

Site Selection and Licensing - Challenges in Building and Maintaining Trust over Many Years – 14482

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ABSTRACT

In March 2011 SKB submitted license applications for a final repository for spent nuclear fuel at Forsmark in Sweden and an encapsulation plant in Oskarshamn. This milestone had been preceded by decades of work aimed at developing and building trust in a repository concept as such and acceptance of a selected site. The initial investigations during 1977-1985 met with mixed reactions, in some cases with great local resistance that forced them to be interrupted.

After a grace time of several years SKB in 1992 initiated a siting program based on the idea that it was reasonable and realistic to focus interest on municipalities where conditions were suitable and that were willing to participate in further exploring the potential for siting of a repository. In 2002 SKB started site investigations after the municipal councils in Östhammar and Oskarshamn had consented to continued participation in the siting program. The investigations facilitated further dialogue with stakeholders based on frequent discussions on results from the geological investigations as well as studies of technical, environmental and societal conditions. Just before Forsmark was selected approximately 80% were in favor of having the repository in their respective communities.

Experience shows that the approach with careful studies of alternatives, voluntary participation without binding agreements, patience, transparency, consistency and honesty from SKB as well as the regulator and extensive eye-to-eye discussion with stakeholders have been essential in successively building trust and confidence and will also be so for maintaining trust in the repository program.

INTRODUCTION

The work on geological disposal started in Sweden in the mid-1970-ies. The Stipulations Act passed in 1997 gave the nuclear power utilities in Sweden the responsibility for disposal of waste from their power generation. Nuclear power, waste management and disposal of nuclear waste had during the course of a few years become a contentious issue. To meet its obligations the industry promptly started the KBS Project to develop a method for final disposal and to gain knowledge on the geological conditions in Sweden that could provide suitable conditions for final disposal. In March 2011, after more than 30 years of scientific, technical development and siting work, SKB submitted license applications for constructing a repository for spent nuclear fuel at Forsmark and an encapsulation plant in Oskarshamn, Sweden. The licensing process is in progress and is expected to continue for a few more years.

INITIATION AND EARLY STUDIES

During the period 1977–1985, SKB (in some cases government organizations) carried out comprehensive investigations at eight sites, called study sites, distributed over Sweden [1] (Figure 1). These investigations met with mixed reactions, in some cases with great local resistance that forced them to be interrupted. Finally, in 1985 violent protests led to a halt in the

drilling program. However, a large body of geoscientific data was acquired showing that there are many places in Sweden with good geological prospects for establishing a final repository.

A principal conclusion from the study site investigations and other studies of the bedrock was that suitable and less suitable areas cannot be attributed to any particular part of the country or any special geological environment within the crystalline bedrock. It is instead local conditions that are of the greatest importance. Another lesson was that the siting work had to be based on the acceptance and trust of the local population. These conclusions were the points of departure for the program for siting of the final spent nuclear fuel repository that was developed in the early 1990s and has since guided the work.

