

K+S Entsorgung GmbH

Underground Waste Disposal



Alexander Baart

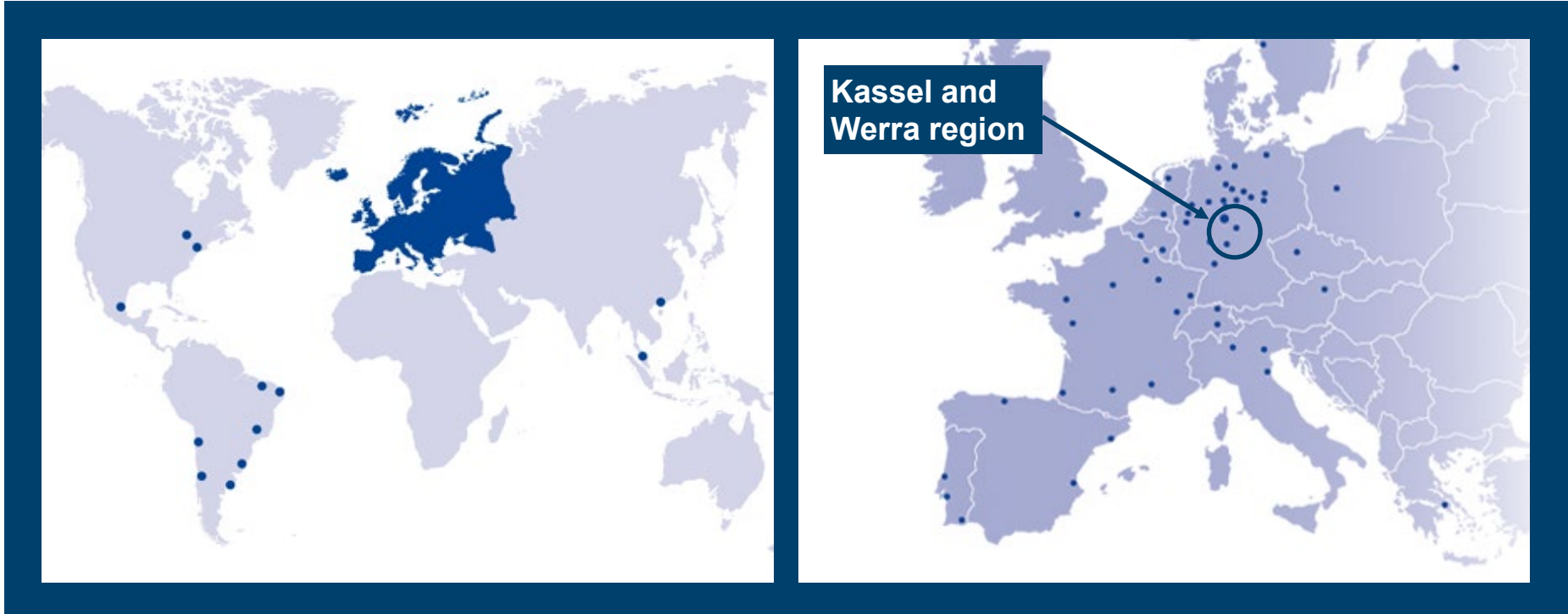
- Sales and Marketing of Chemical Division
- Since 2004 at K+S Entsorgung



A world wide leader in the sectors of:

- Special and standard fertilisers
 - Plant care products
 - Salt products
-
- More than 12,300 employees
 - Revenue 2008: 4.79 billion €
 - Since september 2008 one of 30 DAX-listed companies, Germanys most important stock exchange index





Revenues by region	(2007)
Germany	19.6%
Rest of Europe	47.1%
Overseas	33.3%



K+S Group	
Fertilisers and plant care	K+S KALI GmbH, COMPO GmbH & Co. KG, fertiva GmbH
Salt	esco – european salt company GmbH & Co. KG, SPL - Sociedad Punta de Lobos S. A.
Waste Management and recycling	K+S Entsorgung GmbH
Logistics	KTG - Kali-Transport Gesellschaft mbH
IT-Services	K+S IT- Services GmbH
Consulting	K+S Consulting GmbH
Trading business	CFK - Chemische Fabrik Kalk GmbH



K+S Group	
Fertilisers and plant care	K+S KALI GmbH, COMPO GmbH & Co. KG, fertiva GmbH
Salt	esco – european salt company GmbH & Co. KG, SPL - Sociedad Punta de Lobos S. A.
Waste management and recycling	K+S Entsorgung GmbH
Logistics	KTG - Kali-Transport Gesellschaft mbH
IT-Services	K+S IT- Services GmbH
Consulting	K+S Consulting GmbH
Trading business	CFK - Chemische Fabrik Kalk GmbH

- A K+S Group business segment since 1991
- Disposal activities are centrally steered from Kassel
- Reutilisation, disposal and recycling at company-owned facilities
- Largest number of sites and technologies on the market
- Internationally active, with representatives in eight countries
- Pioneer of underground waste disposal with first facility worldwide: Herfa-Neurode (1972)
- Revenue 2008: 71.1 m. €



