What can we learn from nuclear waste siting when developing new reactors?

Arne Kaijser
Prof. emeritus of the History of Technology
KTH Royal Institute of Technology

What can developers of new reactors learn from the management of nuclear waste?

- The many countries failing to build a repository may provide experience of what **not** to do.
- I will instead try to identify positive lessons from countries that have come a long way, and I will focus on Sweden.

In 1977 Sweden adopted the Nuclear Stipulation Act

- It stipulates that reactor owners have to demonstrate that they will be able to handle the spent fuel from their reactors in a “totally safe” way to get permission to commission new reactors

In 1980 a referendum on the future of nuclear power was held in Sweden

- It resulted in a compromise; a decision to use the twelve reactors that were completed or under construction but to phase out all these reactors by 2010.
- This phase out was later post-poned
- Today six out of twelve reactors have been decommissioned, but nuclear power still provides about 40 % of Sweden´s electricity.

The Swedish Nuclear Waste System

Consists of five components:

- Legislation
- Financing
- Organizational set-up
- Design and construction
- Siting

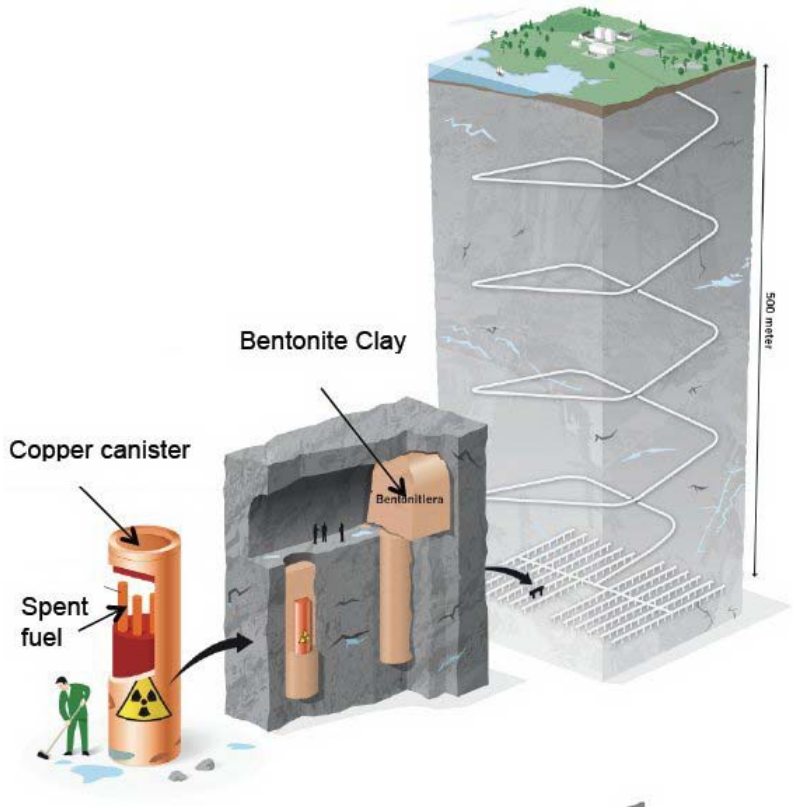
SKBs drilling teams met strong local opposition

In 1985, an advisory body called KASAM was established by the government

- Its purpose was to widen the perspectives on nuclear waste and to create a forum for discussion and reflection of nuclear waste issues
- KASAM organized workshops on topics such as
  - Ethics, radioactive waste and uncertainty
  - Public acceptance, tolerance and participation
  - Decision-making under uncertainty

In the early 1990s SKB adopted a new strategy in which approval from local communities was essential

- It emphasized that geology was only one of three barriers.
- The other two are:
- Copper canisters
- Bentonite clay



In 2002 SKB chose two municipalities, Östhammar and Oskarshamn, which already hosted nuclear power plants, as main candidates for the final repository

- A number of meetings and consultations were held with local stakeholders in both places

Social science research on nuclear waste

- A research program on nuclear waste issues with a focus on social science and humanities was organized from 2004 to 2011. It involved prominent scholars from political science, sociology, economics, law, philosophy and history.

In 2011, SKB submitted a formal license application, for an encapsulation plant in Oskarshamn and a deep geological repository in Östhammar.

- The application was carefully examined by the safety regulator and by the Land and Environment court.
- Civil society and academia also played an important role in the examination.
- Two antinuclear organizations received financial support from the Nuclear Waste Fund for developing their critique of SKBs application.
- Corrosion researchers at my university questioned the durability of the copper canisters.

The Land and Environment court arranged a five-week public hearing in the fall of 2017

- All parties and stakeholders gave their statements.
- The court listened carefully.
- In its final decision it gave conditional support to the application requiring that SKB make further investigations on the durability of the copper canisters.

What can be learnt from the Swedish handling of the nuclear waste issue?

- In order to develop a technological system that is potentially very dangerous and thus contested by many, it is crucial to organize a process that is characterized by transparency and allowing all relevant actors to make their voices heard.
- Or to put it in a one-liner: For developers of contested technologies **to gain trust**, they first have to **encourage informed mistrust**!

How can this be applied to the development of new and advanced nuclear reactors in the United States?

- First, it is essential to organize a process characterized by transparency, allowing critical organizations and researchers to take an active part.
- Environmental organizations skeptical of new reactors should be able to apply for funding. This is a way of earning trust by encouraging informed mistrust.
- No new reactors should be commissioned unless their owners can demonstrate not only a trustworthy method for how to build a repository, but also a suitable place for it where the local population is in favor of such a plant.