# Metallic Mercury Long-Term Storage Possibilities / Options

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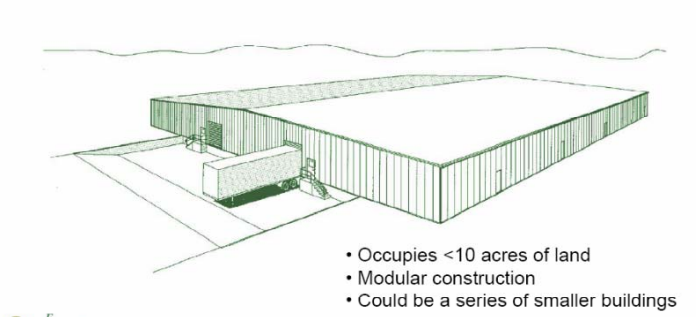
## Who is GRS (‚Plant & Reactor Safety Ltd.‘)

- Non-profit, independent expert and research organization
- Assess and improve safety of technical facilities
- Focus on nuclear safety and waste management
- Customers: Ministries and authorities, European Commission
- Technical support of Federal Ministries conc. safety of chemicals, e.g. Mercury

# Mercury Long-Term Storage: General Options



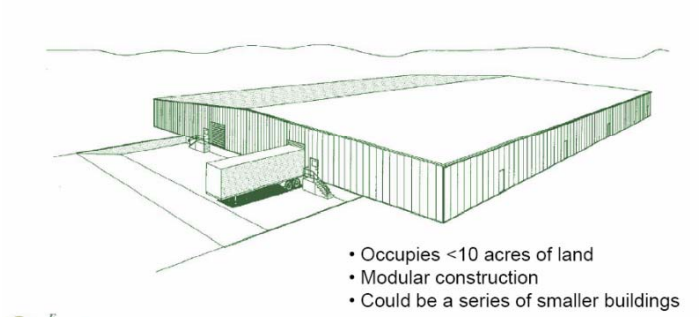

**Warehousing** **Underground Disposal** **Deep Injection**

**+ Additional Option: Stabilization**

Not considered: Surface Landfill

# Mercury Long-Term Storage: Warehousing - Features

- Investment app. 10 Mio US$
- Waste still in biosphere
- Dry climate required




- Safety dependent on political & economic constraints
- US concept for app. 100 yrs.
- No permanent solution
- Current proposal of AIT

# Mercury Long-Term Storage: Deep Injection - Features

- Investment costs unknown
- No control after injection
- Long-term safety assessment problematic
- Suitable geological situation needed
- Several applications worldwide (but no Hg) with different success

# Mercury Long-Term Storage: Underground Disposal - Features

- Investment costs strongly variable
  (e.g. new facility / abandoned mine)
- Long-term safety assessment
  (broad experience)
- Suitable geological situation needed
  (e.g. salt, hard rock - optionally combinations)
- Several facilities with positive experiences
  since decades (esp. in rock salt formations)
- Operational safety must be guaranteed
- Combination with other hazardous wastes
  recommended

# Background: EU Storage Obligation for Metallic Mercury

Regulation allows only few storage options, e.g.:

- Temporary or
- Permanently in
  - Salt mines*) or in
  - Deep underground hard rock formations**)

*) adapted for the disposal of metallic mercury

**) providing a level of safety and confinement equivalent to that of salt mines

## erties – Comparison

| | Rock Salt | Clay / Claystone | Crystalline (e.g. Granite) |
|---|---|---|---|
| | high | low | medium |
| | nearly impermeable | very low - low | very low (without joints) - permeable (jointed) |
| | medium | low - medium | high |
| | viscous (creep) | plastic - brittle | brittle |
| | self-stability | timbering necessary | high (without joints) - low (intensively jointed) |
| | lithostatic isotropic | anisotropic | anisotropic |
| | high | very low | very low |
| | very low | very high | medium - high |