
Management of Decommissioning Waste

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- **Introduction**
- **Decontamination**
- **Solid Mixed Waste:**
 - Suitable for Incineration
 - Not Suitable for Incineration
- **Metal Components** (with negligible activation)
- **Irradiated Components**
- **Ion Exchange Resins** (from decontamination)
- **Other Liquids**
 - Oil, Organic Solvents
 - Aqueous Solutions

Introduction

What is intended by treatment

- Volume reduction
- Product suitable for storage and disposal (Acceptance Criteria of Storage Facilities and Repository), solid product
 - no free liquid
 - chemically stable product, no chemical reactions (e. g. fouling and fermentation) which could result in gas generation
- Additional product quality features (stability against leaching, Thermal stability), which could lead to higher activity limits for the repository

Decontamination

Different Methods

- Chemical Decontamination
 - Electropolishing
 - Water Jet
 - Blasting
- Processes with erosion of material
- Mechanical processes with minimum erosion of material

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Decontamination

Chemical Decontamination



Decontamination

Electropolishing



Decontamination

Water Jet



Decontamination

Blasting



More information on decontamination processes and experience:

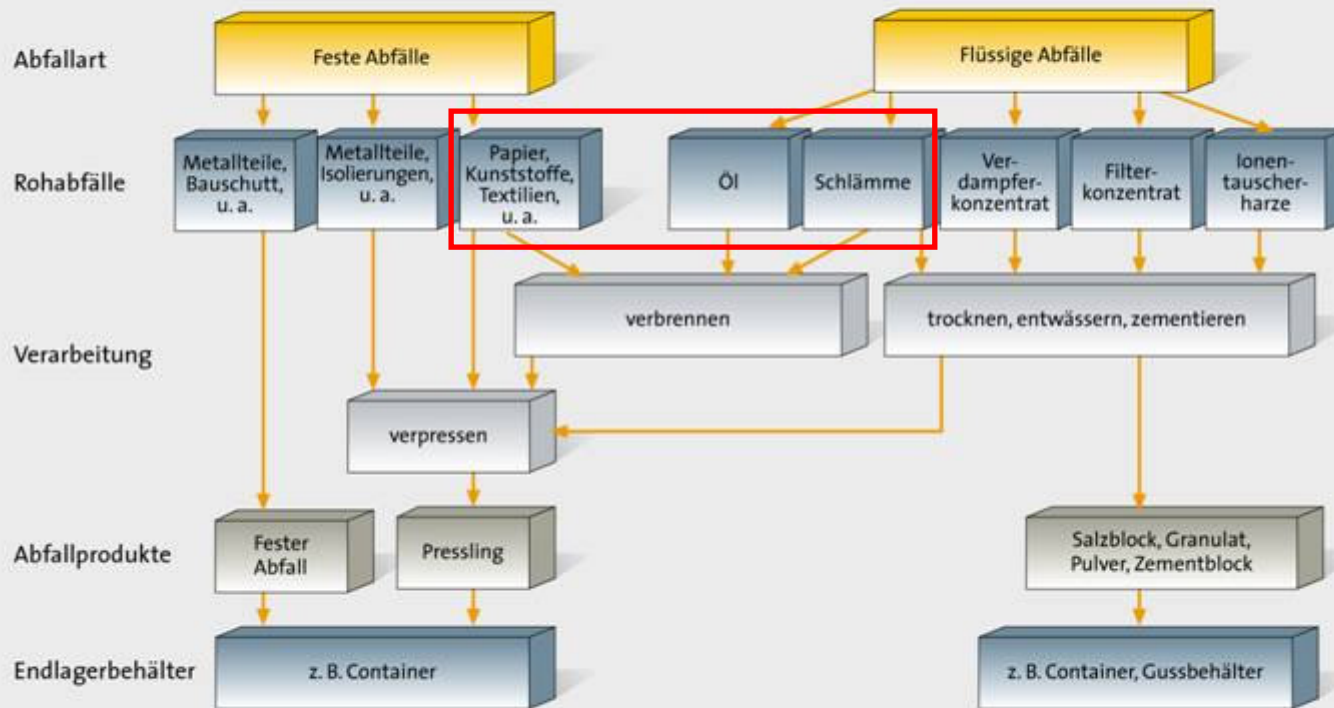
www.eundetraf.be

by the

**European Nuclear Decommissioning
Training Facility**

Burnable Waste

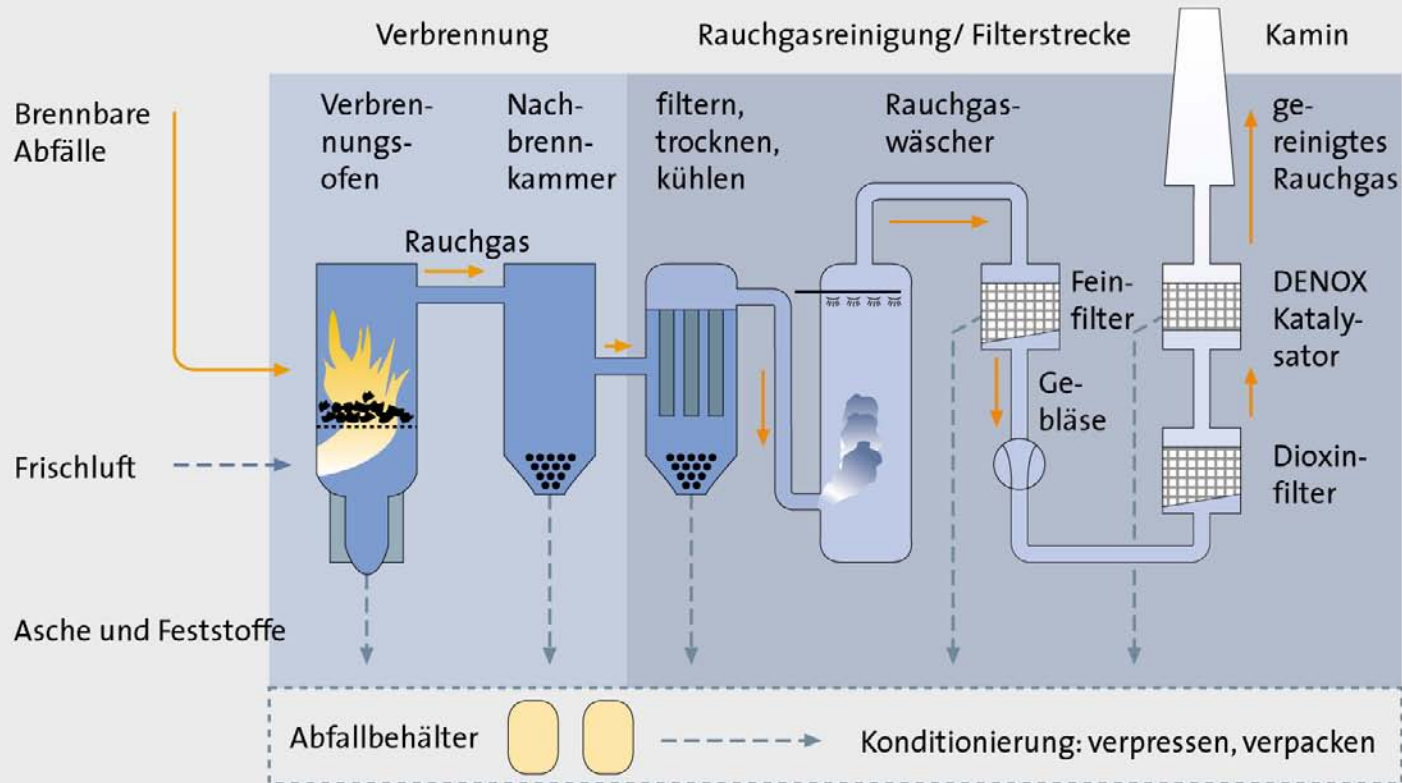
Optimierte Behandlungswege für feste und flüssige radioaktive Abfälle aus Kernkraftwerken