Underground disposal:

- Solution for highly contaminated wastes
- Goal: The permanent and sustainable exclusion of the contaminants from the biosphere

Underground disposal plants (UTD):

- Herfa-Neurode
(technical capacity: 200,000 metric t / year)
- Zielitz
(technical capacity: 40,000 metric t / year)



Long-term-safe disposal solution



- 1 Underground Waste Disposal Plant Zielitz
- 2 Underground Waste Disposal Plant Herfa-Neurode

K+S Entsorgung GmbH

Werk Werra | Facts

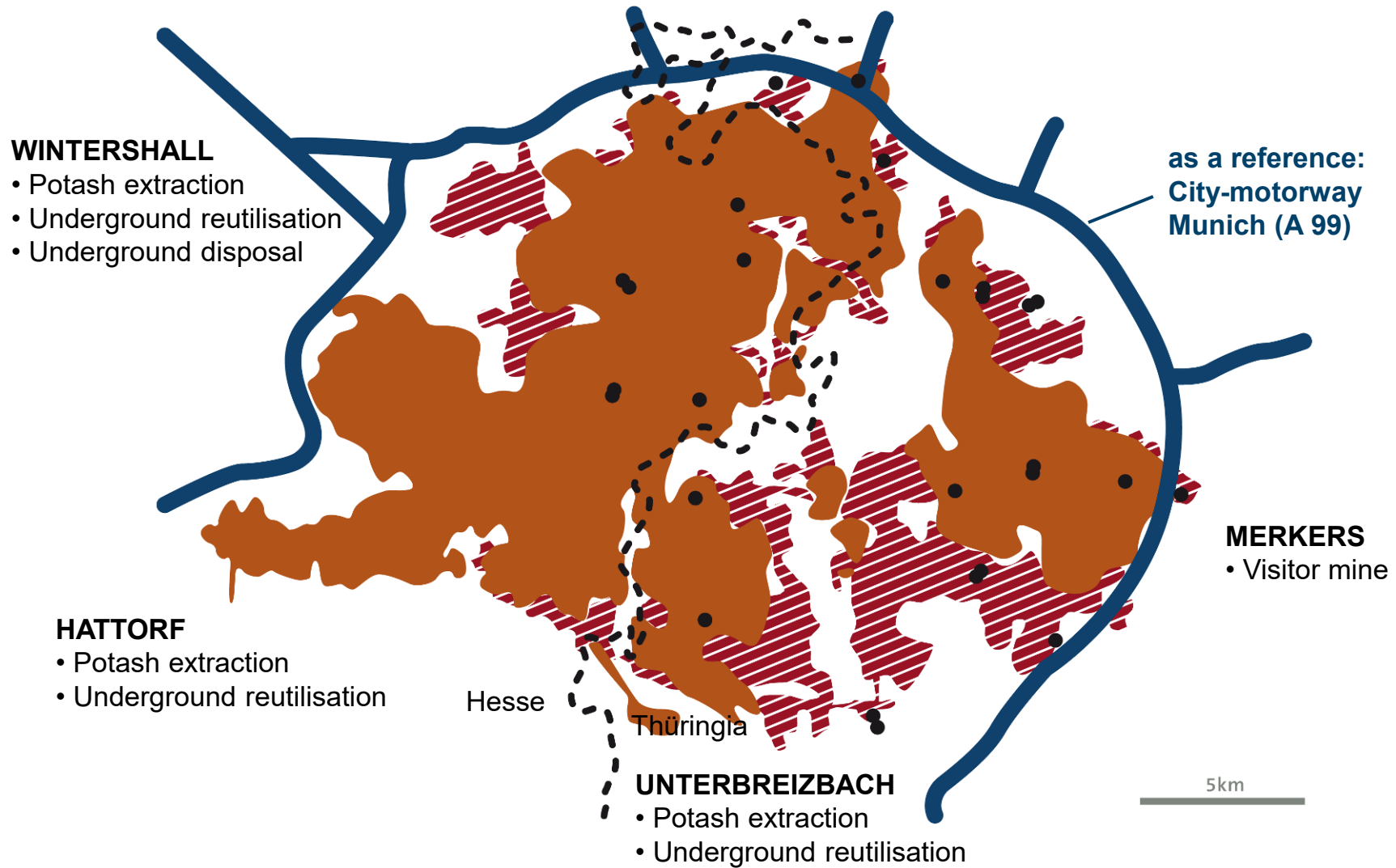


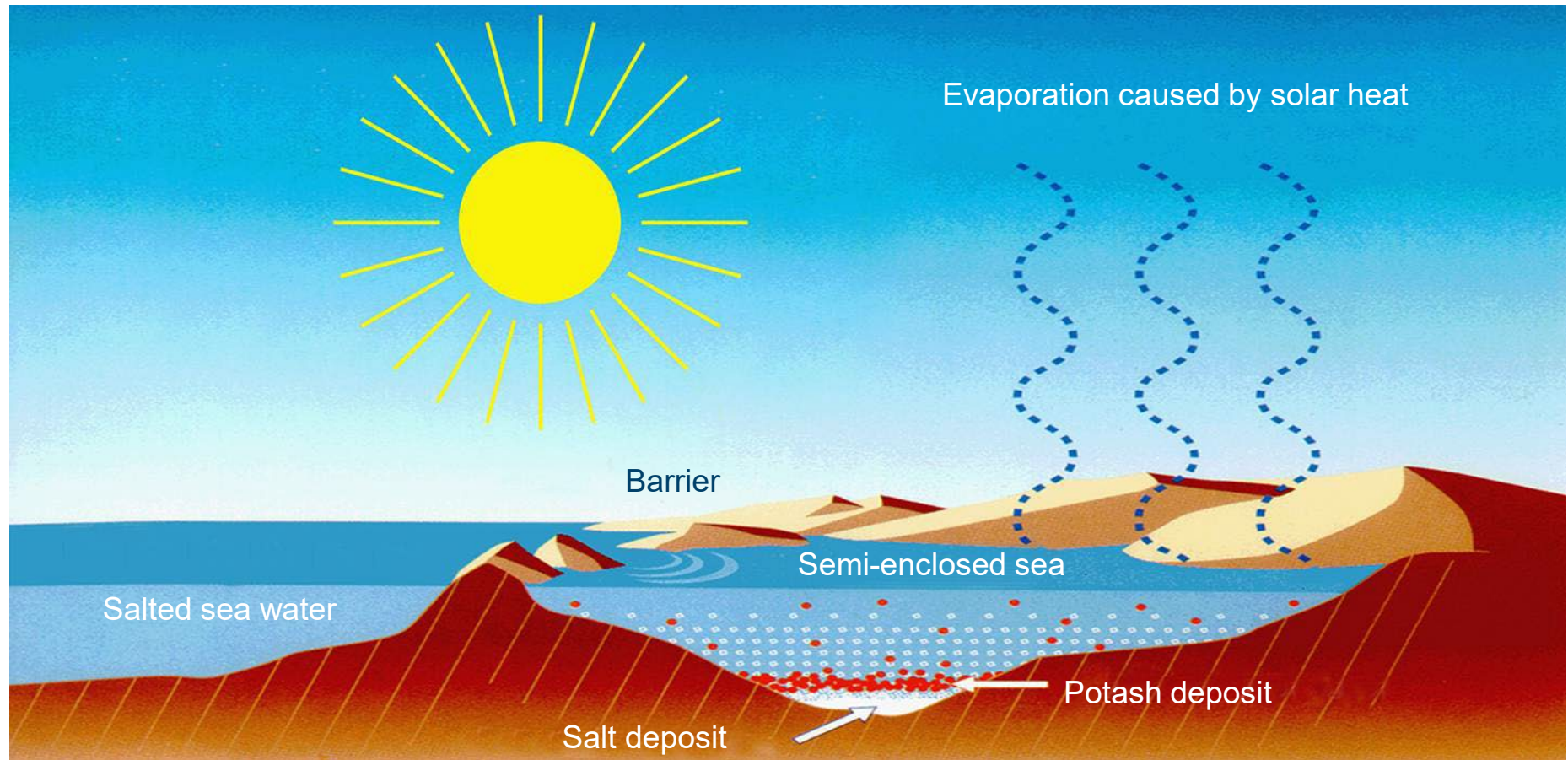
- Extraction of crude potash and magnesium salts: 21.7 m. t/a
- Production of special fertilisers: 3.4 m. t/a
- More than 4,000 employees
- Mining method: room and pillar-system
- 1 underground disposal plant
- 3 underground reutilisation facility



