
17 November	Public meeting with Oskarshamn EIA Forum
17 November	Public meeting in Oskarshamn Municipality
18 November	Public meeting with Forsmark Consultation and EIA Group

At the end of 2005, written consultations were held with concerned government agencies.

2006

10 March	Forsmark Consultation and EIA Group
22 March	Oskarshamn EIA Forum
31 May	Public meeting in Oskarshamn Municipality
1 June	Public meeting in Östhammar Municipality
2 June	Forsmark Consultation and EIA Group
12 August	Open house in Östhammar Municipality
13 August	Open house in Oskarshamn Municipality
20 September	Forsmark Consultation and EIA Group
28 September	Oskarshamn EIA Forum
6 December	Joint meeting with Oskarshamn EIA Forum and Forsmark Consultation and EIA Group

In conjunction with the public meetings of 31 May and 1 June, written consultations were held with concerned government agencies.

Excerpts from minutes

This section contains excerpts from the records of the consultations held in 2007. In each excerpt, questions, viewpoints and topics have been grouped in the following categories:

- Interim storage facility and encapsulation plant
- Final repository
- Common issues

Questions and viewpoints have been expressed both orally at the consultation meeting and in the form of written submissions. The excerpts from the public consultation meetings do not show who posed a question or expressed a viewpoint at the meeting. In the case of written questions and viewpoints, however, there is a notation of who expressed the question or viewpoint.

The excerpts also show the target group for the meeting, who was present and the theme of the background material, as well as how the invitation took place.

Groups who receive money from the Nuclear Waste Fund to participate:

MKG – the Swedish NGO Office for Nuclear Waste Review (joint body between the Swedish Society for Nature Conservation, the Uppsala County Society for Nature Conservation, the Swedish Association of Field Biologists and Oss – Opinion Group for Safe Final Disposal).

Milkas – the Swedish Environmental Movement's Nuclear Waste Secretariat (represents the Swedish Anti Nuclear Movement and Friends of the Earth).

SERO – the Swedish Renewable Energies Association.

Furthermore, the Swedish National Council for Nuclear Waste (formerly KASAM) and the various regional councils have taken an active part in the consultations, particularly in the meetings held with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group.



Public meeting in Oskarshamn Municipality

Date	28 May, 2007
Time	Presentations, 16:00–18:00 hrs Consultation meeting, 19:00–21:00 hrs
Place	Figeholms Fritid och Konferens (Figeholm Leisure and Conference), Hägnad, Figeholm
Target group	Private citizens, organizations, government agencies
Invitation	<p>The meeting was advertised in Oskarshamns-Tidningen (12 and 26 May) and in Nyheterna (12 and 26 May). The meeting was also advertised (21 May) for national coverage in Dagens Nyheter, Svenska Dagbladet, Sydsvenska Dagbladet, Göteborgs-Posten, Västerbottenkuriren and Post- och Inrikes tidningar (the Swedish Official Gazette).</p> <p>Written invitation to about 1,500 households in the Misterhult area. An invitation was also sent to the organizations that receive funding from the Nuclear Waste Fund to follow the consultations, Östhammar Municipality, the County Administrative Board in Uppsala County and to government agencies. A list of all those who obtained a written invitation plus viewpoints received in writing entitled "Summary of written viewpoints and questions plus SKB's replies" is found on page 68.</p>
Background material	<p>Specially produced background material: Background material for consultations under Chapter 6 of the Environmental Code, for licensing review under Chapters 9 and 11 of the Environmental Code, and under the Nuclear Activities Act. Interim storage, encapsulation and final disposal of spent nuclear fuel. Safety and radiation protection. SKB, May 2007.</p> <p>The material contains a general description of SKB's work with safety and radiation protection. A summary of the SR-Can safety assessment was included as an appendix.</p> <p>The material was available on SKB's website on 14 May 2007.</p>
Presentations	The meeting was preceded by presentations, where <i>Erik Setzman</i> (SKB) gave an overview of SKB's work with safety and radiation protection and <i>Allan Hedin</i> (SKB) provided information on the work with long-term safety, with a focus on the recently published SR-Can safety assessment.
Present	<p>Approximately 60 persons in all Private citizens and organizations: about 40 persons</p> <p>SSI – <i>Tomas Löfgren</i> and <i>Mikael Jensen</i> SKI – <i>Josefin Päiviö Jonsson</i> and <i>Holmfridur Bjarnadottir</i> SKB – <i>Saida Laârouchi Engström</i>, <i>Olle Olsson</i>, <i>Erik Setzman</i>, <i>Allan Hedin</i>, <i>Olle Zellman</i>, <i>Anders Nyström</i>, <i>Per Olov Lindberg</i>, <i>Peter Dybeck</i> and others.</p> <p>Representatives from <i>MKG</i>, <i>Milkas</i>, <i>SERO</i>, <i>County Administrative Board in Kalmar County</i>, <i>Döderhult Nature Conservation Society</i>, <i>Oskarshamn Municipality</i> and <i>KASAM</i></p>
Moderator	<i>Björn Nyblom</i> , Diplomat PR
Minutes signed by	<i>Britta Kahanpää</i> and <i>Kaj Nilsson</i>

Questions and answers from the consultation meeting are given below. Written viewpoints received in reference to this meeting and an equivalent meeting in Forsmark on 31 May are presented in a separate compilation entitled "Summary of written viewpoints and questions plus SKB's replies," page 68.

1. Interim storage facility and encapsulation plant

1.1 Where will the boundaries for the encapsulation plant go?

How close to it can people live? What will the physical protection be like?

(SKB) The encapsulation plant will be built directly adjacent to Clab. In other words, the facility will be located in an industrial area where radioactive components are handled today. This is no different from today, people can still live where they live now.

Physical protection is regulated in SKIFS 2005:1 from 2005 (the Swedish Nuclear Power Inspectorate's Regulations concerning Physical Protection of Nuclear Facilities). The regulations apply to Clab, the encapsulation plant and the final repository for spent nuclear fuel. The physical protection requirements have been strengthened, calling for better fencing, better alarms, camera surveillance, own central alarm stations etc. For security reasons, it is not possible to discuss the details of the physical protection of the encapsulation plant.

1.2 Isn't it simple to sabotage the cooling water intake to Clab?

(SKB) Even if someone should sabotage the cooling water channel to Clab it would take about a month before it gets too hot in Clab. This leaves plenty of time to take measures.

1.3 Could the emissions from Clab be reduced if BAT (best available technology) were used?

(SKB) We have looked at how the emissions from Clab and the encapsulation plant could be reduced. If we can get permission to implement the Clab the suggestions that have been put forward, the emissions from the combined facility incorporating Clab and the encapsulation plant will be less than the emissions today from Clab alone.

2. The final repository

2.1 Will you make a decision in the municipal council? SSI and SKI will not make a decision in the final repository matter until all material is available.

(Oskarshamn Municipality) Oskarshamn Municipality will not make a decision in the final repository matter until we receive an inquiry regarding siting of the final repository in the municipality.

2.2 The report SR-Can is in English. A 100-page summary has now been produced in Swedish. Do you think you have access to enough information to conduct a review?

(Oskarshamn Municipality) It was Oskarshamn Municipality that demanded that SKB produce the Swedish summary, and we believe it is sufficient to provide the necessary information and an understanding of the SR-Can safety assessment. The English version was prepared by experts and will be reviewed by experts. Everything cannot be translated. Nor is it possible to read up on every subject.

2.3 SSI's presentation stated that the risk of being harmed by the final repository may not exceed one in a million. How is harm defined?

(SSI) The probability of harmful effects due to a radiation dose are calculated in accordance with Publication 60 from the ICRP (International Commission on Radiological Protection). The harmful effects referred to are mainly cancer, but hereditary defects are also included.

2.4 Is it true that the requirement concerns the risk of dying of cancer, not contracting cancer?

(SSI) The requirement concerns the risk of dying of cancer. When the risk is calculated, different forms of cancer are weighted in accordance with ICRP Publication 60. Work is under way on a new publication that will replace ICRP Publication 60.

2.5 Are the calculations based on the healthcare that is available today? In other words, without assuming that healthcare will become better or vice versa?

(SSI) The calculations are based on today's healthcare.

2.6 Think of what happened with the low-level waste in the near-surface repository. It was supposed to have been disposed of, but radioactivity was then discovered in the runoff. Now you (SKI) have decided that the repository must be monitored and controlled for 100 years to come. This will require more money than you had planned. Intermediate-level waste has also started to leak out, and now you have to monitor this as well for longer than planned. You may have to monitor the high-level waste for millions of years. Or is it simpler to dispose of high-level waste?

(SKI) It is necessary to distinguish between the regulatory authorities' responsibility and the activity operator's responsibility. What you mention is related to the near-surface repository, and it is the activity operator who is responsible for the facilities that are in operation. As far as the final repository is concerned, we have time to formulate the requirements since we have not yet received an application and the facilities will be in operation for a number of decades before they are finally closed.

(SSI) According to the Environmental Code, the industry has an aftertreatment liability for 30 years after the last canister has been deposited.

2.7 You said before that data were lacking from Laxemar, but isn't it so that data are available but have not been processed?

(SKB) Yes, that is correct. When we were working on SR-Can, we lacked data from the area in Laxemar (Oxhagen) that is of greatest interest. Now we have data from this area and are working to interpret them.

2.8 The final repository is supposed to protect man and the environment for 100,000 years. How will it be possible to update the safety analysis report during this long period of time? Has money been set aside for this?

(SKB) The safety analysis reports (SARs) for the facilities must be kept updated during the construction and operating phases. Updates will take place until the final repository has been closed. There will be no updating after closure.

2.9 According to the consultation material, SKB is working on a hydrogeological study. When will it be finished? According to the research report produced by Clifford Voss, the final repository should be sited in an inland area.

(SKB) The hydrogeological study deals with the change in the water table due to the tunnel system that will be built. For example, the groundwater level in nearby wells will be affected. The study will be presented prior to the applications in 2009.

The question of siting in near-coastal areas versus inland locations will not be studied in the hydrogeological study, but has been studied several times before. The results of these studies show that there is no conclusive evidence in favour of an inland location versus a near-coastal location. The presentation of these results will constitute an important part of future applications to show that a suitable site has been selected for the final repository.

2.10 What language will the account of inland versus near-coastal location be written in?

(SKB) The part of the application that deals with the general rules of consideration and the siting principle will be written in Swedish.

2.11 The canister will be hottest about 10 years after deposition.

How hot will it be then? How will the heat affect the rock and the surroundings?

(SKB) The final repository is being designed so that the temperature in the clay buffer will not exceed 100 °C. At high temperatures, the rock wall nearest the deposition hole may crack. Very pessimistic assumptions have been used for this in our calculations.

2.12 According to the Environmental Code, the municipalities do not have a veto in the final repository question. Why does SKB say they do?

(SKB) Let us ask the representatives from Oskarshamn Municipality. Are you aware of the fact that you have a veto?

(Oskarshamn Municipality) Yes, we do. If it is decided that the final repository is to be located in Oskarshamn Municipality, the municipality will be asked.

2.13 According to the veto valve, the Government can override the municipality.

(SKB) Yes, it is possible provided that another location cannot be found for the final repository. The feasibility studies conducted by SKB show that several municipalities could be considered for a final repository. I don't think that any government wants to override a municipality in this question, which would violate the spirit of the Environmental Code.

Information

Oskarshamn Municipality wants to make a clarification in the veto question. Oskarshamn Municipality is a voluntary participant, and we feel we have received the guarantees we need from SKB. The municipality has several instruments to stop the process if need be, for example our planning monopoly. We will not adopt a detailed development plan for the area for a long time.

2.14 If the ice ages that will reach Oskarshamn and Forsmark occur earlier in the reference scenario in SR-Can, how would that affect the rock?

(SKB) In the reference scenario we first have a little ice age and then a slightly larger ice age and then a big ice age. It doesn't matter if we change the order.

The problem we see with ice ages is that the meltwater can affect the buffer. If the buffer disappears, it is the canister that controls the course of events, and corrosion of the canister is a slow process. Our interpretation today is thus that we can make it to the 100,000 year limit regardless of ice ages.

2.15 The Baltic Sea is the most radioactive sea in the world. The Oskarshamn nuclear power plant (OKG) pollutes the most, more than the Russian reactors. It is therefore wrong to locate a final repository in a discharge area near the Baltic Sea. An inland location may be better. So investigate Hultsfred! SKI and SSI have also pointed this out.

(SKB) This information is misleading. It is true that the radioactivity level in the Baltic Sea is relatively high. But this is not because of OKG, it comes from Chernobyl. Our studies show that the emissions from a final repository will be acceptable.

The question of siting in near-coastal areas versus inland locations has been studied several times before. The results of these studies show that there is no conclusive evidence in favour of an inland location versus a near-coastal location.

2.16 It is not just the dose to humans that is of interest, but also which different nuclides will be released. This information appears to be lacking in the SR-Can safety assessment.

(SKB) In the calculations we have reported which nuclides get out. This information is in SR-Can.

2.17 Won't there be any monitoring at the final repository? What is the reason for this?

(SKB) A discussion is under way as to whether such monitoring should be done and if so what should be measured. If measurements of some kind are conducted, it is important that they do not jeopardize the long-term safety of the repository. Neither SKB nor the regulatory authorities are clear as to how this is to be solved. In the SR-Can safety assessment we have not assumed that any monitoring will take place.

3. Common issues

3.1 Have you discussed why the fish outside Oskarshamn are the most radioactive fish in the Baltic Sea?

(Oskarshamn Municipality) No, we are discussing the effects of a final repository.

3.2 How many of the local environmental issues you are working with are related to radiation risks?

(Oskarshamn Municipality) Radiological matters are dealt with in the Safety Group. In the Misterhult Group we deal with local environmental matters such as highway 743, noise disturbances, drinking water and health aspects.

3.3 Do you have any radiological expertise in the Misterhult Group?

(Oskarshamn Municipality) No.

3.4 How do you share in the knowledge collected in the LKO project?

(Oskarshamn Municipality) We have a great deal of cooperation between the three LKO groups. The chairman of each group is also a member of the Development Group. We also have common meetings with all LKO groups, where different questions are discussed.

3.5 So you don't stipulate any requirements on, for example, emissions reduction?

(Oskarshamn Municipality) The Municipality does not yet have any application to consider. In future applications we want to have clear specifications of emissions, and of course we will stipulate requirements. We will also stipulate requirements on measures and sanctions if the requirements are not complied with.

3.6 I have a question regarding BAT (best available technology) in relation to the emissions from OKG to Baltic Sea. SSI does not appear to impose any requirements on BAT if the emissions do not exceed established levels.

(SSI) SSI always has requirements on optimization.

3.7 An evaporation plant is used at Forsmark, but it is not used at OKG because it is too expensive.

(SSI) SSI noted that the optimization requirement always applies.

3.8 I think we are getting the same information from SKB at this consultation as last time and the time before that. Nothing new is being said. The timetable is just postponed all the time. Has it really been decided that a final repository will be built? Isn't it so that OKG wants the fuel in the interim storage facility so they can reuse it in 30 years? Does the nuclear power industry really want a final repository?

(SKI) The industry has a legal obligation to solve the final disposal problem.

(SKB) The industry wants to solve the final disposal problem. Society demands that the problem be solved. We now have the resources necessary to do this and plan to submit the applications in 2009. There are even groups who think we are moving too fast in solving the final disposal problem.

Claim/clarification

Milkas would like to clarify that research should have been conducted long ago on additional methods to be able to compare different alternatives. Now SKB has been conducting research for 30 years on one method, the KBS-3 method. This is what we are criticizing, not that it is moving too fast.

3.9 Is SKI financed by the Nuclear Waste Fund?

(SKI) Parts of SKI's activities are financed by the Nuclear Waste Fund. Most of the financing is coming from administration and research appropriations from the Ministry of the Environment.

3.10 Is there money for SKI's activities in the future, when nuclear power has been phased out?

(SKI) Yes, money has been set aside in the Nuclear Waste Fund for future regulatory costs.

3.11 Is disposal in deep boreholes a better alternative?

(SKB) SKB has worked on a broad front to find a suitable method for final disposal of spent nuclear fuel and has studied disposal in deep boreholes, among other methods. The research and the results obtained during the development of the KBS-3 method are in many respects also relevant for disposal in deep boreholes.

Technology exists today for drilling deep boreholes. But it needs to be developed to handle the large diameter required. Equipment for deposition does not exist, nor does technology for retrieval of canisters, if necessary. It should, however, be possible

to develop technology for drilling and deposition. But the possibility of initial canister damage cannot be excluded in the case of disposal at great depths in boreholes.

One problem with depositing spent nuclear fuel in deep boreholes is the aggressive environment that exists at these depths, with high temperatures and salinities. This, together with the risk that the canisters will be damaged during deposition, means that long-term safety is only based on the assumption that the groundwater conditions are stable at great depth.

In contrast to disposal in deep boreholes, the KBS-3 method entails that we have monitored handling in all steps of the deposition process, and that long-term safety is based on multiple barriers.

3.12 The same problem of final disposal of spent nuclear fuel exists internationally. I therefore assume that you are looking at what other countries are doing and what other methods are being used?

(SKB) Internationally, a broad consensus now exists that geological disposal is the strategy that is best suited to disposal of long-lived radioactive waste. Different geological environments have been studied in different countries, depending on local conditions. France is planning to build a final repository in a clay formation, and Germany in a salt formation. Different types of rock formations are planned to be used in Switzerland, Canada and the USA.

SKB has developed the so-called KBS-3 method for final disposal in Swedish bedrock. Finland, which has similar geological conditions, has been cooperating with SKB for a long time and also plans to dispose of its spent nuclear fuel in a KBS-3 repository.

3.13 SKB should study disposal in deep boreholes. Internationally, natural barriers such as tuff, salt and clay are planned to be used in the final repository. In contrast to the KBS-3 method, disposal in deep boreholes entails the use of a natural barrier in the form of water with a high salinity.

(SKB) It is not correct that we do not have a natural barrier in the KBS-3 method. The rock is a natural barrier that is of great importance for safety. We have performed calculations showing that the bedrock in Forsmark leads to a reduction of emissions by a factor of 100.

3.14 In the discussion it is claimed again and again that we cannot delay the nuclear waste programme since we have now devoted 30 years to research and development. But I believe that safety is the most important consideration. This means we have to look at other methods. The nuclear waste issue has to be allowed to take time, in view of the fact that 1 kg of plutonium will be left per tonne of waste after 100,000 years.

I therefore believe more research is needed, and independent research. SR-Can was a huge project. But it is not right that the industry is in charge of the process. SKB, which is owned by the nuclear power companies, should not have the role of developer while simultaneously leading the process. It should be organized in another way, perhaps as a bipartisan forum.

(SSD) SSI said that they had received a question from the ministry regarding the organization. However, SSI sees no reason to change the organization. In some countries, the Netherlands for example, a special agency is in charge of the EIA process.

3.15 I don't think you have drilled enough boreholes. I would like to see a dry repository. Put the waste 300 metres down in the rock and demonstrate that it can be retrieved.

(SKB) We have been working for 30 years with the KBS-3 method and intend to apply for a permit for final disposal according to this method soon. We think it is reasonable to have our application examined, reviewed and evaluated. If it is not acceptable, we will have to continue studying other alternatives.

3.16 How safe is it to ship spent nuclear fuel by sea, considering terrorists?

(SKB) We have a transportation system for spent nuclear fuel that has been operating since the mid-1980s. The ship we use is specially built for the purpose. The transport casks, which weigh around 80 tonnes, provide great protection. Protection on multiple levels is provided during transport. The exact nature of this protection is classified.

3.17 What happens if Osama Bin Laden fires missiles?

(SKB) The casks can withstand missiles.

3.18 What countries want to have interim storage?

This question was not answered at the meeting.

Public meeting in Östhammar Municipality

Date	31 May, 2007
Time	Presentations, 16:00–18:00 hrs Consultation meeting, 19:00–21:00 hrs
Place	Municipal office, Östhammar
Target group	Private citizens, organizations, government agencies
Invitation	<p>The meeting was advertised locally in Upsala Nya Tidning (11 and 26 May), Östhammars Nyheter (10 and 24 May), Annonsbladet (9 and 30 May) and Upplands Nyheter (11 and 25 May). The meeting was also advertised (21 May) for national coverage in Dagens Nyheter, Svenska Dagbladet, Sydsvenska Dagbladet, Göteborgs-Posten, Västerbottenkuriren and Post-och Inrikes tidningar (the Swedish Official Gazette).</p> <p>A written invitation went to the organizations that receive funding from the Nuclear Waste Fund to follow the consultations, Östhammar Municipality, the County Administrative Board in Uppsala County and to government agencies. A list of all those who have obtained a written invitation plus viewpoints received in writing entitled "Summary of written viewpoints and questions plus SKB's replies" is found on page 68.</p>
Background material	<p>Specially produced background material: Background material for consultations under Chapter 6 of the Environmental Code, for licensing review under Chapters 9 and 11 of the Environmental Code, and under the Nuclear Activities Act. Interim storage, encapsulation and final disposal of spent nuclear fuel. Safety and radiation protection. SKB, May 2007.</p> <p>The material contains a general description of SKB's work with safety and radiation protection. A summary of the SR-Can safety assessment was included as an appendix.</p> <p>The material was available on SKB's website on 14 May 2007.</p>
Presentations	<p>The meeting was preceded by presentations, where <i>Erik Setzman</i> (SKB) gave an overview of SKB's work with safety and radiation protection and <i>Allan Hedin</i> (SKB) provided information on the work with long-term safety, with a focus on the recently published SR-Can safety assessment.</p>
Present	<p>Approximately 50 persons in all Private citizens and organizations: about 15 persons</p> <p>SSI – <i>Tomas Löfgren</i> and <i>Mikael Jensen</i></p> <p>SKI – <i>Josefin Päiviö Jonsson</i>, <i>Övind Toverud</i> and <i>Ranald MacDonald</i></p> <p>SKB – <i>Saida Laârouchi Engström</i>, <i>Olle Olsson</i>, <i>Erik Setzman</i>, <i>Allan Hedin</i>, <i>Kaj Ahlbom</i>, <i>Gerd Nirvin</i>, <i>Jenny Holmström</i> and others</p> <p>Representatives from: <i>MKG</i>, <i>Milkas</i>, <i>EfÖ</i>, <i>County Administrative Board in Uppsala County</i>, <i>Regional Council in Uppsala County</i>, <i>Östhammar Municipality</i> and <i>KASAM</i></p>
Moderator	<i>Björn Nyblom</i> , Diplomat PR
Minutes signed by	<i>Ylva Lundh</i> and <i>Hans Roos</i>

Questions and answers from the consultation meeting are given below. Written viewpoints within the framework of this meeting and an equivalent meeting in Oskarshamn on 28 May are presented in a separate compilation entitled "Summary of written viewpoints and questions plus SKB's replies," page 68.

The day before the consultation meeting, SSI had declared a suspension of deposition for operational waste in SFR. Much of the discussion and questions and answers were therefore about this – see section 3, "Common issues".

1. Interim storage facility and encapsulation plant

No questions or viewpoints were expressed pertaining solely to the interim storage facility or the encapsulation plant for spent nuclear fuel.

2. Final repository

2.1 With regard to flawless canisters: Has SKB taken into account the human factor in the safety assessment when they assume canisters to be flawless?

(SKB) An important factor in the safety assessment is having knowledge of the initial state in final repository. How well can the canisters be welded? Are the canisters leaktight?

At the Canister Laboratory we can perform quantitative test series on the welds. Based on destructive testing of the welds, we have obtained statistics on defect frequencies and types of defects, which we have used in the safety assessment.

An accident analysis is also included, where we look at what the consequences might be if we are wrong in our assumptions. What might happen if a canister emplaced in the final repository has through defects, for example? What flaws can occur in connection with fabrication of inserts and manufacture of buffer?

In summary: Yes, we have taken into account the human factor in the SR-Can safety assessment. That work will be updated for a future safety assessment.

2.2 I can understand the uncertainty regarding the low- and intermediate-level waste storage facility. This waste can be transferred to the final repository for spent nuclear fuel.

SKB claims that they gone from victory to victory. I claim that SKB has been forced to retreat repeatedly in its statements. They have, for example, claimed that the consequences of earthquakes are negligible. Now they have to adjust the given premises to be able to handle ice ages, fractures, displacements etc. This is a huge uncertainty. Being able to guarantee safety for over 100,000 years is an illusion. To make this happen there must be a guarantee for what things will be like then. The alternatives must be described: alternative disposal sites, deep boreholes and DRD. I know of two sites that are much better for a final repository than the sites SKB is exploring now. There is a great uncertainty that is alarming. We have to retain verifiability and freedom of choice. There is no need to rush ahead.

The moderator interposes a question that has come up in the break: Isn't disposal in deep boreholes safer??

(SKB) I agree, the Environmental Code stipulates strict requirements on the alternatives report. SKB will include such a report in the applications. There we will describe all strategies and methods that have been studied.

DRD (dry rock deposit) is a fantastic type of interim storage facility, but it is not final disposal. Disposal in deep boreholes is not considered by SKB to live up to our safety philosophy. For example, a multiple barrier system is not guaranteed.

We will give discuss BAT (best available technology), the siting principle and other general rules of consideration in the Environmental Code in our future applications. We have found the most suitable sites.

I would like to comment on the claim that SKB has to retreat from its positions. In the mid-1990s we assumed we could not fully seal the canisters. Now we can. I don't think this is retreating. In the mid-1990s we did so assume that earthquakes occurred.

2.3 In 1998 in Strasbourg you swore that earthquakes do not occur in the northern part of Sweden.

(SKB) The safety assessment (SR 97) that was presented in 1999 contains scenarios with earthquakes.

2.4 SKB dismisses our alternatives without letting us show that they work. As long as we don't get to do that, something is amiss.

(SKB) The way the laws are formulated, responsibility for finding a solution for final disposal of the spent nuclear fuel rests with the activity operator. We listen to all viewpoints that are expressed.

2.5 Clab is the worst way we have for managing the spent nuclear fuel. We cannot let the law control reality. Reality should control the law.

(SSD) The one who produces the waste is obligated to dispose of it. Changes in this principle must be approved by the Riksdag.

2.6 SKB said before that dry storage is a kind of interim storage. The important thing for the future is to have a monitored repository. We will turn the repository over to future generations. We do not have the right to withhold dangers, facts or the opportunity to make use of new knowledge. That is why the repository should be monitored. Such a design is based on ethical principles.

When we hear that there will be no more monitoring after closure, this is very worrying. In 100,000 years we will have one kilogram of plutonium per tonne of waste.

It is not possible to simultaneously be responsible for both the activity and the consultation process. We want to have another division of responsibilities. A democratic decision process. A new authority or a multipartisan body with independent researchers, authorities, companies and NGOs is needed.

(SSD) We have been asked this question before. SSI sees nothing in the fundamental division of roles that needs to be changed. The polluter pays principle (PPP) is a good one. On the contrary, there is bad experience from the USA, where DOE (Department of Energy) has responsibility for both disposing of the waste and supervising themselves. SSI believes we have a good system in Sweden.

2.7 SKB said earlier that now we can seal the canisters. When the Stipulations Act was passed in the early 1980s, "a safe" rock was required. Now that isn't necessary anymore. SR-Can shows that there is uncertainty regarding the bentonite clay in an ice age. Are we compromising on the multiple barrier system and heading towards one barrier?

(SKB) Now there is sufficient evidence for us to claim that we can seal the canisters. The question that was brought up in connection with SR-Can is whether the buffer may be washed away during a glaciation. We brought this up in the previous safety

assessment (SR 97), and since we still lack sufficient data to calculate this in detail we make pessimistic assumptions. The calculations show that the buffer could be washed away in certain vulnerable positions in the event of a glaciation. It is a question of ten or so canisters over a timespan of a million years.

Can we then still speak of a multiple barrier system? Yes, *the rock* is there and will always be there. Even if both the canister and the buffer are discounted, the rock in Forsmark only lets about 0.7% through and the rock in Laxemar about 2% of a release from a canister. The canister is there and has always been there, even when we have assumed that one out of a thousand is damaged. *The buffer* is a substantial barrier for most canister positions, even with the pessimistic assumptions we have made in SR-Can.

All of these barriers therefore contribute to safety. In the safety assessment we look at situations where one or more barriers for one or a few canister positions fail partially or completely after a period of time that may be thousands of years in the future. It is therefore not a question of whether barriers exist or not, it is not black or white.

Comment on SKB's reply: If the buffer does not hold up, the KBS-3 method is equivalent to the deep boreholes method, where the canister and the rock are the barriers.