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Burnable Waste

Verbrennungsanlage für radioaktive Abfälle



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Burnable Waste



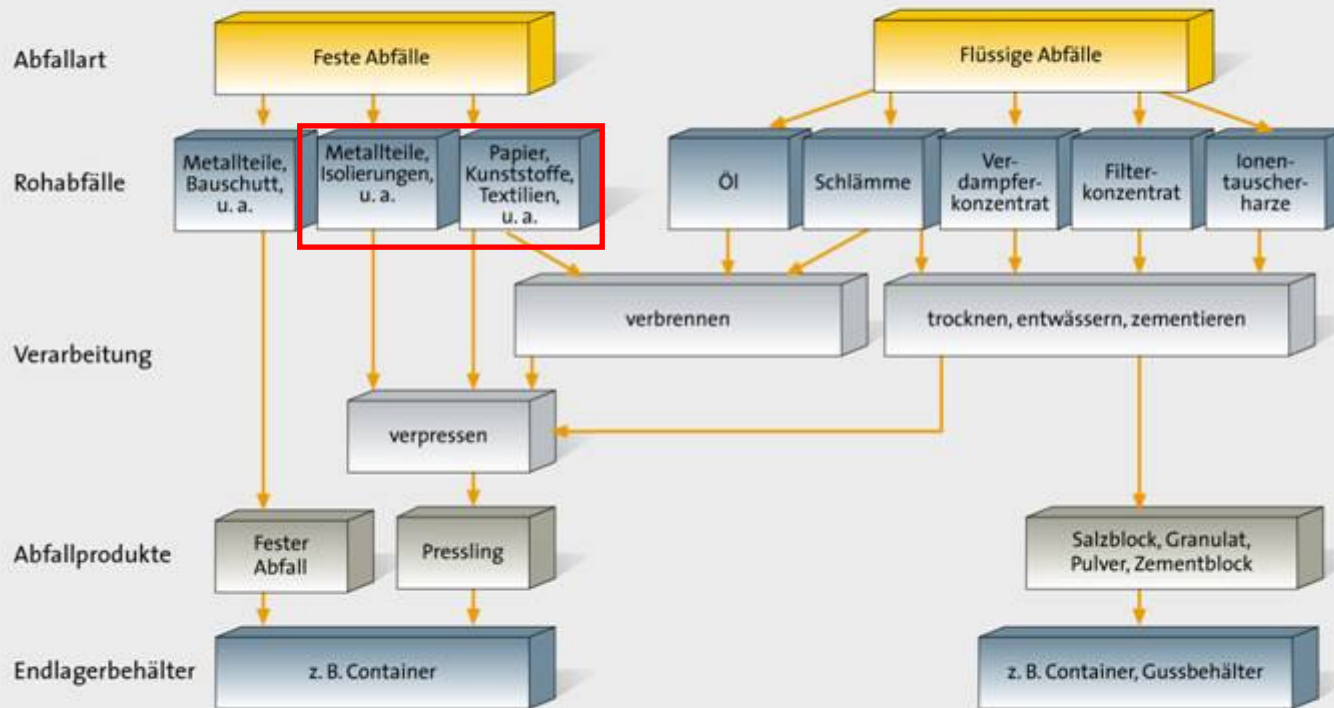
Volume reduction:

- **Incineration approx. factor 30**
- **Incineration and supercompaction factor 100**

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Supercompaction

Optimierte Behandlungswege für feste und flüssige radioaktive Abfälle aus Kernkraftwerken



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Mixed Waste for Supercompaction:

- **filter cartridges**
- **respirators**
- **protective clothing**
- **foils (PVC)**
- **flexible tubes, hoses**
- **et al.**

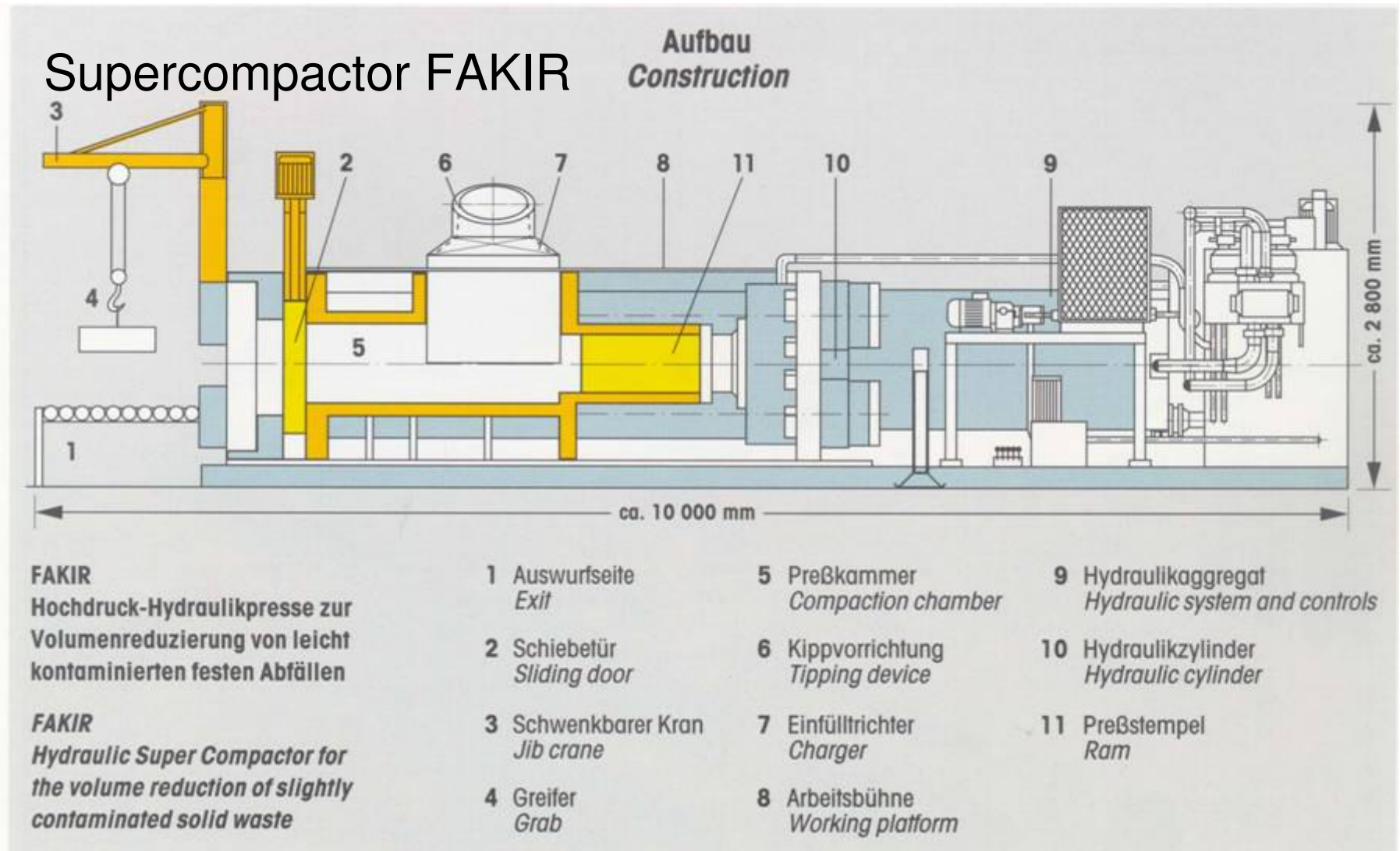
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Treatment of Mixed Waste by

- **supercompaction**
- **drying (if necessary)**

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Supercompaction





Supercompactor

FAKIR

- **Compaction Force**
15 MN („1.500 t“)
- **Weight 60 Mg**
- **Throughput**
10 - 20 drums / h
- **Volume reduction**
factor 3 - 10

Pressbare Mischabfälle



Vacuum Drying Facility PETRA





- **Preparation for Release**
- **Recycling in the Nuclear Industry**
- **Specialty: Contaminated Cables**