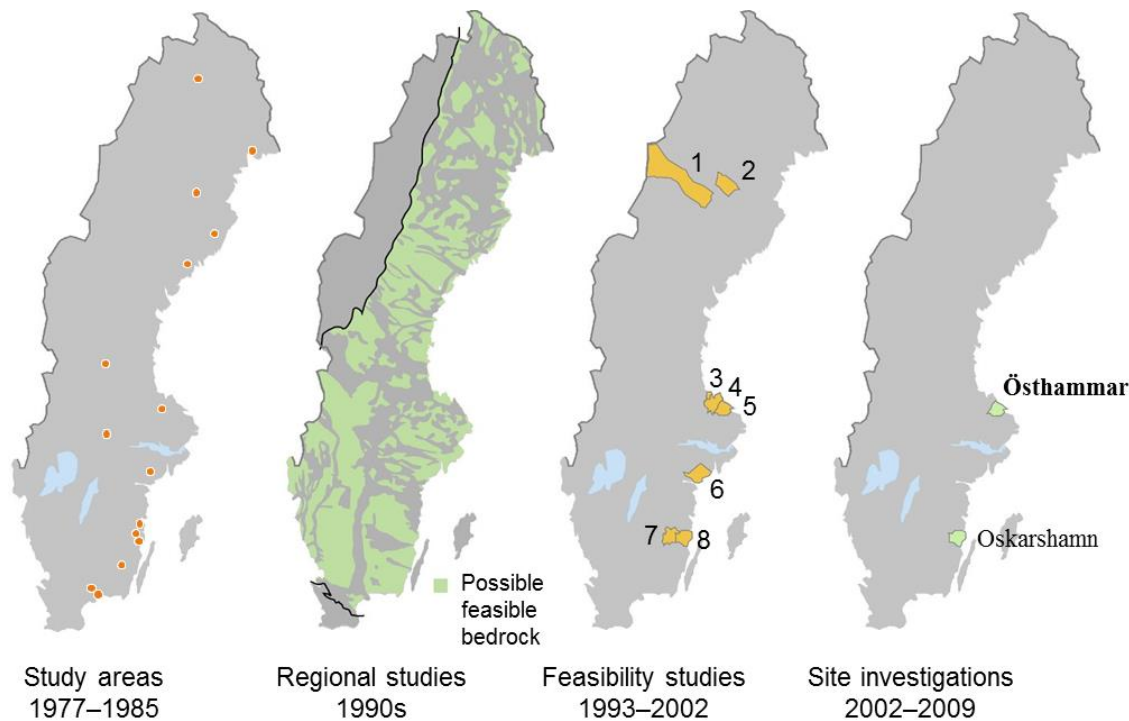


Fig. 1 Sites and areas studied during the Swedish siting program.

FEASIBILITY STUDIES

After a grace time of several years SKB in 1992 initiated a siting program based on the idea that it was reasonable and realistic to focus on municipalities where conditions were suitable and that were willing to participate, or otherwise showed an interest, in further exploring the potential for a siting of a repository. In a Government decision in 1995 it was stated that the applications to build a final repository for spent nuclear fuel should be based on assessment of feasibility studies of 5-10 municipalities and that site investigations should have been conducted on at least two sites.

Feasibility studies were performed in eight municipalities during 1993-2000 [1] (Figure 1). The studies gave the inhabitants an opportunity to form an opinion, without commitments, on the final repository project and SKB to enter into an active dialogue with stakeholders. Geological studies comprised a main component, but no drilling was done at this point. Technical,

environmental and societal conditions were also studied.

In 2000, SKB presented an “Integrated account of site selection and program prior to the site investigation phase” [2]. Three areas were prioritized for site investigations: Forsmark in the municipality of Östhammar (5 in Figure 1), an area in the northern part of the municipality of Tierp (4 in Figure 1), and the Simpevarp-Laxemar area in the municipality of Oskarshamn (8 in Figure 1). The municipal councils in Östhammar and Oskarshamn consented to further investigations, while Tierp said no.

SITE INVESTIGATIONS

In 2002 SKB initiated site investigations after the municipal councils in Östhammar and Oskarshamn had consented to continued participation in the siting program under specific conditions to be met by SKB, the regulators and the government. The investigations facilitated further dialogue with stakeholders based on frequent discussions on results from the geological investigations as well as studies of technical, environmental and societal conditions.

Trust was successively built through clear and open communication of the problem at hand, i.e. the management of nuclear waste, and SKB's future plans. Trust or distrust depends on how an organization is seen to behave. Special attention was given to the concerns of the people directly affected by the site investigations in order to minimize disturbances and to successively inform them of the progress and results from the geological investigations and the design and environmental consequences of the planned facilities including assessments of long term safety. In addition visits were arranged to SKB's facilities, the interim storage (Clab), the final repository for short lived radioactive waste (SFR), the Canister Laboratory, the Äspö Hard Rock Laboratory and the transport ship Sigyn to give the possibility for people to see the current operations with their own eyes and hence get a better sense for what the future could bring.

