

This project has received funding from the European Union's Horizon 2020 Euratom research and innovation programme under grant agreement No 755480



THERAMIN

project on

Thermal treatment for radioactive waste minimization and hazard reduction

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Why thermal treatment of LILW?

- Thermal treatment could be an interesting alternative to process LILW before disposal
- Thermal processing will
 - Enhance safety
 - Reduce volume
 - Reduce toxicity
 - In many cases enables best possible immobilisation of radioactive components



THERAMIN fact sheet



- **THERAMIN - Thermal treatment for radioactive waste minimization and hazard reduction**
- Objective: Promotion of thermal treatment of low and intermediate radioactive waste prior disposal (LILW)
 - Strategic impact of thermal treatment
 - Demonstration of thermal treatment technologies
 - Disposability of thermal products
- Schedule: 3 year project (June 2017 – May 2020)
- EC contribution: 3,9 M€

Enablers of the THERAMIN project

- Number of beneficiaries: 12 (representing 7 European countries)



- 12 members in the End User Group representing European countries and USA

The main themes of the THERAMIN project

- Review of radioactive wastes that could potentially be thermally treated and available thermal treatment technologies
- Demonstration of thermal treatment technologies for selected waste stream/technology combinations
- Characterisation of thermally treated materials and evaluation of disposability of treated products
- Coordination and synthesis, dissemination and training

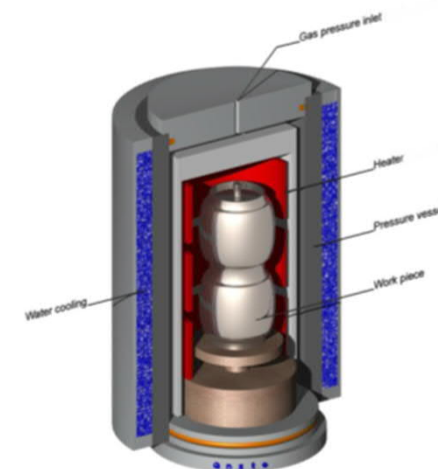
Strategic review of radioactive waste streams and thermal treatment technologies



- Estimation of volumes of LILW
 - Available data collected (primarily from participating countries)
 - Evaluation of LILW suitable for thermal treatment
- Selection of waste materials for demonstrations
- Value assessment of thermal treatment
- Guidelines for waste managers and decision makers on how to select most appropriate waste and thermal treatment option for their particular need

Demonstration of thermal treatment technologies

- Demonstration of several different technologies to treat thermally low and intermediate radioactive waste
- Demonstrated technologies included direct Joule heating, plasma melting, thermal gasification, hot isostatic pressing (HIP), etc.
- Treated products were characterised
- The impact in terms of disposability of thermally treated waste products was evaluated



Schematic of HIP (courtesy of ANSTO)

Thermal treatment technologies selected for demonstrations



* Theramin project did not invest on any demonstration facility *

- Six thermal treatment techniques demonstrated
- Eight waste stream/treatment process combinations
- Part of the demonstrations with radioactive waste, rest using simulated waste materials

Demonstrator	Waste stream	Product
Shiva (CEA/Orano)	Organic ion exchange resin	Vitrified
In Can (CEA/Orano)	Ashes	Vitrified
Geomelt 1 (NNL)	Cementitious wastes	Vitrified
GeoMelt 2 (NNL)	Heterogeneous sludges	Vitrified
Thermal gasification (VTT)	Organic ion exchange resin	Solid residue
VICHR (Vuje/Javys)	Chrompik	Vitrified
HIP USFD	Uranium containing feeds	Vitrified/Ceramics
HIP (NNL)	Sludge/clinoptilolite	Vitrified/Ceramics

Disposability of thermally treated waste products

- Evaluation of thermally treated materials in order to assess disposability
- Identification of the relevant criteria (Waste Acceptance Criteria, WAC)
- Available data on current WACs were collected from partner countries
- Some generic disposability criteria were developed based on examination of these data
 - can be used to evaluate disposability of thermally treated products

Further information

- The THERAMIN project has a web site

<http://www.theramin-h2020.eu/index.htm>

- More information and all public deliverables of the project available for down loading
- Contacts: matti.nieminen@vtt.fi



Thank you for your attention