Metal Components



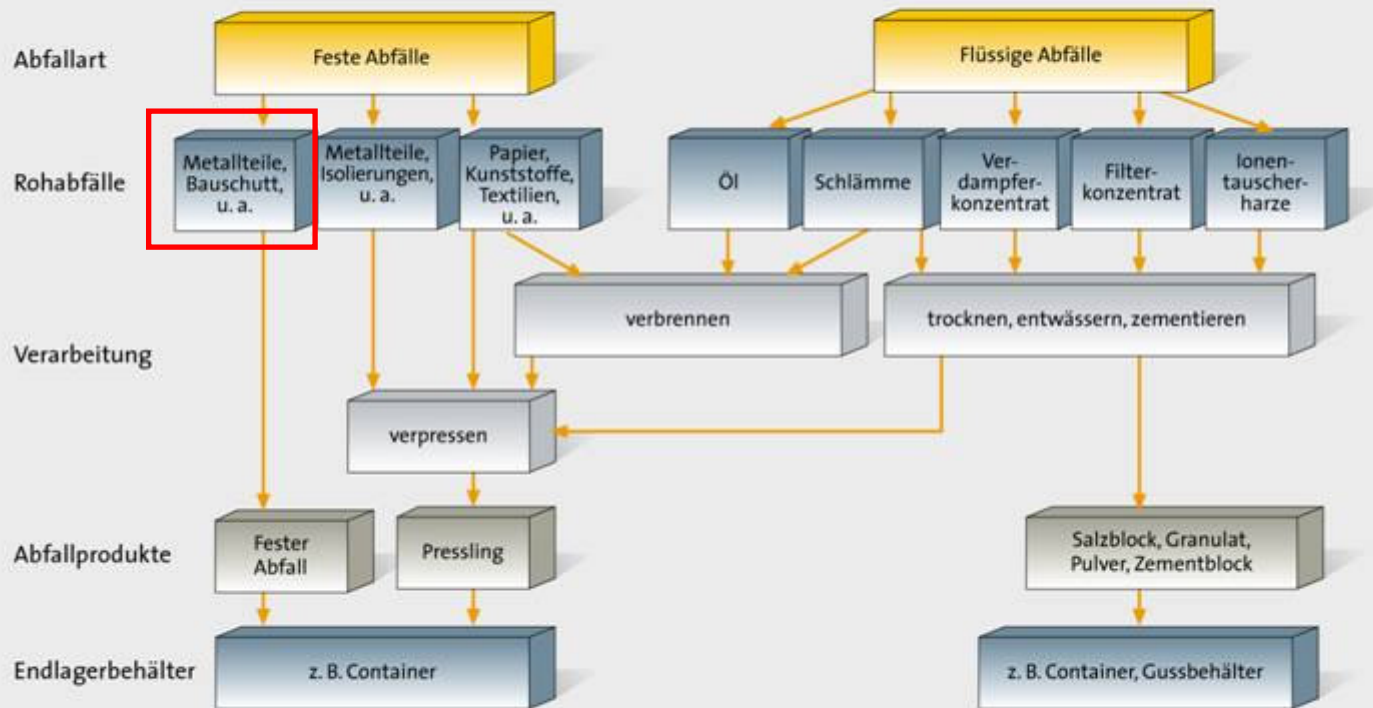
- ▶ Sizing
- ▶ Sorting
- ▶ Decontamination
- ▶ Melting
- ▶ Recycling (e. g. Casks)
- ▶ Releasee

Cables



Supercompaction

Optimierte Behandlungswege für feste und flüssige radioaktive Abfälle aus Kernkraftwerken



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- 
- **Irradiated Components**
 - **Mobile scrap shears**
 - **External treatment (Hot Cell)**