Formal consultations on the Environmental Impact Assessment were initiated in 2002 and concluded in May 2010. Consultations were held with the government agencies, municipalities, organizations, local and national non-governmental organizations, the general public and individuals who would be affected. There has been constant feedback between ongoing investigations, surveys, design work and consultations. As the siting investigations and design process have progressed and various surveys been carried out, the design of the facilities and their adaptation to their surroundings and impact on the environment has been refined and improved. Results of investigations and surveys together with proposals for facility design have been presented at the consultation meetings, and the participants have been given an opportunity to offer their viewpoints on SKB's proposals.

The municipalities set up their own organizations to follow and review SKB's work with the purpose to support the local politicians in taking informed decisions on a potential future license application. There were frequent meetings between SKB and the review groups and SKB gave presentations to the municipal councils at regular intervals.

The opinion polls made every year showed an increase in trust for both SKB and the regulator (SKI and SSI that later became SSM, the Swedish Radiation Safety Authority) over the years. Just before Forsmark was selected approximately 80% were in favor of having the repository in their respective communities (Figure 2).

In June 2009 SKB decided to select Forsmark as the site for the final repository for spent nuclear fuel. SKB then focused on completing the license application document to be reviewed by the regulatory authorities, concerned municipalities and the Government. The license applications for the final repository in Forsmark and the encapsulation facility in Oskarshamn were submitted in March 2011.

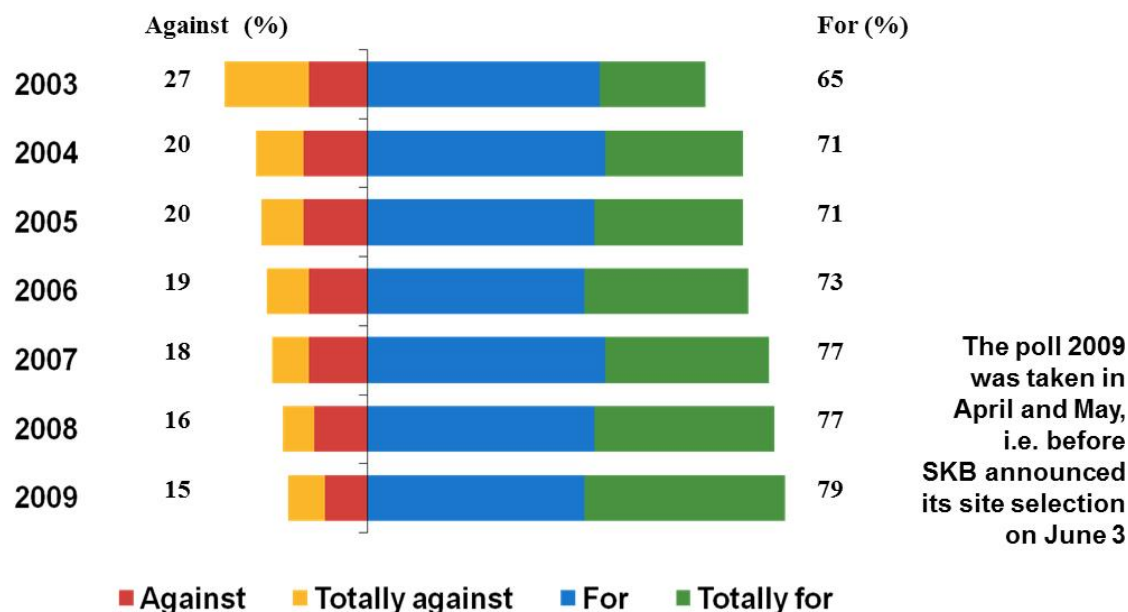


Fig. 2. Results from opinion polls from the municipality of Östhammar made during the course of the site investigations.

LICENSE APPLICATION AND THE REVIEW PROCESS

The licensing process for new nuclear facilities in Sweden is relatively complex (Figure 3) and no new nuclear facilities have been licensed according to the current legislation. Nuclear facilities require permits in accordance with the Swedish Environmental Code and the Nuclear Activities Act. Both laws require that SKB describes the planned facilities and operations as well as the associated environmental risks and safety issues. SKB has submitted two applications to SSM (the Swedish Radiation Safety Authority) according to the Nuclear Activities Act and one to the Land and Environmental Court according to the Environmental Code.

