

# Nuclear Waste, Risks and Sustainable Development

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Svenska Naturskyddsföreningen

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# Plan for Presentation

- **The Challenge of Sustainable Development**
- **The Nuclear Industry's Proposal for a Swedish Nuclear Waste Project**
- **Risks and Nuclear Waste Management**
- **The Nuclear Waste Project and Sustainable Development**
- **Concluding Remarks**



# The Challenge of Sustainable Development (I)

- **1970s: environmental awakening; focus on strict environmental and health concerns**
- **Sustainable development is today an overriding objective in the treaty of the EU and the Swedish Environmental Code**
- **Mainstream interpretations focus on the relationships between society and the environment**
  - limit values for different pollutants
  - maintenance of different types of capital.
- **This may work fine in cases of sufficient knowledge and basic common understanding of challenges and solutions**



# The Challenge of Sustainable Development (II)

- **The more uncertain and the more controversial risks become, however, the less workable is the approach.**
- **A challenging and complementary way of operationalising sustainable development is through process-related principles for public policy, namely**
  - the precautionary principle
  - the polluter pays principle
  - and the principle of public participation

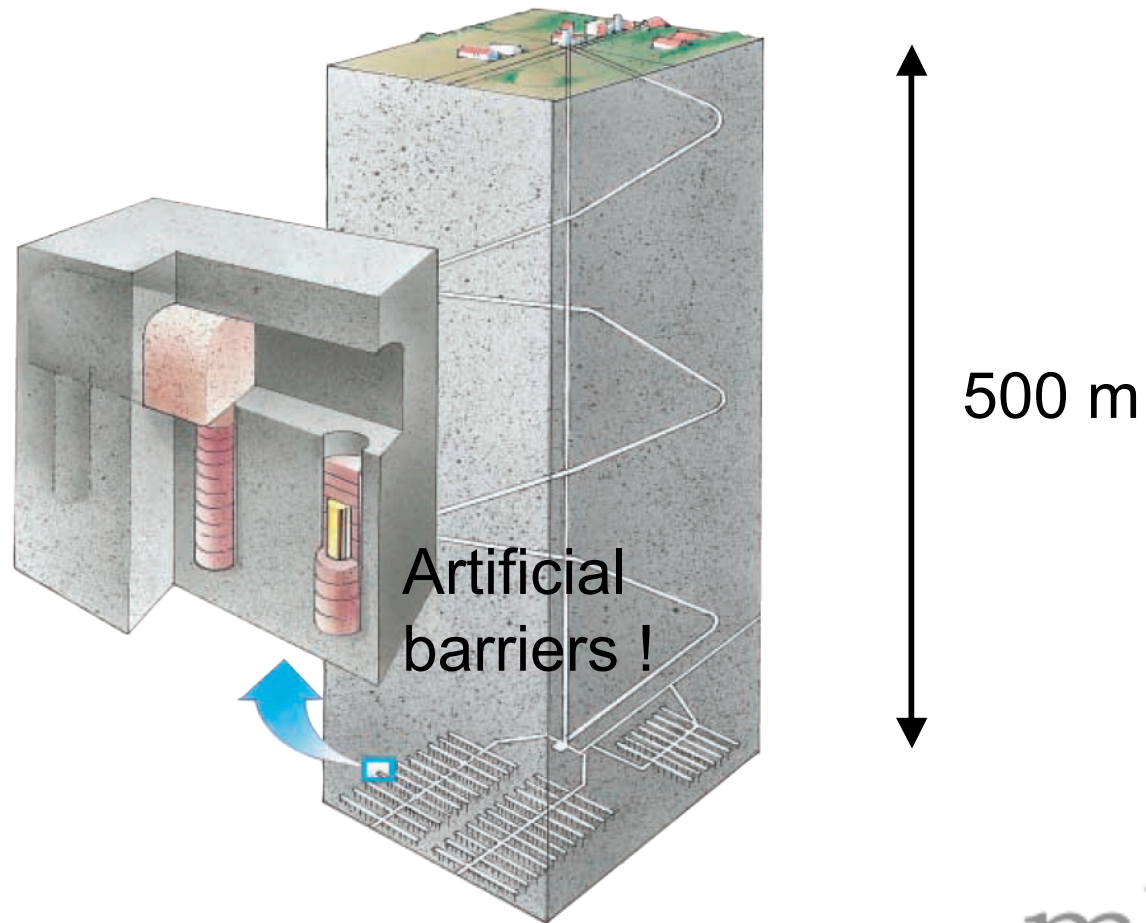


# The Nuclear Industry's Proposal for a Swedish Nuclear Waste Project (I)

- In the early 1970:s the environmental awakening in Sweden also increased the interest for the environmental impact of nuclear power
- Nuclear power, and nuclear waste, became a top issue on the national political agenda
- The KBS project was started by the nuclear industry in 1976
- 1977 – The stipulation law (Swedish: Villkorlagen)
- 1983 – KBS-3 ---> SKB(F) AB