Mobile Scrap Shears

- **Universal Hydraulic Shear (UHS)**

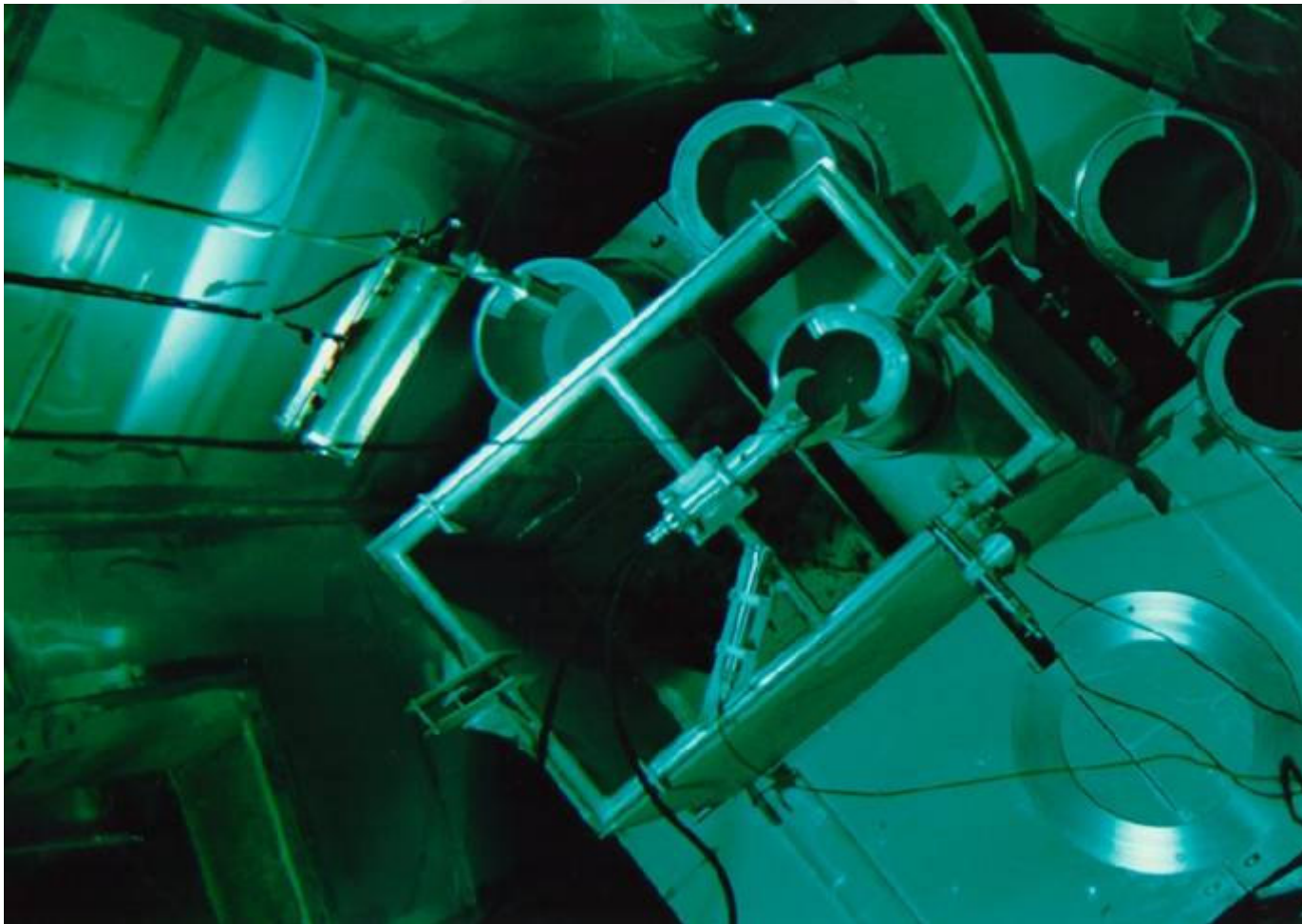
or

- **Underwater Shear (UWS)**

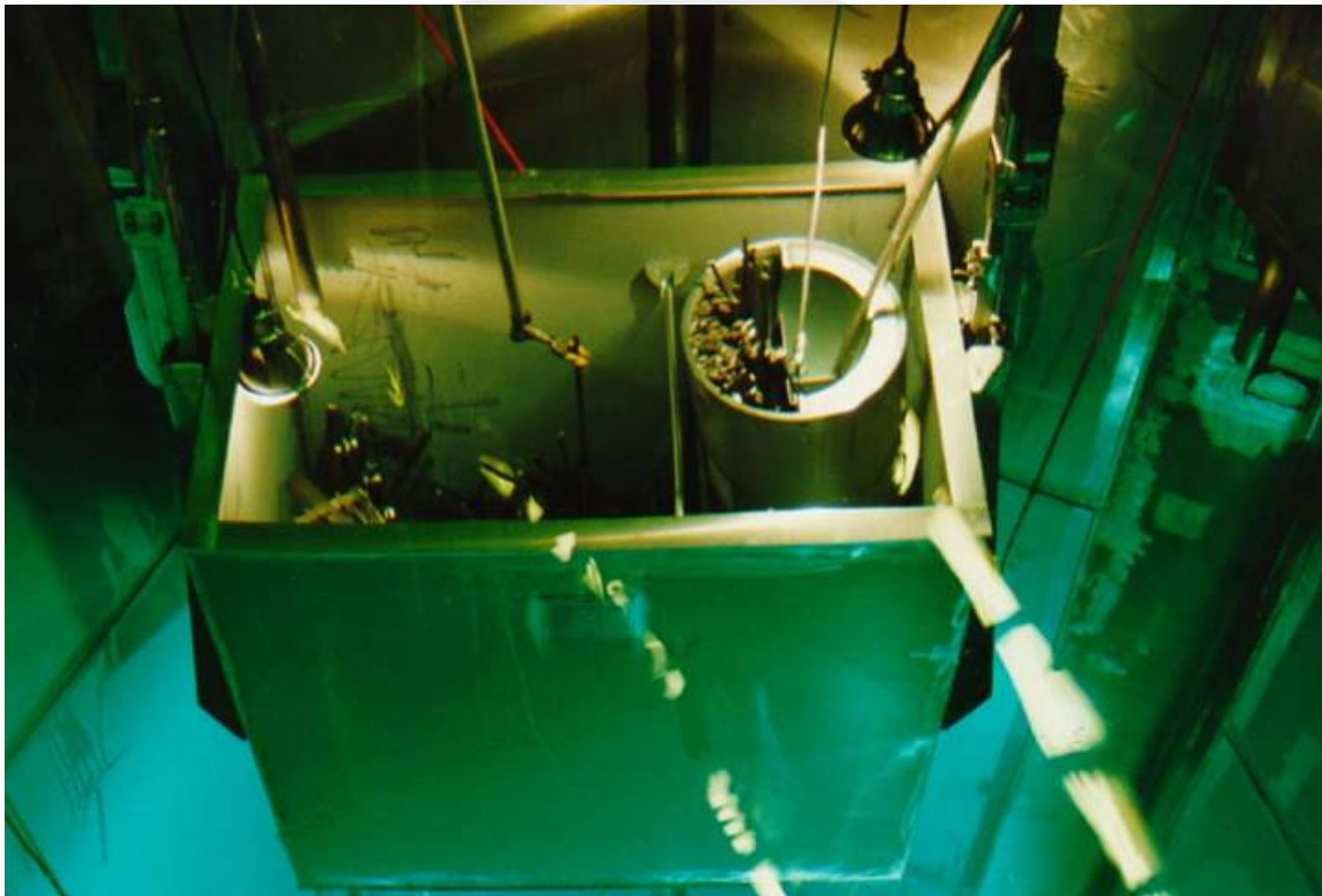
or

- **Sizing and Packaging Unit (ZVA),
a combination of underwater shear and
compactor**

Universalhydraulikscherer (UHS)



Universalhydraulikscherer (UHS)



Underwater Shear (UWS)



Zerlege- und Verpackungsanlage (ZVA)

