

**DECOMMISSIONING OF THE
KFA LABORATORY BZL
PLANNING AND FIRST RESULTS**

BY

POTT, G.; BÜCKER, H.J.; WETZEL, H.

CONTENT:

- DESCRIPTION OF THE LAB.
- PROCEDURE AND TIME SCHEDULE
- WASTE - AMOUNT
- RADIATION ACTIVITY,
COMPOSITION OF NUCLIDES

HZ
03/96

European Working Group; Hot Laboratories

Petten 14./15. May 1996

1) Introduction

After more than 25 years operation of the KFA Hot Cell Laboratory BZL (Blei-Zellen-Labor) it was decided to close the laboratory in 1995. Some of the equipment shall be transferred to an other laboratory, but the major part of the installation should be given to final disposal. Finally the decommissioning should be carried out. The project will be done in 3 phases.

Phase 1: Remouval of samples, fuel, equipment and preliminary decontamination.

Phase 2: Planning and safety report for decommissioning, measuring of the contamination level at the different locations for calculation of the amount of waste. Licensing procedure.

Phase 3: Final decontamination, decommissioning of the cells, sample storage, other installations (e.g. transport systems, ventination system), decommissioning of the building.

2) Description of the laboratory

The laboratory was constructed in several sections over a periode of about 10 years. The three different labs (BZ 1, BZ 2 and BZ 3) and a smal building with offices and changerooms has been operated by 25 people (fig. 1). Examinations on PWR fuel pins, HTR fuel balls and PVS have been carried out.

BZ 1: Lead shielding (10 - 25 cm), mainly testing of structure material

BZ 2: Shielding by 40 - 46 cm cast iron, tests with PWR and HTR fuel elements α/γ technique. The equipment was installed in gas tight boxes.

BZ 3: Concrete shielding, 140 cm thickness with a concrete density up to $2,5 \text{ g/cm}^3$, tests on HTR fuel, metallographic examinations, α/γ technique, the examinations were done in gas tight boxes.

More details are given in tab. 1 and fig. 2.

3) Details about the decommissioning work performed up till now

- Phase 1 will be finished by July 1996. This means: removal of fuel and radioactive samples, contaminated equipment, material and components stored over 20 years. The preliminary decontamination of the boxes inside the cells will be finished, so they can be transported to the KFA decontamination plant for final cleaning.
- Phase 2 is delayed by more than 6 months, but will start second half of 1996.
- Waste: For phase 1 about 125 waste drums (200 ltr.) will be filled with filters of the ventilation system, vacuum cleaner bags, PE-foils, contaminated equipment (cut into small parts) etc.. Those parts with high radiation (e.g. equipment for dismantling, fuel sample preparation) have been stored in shielded containers. The total volume will be
 - ~ 5 m³ waste with high radiation
 - ~ 25 m³ waste with low and medium radiation
 - ~ 0,5 m³ irradiated samples of structure material
- The equipment for the examination of structure material was or will be decontaminated, so that the machines can be used in the future inside a controlled area (e.g. machines for impact tests, tensile tests, fracture mechanics, etc.).
- **Time schedule**
 - Removal of samples equipment, decontamination of boxes up to July 1996
 - Final report on the decommissioning of boxes, cells, installations, etc. up to 1997
 - Licensing procedure up to end 1997
 - Decommissioning, contamination control of cells and installation 1998 / 99
 - Decommissioning of the building 2000 / 01

- Costs

- The running costs of the laboratory including reporting licensing etc. will be about 1 Mio DM/year
- Additional costs for the decommissioning will be about 6 Mio DM
- For waste disposal about 10 Mio DM were estimated

The total costs are about 22 Mio DM. Some more details are given in tab. 2.

Tab. 1: The utilization and the contamination characteristics of the Laboratory BZL

Cells BZ 1

Utilization: Mechanical testing of structure material (PVS, Mo, Mo alloys, graphite) also mechanical tests of fuel balls 20 years ago.

Contamination: Co 60, Cs 137, Sr 90, Fe 55, Am 241

Relation $\gamma / \alpha = 100 - 200$

$\gamma / \beta = \sim 2$

Cells BZ 2

Utilization: Dismantling of components, irradiation facilities, handling of HTR fuel balls, heating of HTR fuel elements. Cutting of LWR fuel pins.

Contamination: Co 60, Cs 137, Ce 144, Rh 106, Sb 125, Eu 154, Cs 134, Sr 90, Am 241, Pu 236 etc.

Relation $\gamma / \alpha \sim 40 - 100$

$\gamma / \beta \sim 1$

Cells BZ 3

Utilization: Handling of HTR fuel balls for safety experiments, heating of HTR fuel, experiments for storage in salt-brine, sample preparation for metallographic examination (mainly fuel)

Contamination: Co 60, Cs 137, Sr 90, Am 241, Pu 236

Relation: $\gamma / \alpha \sim 10$

$\gamma / \beta \sim 0,3 - 0,5$

Removal of equipment, samples, fuel	0,5
Decontamination of boxes, transport- and ventilation-system	0,8
Planning of decommissioning, reports, licensing procedure, health physic control	1,5
Decommissioning of cells and installations	3,5
Decommissioning of building	1,2
Waste Disposal	10,0
Running Costs of the lab. during decommissioning period	2,0
Miscellaneous	2,5
Total	22,0

Tab. 2: Cost-calculation (Mio DM) for the decommissioning of the BZL Laboratory



Fig. 1: Laboratory BZL