The Nuclear Activities Act states the application must address radiation protection and nuclear safety during operation and after closure. The Environmental Code specifically requires a description of the potential impact of the planned operations on human beings and the environment. Both laws require an environmental impact assessment (EIA).

The petitions for the application according to the Environmental Code are for the municipality in Oskarshamn to store nuclear fuel and nuclear waste up to 8,000 tonnes in Clab (the central interim storage for spent nuclear fuel) and, adjacent to Clab, to build and operate a plant for the encapsulation of spent nuclear fuel. For the municipality of Östhammar (Forsmark) the petitions

are to build and operate a facility for the final disposal of spent nuclear fuel and radioactive waste, all in accordance with the application. The application according to the Environmental Code thus includes the whole KBS-3-system, i.e. the final repository, the existing interim storage facility and the encapsulation plant.

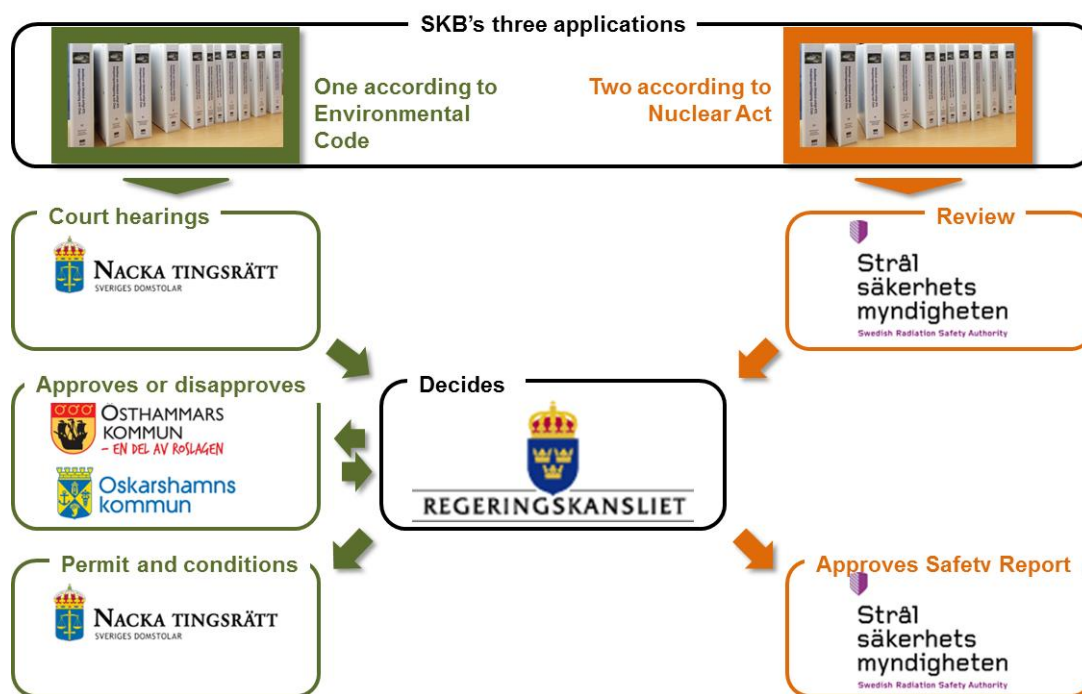


Fig. 3. The process for the review of SKB's license applications for a final spent nuclear fuel repository.

The petitions for the application according to the Nuclear Activities Act are to build, possess and operate a facility for the final disposal of spent nuclear fuel in Forsmark. In the facility, SKB intends to possess, manage, transport, finally dispose of and in other aspects manage the specified material, all in accordance with the application. An application according to the Nuclear Activities Act has also been submitted for an encapsulation plant adjacent to Clab.