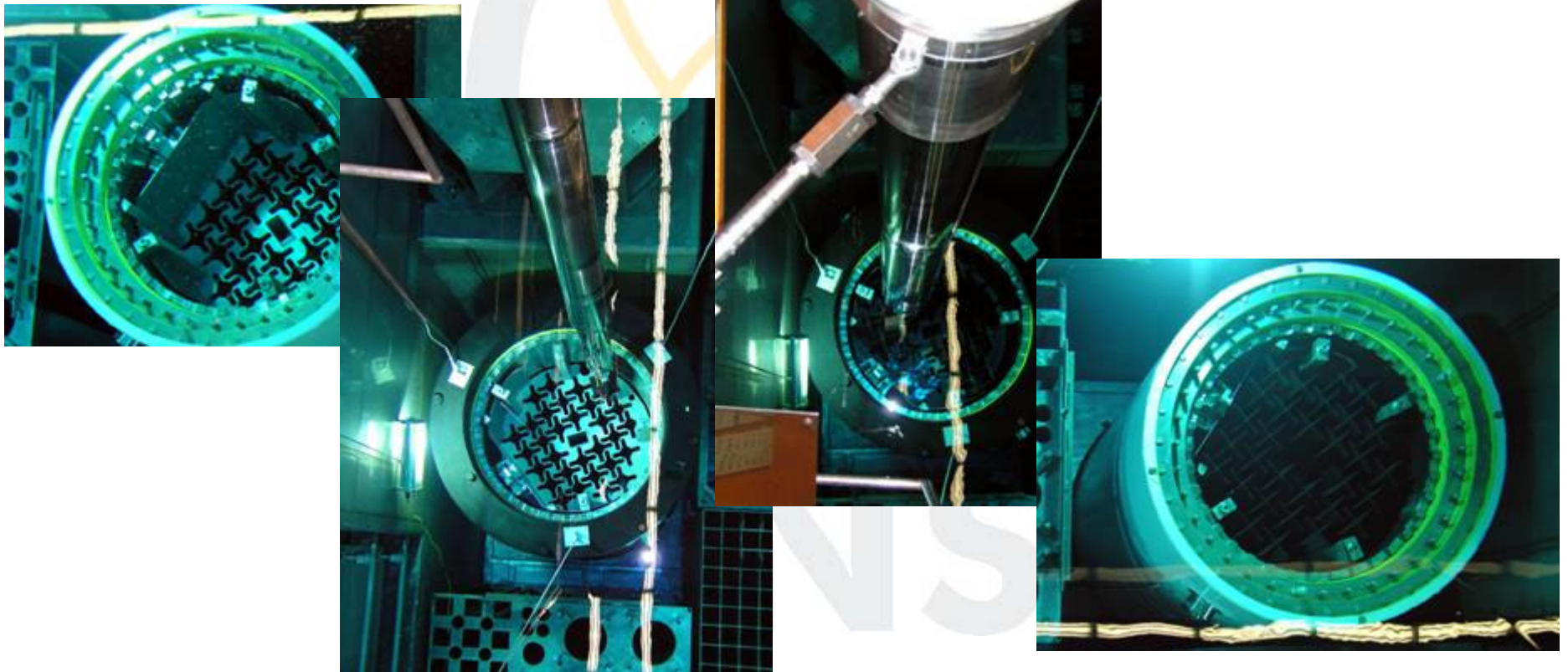




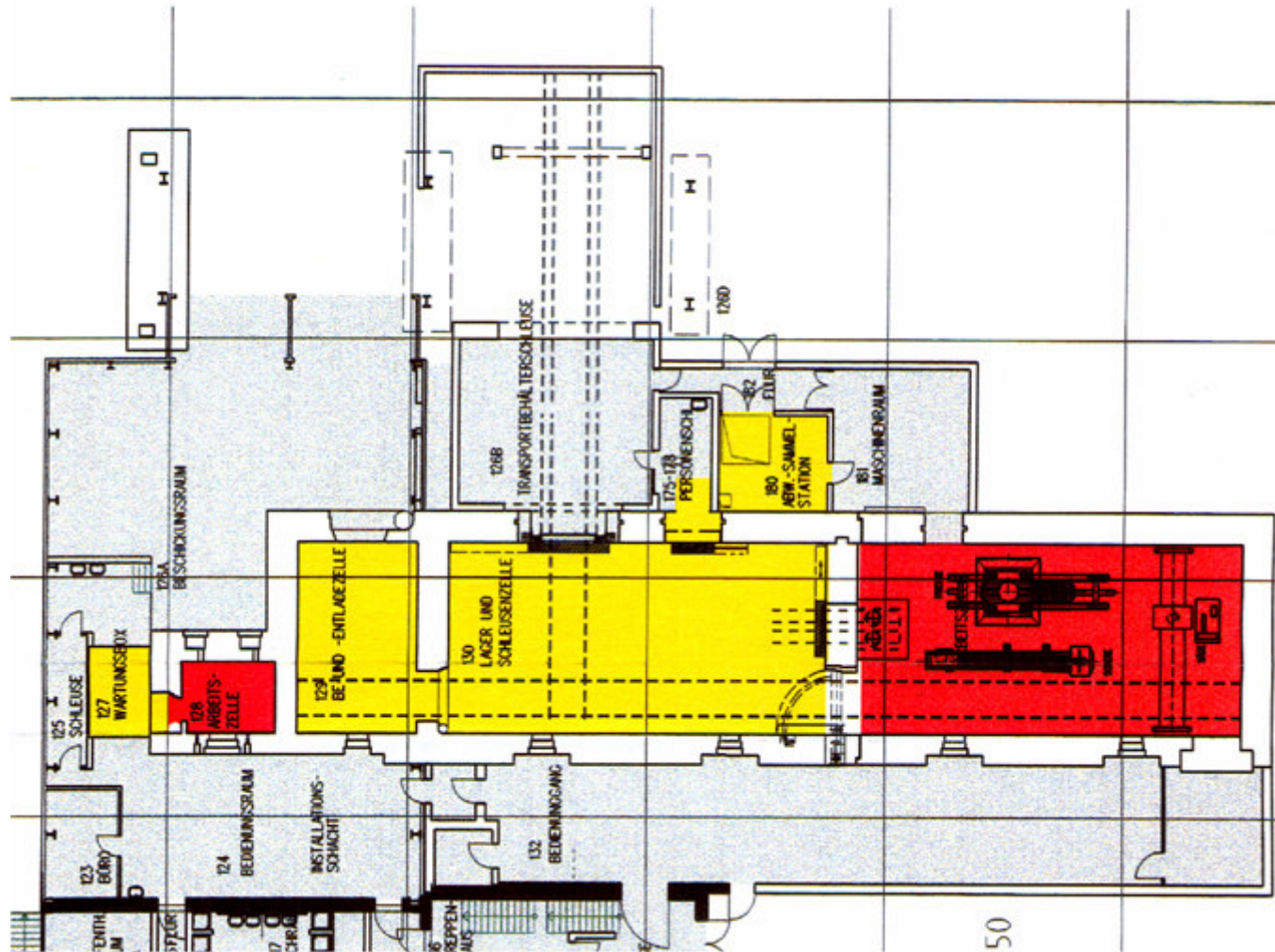
External Treatment in a Hot Cell

- Sizing
- Compaction
- Packaging

External Treatment in a Hot Cell



External Treatment in a Hot Cell



External Treatment in a Hot Cell



External Treatment in a Hot Cell

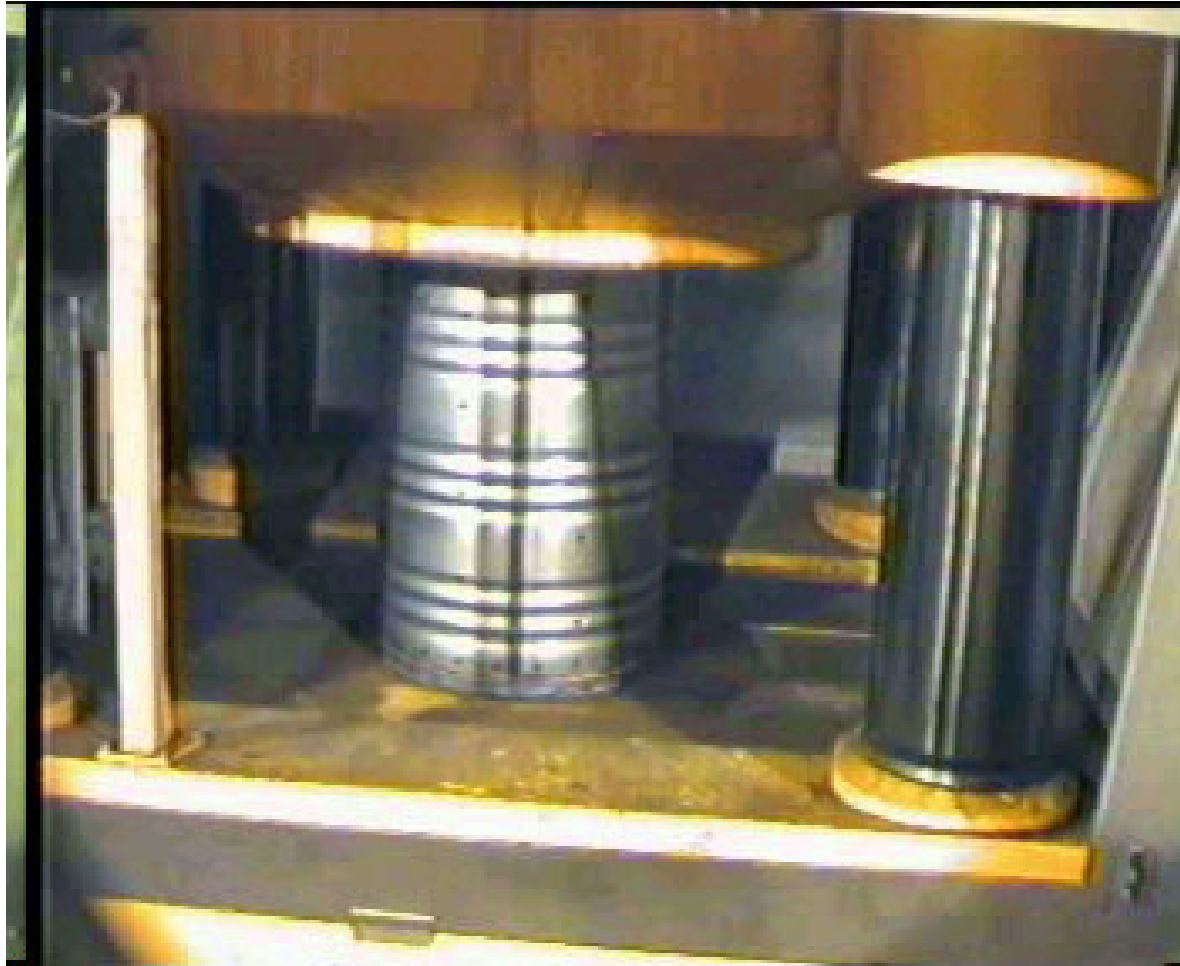




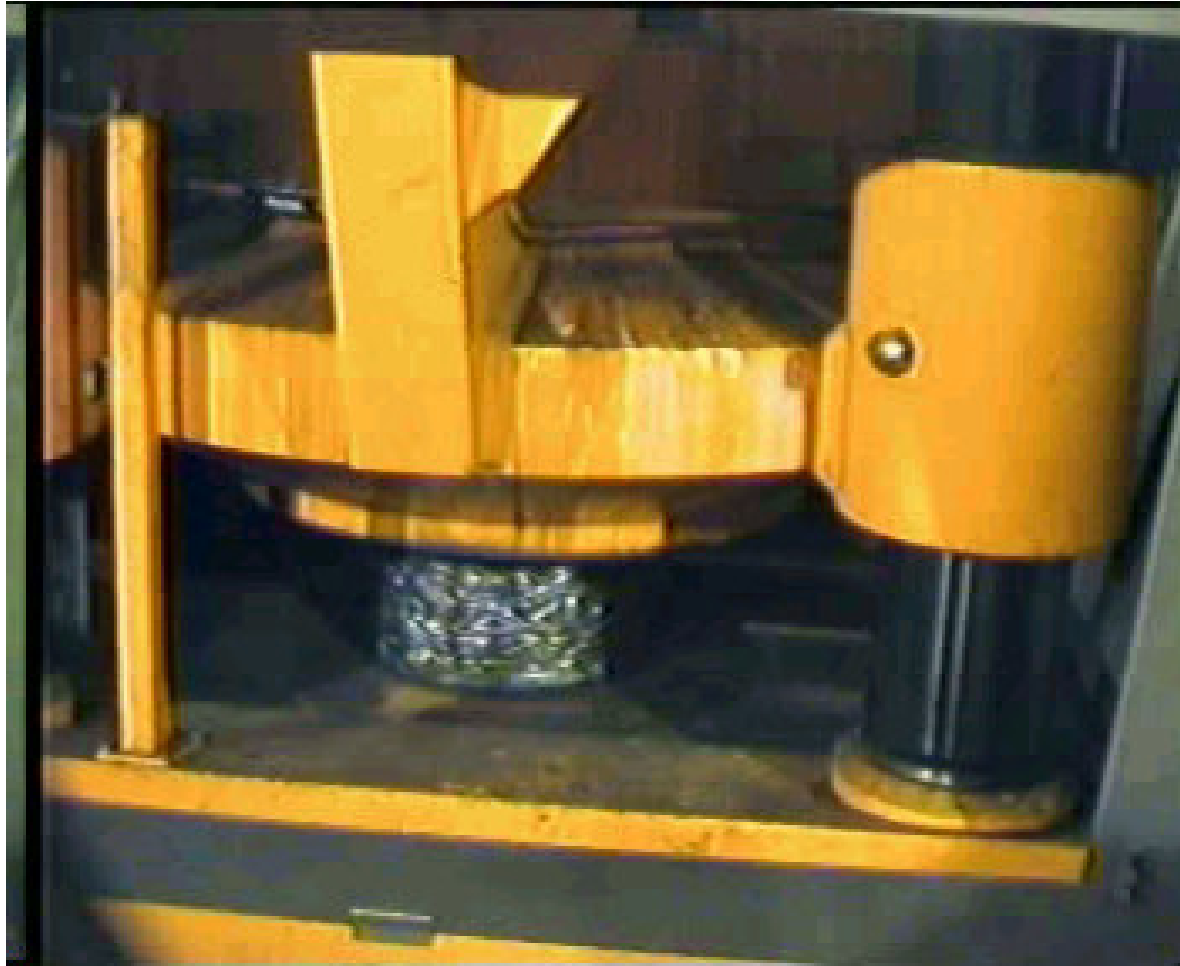
Supercompactor in the Hot Cell

- **Compaction Force
20 MN („2.000 te“)**
- **Volume Reduction
Factor 3 - 10**

External Treatment in a Hot Cell