2.8 Question to N-A Mörner: You said that you knew of a couple of sites that were much more suitable for a final repository. Where are they located? When a scientist says he knows, people believe him even without evidence. I want you to tell us where these sites are.

(N-A Mörner) There is geological evidence supporting my contention. I will present it when I get the question formally and an assignment from SKB or someone else.

2.9 First a comment on the division of responsibilities. The activity operator bears responsibility and the polluter pays principle is good, but if it doesn't work it is possible to do like the Netherlands. They have an independent body that works with EIA.

Now I have a question about the Forsmark lens. I have spoken with a research at KTH about how external stresses affect the lens. He was worried that the lens could be destroyed in connection with land movements associated with an ice age. Have you modelled this? I would like to see a report.

(SKB) External impact on the lens is one of many processes included in SR-Can. Land movements are included in the assessment. This aspect has not been found to affect the lens appreciably. I would be happy to have you put me in touch with the researcher you have spoken with.

2.10 I would like to talk about a concern we have. We have long wanted to discuss the theme risk and safety. It therefore makes me uneasy when I read the background material. The fact that physical protection will come later. Long time perspectives are involved in conveying information to future generations. There will be technological progress. This may include drilling. The sites may be forgotten after the ice age. We think you should be more open about all this. I think it would serve everyone's interests.

(SKB) In the safety assessments we do not assume that information will be available on the final repository in 100 years. Safety must nevertheless be ensured. SKB will submit a plan of action for the preservation of knowledge about the final repository along with the applications in 2009. Some of the plan will be a proposal for how the topic can be kept alive up until the closure of the repository in around 2060.

As far as the design of the physical protection, this information is naturally classified. An account of physical protection for the encapsulation plant has been submitted to the authorities.

2.11 Something that is important for the properties of the clay buffer is the temperature range in which it should function. Have you looked at natural analogues? The clay comes from areas that have undergone ice ages and a warm climate. What has the clay been exposed to and how has its quality been affected?

(SKB) Yes, we have looked at natural analogues and seen traces of alterations due to heat. The clay is stable at temperatures up to about 130 degrees. The final repository is designed so that the clay will not be exposed to temperatures above 100 degrees.

2.12 The SR 97 safety assessment included an intrusion scenario where people drilled for water, but no speculative intrusion was included. It is more likely that drilling will be done on speculative grounds, in other words out of pure curiosity. Will such a scenario be included? Could drilling be done intentionally because it is known that people have drilled before and emplaced something there? My question is thus: Do you have any scenarios with speculative intrusions? I would appreciate comments from SSI, because I think you have worked with this type of question.

(SKB) Intrusion is included in the safety assessment, and what is done in SR-Can can be said to fall between intentional and inadvertent, but not speculative intrusion. On the other hand, the consequences of inadvertently drilling through a canister are included. I find it difficult to see that a speculative intrusion would be worse. If you are looking for something you would be more likely to be on your guard. We are still working on what will be included in SR-Site. It is not certain that speculative intrusion will be included.

(SSI) SSI's regulations for a safety assessment include looking at the consequences of intrusion. SSI has not worked with the risks or consequences of speculative intrusion. Scientists in the USA have tried to calculate the probability of speculative intrusions, but they have not come very far.

2.13 Why isn't malicious intentional drilling included?

(SSI) Scenarios of that type are handled via the work with safeguards. This is another question, which is up to SKI to deal with.

2.14 The risk could increase by several hundred percent due solely to human curiosity. What kind of risk assessment is made of this? Perhaps it is better to have a deeper repository or a monitored one?

(SKB) The regulatory authorities have taken these aspects into account and they are included in SR-Can.

2.15 We have not spoken at all about radionuclides, fuel dissolution, travel times or releases and consequences. I think we should.

(SKB) All of this is included in SR-Can, where the consequences over time are examined.

2.16 The nuclear weapons risk will not disappear. The plutonium will still be there.

(SKB) it is becoming less and less interesting to use spent nuclear fuel for nuclear weapons manufacture. There are probably simpler ways to get nuclear material than breaking into the final repository.

3. Common issues

3.1 Is this [suspension of deposition in SFR] coming out of nowhere like a bolt from the blue? Hasn't SSI kept an eye on these problems along the way?

(SSI) We have requested and received information "in dribs and drabs". For example, carbon-14 is difficult to calculate, and SKB has not replied to a sufficient extent.

3.2 This [the decision to suspend deposition in SFR] is based on a report from 2001. Have the radiation protection limits been exceeded for six years without the authorities intervening?

(SSI) We have had contacts with SKB in the meantime. The shortcomings in the information do not entail any danger for radiation protection here and now.

Comment: The emissions now being discussed will have consequences in the future. In 4,000 years there will be a lake where there is now a seabed.

3.3 My question was, has the authority been sleeping or not?

(SSI) It is not a simple matter to explain what the dialogue between SSI and SKB has been like. You could possibly draw the conclusion that SKB is focusing its resources on matters relating to the final repository for spent nuclear fuel.

3.4 SSI must change the permits if the limits are too low. This worries me. Will they do the same thing when it comes to the final repository for spent nuclear fuel? If they can't meet the limits the authorities have to change them. The limit values have been adjusted in the USA for this reason.

(SKB) These are not questions to be discussed at this time and place. We will take up the question with SSI as to what levels are reasonable and what measurement methods are suitable for SFR.

Comment: If events don't agree with reality you change reality.

3.5 SKB wants to discuss with SSI how much carbon-14 they want to orare allowed to have in the final repository for spent nuclear fuel? If the models have not been right for SFR, how can we rely on them for the final repository?

(SKB) We don't intend to ask SSI to change the risk criterion of 10–6. What we want to discuss is what levels are reasonable and what measurement methods are appropriate.

3.6 Interesting to talk about limit values. STUK in Finland (note: Finnish equivalent of SKI and SSI) has a limit value for emissions of carbon-14 of 10 GBq per year. What limit applies to SFR?

(SKB) I don't know. We are confusing the issues now. It is one thing to talk about the inventory, i.e. the quantity of waste present in SFR, and another to talk about emissions and risks. They are completely different things. SKB has to show that the risk criterion is met with the inventory that is present

3.7 I can't make sense of the situation that has arisen. Is the issue important to SKB? Hasn't it come up before? Why first after the decision?

(SKB) We have noted that the inventory is greater than the predictions made and have asked SSI for an exemption instead of submitting a new application with a new safety analysis report. We have to admit today that it was not the right way to act, but we have not underestimated the problems or given priority to the final repository for spent nuclear fuel over SFR.

3.8 This is a remarkable situation. You don't want to discuss the fact that the repository for low- and intermediate-level waste is not sufficiently safe? At the same time you want to build a repository for high-level waste that will last for 100,000 years? What can you say for certain? I don't understand the question.

(SKB) We know that SFR is sufficiently safe, in both the short and the long term. What is being discussed is showing that safety is not threatened in the long term. SKB has to submit a new safety analysis report based on the existing inventory of radionuclides.

3.9 Is the discussion about the fact that the quantity of carbon-14 has been exceeded and that the report will be postponed?

(SKB) Yes.

3.10 Does this mean that there will be no physical measures in SFR? Is it so simple that you only have to recalculate?

(SKB) We can't answer that today. We will submit a safety assessment and a proposal for possible measures to SSI. Then the question can be answered.

3.11 I have a simple question: These problems have existed in SFR since 2001, right?

(SKB) SKB submitted a safety analysis report to SSI in 2001. It was based on forecasts of what type of radioactive waste would be disposed of. We have since concluded that the inventory is not the same one the report was based on. We have subsequently reported this to SSI.

(SSI) SSI says that the reports have been so inadequate that it has not been possible to determine whether the conditions for operation of SFR have been met or not.

Comment: I would just like to add, to my previous question, that as far as I understand the reports from SKB have been so unclear that we don't know if safety is threatened or not.

Comment: Comment: I have been involved for 10 years and have now experienced a revelation. Reality is adapted to the problem when the problem cannot be got rid of. It's quite natural. We are sitting here with a problem that we produce waste and we have to get rid of it. Then the rules and regulations are adapted to the problem.

3.12 Things have been brought up here such as that SKB has exceeded limit values that could entail risks in the long term. It could be claimed that this does not entail any risk until it has been demonstrated in safety assessments. In six years SKB has not fulfilled its responsibility to report long-term safety for SFR. The radiation protection must be optimized. It isn't enough that there is no risk here and now. It must not be allowed to become a burden to future generations.

(SKB) SKB has not handled this matter vis-à-vis SSI properly. We are going to review our procedures and allocate the necessary resources.

3.13 I have to comment on the background material. It is ambitious and praiseworthy, but is not adequate as background material for consultations under the Environmental Code. It contains too little information.

(SKB) The material contains a general description of SKB's work with safety and radiation protection. Another consultation on safety and radiation protection is planned when more results are available from the safety analysis reports.

Consultation meeting in connection with nearby resident meeting in Forsmark

Date	8 September 2007
Time	12:00 – 13:45 hrs
Place	Teresia School, Forsmarks bruk
Target group	Nearby residents
Invitation	A written invitation to the nearby resident meeting was sent to all residents (about 250 households) within a radius of ten kilometres from the Forsmark nuclear power plant, which is located adjacent to the site investigations. It said in the invitation that a formal consultation meeting was going to be held in connection with the nearby resident meeting.
Background material	—
Presentations	<p>At the nearby resident meeting, SKB provided information on the latest news from the site investigation in Forsmark and what the next two years will bring. They further described what a future final repository would look like.</p> <p>The formal consultation meeting focused on the questions and viewpoints of the participants. All questions and viewpoints, even those that were raised during the information portion, are included in this compilation. A communication was submitted after the meeting. Its contents and how it was handled are described in section 3 “Common issues”.</p>
Present	<p>About 90 persons in all. Private citizens: approximately 80 persons <i>SKB – Kaj Ahlbom, Bengt Leijon, Gerd Nirvin, Inger Nordholm, Erik Setzman</i> and others Representative from Östhammar Municipality</p>

1. Interim storage facility and encapsulation plant

No questions or viewpoints were expressed pertaining solely to the interim storage facility or the encapsulation plant for spent nuclear fuel.

2. Final repository

2.1 How is rock stress measured?

(SKB) Rock stresses are measured at depth, in boreholes. There are two methods for measuring rock stresses: hydraulic fracturing and overcoring. The simplest to explain is hydraulic fracturing, where a borehole section is sealed off between two packers, after which the rock is fractured by water pressure. By measuring the water pressure that is required to keep the crack open, the rock stress across the fracture can be calculated.

2.2 The term “*final repository*” is not good. *Deep repository* is better.

(SKB) The designation “final repository” is the only one used in legal and regulatory texts. We have followed this practice. It emphasizes the purpose of achieving long-term safety. Final disposal must be safe even if there are no institutional controls or monitoring in the future.

**2.3 There are many mine holes in the district. Will they be filled up?
Is it possible to use the rock spoil for this?**

(SKB) We will use some of the rock spoil ourselves and hope to be able to sell the rest so that it can be used for other purposes. It is naturally advantageous if we can sell it locally. We see no problems in using it to fill up mine holes, but we don't know what permits might be required.

2.4 Regarding the number of vehicle passages: Do all types of vehicles count as a passage? The different types of vehicles – trucks, cars, buses – generate different amounts of noise.

(SKB) A passage is a passage, regardless of the type of vehicle, but noise and other effects are calculated in relation to how the traffic is broken down into different vehicle types.

2.5 Has the so-called “thought prohibition section” of the Nuclear Activities Act been abolished?

(SKB) Yes.

2.6 This is a district with fine cultural traditions and natural pathways. It could be improved with a ski complex and a sledding hill. Use the rock spoil for that.

(SKB) That is certainly worth considering.

3. Common issues

3.1 The spent fuel in Clab in Oskarshamn is a gold mine. It would be a waste of resources to just bury it. Reprocess it instead, make new fuel and use it in the new types of nuclear reactors.

(SKB) We have to comply with today's political decisions and legislation. They say that Sweden's spent nuclear fuel has to be disposed of in final repositories. If new decisions are made with other directives, it is possible to retrieve deposited fuel during the operating phase of the final repository. It is also possible to retrieve fuel after repository closure, but this requires great efforts and resources from the society of that time.

SKB continues to keep track of the development of other methods within the framework of our RD&D (Research, Development and Demonstration) programmes, of which accounts are published every three years.

In this context I would also like to mention that transmutation is not a long-term solution to the problem of long-lived radioactive waste. Even after transmutation there is a waste product that must be disposed of. Furthermore, reprocessing and transmutation require continued operation of the nuclear power plants

Comment on SKB's reply: Thank you for that answer. It is good that you are continuing to study other possible methods.

3.2 Highway 76 past Johannisfors is already an accident-prone road today. We need a better road. This is an urgent question for both the nuclear power plant and you. I know that it is the National Road Administration that decides, but I want to raise the question.

(SKB) The standard of the road is important to us. This is an important transport road for everyone. The road is worthy of attention, in terms of standard, safety and noise.

3.3 The wildlife situation contributes to a lot of accidents on this road. How far has the National Road Administration come in its planning?

(SKB) The National Road Administration predicts a general increase in traffic. If the final repository is located in Forsmark it will further add to the traffic. We don't know how far the National Road Administration has come in its planning. Our job is to tell them how much increase in traffic a final repository would lead to, then it is the National Road Administration and the rest of society that decides on expansion and improvement of the road network.

3.4 Regarding the residential area, do you plan to build high-rise hotels to make room? What will happen with the sports facility?

(SKB) The plan is that the new housing will be no more than three storeys high. A new sports facility is planned.

3.5 Is there really enough room for new housing within the area? Are there other alternatives?

(SKB) There is room for the housing. We have examined two alternatives and arrived at the conclusion that a new residential area at Igelgrundet is the best option, in part because most of the people who will live in the housing work at FKA, which is nearby. Furthermore, the housing should not be too close to the final repository, since it can cause disturbances during construction.

3.6 What will happen to the ski track?

(SKB) The ski track will be moved. One proposal is to Kattskäret. We welcome other proposals.

3.7 Where will the school pupils live?

(SKB) The power plant is working on this question. It will be to somewhere else in any case, no pupils on the industrial area.

3.8 The land area you will purchase, will it be a clear-felled area or a wooded area?

(SKB) Sveaskog (forest company) owns it now, and the area will be a part of their "ecomangement". We have not seen any plans for clear-felling. If we decide to purchase the area, SKB will ensure that the area's natural values are preserved, which means that it will not be clear-felled.

3.9 A communication from Lasse Andersson och Joy Nilheim, Kaj and Agneta Enhorn from Habbalsbo was handed in after the meeting. It takes up the problem that electricity is required to receive the alarm that is sent out if anything serious happens at the nuclear power plant. The people who live in old cottages near the power plant have no electricity and can therefore not be warned! The authors of the communication have tried to bring this matter up with the County Administrative Board and FKA.

SKB forwarded this matter to FKA, which replies (Claes-Inge Andersson) that it is the County Administrative Board that is responsible for this type of alarm. The County Administrative Board is also responsible for decisions to evacuate, assembly points etc. in an emergency situation. FKA has nothing to do with civil preparedness.

Public meeting of the Oskarshamn EIA Forum

Date	12 September 2007
Time	9:30 – 15:30 hrs
Place	SKB's site investigation office, Simpevarp Peninsula
Target group	Oskarshamn Municipality, County Administrative Board in Kalmar County, SKI and SSI The meeting was open to the public
Invitation	The date of the meetings is decided on jointly. SKB summons the regular parties to a meeting via e-mail. The invitation to private citizens was published in Oskarshamns-Tidningen (1 and 8 September) and Nyheterna (1 and 8 September).
Purpose	The group consults on matters related to SKB's plans to site an encapsulation plant and a final repository for spent nuclear fuel in Oskarshamn. Furthermore, each participating party gives a status report on the work they are taking part in that has a bearing on the disposal of spent nuclear fuel.
Background material	—
Present	County Administrative Board in Kalmar County – <i>Ulf Färnhök</i> (Chairman), <i>Sven Andersson</i> Oskarshamn Municipality – <i>Lars Blomberg, Bo Carlsson, Rigmor Eklind, Elisabeth Englund, Karl-Gunnar Karlsson, Kaj Nilsson, Antonio Pereira, Rolf Persson, Lars Tyrberg, Peter Wretlund, Harald Åhagen</i> SKI – <i>Holmfridur Bjarnadottir, Patrik Borg</i> SSI – No one present SKB – <i>Claes Thegerström, Saida Laârouchi Engström, Kristina Dahlström, Katarina Odéhn, Olle Olsson, Erik Setzman, Peter Wikberg, Lars Birgersson</i> (secretary)
Audience	Representatives from the <i>Swedish Agency for Public Management, the Regional Council in Kalmar County, KASAM, MKG, Milkas and SERO</i> . Total about 35 persons

1. Interim storage facility and encapsulation plant

No questions or viewpoints were expressed pertaining solely to the interim storage facility or the encapsulation plant for spent nuclear fuel.

2. Final repository

- 2.1 Oskarshamn Municipality said that if the final repository is sited at Oxhagen, parts of the final repository's underground facility may end up outside the area that is designated as being of national interest for final disposal of spent nuclear fuel and nuclear waste.

SKB said that there is nothing to prevent locating parts of the repository outside the area of national interest, and that no special measure is planned at present in this regard.

SKI had no comment, but offered to get back in the matter.

2.2 Will the supplementary borehole affect SKB's timetable?

SKB said that they do not expect the timetable to be affected by the supplementary borehole.

2.3 Drilling has been done to a depth of 1,000 metres in Forsmark. Has drilling been done to the same depth in Laxemar as well?

SKB replied that they have drilled to a depth of 1,000 metres in Laxemar as well.

2.4 EIA question no. 12 – SR-Site in Swedish

The municipality's question to SKB

In preparation for the meeting, LKO's safety group had posed an "EIA question" to SKB about getting the coming SR-Site safety assessment in Swedish.

Rigmor Eklind, Oskarshamn Municipality, said that safety is the most important matter when the municipality makes a decision on the siting of the final repository. The coming safety assessment SR-Site must therefore be available to those who want to familiarize themselves with the safety matters. There will be a need for different types of accounts in Swedish, ranging from detailed descriptions to simple information folders. The municipality requests that the Swedish material be ready at the same time as the main report SR-Site is presented. What plans does SKB have to present the safety assessment SR-Site? The Swedish translation of SR-Can came too late.

SKB's reply

Olle Olsson, SKB, said that the supporting documentation for the application will mainly be written in Swedish, but that SR-Site for example will be in English since quality assurance and review will be carried out to a great extent by foreign experts. SKB's planning is for SR-Site to be written in English, with a summary in Swedish. When SR-Site is finished it will be translated to Swedish. It is reasonable that the Swedish version of SR-Site should be available when SKI circulates the applications for comment.

2.5 MKG said that the area that is of greatest interest for siting of a final repository in Laxemar has a different rock type and is partially located outside the area notified as being of national interest for final disposal of nuclear power waste. The area was initially seen as a bounding area southward that was presumably a fracture zone. Shouldn't the site investigation largely be redone with a focus on the new area? Is a new borehole really sufficient to characterize area?

SKB pointed out that a programme for how the site investigations were to be carried out was prepared before they began. Initially a large area was included in the investigations. The area was gradually narrowed down, Laxemar was prioritized, and within Laxemar the investigations focused on the area at Oxhagen.

2.6 Previously SKB has said that all rock in Sweden is equivalent. Now it turns out that this is not the case. Is it possible that there is better rock than in Oskarshamn and Forsmark?

SKB said that they had not said that all rock is suitable for a final repository, but that it is possible to find suitable rock almost anywhere in Sweden. This was shown in SKB's feasibility studies. The feasibility studies also showed that there are municipalities where there is bedrock that is not deemed suitable, which was the case in Älvkarleby Municipality.

2.7 Does the bedrock in the southern part of the Laxemar area contain iron?

SKB said that rock contains iron in the form of magnetite, which can be oxidized to hematite.

2.8 Isn't there a fracture zone that cuts through the southern part of the Laxemar area?

SKB stated that the available information, including geophysical information, was originally interpreted as indicating a fracture zone in the southern part of the Laxemar area. But there are no indications from the boreholes that this is the case.

2.9 SKB should investigate other places for siting of the final repository. Inland locations should be included in the investigations.

SKB intends to apply for a permit to build a final repository in Oskarshamn or Forsmark.

3. Common issues

3.1 Oskarshamn Municipality asked what alternative modes of transporting rock spoil will be studied.

SKB replied that the study will consider overland transport, but that sea and rail transport of rock spoil are also mentioned.

3.2 Oskarshamn Municipality asked what alternative modes of transporting canisters from the encapsulation plant to the final repository will be studied. Will the study include, for example, overland transport, underground transport and grade-separated junctions?

SKB replied that the focus is on overland transport. SKB has judged the alternative of transporting the canisters underground as less attractive. SKB's reason for this will be made clear in the study. Grade-separated junctions will also be studied in the ongoing feasibility study.

3.3 Oskarshamn Municipality asked why SKB conducts studies and publishes results instead of bringing up these types of questions in the consultations. It is difficult for the municipality to influence the process at such a late stage when designs and solutions may be fixed.

SKB replied that the studies it conducts and the results it obtains serve as a basis for future consultations. The viewpoints that are then obtained are taken into account by SKB. When it comes to questions of this type (transport of canisters from the encapsulation plant to the final repository), it is something which SKB discusses regularly with nearby residents and the municipality in order to get their viewpoints at an early stage.

3.4 Local environmental questions

Discussion

Peter Wretlund, Oskarshamn Municipality, said that SKB's policy is fraught with opportunities and that it is important that the municipality is included in the work.

Karl-Gunnar Karlsson, Oskarshamn Municipality, emphasized that the transport issue is important, not least in view of the fact that the coast road, highway 743, is already overloaded today. Groundwater is also an important issue.

Olle Olsson, SKB, said that SKB is currently working on design stage D2, and that the results of this design work will be included in the applications. Various environmental studies are under way at the same time, and the results from these studies are included in the ongoing design work. As far as groundwater is concerned, SKB looked at private wells early on. Measurements are being made of the groundwater level in boreholes. So SKB is well aware of the groundwater situation in the area.

Saida Laârouchi Engström, SKB, said that SKB welcomes the way the municipality regards the environmental issues. The wishes of the municipality and nearby residents guide SKB's work.

3.5 Openness and accessibility at regional meetings

Discussion

A large part of the question-and-answer session was devoted to a discussion of the communication sent by MKG to, among others, the parties in the EIA Forum on 31 August 2007, "Question of openness and accessibility at the regional meetings on a final repository for spent nuclear power fuel (Oskarshamn EIA Forum and Forsmark Consultation and EIA Group)". A summary of the discussions and the EIA Forum's handling of the communication follows below.

Openness and accessibility at meetings with EIA Forum

Openness and accessibility at meetings with the EIA Forum was discussed. MKG said that meetings of the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group have previously been held about four times a year. Sometimes they have been joint meetings. The number of meetings was reduced considerably in 2007. Both meetings in both series were cancelled in the spring. One meeting in each series will be held now in September, and one joint meeting will be held at Arlanda in December. This means that there will be two meetings in each series during 2007.

MKG also notes here that the meetings this autumn will be held both at the site investigation offices in Simpevarp and Forsmark and at Arlanda (joint meeting). Simpevarp and Forsmark are not the most accessible meeting places for private citizens in Oskarshamn and Östhammar municipalities. Moreover, it is likely that private citizens will find it even more difficult to attend meetings at Arlanda.

In the communication, MKG asks whether the participants in the series of meetings can give greater consideration to the needs and opportunities of private citizens and the environmental organizations to gain insight into the nuclear waste programme via these series of meetings. How will this question be handled by the participants in the series of meetings?

Ulf Färnhök, County Administrative Board in Kalmar County, said that the working group in charge of drawing up the agenda for the meetings arrived at the conclusion that the items which the parties thought were most interesting to take up during the year were most suitable for the autumn meetings. Furthermore, several points are best suited to take up at a joint meeting.

Peter Wretlund, Oskarshamn Municipality, said that the municipality would like to see four meetings per year with the EIA Forum, provided that the agendas are good. Peter Wretlund emphasized that openness and a Q&A session for the public are

important, but so are clear relationships between the parties. It is suitable that two of the meetings be held centrally in Oskarshamn. One meeting can be held near the site investigation area. Furthermore, it is good to have one joint meeting per year for the EIA Forum and the Forsmark Consultation and EIA Group. A choice of venue for this meeting will be a compromise, however, with Arlanda offering a suitable solution.

Claes Thegerström, SKB, said that SKB shares the municipality's view that nearness to the area is important. Claes Thegerström noted that meetings with the EIA Forum are not the only way to gain insight into the nuclear waste issue. SKB would be happy to provide information on various questions to various groups, such as MKG.

Saida Laârouchi Engström, SKB, emphasized that it is important to have some meeting every year for nearby residents.

Status of meetings of EIA Forum

MKG stated that according to SKB, the meetings of the Oskarshamn EIA Forum are consultation meetings under the Environmental Code and are thereby controlled by SKB, even though the agenda and minutes are discussed with the other parties. Can the County Administrative Board clarify the status of the meetings?

Ulf Färnhök of the County Administrative Board in Kalmar County said that the minutes used to be written by the County Administrative Board, but that SKB does this nowadays. All parties check the minutes. The agenda for the meetings is prepared by a working group with representatives of the parties. The meetings of the EIA Forum are a part of SKB's consultations.

Saida Laârouchi Engström, SKB, clarified that the meetings with the EIA Forum are a part of SKB's consultations under Chapter 6 of the Environmental Code.

National meetings

The question of national meetings was discussed. Milkas contended that the nuclear waste issue is a national issue and that meetings should therefore also be held in, for example, Malmö, Göteborg and Stockholm. Saida Laârouchi Engström, SKB, said that SKB arranged regional meetings in both regions in 2004, as well as a national consultation meeting in Stockholm. Invitations to both meetings were sent out on a broad front to conservation and environmental organizations. Unfortunately, the turnout was poor. Further, SKB was criticized for the fact that the consultation process was fragmented, making it more difficult for other parties to get an overall picture. After this criticism, SKB has refrained from having consultations with a limited group, but instead arranges consultation meetings to which we send out invitations on a broad front. Erik Setzman, SKB, said that SKB is prepared to adapt the forms of the consultations, as has been done in recent years. Advertisements have been run in the national media prior to the most recent consultation meetings. However, this has not resulted in increased participation or requests for SKB to arrange consultation meetings in other parts of the country.

Milkas contended that there are other stakeholders at the national level, such as members of parliament, that should be informed. SKB said that it is unfortunately difficult to arouse interest in the nuclear waste issue, but that they are positive to consultations at the national level.

Torsten Carlsson, KASAM, pointed out that KASAM recently arranged a Q&A session on deep boreholes. The purpose was to get as comprehensive and neutral an analysis of the deep borehole alternative as possible. The target group for the Q&A session was the public (particularly private citizens in the candidate municipalities), decision-makers in industry and public agencies, environmental and interest organizations, politicians at the local and national level and the media.

Handling of MKG's communication

Ulf Färnhök, County Administrative Board in Kalmar County, summarized the discussions of MKG's communication and how it will be handled.

The parties in the EIA Forum will frame a joint reply to the communication. The basic message in the reply will be that:

- The EIA Forum intends to have four meetings per year, provided that good agendas can be arrived at.
- One meeting per year should be a joint meeting with the Forsmark Consultation and EIA Group.
- The other meetings are held near the area in question.
- The agendas for the meetings are drawn up by the working group.

The reply will also contain a comment on the status of the meetings with the EIA Forum.

3.6 SKB's consultation procedure

Discussion

Torsten Carlsson, KASAM, asked whether the EIA Forum intends to evaluate SKB's consultation procedure?

SKB replied that such an evaluation is being carried out by Göran Sundqvist and Mark Elam within the ongoing CARL project. Furthermore, SKB's consultation procedure has been studied by Linda Soneryd, Stockholm University, within the framework of SKB's social science research programme. SKB also receives comments and viewpoints on the consultations from other actors. In other words, many people study SKB's consultation procedure. The comments and viewpoints SKB receives from them are incorporated in the work. Kaj Nilsson, Oskarshamn Municipality, claimed that all parties in the EIA Forum are involved in the CARL project. SKI said that they are funding a doctoral student who is studying SKB's consultation procedure. The study will be finished during 2007. The Regional Council in Kalmar County said that they had met with all municipal councils in the county to inform them about the final repository project. Furthermore, they will, together with SKB, give information to the Riksdag at a breakfast meeting on 24 October.

