

ENTRIA

ENTSORGUNGSOPTIONEN FÜR RADIOAKTIVE RESTSTOFFE:
INTERDISZIPLINÄRE ANALYSEN UND
ENTWICKLUNG VON BEWERTUNGSGRUNDLAGEN

Storage of high-level waste - Controversies about risk

Safety – everything all right?

- Widespread consensus on
 - the importance of safety in the storage of high-level waste
 - the necessity of rigorous safety requirements



Safety and risk

- Safety: acceptable risk
 - «risk culture»
- Complementary terms in the public debate
- Feeling safe
 - trust in persons and organizations that control the risk



Aspects of the debate on risk: Lack of knowledge

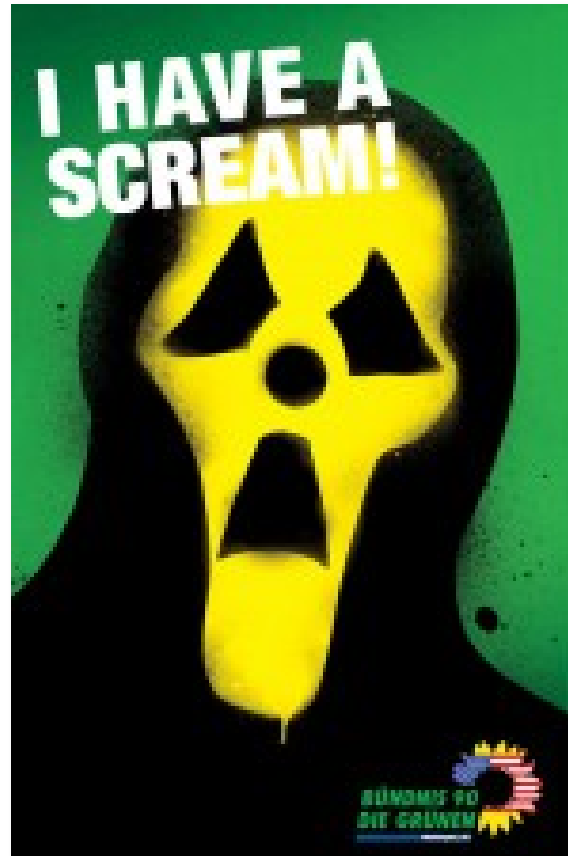
- Future developments of humankind and in society
- Retrievability
- ...

- ⇒ Expertise and counter expertise on risk



Aspects of the debate on risk: Instrumentalization for other interests

- Energy policy
- Economic benefit
- NIMBY
- More power for authorities
- More money for research
- ...
- ⇒ veto players



Aspects of the debate: Historical experiences



Hannover1979, <http://www.ndr.de/kultur/geschichte/chronologie/Albrecht-wir-kommen-Gorleben-Protest-in-Hannover,gorleben240.html>

**Aspects of the debate:
Different conceptions of risk and safety**

Tiefenlager: Das Schreckgespenst bekommt ein Gesicht



**Tiefenlager macht mehr
Angst als ein Zwischenlager**

hz vom 18. 8. • Radioaktiver Abfall – ha-

Diversified landscape of risk

governance

trust

„objective“ and „subjective“ risks

risk assessment

risk perception

uncertainties

emotions

resilience

long-term risks



worst case scenarios

acceptance

vulnerability

acceptability

Different conceptions of risk and safety in science

- Risk is the
 - intentional interaction with uncertainty
 - potential of losing something of value
 - probability of an event multiplied by the resulting damage
 - product of the consequence and probability of a hazardous event
 - effect of uncertainty on objectives
 - probability of a negative occurrence that is caused by vulnerabilities
 - ...



Conceptions of risk and safety in controversies

- Two differing conceptions determine the debate on the disposal of high-level waste today
 - technical conception
(technical experts from universities, safety authorities, nuclear industry, NGOs, consultants, specialized journalists...)
 - societal conception
(concerned population, politicians, experts from social sciences, representative of NGO and the media...)

