

MINUTES OF THE MEETING
OF THE DISPOSAL SUBCOMMITTEE
OF THE BLUE RIBBON COMMISSION
ON AMERICA'S NUCLEAR FUTURE
AT THE FORSMARK INN AT
FORSMARK, SWEDEN
ON OCTOBER 23, 2010

COMMISSIONERS PRESENT:

JONATHAN LASH, Chair
VICKY BAILEY
SUSAN EISENHOWER
ALLISON MacFARLANE
PER PETERSON

Tim Frazier convened the meeting at 3:24 p.m.

Claes Thegerstrom, Chief Executive Officer of SKB, welcomed the Commission and introduced those who would speak during the meeting.

Chair Lash expressed the Commission's gratitude for SKB staff spending their Saturday with the Commission. SKB's work represents an opportunity for the United States to proceed better in its management of nuclear waste. The Blue Ribbon Commission on America's Nuclear Future was appointed by Secretary of Energy Chu after President Obama decided not to proceed with the Yucca Mountain license application. The BRC is not a siting commission; rather, its role is to advise the Secretary of Energy on the management of high-level nuclear waste. The US has been producing military nuclear waste since 1943 and has had civilian nuclear reactors operating since 1963. The US has not been successful in producing a long-term disposal facility for these wastes. Presently, older waste is in interim dry cask storage and younger waste is being stored in spent fuel pools. It is clear that part of the US's difficulty has been technical in nature, though the greater part is political. The Commission, therefore, is interested in learning from other countries' success. The Commission is eager to hear from SKB on technical issues as well as throughout their siting, construction and political processes.

Mr Thegerstrom provided a brief general overview and background of the Swedish nuclear system. The waste debate started in 1976. Nuclear operators were given responsibility to show viability for applicant disposal technologies. The corporation SKB was formed by the nuclear power industry to deal exclusively with nuclear waste and its attendant issues. The basic elements of the disposal plan were developed in the late 70s and 80s and having been playing out since then. The fundamental tenet of the plan is that the polluters pay for the waste they have produced. Sweden does not have states as in the US; the federal system contains national and municipal governments.

Centralized interim storage was decided early in the process, followed by the referendum on a Swedish repository. A transportation vessel was designed in 1982. The Clab interim

pool storage facility at Oskarshamn has been operating since 1985. Development of concepts over the late 70s and 80s led to the KBS-3 concept. Submission of the license application for the repository is approaching. Most of the waste was produced for electrical generation, though a small part is medical waste. KBS-3 concept is built on a multi-barrier canister surrounded by bentonite clay and crystalline bedrock. Full-scale inactive demonstration projects are ongoing at the canister lab, bentonite lab and the Aspö Hard Rock Laboratory. He believes that there is presently enough knowledge to submit the license application, though that event is anticipated in March 2011. The ability to weld one capsule shut per day needs to be demonstrated. Also, an encapsulation factory needs to be built. Construction is expected to take seven years and will be sited adjacent to the interim storage facility at Oskarshamn.

The study to identify candidate sites from 1977-85 led to new scientific knowledge but was not good for growing political support. Two principles did help: 1) the final site must meet the technical criteria set forth and, 2) SKB must work with the locality's confidence. Many potential areas were identified, pointing toward a voluntary siting process. Candidate sites were then subjected to broad-based feasibility studies.

Chair Lash asked if the process had been voluntary from the beginning. Mr Thegerstrom replied, no. The process was more scientific at that time. SKB gained access to the land by purchasing it from the owner and would then contact the local mayor about beginning feasibility studies. It was not a good basis for dialogue. The voluntary process evolved over time. Cities were entitled to monies from the Swedish Nuclear Waste Fund (NWF). Later, NGOs were given access to Fund monies. Local referenda were held to decide whether to continue site investigations. Responses were about 70% negative.

Following the studies, two sites were selected for further analysis: Forsmark and Oskarshamn, two communities which already house nuclear facilities. A thorough evaluation completed in 2009 selected Forsmark, citing its superior safety characteristics. Throughout the process, there was a who-is-going-to-win perception in the public. The mayors of Forsmark and Oskarshamn had a formal agreement to cooperate. Value was added to the non-selected site.

SKB has several challenges presently: converting their RD&D programs into industrial operation, strengthening the safety case, and keeping and developing public confidence.

Member MacFarlane asked how long the licensing process would take. Mr Thegerstrom replied that nobody knows the answer to that. He expects it to take about four years but there is no limit. The minimum period is probably 2-1/2 years. She asked what was the technical value of investigating more than one site. He replied that, since crystalline rock is heterogeneous, it is a good idea to have more than one site.

Chair Lash asked if SKB had considered aspects of retrievability. Mr Thegerstrom replied, yes. SKB takes all measures to manage safety. There is a natural need to be able to remove the canisters.

Member Bailey asked if the design criteria were cognizant of environmental issues arising with the canisters. Mr Thegerstrom replied, yes. Compliance will be verified.

