



PROGRESS IN DECOMMISSIONING THE LOW FLUX REACTOR IN PETTEN

Workshop on
"Current and Emerging Methods for Optimising Safety
and Efficiency in Nuclear Decommissioning"

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7-9 February 2017





OVERVIEW

- Introduction
- Status overview
- Waste management approach
- Measuring tool
- Lessons learned



INTRODUCTION LOW FLUX REACTOR



MODULAR REACTOR FOR RESEARCH AND EDUCATION



STATUS OVERVIEW

- Clean up, remove everything which is not part of the reactor
- Adjustment of the ventilation system LFR hall
- Detachment of all wiring to reactor and reconstruction of essential power supply
- Removal of the BNCT set-up
- Removal of the starting source

CLEAN UP



September 2015



February 2016

ADJUSTMENT OF THE VENTILATION SYSTEM LFR HALL



DETACHMENT OF ALL WIRING TO REACTOR AND RECONSTRUCTION OF ESSENTIAL POWER SUPPLY



Before



During



After

REMOVAL OF THE BNCT SET-UP



Before

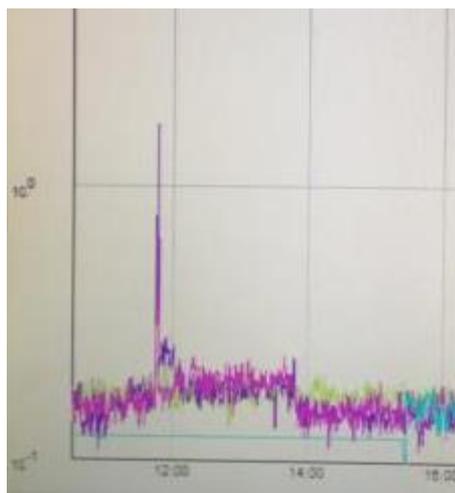


During



After

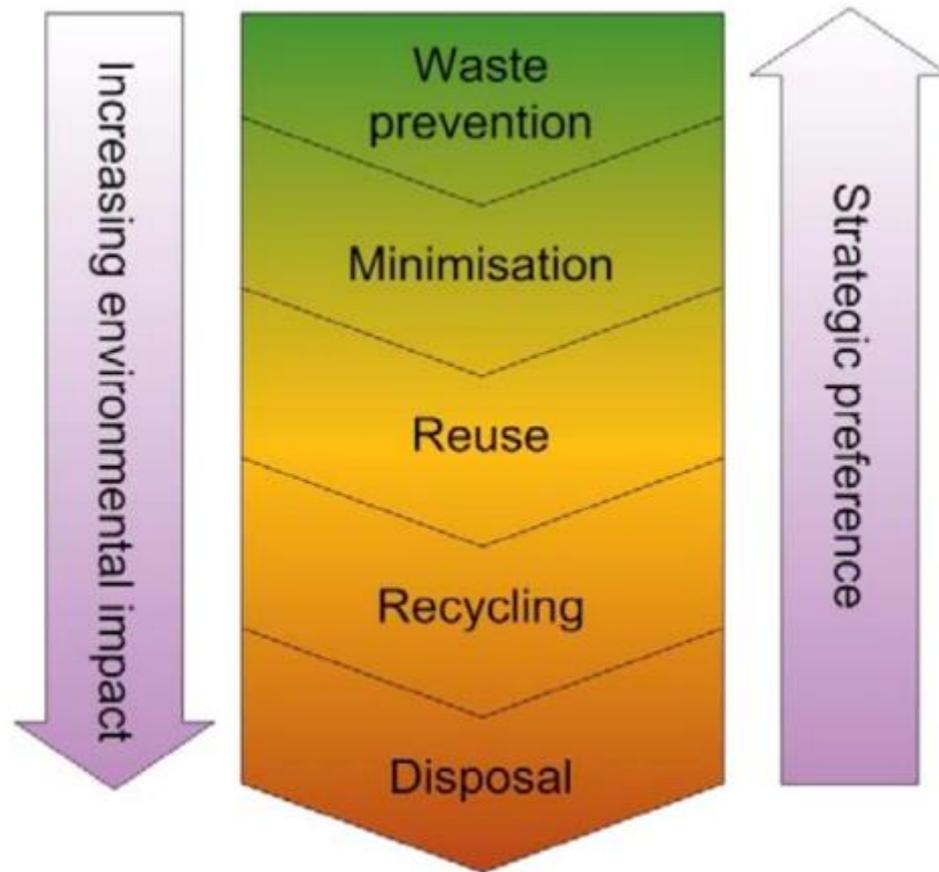
REMOVAL OF THE STARTING SOURCE



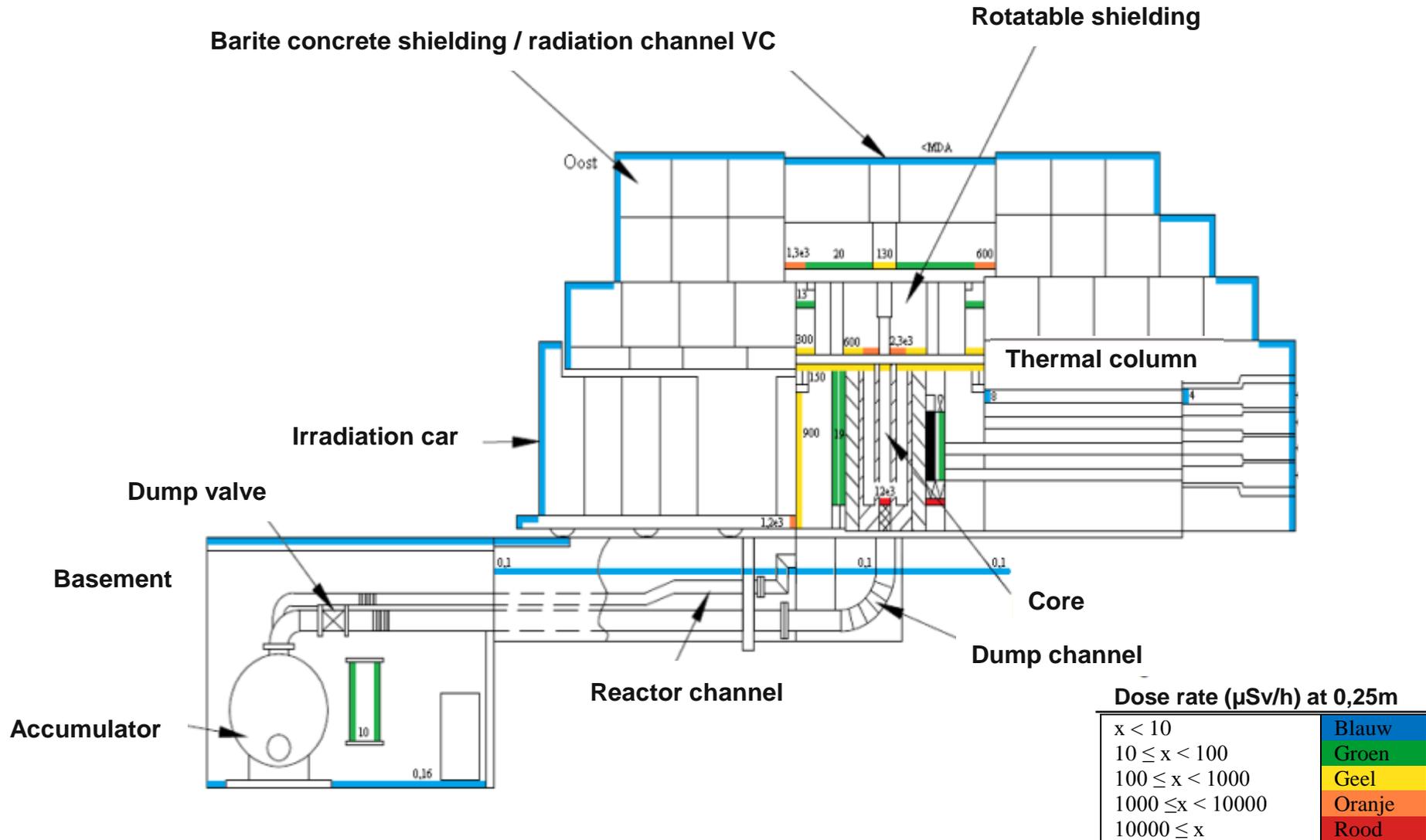
STATUS DECEMBER 2016



WASTE MANAGEMENT APPROACH



CROSS SECTION



ACTIVATION OF LFR

- Shielding ((barite) concrete, graphite, lead)
- Reactor vessel (Aluminum)
- Starting source (Am-Be)
- Technical installation (metal, resin)