External Treatment in a Hot Cell

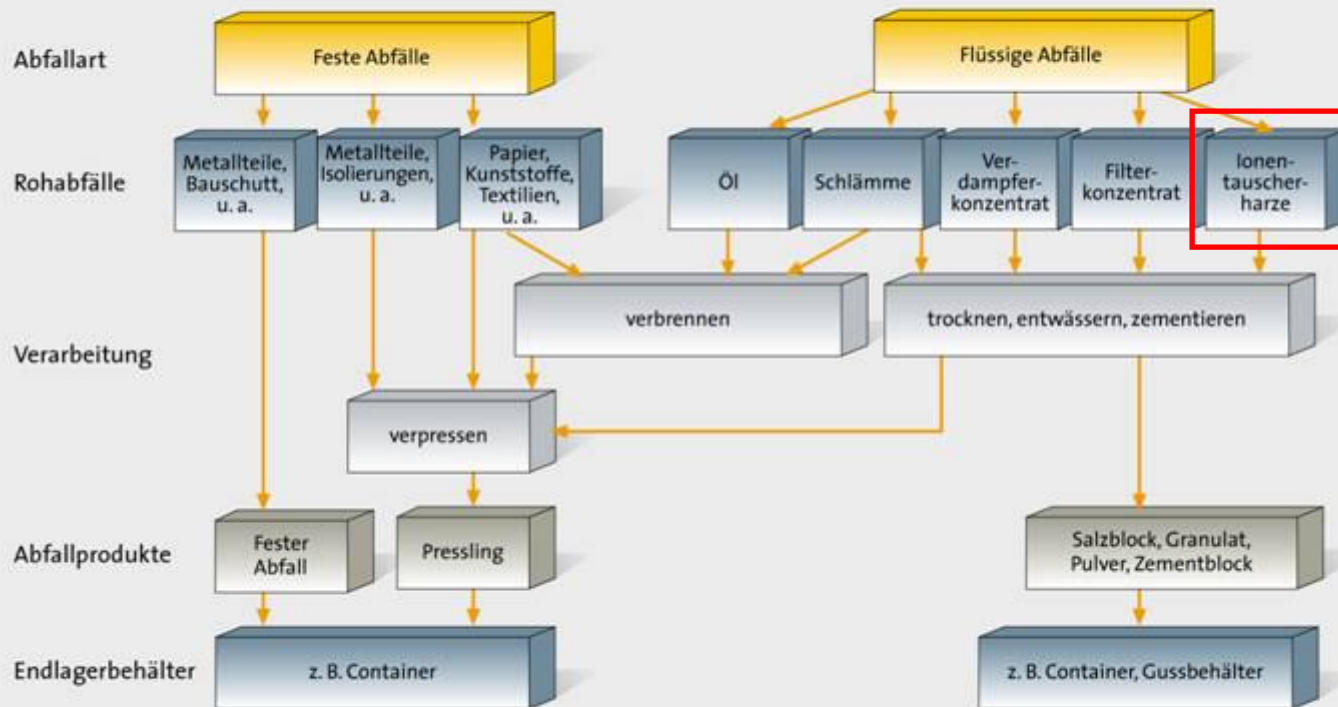


External Treatment in a Hot Cell



Supercompaction

Optimierte Behandlungswege für feste und flüssige radioaktive Abfälle aus Kernkraftwerken



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Treatment of Ion Exchange Resins

- **Bead Resins from Chemical Decontamination:
Conveying into Disposal Casks and De-Watering
using FAFNIR and NEWA**

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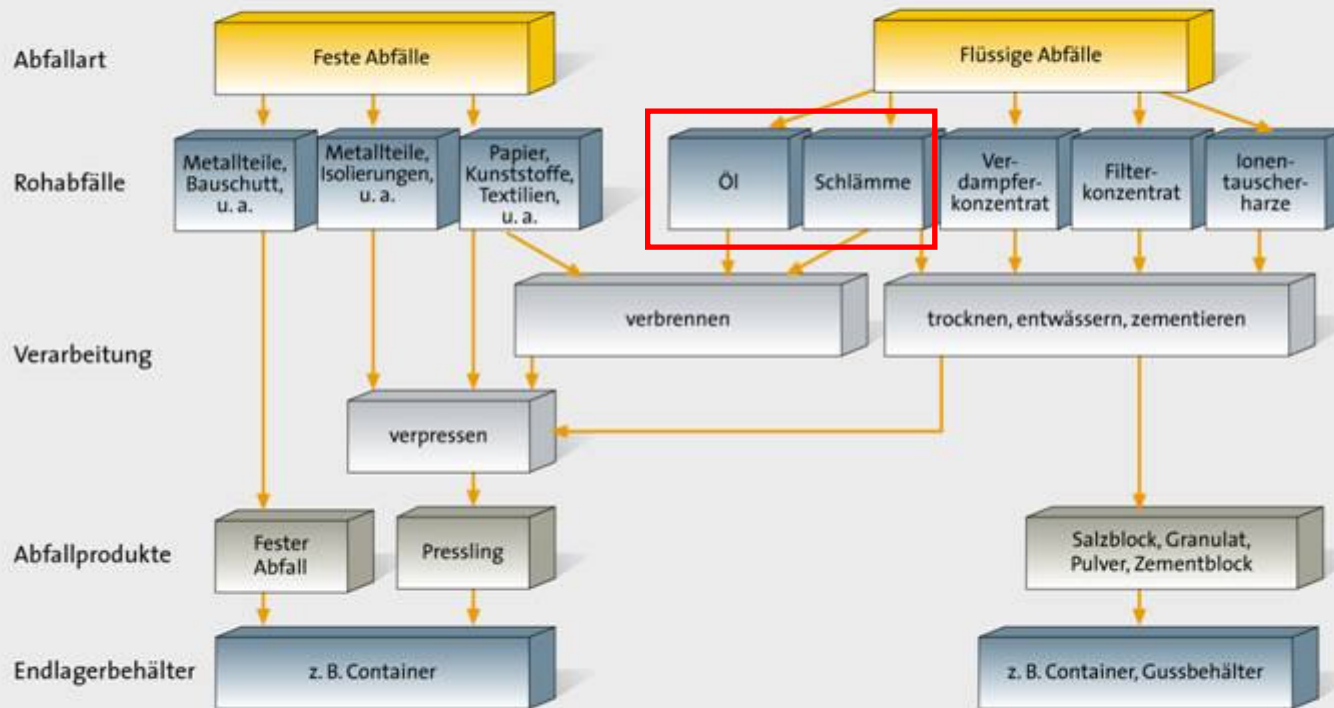