SKB will provide the analysis to the authorities who will review it. SKB is investigating the effect of glaciation on bentonite clay. Annualized risk of release is presently approximately ten to the negative six. If there is no glaciation, the facility will be zero-release. Dose criteria for the site are limited to 14 millisieverts per year.

Member Eisenhower asked about the advantages of siting underwater versus on land. Mr Thegerstrom replied that land uplift and water drainage would yield a site that is above the

Baltic Sea in 1000 years. The radiation at the site will lower over time.

Member Peterson asked if in the course of site proposals all technical issues and contracted obligations were considered. Mr Thegerstrom replied, yes, the basic factor was long-term safety.

Jacob Spangenberg, Mayor of Osthhammer Municipality, thanked the Commission and said he welcomed interruptions to his presentation. He provided an introduction to grassrotts challenges with respect to site selection. As time passes, experiences are of international interest and he wanted to share his experience.

Swedish municipalities have a lot of independence. Osthhammer has about 21,500 inhabitants and manages social services for them. Population density stands at about 13 per square kilometer. This is largely due to the archipelago of about 1,000 islands in the municipality. There are also some 4,000 miles of shoreline and 5,000 holiday cottages. The population is higher in the summer as vacationers come to stay for the season.

SKB and a tool manufacturer, Sandvik Coromant, are the major industrial players in the area. An iron mill will be opening later. In the past, some 60% of European iron came from Osthhammer.

The foundation of a trustworthy local process for siting a repository: a legal framework that spells out roles of participants and an industry that produces a safe method. The national authority conducts its own reviews and the Environmental Court works to ensure protection of resources. The Municipality and the local population have the opportunity to veto the project in the end. If they say yes, the national government still may say no. The NWF funds projects conducted by SKB, the national authorities and the Municipality. Osthhammer receives approximately \$1 million annually for capacity-building.

Public knowledge and awareness are important. Socio-economic studies have helped to raise issues in the Municipality. There is some concern that the repository will become the site of EU wastes, in addition to Sweden's. There are also concerns about the local supply of goods and services and the effect the repository will have on the town's image. Openness and transparency must be maintained between the Municipality and SKB, the Swedish government and the Municipality, within the Municipality and toward the public. Osthhammer could end the process immediately with its veto power.

Chair Lash asked how long the Municipality would have the power to veto the project. The Mayor said he didn't know. Mr Thegerstrom said there is a difference between exercising the veto informally now and formally at the appointed time for the Municipality's decision. The town may veto following the formal national government decision. However, the town may act more informally and stop the process earlier.

Member Eisenhower asked if a separate license would need to be submitted to provide for waste acceptance. Mr Thegerstrom replied that a new license must be issued for operations.

Osthhammer has an extensive administrative apparatus to work on repository issues, including national experts, a long-term Safety Committee and a Consultative Committee to control interaction between the public and the Municipality.

Member Peterson asked where the structure of municipality administration came from. The Mayor replied that the structure was changed in June 2009 following the siting decision. The Commissioner asked if SKB provided resources to assist in the town's review. The Mayor replied, no, monies come from the NWF. The town has hired consultants to assist in the technical review of the project. The main political concerns are long-term safety, environmental impact, potential health effects and socio-economic impacts.

In conclusion, the Mayor said that building trust takes time. Players must communicate and participate throughout the process. The process itself is as important as the content of the process. Timetables must be realistic. Value added to the community promotes entrepreneurship and development of infrastructure.

Next steps for Osthhammer include additional RD&D efforts, consultation and a workshop in Las Vegas and seminars. SKB will submit its application in 2011 and then “the real work.” The Mayor thanked the Commission for listening.

Chair Lash asked what he said was a more moral or philosophical question. That is, what to do about the perception of value-added negotiations as bribes to the municipality. Mr Spangenberg replied that the value-added program is shared between two cities; the non-selected site still receives benefits. Also, since the Municipality is involved in solving a national problem, it should receive some benefits.

Member Peterson asked how the Municipality’s long-term experience with nuclear issues has affected their approach. The Mayor replied that awareness of nuclear production has led to more public acceptance. People questioned at the beginning but it created a more positive environment over time. The Commissioner asked about the opportunity of neighboring municipalities to communicate their concerns in the process. Information is shared and views are offered on a voluntary basis, though there is no formal obligation.

Member Eisenhower asked if Sweden’s Baltic neighbors were involved in the process. **Saida Engstrom**, Director of Environment Stakeholders and Community for SKB, said must ask its neighbors on matters of safety and environmental impact. The process is ongoing.

Kenneth Gunnarsson, representing MKG, said he is “extremely local,” and would try to characterize local environmental NGO perspectives. SKB began the siting process in the 1980s and it was not a public success. SKB changed its strategy and implemented a dialogue process to increase confidence. One conclusion drawn from the process is that municipalities need financing for independent evaluation. In 2004, the Ministry of Environment proposed that municipalities get NWF resources, a move which SKB opposed. The national government made a pragmatic decision in allowing municipalities to access NWF funds; funding allows participation in the process. However, participation is not influence. Nevertheless, the Swedish process is an international exemplar. High public support is possible because Swedes like compromise and structure.