3.7 SERO asked how SKB was planning to implement the experience transfer requested by SKI in view of the long time perspective. Does suitable technology exist for this?

SKB stated that SKI's request for experience transfer had to do with transferring experience from the application for Clab stage 2 to future applications regarding the encapsulation plant and the final repository. The experience transfer did not involve any long time perspectives.

3.8 MKG stated that a number of questions were posed at the meeting with the Oskarshamn EIA Forum on 6 December 2006 (joint meeting with Forsmark Consultation and EIA Group) and that the questions are noted in the minutes, but that the nuclear power industry's nuclear waste company, Svensk Kärnbränslehantering AB (the Swedish Nuclear Fuel and Waste Management Co), SKB, which keeps the minutes, has replaced MKG's designation of the industry specifically as the nuclear power industry with the designation SKB. In MKG's opinion there is a risk that the industry, which is a special interest in the nuclear waste issue, will be wrongly perceived as being a public interest, almost a public authority, in as much as the industry is only mentioned as SKB in all contexts. MKG has therefore intentionally used the phrase "nuclear power industry, SKB AB" in the questions it has posed. MKG wonders if the industry in future minutes can retain MKG's nomenclature when the actual question is mentioned in the minutes?

SKB stated that the name is SKB or Svensk Kärnbränslehantering AB (the Swedish Nuclear Fuel and Waste Management Co) and nothing else.

Public meeting with Forsmark Consultation and EIA Group

Date	13 September 2007
Time	9:00 – 12:30 hrs
Place	SKB's site office in Forsmark Harbour
Target group	Östhammar Municipality, County Administrative Board in Uppsala County, SKI and SSI The meeting was open to the public
Invitation	The date of the meetings is decided on jointly. SKB summons the regular parties to a meeting via e-mail. The invitation to private citizens was published in Uppsala Nya Tidning (17 November and 1 December), Östhammars Nyheter (15 and 29 November), Annonssbladet (14 and 28 November) and Upplands Nyheter (16 and 30 November).
Purpose	The group consults on matters related to SKB's plans to site an encapsulation plant and a final repository for spent nuclear fuel in Forsmark. Furthermore, each participating party gives a status report on the work they are taking part in that has a bearing on the disposal of spent nuclear fuel.
Background material	—
Present	County Administrative Board in Uppsala County – <i>Leif Byman</i> (chairman), <i>Mats Lindman</i> Östhammar Municipality – <i>Bertil Alm</i> , <i>Barbro Andersson Öhrn</i> , <i>Ronald Arvidsson</i> , <i>Sten Huhta</i> , <i>Hans Jivander</i> , <i>Virpi Lindfors</i> , <i>Jacob Spangenberg</i> , <i>Anna-Lena Söderblom</i> , <i>Arno Unge</i> SKI – <i>Holmfridur Bjarnadottir</i> , <i>Bengt Hedberg</i> SSI – <i>Elisabeth Öhlén</i> SKB – <i>Kaj Ahlbom</i> , <i>Saida Laârouchi Engström</i> , <i>Bengt Leijon</i> , <i>Gerd Nirvin</i> , <i>Olle Olsson</i> , <i>Erik Setzman</i> , <i>Sofie Tunbrant</i> (secretary)
Audience	Representatives from <i>EfÖ</i> (<i>Energy for Östhammar</i>), <i>Oss</i> (Opinion Group for Safe Final Disposal) and the reference group and the screening group in <i>Östhammar Municipality</i> . Total about 5 persons

1. Interim storage facility and encapsulation plant

1.1 Östhammar Municipality wondered why the canister factory is not included in the application for the encapsulation plant. The canister factory will only exist specifically for this.

SKB replied that the canister factory will not be included in the coming EIS for the final repository system. Exactly what activities will be conducted at the canister factory is not known yet, but there will not be any nuclear activities. The scope of the EIS has been discussed in the consultation, and no objections have been made to the fact that the canister factory is not included, either by SSI or SKI.

2. Final repository

2.1 Östhammar Municipality asked how deep the repository is planned to be located in Laxemar and whether it can really be accommodated within the area.

SKB replied that the planned depth is 500 metres and that the area accommodates 6,000 canisters, with margin.

2.2 Östhammar Municipality wondered whether all consultations will be implemented during 2008, including on a preliminary EIS?

SKB replied that all consultations will be implemented in good time before the applications are submitted.

2.3 When will the results come from the water and chemical analyses from the final repository level?

SKB replied that the results have been used in SR-Can and are presented in one of all the reports that have been produced.

3. Common issues

3.1 Östhammar Municipality wondered whether FKA's planned interim storage facility for reactor internals will compete for space with a possible encapsulation plant in Forsmark.

SKB replied that the study will address road transport, but that sea and rail transport of rock spoil are mentioned.

3.2 Östhammar Municipality asked whether the new Financing Act means that only the chosen municipality can apply for money after site selection.

SKB replied that up to a decision by the Government, both municipalities are counted as site investigation municipalities.

3.3 Östhammar Municipality is worried that the regulatory authorities will not have time to discharge their obligations. Why don't they have sufficient resources? The decision to merge the authorities was unexpected. Östhammar Municipality and Oskarshamn Municipality have written jointly to the Government asking for assurance that the regulatory authorities have sufficient resources, but have not yet received an answer.

SKI replied that they believe they have the resources they need. The review of SR-Can is proceeding according to plan, and an exemption has been granted for the review of the RD&D programme. Future needs will be analyzed.

3.4 Östhammar Municipality wondered how the merger of SSI and SKI will affect SSI's exercise of authority. Will SSI still be able to express its opinions as an expert body? Sweden can after all be regarded as a model in having two regulatory authorities that work with safety relating to nuclear technology and radiation protection.

SSI replied that they will act as a public authority after the merger. There is nothing to suggest any change in priorities with regard to radiation protection.

SKI concurred that the new authority will work in accordance with existing legislation.

SKB said that there is no opposition between the authorities. The merger means that matters will be handled as in other countries, by a *single* authority.

3.5 Östhammar Municipality wondered about the changes in how the applications will be divided up and submitted. First applications for the encapsulation plant and the final repository are processed in two separate matters. Then they are to be combined, and now they are separate again.

SKI replied that according to SKB's planning, the regulatory authorities can submit simultaneous statements of comment to the Government.

SKB has always said that it is preferable for all involved to start early. The application for the encapsulation plant is a thoroughly researched application, and starting by looking at this application provides experience regarding how to best organize the future work. It has been a long time since any applications have been submitted for new nuclear facilities.

SKB has no intention that anyone should make any official comments on the encapsulation plant before all the documentation on the whole system is on the table.

3.6 Östhammar Municipality would like to emphasize that SKB's continued information activities are important. The replies to a questionnaire sent to the reference group revealed uncertainty as to the group's duties. SKB's further information will provide a basis for the work of the group.

SKB observes that while the drilling is finished, a lot of other activities are going on. EIA and design will provide more practical results to which people's attention can be devoted. SKB will continue to participate in dialogue and would be happy to help keep interest alive in different groups.

3.7 MKG points out that the evaluation of the use of funds from the Nuclear Waste Fund only applies to funds for the environmental organizations, where there has been a four-year trial programme, 2005–2008.

When the Financing Ordinance is amended as of 1 January 2008, the opportunity for municipalities to apply for funds from the Nuclear Waste Fund will be changed. MKG wonders how the opportunities for the regional councils in Kalmar and Uppsala counties to obtain funding from the Fund will be affected?

SKI replied that it does not appear as if these opportunities will be affected.

3.8 MKG wants to know why the nearby resident meeting of 8 September 2007, which was apparently also a consultation meeting, has not been included in SKB's consultation planning. How was the invitation to the meeting made? Were nearby residents in Gräsö invited to the meeting? Are there other changes in the consultation plan posted on SKB's website (dated 10 May 2007)?

SKB replied that the reason the formal consultation was held at the same time as the nearby residents meeting is cool interest on the part of nearby residents in attending the consultation meetings. They have been known to leave during the break. Complaints have been expressed by nearby residents that the meetings are dominated by the big environmental organizations, who are mainly concerned with formalities, and that nearby residents are not given enough opportunity to voice their concerns. The best opportunity to reach them is at the nearby resident meetings, which are well attended. SKB's purpose with the meetings is to reach everyone.

Invitations to the nearby resident meeting were sent to everyone within a ten-kilometre radius of the area for the site investigations. Gräsö is not included.

There may be further changes in the consultation schedule, in terms of both dates and themes.

3.9 The question being asked is: final repository here or in Oskarshamn? Perhaps the new Government will want to consider other alternatives than final disposal. The fuel in Clab is worth a lot of money. Now it is permitted to do research on nuclear technology again. Get the Alliance to agree to reconsider the decision for final disposal. Reprocessing is a better alternative, since it permits the resources to be utilized. What does a copper canister cost? The encapsulation plant will presumably be located in Oskarshamn, won't it?

The County Administrative Board replied that it is not the role of the regulatory authorities to put political pressure on the Government. The work must be based on today's political decisions and legislation.

Östhammar Municipality pointed out that the political parties are lobbying for their opinions.

SKI observed that a previous calculation showed that a copper canister costs approximately SEK 1 million. The price of copper has risen since then, so the cost is probably higher today. SKB's proposal is that the encapsulation plant should be located in Oskarshamn. This permits simple handling, since the fuel is kept in Clab. Considerations of safety will then determine which site is chosen in the application for the final repository. The preliminary assessment is that both sites are adequate.

3.10 SERO (Swedish Renewable Energies Association) believes that the incident in Forsmark revealed shortcomings in emergency preparedness. It does not appear as if the County Administrative Board has sufficient resources or expertise. SERO proposes central surveillance round the clock, including surveillance of Clab for all future time. In a hundred years SKB will no longer exist.

The County Administrative Board said that they have regular evacuation exercises in the event of an accident. Regional preparedness is good, and municipal preparedness perhaps even better. If needed, it is possible to get national reinforcement. Nationally, however, emergency preparedness is more questionable. A topical example is the tsunami in Thailand. It took a long time to mount a national response. Spontaneously, the County Administrative Board therefore does not find central surveillance to be of interest.

Östhammar Municipality pointed out that the final repository will not be the responsibility of either the nuclear power industry or the municipalities in a hundred years. Responsibility will be handed over from the industry to the state. Some of the responsibility already rests centrally with SSI and SKI.

SSI pointed out that central surveillance does exist – SSI is tasked to plan and organize preparedness for radiological accidents on a national level. This is done in collaboration with SKI and the Swedish Rescue Services Agency. This preparedness is good and regular exercises are held together with local and regional bodies.

3.11 Discussion of alternative methods

The discussion was based partly on a previous comment that the fuel in Clab is too valuable to be disposed of and on the fact that reprocessing methods exist and are used.

Östhammar Municipality said that the value of fuel stored in Clab is dependent on supply and demand from nuclear power plants. Big investments in new reactors are necessary to make it possible to use the fuel. Today's reprocessing methods do not meet our environmental safety requirements either. Other methods are constantly being evaluated. Reprocessing on a commercial basis lies far in the future.

SERO said that transmutation lies at least 50 years in the future and is not appropriate for Sweden, since the Baltic Sea is already the most radioactively contaminated sea. The municipality does not agree that the Baltic Sea is so contaminated.

The person posing the question pointed out that reprocessing is being done in France and the UK. Even Thorbjörn Fälldin [former prime minister] thought that reprocessing was good. The fuel is already there and it's insane to put it down in the rock. As far as reprocessing and Thorbjörn Fälldin is concerned, it was answered by saying that a condition for getting a permit to build the nuclear power plants was that a solution existed for the waste. Reprocessing was the only solution available then.

3.12 It was previously pointed out that the combined evaluation of the encapsulation plant and the final repository was important, but what is happening with the plans for the final repository for long-lived waste? FKA is now planning for an interim storage facility for reactor internals. It has previously been said that final disposal would take place in the same repository as that for spent nuclear fuel. What is planned now?

SKB replied that there is not yet any detailed planning for where a repository for other waste will be located. At OKG there is a rock cavern for dry interim storage of low- and intermediate-level waste (BFA). It can be utilized as an interim storage facility for long-lived waste. The need for a final repository is expected to arise in around 2040. Siting has not yet begun.

3.13 Who owns the land in Oskarshamn?

SKB replied that the area in Laxemar is owned by about 50 private persons.

3.14 MKG is anxious that as many people as possible should have as much insight as possible in the ongoing nuclear waste process. The number of meetings with the Forsmark Consultation and EIA Group was reduced in 2007. Two meetings were cancelled in the spring. MKG has written a letter to the county administrative boards, the regulatory authorities, the municipalities and SKB about the future planning of the activities in the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group. The County Administrative Board in Uppsala County has answered MKG and says that it is the County Administrative Board's ambition to continue to contribute to giving concerned citizens and NGOs good opportunities for insight in the meetings of the Forsmark Consultation and EIA Group. How will this question be handled by the other participants in the Forsmark Consultation and EIA Group?

Östhammar Municipality is also anxious that as many people as possible should have broad insight into and information about what is going on. They have not yet specifically prepared a reply to MKG's communication.

SKB noted that MKG posed the same question at the meeting with the EIA in Oskarshamn the day before (12 September) and makes the same reply:

There were forms for regional meetings long before there was a formal consultation process. The municipality wanted to have a forum for meeting the regulatory authorities and SKB. Now these meetings have been developed and are included in the formal portion of the consultations in accordance with Chapter 6 of the Environmental Code, which means SKB is responsible. Purpose, participants and procedures are agreed on in the work forms. The agenda for the meetings is prepared by a working group with representatives of the parties.

SSI stated that they will probably reply to MKG next week.

SKI is anxious to have good forms for the meetings. In this constellation they view themselves primarily as an advisory body to the municipality.

3.15 MKG points out that they think it is difficult to get information on "the same level" as for example the municipality gets..

SKB notes that MKG says that they do not get enough information to be able to review SKB's work, but that is not the intention either. MKG gets funds from the Nuclear Waste Fund to follow the consultations. MKG has declined invitations to attend information meetings. For example, SKB invited them to an information meeting about SR-Can where the experts would also participate, but MKG declined saying they did not want to be at the same meeting as the regulatory authorities and the municipalities. SKB welcomes MKG's participation at meetings, but not all meetings arranged by SKB.

Road consultation with regulatory authorities

Date	13 september 2007
Time	13:00 – 15:00 hrs
Place	SKB's site investigation office, Simpevarp Peninsula
Target group	Oskarshamn Municipality, County Administrative Board in Kalmar County, the Rescue Services, the Swedish Road Administration Consulting Services and the Swedish Road Administration Region Southeast
Invitation	Invitations were sent by e-mail.
Purpose	Discuss connecting roads to a final repository in Laxemar, Oskarshamn.
Background material	—
Present	SKB – <i>Jonas Nimfeldt, Kristina Dahlström and Olle Zellman</i> Swedish Road Administration Region Southeast – <i>Karl-Gunnar Edman</i> County Administrative Board in Kalmar County – <i>Peter Sieurin</i> Oskarshamn Municipality – <i>Elisabeth Åkerman</i> Rescue Services – <i>Roine Hansson and Gert Persson</i> Swedish Road Administration Consulting Services – <i>Mats Pettersson, Andreas Hansson and Frida Kumb</i>

1. Interim storage facility and encapsulation plant

No questions or viewpoints were expressed pertaining solely to the interim storage facility or the encapsulation plant for spent nuclear fuel.

2. Final repository

No questions or viewpoints were expressed pertaining solely to the final repository for spent nuclear fuel.

3. Common issues

Discussion/ viewpoints

Peter Sieurin, County Administrative Board in Kalmar County, wanted to see a feasibility study according to the Public Road Act in order to avoid complications at a later phase. The link to the existing road network (E22, highway 743 etc.) and public access to the area are of interest from the viewpoint of the County Administrative Board. All safety requirements have increased with time, which is why Peter Sieurin wants to see more long-range planning of the canister shipments. The County Administrative Board therefore prefers a grade-separated junction with highway 743.

Peter Sieurin gives the advice to limit the feasibility study to the connecting road and avoid broadening the area it is supposed to cover. If SKB has decided not to re-route highway 743, there is no need for an in-depth look at re-routing in the feasibility study.

Karl-Gunnar Edman, Swedish Road Administration Region Southeast, clarified that a work plan has to be prepared if the junction with highway 743 has to be rebuilt in such a way that the new road area has to be used. If the rebuild and the land use are included in the detailed development plan for the final repository, the work plan does not have to be exhibited or adopted.

Peter Sieurin wanted to see several alternative solutions to the junction with highway 743 where traffic safety and emergency safety are also addressed. The connecting road should be designed to accommodate future plans for expansion in the area. The requirements for canister transport (inclines etc.) should also be addressed in the feasibility study.

The County Administrative Board, the Swedish Road Administration and the Rescue Services see the junction with highway 743 as a risk point, in terms of both capacity and traffic safety. The Swedish Road Administration considers a grade-separated junction with highway 743 to be preferable. If the junction is not grade-separated and can be solved within the existing plan area, it can be handled as a connection matter under the Public Road Act according to the Swedish Road Administration, which also would like to see an in-depth study of rail-bound traffic.

Karl-Gunnar Edman preferred a separate transport route for canister transport if possible, taking into account the length and speed of the vehicle rig and other traffic.

The Rescue Services expressed a desire for two access roads, but existing gravel roads could also serve as response routes in the event of an emergency. Some improvements of these roads may however be required. The evacuation route should be designed so that two heavy vehicles can meet. The Rescue Services also noted the need for a response plan during the construction period and that there are designated rescue areas that are clearly marked on maps.

The existing gravel road just south of the Laxemarån River but north of today's entrance to OKG is not used by the Rescue Services today; instead, the private road to Ävrö is used.

SKB's standpoint is that existing roads that will be affected by increased traffic may be improved when the siting of the final repository has been determined (Oskarshamn or Forsmark). This applies mainly to highway 743 southward towards Fårbo. A transport study is being conducted with a focus on traffic flows and transport by boat, rail, truck etc. In view of the limitations in the existing harbour in Simpevarp, Olle Zellman, SKB, noted that a likely scenario is that the shipments of rock spoil will take place during the first 30 years by truck, after which there may be an extended railway for the shipments.

The question arose as to whether it is permitted to overtake the canister transport vehicle. Olle Zellman, SKB, points out that private cars should not come between the canister transport vehicle and the warning vehicle. Jonas Nimfeldt, SKB, returned after the meeting with the reply that there are no formal obstacles to overtaking a canister transport vehicle.

Road consultation with private citizens

Date	8 October 2007
Time	18:30–21:00 hrs
Place	SKB's site investigation office, Simpevarp Peninsula
Target group	Private citizens, associations and property owners
Invitation	Invitations to the meeting were sent to 62 households and to the Döderhult Nature Conservation Society. A drawing with alternative connecting roads was enclosed with the invitation.
Purpose	Discuss connecting roads to a final repository in Laxemar, Oskarshamn.
Background material	Drawing with alternative connecting roads.
Present	SKB – <i>Jonas Nimfeldt, Kristina Dahlström, Erik Setzman and Olle Zellman</i> Swedish Road Administration Consulting Services – <i>Mats Petersson and Andreas Hansson</i> Representatives from private citizens, associations and property owners in the area. Total about 20 persons.

1. Interim storage facility and encapsulation plant

No questions or viewpoints were expressed pertaining solely to the interim storage facility or the encapsulation plant for spent nuclear fuel.

2. Final repository

No questions or viewpoints were expressed pertaining solely to the final repository for spent nuclear fuel.

3. Common issues

3.1 Catharina Lihnell Järnhester, Döderhult Nature Conservation Society, said that a cycle path may be needed to the facility, really all the way from Figeholm. Catharina also wondered why the alternative of separating other traffic from the canister shipments along the entire route is not proposed.

SKB said that the benefit of such separation is very low, with regard to both the traffic situation and improving transport safety for the canisters.

3.2 Discussion

Dan Strömhag (landowner) recommends that the connecting road(s) be built along the existing power line corridor. It should be possible to build an attractive connecting road in the power line corridor. Dan is further of the opinion that the three connecting road alternatives from the south should be rejected, since they fragment the landscape and give rise to increased disturbances. Since the houses in the village of Ström lie in a valley, Dan is worried that road alternatives 1004, 1009 and the architect's proposal might generate increased traffic noise. Particularly if there is to be a road for visitors and personnel from the south and heavy traffic along the power line

corridor, the village of Ström will end up in between. Dan would like to see a noise barrier built along highway 743 to reduce the noise from the traffic.

Bengt Järnhöster (representative of property owners at Bikullen) believes that a holistic approach should be taken to the whole road system. Bengt is also worried about being squeezed in by one of the southerly alternatives (1004, 1009 and the architect's proposal), since he has properties on both sides of highway 743.

Olle Zellman, SKB, explained SKB's policy regarding highway 743 where the initiative for improvements along this road rests with the Swedish Road Administration. If a final repository is built at Laxemar, SKB is prepared to contribute to an improvement of the existing road.

Karl-Gunnar Karlsson thinks that one of the road alternatives in the existing power line corridor is preferable.

Several people at the meeting contended that road alternative 1002, which is intended solely for the transport of rock spoil, is not suitable in view of the fact that these trucks would probably have to drive through Lilla Laxemar. A grade-separated junction at highway 743 was said to be a good proposal in view of the traffic load that already exists today at this junction (intersection of highway 743 and the entrance to OKG). One of the participants thought it would be a good idea to have a separate road for the canister shipments in view of the fact that they go so slow (10 km/h).

3.3 Has SKB considered a tunnel alternative?

SKB replied that this has been briefly studied, but that it is not realistic in terms of cost. The tunnel alternative does not offer any significant advantages over a road alternative.

3.4 Is it possible to build a road beneath the power line?

The Swedish Road Administration replied that there is no problem crossing the power line corridor, but that the road(s) should not be run in the centre of the corridor, since this would obstruct maintenance of the power line. Building the roads parallel to the corridor is not a problem.

3.5 Do costs have any bearing on the evaluation of the proposals?

SKB replied that costs will be considered and evaluated along with other factors, such as logistics, environment, time, quality, etc.

3.6 We think one access road to the final repository should be enough for both passenger traffic and heavy haulage. The most suitable route for such transport should, we think, be in the immediate vicinity of the existing power line, so as not to disturb the housing construction in the immediate area and so as not to impair the high natural, cultural heritage and landscape values in the area.

(SKB) These viewpoints have been taken into account in the feasibility study.

3.7 Rosmarie Karlsson did not want alternative 1002 to be chosen (the most northerly alternative that runs north of Laxemar).

SKB replied that there is nothing to indicate that we will choose that alternative.

3.8 Rosmarie Karlsson wondered what the plans are with regard to noise barriers in the Ström area.

SKB will have better information regarding the noise situation this spring and by the next consultation meeting.

3.9 We are of the opinion that it is not possible to decide how connecting roads should be routed to a final repository before it has been clarified how highway 743 will be routed in the future, which means that this consultation and the proposed alternatives are purely hypothetical. We will nonetheless express our opinion on the proposals.

(SKB) Different needs and changes of highway 743 have been studied before, by SKB among others. In all probability, such studies will continue if a final repository is located in Laxemar. A new routing of highway 743 is nevertheless highly uncertain, and SKB has to study what the options are if highway 743 remains where it is today.

3.10 We believe that the three southern road alternatives routed in different places straight through an old cultural landscape with very high or high natural values should be rejected, along with the northerly alternative which entails that heavy traffic will pass through Laxemar village. A great deal of the landscape in this district will be affected by the surface facility as well as the rock heap. To further deface this culturally and naturally valuable environment with roads that do not necessarily have to go there feels like a violation of the area.

(SKB) These viewpoints have been taken into account in the feasibility study.

3.11 The only reasonable alternative is to route the road(s) along the power line corridor, with entrance at the level of the entrance to OKG.

(SKB) These viewpoints have been taken into account in the feasibility study.

3.12 We do not think there should be two different connecting roads with different entrances from highway 743. We have no objections if SKB wants to build one passenger road and one road for heavy traffic within the framework of the “power line alternative”, but if it is not feasible for cost reasons to separate the canister traffic from the other heavy traffic, it cannot be economically reasonable to build a separate car road either, can it?

(SKB) The feasibility study takes a holistic approach to the connecting road question. The study takes into account aspects relating to such factors as the environment (noise, land incursion, natural and cultural values etc.), traffic safety, costs, feasibility and user perception. The viewpoints expressed at the consultations will then also serve as a basis for the consultants when they study and evaluate different alternatives.

3.13 We believe a safe intersection should be built at the entrance to OKG, either grade-separated or as a roundabout. At the consultation it was hinted on several occasions that one or the other alternative costs too much, for example a grade-separated junction, as well as various bridge alternatives over the Laxemarån River. It feels a bit absurd in this context when we are talking about multibillion kronor investments and similar operating costs for the entire final repository project.

SKB shares the opinion that the intersection with highway 743 must be designed safely. Various junction designs are being studied in the feasibility study. Building a grade-separated junction entails a great incursion in the landscape with long over-passes and deep cuts. If such a solution does not provide any improvement in terms of traffic safety, SKB does not think such an alternative should be chosen.

3.14 We believe the canister vehicles should travel in a tunnel and not on ordinary roads from the encapsulation plant. It was not clear, incidentally, how the canister shipments are to arrive at highway 743.

(SKB) The tunnel issue has been studied in general terms in a previous study. A tunnel solely for canister shipments is extremely expensive and not justified from a safety viewpoint. The idea is that the canister shipments from the encapsulation plant, roughly one a day, should go on the existing entrance road to OKG. The possibility of widening the entrance road in order to improve passability is being studied.

3.15 We would like to see proposals for cycle paths to and from the final repository, no proposals were made for cycle paths either to and from highway 743 or to and from Figeholm and Misterhult.

(SKB) This study only looks at the connection to highway 743 from a final repository. It is possible to both cycle and walk safely on the connecting road. The existing roads in the area, including from the south, can also be used to walk or cycle to a final repository in Laxemar.

3.16 We regret the lack of any future vision in the transportation systems. What is now being sketched must be built for the future, for example with consideration given to climate change and modern transportation systems such as environmentally friendly rail transport. Cars, trucks and buses are a thing of the past. Where are tomorrow's visions in SKB's traffic and transport planning?

(SKB) The transportation system to and from a final repository must work from the time construction of the facility begins, in perhaps 2013, until the facility is closed. A rail connection is often seen as an environmentally friendly alternative to road transport, but building a railway to Laxemar entails a very large incursion in the landscape, at the same time as only a small fraction of the transport need is met by a rail connection. The environmental benefit of a railway is therefore highly doubtful. A road connection with furthermore always be needed, for example to enable the rescue services to reach the repository.

Public joint meeting with Oskarshamn EIA Forum and Forsmark Consultation and EIA Group

Date	5 December 2007
Time	09:00 – 16:00 hrs
Place	Arlanda Conference & Business Center
Target group	Oskarshamn Municipality, Östhammar Municipality, County Administrative Board in Kalmar County, County Administrative Board in Uppsala County, SKI and SSI The meeting was open to the public
Invitation	The date of the meetings is decided on jointly. SKB summons the regular parties to a meeting via e-mail. The invitation to private citizens was published in Uppsala Nya Tidning (17 November and 1 December), Östhammars Nyheter (15 and 29 November), Annonsbladet (14 and 28 November) and Upplands Nyheter (16 and 30 November), as well as in Oskarshamns-Tidningen (17 November and 1 December) and Nyheterna (17 November and 1 December).
Purpose	The groups consult on matters related to SKB's plans to site an encapsulation plant and a final repository for spent nuclear fuel in Oskarshamn and Forsmark, respectively. Furthermore, each participating party gives a status report on the work they are taking part in that has a bearing on the disposal of spent nuclear fuel.
Background material	—
Present	County Administrative Board in Kalmar County – <i>Ulf Färnhök</i> (chairman), <i>Sven Andersson</i> , <i>Anne-Li Fiskesjö</i> County Administrative Board in Uppsala County – <i>Leif Byman</i> , <i>Mats Lindman</i> Oskarshamn Municipality – <i>Bo Carlsson</i> , <i>Rigmor Eklind</i> , <i>Kaj Nilsson</i> , <i>Antonio Pereira</i> , <i>Rolf Persson</i> , <i>Lars Tyrberg</i> , <i>Peter Wretlund</i> Östhammar Municipality – <i>Bertil Alm</i> , <i>Ronald Arvidsson</i> , <i>Sten Huhta</i> , <i>Hans Jivander</i> , <i>Virpi Lindfors</i> , <i>Jacob Spangenberg</i> , <i>Anna-Lena Söderblom</i> , <i>Margareta Widén Berggren</i> SKI – <i>Holmfridur Bjarnadottir</i> , <i>Patrik Borg</i> , <i>Öivind Toverud</i> , <i>Elisabeth André Turlind</i> SSI – <i>Björn Dverstorp</i> , <i>Jinsong Liu</i> , <i>Tomas Löfgren</i> SKB – <i>Kaj Ahlbom</i> , <i>Lars Birgersson</i> (secretary), <i>Saida Laârouchi Engström</i> , <i>Gerd Nirvin</i> , <i>Olle Olsson</i> , <i>Erik Setzman</i> , <i>Christer Svemar</i> , <i>Claes Thegerström</i> , <i>Sofie Tunbrant</i> (secretary), <i>Lars Werme</i> , <i>Peter Wikberg</i> National Board of Housing, Building and Planning – <i>Bengt Larsén</i>
Audience	<i>MKG</i> , <i>Milkas</i> , <i>SERO</i> , <i>Döderhult Nature Conservation Society</i> , <i>Friends of the Earth</i> , <i>Swedish National Council for Nuclear Waste</i> , <i>Regional Council in Kalmar County</i> , <i>Regional Council in Uppsala County</i> , <i>EfÖ</i> (Energy for Östhammar), <i>Oss</i> (Opinion Group for Safe Final Disposal) and the Swedish Agency for Public Management. Total about 20 persons.