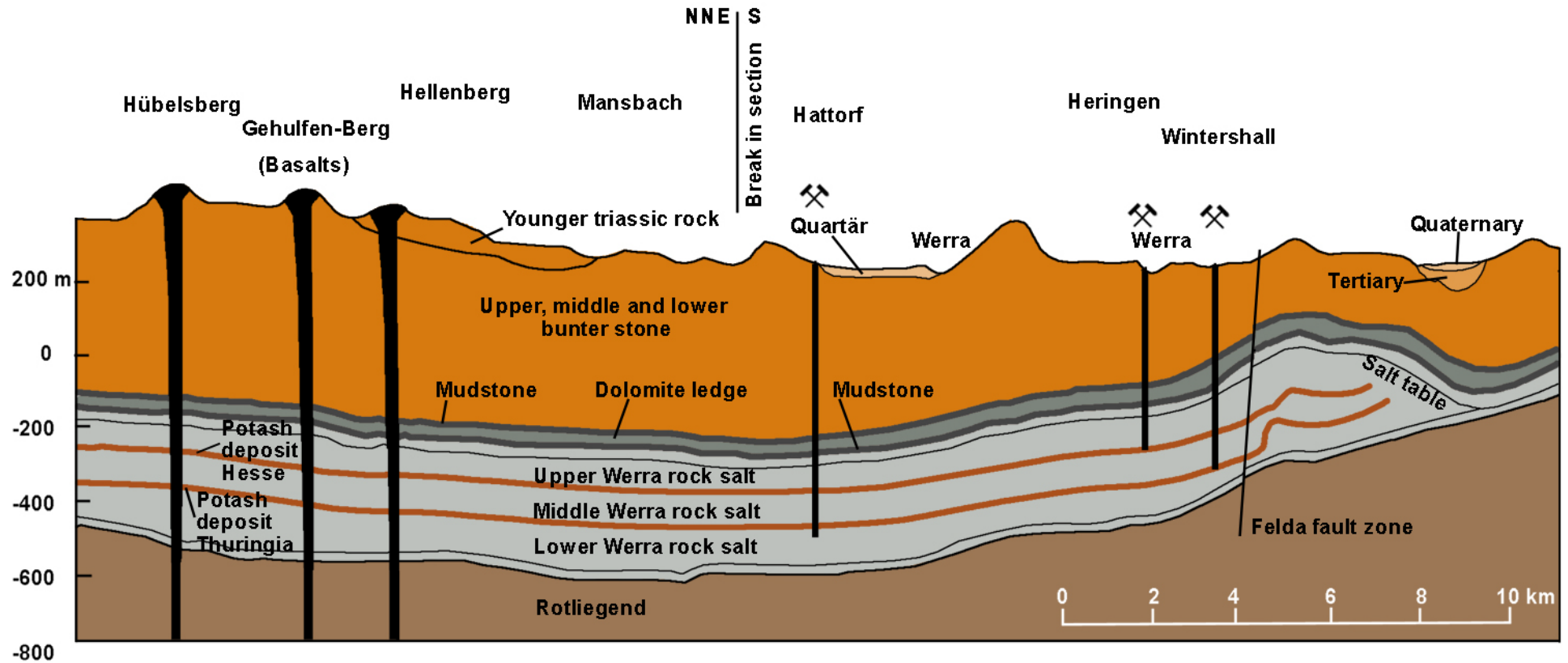
**In the heart of Germany -
the largest works alliance
within K+S**

