

Uranium Floor

– Simple Contamination, Comprehensive Solution –



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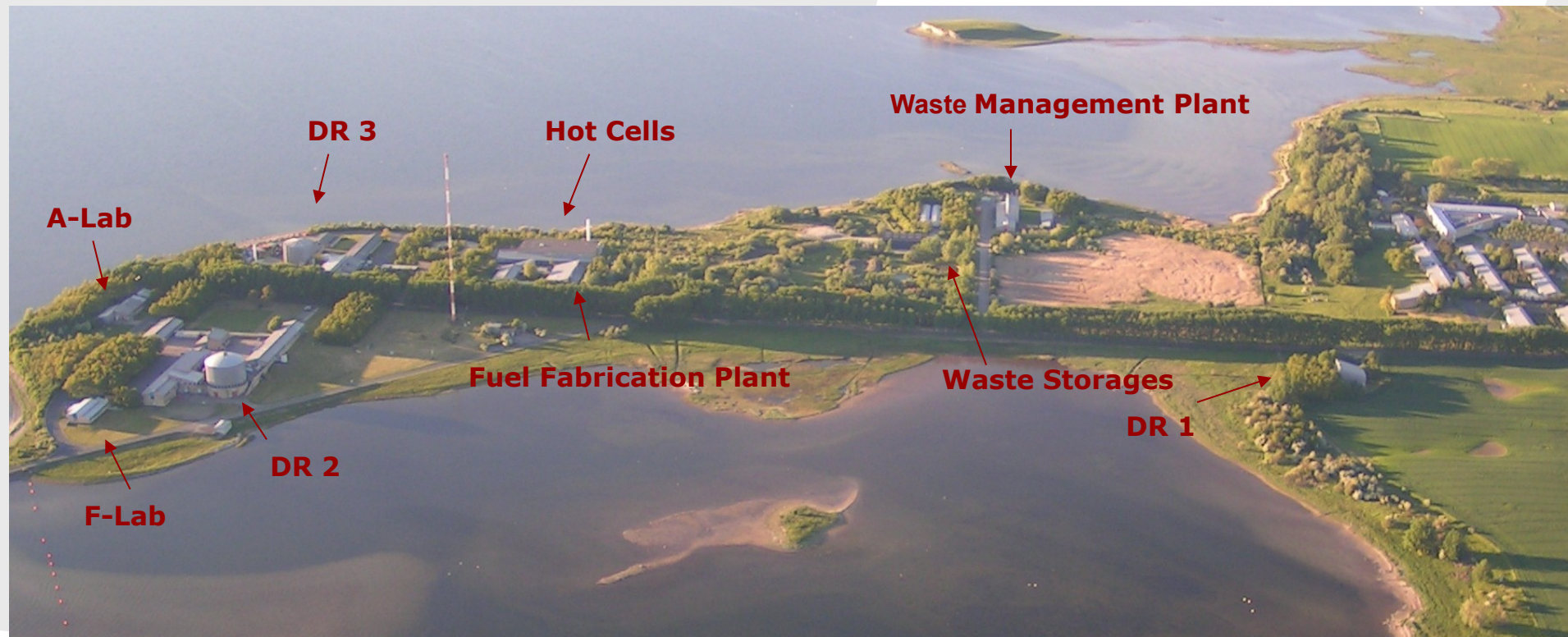
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Location of DD facilities

1 km = ~0,6 mi.



To be decommissioned

- Reactor DR 1 ✓
- Reactor DR 2 ✓
- Reactor DR 3 - ongoing
- Hot Cell facility - ongoing
- Fuel Fabrication Plant - ongoing
- Waste Management Plant - in operation – Project Description for Decommissioning approved



