

The Swedish Process for Selection of a Site for Localization of a Depository for High Level Nuclear Waste

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ABSTRACT

The Swedish process for selection of a site for localization of a depository for high level nuclear waste is firmly anchored in the Environmental code of Swedish law. Minimum of damage and detriment to human health and environment are the main guidelines. In public discussion the phrase “best possible site” has been used, even if the Swedish National Council for Nuclear Waste (National Council) has urged for a set site selection criteria, presented by the implementer (SKB, Swedish Nuclear Fuel and Waste Management Company) in 1995. The strategy has been based on a combination of geological criteria and voluntary participation. The site selection process has been marked by a tension between these two criteria.

INTRODUCTION

One of the main problems in the nuclear waste issue is the site selection, that is arriving at a well-founded decision on the siting of a final repository. The Environmental Code provides that “Sites for activities and measures shall always be chosen in such a way as to make it possible to achieve their purpose with a minimum of damage or detriment to human health and the environment” (Chap. 2, Sec. 4).

SKB’s site selection strategy has been based on voluntary participation and local acceptance. And in June 3, 2009, SKB selected Forsmark as the site for the final repository of the Swedish spent nuclear fuel. They argue that Forsmark has a clear advantage concerning long-term safety. The rock in Forsmark at repository depth is dry and has few fractures which is important factors for the long-term safety.

At the end of 2010, SKB plan to submit their license applications according to the Nuclear Activities Act and the Environmental Code. After that follows a 3 – 4 year long review period during which the Swedish Radiation Safety Authority and the Environmental Court will decide whether they can agree on SKB:s site selection.

General Points of Departure

A phrase that has often been used in discussing site selection has been “best possible site”. But the implications of this expression are unclear, and it does not occur in the text of the law or in the relevant travaux préparatoires. In the opinion of the Swedish Council for Nuclear Waste (the Council) it is more relevant to speak of site selection criteria, meaning a set of requirements which a site for the establishment of a final repository should satisfy. Such criteria have also been established by SKB (RD&D Programme 1995 and TR-01-03).

The Council find that a distinction should be made between the criteria for the geographic siting and the criteria for the geological siting. The geographic siting has to do with where in the country the final repository should be located. The geological siting refers to the rock formation. In what type of rock should the final repository be located – and at what depth? Geographic and geological siting are naturally dependent on each other. Certain geographic sites in the country can be excluded because they do not meet the criteria for geological siting.

The question of a best possible site has been the subject of lively discussion in connection with the Environmental Code’s requirement of a minimum of damage or detriment to human health and the environment. Different interpretations has been made as far as site selection is concerned: does the Environmental Code require only a sufficiently good site or does it require that the site is the geologically best site in a stricter and more absolute sense. The Councils opinion is that the term “Best possible site” lacks meaning if what is meant and under what conditions the term should be applied are not defined. Nor is there any explicit requirement in the Environmental

Code for a best site from a geological viewpoint. But it may be difficult for applicants – as well as for the Government – to justify why the site that is “best” from a geological viewpoint should not be selected in an overall assessment of the concrete alternatives presented in the EIS.

The Basis for SKB:s Site Selection

In 1993 and 2000, SKB carried out feasibility studies in eight municipalities: Storuman, Malå, Östhammar, Nyköping, Oskarshamn, Tierp, Älvkarleby and Hultsfred. In 1995, SKB published a national general siting study, and in the late 1990s county-specific general siting studies of the bedrock.

After municipal referendums in 1995 and 1997, the municipal councils in Storuman and Malå said no to further investigations. SKB reported its conclusions from the feasibility studies at the end of 2000 (see also section 5.4). According to SKB, areas existed in five of six municipalities which were geologically suitable for further studies. SKB wanted to conduct site investigations on three areas, situated in the municipalities of Östhammar, Oskarshamn and Tierp. SKB also wanted to study an area situated in the municipality of Nyköping, but in the spring of 2001 the municipal council in Nyköping voted against continued participation in SKB’s site selection process. The municipal council in Tierp voted with a narrow majority to decline further cooperation with SKB, while clear majorities in Östhammar and Oskarshamn spoke in favour of the proposed site investigations.

After agreements were reached with the two remaining municipalities, site investigations were commenced in 2002 in Forsmark and in the vicinity of the Oskarshamn nuclear power plant. Very extensive investigations have since been conducted in the two areas, including a large number of boreholes (600–800 m deep) intended to provide information on such parameters as rock strength, fracture zones, water flow and water pressure, as well as the chemical composition of the groundwater. With the support of these investigations, SKB selected Forsmark as the site to host the final repository in June this year.

Concluding Reflections

For SKB it has been a successful process. The mayor of Östhammar has expressed his trust in both SKB and the review process. Also the mayor of Oskarshamn has expressed that he respect the decision.

But the credibility of the final repository project depends on the site selection process being perceived as scientifically tenable. A selection process that ends with site selection being reduced to a choice between two areas close to existing nuclear power plants may attract many critical questions. Has local acceptance been allowed to play too prominent a role in comparison with geological aspects? Has an inland alternative been dismissed without sufficient reasons? The dismissal of an inland alternative means that it is not possible to make a closer comparison between e.g. groundwater flows in a near-coastal alternative and an inland alternative. At all events it appears urgent that SKB should clearly explain its standpoint and how it has proceeded.