The review process started by an initial formal review of the license applications where SSM and the Land and Environmental Court concluded that the applications included the required documents. After a few months the licensing documents were sent to various stakeholders who were asked to provide their view on if SKB needed to supplement the license application in any way. The stakeholders were given approximately a year to respond. In April 2013 SKB provided supplementary information on the large majority of issues raised by the stakeholders. Some of the major issues have been; formal issues relating to the scope of the Environmental Code application and the EIA, scope of documentation on other disposal methods (e.g. deep boreholes), spent fuel as a resource, site selection, conventional environmental aspects (e.g. discharges to water, consequences for endangered species) and long term safety issues (e.g. related to canister degradation). In October 2013 the stakeholders and SSM provided their comments to the Court on the supplementary information provided by SKB. In November 2013

SKB provided a statement on what additional information SKB intends to submit to the Court. The Court is expected to take a decision during Spring 2014 if there is any further information SKB should supply before the Environmental Code application can be considered complete. After SKB has supplied the required information the Court will announce that the application is complete and after a final review the court hearings can be held.

As part of the review according to the Nuclear Activities Act it is only SSM that poses questions to SKB and requests complementary information. In posing their questions and requests SSM uses the statements they have received from stakeholders as input. SSM has issued a number of requests for clarifications and complementary information that SKB has responded to. The SSM requests have concerned e.g. copper corrosion, canister design, groundwater flow modeling and biosphere modeling. The complementary material SKB has supplied is comprehensive and comprises more than 100 reports or short notes. SSM will coordinate their schedule with the Court and it is expected that the license applications can be declared as complete during Autumn 2014.

After the Court hearings the Court and SSM will each give a statement to the Swedish Government on the license applications and recommend a decision. The Governments will request statements from the municipalities of Östhammar and Oskarshamn. The municipalities will accept or reject and have a right of veto. The Government will then make a decision on whether the final disposal system is permissible or not. If the application is accepted, the Environmental Court will hold a new hearing. Thereafter, the Court will grant permits and stipulate conditions pursuant to the Environmental Code. If the Government grants the permit, the authority will subsequently stipulate conditions pursuant to the Nuclear Activities Act as well as to the Radiation Protection Act.

To assist the ongoing licensing review the Swedish Government requested the OECD/NEA to perform an independent review by international experts of the long-term safety assessment presented in the SR-site report [3]. The expert group concluded in its statement to the Swedish government [4] that: "SKB's post-closure radiological safety analysis report, SR-Site, is sufficient and credible for the licensing decision at hand. SKB's spent fuel disposal programme is a mature programme - at the same time innovative and implementing best practice - capable in principle to fulfill the industrial and safety-related requirements that will be relevant for the next licensing steps." The group also highlights the importance that SKB as part of the step-wise implementation now put more emphasis on the industrial feasibility of the barriers including assurance of their quality. Another challenge for the future will be to both enhance and broaden the basis for the scientific evidence supporting long-term safety.

After the license applications were submitted the stakeholders in the municipalities have spent considerable effort scrutinizing the license applications. Consequently, SKB has spent considerable effort in trying to explain the contents of the license applications and in responding to the questions and requests for additional information submitted to the Land and Environment Court and SSM. The licensing process will take many years and it will be a challenge to maintain trust over the years where essentially no investigation or construction activities will take place on site, contrary to the expectations of many in the local community.

CONCLUDING REMARKS

At the end of 2013 SKB has been working in the Oskarshamn and Östhammar municipalities for more than 20 years. SKB already has facilities in these municipalities and feels that the residents generally have trust in its work. Continued safe operation of these facilities is of course a must for maintained trust. SKB's statements, conclusions on safety issues and plans will be challenged during the licensing review and it is essential that SKB can respond to these challenges so that trust is maintained and the process can proceed.

Experience shows that the approach with careful studies of alternatives, voluntary participation without binding agreements, patience, transparency, consistency and honesty from SKB as well as the regulator and extensive eye-to-eye discussion with stakeholders have been essential in successively building trust and confidence and will also be so for maintaining trust in SKB and the repository program as a whole.

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