

Mining engineering

The potash deposits at the Zielitz and Herfa-Neurode locations were extracted using the 'room and pillar' system. A tessellated grid of pillars supports the rock overburden. The mining chambers remain open and accessible, while at the same time the structural safety and stability of the mine workings are maintained. Nevertheless, the deposit of waste does require preparatory work: gallery roofs are inspected and repaired wherever necessary; rock salt rubble is compacted to form level roads and utility space.



Approval

The underground waste disposal plants have been issued all of the required approvals. They have been certified as qualified waste management facilities in compliance with the standards of the German specialist waste contractor ordinance (EfbV).

Quality management

Certified quality management-systems in accordance with DIN EN ISO 9001 have been established.

PACKAGING

All types of waste need to be packed in tightly sealed containers which have been approved for underground waste disposal. These packing units need to be able to withstand mechanical strain, comply with ADR regulations and withstand waste-induced corrosion.

Packaging is chosen based on the particular characteristics of the waste. Selection criteria are toxicity, pH values, residual moisture and the waste's fine dust proportion.

Types of packaging:

- Big bags
- Steel drums
- Steel containers

At the Herfa-Neurode underground waste disposal plant, pneumatically conveyable waste in powder form can also be delivered in bulk by silo trucks; packaging in big bags is done on-site.

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A K+S Company

EXAMPLES OF TYPES OF WASTE

- Galvanic residues
- Hardening salt residues
- Arsenic, cyanide and mercury wastes
- Chemical distillation residues
- Filtration residues
- Contaminated soil and construction material
- Evaporation residues from landfill leachate
- Filter dusts
- Hazardous-waste-containing fibres
- Residues from the steel and metal industry

WASTE DISPOSAL CONDITIONS

Waste suitable for underground disposal **must not be:**

- Radioactive
- Explosive
- Highly flammable
- Liquid
- Contagious
- Malodorous
- Biodegradable
- Highly flammable under deposit conditions

Under deposit conditions, reactions of the wastes with each other or the surrounding rock bed must **not** cause volume expansions, the generation of self-ignitable, toxic or explosive gases or substances, or any other dangerous reactions.

UNDERGROUND

WASTE DISPOSAL

Technical information

The K+S underground disposal plants

Underground waste disposal plants in rock salt are considered to be the safest solution for the disposal of hazardous wastes. In underground disposal plants, waste is permanently removed from the biosphere without the need for any future processing.

The K+S Group operates two underground waste disposal plants.

Natural barriers | Geological situation

The geological situation is decisive for the safety of the underground disposal plants. The geological conditions within the gas-tight rock salt have been stable for millions of years. The stored waste remains securely enclosed in the solid salt beds and is reliably withdrawn from the biosphere for good. The underground waste disposal plants are located in exhausted mines where excavation finished a number of years ago, at depths of up to 800 metres.

Artificial barriers | Technical measures

1. Packaging

All waste is packed in big bags, steel drums or steel containers.

2. Stone walls

As soon as depositing in a chamber is complete, it is walled off against the other deposits either by a stone wall or a salt bank.

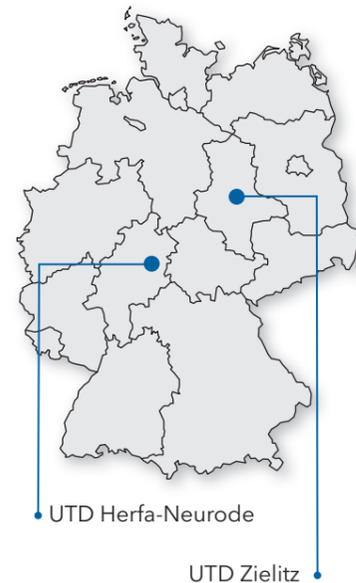
3. Damming up of deposit field

After a deposit field has been filled, all entrances are permanently sealed by massive dams.

