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

- Increasing environmental impact
- Waste prevention
- Minimisation
- Reuse
- Recycling
- Disposal
- Strategic preference

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**CROSS SECTION**

Dose rate (µSv/h) at 0,25m:

- $x < 10$: Blauw
- $10 \leq x < 100$: Groen
- $100 \leq x < 1000$: Geel
- $1000 \leq x < 10000$: Oranje
- $10000 \leq x$: Rood

- Barite concrete shielding / radiation channel VC
- Rotatable shielding
- Thermal column
- Core
- Dump channel
- Reactor channel
- Accumulator
- Basement
- Irradiation car
- Dump valve
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 background 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
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
ACKNOWLEDGEMENT

NRG LFR decommissioning team:
Benno Haverkate, Michel Kok, Rob Kramer, Arco Lameree, Guido Visser, Karlijn van de Wagt.
QUESTIONS???