1. Interim storage facility and encapsulation plant

No questions or viewpoints were expressed pertaining solely to the interim storage facility or the encapsulation plant for spent nuclear fuel.

2. The final repository

2.1 Oskarshamn Municipality said that they had read SKB's report [regarding groundwater flow in eastern Småland (SKB R-06-64)], which seems good, but that the authorities' review statement puzzles us. What is the significance of the supplementary account with a view to site selection?

SSI replied that the regulatory authorities want to see SKB's reasons for the steps that resulted in the site selection that has been made. It is important to be able to see that there is no obviously better site or better method.

2.2 Östhammar Municipality asked whether there is sufficient data on the bedrock in the Forsmark area, or whether a similar study to that that has now been done for Eastern Småland should also be done for Uppland.

SKB replied that an equivalent study was done for Northern Uppland in 2002–2003. The regional groundwater flow has also been studied in the site investigations.

SSI pointed out that there are differences between Northern Uppland and Eastern Småland. The same premises for large-scale groundwater flow do not exist in Northern Uppland. Nor has any municipality west of Östhammar expressed an interest in the final repository.

2.3 SERO noted that the shafts, the ramp and the central area are planned to be filled with crushed rock and wondered if that will lead to high water pressures at repository depth?

SKB replied that backfilling is planned to be done with crushed rock and that there will be high water pressures at repository level.

2.4 A number of research projects are being conducted in the Äspö HRL regarding the impact on the bentonite buffer. MKG has heard that there are problems with unexpected changes in the bentonite clay. Can SKB confirm or deny this? When will the reports from the research projects be released? Reviewing these reports is an important part of the RD&D process.

SKB replied that as far as the bentonite tests are concerned, no unexpected changes have been obtained in the tests in the Äspö HRL. The work currently being done is a continuation of the tests begun in Stripa. The focus then was on determining what can happen. Now we know that and are proceeding to see what the consequences are for the bentonite so that we can increase the margins.

2.5 Milkas contended that corrosion and backfilling have been dealt with like minor engineering issues, but because of the long time perspective they will be important issues. Methane will be formed from the hydrogen that is produced. In a future ice age methane ice will be formed, and then in the transition from a cold to a warm climate the methane ice will be vaporized and explode. These methane ice explosions are vital questions that must be taken into account – they must not be marginalized. They have occurred previously in history, 2,000 years ago, and then caused a tsunami.

SKB replied that the question of methane ice has neither been forgotten nor neglected. It is taken up in one of the process reports for SR-Can. There is no evidence that methane ice explosions can occur at repository depth.

2.6 A thought with regard to fuel dissolution and further transport with the groundwater: The iodine that is dissolved from the fuel and mixed with the water should not end up in the drinking water. With this in mind it is perhaps not an advantage to locate the repository inland with fresh water, but instead to locate it in an area where the recipient consists of brackish water, which does not enter people's everyday life in the same way?

SSI replied that the great uncertainties regarding future climate and sea level changes make it difficult to guarantee that what would leak into the sea today will also do so in the future. SSI therefore believes that a final repository should be designed to provide the primary safety functions of isolation and retardation in the rock. This is also a reason why SSI calls for a presentation of the advantages and disadvantages of locating a repository in a recharge versus a discharge area, as a function of time and with consideration given to future climate change.

2.7 Milkas says that some of the canisters will break apart. How quickly can a water-soluble radioactive particle reach the surface, taking into account osmosis and capillary forces? How quickly can microbes reach the surface?

SSI replied that it is the difference in pressure that drives the groundwater. Osmosis is not relevant in this context. Microbes or other colloidal particles could be transported at the same velocity as the groundwater.

SKB added that transport of both solutes and colloids has been studied and is well understood. The calculations will be updated and made more detailed. What controls the groundwater flow is pressure differences caused by the topography. Capillary forces and osmosis are not significant in this context.

2.8 The question of groundwater flow is only approached from a hydrological viewpoint. But the time perspective must be taken into account, which is enormous. Downstream can turn into upstream and fresh water can become salt water. This is important for the municipalities to take into account.

SKB replied that the most important functions of the final repository are isolation and retardation. If a release should take place, the dose can be calculated by assuming different hydrogeological conditions, as one parameter of many. The conditions can change since the time spans are great. For example, ice ages alter the groundwater gradient. This is calculated and reported in SR-Can.

2.9 MKG wondered when the reports from the tests in Äspö that deal with the impact on the bentonite buffer will become available?

SKB replied that the work in Äspö is being done in international cooperation. The reports will come next year.

2.10 MKG wondered whether there may be better places in the interior and asserted that SKB is marginalizing the importance of regional flows compared with local ones. The regulatory authorities' analysis of SKB's modelling shows that comparison site A has much longer breakthrough times than Laxemar, which in turn exhibits longer breakthrough times than SKB's modelling runs in the site investigations. Have the regulatory authorities only used the models or have you also used actual data?

SSI replied that the modelling results from the supraregional model cannot be compared with SKB's detailed site models. The supraregional model has much too large a resolution of heterogeneity, for example local fractures and fracture zones, to be able to resolve the detailed flow distribution in the rock at a given site. The purpose of the supraregional model is instead to study regional differences in the flow pattern between different areas that are due to other reasons than local site characteristics, and this is what SSI has asked SKB to do. SSI's own evaluation of the results of SKB's supraregional modelling suggests that there may be better sites in the interior than Laxemar. SKB's new modelling results show, however, that the advantages of an inland siting are probably not as dramatic as suggested in earlier studies, in other words in the study conducted by Clifford Voss.

2.11 Oskarshamn Municipality said that the site investigation in the Laxemar area has been shifted so that a part of the area that may be of interest for the final repository's underground part is now located outside the area that has been designated as being of national interest for final disposal of spent nuclear fuel and nuclear waste. What does this mean?

Bengt Larsén, National Board of Housing, Building and Planning, replied that it is normal to start with a larger area that is then narrowed down during the course of the process. It is difficult to say what the reverse procedure might entail.

2.12 Östhammar Municipality wondered what will happen with "the other" area of national interest when SKB has made its site selection.

SKI replied that they will recommend that the area that is not chosen should no longer be of national interest. However, SKB may wish to retain both areas of national interest even after the site selection. Even if both areas of national interest are retained, it is possible that they will be narrowed down.

The National Board of Housing, Building and Planning said they do not have a differing opinion in the matter.

2.13 Östhammar Municipality noted that SKB had previously said that the site selection would be made by the beginning of 2009, provided there is a clear difference between the sites. Will the safety assessment be finished by this time?

SKB replied that the SR-Site safety assessment would not be finished by the end of 2008, but that the work will have come far by that time. It will therefore be possible to make an assessment of the outcome for the sites. If the assessment shows that there is a clear difference between the sites, it is possible to select a site.

SKB will continuously evaluate both sites. When the picture begins to clear, it will not be possible to sit on the information we have and the site selection we have made, and we will announce which site will be proposed in the applications.

2.14 Two site investigations are being conducted – is there enough room at the sites to accommodate the increased waste quantities?

SKB replied that there is enough room for final disposal of 6,000 canisters.

2.15 Will the final repository for other long-lived waste be coordinated with the final repository for spent nuclear fuel?

SKB replied that the repositories will not be coordinated and that they should not be located near each other due to their different character. The repository for other long-lived waste will contain a lot of cement and concrete, which in turn affects the

pH in the immediate environment. Such a pH effect should be avoided in the vicinity of the final repository for spent nuclear fuel.

2.16 Which application will come first?

(SKB) The applications for the final repository for spent nuclear fuel will come first. SKB plans to submit these applications in 2009 and the applications for the final repository for other long-lived waste in around 2040.

2.17 Oss (Opinion Group for Safe Final Disposal) says that it is clear from the afternoon's presentations and discussions that many questions remain to be answered. The answers that are sometimes given are of the type: "We don't know now, the answer will come later ...". The project is now in its final phase, but many answers are still not available. For example, the issues of groundwater flow and buffer erosion may be crucial for the site selection. I recommend optimization and caution; site selection should not take place until we have all the answers. Now SKB is planning to move the application process forward rather than wait for the answers. The regulatory authorities will never make any demands beyond their regulations. The municipalities are, however, free to make demands. One demand should be: No site selection until all the answers are on the table.

SKB believes it is unfair to say that they are deferring all answers until the applications. SKB has been conducting research and delivering answers for more than 30 years. As far as siting is concerned, we will make the selection when we have enough supporting material. The reasons for the selection will be given in the applications.

SKB has altered timetables when this has been necessary. The feasibility studies were planned to take one and a half years from the beginning; they went on for eight years. The applications for the final repository were supposed to be submitted in 2008; this has been postponed until 2009. Now we are ready to conclude our assignment and present the choices we have made.

As far as the time of the site selection is concerned, no drastic change has been made. We have previously said that it would come in the summer of 2009, but have now moved it forward six months. An extensive and systematic effort is now being made to evaluate the results of the site investigations. This is yielding material to serve as a basis for evaluating and comparing our two sites. When that work has come to the point where we can make a decision on which site we want to select, we will announce this.

Comment: Jacob Spangeberg, Östhammar Municipality, offered a few reflections. As far as site selection is concerned, the safety issues are crucial and the municipalities must be willing. There are two, but our patience is not unlimited. Even after site selection, the process will continue with the safety issues in focus. We must come to the point with a national review of an application. It is important to bring things to a conclusion!

Peter Wretlund, Oskarshamn Municipality, agreed.

2.18 Friends of the Earth wonders about how responsibility is being taken for future generations. The first people settled in Sweden 12,000 years ago, and in Europe 30,000 – 50,000 years ago. The first human beings arrived 100,000 years ago. Given these time perspectives, I wonder how information on the final repository will be preserved.

SKB replied that as far as knowledge transfer is concerned, there are directives from SKI and SSI regarding what documents and what information is to be saved for the foreseeable future. Extensive research is being conducted internationally, for example by the IAEA, on how knowledge can be preserved for very long periods of time. SKB is also pursuing its own work which will result in a plan of action with proposals for how knowledge preservation should take place and ways to keep the plan of action updated in the future.

It is really not just a question of preserving knowledge about the final repository for spent nuclear fuel. There is other hazardous waste for which knowledge of its management and disposal must be preserved. International work is also under way on how this can be done. For example, there will be a seminar in Paris on 11 December (*La mémoire industrielle au service des générations futures*) that will take up questions of this type.

2.19 Friends of the Earth wonders about SSI's claim that there are no municipalities west of Forsmark that are interested in the final repository. Should such aspects affect the decision?

SKI pointed out that SKI had requested that Eastern Småland should be examined more thoroughly since there are topographical differences that can control the large-scale flow pattern for groundwater. SKI has not requested a similar study in Northern Uppland. SKB's report here was done on its own initiative.

2.20 SERO notes that the properties of the groundwater change with time. Salt water becomes more saline and fresh water becomes fresher. What is happening? How is this being taken into account in the time perspective we have proposed?

SKB replied that the safety assessment includes what happens when the ice sheets advance and retreat. This includes analyses of changed salinities and pressures.

Comment: Milkas claims that what SKB says is nonsense. Knowledge of how the water is transported is nothing new. SKB has been conducting research for a long time, and not with fantastic success, but with constant setbacks. Claes Thegerström admits that the site investigations have taken 15 years instead of one and a half as planned. Methane ice was forgotten, now 40 professors have looked at it. Flow models have been called for, SKB has produced flow models. Glaciation models have been called for, SKB has produced glaciation models. Gravity potential deformation is treated as ripples on the water, when it is in fact tidal waves. Gravity potential deformation can lead to other flow models.

2.21 SERO has a question with regard to the fact that two areas of national interest have been designated for final disposal of spent nuclear fuel, both with saline groundwater. Why hasn't Hultsfred, with non-saline groundwater, been included? Now the safest method and the safest the site are not being studied, but instead we are being offered a politically convenient solution. Why was Hultsfred excluded from the siting process? It will lead to 50 years of appeals.

SKB has good contact with Hultsfred Municipality, but we do not have enough material to be able to select a safe site, and we do not need additional candidates.

2.22 Milkas wonders, when it comes to preserving knowledge of the final repository for 100,000 years, one method mentioned is to develop a cross archive. The question is who will be able to read our alphabet after such a long time?

SKB replies that the development of a cross archive is being discussed within the IAEA, for example. In Sweden, SSI has shown special interest in these matters.

3. Common issues

3.1 Oskarshamn Municipality (Safety Group) has met the researchers who have arrived at the conclusion that rapid corrosion can take place in warm, oxygen-free environments. There appear to be questions that must be answered.

SKB replied that in order for the copper canister to corrode away in as short a time as 1,000 years, a corrosion rate of more than 50 microns (μm) per year would be required, which is 100 times faster than the corrosion rate for iron under the same conditions. Such a corrosion rate is not reasonable. The results from the work of the researchers have, however, not yet been published for scientific review. When this happens, SKB will naturally study the results, but we cannot comment on the researchers' work before we have seen their report.

3.2 Discussion of backfilling and sealing material

Oskarshamn Municipality noted that questions concerning buffer and bentonite are important and are included in one of the municipality's conditions for the site investigations (condition 7). But the municipality has not had time to give much attention to these matters.

Both Oskarshamn Municipality and Östhammar Municipality asked for clarifications regarding SKB's timetable for the work with buffer and backfill. It seems that many questions concerning buffer and backfill will get answers far in the future. SKB plans to submit applications in 2009. Viewpoints from the review of SR-Site will come in around 2010–2012, and the work with buffer and backfill is planned to continue up until 2020, which is long after the municipality must have made its decision. Will tests continue up until 2020, even though the applications are planned to be submitted in 2009? What supporting material is needed for the applications? Could the research lead to the conclusion that other methods and other materials should be used?

SKB said that they have already come far with regard to both materials and methods. For those questions that have not been fully answered today there is a hypothesis which SKB is working to confirm or reject. The work thus now consists primarily of refining and looking for errors. The timetable for the work with buffer and backfill is up to 2020. A practically functioning solution is supposed to be available by that time. In the applications regarding permissibility, which are planned to be submitted in 2009, schematic solutions will be presented. Sufficient supporting material must accordingly be provided in the applications in order to determine whether the KBS-3 method is robust. An overall assessment will be presented in the SR-Site safety assessment, which will be submitted in conjunction with the applications. After the applications have been submitted, SKB will continue with its research and development work. Detailed questions will thus be solved as they arise so that new technological developments will constantly be made use of. SKB will present RD&D programmes at least up until 2020. This is a guarantee that the latest knowledge will always be used. The research and development that is planned to be conducted up until 2020 is very ambitious. SKB does not believe the coming development work will lead to other methods and other materials, but that the work will continue to refine the methods and materials that are intended to be used today.

In this context it can be noted that SKB is already conducting research pertaining to existing facilities that are in operation, for example regarding the carbon-14 measurements being performed in SFR.

SKB considers SKI's method of following up the safety issues with "partial permits" to be good. SSI said that they think the work methodology with a stepwise process is good. The step of getting a permit to build the facilities is an important step. Then there should at least be a credible description of the reference method. It is not possible today to say what this description will look like. The regulatory authorities must have a chance to review SKB's supporting material before an assessment can be made. SKI said that since the process consists of several licensing occasions, it is not reasonable to demand that all information should be available at the time of the applications in 2009.

Oskarshamn Municipality observed that it is not a stepwise process from the municipal perspective, but an acute situation. It is therefore important that sufficient material is available when the municipality has to make its decision. SKB stated that

it is a judgement call in view of the fact that there is a tendency to “dig in” at a specific site with time and compared with how the process is taking place in Finland. There a final decision will not be made until the tunnels have begun to be built, in contrast to Sweden where a decision on site selection is made at an early stage but followed by several licensing occasions for “partial permits” as the investigations and the work proceeds.

3.3 Östhammar Municipality wondered how resources are allocated between the two applications for Clab/the encapsulation plant and the final repository.

SKI replied that both permit applications are equally important, but that the application for the final repository will be more extensive and therefore require more resources for review. Both legal competence and specialist competence will be needed in the review work.

3.4 Oskarshamn Municipality and Östhammar Municipality stated that there must be sufficient resources, both human and financial, to conduct the reviews, since the regulatory authorities are the experts on whom the municipalities have to rely. This was expressed by the municipalities in a joint letter in February 2007 to the Ministry of the Environment.

SKI stated that they asked for extra funding in view of the reviews, and that a reply to this request is expected in December. The letter sent by the municipalities to the Ministry of the Environment was not sent for comment to SKI; the municipalities got a direct reply from the Ministry.

3.5 The County Administrative Board in Uppsala County wondered whether the permit decision from the Government might contain requirements on future additional Government decisions or whether the Government decision will be final?

SKI believed it was possible that additional Government decisions may be required.

SKB said that the big step in the process will be to get a permit for building the final repository on the selected site. The main process, after the Government’s decision, will be for the regulatory authorities to make sure that the final repository that is built is safe. SKB does not see a need for further political decisions unless there are major changes, for example if the site of the final repository is changed.

3.6 Östhammar Municipality wondered whether SKB or the regulatory authorities will propose permit conditions for the activity?

SSI pointed out that there is a difference between applications under the Nuclear Activities Act and the Environmental Code. In applications under the Environmental Code it is the applicant, in this case SKB, who proposes conditions. In applications under the Nuclear Activities Act it is the regulatory authorities who define conditions for the activity. The applicant may, however, propose conditions.

SKB stated that they intend to propose conditions in the applications under both the Environmental Code and the Nuclear Activities Act.

3.7 Future activities of the forums

Discussion

Oskarshamn Municipality said it is important to have a clear division of roles. The municipality has nothing against SKB convening the next meeting. The time up until the next meeting should be used to discuss the proposed new order.

SKB observed that even now it is SKB who convenes the meetings and that the meetings are a part of SKB’s consultations under Chapter 6 of the Environmental

Code. The changes implemented previously were formulated jointly, and the change that is now about to be made should also be formulated jointly. The municipalities have wanted the County Administrative Board to chair the meetings thus far.

Östhammar Municipality is positive towards the proposed change and also believes that the time up until the next meeting should be used so that the meeting can be the kick-off for the continued work.

Oskarshamn Municipality stated that this is the 58th meeting of the EIA Forum and that it is important to find a consensus solution for the continued work.

The chairman summarized the discussion by concluding that SKB will convene future meetings. The respective county administrative board will chair the next meeting of the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group. In preparation for the next meetings of the two forums, a working group will draft a proposal for the forms of the continued work.

3.8 SERO asked whether the process for the final repository for long-lived waste can be decoupled from the process for the final repository for high-level waste?

SKB replied that the planning for the management and disposal of decommissioning waste is based on an operating life of the nuclear power plants of 50–60 years. The extension of SFR is projected to be finished in 2020, after which it will be able to receive both operational waste and short-lived decommissioning waste. The decommissioning of Barsebäck will give rise to waste that must be disposed of in SFR and in the final repository for long-lived waste. The final repository is not planned to be in operation until 2045 at the earliest. The siting process has not yet even begun.

3.9 Milkas wondered when the alternative methods will be presented? There is talk here of risks and uncertainties regarding water flows. A better presentation is needed of deep boreholes and dry storage.

The question was not answered.

3.10 MKG wondered whether the County Administrative Board will take responsibility for the minutes at the next meeting?

The chairman said that the forms for the minutes of future meetings will be discussed by the working group.

3.11 In the autumn of 2007, researchers at KTH published results from laboratory studies showing that copper can corrode in an oxygen-free environment. MKG wonders how SKI intends to ensure that independent studies are conducted to validate these results? How does SKB plan to handle the question?

SKI confirmed that MKG has called for independent studies of barrier safety. SKI has replied in a letter to MKG and to the researchers at KTH. On behalf of SKI, the Swedish National Testing and Research Institute carried out experimental studies of copper corrosion under oxygen-free conditions in the mid-1990s (SKI report 95:72). These studies did not confirm the findings now being discussed. SKI has no plans to demand any more independent studies. SKI intends to let external experts go through the account of the results from KTH and possibly make a statement in conjunction with the RD&D review.

SKB replied that new research findings contradicting SKB's own results are usually handled by having SKB's experts review methods, data and results and make an assessment of whether they are relevant or can be dismissed. In order to make this assessment, they must have access to background reports, and these have not yet been made available to SKB.

3.12 SERO asks, with regard to SKB's previous reply to the observation that all replies come so late. Will Barsebäck remain standing for another 40 years? Kävlinge Municipality wants to use the land for other purposes.

SKB replied that the dismantling of Barsebäck is planned to start in 2020. According to the plans, SFR will at that time be ready to receive the short-lived low- and intermediate-level decommissioning waste. The long-lived waste, for example reactor components, will be interim-stored in BFA at OKG.

3.13 MKG noted that nothing was said about copper corrosion in oxygen-free water in the plan for corrosion research presented earlier by Lars Werme. Furthermore, the results reported in the SKI report SKI 1995:72 "Koppar-korrosion i syrefritt vatten" ("Copper corrosion in oxygen-free water") are questioned by the KTH researchers in an appendix to their letter to the Inspectorate. How does SKI plan to handle this?

As far as Äspö is concerned, SKI has engaged a consultant who looked at quality control of the research. Criticism was levelled at the fact that there does not appear to be any plan for feedback of results from the experiments to the safety assessment. What will SKI do to make sure that the research results from Äspö undergo quality control?

SKI replied that with regard to quality control of the research on Äspö, SKI will continue to engage the consultant, T.W. Hicks, who carried out the study.

Jinsong Liu, SSI, presented the Inspectorate's view of the new research findings on copper corrosion in oxygen-free environments. There is disagreement on this issue in the scientific community, so it is too early to draw any conclusions. However, SSI views the matter seriously and will conduct a review together with SKI with the aid of external experts in conjunction with the review of RD&D Programme 2007.

3.14 MKG says that new facts entail new problems to solve. The process does not take this into account. There are a number of important questions that will not be answered before site selection and applications. They are therefore not brought up in the consultation. An appeal is made to the municipalities and the county administrative boards to consider these questions. There are still unclear points, at the same time as the process is becoming locked in.

SKB replied that two years remain before the applications will be submitted. It is SKB as the activity operator who bears responsibility for judging when it is appropriate to submit the applications for review. If we have to wait until no one has any more questions before submitting the applications we will never get there. It will be an advantage to get an overall view in the applications.

The consultation is supposed to be about the environmental impact assessment. We do not consult about how the experts will interpret results concerning, for example, copper corrosion.

Jacob Spangenberg, Östhammar Municipality, contends it has to do with whether you have confidence in the process and the division of roles or not. Jacob Spangenberg has confidence in the application and review process, as well as in the democratic process. If MKG's fears are borne out, those responsible will be made to answer for this. Things have been pointed out in the consultation that should be changed and improved; this has been done, and that strengthens confidence in the process. The division of roles is important for the process to work.

Peter Wretlund, Oskarshamn Municipality, contends that the regulatory authorities have an important role and must be given the resources they need. They are constantly encountering questions that need to be taken into account. Peter Wretlund also has confidence in the process. As a politician he cannot determine how thick a canister has to be, that is a matter for the regulatory authorities.

3.15 Milkas asks Mats Lindman regarding the County Administrative Board's status report. Will there be a decision on an interim storage facility in Forsmark during the first quarter of 2008? What will be stored in it?

Mats Lindman, County Administrative Board in Uppsala County, clarified that FKA is planning for an interim storage facility for reactor internals (intermediate-level long-lived waste) pending their removal to the existing BFA interim storage facility at OKG (for subsequent final disposal in a future final repository for long-lived waste). FKA's application was recently submitted to the environmental court. It is uncertain when the environmental court's judgement can be expected.

However, the County Administrative Board expects the environmental court's judgement regarding the environmental review of the Forsmark nuclear power plant, including power increase, in the first quarter of 2008.

3.16 Milkas wonders, regarding alternative methods, that in view of the discussion of corrosion whether dry storage would be better?

SKB says that the form of dry storage discussed is the DRD method, which has been talked about for a long time and which SKI and STUK (the Finnish Radiation and Nuclear Safety Authority) have looked at. It is, however, not a final repository, just an interim storage facility, and there is already a good one of those, namely Clab.

Comment: It is we [Nils-Axel Mörner et al.] who have developed the DRD concept and it is we who should answer. We do not believe there is any method that can guarantee safety for a million years. It is better to keep the waste in safe interim storage in a DRD repository until a safe final disposal method has been developed, such as deep boreholes. BFA is a vulgar form of DRD. Clab is life-threatening.

3.17 MKG notes that SKB says different things about what the consultations should contain. Claes Thegerström says that the consultation should be about the environmental impact assessment, and Saida Laârouchi Engström says that consultations can be held about anything at any time.

SKB replied that the consultations for the final repository for spent nuclear fuel are being conducted via two processes, which should not be confused. The results and direction of research are presented and reviewed in the RD&D process, according to Government decision. The question of copper corrosion is dealt with there, for example. The other process includes the consultations under Chapter 6 of the Environmental Code. It is carefully formulated there what these consultations should deal with. SKB proposes subjects to discuss at the consultation meetings and is happy to consider suggestions.

3.18 When MKG compares the industry's predicted costs for nuclear waste management in the different Plan reports with some of the more recent annual reports, a difference of over SEK 100 million has been observed for administrative expenses. MKG says that this amount includes the cost of information activities.

Can SKB explain how much money you yourselves consider you use for information activities per year and report what other expenses than administration and information are included in the item "SKB administration" in the Plan reports?

(SKB) The cost of SKB's administration includes, for example, the accounting department, the human resources department, the department of EIA and Public Information, the department of Nuclear Safety and the IT department. Get in touch with SKB and we will explain.

Summary of written viewpoints and questions and SKB's replies from public meetings in Oskarshamn Municipality (28 May) and Östhammar Municipality (31 May)

Regarding questions and replies brought up at the different meetings, see the particular meeting.

Written invitations to participate at the consultation meetings and/or to submit written viewpoints were sent to the following organizations (which obtain funds from the Nuclear Waste Fund to follow the consultations), government agencies and concerned municipalities. The table also shows who replied.

National Board of Housing, Building and Planning	No reply
Swedish Environmental Protection Agency	No reply
SKI	No reply
SSI	No reply
Swedish Energy Agency	No reply
National Board of Fisheries	Viewpoints expressed
National Institute of Public health	Abstains
Swedish Armed Forces	No reply
National Rural Development Agency	No reply
Swedish Board of Agriculture	Viewpoints expressed
KASAM	No reply
Legal, Financial and Administrative Services Agency	No reply
National Chemicals Inspectorate	No reply
Swedish Emergency Management Agency	No reply
Swedish Agency for Economic and Regional Growth (NUTEK)	No reply
National Heritage Board	No viewpoints
Swedish Rescue Services Agency	No reply
Geological Survey of Sweden (SGU)	No viewpoints
Swedish Maritime Administration	Viewpoints expressed
National Board of Forestry	No viewpoints
National Board of Health and Welfare	No viewpoints
Swedish Road Administration	Viewpoints expressed
Oskarshamn Municipality	No reply
Östhammar Municipality	No reply
County Administrative Board in Kalmar County	No reply
County Administrative Board in Uppsala County	No reply
Swedish NGO Office for Nuclear Waste Review (MKG)	Viewpoints expressed
Swedish Environmental Movement's Nuclear Waste Secretariat (Milkas)	Viewpoints expressed
Swedish Renewable Energies Association (SERO)	No reply

In addition, viewpoints were received from the following in connection with the consultation meetings:

Oss – Opinion Group for Safe Final Disposal
 Döderhult Nature Conservation Society (Oskarshamn)
 Anders Andersson (Forsmark)
 Leif Hägg (Forsmark)

Since the previous consultation meeting, viewpoints have been received from the following:

County Administrative Board in Uppsala County

1. Interim storage facility and encapsulation plant

1.1 In the application under the Nuclear Activities Act for a permit to build an encapsulation plant for spent nuclear power fuel, values are given for atmospheric emissions from the facility during operation.