4. Shaft backfilling

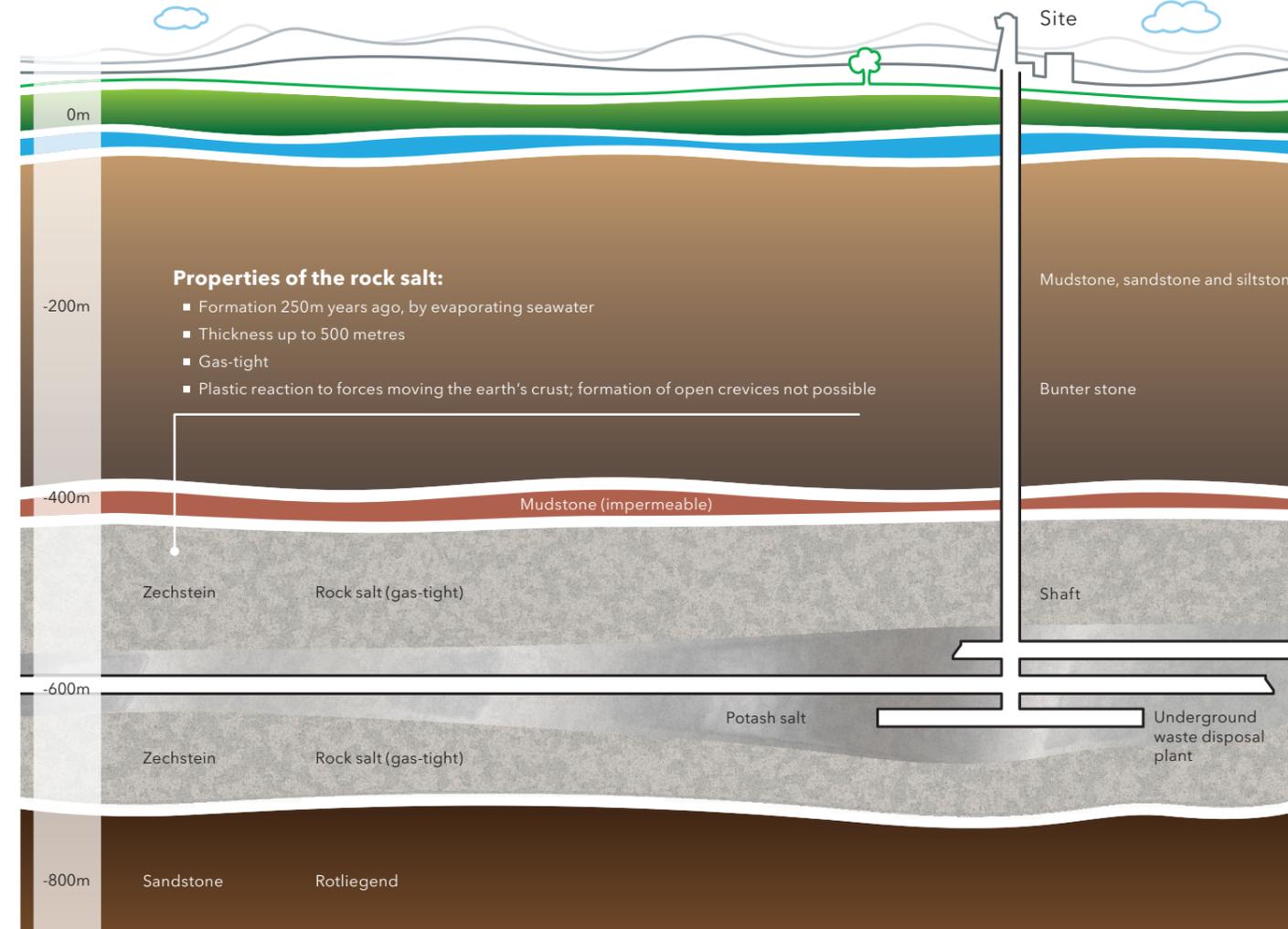
After mining or deposit activities have ended, all shafts - representing the only connections to the environment - are backfilled, making them secure for the long term.