NEWA



Supercompaction

Optimierte Behandlungswege für feste und flüssige radioaktive Abfälle aus Kernkraftwerken



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Oil, Organic Solvents

- Incineration
- chemical decontamination

Concentrates

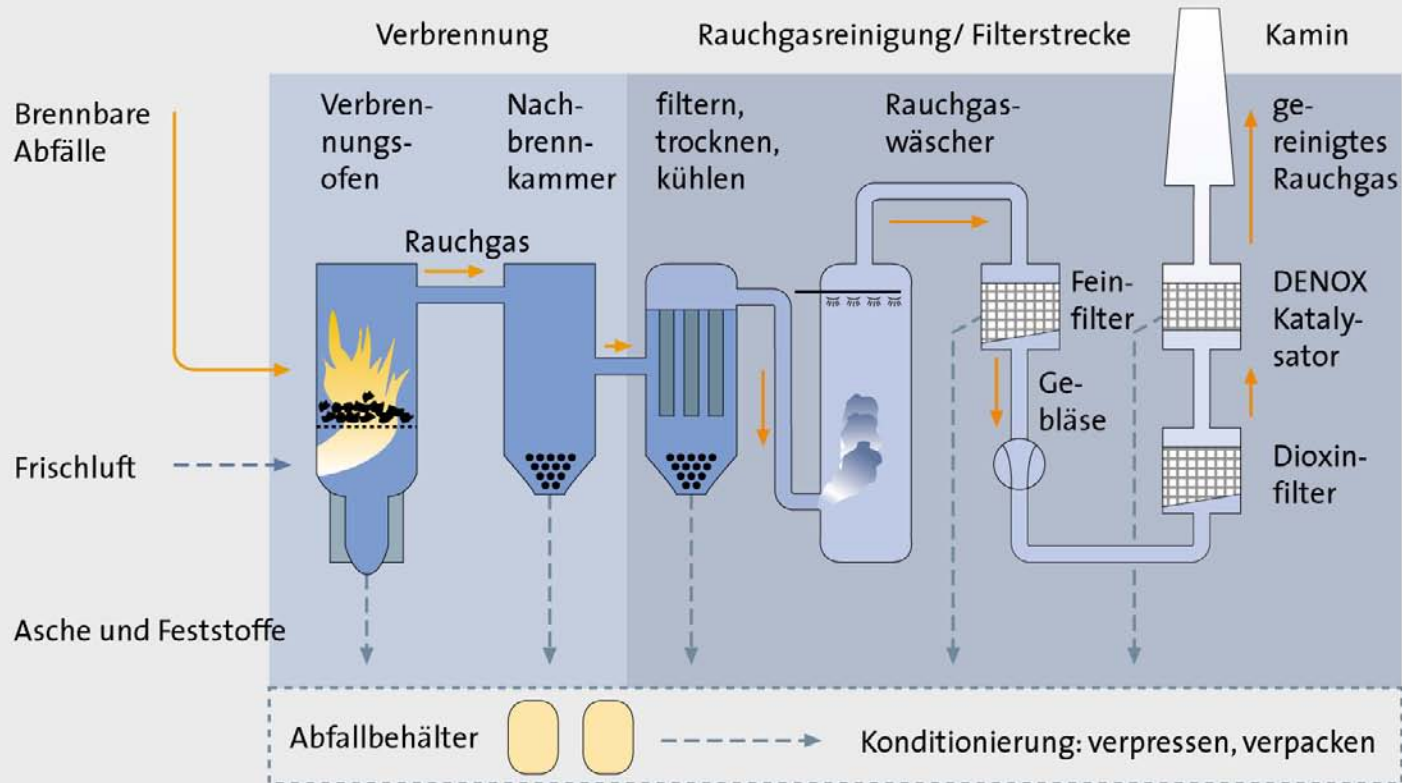
- Vacuum Drying using Favorit Plant
- TORA (RC Juelich)
- Drum Dryer
- Rotating Thin Film Evaporator

Oil, Solvents



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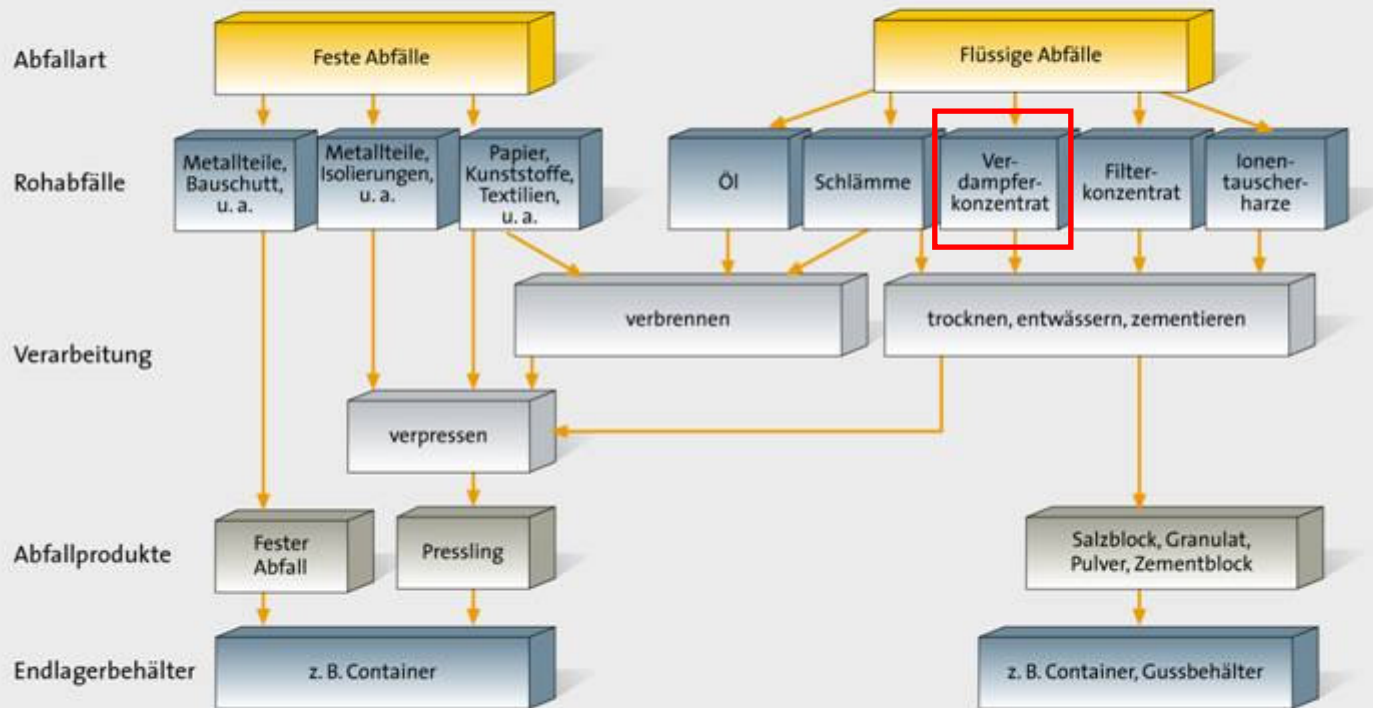
Verbrennungsanlage für radioaktive Abfälle