- Both conceptions are rich and diversified



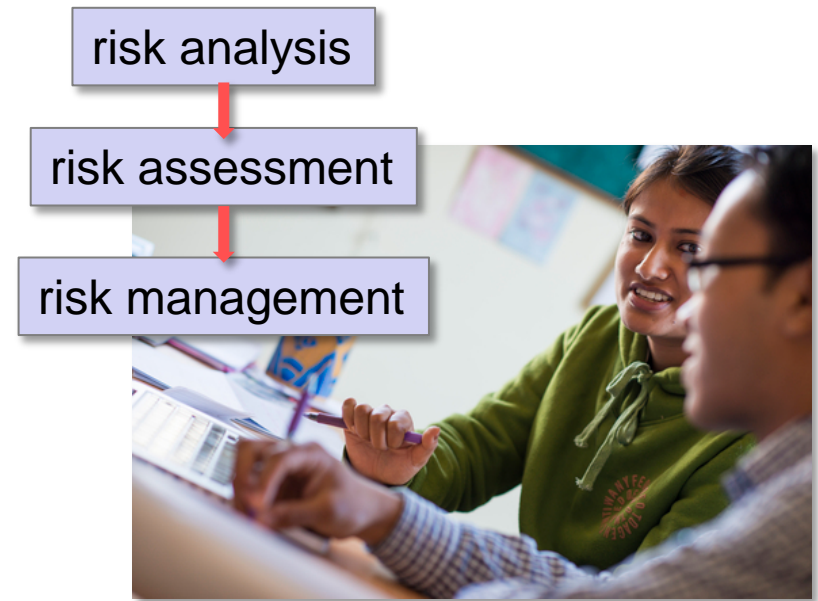
Technical conception of risk

- Which are the hazards?
- What values have to be protected?
- How can the probabilities of occurrence and the possible damages be analyzed and – if feasible – quantified?
- How should uncertainties be dealt with?
- How will the risk be assessed?
What are the safety objectives?
- How can I optimize risk management?



Technical conception of risk

- Sequence of
 - Risk analysis
(objective and neutral)
 - Risk assessment
(political)
 - Risk management
(negotiable, sustainable)



Societal conception of risk

- How far is coping with the risk feasible – for the individual and the community?
- Can the persons and organizations that control the risk be trusted?
- Is the way the risk is dealt with compatible with moral convictions?
 - voluntariness
 - justice
- ...



Potential for conflict and bridging the gap – a real-life example

- Worst case scenarios for geological disposal
 - Request from a regional conference in the Swiss site selection process



Potential for conflict and bridging the gap – a real-life example

- Worst case scenarios for geological disposal
 - Considerations of the safety authority
 - hazard of political instrumentalization
 - challenges from a technical point of view
 - «We must explain them why it is safe.»



Potential for conflict and bridging the gap – a real-life example

- Worst case scenarios for geological disposal
 - Considerations of affected persons
 - For what do we have to prepare ourselves?
 - «What provisions must our fire brigade make?»
 - Whom can we trust?



Potential for conflict and bridging the gap – a real-life example

- Worst case scenarios for geological disposal:
 - agreement
 - no unrealistic scenarios
 - illustrate the hazards of high-level waste
 - depict how the hazards are countered, especially by accident management
 - discuss these topics in a forum with stakeholders and experts



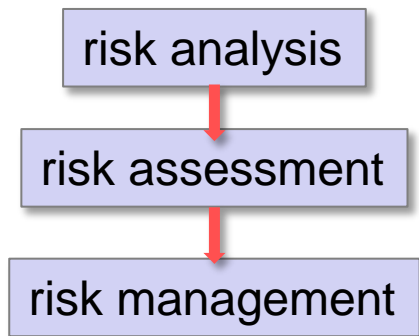
Normative aspects

- Important for the technical as well as for the societal conception of risk
- Which values have to be protected?
 - persons
 - natural resources
 - material assets
 - idealistic values
 - ...
- How will the risk be assessed?
What are the safety objectives?
- How to deal with uncertainties?
- Is the way the risk is dealt with compatible with moral convictions?
- ...



Normative aspects

- Strict separation between risk analysis and risk assessment (as applied in the technical conception) is not possible
- Sequence of



has to be complemented



Treating the normative aspects

- Clarifying and exposing the premises when dealing with risks, e.g.
 - “risk” is dealing with something that exists in the world
 - it is not a mere construct
 - risks can be analysed and assessed
 - the risk analysis integrates technical and societal aspects
 - part of risk analysis is to disclose the limits of the analysis
 - risk assessments must be based on good reasons and exposed transparently
 - ...