K+S Entsorgung GmbH Werk Werra | Dimensions

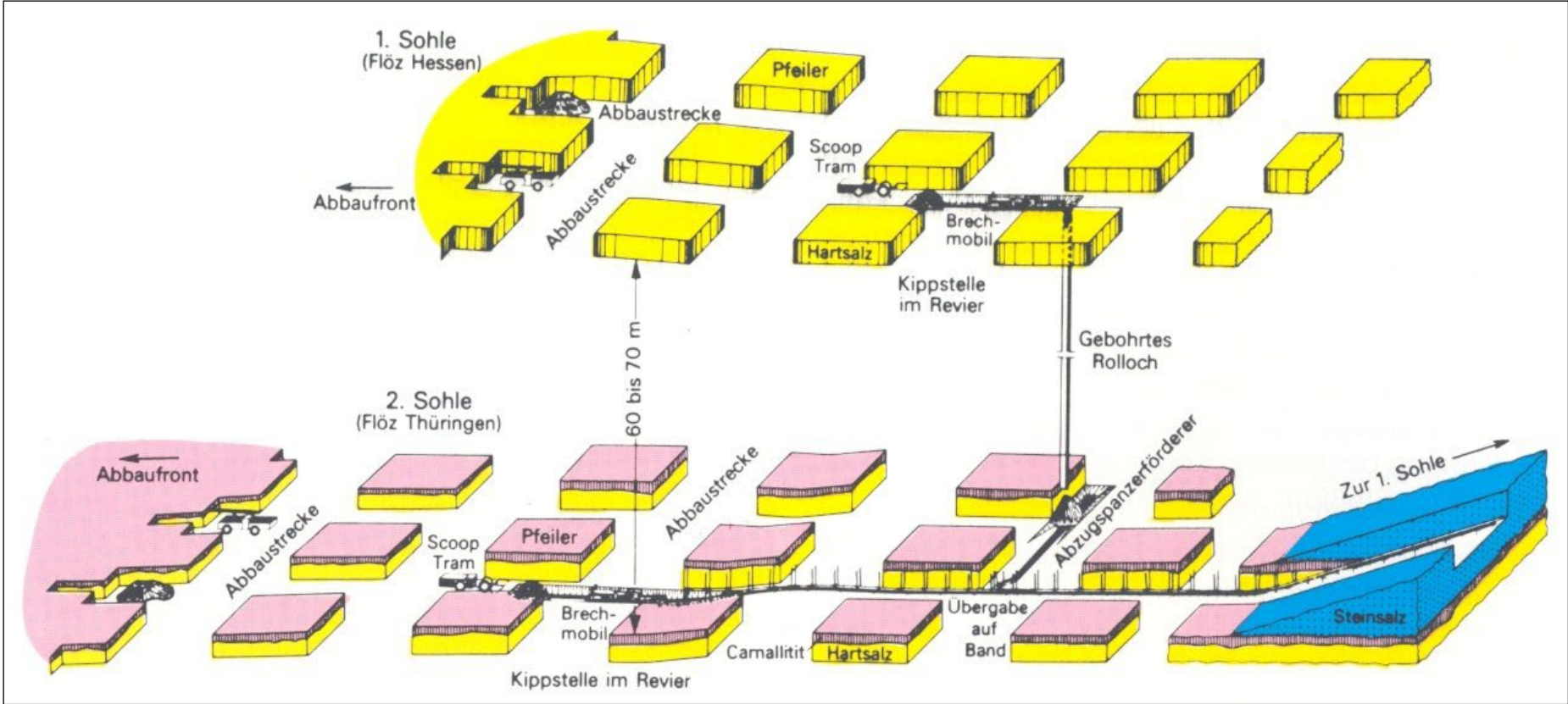




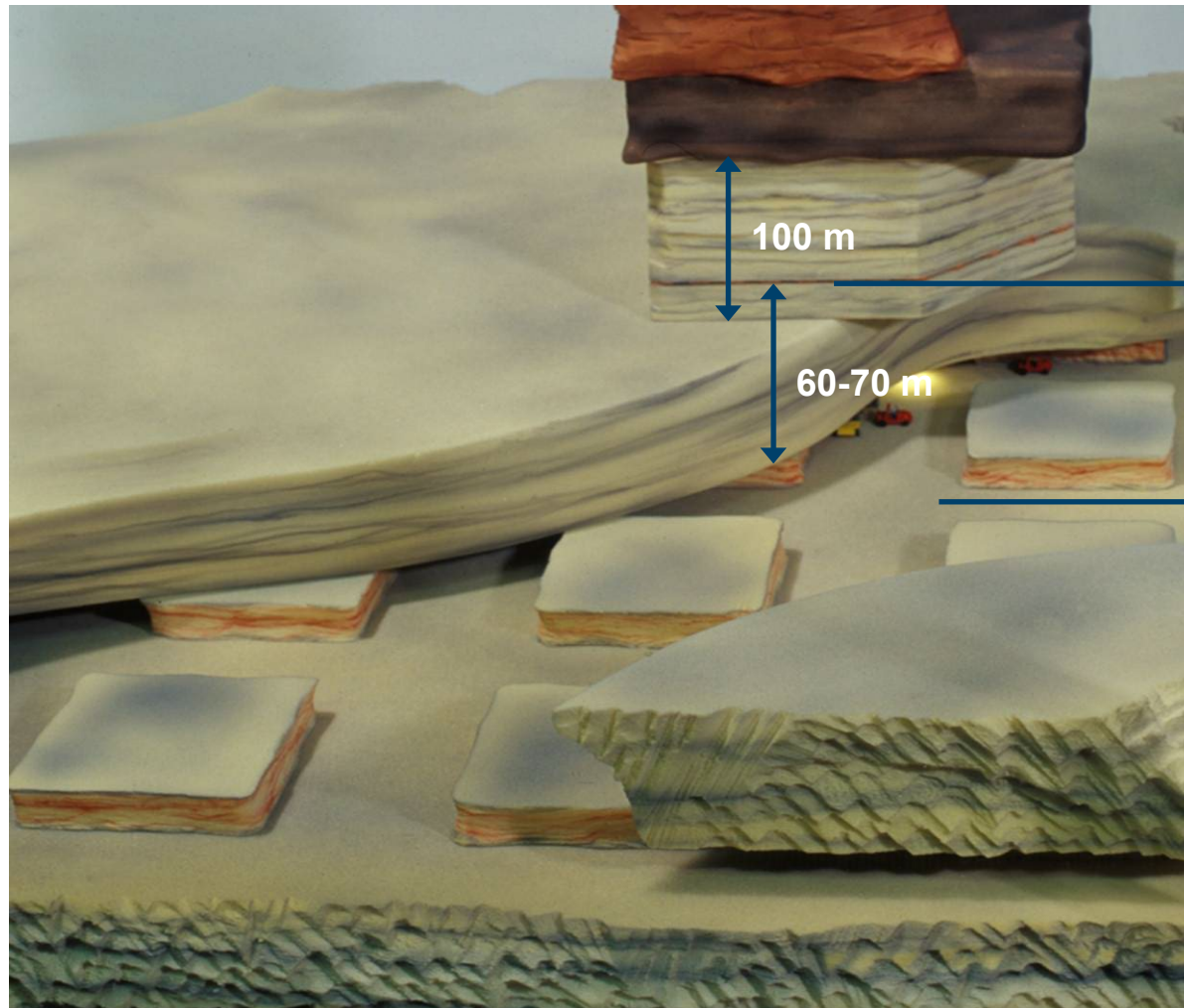
Formation of the salt layers 250 million years ago