How can the industry claim that the emissions from the encapsulation plant will not be greater than the emissions from the interim storage facility for spent nuclear power fuel, CLAB? Isn't there a risk that the fuel will be damaged when 40-year-old fuel is handled in the encapsulation plant? (MKG)

The specified emissions are calculated based on existing knowledge. The calculations are presented in the application.

There is always a small risk that fuel will be damaged during handling; the consequences of this are analyzed in the safety assessment's mishap analysis. Fuel can be stored in Clab without problem for 40 years without degenerating, provided the water chemistry is good. The water chemistry in Clab is kept under strict observation and the water is continuously purified.

1.2 How much does it cost to bring down emissions to zero in CLAB? Which nuclear power plant has the lowest emissions to water known to SKB or the IAEA? (Milkas)

Emissions from Clab are very low, far below the regulatory limits.

It is not practically feasible to achieve zero emissions.

1.3 Is the requested list of nuclide pollutants from Clab in Swedish and are the calculated emissions from encapsulation and disposal in any public document in Swedish? If not, can SKB AB provide such a document? (Milkas)

Chapter 6 of Clab's safety analysis report describes what specific nuclide emissions are expected to come from the facility. These emissions have been calculated conservatively.

All emissions to air and water are monitored during operation. These figures are compiled and sent to SSI in the form of annual and semiannual reports. The reports to SSI are nuclide-specific.

All documents are written in Swedish.

2. Final repository

2.1 The Swedish Board of Agriculture thinks the material compiled for the consultations is good. However, the language of Appendix 1, which is a summary of the SR-Can safety assessment, is at a very high level, making it difficult for people without very deep knowledge in the area to comprehend the contents.

Appendix 1 is a summary of the 700-page report SR-Can. In order to simplify for people without very deep knowledge in the area of safety assessments, SKB recently published a 100-page report, R-07-24, which is a simplified Swedish summary of the SR-Can safety assessment. The report is intended for readers without special knowledge who want to gain a deeper understanding of what a safety assessment is and what the results of the SR-Can safety assessment were.

2.2 The bedrock at the site in Forsmark is very different from the bedrock in the research laboratory on Äspö near the Oskarshamn NPP. The rock stresses in the rock are much higher, and the permeability of the rock to groundwater is much lower. This means that data from trial depositions and other investigations carried out on Äspö and experience from the construction of the laboratory are not as useful in the event Forsmark is chosen as the site of the final repository.

What investigation data obtained from various tests in the Äspö HRL must be gathered all over again to provide supporting material for a safety assessment in the type of rock that exists at the investigated site in Forsmark? (MKG)

Much of the research concerning the future final disposal of spent nuclear fuel is taking place at SKB's underground Hard Rock Laboratory on Äspö. The research at the Äspö HRL and other laboratories around the world is generating knowledge about the processes that can affect a final repository. Our site investigations furnish information on geological conditions on the investigated sites.

It is a combination of knowledge about processes and site-specific data that serves as a basis for assessment of the long-term evolution of the repository and thereby of the suitability of a site. The research results that have been obtained at the Äspö HRL are thus relevant for an evaluation of Forsmark as well. In Forsmark, for example, it can be expected that many deposition holes will be "dry", i.e. they will not be in direct connection with flowing groundwater via fractures in the rock. However, there are such rock areas in Äspö as well, and there are expected to be such rock areas in a repository in Laxemar. The difference is that a larger proportion of such holes can be expected in Forsmark.

Technical solutions are also being tested at the Äspö HRL on a full scale and in a realistic environment. The facility resembles the future final repository in many respects. Most elements are already in place: canisters, bentonite clay, machines, tunnels and deposition holes. The results are applicable to both sites.

2.3 How do tectonic stresses affect the Forsmark lens? Is there a risk that the whole lens will crack? Are there examples of other lenses failing in a similar fashion, and if so why? Can the final repository itself comprise a defect that will cause the lens to crack horizontally through the final repository so that a large number of canisters are crushed? (MKG)

During the site investigations, SKB has analyzed the question of what impact the high rock stresses in Forsmark may have on the final repository. The issue has been accorded less and less importance as data have been accumulated. The repository does not have to be located at a shallower depth due to the rock stresses; the recommended depth is 450–500 metres.

Tectonic lenses are characterized by the fact that they have remained more intact through geological history than the surrounding rock. The lens in Forsmark was formed more than 1,800 million years ago and has since then been subjected to highly varying rock stresses, for example during glaciations. The fact that the lens is still relatively intact indicates that there is little risk that tectonic stresses will cause any fracturing in the future. A precautionary measure that is nonetheless taken is that deposition is avoided in or adjacent to fracture zones where rock movements are expected to occur.

SKB does not consider it possible that the repository itself could comprise a defect that causes the lens to disintegrate. The fraction of rock that is extracted (the tunnels) in relation to the total volume (or surface area) is far too small for such a fracture sequence to be initiated. Relevant knowledge is available from the mining sector, where it is often desirable for economic reasons to extract as small a fraction of the rock as possible without risking large-scale fracturing.

2.4 If a final repository in Östhammar Municipality is located in the area in Forsmark where the site investigation has been conducted, the rock in which the repository is located will have very high rock stresses. During construction in rock and after construction is finished, rock will spall off from the inside of deposition holes and tunnels in the final repository.

How is long-term environmental safety affected by spalling of rock in deposition holes and tunnels in the final repository? (MKG)

It is not clear today in how large a fraction of the deposition holes such spalling may occur and how much rock will be spalled off in the afflicted holes, and this applies to Laxemar as well. It is therefore pessimistically assumed in SR-Can that it occurs in all deposition holes (at both sites) and that the impact is relatively great. This is included in the risk calculations in SR-Can. Variants without spalling have also been analyzed, and the difference in the final result is insignificant.

2.5 When a final repository starts to leak it will take a relatively short time (50 – 100 years has been mentioned) for radionuclides to reach man and the environment at the sites the nuclear power industry is now considering, both in discharge areas for groundwater on the Baltic Sea coast. This is because the rock is a doubtful barrier (retardation) at those sites, located in discharge areas.

If groundwater comes into contact with the copper canister, sulphides and, under certain circumstances, oxygen can also reach the canister, causing corrosion. In this case the canister is also a doubtful barrier. What is supposed to stop sulphides and oxygen from reaching the canister is a layer of bentonite clay. This clay is therefore important for the long-term safety of the nuclear power industry's final repository project according to the KBS method.

What threats are there that the bentonite clay will be damaged or disappear, thereby increasing the considerable risk that the final repository will begin to leak? (MKG)

At both sites it generally takes a very long time (thousands of years or more) for most radionuclides to reach the surface in the event of a release. But for certain positions in the rock, and for certain nuclides, the travel times can be much shorter.

Even if the bentonite barrier is missing from the start in all deposition holes, the analyses show that it is only the canisters in the ten or so most vulnerable deposition holes that would be damaged in a time perspective of a million years.

The only real threat to the bentonite is posed by dilute groundwater, which could occur during an ice age. Contact with such water can cause the bentonite to dissolve and leave the deposition hole via the groundwater. Whether or not this would really occur during an ice age (whether the water would really be sufficiently dilute) and how quickly and to what extent the dissolution process would then take place is unclear. It is therefore pessimistically assumed in SR-Can that the water is always highly diluted during an ice age, and that the process takes place rapidly and can proceed until the bentonite has been eroded away. With these pessimistic assumptions, some ten or so canisters would be damaged in the course of a million years.

2.6 When the bentonite clay is gone, if not before, the copper canister can corrode. Corrosion can occur if the copper in the canister comes into contact with chlorides, sulphides and oxygen.

What are the processes that the industry has identified that can give rise to corrosion of the copper canister? Under what circumstances do these processes occur? How do biochemical processes caused by microbiological activity affect the corrosion rate in different scenarios? How long time does it take for an average canister to be penetrated under these conditions? (MKG)

The processes that have been identified are copper corrosion due to:

- i) oxygen,
- ii) sulphides, including sulphide from sulphate conversion caused by microbes,
- iii) combination of very high chloride concentrations and very low pH,
- iv) nitric acid.

Oxygen corrosion initially appears due to the oxygen that is brought down into the repository during operation and possibly, under certain conditions, during limited periods of ice ages.

Sulphides are present naturally in low concentrations and thus cause some corrosion under all conditions. If the protective bentonite buffer should be defective, microbes can contribute to increased sulphide concentrations, and this is included in analyses of such scenarios in SR-Can.

The combination of very high chloride concentrations and very low pHs has been judged to be impossible in Swedish groundwaters, today and under future conditions.

Corrosion resulting from nitric acid can occur initially due to the fact that the radiation from the canister transforms the nitrogen in the air remaining in the repository to nitric acid. The scope of this corrosion is, however, greatly limited by the air supply.

The “average” canister is not expected to be penetrated as a result of any of these processes (or a combination of them) even in the million-year perspective covered by a safety assessment.

2.7 The nuclear power industry has said that the rock in the southern part of Laxemar, as well as outside the site investigation area, may be better than the relatively poor rock that has so far been found in the area.

When will data from this rock be presented? Will a supplement to the SR-Can safety assessment be done so that a comparative risk summation can be presented? (MKG)

SKB does not intend to supplement SR-Can. Data from the area in Laxemar that may be relevant for the final repository will be incorporated in the next safety assessment, SR-Site. Data for Laxemar will be presented as investigations and modelling of Laxemar progress.

2.8 An ice age scenario is used in the safety assessment that repeats the glaciation that occurred during the last ice age that took place, the Weichselian glaciation. A number of glaciations and deglaciations occurred during this ice age. The glaciations got bigger and bigger, and the first two did not reach the sites where the nuclear power industry is preparing for a final repository. This means the final repository sites will not be affected by ice above the repository for 55,000 to 60,000 years. If, on the other hand, the industry had reversed the ice age scenario in its main scenario so that the biggest glaciations occurred at the start, the safety assessment would presumably have given another result.

How would the safety assessment in SR-Can be affected if the three glaciations in the main ice age scenario changed places in time so that the biggest glaciations came first? What would the risk summation in the safety assessment for Forsmark in Östhammar Municipality and Laxemar in Oskarshamn Municipality look like if such a change of the main scenario for ice ages were made? What factors are affected most of all by such a change (clay barrier, copper canister, earthquakes etc.)? (MKG)

The risk summation in SR-Can would scarcely be affected at all if the order of the three glaciations were to be changed. The factors that are affected most are possible

erosion of the buffer accompanied by increased corrosion of the canister (the corrosion increases if the buffer loss is extensive, which is uncertain but nevertheless pessimistically assumed in SR-Can) and the risk of earthquakes. Corrosion must nevertheless continue for thousands of years in order for even the most vulnerable canisters to be penetrated, and most canisters will not be penetrated even if the buffer is completely missing from the start.

The earthquake risk is already distributed over the entire glacial cycle, so the result would not be affected appreciably here either.

Furthermore, the calculated risks are dominated by Ra-226, a nuclide that does not exist from the start in the fuel but grows as a result of radioactive decay over a timespan of about 100,000 years.

Moreover, the state of scientific knowledge concerning how ice sheets generally advance and retreat is good. From information from marine sediment cores, we know that a gradual build-up of ice volumes occurs on the continents during an ice age, with a subsequent much more rapid deglaciation when the ice melts. The gradual build-up proceeds in different phases, which can be seen in, for example, the reconstruction of the Weichselian ice sheet in the SR-Can safety assessment. The reason for the relatively slow gradual build-up (with small ice sheets first and big ones at the end) is the gradually colder climate during the ice age. Furthermore, for each glacial period during the ice age, the biggest ice sheet comes at the end of each period, since it takes a very long time to build up a big ice sheet at the relevant precipitation rate. Melting of the ice in a warm climate goes much faster. This pattern, with the biggest ice sheets at the end of the ice age, is typical of all major ice ages during the Quaternary Period (the last 2 million years). In other words, there is no scientific basis for analyzing the reverse scenario.

2.9 With the sitings chosen by the nuclear power industry for site investigations, when the bentonite clay no longer protects the copper canister from corrosion, the only barrier to prevent damage to man and the environment is the copper canister. The rock constitutes a natural barrier, but with the short breakthrough times at the chosen sites (50–100 years) there is no functioning natural barrier.

How long would it take before the copper canister is the only barrier in the final repository if the ice age scenario were changed according to the question above [NB: If the sequence of the glaciations is reversed so that the big glaciation comes first]? (MKG)

As is evident from, for example, section 10.10 in the main report for SR-Can, the rock in Forsmark provides considerable protection and the canister will not be the only barrier in the scenario outlined above. The rock in Laxemar provides slightly poorer protection, but the calculated risk is reduced by more than 95 percent by the rock alone even there (not reported in the report).

In the case of a few canisters, at the most vulnerable deposition holes, the buffer could be lost slightly earlier if the ice age scenario were “reversed”, but this would be of only marginal importance for the calculated risks.

2.10 When the nuclear power industry chooses scenarios in the SR-Can safety assessment, the industry can rule out certain processes after only a limited analysis. In this way the industry could eliminate scenarios in the safety assessment that do not give the desired results in the risk summation.

Can the nuclear power industry show that the exclusion of those processes that are not included does not lead to modelling results that show too high long-term safety? Can the nuclear power industry show that the elimination of scenarios in the SR-Can safety assessment has not been done in such a way that scenarios that do not give the desired results in the risk summation have not been included? (MKG)

The exclusion of a process must always be scientifically justified, and this is done systematically for processes excluded in SR-Can, primarily in the process reports. Exclusion of a scenario from the risk summation must also naturally be scientifically justified, and this is done where applicable in the main report for SR-Can.

2.11 In their analysis (20 December 2006) of the preliminary safety assessments of the site investigations, the Swedish Nuclear Power Inspectorate, SKI, and the Swedish Radiation Protection Authority, SSI, criticized the nuclear power industry for hedging in the question of what is a requirement and what is a preference with regard to the properties of a site for a final repository. Earlier in the site investigation process in the selection of sites as well, the industry changed its view of “what is sufficiently good rock”. There is a risk that the industry may adjust its requirements according to the rock and the groundwater conditions that are available instead of starting with established requirements that cannot subsequently be changed in the site selection process.

How have the nuclear power industry’s requirements on rock, groundwater and other features of importance for site selection changed since the site investigation process began? (MKG)

A fundamental prerequisite for the site that is selected for the final repository for spent nuclear fuel is that the requirements on long-term safety must be met. In RD&D-K (which was published in 2000), and in background reports referred to in RD&D-K, SKB has reported the properties of the rock that are of importance for safety, based on previously completed safety assessments. Some updating of the requirements and preferences has taken place in the light of the analyses performed in SR-Can.

SR-Can (TR-06-09) introduces the concept of performance indicators (called “function indicators” in SR-Can) as a criterion for judging whether safety is ensured. Some of these indicators pertain to the rock and can thus be of importance for the site selection. They largely correspond to the requirements and preferences presented in TR-00-12, but certain minor modifications have been made. The most important ones are:

- Specification of respect distances to major deformation zones and fractures.
- Change of the maximum permissible temperature of 100 °C to apply to the buffer instead of the canister.
- The preference regarding the concentration of divalent cations in the groundwater is now approximately 40 milligrams per litre, which is an increase compared with RD&D-K.

It is important to note that these requirements and preferences cannot take the place of a complete safety assessment where all factors of importance for safety are weighed together. The SR-Site safety assessment, which will be appended to the application for a permit to build the final repository for spent fuel, will be based on up-to-date knowledge of processes of importance for safety and the planned design of the final repository, which may entail a modification of requirements and preferences regarding the properties of the rock.

2.12 Does the nuclear power industry consider it important that a thorough analysis of the long-term risks of nuclear weapons proliferation from plutonium in a closed final repository should be included in the safety assessment in the application for a permit to build a final repository for spent nuclear power fuel? (MKG)

Questions related to long-term risks of nuclear weapons proliferation from plutonium will not be included in the SR-Site safety assessment.

The final repository for spent nuclear fuel is designed in such a manner that it effectively prevents illicit tampering with the spent nuclear fuel without having to be

monitored. If future generations should want to retrieve the fuel again after closure, this is possible, but requires extensive efforts compared with those required to build the repository. It will thus not be possible for individuals or a small group to enter the final repository after closure unnoticed.

2.13 Why does the nuclear power industry claim that long-term monitoring is not required for a final repository that is built according to the method chosen by the industry when monitoring in the form of physical protection will be needed for a final repository of the KBS type for hundreds of thousands of years after closure? (MKG)

The whole idea of the KBS-3 method for final disposal of spent nuclear fuel is that the repository does not need to be monitored. If future generations should wish to retrieve the fuel again, this is possible. However, it will not be possible for individuals or a small group to enter the final repository after closure unnoticed. An extensive effort will be required to do this.

2.14 The nuclear power industry has changed the requirement made on the temperature in a final repository. If a copper canister should break apart, iron from the canister insert could affect the bentonite clay.

Does the nuclear power industry have experimental data showing how the bentonite clay is affected by a temperature of over 100 degrees or how it is affected by iron? Are there still uncertainties regarding this? (MKG)

The impact of high temperatures on bentonite is of great importance for oil exploration and exploitation. The process has therefore been studied in great detail since the 1960s. Some experiments have also been conducted within SKB's programme. The most important of these is the LOT test in the Äspö HRL, where a bentonite buffer was exposed to 140°C for a long period of time.

The impact of iron on bentonite is more complicated. It is obvious that bentonite is affected by metallic iron, but the scope of this impact is unclear, at least at temperatures < 300°C. If bentonite is affected by iron at lower temperatures, the process is very slow and therefore difficult to measure. Data for very long times cannot be obtained because the process does not occur in nature. The archaeological analogues that have been studied show no or very little impact in a hundred-year perspective. However, the question has received quite a bit of attention in recent years and extensive research is being conducted at many places in the world. SKB is conducting the "Alternative Buffer Materials" test in the Äspö HRL where the impact of iron on bentonite is being studied for a variety of bentonite materials over a long period of time.

2.15 Will the nuclear power industry present material describing the risks that there may be an early ice age caused by the greenhouse effect and resulting climate change? (MKG)

Such a change has a marginal impact on the risk assessment for the repository. The climate scenarios will be reviewed in SR-Site, and the requested scenario will then be considered.

2.16 The Swedish NGO Office for Nuclear Waste Review, MKG, has previously posed the question as to how new knowledge about the role of colloids in the transport of radioactive particles affects the long-term safety of a final repository for spent nuclear power fuel.

Has knowledge of the transport of radioactive particles with colloids been fully taken into account in the SR-Can safety assessment? (MKG)

Yes, this impact has been bounded by calculating what it would mean if the rock makes no contribution at all to the retardation of nuclides, in other words if, for example, colloids were "infinitely efficient" carriers. For the scenarios that make a contribution

to the risk for the repository, this impact is very limited. On the other hand, a more realistic view of colloids has not been modelled; this is planned for SR-Site.

2.17 If the KBS method is to be used, isn't it better to locate the repository as deep as possible, say at a depth of 1000 m? (MKG)

SKB intends to build the final repository at a depth of 400–700 metres. This depth has been chosen in consideration of many factors, such as the water flow in the bedrock, the salinity and temperature of the water, rock stresses, constructability in rock, and the risk of drilling from the surface. The alternatives of building the repository at smaller or greater depth have both been considered, but judged to be inferior.

Locating the repository at greater depth than 400–700 metres could mean a reduced groundwater flow and a longer transport pathway and travel time for radionuclides to the biosphere. The risk of human impact on the repository can also be judged to be less. The main negative aspect of a deeper siting is reduced constructability, due to increased water pressure and higher rock stresses, leading to stability problems. The zone around tunnels and deposition holes affected by blasting damaged and stress redistribution is expected to be larger and the degree of damage greater. Furthermore, the costs of construction, rock support and backfill of the repository will increase. The increased temperature at greater depth means that the repository has to be spread out over a larger area in order to meet the temperature criterion for the buffer. Locating the repository at greater depth probably leads to greater uncertainties and a higher risk of unexpected events.

All in all, the disadvantages of a deeper siting clearly outweigh the advantages, and there are no good reasons for going to greater repository depths than those assumed for KBS-3. Conditions on the site will finally decide what depth is chosen.

2.18 Professor Nils-Axel Mörner says that methane explosions could be a long-term threat to a final repository.

What process could cause methane explosions in the manner Professor Mörner claims is a threat to the final repository? Should the risk of methane explosions be included in the safety assessment? (MKG)

All possible processes have to be analyzed in the safety assessment. Professor Mörner claims that he has found evidence that methane explosions have occurred in Sweden. Methane ice can form under high pressure and low temperature, for example during permafrost periods. In simplified terms, it can be described as “ordinary” ice where methane molecules have occupied the space between the water molecules in the ice. The process is described in the SR-Can process report for the geosphere (SKB TR-06-19). The conclusion in the process report is that more data has to be collected on methane in Forsmark and Laxemar before the formation of methane ice can be completely ruled out. New data will be analyzed in SR-Site.

2.19 A trial deposition and retrieval of one or more canisters has been done in the Äspö HRL.

Was the experiment done as if the canister would provide the same radiation environment as a newly deposited canister? Shouldn't the industry show that deposition and retrieval of canisters can be done in a reliable manner before a decision is made to start construction of a final repository? (MKG)

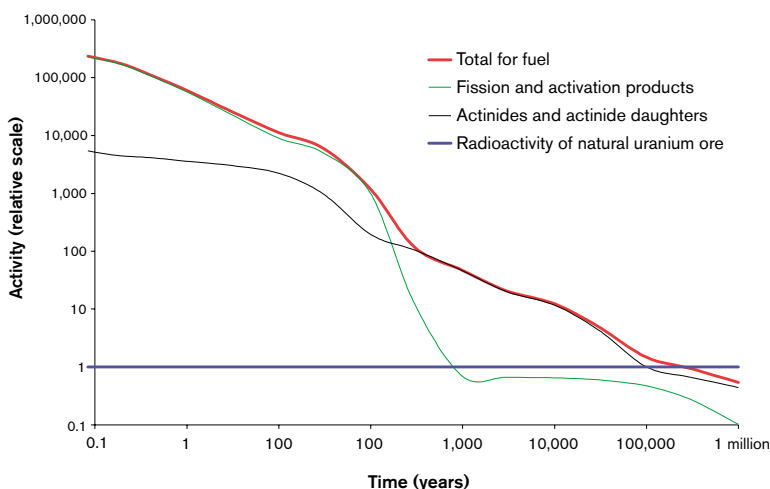
SKB has demonstrated that it is possible to retrieve canisters during the operating phase in an experiment in the Äspö HRL, both during the deposition process (reversal) and after the deposition tunnel has been backfilled and the bentonite around the canister has become water-saturated and swollen (retrieval). In both cases the canister is lifted up and into the deposition machine. But in the case with swollen bentonite, the tunnel has to be cleared and the bentonite around the canister removed before the canister can be lifted. The specific retrieval demonstration showed on a full scale

that the bentonite can be removed in a radiation-shielded environment (water-filled hole) so that no swelling pressure is exerted on the canister before the deposition machine is driven over the hole. The method provides the radiation protection required by a newly deposited canister, as well as the radiation protection that is needed if the bentonite should be contaminated due to an initially broken canister.

2.20 In the Swedish condensed translation of the SR-Can safety assessment (SKB R-07-24), the nuclear power industry repeats a myth, namely that the radiation intensity of the spent nuclear power fuel eventually declines to a level comparable to that of “natural radiation”. The following figure is shown on p. 21 of the report.

In the figure, the radiotoxicity of the fuel is compared with the that of natural uranium ore, which is a naturally occurring material, although with a very different uranium content. The nuclear power industry’s intention with this type of graph is to make it seem as if the waste is harmless after a certain period of time. But it is not the activity of the uranium ore that is shown in the graph, but the activity of the quantity of natural uranium that is used to make the equivalent quantity of fuel. There is a big difference between comparing with the mass of natural uranium and comparing with the mass of uranium ore containing an equivalent quantity of uranium. Uranium ore in Swedish bedrock has a maximum uranium content of 0.03–0.04%. The average uranium content of Swedish granite is 0.0005%. This means that if the horizontal line were to represent uranium ore it would be far beneath the figure.

Can the nuclear power industry present a figure that really shows the activity of uranium ore in a graph that shows how the activity of the spent nuclear power fuel declines with time? (MKG)



The intention in the condensed Swedish SR-Can report is to compare the toxicity or radioactivity of the spent nuclear fuel with the toxicity or activity of the material that was originally used to produce the fuel, and nothing else. This is clear from the text in, for example, sections 2.4.2 and 2.6.4 in the report. Whether the comparison is made in absolute or relative terms is irrelevant, the result is the same. The report does not talk about any “natural levels” for uranium ore. It is of course possible to provide the figure asked for, but it must then be done in a context where it serves a suitable purpose.

2.21 An analysis of the nuclear power industry's report on supraregional groundwater flow in Eastern Småland shows that in, for example, the catchment area of the Virån River there may be areas where the travel times (breakthrough times) are between about 30,000 and 800,000 years. This can be compared with the breakthrough times at the site investigation areas on the Baltic Sea coast in Forsmark and Laxemar, which the industry has reported are around 50–100 years.

Is the nuclear power industry saying that there are not any environmental advantages in siting a final repository in an inland recharge area compared with the siting in Forsmark or Laxemar planned by the industry? Would the breakthrough times be both more reliable and higher if the final repository were located at a depth of 1,000 m in a recharge area? (MKG)

Modelling of supraregional groundwater movements is associated with great uncertainties and the results should be used with caution. The study shows that a siting of the repository in an inland recharge area does not generally result in longer breakthrough times. The uncertainties in calculated breakthrough times are mainly due to our limited knowledge of the permeability of the rock in a regional perspective, which means that siting the repository in the interior at a depth of 1,000 metres does not guarantee that the calculated breakthrough times will be more reliable.

SKB's view is that investigations and analyses over a long series of years have gradually confirmed that local flow patterns, controlled by local conditions, are of crucial importance for the suitability of individual sites with respect to groundwater flow. SKB's report on supraregional groundwater flow confirms this view, as does the experience from the site investigations.

Notwithstanding this, the groundwater flow from a repository location may include regional components characterized by long flow paths and times. But SKB does not consider it possible to take credit for this in assessing the repository's protective capacity. The reasons are as follows: 1) the difficulties of demonstrating and quantifying regional flow for specific sites by means of calculations and verifying measurements, and 2) the difficulties of ruling out the dominance of local flow, which determines the potential for radionuclide transport, for specific sites.

Since the safety of the final repository must be based on robust factors, SKB considers it environmentally preferable to focus on the permeability of the rock locally and adapt the repository to that knowledge, rather than putting a great emphasis on factors associated with great uncertainties such as regional groundwater flow.

SKB intends to build the final repository at a depth of 400–700 metres. This depth has been chosen in consideration of many factors, such as the water flow in the bedrock, the salinity and temperature of the water, rock stresses, constructability in rock, and the risk of drilling from the surface. The alternatives of building the repository at smaller or greater depth have both been considered, but judged to be worse.

2.22 A final repository for spent nuclear power fuel must be safe for hundreds of thousands of years. Reflecting on how much human evolution has taken place during the past one hundred thousand years provides some appreciation of the great changes that can be expected in the next hundred thousand years.

Can the nuclear power industry give a researcher who works with human evolution an assignment to describe this so that the public and other actors will understand how much has changed over the past 100,000 years? (MKG)

In view of human evolution and what happens on the ground surface, 100,000 years is a very long period of time. What is more interesting in this context is the geological evolution during the equivalent period. Geological processes are slow. The bedrock that is now being investigated in the site investigations in Oskarshamn and Forsmark

is about 1,800 million years old. In geological contexts, time periods of a million years are relatively short.