Expected amount:

- Radioactive material; 67 tons
 - Barite concrete 45
 - Graphite 6
 - Concrete with steel 7
 - Steel/Stainless steel 2,5
 - Lead/aluminum 1,5
 - Concrete (foundation) 5
- Principally low radioactive waste



TRACK AND TRACE

- Digital track and trace of all disposed elements
- Tablet device for entering data and pictures



WASTE CONTAINERS



MEASURING TOOL



MEASURING TOOL



MEASUREMENTS

- Differences between 2 types of barite concrete (old & new) can be measured.
- Measured values:
 - Free release barite concrete old: 50-60 nSv/h
 - Free release barite concrete new: 80-90 nSv/h
- The Petten site, in the dunes, has a very low back ground radiation.



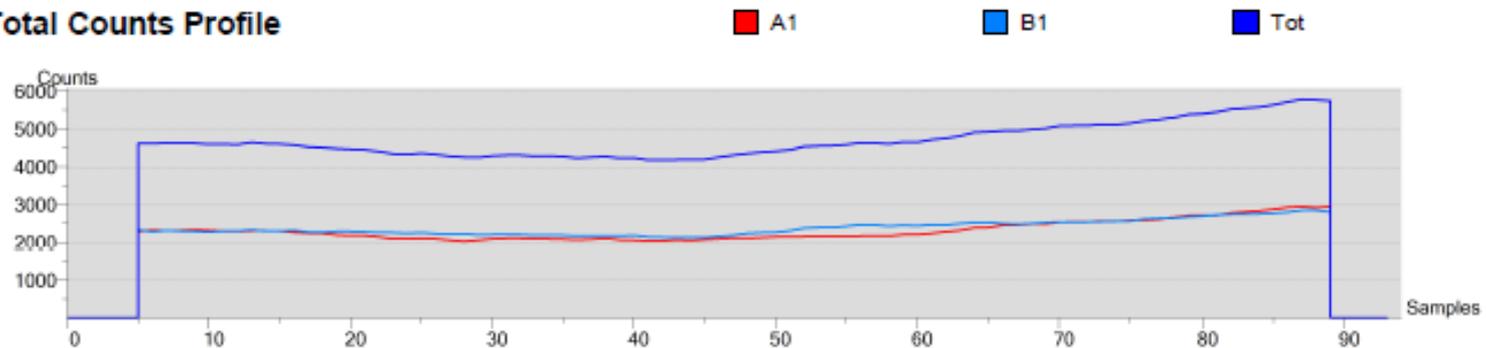
FINAL MEASUREMENT BEFORE LEAVING THE SITE: GATE MONITOR



GATE MONITOR MEASUREMENTS

- The gate monitor can measure an increase of 10 nSv/h.
- Three trucks have been measured without any problem:
 - Two with concrete, stones and sand
 - One with metal waste

Total Counts Profile



LESSONS LEARNED

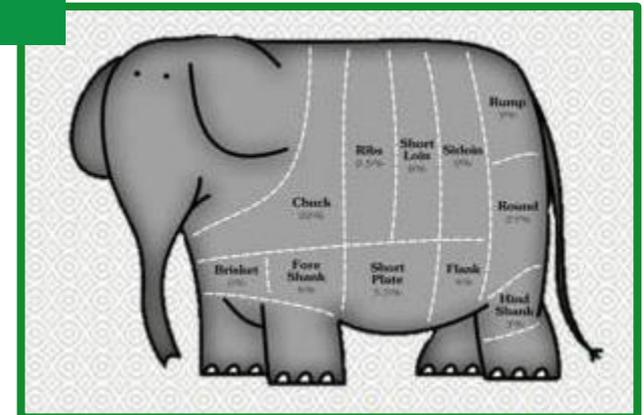
- Start cleaning up the site under regular operational conditions. (All persons responsible are still present).
- Experience and knowledge of operation and maintenance is very useful in planning dismantling activities. Don't wait too long after shut down with actual dismantling.
- Conventional safety is as important as radiological safety. The tendency is to focus on the radiological aspects.
- Don't underestimate the time for procedures, both internal and external.
- Ensure certain flexibility in your permit for changes



THE SIMILARITY BETWEEN DECOMMISSIONING AND EATING AN ELEPHANT?

When eating an elephant
take one bite at a time.

Creighton Abrams



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QUESTIONS???