Deposit thickness up to 500 metres | Gastight



Two potash deposits | Mining with room-and-pillar-system



- 1. potash layer
- 2. potash layer

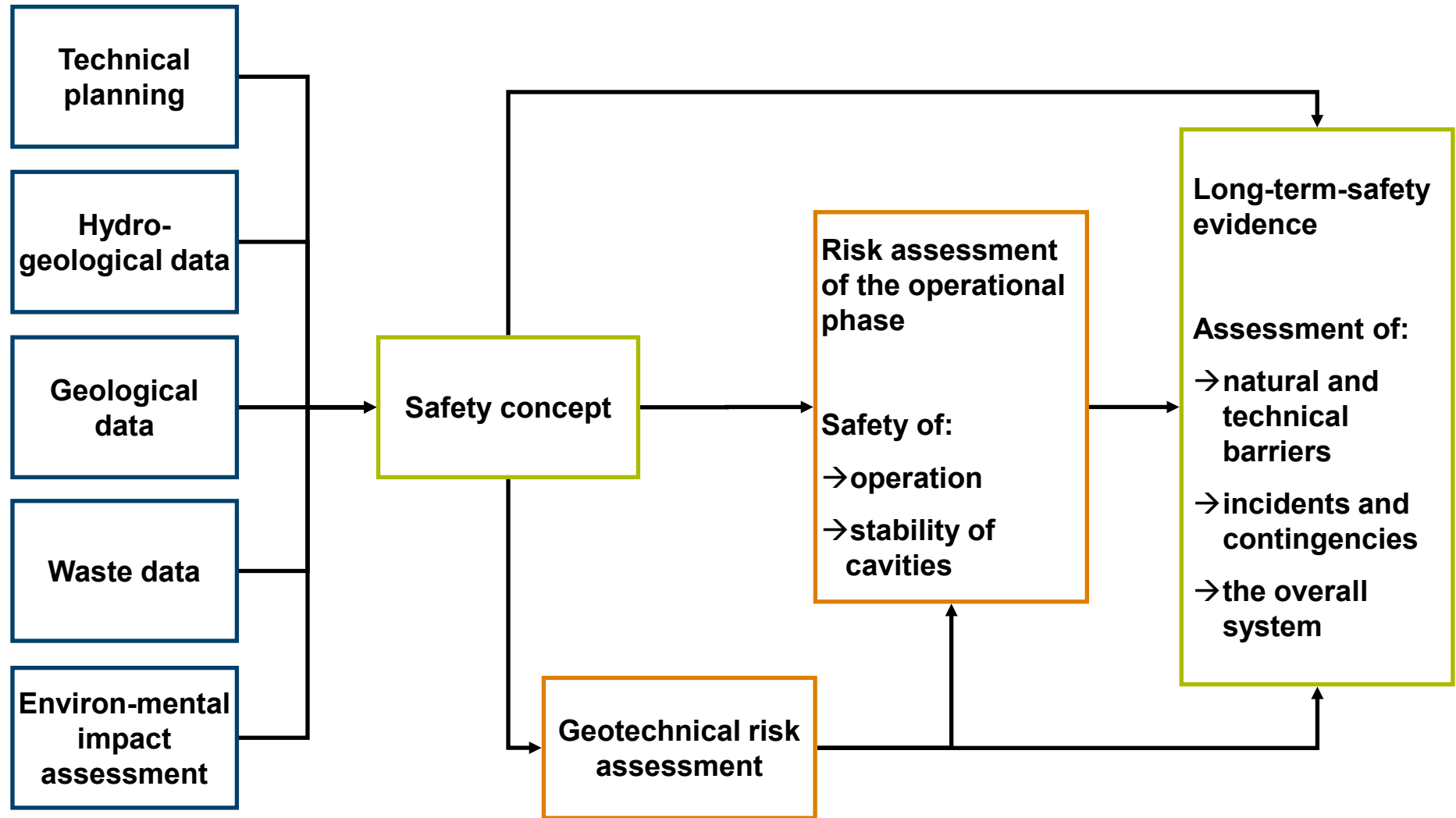
Mining with
room-and-pillar-system

Prerequisites for underground waste disposal

- Waste storage only in disused, excavated areas of the mine
- Storage area has to be remote from extraction area with possibility to be sealed off from it
- Cavities remain open and have no backfill obligation
- Cavities have to be stable and must remain accessible even after prolonged time
- Mine has to be dry and free of water
- Storage areas have to be sealed off from water-bearing layers



The safest solution for the disposal of hazardous waste



Safety Measures

- Installing steel bolts into the top rock to reinforce it
- Deployment of rock anchors



Extensive measures are taken in order to prepare the caverns

Construction of roadways

- Application of rock salt
- Levelling
- Humidification
- Compacting



Extensive measures are taken in order to prepare the caverns

**Not acceptable for underground disposal
are wastes that are:**

- explosive
- self inflammable
- spontaneous combustile
- infectious
- radioactive
- releasing hazardous gases
- liquid
- increasing their volume