2.23 Naturally there are sites in Sweden that are at least as good as the two candidate sites, if not considerably better. The selection process has been remarkably weak.

Personally I can point out a couple of areas in Sweden where the geological conditions are much more favourable. (Milkas)

In the late 1970s, SKB commenced an extensive effort aimed at building up a body of general knowledge of the Swedish bedrock and the conditions that can affect the performance of a repository in the bedrock. With a final repository according to the KBS-3 method as a planning premise, a stepwise siting process has been under way since 1992 and has now entered a final phase with the ongoing site investigations. In 2002, SKB initiated site investigations for siting of a final repository on two sites: the Simpevarp area in Oskarshamn and the Forsmark area in Östhammar. In 2004 the investigations in Oskarshamn were extended to include the Laxemar area as well.

SKB looks forward to hearing Mörner's account with interest.

2.24 The broad search for the “best possible method” has been bypassed by talk of creating a “final repository”.

The term “final repository” comes from the highly inaccurate and obsolete geological picture that existed in the late 1970s. Then it was believed that the rock was “stable” and could permit construction of a “final repository”. We know better today. We now know that the rock after the ice age was highly “unstable”, was shaken by repeated gigantic earthquakes, was fractured and faulted in a way not previously thought possible, and was furthermore subjected to outright explosions when methane ice was vaporized to methane gas.

Today no one can provide any serious guarantees that the repository will be safe for 100,000 years, which is a basic prerequisite for being able to talk about a “final repository”.

This invalidates the whole concept of a “final repository”. Instead, all concentration should be focused on finding the “best possible solution”. And it is in this situation we must have all available alternatives studied and described in an adequate fashion so that they can be assessed. (Milkas)

Under the Nuclear Activities Act, SKB is responsible for final disposal of spent nuclear fuel. We will apply for a permit to dispose of spent nuclear fuel according to the KBS-3 method. The regulatory authorities, the environmental court and the Government will decide whether the KBS-3 method satisfies the requirements made on a final repository.

2.25 SKB has been forced to retreat, step by step, in the question of earthquakes. But a lot still remains in their acceptance of new findings and new knowledge. To persist as SKB does in contending that the maximum earthquake during a 100,000-year period can only be one magnitude 7 earthquake is extremely primitive and downright wrong. Reality is something else entirely. Given the large number of earthquakes we have reconstructed and dated after the ice age (currently 56, of which several are well in excess of magnitude 8 on the Richter scale), we must realistically expect an entirely different seismic picture during a period of 100,000 years. SKB's scenario is simply outdated and inaccurate and must be totally revised. (Milkas)

SKB takes earthquakes into account both in the SR 97 safety assessment presented in 1999 and in SR-Can (2006).

2.26 SKB persists in claiming that the waste canisters can be emplaced “50–100 m from a regional fault line”. This claim is embarrassing in its ignorance of actual geological conditions. Actual data from reality would require something more like 50–100 km!

This makes it impossible to find suitable bodies of rock. It is worth mentioning (as I have done on repeated occasions) that Nature herself provides the best and most reliable answers, and we would do best to act accordingly. Any talk of “safe rock volumes” is effectively disproved by a fine example in Finland, where such a volume surrounded by zones of weakness (which in SKB’s way of thinking would absorb the stresses) was suddenly cross-cut by a large postglacial fault.

There is no such thing as a safe “respect distance” in SKB’s sense. (Milkas)

SKB will configure the repository so that the canisters with the spent nuclear fuel are deposited with good margin at a suitable respect distance to fracture zones, in order to guarantee the long-term safety of the repository.

2.27 In my [note: Nils-Axel Mörner] book “Paleoseismicity of Sweden – a novel paradigm” (2003) I was able to show that the Swedish basement rock has actually been subjected to a series of methane explosions, the last one only 2,000 years ago, followed by a 20 m high tsunami wave generated by the blast. The background is that methane gas under high pressure and low temperature becomes methane ice, which, when the pressure and temperature change (as they did after the ice age and during seismic waves), is explosively transformed to gaseous form.

This process and its consequences for a long-term repository in the rock are not included at all in SKB’s analyses. This represents a large and serious safety oversight. (MILKAS)

The process and the consequences are of course described in SKB’s safety assessments. In SR-Can, this is described in the geosphere process report (SKB TR-06-19). In order for any “explosion” of importance to occur, there must be a great accumulation of “explosive”, i.e. methane ice. In order for methane ice to form, methane must be present. An “explosion”, or rather a rapid thawing of methane ice producing large quantities of gas, requires a corresponding quantity of methane. New methane data (for example groundwater concentrations) from Forsmark and Laxemar will be analyzed in SR-Site to determine if any methane ice at all can be formed on these sites during long permafrost periods.

2.28 Once it was stubbornly asserted that “ice ages have no effects” (it was from such a claim that talk of a “final repository” was born). Now this is recognized as one of the project’s big problems, which I [note: Nils-Axel Mörner] pointed out back in 1979. There are several ways to try to understand what the future climate will be like. There are great uncertainties here.

However, it is indefensible that SKB is so careless or arrogant as to give such widely divergent pictures in its own publications as in: Figure 3-2, page 13 in “Consultations May 2007”, May 2007, and Figure 5-3, page 59 in R-07-24, April 2007. (MILKAS)

The background material for the consultations on safety and radiation protection in May 2007, “Consultations May 2007”, describes SKB’s work with different safety assessments. Figure 3-2 in the background material is an illustration of the ice age scenario on which the SR 97 safety assessment published in 1999 was based. Figure 5-3 in R-07-24 describes an ice age scenario in the SR-Can safety assessment, published in November 2007.

Since they are from two different safety assessments spaced 8 years apart, the difference between the two figures is not an expression of carelessness or arrogance, but rather the

result of a natural and desirable development of analysis methodology. Climate-related processes (including glaciations) are dealt with in a more thorough manner in SR-Can than in previous safety assessments. The figure in R-07-24 shows examples of ice sheet extents during a glacial cycle, based on a more detailed reconstruction of the continental ice sheet during the last ice age. The two figures therefore differ in details, but agree in their major features.

It is true that there are great uncertainties in what the future climate may look like. This is discussed in R-07-24, and in greater detail in the climate report for SR-Can, TR-06-23. The reports also describe the method that enables us to analyze the long-term safety of a repository for spent nuclear fuel in spite of these uncertainties, a method which in brief entails also analyzing the extreme climate situations within which the climate may vary on the time scale in question.

The reconstruction of the last ice age in Figure 5-3 in R-07-24 is just one of many possible ones. The reconstruction is a very relevant example of how a glaciation takes place, and how associated processes such as shoreline displacement and permafrost are affected (Figure 5.4 in R-07-24). In addition to the fact that the safety of the repository is analyzed for this case, the reconstruction (together with the associated calculations of shoreline displacement and permafrost) fills an even greater purpose in serving as a point of departure for the reconstructions of other climate scenarios that cause greater stress on the repository.

2.29 Milkas agrees with SKB, SSI and SKI that it is impossible to see into the future. We cannot say with certainty what will happen with the rock and the waste during a million years. SKB's assumptions may be completely wrong. Assume that someone buried hellishly hazardous waste 100,000 years ago. Then something currently inexplicable happens so that we are forced to move the waste to a safer place. (Several sites in Europe have already become radioactive due to leaking atomic garbage.) Do SKB and the Government think we should have an opportunity to move the waste and make sure it doesn't leak? How is the waste moved? Has SKB showed concretely how this is done? (Milkas)

The final repository for spent nuclear fuel is being designed in such a way that it does not need to be monitored. If future generations should want to retrieve the fuel again after closure, this is possible, but requires extensive efforts compared with those required to build the repository. It must not be possible for individuals or a small group to enter the final repository after closure unnoticed.

In a test in the Äspö HRL, SKB has demonstrated that it is fully possible to retrieve canisters during the operating phase, prior to closure.

2.30 What and how many measurement instruments must there be in the repository in order for us to get the signal that now it is time to move the waste? (Milkas)

The final repository for spent nuclear fuel will be designed in such a way that it does not need to be monitored. SKB has no plans to install any monitoring equipment in the final repository that is intended to work after closure.

2.31 Can SKB guarantee that the microbes cannot mutate and acquire other properties not known to us? (Milkas)

No, SKB cannot guarantee that, but experts in the field have considered this and even mutated microbes will require nutrients, which are in short supply in the rock and the groundwater. Furthermore, consequences of extreme assumptions, such as that some unknown or currently non-existent microbe (or other process) will eventually damage the canisters, can be explored in the safety assessment. This has been done in SR-Can and is discussed in section 10.10 of the main report.

2.32 SKB wants to emplace the waste in a “long-term stable geological environment”. What evidence is there that such an environment exists that will be absolutely safe in a million years? (Appendix 1, p. 39) (Milkas)

The bedrock in the areas where site investigations are currently being conducted is approximately 1,800 years old. The site investigations have given us a good picture of what has happened in the bedrock during this time. Geological processes are slow. In geological contexts, time periods of a million years are relatively short.

2.33 The description of safety and radiation protection in SR-Can is incomplete and a great deal of knowledge is lacking. When will the background material be complete and final? (Milkas)

SR-Can is a complete safety assessment based on preliminary data from the sites at Forsmark and Laxemar. It is an initial evaluation of how the repository sites in Forsmark and Laxemar function together with the copper canisters that will be sealed in the encapsulation plant.

Experience of and viewpoints on SR-Can will be taken into account in the work with the SR-Site safety assessment, which will be included in the applications for the final repository system. SR-Site will be based on the complete body of data available when the site investigations and the design of the final repository are finished.

Some knowledge of relevance to radiation protection is incomplete and will remain so even when SR-Site is presented. We will, for example, never achieve full knowledge of what the rock looks like or how the climate will change in the long term. In general, such situations are handled by pessimistic assumptions in the safety assessment.

2.34 Has SKB succeeded in proving that the barriers can delay releases for a million years? (Appendix 1) (Milkas)

It is not possible in any ultimate sense to “prove” anything relating to conditions a million years in the future. However, no evidence has been found in SKB’s studies that the rock, the buffer, the canister and the fuel matrix will have lost their retarding properties after a million years. Based on examples in the SR-Can safety assessment, the reservation must be made that erosion of the buffer cannot be ruled out in the long term, and there is a risk that this barrier will not remain in place or be fully functional. This has been weighed into the risk assessment for the repository in a pessimistic manner.

2.35 SKB says that the barriers are composed of materials that occur naturally in the repository environment. Can SKB prove that the materials will endure in the KBS-3 repository for a million years? When will Milkas be able to read research reports in Swedish about this? (Appendix 1) (Milkas)

See the reply to the above question. SKB’s research programme with the results achieved is described in the RD&D programmes that are published every three years, most recently in 2007. No additional report on this in Swedish is planned.

2.36 Why isn’t the risk of methane explosions addressed, since oxygen gets down into the rock? How can SKB be 100% certain that all oxygen will disappear in all small fractures in the rock (Appendix 1, p. 47) (Milkas)

Methane ice formation and the risk of explosions in connection with thawing are described in the SR-Can geosphere process report (SKB TR-06-19).

A methane explosion can occur if methane and oxygen are mixed in the gaseous phase. Both oxygen (from above) and methane (from below) can only reach the vicinity of the repository when dissolved in groundwater. There is no reasonable possibility that they

will be present in gaseous form together. There is thereby no risk of gas explosions. In this context it must also be borne in mind that no large volumes of free gas can occur. If for some reason a gaseous phase should occur (for example if someone injects an oxygen/methane mixture into the rock through a hose), the gas can only get into the fracture volume, which represents only about 0.1 percent of the total rock volume.

Oxygen reacts with minerals and groundwater. Furthermore, there are bacteria in the bedrock that consume oxygen. In other words, there is no oxygen in the water at repository depth, which has been confirmed by numerous measurements.

2.37 The theme of this spring's consultation meetings was safety and radiation protection, which Milkas welcomes since these questions have been neglected at previous consultation meetings with the public. However, the theme has not been dealt with satisfactorily either in the background material or at the meetings, of which we give examples below. We question whether it is at all possible to use the term "safety" with regard to a waste system that is supposed to last for such long spans of time as those involved here, with all risks due to climate changes, ice ages, earthquakes, other geological factors, and intentional or inadvertent intrusion. (Milkas)

Making predictions about the future is naturally always associated with uncertainties, not least when it comes to final disposal of spent nuclear fuel, where we are dealing with timespans of many thousands of years. The safety assessment does therefore not work with predictions of the future, but rather scenarios that are supposed to cover all reasonably possible future courses of events of importance for repository safety. This requires knowledge of the initial state of the repository, important processes in the repository and external impact on the repository. The initial state and important processes will be known for a KBS-3 repository. Various scenarios will be analyzed to judge how the repository is affected by ice ages, earthquakes etc.

SKB will apply for a permit to dispose of spent nuclear fuel according to the KBS-3 method. The regulatory authorities, the environmental court and the Government will decide whether the KBS-3 method satisfies the requirements made on a final repository.

2.38 SKB AB's own figures in the background material reveal the uncertainty in the entire final repository project. A couple of examples:

It is estimated that the degree of utilization will be 89% in Forsmark and 80% in Laxemar, which means that it is assumed that 11-20% of the boreholes will not be able to be used due to fractures. The degree of utilization is also based on the probability of encountering fractures that render the hole useless. Since the location of the fractures cannot be known in advance, it cannot be known whether a successful borehole lies right next to a fracture which might widen and ruin the borehole.

The mean percentage of canisters breached during the first glacial cycle due to major earthquakes is calculated to be 1.4% for Forsmark and 0.77% for Laxemar. If there are 5,000 canisters, 70 canisters will be affected in Forsmark and 39 in Laxemar. Nevertheless, SKB AB has not explained how it would be possible to retrieve the nuclear waste if anything goes wrong, for example a canister failure. Nor have they succeeded in proving that the barriers can retard releases. (Milkas)

The figures given in the matter *apply to the mean number of damaged canisters in the entire repository*, in other words the figure should *not* be multiplied by 5000. Retrieval of canisters is not a question for the safety assessment, but is addressed elsewhere by SKB.

SKB has demonstrated in an experiment in the Äspö HRL that it is possible to retrieve canisters during the operating phase, both during the deposition process (reversal) and after the deposition tunnel has been backfilled and the bentonite around the canister has become water-saturated and swollen (retrieval). In both cases

the canister is lifted up and into the deposition machine. But in the case with swollen bentonite, the tunnel first has to be cleared and the bentonite around the canister removed before the canister can be lifted.

It is not possible in any ultimate sense to “prove” anything relating to conditions a million years in the future. However, no evidence has been found in SKB’s studies that the rock, the buffer, the canister and the fuel matrix will have lost their retarding properties after a million years. Based on examples in the SR-Can safety assessment, the reservation must be made that erosion of the buffer cannot be ruled out in the long term, and there is a risk that this barrier will not remain in place or be fully functional. This has been weighed into the risk assessment for the repository in a pessimistic manner.

2.39 There is no control whatsoever of the waste since there is no monitoring. The monitoring equipment in the Äspö HRL broke right away, so conditions for monitoring are not the best. SKB AB claims that it is more responsible to future generations to make sure that they should not have to deal with the waste at all, and that monitoring is therefore not necessary. But we who are alive now do not have the right to withhold knowledge of what is in the repository and facts about the dangers from future generations, or to prevent new knowledge from being obtained. It is therefore important to have some form of monitored repository so that awareness of what we have created is preserved. SKB AB regards the operation of the final repository as something that is finished when the repository has been closed and sealed. But the radioactivity is still there! After 100,000 years there will still be around 1 kg of plutonium per tonne of waste (according to Mats Törnqvist, “Hur länge är kärnkraftsavfallet farligt?” (“How long is the nuclear power waste dangerous?”, 2000). (Milkas)

It is correct that we will not withhold knowledge of what is in the repository and facts about the dangers from future generations. In order to make sure that future generations have sufficient knowledge, SKB is currently working on how best to carry out this knowledge transfer. A draft plan of action for the knowledge transfer will be presented in connection with the applications for the final repository system.

The final repository for spent nuclear fuel must be designed in such a way that it does not need to be monitored. SKB has no plans to install any monitoring equipment in the final repository that is intended to work after closure.

2.40 Finally: The radioactive waste we are discussing is extremely dangerous and will remain so for a very long time to come, longer than humans can be expected to grasp. If we look “only” 1,000 years back in time we are back to the Viking era, and we know something about it, but not enough to understand exactly how they sailed their boats. Petroglyphs and monuments give us clues, but the archaeologists are not in agreement. Of relevance in this context is the fact that many of the important places the monuments depict are unknown. If we go back another few thousand years we are in the Bronze Age. We are trying to interpret their rock carvings, but much still remains a riddle to the archaeologists today. A greater humility from SKB AB is required in admitting that it is not possible to know whether repository can be safe for such a long time. (Milkas)

SKB is aware of the fact that final disposal of spent nuclear fuel involves a very long time perspective and is humble in this regard. In view of human evolution and what happens on the ground surface, 1,000 years is a very long period of time. What is more interesting in this context is the geological evolution during the equivalent period. Geological processes are slow. The bedrock that is now being investigated in the site investigations in Oskarshamn and Forsmark is about 1,800 million years old. In geological contexts, time periods of a million years are relatively short.

2.41 The Environmental Code requires us to make sure the best available technology is used. Even if no purely technical problems should arise, there is a considerable risk that the transfer of information will not work so that knowledge of how dangerous the waste is will be forgotten after an ice age. People may drill down into the repository looking for the copper or what they believe is some other fantastic energy resource. As a result, the risk that people would in the space of 100,000 years drill down into the final repository is much higher than that they would drill anywhere else at random. It isn't enough that SKB AB says, for example during the consultation in Östhammar on 31 May, that there is much to indicate that it will be possible in the future to preserve information for a much longer time. Assume that we can in the future preserve information for 5,000 years – twice as long as most rock carvings. This isn't enough. We have to know for a longer time than that, and SKB AB has not shown that this is possible.

As long as questions like this are not addressed, the safety assessment is so incomplete that it unfortunately cannot even be judged as a safety assessment. (Milkas)

We will not withhold knowledge of what is in the repository and facts about the dangers from future generations. In order to make sure that future generations have sufficient knowledge, SKB is currently working on how best to accomplish this knowledge transfer. A draft plan of action for the work of knowledge transfer will be presented in connection with the applications for the final repository system.

2.42 Oss (Opinion Group for Safe Final Disposal) wants SKB AB to clearly explain in the EIS the criteria for site selection and how different factors have been evaluated against each other. (Oss)

In the application documentation, SKB will clearly explain and justify the selected site and how different factors have been evaluated against each other.

2.43 Oss wants clarification as to whether the high rock stresses prevailing in Forsmark will be assessed and evaluated from the perspective of long-term safety. (Oss)

During the site investigations, SKB has analyzed the question of what impact the high rock stresses in Forsmark may have on the final repository. The issue has been accorded less and less importance as data have been accumulated. The repository does not have to be located at a shallower depth due to the rock stresses; the recommended depth is 450–500 metres. The rock stresses have no impact on long-term safety, but are a problem in connection with the risks of rock breakout during construction and operation.

2.44 We would also like clarification as to whether the higher water flux prevailing in Laxemar is to be regarded as an advantage in the perspective of long-term safety. (Oss)

No, SKB does not generally view a higher water flux as an advantage for safety. The water flux is, however, only one of a number of factors that together determine safety. The analyses in SR-Site will provide a more detailed answer to how the hydraulic conditions in Laxemar affect safety.

2.45 Oss wants SKB AB to explain what investigation results from Äspö are not relevant for Forsmark and how this affects the judgement of Forsmark as a suitable site for a KBS-3 repository. (Oss)

Much of the research concerning the future final disposal of spent nuclear fuel is taking place at SKB's underground Hard Rock Laboratory on Äspö. The research at the

Äspö HRL and other laboratories around the world is generating knowledge about the processes that can affect a final repository. The site investigations are generating knowledge of the geological conditions on the investigated sites. It is a combination of knowledge about processes and site-specific data that serves as a basis for assessment of the long-term evolution of the repository and thereby of the suitability of a site. The research results that have been obtained at the Äspö HRL are thus relevant for an evaluation of Forsmark as well.

Technical solutions are also being tested at the Äspö HRL on a full scale and in a realistic environment. The facility resembles the future final repository in many respects. Most elements have already been tested: canisters, bentonite clay, machines, tunnels and deposition holes. The technical solutions that are being developed are applicable to both sites.

2.46 If crucial material from Äspö cannot be used for an assessment of the suitability of Forsmark, how will SKB AB explain that these two sites can comprise alternatives for each other in keeping with the requirements of the Environmental Code? (Oss)

SKB is conducting site investigations in Forsmark and Oskarshamn. SKB sees no problems in applying for a permit to build the final repository on one of these sites and designating the other site as an alternative in keeping with the requirements of the Environmental Code.

Research at the Äspö HRL provides knowledge of the processes that can affect a final repository. The research results that have been obtained at the Äspö HRL are relevant for an evaluation of Forsmark as well. Technical solutions are also being tested at the Äspö HRL on a full scale and in a realistic environment. The facility resembles the future final repository in many respects. Most elements have already been tested: canisters, bentonite clay, machines, tunnels and deposition holes. The technical solutions that are being developed are applicable to both sites.

2.47 The most important safety-related features of the KBS-3 method are isolation and retardation. The third principle, dilution, is never mentioned in these contexts nowadays, which can be questioned since the dilution principle is regarded as an important safety function of SFR.

Oss wants SKB AB to clearly explain in the EIS the importance of the dilution principle for the view of the long-term safety of the KBS-3 method and for the site selection. (Oss)

The KBS-3 method is based on isolation as the primary safety function and retardation as the secondary safety function. Dilution is not credited as a safety function in safety assessments, but in order to calculate the consequences quantitatively, for example of releases to a well or a stream, dilution effects must be taken into account.

2.48 Oss wants SKB AB to explain in its EIS how the protective capacity of the buffer changes over time. An important question to answer is whether the buffer's protective capacity is necessary to meet the requirement on protection for at least 100,000 years. (Oss)

SKB does just that in SR-Can. Since knowledge of how the buffer is affected by dilute water during an ice age is not complete, the effect of a gradual loss of the buffer is analyzed. Bounding calculations with preliminary rock data show that the safety requirement is fulfilled in the 100,000-year perspective despite pessimistically estimated buffer losses.

2.49 The company refers to regulatory requirements when they say that the chosen final disposal method must be based on multiple engineered barriers and that only the KBS-3 method fulfils this requirement. This is one of the company's crucial arguments against the deep borehole alternative.

If the bentonite buffer cannot be expected with certainty to be intact after an ice age, this buffer cannot reasonably be counted as a protective barrier since the requirement on the method is that it should protect for at least 100,000 years. The KBS-3 method can therefore be regarded as a “single-barrier method” in the same way as the company describes the deep borehole alternative.

Oss wants SKB AB to clearly explain the long-term isolating function of the buffer and how this buffer can guarantee the multiple barrier function of the KBS repository. (Oss)

What SKB means when we talk about the fact that deep boreholes can only guarantee one barrier is that the deposition procedure cannot be checked at such great depths and that it can therefore not be guaranteed that the canister and the bentonite are intact directly after deposition. This can, however, be checked at deposition according to the KBS-3 method.

For a few canisters at the most vulnerable deposition holes, the buffer could be lost during an ice age without this having more than a marginal effect on the calculated risks.

2.50 Scenarios involving intentional intrusion are lacking in SR-Can. The reason is that the company believes that “good” intrusions will probably occur with an awareness of the consequences, and that it is impossible to judge how likely “evil” intrusions or how great the consequences might be.

According to the company’s account in connection with the consultation, scenarios involving intentional intrusion are handled within the framework of the IAEA agreement on safeguards, but Oss contends that scenarios concerning possible environmental consequences of intentional intrusions must also be included in the safety assessment for the final repository. (Oss)

Scenarios regarding, or the possible environmental consequences of, intentional intrusions will not be included in the safety assessment. In accordance with international practice, only inadvertent intrusions are included.

2.51 SR-Can presents a number of scenarios where some have been dismissed and others are included in the analysis of the canister scenarios. We can conclude that the outcome is that no scenario tells against the selected KBS solution.

The analyzed scenarios have been combined, and to give a picture of the “worst scenario” it has been posited that all protective barriers are lost. The argument is based on the outcome of the most pessimistic models in Forsmark consequences and concludes that a total failure of the final repository does not lead to greater consequences for the environment than natural background radiation.

This optimistic result raises the question of whether the multiple barrier requirement is relevant to safety and whether a final repository project of this scope is even necessary. The outcome also prompts other questions. The risk summation and the scenario with a total failure in the repository were based on the conditions that apply for Forsmark. Forsmark is presented from a hydrogeological viewpoint as being unusual for Sweden, with low water flux and high rock stresses. In SR-Can the company says that the “uncertainties in the hydrogeological interpretation and understanding of the Forsmark site are, however, considerable...” and that “A reduction of these uncertainties would allow more definite conclusions in future assessments”.

Oss wants SKB AB to explain why the company at this point uses Forsmark as a reference basis for scenarios when there are such great uncertainties.

If SKB AB intends to present modellings and scenarios of risk summation that are based on truly pessimistic conditions, they should rather use Laxemar, whose hydrogeological conditions differ from those in Forsmark and are more typical of Swedish conditions. (Oss)

SKB uses Forsmark (and Laxemar) because they are candidate sites for a final repository. All analyses in SR-Can and SR-Site are site-specific and pessimistic postulations are made for specific sites. Otherwise it is impossible to make a meaningful assessment of a site.

2.52 Oss wants SKB AB to clarify to what extent the company's long-term risk assessments are based on the risks of internal radiation. (Oss)

SKB's long-term risk assessments are based entirely on the risks of internal radiation.

2.53 The KBS-3 method entails considerable groundwater lowering (drawdown) in the area in question. We have asked several times how great this drawdown will be, but SKB has not yet provided a clear answer.

- How great will the drawdown be?
- How does this drawdown affect biodiversity?
- How will SKB compensate people, animals and Nature for this? (Döderhult Nature Conservation Society)

The drawdown does not have to be so great. How great it is and what consequences it leads to will be discussed at a separate consultation and in the EIS. The matter is currently under study. It requires further processing of data from the site investigations and further design work. When this has been done, reliable calculations can be performed.

If necessary, suitable measures will be adopted to reduce the consequences. Compensation will be paid by SKB for any damage to wells or similar damage.

2.54 We have seen presentations and illustrations of a possible location for a KBS-3 repository in the Laxemar area, but nothing about what safety arrangement will be required.

- What safety zones can be expected around surface facilities?
- What areas and roads may be completely closed off due to the project?
- How much will the Right of Public Access be curtailed? (Döderhult Nature Conservation Society)

SKB intends to divide up the facilities on the ground surface into an industrial area, a guarded area and a protected area. All sensitive parts such as administration, some stores, the restaurant and the information building will be located in or just outside the industrial area. The industrial area will be surrounded by a single fence. The guarded area has an entrance building where thorough security checks are made of individuals, vehicles and goods. This area is surrounded by a double fence with camera surveillance. Inside the guarded area we have a protected area that is surrounded by a stronger perimeter protection. This area contains the descent tunnel to the underground part, elevator shaft and other vital parts.

In the present-day layout, the operations area on the ground surface consists of an inner guarded area and an outer area. Both areas are fenced-in, the inner one with a double fence and the outer with an ordinary industrial fence. At Laxemar, the inner area is about 2.6 hectares and the outer about 4.7 hectares.

Aside from this area, no other areas or roads will be closed off. The restriction in the Right of Public Access will be limited to the fenced-in area.

2.55 Corrosion is of great importance for safety. You calculated that the concentration of sulphide dissolved in water was less than 1.6 milligrams per litre.

Does that figure agree with the measurements made in Forsmark?

That means that with the calculations that have been done, only a few millimetres of copper will corrode away in a million years. Thus, 1.5 tonnes of sulphide are required for the entire canister to disappear? (Leif Hägg, Östhammar)

The highest measured concentration of sulphide dissolved in water in Forsmark is 1.57 milligrams per litre, and the mean value for all groundwater that has been measured is 0.08 milligrams per litre. Much more than 1.5 tonnes of sulphide is needed for the “entire canister to disappear”, in other words for the entire quantity of copper to react with sulphide. Less is needed to make a hole in the canister – exactly how much depends on how spread-out the corrosion attack is over the surface of the canister.

