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CARbon-14 Source Term CAST



Project Presentation (D7.2)

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CO	Confidential, only for specific distribution list defined on this document	





CAST – Project Overview

The CAST project (CARbon-14 Source Term) aims to develop understanding of the potential release mechanisms of carbon-14 from radioactive waste materials under conditions relevant to waste packaging and disposal to underground geological disposal facilities. The project focuses on the release of carbon-14 as dissolved and gaseous species from irradiated metals (steels, Zircalloys), irradiated graphite and from ion-exchange materials as dissolved and gaseous species.

The CAST consortium brings together 33 partners with a range of skills and competencies in the management of radioactive wastes containing carbon-14, geological disposal research, safety case development and experimental work on gas generation. The consortium consists of national waste management organisations, research institutes, universities and commercial organisations.

The objectives of the CAST project are to gain new scientific understanding of the rate of release of carbon-14 from the corrosion of irradiated steels and Zircalloys and from the leaching of ion-exchange resins and irradiated graphites under geological disposal conditions, its speciation and how these relate to carbon-14 inventory and aqueous conditions. These results will be evaluated in the context of national safety assessments and disseminated to interested stakeholders. The new understanding should be of relevance to national safety assessment stakeholders and will also provide an opportunity for training for early career researchers.

For more information, please visit the CAST website at:

<http://www.projectcast.eu>



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Executive Summary

The CAST Project began in October 2013. This document forms the Project Presentation which aims to disseminate information about the project and its objectives to a public audience. The project presentation is available on the CAST website.



Contents

CAST – Project Overview.....	ii
Executive Summary	iv
1 Carbon-14 Helps Waste Safety Assessment	1
1.1 Safety Assessment	1
1.2 Fundamental science.....	1
1.3 Safety case impact	1
1.4 Training Opportunities	2
1.5 Information	2

1 Carbon-14 Helps Waste Safety Assessment

The CAST project aims to develop understanding of the potential release mechanisms of carbon-14 from radioactive waste materials under conditions relevant to waste packaging and disposal in underground geological disposal facilities. The increased understanding provided through CAST should decrease uncertainties in long-term safety assessment and increase confidence in the safety case. The project focuses on the release of carbon-14 as dissolved and gaseous species from irradiated metals (such as steels, Zircalloys), irradiated graphite and from ion-exchange materials.

1.1 Safety Assessment

The CAST consortium brings together 33 partners with a range of skills and competencies in the management of radioactive wastes containing carbon-14, geological disposal research, safety case development and experimental work on gas generation. The consortium consists of national waste management organisations, research institutes, universities and commercial organisations.

The objectives of the CAST project are to gain new scientific understanding of the rate of release of carbon-14 from the corrosion of irradiated steels and Zircalloys and from the leaching of ion-exchange resins and irradiated graphites under geological disposal conditions, its speciation and how these relate to carbon-14 inventory and aqueous conditions. These results will be evaluated in the context of national safety assessments and disseminated to interested stakeholders. The new understanding should be of relevance to national safety assessment stakeholders and will also provide an opportunity for training for early career researchers.

1.2 Fundamental Science

The objectives of CAST will be met through a number of Work Packages that will be coordinated by the UK's Radioactive Waste Management Limited (a wholly owned subsidiary of the UK's Nuclear Decommissioning Authority) under Work Package one. Work Packages two to five undertake fundamental scientific experimental work and will develop conceptual models for carbon-14 release from a range of radioactive waste materials.

Work Package six will relate the results to national safety cases, while Work Package seven will ensure that the project's results and their implications are disseminated to all partners and interested stakeholders. Each Work Package will produce a final report to record the findings; these will be published along with a Final Report assimilating all of the results into one comprehensive overview.

1.3 Safety Case Impact

The results from the CAST project will be directly applicable to organisations that either evaluate or make safety cases for the geological disposal of radioactive wastes containing carbon-14 and will be disseminated to a wide audience. A dedicated CAST website will be established to provide key information for the wider scientific community. Events, such as workshops and courses, will be published on this website.



The main outputs from CAST will include final reports from each Work Package, along with an overall overview report summarising the results and achievements of the whole project. Two workshops will be held as part of the project. The first aims to outline the initial findings from the research and allow interested parties to familiarise themselves with the proposed work and ask questions of the Work Package teams. This will provide interested parties with an opportunity for early communication and engagement. The second workshop will present the overall results and findings of CAST and discuss these with target groups.

1.4 Training Opportunities

In addition to the two workshops, two training courses will be provided for junior participants: the first organised by the Karlsruher Institut fuer Technologie to provide experience in radioanalytical techniques and sample handling. The second will be run by the Centrale Organisatie voor Radioactief Afval NV to provide understanding of carbon-14 generation and wastes, and experience in transport modelling. There will also be opportunities for early-career researchers to exchange with other partners within the project, where appropriate, to provide collaboration with, and training in, other studies within CAST.

1.5 Information

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Project details

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Commissariat a l Energie Atomique et aux Energies Alternatives (CEA), FR
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