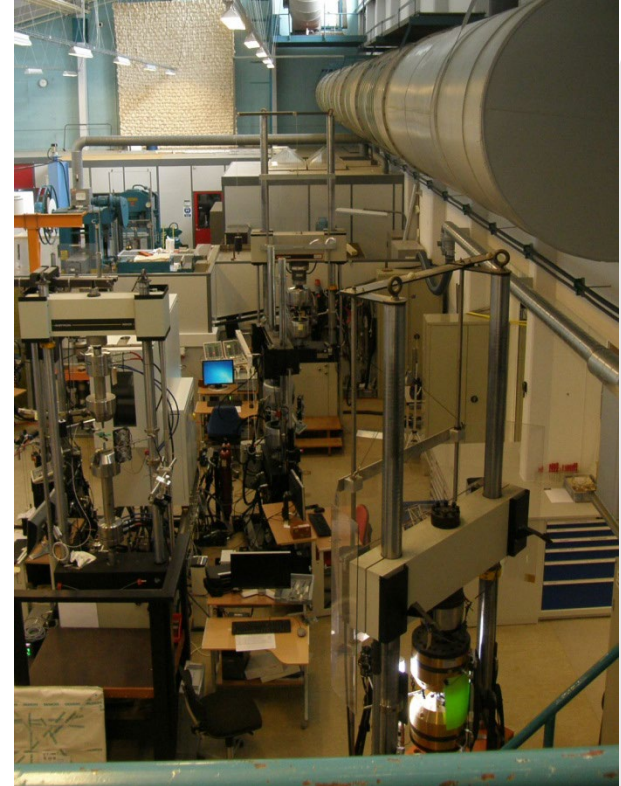
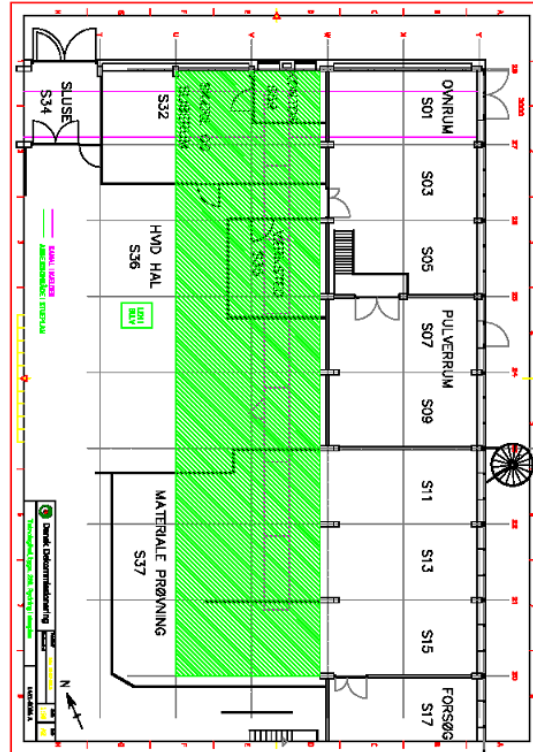
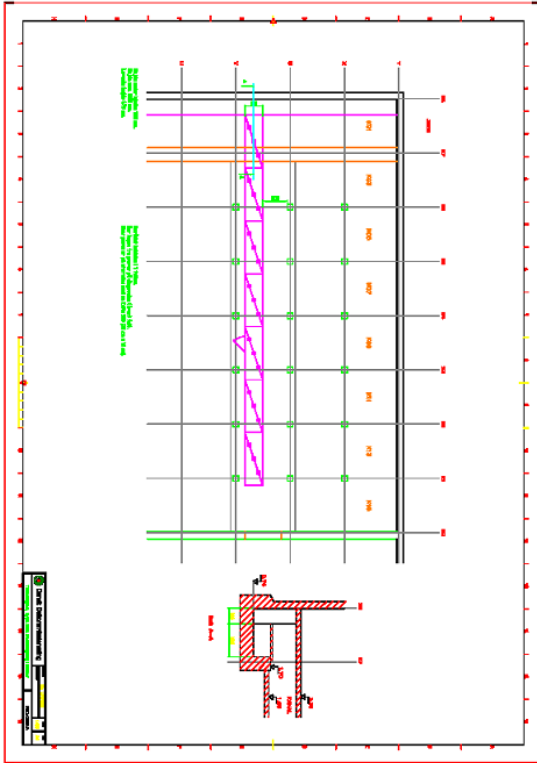


