

**THE WASTE MANAGEMENT PROGRAM AT VUB-AZ:
AN INTEGRATED SOLUTION FOR NUCLEAR BIOMEDICAL WASTE
MANAGEMENT**

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Due to escalating costs and the lack of acceptance of near-surface disposal facilities, the University of Brussels (VUB) and its Academic hospital (AZ) have developed an on-site waste storage program in collaboration with Canberra Europe.

This programme (fig. 1) is based on selective collection, measurement before decay, storage for decay of short-lived radionuclides, measurement after decay and eventual clearance as non-nuclear waste [1]. It has proved its effectiveness over the past 5 years.

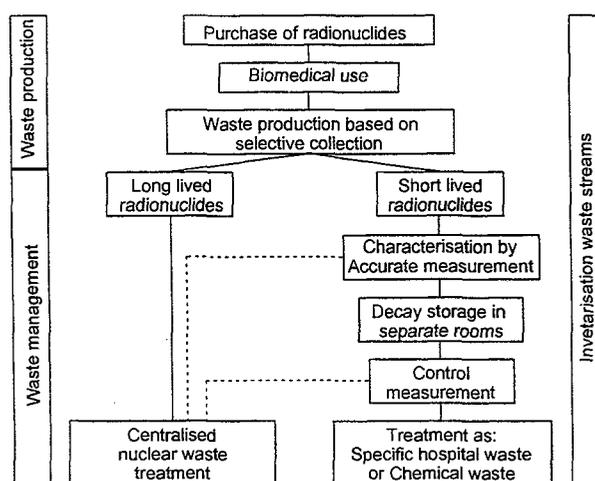


Figure 1: Scheme of the decay storage program at VUB-AZ

Effective characterisation for on-site storage for decay of short-lived radionuclides makes selective collection of waste streams mandatory and requires motivated and trained laboratory staff. Dynamic optimisation of this selective collection increases the efficiency of the storage for decay programme.

The accurate qualitative and quantitative measurement of nuclear biomedical waste before decay has several advantages such as verification of correct selective collection, optimisation of the decay period and possibility of clearance below the minimal detectable activity.

In the research phase of the program several measurement techniques were investigated. The following measurement concept was selected. Closed PE drums containing low density solid waste materials contaminated with small amounts of β/γ -or pure β -emitting radionuclides [2] are assessed for specific activity by the Canberra measurement unit for nuclear biomedical waste, based on a HPGe-detector. Liquid waste containing β/γ -emitters are characterised by the same technique while for pure β -emitting liquid waste a Packard liquid scintillation counter is used. Measurement results are obtained by using the gamma-spectroscopy software Genie-2000. A user-friendly interface, based on Procount-2000 and optimised by Canberra for the characterisation of nuclear biomedical waste, has increased the sample throughput of the measurement concept.

The MDA (minimal detectable activity) of different radionuclides obtained by the measurement unit will be compared with the MDA obtained by different handheld monitors. All results will be finally correlated to the different proposed clearance levels. These clearance levels can easily be met through on-site storage for radionuclides with half-life less than 1 year.

For a waste stream of 1000 packages or more a year, a management software is indispensable. The software "WasteMan" was developed on-site. This user-friendly software takes care of the entire storage procedure and allows a complete bookkeeping of the daily nuclear waste streams. Based on the sophisticated waste collection procedure, the WasteMan software allows both a complete inventory of the storage facility and a full traceability of all waste packages from production to either clearance or disposal. At the same time all necessary documents for either clearance or disposal are generated automatically. The data-exchange between several interfaces enables timesaving administration.

In addition to these technical aspects a general analysis of the economic impact of such an on-site decay program will be made for a medium sized university with hospital, yielding a serious reduction of waste handling costs.

This waste storage program, including the complete measurement set-up and the necessary management software, was recently installed in a second university, proving the general applicability of the whole concept for biomedical nuclear waste.

Many hospitals and other biomedical centres however produce small quantities of nuclear waste for which investments, like measurement equipment and decay rooms, are not cost-effective. The installation of a regional centre for nuclear biomedical waste will be presented here as an alternative solution for this problem.

References

- [1] EGGERMONT, G., COVENS, P., HERMANNE, A. and MEERT, D., Decay management of nuclear waste in university and hospital, Proceedings DOE Low Level Waste Conference, Salt Lake City, 1997
- [2] TAKACS, S., HERMANNE, A., EGGERMONT, G. and COVENS, P., Quantitative determination of activity of pure β -emitters in closed waste packages using γ -spectrometry, Proceedings Spectrum Conference Denver 1998, J. Graham Editor, ANS 700257, Vol. 1, pp 450-455