# The Nuclear Industry's Proposal for a Swedish Nuclear Waste Project (II)



**The KBS method**

(Source: SKB AB)

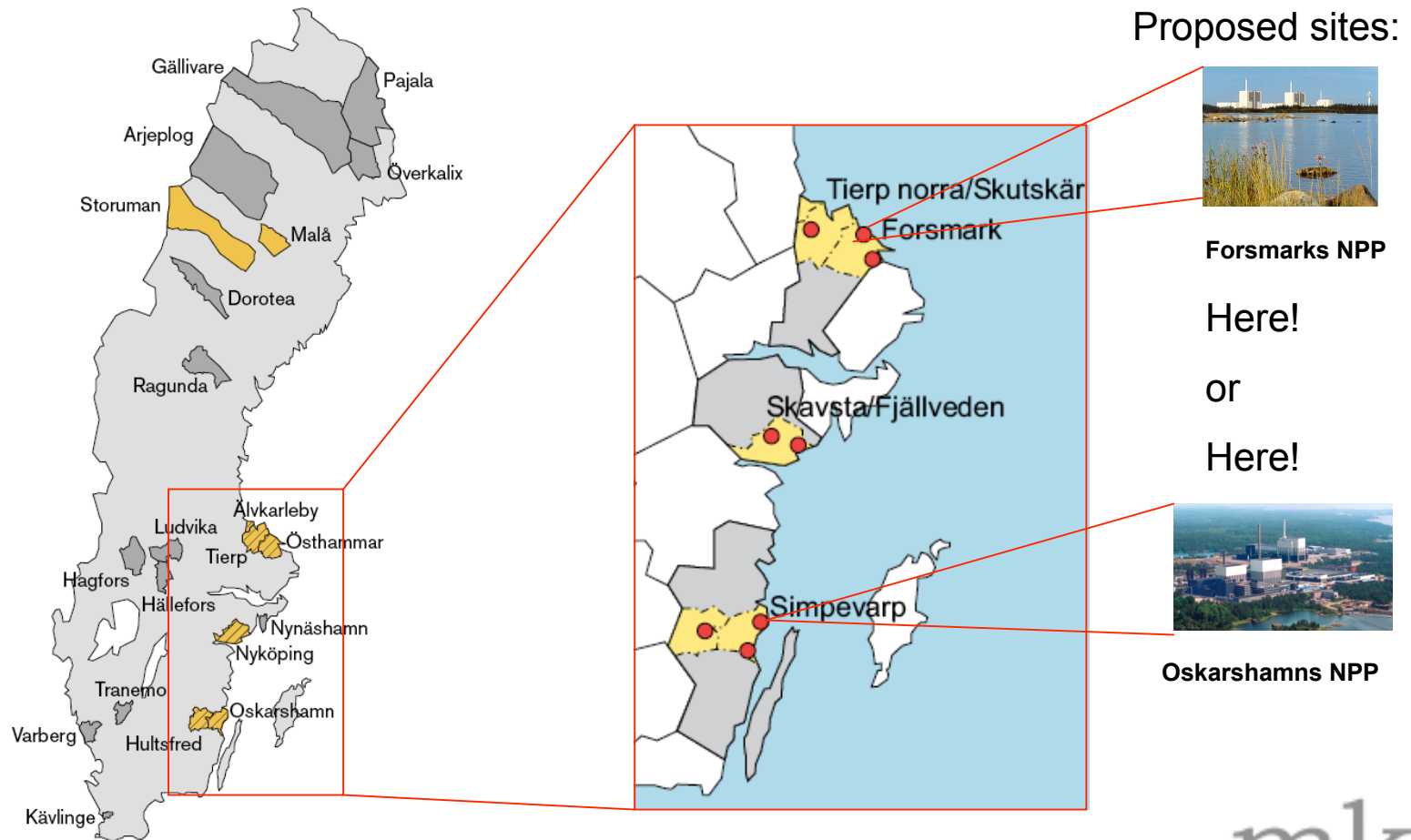


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# The Nuclear Industry's Proposal for a Swedish Nuclear Waste Project (III)