Fuel Fabrication

- The plant produced fuel elements for DR 2 + DR 3
- Decommissioning almost finalised
- Mainly decontamination of walls/floors and removal of equipment, ventilation and drainage systems
- Unexpected contamination in part of the basement

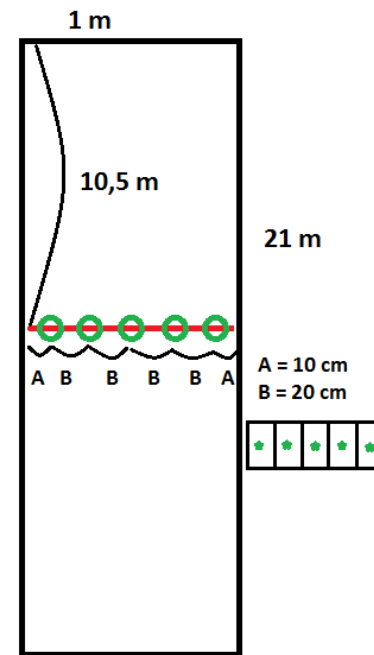
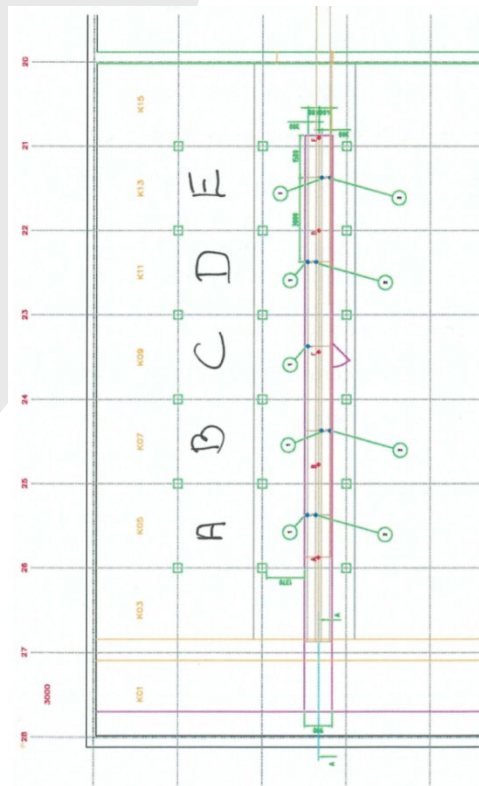
Impacted Area

– The floor is made of Uranium –



Sampling

– Measuring the crawlspace –



Results

– What we found –

1. Surface- α and smear tests

- 0.2 – 0.5 Bq/cm² and \leq 0.002 Bq/cm²

2. Drill samples (increments of 2 cm, max ²³⁵U, \pm 20 %)

- 0-2 cm: 0.185 Bq/g
- 2-4 cm: 0.0331 Bq/g
- 4-6 cm: 0.00179 Bq/g
- 6-10 cm: < PGA

3. Clearance

- 2-4 and 4-6 would pass clearance, as the clearance index [CI] is below 1
 - If they were individually assessed and not part of the building
- 0-2 would require an exemption by increasing CI to 5



Real Results

– What really happened –

1. DD asks for exception from normal clearance [$10 \mu\text{Sv}/\text{yr}$]
 - $\sim 1000 \text{ kg}$
 - Need to eat 120 g or inhale 2 g dust to reach $10 \mu\text{Sv}$
2. Price for removal of top 2 cm
 - $1,6 \text{ million DKK}$
 - $\sim 240,000 \text{ USD}$
3. Standard value of “1 avoided person·Sv” is approx. 1 million DKK
 - So in this case that would be 10 DKK
 - Estimated price is more than 5 orders of magnitude higher
4. Regulators: Remove it all



Cutting Concrete

– To remove just top 6 cm –



Summary

- Argue based on facts
 - Measurements/calculations/evaluations
 - Guidelines describe **in the order** of 10 $\mu\text{Sv/y}$
 - Guidelines describe (...) for **bulk quantities**
 - Guidelines describe **exemption**
- Remember the authorities have a political aspect, as well as economical and scientific
- Solve the problem – not the issue
- Keep the solution simple