NGOs must have organization and funding. Presently, industry has an advantage because of the availability of funds. SKB steers the research program, leading to a lack of national political involvement. He suggests increased openness, access to information and legal resources. It is important to identify the aims of actors and that these actors clarify their perspectives. Actors should work toward common goals with visible results. An independent agency should be established to oversee the industry and financing to NGOs.

Chair Lash asked Mr Gunnarsson to comment on the perception of the benefits process. Mr Gunnarsson replied that the negotiation process began in the 1980s. The benefit package has not influenced SKB’s strategy for siting. The Chair noted that most NGOs are not interested in nuclear and waste issues until late in the process. He asked if funding had increased NGO expertise on these issues. Mr Gunnarsson replied, no, there is not enough money. Mayor Spangenberg noted that NWF funds were disbursed through the municipality.

Member Bailey asked if openness and transparency were the most important qualities of the political process of siting. Mr Gunnarsson replied that ethical, environmental and economic concerns were most important. We have the waste despite anyone’s view on nuclear power.

NGOs do not have a financial interest in the outcome of the siting and design process, leading to a wider perspective of the issues. Mayor Spangenberg said the biggest challenge to local politicians was to ensure that a tyranny of the majority does not disallow the voicing of critical views.

Member Eisenhower asked for additional comment on MKG's role. Mr Gunnarsson replied that the organization is working to provide additional information to the national authorities, though MKG lacks technical proficiency due to lack of funds.

Chair Lash asked about the case in which the consent-based process yields a willing but technically unsuitable site. Mr Gunnarsson noted the presence of a "third barrier:" public trust. Generational equity is an additional concern. Acceptance is important for the process, but it does not affect the process.

Member Peterson asked if the level of transparency has been sufficient. Mr Gunnarsson replied that the Municipality has access to all the pertinent documentation, but MKG does not have access to SKB's documents. The Commissioner asked if this situation allowed MKG to engage in the public debate. Mr Gunnarsson replied, yes, on a technical basis, though it is harder on political and ethical matters. The Commissioner observed that transparency tends to improve reliability since issues are out in the open and asked if transparency had helped MKG's trust in the siting and evaluation process. Mr Gunnarsson replied that Sweden is a small country and industry employs the experts. An international conversation is needed. The situation is difficult now for environmentalists.

Kaj Ahlbom, the former site manager for SKB site investigation at Forsmark, spoke about site investigation at Forsmark and public acceptance. He said the site comprises ten square kilometers of flat landscape with a low hydrological gradient. It is Precambrian rock about two billion years old. The site was selected because it is part of the Precambrian shear and the faults are old. Between the faults, the rock is well formed and undisturbed. The site is also essentially a nature reserve. Land owners are important players in the process. Five years of investigation have contained about 25 cored boreholes, 38 percussion boreholes and seen the production of some 600 reports. The most promising site is below the reactors at Forsmark. The upper bedrock contains fractures, though below 200 meters, different intact cores are found. There are very few hydraulically conductive fractures below 300 meters or at the repository depth. The upper part is hydraulically reactive, with low responses in the lower part. Sweden's higher-than-normal rock stresses can be handled safely. There are at least 100 meters between water-conductive fractures.

With respect to public acceptance, SKB looked at what they did wrong before and placed new emphasis on public information. They set a goal to get in touch with every resident within ten kilometers. They met people in their own homes. Public meetings have been held once or twice every year, with greater than 100 residents attending. SKB needs dialogue with the whole municipality. Their process so far has helped build public acceptance. Several free two-day facility tours have been arranged and about 20% of residents have participated. The fuel-transport ship Sigyn had over 4,000 visitors over a three-day period of public viewing. An annual poll is conducted on public opinion on the Forsmark site with acceptance increasing over time. Opposition has also decreased from 27% down to 10%. The process continues and will never be complete.

Member MacFarlane asked, if he could the type of rock for a repository, what would Mr Ahlbom choose. He replied that there are only two types to choose between; crystal and salt. The Commissioner suggested basalt. Mr Ahlbom replied that he was hesitant to

comment since he was not expert on that type. Forsmark is a very good site. Different environments yield different concerns.

Member Eisenhower asked for comment about public feedback on transportation issues. Mr Ahlbom said there has been very little such feedback. SKB has been transporting waste since 1985.

Member Peterson asked how rapidly waste would be emplaced at the repository. Mr Ahlbom replied that the repository would take until 2070 to fill. Mr Thegerstrom said that one canister will be sealed per day, yielding about 200 per year. The Commissioner asked if an oldest-fuel-first principle was in place. Mr Thegerstrom replied, yes. Waste is stored for 30 years prior to placement in the repository. Heat load is the limiting factor.

Chair Lash thanked all parties for their candor, noting the importance of interaction, adjourning the meeting at 5:40 p.m.