Our sites

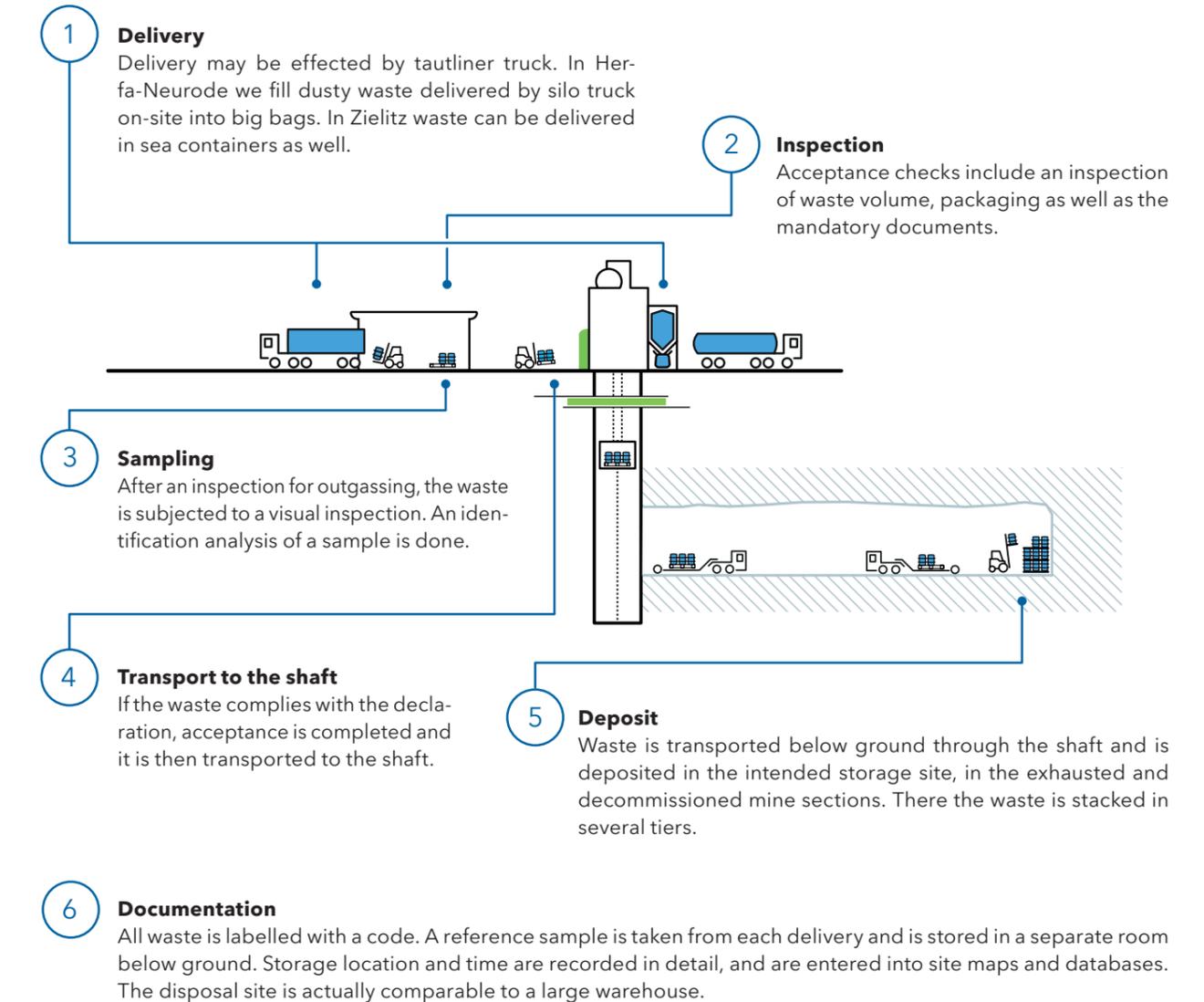


Schematic diagram of geological conditions

The deposit sites are embedded in the potash and rock salt layers.



Disposal procedures



No other post-closure processing is necessary, as the waste is irrevocably removed from the biosphere.