2.56 Are there high concentrations of carbonate at repository level? (Leif Hägg, Östhammar)

The highest measured concentration of carbonate in all groundwater that has been analyzed at depths between 200 and 700 metres is 195 milligrams per litre, while the mean value is 65 mg/L. It all depends on what you mean by “high”. In general, shallower groundwater has a higher carbonate content; values above 400 mg/L are not uncommon at depths between 0 and 200 metres.

2.57 The environment in the canister is composed largely of corrosion products from the insert. How is the uranium dioxide and oxidized plutonium affected by that environment? Won't the radionuclides sorb onto these corrosion products? (Leif Hägg, Östhammar)

SKB does not rule out the possibility of such sorption, but it is not easy to prove so it has not been taken into account in the safety assessment.

2.58 How long does the radiation in the fuel have the capacity to convert water to hydrogen peroxide? Is this of great importance for fuel dissolution?

These hydrogen molecules that are formed during the corrosion process, can they be bound to the hydrogen peroxide (H₂O₂) and thereby accelerate the dissolution of the fuel? (Leif Hägg, Östhammar)

Some production of hydrogen peroxide will occur even after a very long time, since U-238 and U-235 are also radioactive, but this production will be negligible for fuel dissolution. The presence of iron in the canister will contribute to consumption of the hydrogen peroxide in other reactions than reactions with the fuel. If the hydrogen is bound to the hydrogen peroxide, water will be formed (the alpha radiation from the fuel gives rise to hydrogen gas and hydrogen peroxide). Dissolution of the fuel is not accelerated.

3. Common issues

3.1 The National Board of Fisheries assumes that the coming environmental impact statement will shed more light on possible effects on the fish fauna and fishing in the areas. Fishing includes recreational fishing, subsistence fishing and professional fishing. (National Board of Fisheries)

In the environmental impact statement, SKB will shed light on the possible effects of the activities on the fish fauna and fishing in the area, where relevant.

3.2 The Swedish Maritime Administration makes the judgement in this situation that you will return to sea transport at a later date. We look forward to such an occasion and would then like to discuss the questions regarding the appearance of the bridge on the m/s Sigyn which we know existed a number of years ago in conjunction with the ship's passage through Södertälje Canal. (Swedish Maritime Administration)

SKB will discuss questions associated with safety and radiation protection at future consultations, for example with regard to sea transport. As far as the appearance of Sigyn's bridge is concerned, it was rebuilt in 2003 and thereby given larger windows and new equipment, radar, an Automatic Identification System (AIS) etc. in cooperation with and in response to the wishes of the commander of the ship.

3.3 We at the National Road Administration consider that we should only express an opinion on those parts that have to do with the transport of dangerous goods. We also note that the rules that regulate transport of radioactive material are extremely tough and rigorous. Stringent requirements are made on transport casks and containers and the personnel that handle them. If the regulations are complied with, the risk of accidents is minimal.

Thus, the National Road Administration has no objections to the proposal. (National Road Administration)

SKB complies with the National Road Administration's vigorous rules and agrees that the risk of accidents is thereby minimal.

3.4 The Swedish NGO Office for Nuclear Waste Review, MKG, has stated at various meetings that the association wants not just the question itself, but also an introductory background to the question, to be included in the consultation minutes and compilations published by the nuclear power industry. This will enable the reader to see how the reply relates to the entire question that was posed, including an introductory description of the background to the question. Furthermore, the association wants entire comments to be published. This should apply to all comments and questions posed in the consultation. This has previously been the exception rather than the rule.

MKG is aware of the fact that the written questions from various organizations are appended to the consultation minutes and that the entire question can be read there, but the association feels that readers of the minutes and subsequently environmental courts, regulatory authorities and the Government should have an opportunity to see the questions in their entirety in direct connection with the replies given. The same applies to comments made at the consultations or submitted subsequently.

Will the nuclear power industry see to it that questions will be published in their entirety together with the replies in future consultation minutes? Will the same apply to comments that are made? Will the nuclear power industry see to it that the environmental court and other decision-making bodies get access to the questions in their entirety together with the replies to the questions in consultation reports that are submitted together with applications? Will the same apply to comments that are made at the consultation? (MKG)

SKB has previously included and will continue to include, in the minutes from the public consultation meetings and in the annual compilations of the consultations, the concrete questions that are posed as well as in some cases some or all of the background that has been given for each question. The complete written briefs are included as appendices to the minutes. Minutes and appendices are posted on SKB's website.

The consultation report that will be appended to the EIS and the applications will also include complete briefs from all consultation parties.

3.5 Is the nuclear power industry willing to hand over responsibility for the consultations to an independent party that can discharge the task in accordance with the intentions of the environmental legislation? (MKG)

SKB refers to the provisions of the Environmental Code, which assign responsibility for the EIA to the operator of the activity. We take our responsibility very seriously and intend to do a good job that will stand up to public scrutiny and insight. In the EIA work, SKB engages various experts whose work is based on the best available knowledge and scientific practice.

The tradition by which the applicant takes responsibility for preparing all application documents himself, including the EIS, dates back a hundred years to when the requirement for a permit for water activities was introduced in Swedish law. The Swedish system complies with the EEC's EIA directive (85/337/EEC, amended by 97/11/EEC). The EIA directive states that it is the developer who shall compile the necessary information.

3.6 For some time now the nuclear power industry, SKB, has chosen to have an outside moderator at the consultation meetings. The industry has then chosen Björn Nyblom, who comes from the public relations and lobbying company Diplomat PR.

At these meetings [note: the consultation meetings in Oskarshamn on 28 May 2007 and in Forsmark on 31 May 2007] as well as previous consultation meetings led and moderated by Nyblom, Nyblom has not shown that he has the necessary qualifications to be an impartial meeting leader and moderator. The Swedish NGO Office for Nuclear Waste Review, MKG, has therefore lost confidence in Björn Nyblom as a moderator at the consultation meetings.

Will the industry replace Björn Nyblom from the public relations and lobbying firm Diplomat PR with a professional and impartial person as meeting leader and moderator at future consultation meetings? (MKG)

SKB is satisfied with Björn Nyblom's work and we can absolutely consider continuing to use him as a moderator at future consultation meetings.

3.7 The nuclear power industry, SKB, has in its consultation plan planned to hold consultations on various topics on various dates. For two years in a row now the consultation meeting in Oskarshamn Municipality has been held in Figeholm a few kilometres from the Oskarshamn nuclear power plant. This is also near the site where the site investigation for a final repository is being conducted. However, the site is located about 20 km from central Oskarshamn, and it has not been possible to get to the consultation meetings by public transportation.

Wouldn't it have been better if the consultation meetings that concern broad questions such as long-term safety and alternative methods and siting had not been held so far from Oskarshamn? Wouldn't a meeting in Oskarshamn have enabled more private citizens and politically engaged persons in the municipality to participate in the consultation meeting? (MKG)

SKB has chosen to hold consultation meetings in Hägnad, Figeholm, in order to make it easier for residents in or near the site investigation area to participate.

3.8 Does the nuclear power industry intend to include the environmental organizations when the industry furnishes information in the consultation process and on other occasions when the Swedish nuclear waste actors are described? Does the nuclear power industry intend to change its view towards allowing the environmental organizations to participate in future information meetings and at the national consultation meetings? (MKG)

MKG says that SKB is deliberately trying to downgrade the role of the environmental organizations in the consultation process and is actively trying to exclude them from

insight into SKB's work in developing a final repository for spent nuclear power fuel. In this way SKB is trying to make it more difficult for the environmental organizations to review the consultations. MKG refers to the information meeting that was held on 1 November 2006 about SR-Can, to which the environmental organizations were not invited, and to the SI and SSA consultations that are held in accordance with a Government decision. Further, MKG says that SKB does not give the environmental organizations a chance to participate when overviews are presented at the consultation meetings by actors who are participating in the work of developing and deciding on the final repository for spent nuclear fuel.

SKB is in charge of conducting consultations, preparing an EIS, submitting applications etc. In this work, SIB must have an opportunity to meet and consult with any parties they like.

SKB has allowed the regulatory authorities SKI and SSI as well as the concerned county administrative board and municipality to present their roles in the decision process in connection with public consultation meetings. The consultation meetings have otherwise increasingly aimed to give other parties, such as organizations and individuals, a chance to express viewpoints and pose questions.

3.9 How does the nuclear power industry justify its practice of fragmenting the application for a permit to build a final repository for spent nuclear power fuel when the procedure is legally incorrect. How does the nuclear power industry justify the fact that the Swedish Nuclear Power Inspectorate, SKI, and the Swedish Radiation Protection Authority, SSI, have had to devote resources to reviewing a separate application for the encapsulation plant which was already at the time of its submission in need of considerable supplementation – resources that are needed to review the industry's SR-Can safety assessment and other reports published by the industry? Does the industry intend to withdraw the application in order to submit instead a complete application for the entire final repository project all at once, which is the legally correct procedure? (MKG)

SKB has not fragmented the application. In November 2006, SKB submitted applications for the encapsulation plant and Clab under the Nuclear Activities Act. The regulatory authorities can now begin their review of the nuclear engineering aspects of encapsulation. SKB plans to submit the remaining applications for the final repository system under the Nuclear Activities Act and the Environmental Code in 2009. No final statements of comment will have to be submitted by any party before all material has been submitted.

3.10 In the consultation minutes from last year's consultations, the nuclear power industry, SKB, says on a number of occasions that the consultations only concern the KBS method at the sites where the industry is conducting site investigations. This is contrary to the intentions of the Environmental Code with legislative history and existing practice. When, for example, a new road is to be built, the consultations have to include alternative routes and alternative ways of achieving the goals that building the road is intended to achieve.

Why does the nuclear power industry maintain that it does not need to provide detailed accounts of alternative methods and sites? (MKG)

If new roads are to be built, the consultations have to comply with the Public Road Act, which contains different rules for consultations than the Environmental Code.

The consultations which we are conducting on Clab, an encapsulation plant and a final repository for spent nuclear fuel shall, according to Chapter 6 Section 4 of the Environmental Code, pertain to the siting, scope, design and environmental impact of the applied-for activity as well as the form and content of the environmental impact statement. SKB will present alternative designs and sitings of the applied-for activity within the framework of the EIS. An account of the other methods and strategies for disposal of spent nuclear fuel which SKB has studied in its research, development and

demonstration work (RD&D) will accompany the applications under the Nuclear Activities Act and the Environmental Code.

3.11 At a seminar arranged by the Swedish National Council for Nuclear Waste in November 2006, environmental attorney Peggy Lerman pointed out the importance of providing the environmental court and the Government with a societal purpose to enable the method and siting proposed by the industry to be compared with other methods and sitings. Peggy Lerman said that several of the goals identified by the nuclear power industry as general for the final repository project are in fact project goals for the particular nuclear waste project, the KBS project, promoted by the nuclear power industry. Wouldn't the nuclear power industry, SKB, benefit from a general discussion of the societal goal of the final repository project that leads to a national political consensus regarding what criteria should be used to judge a final repository project? Isn't it also the intention of the nuclear power industry that environmental courts, regulatory authorities and the Government should have access to societal goals for a final repository for spent nuclear power fuel formulated on a high political level after a broad societal discussion? (MKG)

SKB's mission is to manage and dispose of the waste from the nuclear power plants in a safe and environmentally good way. Society formulates its goals and purposes with different activities in national laws and regulations as well as international treaties and agreements. Based on the overall requirements and principles for the management and final disposal of spent nuclear fuel in Swedish legislation and international agreements, SKB has defined the purpose of its mission to manage and dispose of the spent nuclear fuel.

3.12 The environmental court will pass judgement on a preliminary safety assessment for the final repository, since the safety assessment must be supplemented with knowledge that can only be obtained during the repository's construction period. A final safety assessment will therefore not be available until the final repository is finished and in operation. If the operating licence is only a question for the regulatory authorities, private citizens and environmental organizations will not have an opportunity to express their viewpoints on the final safety assessment. If, on the other hand, a separate examination of the operating licence takes place according to the Environmental Code, environmental courts and thereby also private citizens and environmental organizations will have a formal opportunity to make their voices heard.

How does the nuclear power industry view the opportunities of the environmental courts and the Government to pass judgement on the licence for operation of the final repository based on the Environmental Code? (MKG)

A facility's safety analysis report describes how safety and radiation protection in a nuclear facility are arranged to protect human health and the environment. The safety analysis report is prepared in the following steps:

1. Preliminary safety analysis report, PSAR.
2. Renewed safety analysis report prior to trial operation.
3. Supplementary safety analysis report prior to routine operation.
4. Constantly updated safety analysis report.

The purpose of the preliminary safety analysis report (PSAR) is to give an account of safety and radiation protection during normal operation and to evaluate the risks of disturbances and mishaps in and around a facility and their consequences. Besides an account of the safety of the final repository during the operating period (operational safety), it will also include an account of the post-closure safety of the final repository (long-term safety).

A “preliminary PSAR” will be submitted with the application under the Nuclear Activities Act and serve as a basis for the permit. It must later be updated before the start of construction. This means that another formal examination of the safety analysis report is required prior to the start of construction.

The renewed safety analysis report describes the pre-operational state of the facility and is submitted to receive a permit for trial operation. For natural reasons it is more detailed than the preliminary report.

Subsequently, before the facility is allowed to be put into routine operation, the safety analysis report must be augmented. The augmented safety analysis report is a living document that describes the actual facility and is updated when changes occur.

It is the duty of the state (and thereby the regulatory authorities) to safeguard the public interest. The safety analysis reports are reviewed and approved by SKI and SSL. This guarantees that the licence for operation of the final repository will be approved by those authorities whose task it is to judge the safety of the final repository. The procedure with the safety analysis report is regulated by SKI’s regulation SKI 2004:1 (where it is called a “safety report”).

3.13 Why does the nuclear power industry persist in asserting that the municipalities have a municipal veto on the establishment of a final repository for nuclear waste when the environmental legislation makes an exception for the municipal veto of a Government decision for a final repository of nuclear power waste? (MKG)

It is the Government who examines the permissibility of facilities for nuclear activities. The main rule is that the Government may only permit such activities if the municipal council in the concerned municipality approves. However, the Government may permit such activities against the will of the municipality if it is a question of interim storage or final disposal of nuclear materials or nuclear waste and the activity is of the utmost importance with regard to the national interest (“the veto valve”). However, this shall not apply if another site is considered more appropriate for the activity or if an appropriate site has been designated for the activity in another municipality that is likely to approve the site (Chap. 17 Sec. 1 and 6 of the Environmental Code).

In practice, the municipalities have a veto. The veto valve is subject to such strict conditions that it is in principle out of the question that the Government would use it for the siting of the final repository. Nor is there any reason to believe that the Government would want to resort to the veto valve. The whole siting process rests on the community’s acceptance. A decision by the Government to go against the will of a municipality would carry a great political price, since it would be heavily criticized.

Furthermore, SKB has made it clear that we will not try to establish a final repository contrary to the wishes of the concerned municipality.

3.14 Why hasn’t the nuclear power industry changed the timetable for submission of the SR-Can safety assessment instead of submitting an incomplete safety assessment? (MKG)

SR-Can is a complete safety assessment based on preliminary data from the sites at Forsmark and Laxemar. It is an initial evaluation of how the repository sites in Forsmark and Laxemar function together with the copper canisters that will be sealed in the encapsulation plant.

SR-Can was submitted to the regulatory authorities in November 2006 and has been reviewed by both them and an international panel of experts. The results of the regulatory review were presented in December 2007.

An important reason for submitting SR-Can at the chosen time was to give the regulatory authorities and other concerned parties an opportunity to offer viewpoints on the methodology in particular so that these viewpoints could be weighed into the work with the SR-Site safety assessment, which will be included in the applications for the final repository system.

3.15 In May this year the Swedish Radiation Protection Authority, SSI, decided to close the final repository for low- and intermediate-level waste, SFR, which is situated next to the Forsmark nuclear power plant. The nuclear power industry had so mismanaged the deposition of waste in the final repository that it is uncertain whether the long-term safety of the final repository can be guaranteed. Among other things the limit values for a number of substances had been exceeded.

The nuclear power industry says that it will recalculate the values and in this manner show that the long-term safety of the final repository SFR is not threatened. This is reminiscent of how the nuclear power industry, in its work to develop a final repository for spent nuclear power fuel, devises new models to show that there is not a problem with how the industry conducts its method development and siting work.

If the nuclear power industry does not show that it can manage the final disposal of low- and intermediate-level waste in a satisfactory manner, how will it then be able to demonstrate credibly that it will be able to successfully execute the much more difficult task of final disposal of the high-level spent nuclear power fuel? (MKG)

Final disposal in SFR has always been carried out in a safe manner. All waste packages that are deposited in SFR are recorded in a waste database. The operation of SFR is carried out in a structured and documented manner and extremely few accidents have occurred in the handling of radioactive waste in nearly 20 years of operation. The radioactive dose to the personnel is negligible year after year, and “third parties” have never received a measurable dose from the waste repository.

SKB is constantly working to further improve waste forecasts and determine how much radioactive waste is admitted to SFR. This includes refining the methods for determining the quantities of different radionuclides brought into the repository. This work has led to new methods for determining some of the “difficult-to-measure” radionuclides, in other words nuclides that have such weak radiation (normally beta radiation) that they are “drowned out” by the radiation from more radioactive nuclides such as cobalt-60 and caesium-137.

SKB’s most recent studies and research projects have in the past year yielded updated methods for determining the difficult-to-measure nuclides carbon-14, nickel-59, technetium-99 and iodine-129. SKB’s new methods show that the quantity of these substances is greater than previously calculated and in certain cases exceeded the formal permit, the radiation protection condition, for all or parts of SFR. The updated waste quantity was reported to SSI in the spring of 2007, and the radiation protection condition for a few substances was exceeded.

Since the permit for these nuclides has been exceeded, SSI decided in June 2007 to suspend deposition in SFR until SKB has come in with a new report and an application for a new radiation protection condition that reflects actual deposition in SFR. The application has to be supported by an account showing that SFR complies with the criteria with the new nuclide inventory as well.

In its decision, SSI also requests an account of what methods SKB uses to measure or calculate the quantity of various radionuclides in the facility. SSI also requests an account of SKB’s criteria for determining how a radioactive waste should be managed and where in SFR it should be deposited, and how SKB optimizes the operation of SFR. Finally, SSI requests an account of why the account of the quantity of waste deposited in SFR has sometimes contained recurrent inaccuracies and how SKB will ensure that these inaccuracies will not be repeated.

On 1 October, SKB submitted an account to SSI addressing all points in SSI’s decision on a suspension of deposition, including an application for a renewed radiation protection condition based on the new forecast of the quantity of waste and an assessment of how SFR fulfils both safety during operation and the long-term safety of the repository.

3.16 In March 2007, the Swedish National Council for Nuclear Waste, KASAM, arranged a seminar/question-and-answer session on deep boreholes as an alternative method for the final disposal of spent nuclear power fuel. KASAM had chosen the leading experts in different areas to present the current state of knowledge in different technical and scientific areas. Expert assessments were presented at the seminar on the feasibility of developing drilling and deposition technology that were much more optimistic than those that had been presented by the nuclear power industry in the consultation.

Doesn't the nuclear power industry use the best possible experts to assess the prospects for executing alternative methods compared with the industry's own method? (MKG)

Of course SKB uses the best possible experts. At KASAM's question-and-answer session, SKB stated that disposal in deep boreholes involves technical difficulties, particularly with drilling technology and deposition. SKB concurs with the other experts, who said that difficulties with drilling could perhaps be solved by technology development. But the fundamental weaknesses when it comes to long-term safety cannot be solved by further research and development. These weaknesses will persist, such as the fact that deposition is difficult to check, which means that only a single barrier can be counted on after a short time, and great uncertainties regarding the evolution of the repository during an ice age.

3.17 What additional background material does the industry deem necessary to be able to compare the chances of being able to safely implement the industry's KBS method versus the alternative method of deep boreholes? Do both methods really have to be developed so that it is possible to submit an application to build a final repository in order for this background material to be available? (MKG)

SKB estimates that it would take 30 years and cost at least SEK 4 billion to achieve a level of knowledge that makes it possible to perform a safety assessment of the same quality as for the KBS-3 method. If the ambition were instead to carry the work so far that it would be possible to submit an application based on the deep borehole concept, this would require even more time and costs.

SKB does not consider it justified to conduct a research programme for deep boreholes. Available resources should instead be concentrated on realizing a final repository according to the KBS-3 method.

3.18 At the seminar/question-and-answer session on the alternative method of deep boreholes arranged by the Swedish National Council for Nuclear Waste, KASAM, in March 2007, representatives of the nuclear power industry, SKB, said that the industry does not intend to conduct any further studies for the purpose of exploring the potential for implementing the method in a safe manner or the potential for the method's long-term environmental safety.

Can the nuclear power industry, SKB, confirm that the industry's intention is to refrain from gathering more material to permit a fair comparison of the alternative method of deep boreholes for final disposal of spent nuclear power with the industry's KBS method? (MKG)

The weaknesses in terms of long-term safety of the deep borehole concept cannot be overcome by further research and development. SKB therefore does not consider it justified to conduct a research programme for the concept. Available resources should instead be concentrated on realizing a final repository according to the KBS-3 method. SKB will continue to follow the development work in the field of deep boreholes.

3.19 In the information given to the public and other actors, the nuclear power industry often states that the results of its work on a final repository are “promising”. This applies in particular to the reports from the site investigations.

In the review of the industry’s preliminary safety analysis reports for the site investigations in Forsmark in Östhammar Municipality and Laxemar in Oskarshamn Municipality presented by the Swedish Nuclear Power Inspectorate, SKI, and the Swedish Radiation Protection Authority, SSI, on 18 December 2006, the regulatory authorities conclude that the results of the site investigations do not support SKB’s confident statements in the reports from the site investigations where it is contended that both sites meet the requirements established by the industry.

Does the nuclear power industry intend to ensure in the future that the information given to the public and other actors gives a fair picture of the state of the nuclear waste project? (MKG)

SKB has always been open with the results obtained, for example from the site investigations, and has always striven to give the public and other actors a fair picture of the state of the nuclear fuel project.

Since the preliminary safety analysis reports were presented, large quantities of data on the properties of the sites have been gathered and SKB has provided regular and accurate information on the results. The investigations on both sites are now (November 2007) virtually concluded and an integrated evaluation of the results is under way. Once the results of the evaluations have been reported, SKB will be able to provide an in-depth picture of the sites and how their properties relate to the requirements on safety and radiation protection.

3.20 In reply to previous questions from the Swedish NGO Office for Nuclear Waste Review, MKG, the nuclear power industry has stated that reports, including scientific reports, that deal with alternative methods and sitings and have only been published in Swedish will not be translated to English. MKG finds it remarkable the reports dealing with issues that are sensitive for the nuclear power industry are published in Swedish. This makes it more difficult for independent foreign experts to review the work of the industry.

Can the nuclear power industry explain why it is so important that reports the industry wants reviewed internationally are in English while reports that the industry does not want to subject to international review, such as those dealing with alternatives methods and siting, are in Swedish? (MKG)

SKB does not choose the report language in order to avoid reviews. On the contrary, the report language is chosen with a view to the review work and the target group.

3.21 The nuclear power industry uses extensive resources from the Nuclear Waste Fund to provide information in the consultations, at both the national and local level.

How large resources measured in money and man-years did the nuclear power industry, SKB, use in 2006, 2005 and 2004 to provide information on the nuclear waste issue? How have the resources been divided between central work and work in the final repository municipalities? (MKG)

During the period 2004–2006, SKB’s total annual operating budget was about SEK 1.2 billion. Of this amount, SKB spent approximately one percent on exhibitions, information meetings, publications, the website, events open to all actors, press relations, internal information and other information activities. These activities are carried out both centrally and in the site investigation municipalities.

3.22 The nuclear power industry's, SKB's, social science research programme recently issued a new call for proposals for grants. There the following research topics are mentioned as particularly interesting:

"Should the formal decision-making mandate be more local and reflect the attitude of the local population to, and knowledge of, the repository?"

"Is it legitimate to formulate more or less absolute permit requirements in the Environmental Code and the Nuclear Activities Act and then delegate responsibility to the regulatory authorities to issue their own requirements? Is it reasonable to require that an activity use the best available technology even if the resources freed by a marginal increase in risk could save human lives if they were instead used to improve traffic safety, for example?"

"Will [public institutions, legislation and decision-makers] on the whole support each other during the several-year-long decision process or are there areas of conflict and unclear points that will cause more or less serious obstacles along the way?"

"Decision-makers should preferably make decisions based on an overall assessment of what is best for people and society as a whole. Is this possible in practice? Or is society organized in such a way that special interests have taken precedence over the public interest, the parts over the whole, and the short view over the long view? What are the areas of conflict, where and how do they arise, how are power, mandates, profits and losses divided and what is democracy and whose democracy is it?"

"The decision process for the establishment of a final repository and the facilities included in the Swedish system have been designed as a step-wise process. An important question here is: Should interim decisions be made if they affect the decision that will be made in the end? In a well-financed project, different actors can make other demands on more studies, more research, alternative methods and more investigations before a decision is made than in an underfinanced project. One consequence of this could be that a well-funded project is much more drawn-out in time and has difficulty making the transition from planning to execution, since demands can always be made on more research, for example. In this case, could it be that projects with a limited budget have a better chance of coming to completion and being implemented in practice? A research topic here could be: Is there a connection between degree/form of funding and set of requirements, and if so what is the connection, for the chances of executing large projects aimed at solving problems of great importance for people, the environment and society as a whole?"

Can the nuclear power industry, SKB, understand that formulating the interesting research topics in this way can steer the research done in the programme in a certain direction and thereby promote the interests of the industry? (MKG)

Aside from the technical aspects, disposal of the spent nuclear fuel is a societal issue with important economic, social, legal and cultural implications. Knowledge in the field of the social sciences and humanities is required to shed light on these questions. SKB has therefore compiled a programme of social science research and study. A Scientific Committee was appointed for the research programme in the spring of 2004 consisting of researchers and representatives from SKB. The Scientific Committee has specified a number of criteria for assessment of the applications:

- The research projects must focus on topics linked to SKB's task of managing and disposing of Sweden's spent nuclear fuel. They must enhance the quality of the data underlying SKB's and the concerned municipalities' future decisions regarding

the siting of a final repository for spent nuclear fuel. The research projects must broaden perspectives on and enhance knowledge of the nuclear waste issue.

- Purpose, problem, work plan, method and expected results must be clearly formulated. The expected results must be relevant to both the research area and SKB. The costs of the projects must be reasonable and realistic. Applied research is prioritized. The research must be of high quality and based on the intradisciplinary state-of-the-art”.
- The participants in the social science research programme must be well-reputed in their fields, well-acquainted with SKB’s work, familiar with the background and content of the siting process and updated on the current situation in SKB’s programme. In contrast to the research being conducted with funds from public research councils and foundations, the projects supported by SKB thus have a clear character of applied research. To be relevant they must also naturally be of high scientific quality.

Based on a general description of relevant problems in a public call for proposals aimed at Swedish universities, the researchers choose those issues that they judge to be scientifically important to obtain more knowledge about. The researchers formulate their own research questions in the applications and take full responsibility for the methodology, results and conclusions of their research. The research undergoes the customary academic review and is also reviewed via the RD&D programme and at open seminars where various stakeholders can discuss the projects directly with the researchers.

3.23 SKB ignores having alternative methods studied adequately. The judgements made of these alternative methods to KBS-3 are superficial and one-sided and seem mainly aimed at dismissing these alternatives from the discussion.

It is not up to SKB to judge the relative merits of these alternatives but rather up to the persons and organizations who stand behind them to present adequate arguments with adequate means put at their disposal.

SKB and SKI have dismissed the DRD method by saying it is an “interim store”. We who stand behind this method should be allowed to show what it really is. (Milkas)

Under the Nuclear Activities Act, SKB is responsible for final disposal of spent nuclear fuel. The DRD method is not a final disposal method, but rather a method for long-term monitored dry storage in a self-draining rock cavern. Assessments of the evolution of the rock cavern, the storage containers and the fuel in such a repository can be done based on today’s experience of rock construction and dry storage. The DRD method does not provide acceptable safety in a long time perspective and therefore does not fulfil the requirements of the Nuclear Activities Act on final disposal of the spent nuclear fuel.

In parallel with the KBS-3 method, SKB has for more than 20 years studied other methods for management and disposal of spent nuclear fuel, mainly methods based on geological disposal. Different methods have been compared with the KBS-3 method in terms of e.g. technology, long-term performance, safety and costs. No evaluation has indicated that there is any reason to depart from the KBS-3 method. The evaluations and assessments have been presented in the RD&D programmes which SKB publishes every three years. The viewpoints offered by the regulatory authorities and the Government in the reviews of the RD&D programmes have strengthened our commitment to the KBS-3 method.