Treating the normative aspects

- Clarifying and exposing the premises when dealing with risks, especially
 - framework and rules for dealing with risk
 - acknowledging the importance of risk governance and safety culture (that become today more and more part of the technical concept)



Some crucial questions

- Weighting of different risks:
 - risks resulting from mistakes which make retrieval necessary against risks resulting from provisions for monitoring and retrievability



Memorandum zur Entsorgung hochradioaktiver Reststoffe



Some crucial questions

- Weighting of different risks:
 - risks resulting from missing new technological and societal opportunities against
 - risks resulting from prolonged intermediate storage



Some crucial questions

- Weighting of risks for persons (and idealistic values) against economic risks and against costs:
 - How much safety can we afford?
 - How much safety do we want to afford?
- ... while the motivation to solve the problem is declining and with it the available resources



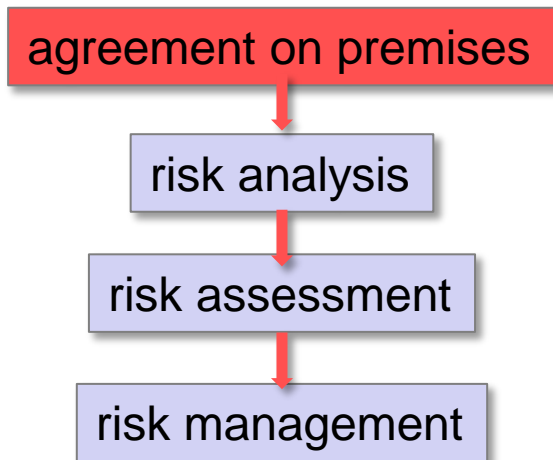
Conclusions

- Two risk-conceptions determine the debate on the disposal of high-level waste today
 - technical conception
 - societal conception
- Both conceptions are rich and diversified
- It is necessary to understand both conceptions profoundly and to bridge the gaps in order to obtain stable solutions for disposal

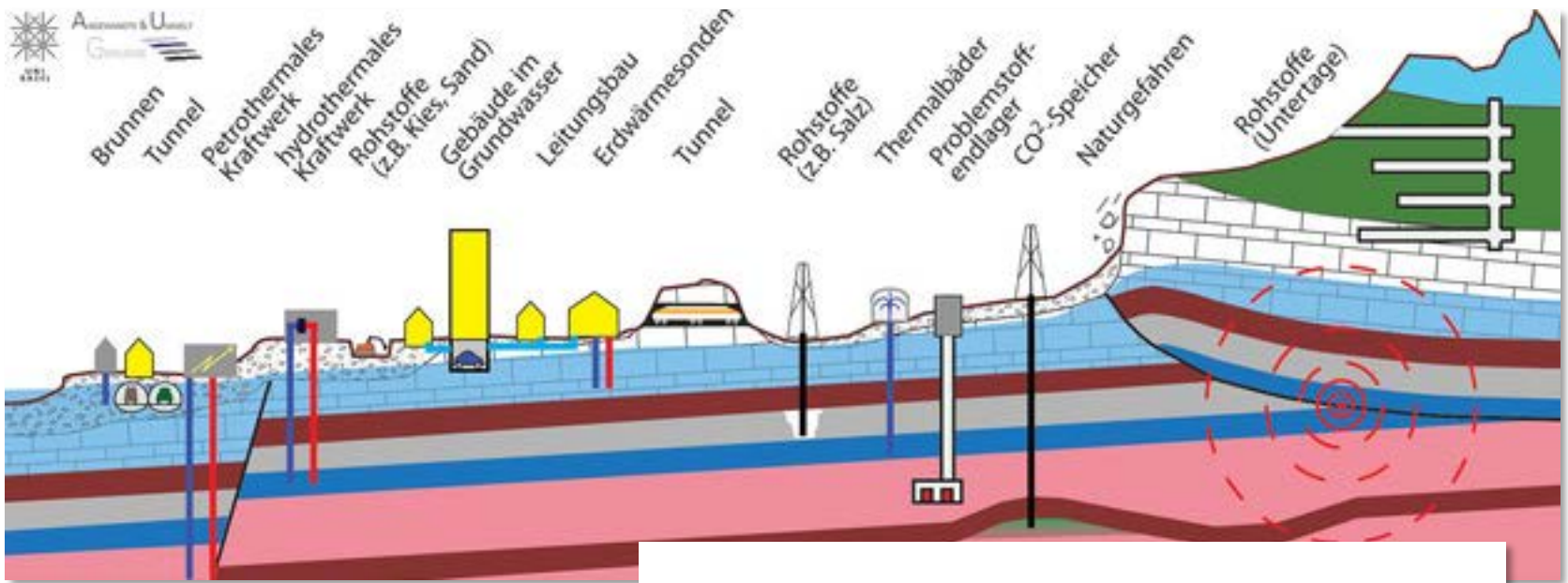


Conclusions

- When dealing with risks the normative aspects are of great importance
- The classical sequence in dealing with risks has to be completed:



How do we deal with risks in the near and far future?



Die Zukunft liegt im Untergrund

Donnerstag, 14. Februar 2013, 14:53 Uhr

Thank you very much for your attention