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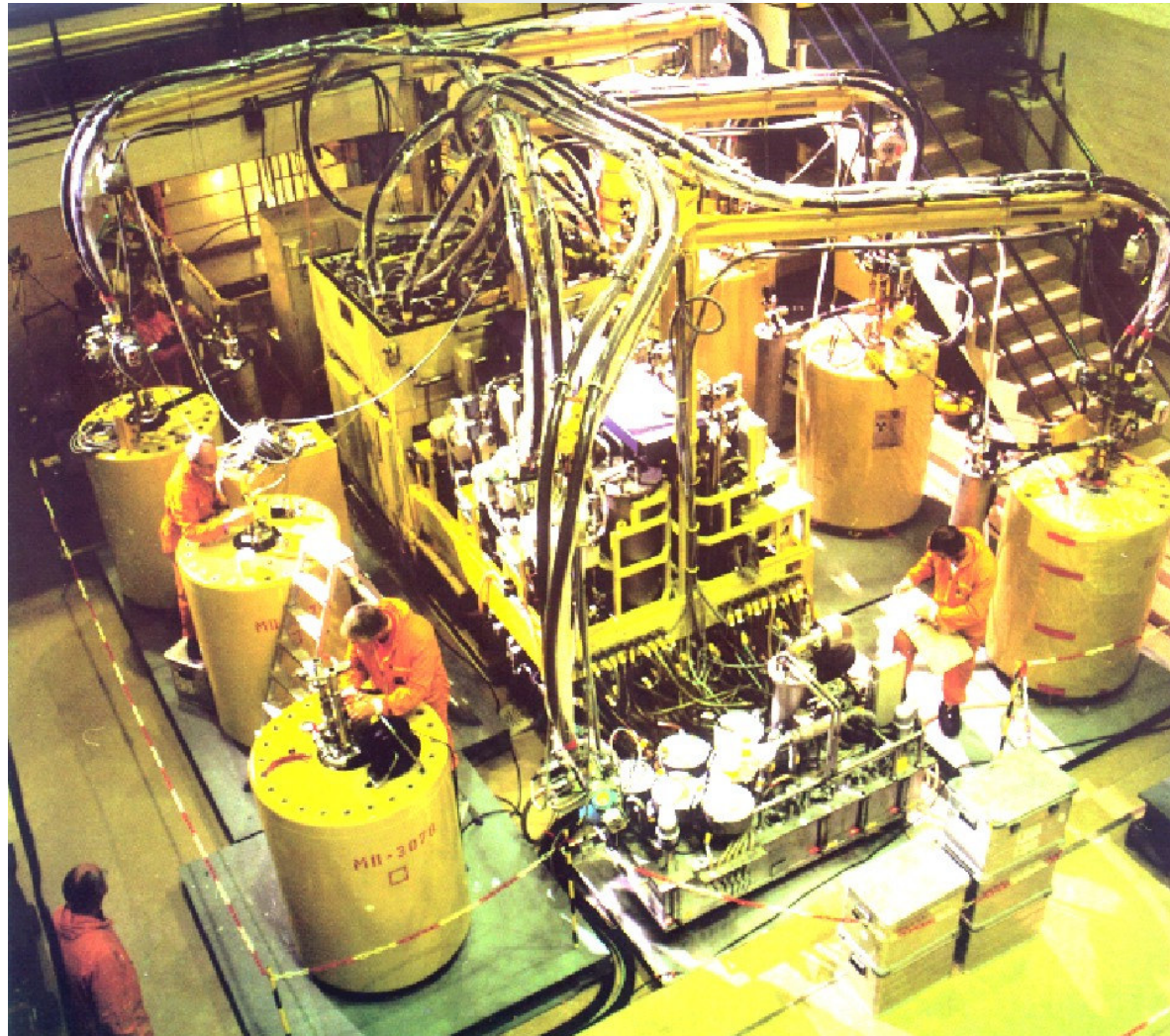
Supercompaction

Optimierte Behandlungswege für feste und flüssige radioaktive Abfälle aus Kernkraftwerken

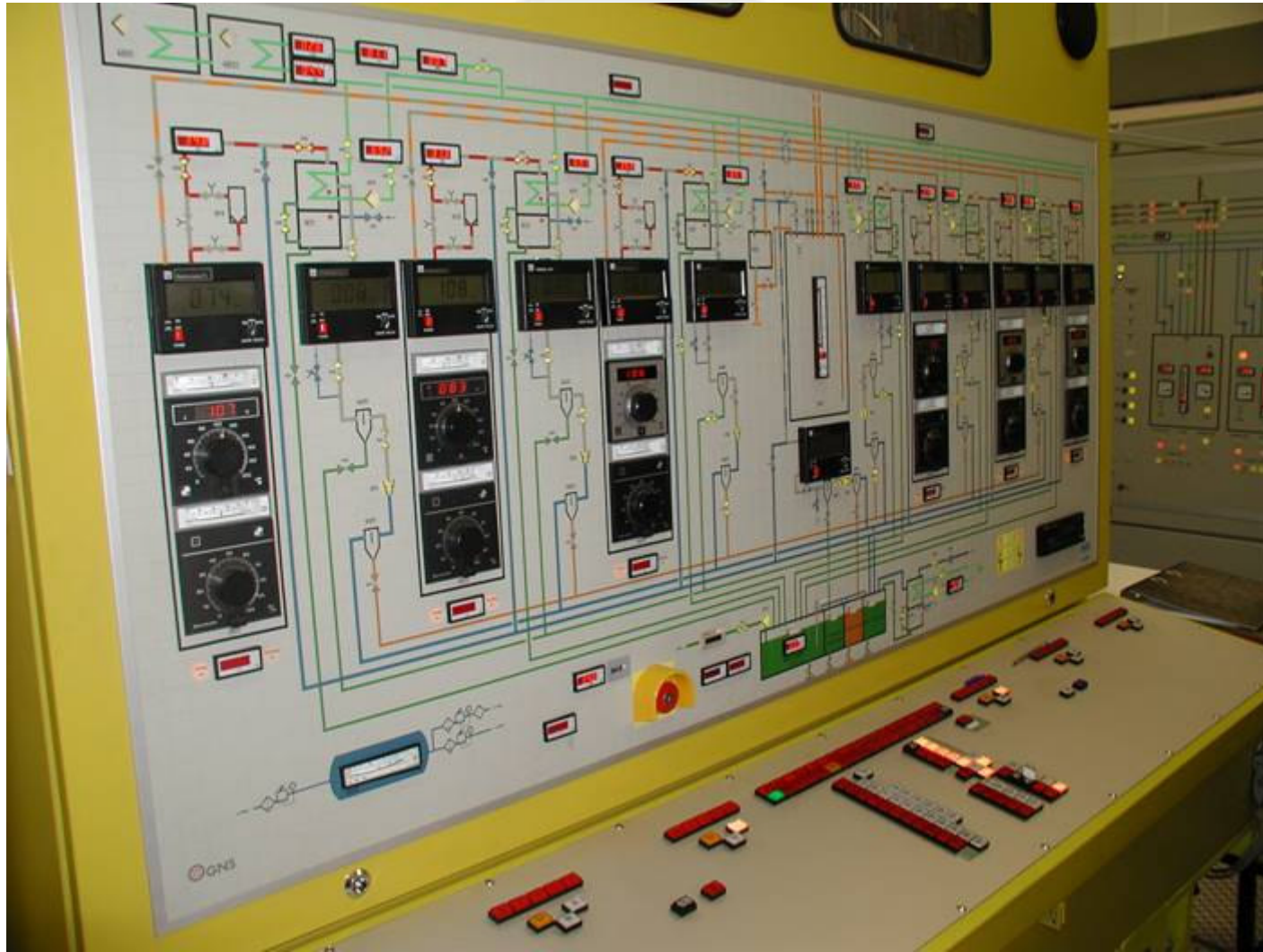


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Thank You
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Attention!

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