



Dr. Havenith and Dr. Kettler participated in the 2nd Workshop of the Joint Research Project ENV54 MetroDecom. This project deals with innovative metrological systems for decommissioning. The Workshop lasted 2 days (11-12 October 2016) and was carried out in the Joint Research Centre in Ispra, Italy.

During the workshop, Dr. Havenith gave a talk about non-destructive radiological and material characterization of waste packages present on decommissioning sites. The presentation can be viewed under the following link:

[http://www.decommissioning-emrp.eu/?attachment\\_id=1477](http://www.decommissioning-emrp.eu/?attachment_id=1477)







## JRP-V19 METRODECOM Metrology for Decommissioning Nuclear Facilities

"Underpinned by innovative metrology, nuclear facilities decommissioning will be more safe and cost-effective."

Jiri Suran

## MOTIVATION

Significant reduction in the enormous decommissioning costs of more than one hundred nuclear facilities in Europe by development and implementation of new measurement techniques. Exploitation of the technologies developed in the existing EMRP project "Metrology for radioactive waste management" by implementation in real decommissioning situations.

## IMPACT

**The key direct benefit:** Quick improvement of capacity, accuracy, reliability and efficiency of the measurement, which will result in more reliable decision-making concerning safe release and safe disposal of radioactive wastes into the environment with positive economic impacts.

**The key indirect and long-term benefit:** More accurate and reliable long-term monitoring of safety of the radioactive waste repositories and building of the public's trust in nuclear technologies.

**Environmental and health:** Minimisation of environmental contamination by radioactive materials and better protection of workers and the population against radiation exposure.

**Financial:** Significant reduction of huge decommissioning costs by precise identification of recyclable materials for release (thereby minimising needless use of expensive repositories capacity), typically savings of tens of millions of Euros for single nuclear power plant.

**Public:** Enhancement of public confidence in radioactive waste management during the decommissioning process and in the long-term operation of radioactive waste repositories.

**Legislation:** Underpinning infrastructure enabling effective implementation of legislation contained in a series of EC Directives, EC Recommendations, IAEA Joint Convention and IAEA Safety Standards.

**Stakeholder needs** for benefits specified above are fully addressed; availability of the research results and outputs in actual industrial operations will be ensured by close cooperation with end users and regulators in the field.

**Dissemination plan** includes JRP website, workshops, training courses, conferences, publications, Stakeholder Committee establishment; links to IAEA, DG Energy, ICRP, ICRM, ISO, IRPA, national regulators, waste management agencies, standardization bodies, nuclear facilities, devices producers.

## T/S EXCELLENCE

### Concept

The project will deliver research addressing all aspects of the decommissioning process, i.e. the characterization of solid wastes, pre-selection, free release and repositories monitoring, measurement of thermal power prior to repository storage, and monitoring of wastes and repositories in the long term. A collaborative multi-disciplinary approach will ensure that regulators' and industrial stakeholders' requirements across Europe are met, guaranteeing the integrity and cost-effectiveness of the clearance and disposal processes and improving safety and accuracy.

### Progress beyond the state-of-the-art

The proposed project addresses the needs of the decommissioning process by the development and implementation of new measurement techniques, instruments, standards and reference materials, and by ensuring knowledge transfer to stakeholders.

WP  
1

### Characterisation of materials present on decommissioning sites

Remote mapping of contamination inside nuclear facilities, statistically valid sampling methods, automated in situ radiochemical analysis laboratory.

WP  
2

### Measurement facility for waste segregation

Segregation of wastes for potential free release in the environment or storage in repository, development of automated facility design, measurement and calibration procedures and software.

WP  
3

### Implementation of free release measurement facility (FRMF) on a decommissioning site

Implementation and testing of large-scale industrial prototype eco-friendly shielded FRMF, measurement software improvement, scanning of wastes with heterogeneous density, passive neutron counting.

WP  
4

### Radioactive waste repositories monitoring

Construction and field-trial of gas monitoring systems including prototype of radiocarbon monitoring mid-infrared spectroscopy, development of sensors for repository sites integrity monitoring, construction of acoustic thermometry testing facility for temperature monitoring, design of calorimeter for direct measurement of radioactive waste packages thermal power.

WP  
5

### Development of reference materials and standard sources

New reference materials and standard sources for calibration, validation and testing of devices, instruments and procedures developed in the above WPs.

## RELEVANCE TO EMRP OBJECTIVES

Cooperation among 10 metrology institutes, European Joint Research Centre, 3 unfunded partners (industry and regulatory) and 1 REG.

Official support from 21 stakeholders including 11 collaborators (industrial companies, regulators, universities, policy makers).

Development of metrological capabilities aimed at industrial applications. Innovative technological solutions for sustainable energy and management of natural resources.

A multi-disciplinary approach, integrating national metrology programmes to solve metrological problems associated with decommissioning.

Research addressing environmental challenges related to harmful emissions control and radiation protection. Creating new measurement capabilities to facilitate European standardisation of measurements in decommissioning.

The project fully conforms to the EMRP Outline 2008, section on "Grand Challenges" related to Energy and Environment, and supporting document SRT-v19.

## IMPLEMENTATION AND MANAGEMENT

**Efficiency:** Considerable managerial experience of JRP-Coordinator and WP leaders; high-level specialist expertise of JRP-Partners and REG researchers approved in previous projects; broad experience of unfunded partners in radioactive waste management; contributions of collaborators and access to their facilities will provide the critical mass.

**Quality:** High quality results in terms of accuracy and credibility with field implementation and effective dissemination.

**Balance:** Excellent balance of skills by combining research capabilities of partners, better reactivity, reduced delay in generating results, and improved accuracy of results achieved through cross-checking and comparisons.

**Resources:** Involvement of best capabilities and equipment of 14 partners, investments of industrial unfunded partners in production of prototypes, facilities of collaborators together with balanced price/performance ratio are sufficient to accomplish the JRP objectives.

**Planning:** Human resources, facilities, funding are planned in detail, integrated and cross-linked.

## JRP PARTICIPANTS



CMI  
63pm



CEA  
20pm



ENEA  
39pm



IFIN-HH  
32pm



JRC  
34pm



LNE  
29pm



MIKES  
22pm



NPL  
54pm



PTB  
30pm



SCK-CEN  
10.5pm



STUK  
12pm



ANDRA  
2pm



EDF  
2pm



ENVINET  
24+30pm

Total  
403.5pm