K+S Entsorgung GmbH UTD Herfa-Neurode | Acceptance control



K+S Entsorgung GmbH UTD Herfa-Neurode | Shaft transport



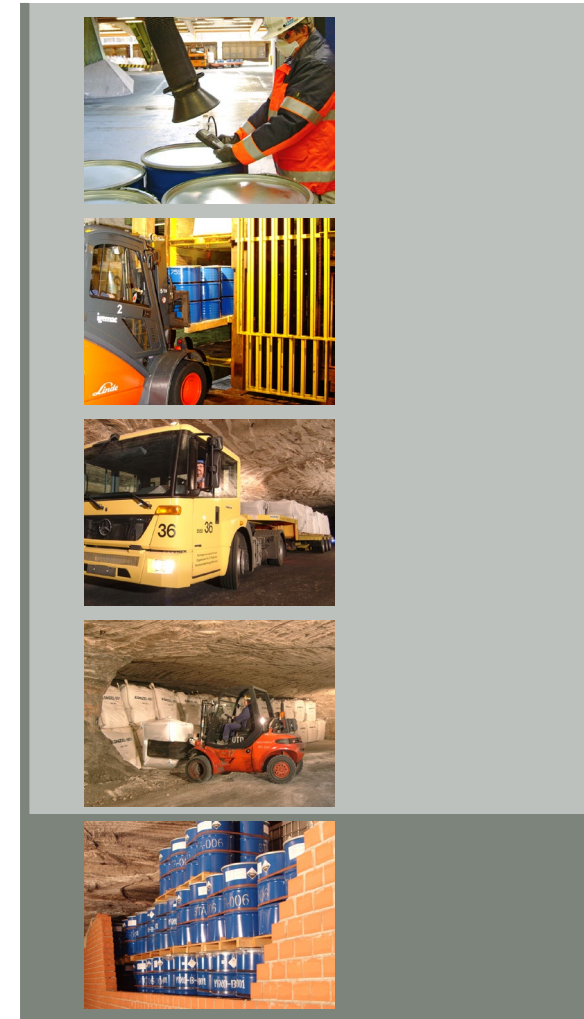
K+S Entsorgung GmbH UTD Herfa-Neurode | Underground Transport



K+S Entsorgung GmbH UTD Herfa-Neurode | Storage Chambers

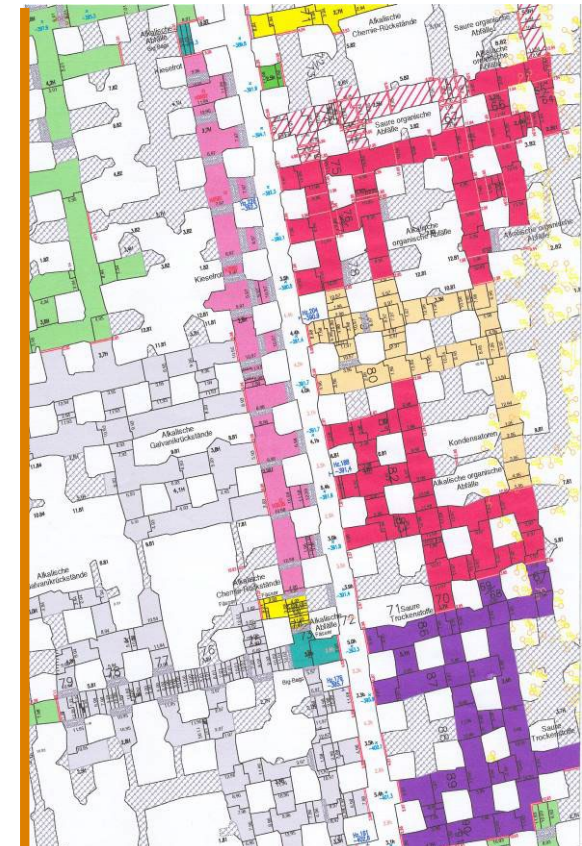


K+S Entsorgung GmbH UTD Herfa-Neurode | Sealing off by walls



Wastes are separated by 17 material groups:

- Alkaline wastes
- Alkaline wastes, moisture sensitive
- Acid wastes
- Acid wastes, moisture sensitive
- Cyanides (acid / alkaline)
- Mercury (acid / alkaline)
- Organic wastes (acid / alkaline)
- Hydroxide sludges
- Capacitors
- Transformers (Cu / Fe)
- Parts of transformers (Cu / Fe)
- Other wastes