3.24 Isn't it easier to make a tunnel on a weak uphill incline in rock and then place the waste on both sides of the road? Then the leachate that collects in the tunnel mouth could indicate if radioactive material begins to leak out and people could more easily repair the repository. (Milkas)

Final disposal of spent nuclear fuel according to the KBS-3 method should be designed in such a manner that the repository does not need to be monitored or repaired.

The method described in the question appears to be the DRD method. The DRD method is not a final disposal method, but rather a method for long-term monitored dry storage in a self-draining rock cavern. Assessments of the evolution of the rock cavern, the storage containers and the fuel in such a repository can be done based on today's experience of rock construction and dry storage. The DRD method does not provide acceptable safety in a long time perspective and therefore does not fulfil the requirements of the Nuclear Activities Act on final disposal of the spent nuclear fuel.

3.25 The consultations entail that everyone participating in the consultations should have a say in determining the form, content and scope of the environmental impact statement, and that SKB should make use of what the organizations know. Does SKB make use of Milkas's knowledge when SKB designs the EIS (chap. 1.3)? Can Milkas have a say in determining the form, content and scope of the environmental impact statement? (Milkas)

According to the Environmental Code, the activity operator is responsible for consultations and the environmental impact statement (EIS). The consultations should concern the siting, scope, design and environmental impact of the activity or measure and the form and content of the environmental impact statement.

The viewpoints expressed in the consultations, for example by Milkas, are taken into account in SKB's work. A consultation report will be included in the applications. Viewpoints received and how SKB has replied and taken them into account will be described in this report.

3.26 SKB believed that SKB had built absolutely safe near-surface repositories that did not need any attention or repairs after closure. Now it has turned out that repairs and movement of materials have been necessary. Does SKB think that all near-surface repositories for low-level material have been absolutely safe? (Milkas)

SKB does not have any near-surface repositories for radioactive waste. The nuclear power plants operate such repositories, however.

3.27 Has SKB had complete control over the final repository for intermediate-level material in Forsmark? (Milkas)

Final disposal in SFR has always been carried out in a safe manner. All waste packages that are deposited in SFR are documented and recorded in a waste database. The operation of SFR is carried out in a structured and documented manner and extremely few incidents have occurred in the handling of radioactive waste in nearly 20 years of operation. The radioactive dose to the personnel is negligible year after year, and "third parties" have never received a measurable dose from the waste repository.

3.28 If a "reportable event" (abnormal event) occurs, a Licensee Event Report must be submitted within 30 days, according to SKI. The environmental movement thinks that such a report should be submitted to SKI immediately. (Chap. 4.1). Is this impossible? (Milkas)

Events that can be assigned to category 1, according to SKIFS, or events that occasion an emergency alarm in accordance with the criteria established by SSI, shall be reported without delay.

In the case of events that can be assigned to category 2, according to SKIFS, the requirement is that this be done within 30 days of the event.

A written report (LER) containing basic cause analysis, impact on operation and nuclear safety, and adopted and planned measures to prevent a recurrence is submitted as described above.

Verbal information to SKI in conjunction with the event is provided in most cases.

3.29 The background material says that the IAEA strives to avoid placing burdens on future generations, and that we who have benefitted from the nuclear power should assume the responsibility. Does SKB think that we should assume all moral responsibility for the waste (chap. 1:3)? (Milkas)

SKB believes that we should avoid placing burdens on future generations, which means that the waste problem should essentially be solved by the generations who have enjoyed the benefits of the electricity produced by nuclear power.

3.30 Should we assume all economic responsibility and pay all future costs for a million years or more? (Milkas)

The nuclear power plants are currently paying approximately one öre per kilowatt-hour for management of the radioactive waste. The money is managed in a special fund, the Nuclear Waste Fund. This money finances activities such as interim storage of fuel, siting, construction and operation of the final repository for spent nuclear fuel, the canister factory and the encapsulation plant and decommissioning of the facilities and the nuclear power plants up until closure of the repository in around 2060. After that the main strategy is that the repository will become the property of the state. Funds are not being set aside for postclosure measures. The final repository is designed so that such measures will not be necessary.

3.31 Does SKB always use the shortest routes for transport of nuclear fuel and waste, even if a longer transport route by a subcontractor would be cheaper? (Milkas)

As far as transportation of nuclear fuel and waste is concerned, safety is the primary concern, not cost.

3.32 SKB's research funding comes from the taxpayers' waste fund. The research results are sold abroad. Does the taxpayers' waste fund receive that income? (Milkas)

The nuclear power plants are currently paying approximately one öre per kilowatt-hour for management of the radioactive waste. The money is managed in a special fund, the Nuclear Waste Fund. The Fund is used exclusively for management and final disposal of the Swedish nuclear waste. SKB's consulting activities are fully financed by the client. The surplus goes to SKB's owners.

3.33 What is meant by "internationally adopted screening limit"? And who has set the limits? (Milkas)

The screening limit has been arrived at within the EU project ERICA and the meaning of the limit is that if the value is below the limit, the impact on the environment has been judged to be negligible.

3.34 In what ways will SKB further calculate and report the emissions from the planned facilities for encapsulation and disposal? (Milkas)

Estimates of emissions from the encapsulation plant are presented in the preliminary safety analysis report for the encapsulation plant submitted by SKB to SKI together with the application for the encapsulation plant in the autumn of 2006. An overview of the emissions is provided in the current consultation material (Safety and radiation protection, May 2007), Chapter 4.2.

Calculated emissions from the final repository will be reported in the SR-Site safety assessment. SR-Site will be based on the data gathered during the site investigations and the design of the final repository. SR-Site will be reported in connection with the submission of future applications.

3.35 Will SKB recommend a national referendum on the kind of repository we want so that the people can learn more about different methods? (Milkas)

No, SKB will apply for a permit to dispose of spent nuclear fuel according to the KBS-3 method. The regulatory authorities, the environmental court and the Government will decide whether the KBS-3 method satisfies the requirements made on a final repository.

3.36 As usual, issues concerned with radiation are regarded solely as safety issues and kept separate from environmental issues. This is clear in the background material, where the sections “Environmental risk analysis” and “Working Environment” get a half page each dealing solely with non-radiological consequences. This was also true of the presentations held by the Safety Group and the Misterhult Group at the meeting in Oskarshamn on 28 May. The Misterhult Group does not care at all about radiation issues, but discusses local environmental issues such as noise and road construction. (Milkas)

The environmental risk analysis focuses on non-radiological consequences. The radiological environmental impact of the facilities in connection with normal operation, disturbances and incidents as well as long-term safety are summarized in safety analysis reports, in accordance with SKI’s regulations.

Working environment issues are regulated by laws and regulations and handled within the design work. Working environment issues will not be included in the applications for the final repository system and are therefore not included in the ongoing consultations, but SKB chose to describe the work with working environment issues briefly in the consultation material in order to convey an overall picture of SKB’s work with safety and radiation protection.

3.37 SKB AB erroneously contended at this meeting that Oskarshamn Municipality has an absolute veto over the final repository plans. The environmental movement had to point out that the Environmental Code contains an exception from the normal veto legislation so that the Government can overrule a municipality that has said no, the so-called veto valve. (Milkas)

It is the Government who examines the permissibility of facilities for nuclear activities. The main rule is that the Government may only permit such activities if the municipal council in the concerned municipality approves. However, the Government may permit such activities against the will of the municipality if it is a question of interim storage or final disposal of nuclear materials or nuclear waste and the activity is of the utmost importance with regard to the national interest (“the veto valve”). However, this shall not apply if another site is considered more appropriate for the activity or if an appropriate site has been designated for the activity in another municipality that is likely to approve the site (Chap. 17 Sec. 1 and 6 of the Environmental Code).

In practice the municipalities have a veto. The veto valve is subject to such strict conditions that it is in principle out of the question that the Government would use it for the siting of the final repository. Nor is there any reason to believe that the Government would want to resort to the veto valve. The whole siting process rests on the community’s acceptance. A decision by the Government to go against the will of a municipality would carry a great political price, since it would be heavily criticized.

Furthermore, SKB has made it clear that we will not try to establish a deep repository anywhere contrary to the wishes of the affected municipality.

3.38 SKB AB's concept of "taking responsibility" is well in line with the company's self-interest in achieving a quick solution so that the waste problem will not stand in the way of continued nuclear power operation. This is one of several examples that show how untenable it is that the company is at the same time a developer and a guarantor of a democratic decision process in the nuclear waste issue. Milkas wants a bipartisan body to be in charge of the EIA process, composed for example of representatives of the industry, environmental organizations, regulatory authorities, and domestic and international scientists and experts. (Milkas)

SKB refers to the requirements in the Environmental Code, which assign responsibility for the consultation process and EIA to the operator of the activity. We take our responsibility very seriously and intend to do a good job that will stand up to society's scrutiny and insight.

The tradition by which the applicant takes responsibility for preparing all application documents himself, including the EIS, dates back a hundred years to when the requirement for a permit for water activities was introduced in Swedish law. Ever since then the licensing process has been a two-party process where the one party is the applicant, who presents his side of the case, and the regulatory authorities and private individuals are opposing parties. The independent review is finally carried out by the court, whose task is to judge the parties' arguments in light of the law. The Swedish system complies with the EEC's EIA directive (85/337/EEC, amended by 97/11/EEC). The EIA directive states that it is the developer who shall compile the necessary information.

3.39 Criticism and viewpoints have been expressed regarding the fact that SKB AB controls the structure, focus and content of the EIS too strictly. This and other process problems have been addressed and verified in the company's own social science research programme. Adequate background material has usually been lacking for the consultations, and the company has used the consultation procedure to publicize factors that support its own project instead of looking for uncertainties.

The background material for the consultation of May 2007 was no exception in this regard. The 54-page document mainly describes how the company works with different questions, with references to future studies and reports. The material does not have the necessary focus on uncertainties and weaknesses in the project, and the important SR-Can document has not been translated to Swedish in reasonable time before the consultation. (Oss)

The consultations shall, according to the Environmental Code (Chap. 6, Sec. 4), be concerned with the siting, scope, design and environmental impact of the applied-for activity and the form and content of the environmental impact statement. Many questions have come up over the years in the consultations about how SKB works with different types of safety aspects and when and how reports and background material will be presented.

The background material for the consultation of May 2007 was intended as information to provide a brief description of SKB's work with safety and radiation protection. It was also supposed to show what the work includes and what types of information will be provided in future reports and how they will constitute a basis for the environmental impact statement.

Chapter 6 of the Environmental Code regulates what the consultations and the EIS should include. A regulatory authority can, in connection with its regulations, issue guidelines and recommendations on how the requirements in the regulations can be satisfied. The Swedish Environmental Protection Authority's proposed general recommendations on environmental impact statements say regarding uncertainties that an EIS should contain information on the prediction and calculation methods used, the assumptions made and what background material and information sources have been used. Possible shortcomings and uncertainties in methods and background material should also be described. This will be covered in the EIS.

3.40 Oss (Opinion Group for Safe Final Disposal) would therefore like once again to propose improvements in the EIA process to improve confidence in the work and so that the EIS included with the applications will be as complete as possible.

- Consultations should only be held when there is something to consult about – i.e. when adequate background material is available.**
- The EIA process must be led by an actor independent of the waste company.**
- The consultation procedure must have a clear focus on the project's weaknesses and uncertainties with the goal of revealing any future environmental consequences, in accordance with EC directives and general recommendations. (Oss)**

As far as the demand that the EIA process should be led by an actor independent of SKB is concerned, SKB refers to the requirements in the Environmental Code, which assign responsibility for the consultation process and the EIS to the activity operator. We take our responsibility very seriously and intend to do a good job that will stand up to society's scrutiny and insight.

SKB's purpose with the consultations is to comply with the law in providing an active exchange of knowledge, viewpoints and information. SKB has a great deal of information to convey as a basis for the discussions, for example proposals and results from design, calculations and analyses.

SKB's goal in the consultations has been to describe in the background material for the consultations the consequences of the planned activities as site investigations and design have progressed and to solicit viewpoints and questions from the consultation parties for the purpose of enabling the parties to participate in an iterative process. Disposal of the spent nuclear fuel is a large project in which studies, site investigations, design work etc. have been conducted for many years. It is not possible to consult about everything involved in the project on a few isolated occasions. SKB has therefore tried to arrange consultations on different themes as the relevant studies have been completed. The last consultation before the applications are submitted will be based on a preliminary EIS.

Chapter 6 of the Environmental Code regulates what the consultations and the EIS should include. A regulatory authority can, in connection with its regulations, issue guidelines and recommendations on how the requirements in the regulations can be met. The Swedish Environmental Protection Authority's proposed general recommendations on environmental impact statements say regarding uncertainties that an EIS should contain information on the prediction and calculation methods used, the assumptions made and what background material and information sources have been used. Possible shortcomings and uncertainties in methods and background material should also be described. This will be covered in the EIS.

3.41 Since the 1980s, environmental organizations have regularly commented on the lack of clear performance criteria for the final repository project. The term "performance criteria" has then referred to basic conditions, goals and purposes that describe why the waste problem must be solved and should serve as a basis for the choice of method.

The performance requirements and criteria referred to by SKB AB are the ones established by the Nuclear Activities Act, the radiation protection legislation and regulatory requirements. The waste company's work involves describing how the company intends to solve the waste problem, and the goal is to satisfy the conditions for the nuclear power plants' operating licences. These purposes and goals can be defined as project goals and differ from goals defined by society.

Societal goals are linked to national and international environmental legislation and established long-term environmental objectives and are

based on the question of why a measure should be implemented – in other words, the societal purpose of the project.

In conjunction with KASAM's seminar on 15 November 2006 about the regulatory system and the roles of different actors, leading environmental lawyers pointed out that the lack of clearly defined purposes prior to licensing influences the supporting material and important choices during the planning process.

In the absence of clearly formulated purposes, it is difficult to determine whether the final repository project and the choice of method have a reasonable chance of success in the future licensing process.

This is not just a question for SKB AB as an activity operator, but perhaps mainly for the Government and the Riksdag whose responsibility it is to formulate and update the directives for the project. (Oss)

SKB's mission is to manage and dispose of the waste from the nuclear power plants in a safe and environmentally good way. Society formulates its goals and purposes with different activities in national laws and regulations as well as international treaties and agreements. Based on the overall requirements and principles for the management and final disposal of spent nuclear fuel in Swedish legislation and international agreements, SKB has defined the purpose of its mission to manage and dispose of the spent nuclear fuel.

3.42 The key question in this context is whether the spent nuclear fuel should be regarded as a waste to be isolated and rendered inaccessible, or whether it should be considered a potential resource for future generations.

This question could possibly be considered to be answered by the passage in the Nuclear Activities Act stating that the activity operator shall: "prevent illicit tampering with nuclear materials or nuclear waste". But since RD&D-92, SKB AB has come to talk more and more about retrievability as a performance criterion and requirement in such a manner that the KBS-3 method has been seen as a method that provides freedom of choice for future generations.

The company has exploited this lack of clarity to support the project by sustaining the illusion that retrievability has been an important basis for the acceptance for the method that now exists among politicians and the public in the two site investigation municipalities.

This unfortunate state of affairs has been made possible by the lack of clear directives regarding the purpose of the final repository project, and it is therefore necessary that this purpose be clarified.

Oss wants SKB AB to clarify in the EIS how the final repository project relates to the purpose and the societal goals so that it will be possible in the licensing process to determine the suitability of the chosen solution. (Oss)

There is no formal requirement in Sweden that it must be possible to retrieve a deposited canister. On the contrary, the Nuclear Activities Act says that spent nuclear fuel should be disposed of.

However, SKB has decided that the final repository should be designed in such a manner that it is possible to retrieve deposited canisters prior to closure. This may not lead to technical designs that compromise the long-term performance of the repository, however. Single canisters may have to be retrieved from a deposition hole if something unforeseen happens during deposition. Retrieval of a large number of canisters in a later phase of operation must also be possible.

If future generations should wish to retrieve the canisters of spent nuclear fuel after closure, this is also possible. But it requires efforts and resources on the part of society of the same order of magnitude as those required for the final repository project.

3.43 New political directives may be issued changing how the nuclear fuel waste is viewed, which makes it important that the waste company deal with different scenarios.

Oss wants SKB AB to clearly describe on what grounds it considers the KBS-3 method to be the best solutions, regardless of whether the spent nuclear fuel is to be defined as an irretrievable waste or a retrievable resource. (Oss)

SKB works according to the laws and regulations that apply now. The Nuclear Activities Act calls for disposal of the spent nuclear fuel, and the KBS-3 method has been developed on this premise.

The scientific and technical basis for the method has been continuously developed and reported to the regulatory authorities and the Government every third year in the RD&D programmes. At the same time, SKB has followed, and will continue to follow, the development of other strategies and methods for the management and disposal of spent nuclear fuel. The regulatory authorities and the Government have repeatedly approved the focus of the RD&D programmes on deep geological disposal according to the KBS-3 method with continued parallel evaluation of alternative methods.

3.44 Oss wants SKB to describe in what way the current state of knowledge influences the company's view of the deep borehole alternative. If the company does not feel it has to reconsider its attitude towards the alternative, it is important that they give a more satisfactory account of the grounds on which they reject the alternative than have been given before. (Oss)

SKB's assessment is that the deep borehole concept, which entails deposition of the fuel at a depth of several kilometres, has such great fundamental weaknesses in terms of long-term safety that continued research cannot be justified. However, SKB will continue to monitor the development of the concept, even though it is not to be regarded as a feasible alternative.

SKB will present a report with the purpose of illustrating factors that distinguish between final disposal of spent nuclear fuel according to the KBS-3 method and disposal in deep boreholes. All steps of the process will be compared. In the report. The comparison will include factors such as site investigation, site selection, facility construction, deposition, closure, nuclear safety, safety in handling, long-term safety, physical protection and safeguards, and planning premises in the form of lead times, development needs and costs.

SKB believes that disposal in deep boreholes entails technical difficulties, above all with drilling technology and deposition. Any difficulties with drilling can perhaps be solved by technology development. But the concept also has fundamental weaknesses when it comes to long-term safety that cannot be solved by further research and development. These weaknesses – such as the fact that deposition is difficult to check, which means that only a single barrier can be counted on after a short time, and great uncertainties regarding the evolution of the repository during an ice age – will persist.

3.45 In the summary of the purpose of SKB AB's work further down on the same page, it says that "The final repository should be established by those generations..."

Oss wants the company to cite legal support for the claim that it is an express requirement and not a preference that the final repository should be established by certain generations. (Oss)

SKB does not have any explicit legal support for this passage in the formulation of our purpose. However, according to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, the Contracting Parties shall "aim to avoid imposing undue burdens on future generations".

It is a matter of morals and ethics that those generations that have derived benefit from the Swedish nuclear reactors should take responsibility for the waste and establish a final repository which is designed so that it remains safe after closure without maintenance or monitoring.

3.46 We note that SKB AB brings up certain selected international commitments, but refrains from mentioning others that Sweden has undertaken to comply with and that have the goal of eliminating and reducing radioactive releases, such as the Helsinki and Ospar conventions.

Oss wants SKB AB to describe in the EIS how the KBS project fulfils the obligations in all adopted international treaties and conventions that deal with diffuse radioactive emissions. (Oss)

SKB will explain in an appendix to the applications how the final repository satisfies the general rules of consideration in the Environmental Code.

The Helsinki Convention – Convention on the Protection of the Marine Environment of the Baltic Sea Area – was created to protect the marine environment of the Baltic Sea Area by adopting measures against water and air pollution. The goal is “to promote the ecological restoration of the Baltic Sea Area and the preservation of its ecological balance”. It embodies fundamental environmental principles such as the precautionary principle, the polluter pays principle (PPP) and use of the best environmental practice (BEP) and the best available technology (BAT).

OSPAR – Convention for the Protection of the Marine Environment of the North-East Atlantic – was created to improve the environment in the North-East Atlantic, the Skagerrak and the Kattegat. This convention is also based on modern environmental principles such as the precautionary principle, the polluter pays principle, best available technology (BAT) and best environmental practice (BEP). The contracting parties shall work to prevent and preferably eliminate marine pollution and adopt necessary measures to protect the marine environment. Human health shall be protected and the marine ecosystems shall be preserved and restored in cases where they have been adversely affected.

SKB does not see that the final repository for spent nuclear fuel should conflict with the above or other conventions or adopted international treaties.

3.47 The consultation material’s description of general requirements and premises occasions the question as to whether SKB AB prioritizes the time factor above environmental protection.

Oss therefore wants SKB AB in the coming EIS to make it possible to judge how the company has weighted environmental protection and long-term radiation protection compared with other factors that are more related to the execution of the project in time and space. (Oss)

SKB prioritizes environmental protection first, which includes radiation protection as an important component.

3.48 SKB writes that another purpose is that the final repository should be intended for spent nuclear fuel from the Swedish nuclear reactors that has been generated within Sweden’s borders.

We note that SKB AB now brings up the issue of Swedish versus foreign waste as a long-term premise (the project is assumed to last another 50–100 years), when the company usually dismisses questions on the subject with the argument that the project is based on the premises that apply “today”.

Oss is of the opinion that the issue of disposal of only Swedish waste cannot be cited as a final purpose since these issues are to be regarded as political, which means they may change as the EU’s supranationality and free trade agreements are developed and strengthened and are therefore issues without any reasonable importance for method and site selection.

The fact that SKB AB nevertheless chooses to define the question of Swedish/foreign waste as a project premises may be regarded as part of the marketing of the project, offered as reassurance to worried politicians and private citizens. (Oss)

SKB has based its formulation of the purpose of the final repository project on current legislation and adopted international treaties. The Nuclear Activities Act prohibits “disposal of spent nuclear fuel in Sweden or nuclear waste from a nuclear facility or another nuclear activity in another country without a special permit”. In the Nuclear Waste Convention it says that “...radioactive waste should, as far as is compatible with the safety of the management of such material, be disposed of in the State in which it was generated...”.

3.49 The background material for the consultation says that “The assessment shows that the canister performs as it should in the final repository...”.

The prerequisite for this claim is that the canister is intact and that conditions in the final repository are as expected.

We would once again like to point out that the most important function of the EIA process is to bring out uncertainties and describe the consequences of unexpected and undesirable events.

An assessment of long-term safety should reasonably focus on what happens in the final repository if the canister and other barriers do not perform as planned. (Oss)

SKB’s work with safety assessments entails analyzing possible consequences of both a normal evolution of the repository and various scenarios. This is done in SR-Can.

Chapter 6 of the Environmental Code regulates what the consultations and the EIS should cover. A regulatory authority can, in connection with its regulations, issue guidelines and recommendations on how the requirements in the regulations can be met. The Swedish Environmental Protection Authority’s proposed general recommendations on environmental impact statements say regarding uncertainties that an EIS should contain information on the prediction and calculation methods used, the assumptions made and what background material and information sources have been used. Possible shortcomings and uncertainties in methods and background material should also be described. This will be covered in the EIS.

3.50 In the consultation in 2006 on alternative methods, SKB AB held up a probable negative development of society in the future as an important and clear argument in the method question. They said that it was urgent to find a solution and that KBS-3 is therefore the only alternative. If SKB AB persists in this negative view of the future, it is reasonable that this attitude will also be cited as an argument in the siting question.

In view of these negative future expectations and the fact that what could not happen nevertheless did happen in Forsmark in the summer of 2006, and the knowledge that it could happen again with much more serious consequences, it would seem unwise to concentrate more nuclear facilities in the same area.

A reactor accident in e.g. Oskarshamn would probably make it difficult for an indefinite period to maintain the activities required at Clab, the encapsulation plant and the final repository if they are co-sited, and likewise in Forsmark with SFR and other repositories.

Oss wants SKB AB to explain how these safety factors have been dealt with and weighted in view of the fact that the crucial siting factors for the final repository project have been local acceptance and industrial advantages. (Oss)

SKB does not have a negative view of the future. The study Oss refers to examines a number of more or less probable events that could occur in the future. It should be taken into account in the work with the final disposal of the spent nuclear fuel. All

factors considered, SKB judges the advantages of siting adjacent to existing nuclear facilities as being much greater than the disadvantages.

3.51 As a local environmental organization, the Döderhult Nature Conservation Society has received a written invitation to earlier consultations, which it did not this time. As far as we understand it was not a problem with the mail or the like, since we are reportedly not on the distribution list. Why have we not received an invitation? (Döderhult Nature Conservation Society)

SKB has previously held consultations aimed at local organizations. We have sent written invitations to these consultation meetings to local organizations, such as the Döderhult Nature Conservation Society. A couple of years ago it became possible for organizations to apply for funds from the Nuclear Waste Fund to participate in these consultations. The organizations who receive funds now receive invitations to public consultation meetings and meetings with the Oskarshamn EIA Forum and the Forsmark Consultation and EIA Group. One of the organizations that receives funds is MKG, which includes the Kalmar Society for Nature Conservation, in which the Döderhult Nature Conservation Society is one of the circles. In addition to the written invitations, all consultation meetings are also advertised in a several local and regional newspapers. SKB feels that we have in this way made the information on the consultation meetings available to everyone.

3.52 During the consultation a question came up regarding the alternative method deep boreholes. Then SKB's representatives held a long lecture about how bad it is from various viewpoints. In practice it is currently impossible to say anything about the safety issues or the technical possibilities, since background material is lacking.

- How can SKB express itself with such certainty about the deep borehole method when no real research has been conducted on this method?
- Does SKB have information other than that which has been published?
- Why is it so obvious that it is not possible to have multiple barriers in deep boreholes? Has research been done on this? (Döderhult Nature Conservation Society)

SKB believes that disposal in deep boreholes entails technical difficulties, above all with drilling technology and deposition. Any difficulties with drilling can perhaps be solved by technology development. But the concept also has fundamental weaknesses when it comes to long-term safety that cannot be solved by further research and development. These weaknesses – such as the fact that deposition is difficult to check, which means that only a single barrier can be counted on after a short time, and great uncertainties regarding the evolution of the repository during an ice age – will persist.

3.53 The meeting was a complete failure, mainly due to poor meeting procedure. I would almost like to say that it was sabotaged by certain participants. When SKB (Saida Laârouchi Engström) started by introducing the meeting, she was immediately interrupted by questions. A speaker must be allowed to say what they have to say! The national environmental organizations must not be allowed to dominate the meetings. All participants must be given a chance to have their say!

- Someone also created a constant disturbance by photographing.
- The national environmental organizations also showed poor judgement by proposing that their members only should check the minutes.

Otherwise I think that SKB is doing a good and ambitious job. (Anders Andersson, Östhammar)

SKB concurs with the person posing the question and has therefore made certain changes in the consultations. On 8 September, i.e. a few months after the consultation meeting in Forsmark, the annual nearby resident meeting was held in Forsmark. In connection with the nearby resident meeting, a consultation meeting was held to give nearby residents an opportunity to ask their questions regarding a final repository for spent nuclear fuel in Forsmark. In future the consultation meetings will be held both as public meetings and in connection with nearby resident meetings, in both Oskarshamn and Forsmark.

If you would like to read more

Some brochures and reports from SKB with a bearing on the ongoing consultations and site investigations are shown below. All are available at www.skb.se or can be obtained on request.

Encapsulation plant

In November 2006, SKB submitted an application under the Nuclear Activities Act for a permit to build and own an encapsulation plant for spent nuclear fuel and to operate it integrated with Clab. An environmental impact statement (EIS) and a consultation report were appended to the application. Printouts of these documents – in Swedish – can be obtained on request.

Annual reports

Site investigations are being conducted in Oskarshamn and Forsmark. Each site has its own annual report describing the past year's activities (available in English).

SKB's social science research is available in an annual report, *Social Science Research 2007* (in Swedish only).

Safety assessment

The safety assessment, SR-Can (where Can stands for canister) was published in November 2006 (TR-06-09, in English). SR-Can is a preparatory step for the safety assessment SR-Site, which will serve as a basis for SKB's applications in 2009 for a permit to build a final repository.

RD&D Programme 2007

SKB's latest programme for research, development and demonstration of methods for the management and disposal of nuclear waste. It was submitted to the Government in September 2007.



Svensk Kärnbränslehantering AB

Swedish Nuclear Fuel and Waste Management Co

Box 250 SE-101 24 Stockholm, Sweden

Telephone +46 8 459 84 00

www.skb.se