# Risks and Nuclear Waste Management (I)

- **The spent nuclear fuel needs to be isolated from the environment for more than 100 000 years**
- **Risks from direct radiation from spent fuel rods before final disposition**
- **Radiation risks from from leaking or destroyed fuel rods before final disposition**
- **Radiation risks from a leaking repository**
- **Radiation risks from unintentional intrusion into a repository (for example when mining or drilling for water)**



# Risks and Nuclear Waste Management (II)

- **Radiation risks from sabotage or external attack that damages the spent fuel rods in order to spread terror or induce other social change, before or after final disposition**
- **Radiation risks as a result of material in the spent fuel rods being used by national entities or sub-national groups for purposes of mass destruction (nuclear weapons or radioactive "dirty" bombs)**
- **Long-term chemical risks**



# Risks and Nuclear Waste Management (III)

- **Current issues:**
  - Can the KBS method survive an ice age (salt water can compromise clay buffers, oxygenated water can cause erosion, earthquakes can change water flow in bedrock and perhaps directly damage canisters)?
  - Is there a method which is environmentally superior to the KBS-method for long term safety (deep boreholes with disposition at 3-5 km)?
  - Is it environmentally preferable to locate a repository of the KBS type inland above the "highest coast line" (salt content in ground water on the coast, regional ground water flow)?
  - Is there a method that lowers risks of intentional intrusion and reduces the need for long-term surveillance (deep boreholes with disposition at 3-5 km)?



# The Nuclear Waste Project and Sustainable Development (I)

- **The Polluter Pays Principle, in General**
  - A cornerstone in environmental policy since 1970s, which nowadays is recognised worldwide by nations and international forum
  - Increases welfare by correcting market failures (externalities)
  - Often difficult to assign monetary values, in particular for potential problems far in the future
  - Implementation can be done by direct pricing (through market evaluation or political decisions), or through liability-insurance systems on base of worst-case scenarios



# The Nuclear Waste Project and Sustainable Development (II)

- **The Polluter Pays Principle, in Sweden**
  - 1970s: the nuclear industry paid for “full” waste management costs by setting aside a sum per unit of generated electricity
  - 1980s: an annual fee was stipulated for each reactor company
  - 1990s: reactor companies also had to provide guarantees
  - 2000s: liable companies lack assets to cover unexpected costs, so requirements to pay fees should be extended to owning companies
  - The new proposal is not implemented, and calculations of future costs are uncertain and based on the non permitted KBS 3 method, so the polluter pays principle is not implemented



# Or, as the Minister of Environment Said Recently:

- **On the 11<sup>th</sup> of May, 2006:**

“On basis of the principle that the nuclear industry must cover the costs, the present system for liabilities is insufficient. I therefore want the “Riksgäldskontoret” to analyse if a greater responsibility should be placed on the industry”, says Lena Sommestad, Minister of the Environment



# The Nuclear Waste Project and Sustainable Development (III)

- **The Precautionary Principle, in General**
  - Aims at managing uncertainties in cases of complex risks
  - Constitutes a foundation of political declarations and environmental law on both national and international level
  - Is often debated and contested, but still workable
  - A general formulation from international environmental treaties: 'if there is a threat, which is uncertain, then some kind of action is mandatory'



# The Nuclear Waste Project and Sustainable Development (IV)

- **The Precautionary Principle, in Sweden**
  - Assessments of risks should be made from the widest possible perspective, and e.g. assuming that leakage is a fact
  - Alternative management options need thorough investigations
  - The burden of proof must rest with the polluter, i.e. reactor companies must prove that sites lead to ‘a minimum of damage...’, and that best available technology is used
  - The principle challenges the common decision-criterion to maximise expected utility
  - There are legal and practical shortcomings of the present disposal project in the light of the precautionary principle



# The Nuclear Waste Project and Sustainable Development (V)

- **The Principle of Public Participation, in General and in Sweden**
  - Might increase trust in society and enriches risk assessments by adding knowledge and values to the findings of experts
  - While some preparatory processes in the Swedish nuclear waste project have meant slightly increased public inclusiveness and deliberation, there are more examples of the opposite
  - Processes are clearly expert-dominated and often rests on an old-fashioned view of representative democracy
  - Clearly, much remains to be desired when it comes to public participation in the Swedish nuclear waste project so far



# Concluding Remarks

- The proposed Swedish nuclear waste project is not in line with the three principles of sustainable development
- In some aspects, the project is not yet compatible with Swedish law and should therefore not to be given a permit
- It is important to implement the new recommendations on the polluter pays principle
- Alternative methods (e.g. 'deep boreholes') and sites (avoid e.g. siting the repository on the coast) have to be examined to see if they could provide a better long-term safety





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