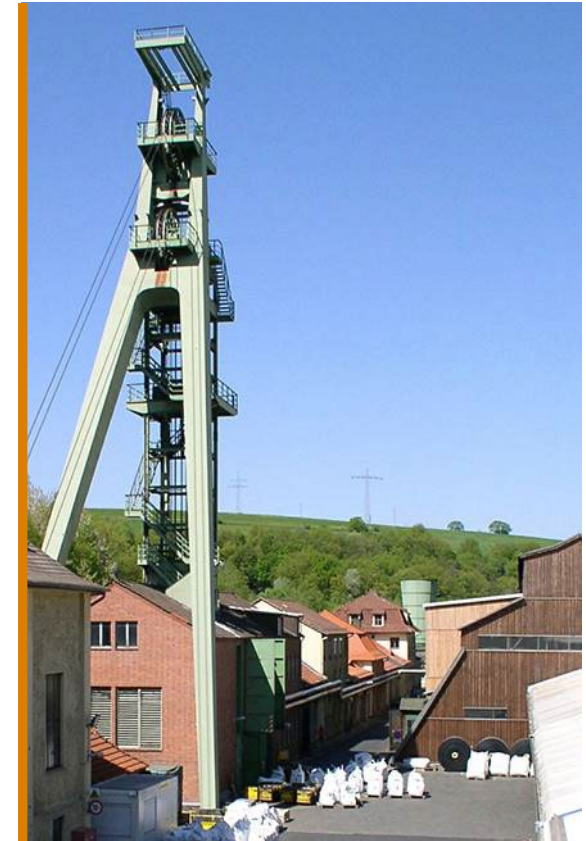
Structure and
documentation

K+S Entsorgung GmbH

UTD Herfa-Neurode | A unique disposal plant



- First underground waste disposal plant worldwide
- Complex safety installations
- Complex documentation to allow precise backtracking
- Retain samples of every single waste delivery
- Retrievability of wastes for recovery of resources
- High capacities and flexibility
- Infrastructure of a major company



Shaft at Werk Werra

Natural barriers

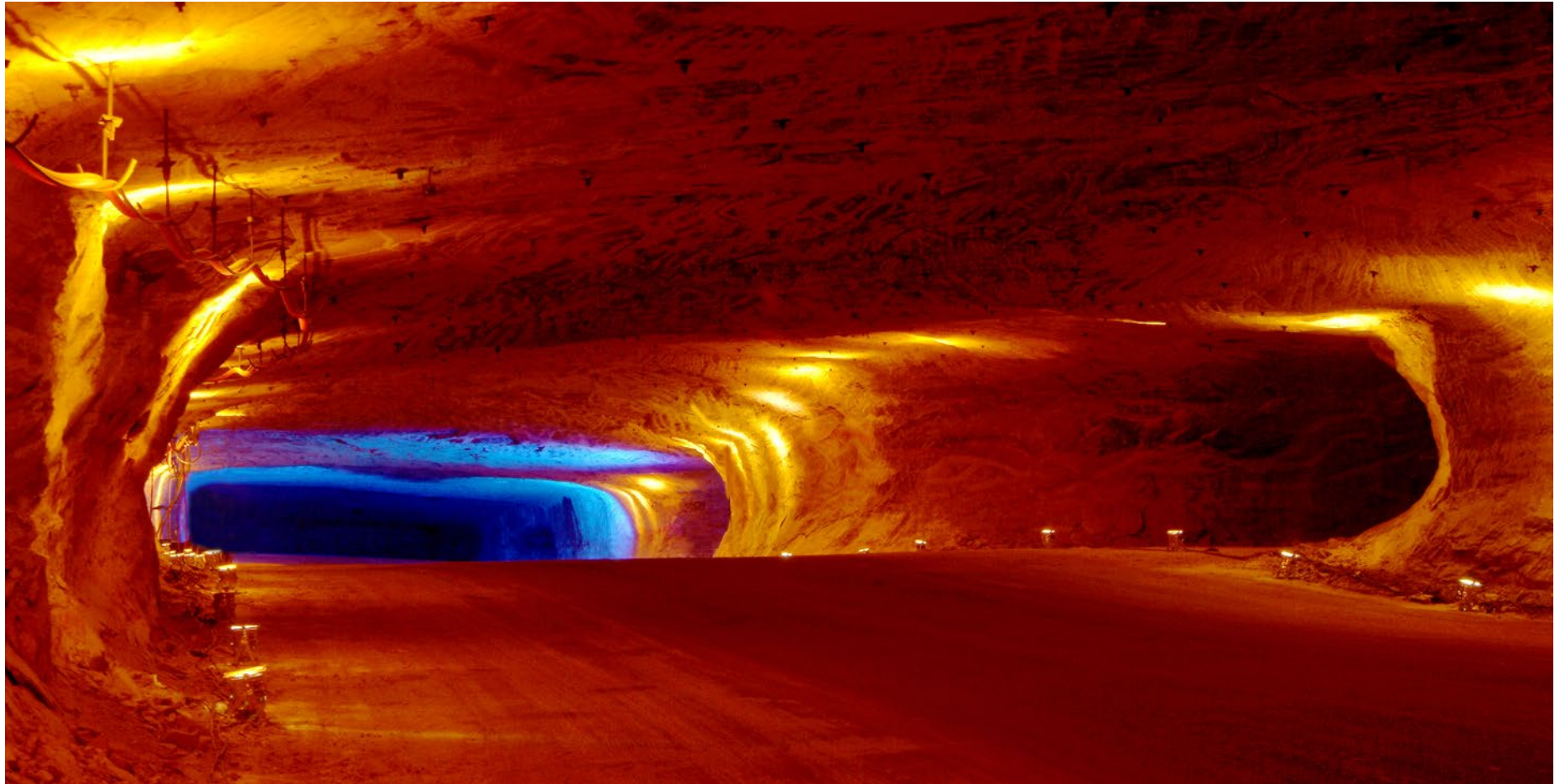
- Salt (gastight) 300 m
- Clay (watertight) 100 m
- Bunter stone 500 m

Artificial barriers

- Packaging
- Brick walls
- Field dams
- Waste repository zone dams
- Watertight filling of the shafts



Long-term-safe and
maintenance-free



Thank you for your attention!