

Radioactive Waste Storage Issues in Denmark

Upon request I am providing the following comments regarding the Danish government's plan to construct a long-term (about 300 years) nuclear waste repository someplace in Denmark. The waste was generated by previous nuclear research projects at Risø, the disassembly of the Risø research reactors, and to some extent from hospital medical research and treatment activities. The total amount is expected to be within the range of 5 – 10,000 cubic metres of low-level waste and several hundred kilograms of mid-level waste. The waste contains a mixture of radionuclides some of which have half-lives of about 30 years. From a purely environmental and health concern cesium-137 may be one of the most important radionuclides due to its emitted radiation, long half life, and water solubility. The waste treatment process, performed at the Risø Waste Management Plant, includes initial treatment, stabilization in concrete and metal barrels before being placed in the existing on-site short-term storage facility. That is where it will remain until it can eventually be transferred to the yet to be constructed long-term repository. The current plan for the repository is to construct a concrete vault, most likely placed near the surface (0-30 metres) into which the low-level waste is placed, while the mid-level waste may require somewhat deeper storage; somewhere between 30 – 100 metres. This summary was acquired from the online published reports.

Locating a suitable site for such a long-term repository on Danish soil is truly a very difficult task. Since there is no way to absolutely guarantee that there will be no leakage of the radioactivity out of the containment over the next 300 years with subsequent potential for entry into the local aquifers, one generally looks for a site with impermeable soils (such as clays) and away from coastal and river areas where ground water is being tapped for human consumption or for agriculture.

Currently six different sites within Denmark are being considered for this repository. Some are located in the Hvidbjerg/Thyholm/Struer and Skive areas. These sites are situated in low-lying areas near or adjacent to the south shore of the Limfjord. The preliminary feasibility report from the Hvidbjerg/Thyholm site appears to indicate the presence of a shallow and complex ground aquifer system. The nearby Hvidbjerg residents currently acquire their drinking water from this source at a relatively short distance from the proposed repository site. On the basis of my boyhood experience of living in the Salling area, I suspect the other sites under consideration have somewhat similar geologic and hydrologic characteristics. Many more people in the Skive area are dependent on clean fresh ground water supplies. It is difficult for us to predict what northern Jylland will look like 300 years from now except that there most likely will be a much bigger population that will be dependent upon clean fresh ground water. Thus, in my opinion none of these sites are suitable for the installation of a safe and reliable long-term waste repository. It is just taking an unneeded approach to risking a valuable fresh water source. I know for certain, that the installation of such a waste repository into a similar environment here in California, where I presently reside, would never be permitted. I have learned to appreciate the value of safe drinking water while living in this drought prone area.

An alternative approach is to expand the present waste storage facility at Risø to hold all of the waste for an interim period of about 50 – 100 years. During that time the international community, at least in my opinion, will be forced to develop acceptable methods for treating and long-term storage of the vast quantities of radioactive waste that we will be faced with. For instance, the U.S., Europe, Japan, etc. will together have several hundred decommissioned reactors along with vast quantities of spent fuel that need to be safely treated and stored. At that time Denmark should explore the possibility of working with the international community, especially with European countries, to integrate the relatively small amount of Danish waste with that from other countries for storage in a more stable and reliable repository elsewhere. This approach makes the best use of the highly trained staff at Risø while it also makes sense from a purely economic standpoint. I was truly impressed with the high quality Risø staff when I worked there one summer a number of years ago. I suggest making the best use of their expertise. This approach is better than to risk the possibility of contaminating a Danish community's water supply. Having a nuclear waste disposal site in your neighborhood can also place a significant blight upon any community.

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